Financial Stability Report 2015

National Bank OF BELGIUM

Eurosystem

Contents

Executive summary

The law of 25 April 2014 officially designated the Bank as the Belgian macroprudential authority. The new mission confirms the mandate of the Bank as the institution in charge of the timely detection and monitoring of developments which could harm the stability of the financial system; tasks that were already taken on by the Bank since many years in relation to its monetary policy responsibilities. In addition, the law confers to the Bank the mandate of implementing the measures required to avert instability risks, either via a direct activation of instruments over which it has authority, or via recommendations to the authorities empowered to implement other specific measures.

The range of instruments foreseen in the law is very broad. Capital or liquidity requirements can be imposed in both general or specific instances, depending on the type of exposures, sectors of activity or geographical regions. Quantitative limits on exposures to the same counterparty or a group of counterparties, characterised by tight inter-linkages or common characteristics, can be introduced. Furthermore, the law foresees the possibility to enact specific rules concerning the valuation of assets or securities accepted as collateral for loans, as well as possible restrictions to the distribution of profits so as to increase capital. In addition, the recommendations the Bank may address to competent authorities can propose to introduce ceilings on the amount of loans granted in relation to the value of the asset being financed or to borrowers' disposable income.

The broad scope of the envisaged instruments calls for a clear and transparent communication of the actions the Bank undertakes in relation to its role as the macroprudential authority. The Bank is therefore required to publish and motivate the rationale for its decisions and recommendations, as well as report annually to the President of the House of Representatives on its achievements in the safeguarding of financial stability.

During its first year as the macroprudential authority, of which this report provides an account, the Bank exercised its mandate in a complex environment. This is primarily due to the lack of historical experience and benchmarks for the calibration of the new instruments available to the Bank. In fact, macroprudential policy is largely a new territory: it has been put into practice only in recent years in the EU, and it is still far from being widespread among all the member countries. Its implementation also entails an evaluation of potential interactions with other areas of economic policy which have been in use for many decades.

Difficulties also arise as a consequence of the significant changes in the financial intermediation environment that have taken place in recent years. The precrisis years – when the expansion and diversification of activities were accompanied by increasingly sophisticated organisation and management methods – gave way to a period of retrenchment, characterised by a refocusing on core business activities, and emerging questions on financial intermediaries' traditional business models in times of interest rates approaching zero or even negative values.

Mitigating the negative spillovers on the financial system of the high procyclicality of financial markets is one of the primary aims of macroprudential policy. However, when downturns are accompanied by structural changes, it becomes harder to rely on traditional yardsticks. Thus, in Belgium, the debt increase of economic agents, the rising ratios between prices and yields of financial and real estate assets, and the rate of expansion of certain forms of credit, could indicate that an upward

phase of the financial cycle is already well under way. However, such signals must be viewed in perspective before inferring that they could warrant the introduction of countercyclical solvency or liquidity requirements, as economic growth is still subdued and does not encourage risk-taking or new investment.

All the same, the persistence or – conversely – the development of pockets of vulnerability on the balance sheets of financial institutions justifies the targeted use of macroprudential policy, focusing on the areas of instability. That was the reason underlying the Bank's first two measures in the conduct of its new policy.

Since the financial crisis proved the potentially high volatility of proprietary trading results, possibly leading to heavy losses if the markets reversed their course, the Government decided in 2014, based on the proposal of the Bank, to introduce a structural measure prohibiting banks from engaging in such operations. Some flexibility is, however, foreseen in order to ensure that a strict application of such a measure does not entail negative spillovers on activities supporting the economy, such as the use of derivatives to hedge the financial risks incurred by the banks themselves or by their customers, or market-making activities intended to support secondary market transactions in financial securities, particularly in bonds issued by Belgian public authorities. These market operations are still authorised, if their purpose is directly related to the smooth functioning of the economy, albeit subject to additional capital requirements, if appropriate.

During the past decade, the Belgian real estate market witnessed a very sustained acceleration in house prices and mortgage lending. In light of the lengthening of loan maturities, of the fairly large proportion of loans with a loan-to-value ratio exceeding 80 %, and of a significant number of borrowers devoting a large part of their income to loan repayments – implying a potentially increased risk of future losses for the banks – the Bank implemented a 5 percentage point increase in the risk weights for mortgage loans granted by credit institutions using internal risk models. As a result, the risk weights attributed to mortgage loans rose by 50 % on average, implying a significant increase. Notwithstanding banks' more conservative lending policy in the recent period, and the easing of the upward trend in real estate prices, the Bank still closely monitors the conditions prevailing on this market. It must assess whether the repercussions of a weaker economy on borrowers' ability to repay, or the downward pressure on house prices resulting from a reduction in the tax advantage linked to mortgage loans, warrant further actions to mitigate risks related to mortgage loans.

The growing exposure of financial institutions to the commercial property market also calls for vigilance. The Bank recommends credit institutions and insurance companies to arrange regular appraisal, by third parties, of the quality of their loans and of the value of the collateral, in order to ensure the correct and prudent valuation of real estate assets on their balance sheet.

The growth of mortgage loans in the past ten years is due to a combination of conditions favouring this type of activity, such as low interest rates, a relatively favourable tax system, and the repatriation of funds which had previously been invested abroad for tax reasons. However, factors supporting demand were greatly reinforced by factors stimulating supply, as financial intermediaries tried to take advantage of a still expanding market to increase the volume of their lending.

This strategy reflects the more general search for yield by credit institutions in an environment where the steady decline in interest rates puts increasing pressure on their profitability. Another manifestation of this is the recently renewed interest among banks and insurance companies for euro area government securities offering higher yields than Belgian government bonds. While the investments of banks and insurance companies in Greek government bonds have been substantially scaled down in recent years, these institutions are nevertheless exposed to the contagion effect that a deterioration of the situation in Greece could entail for other euro area sovereign debt markets.

The environment of low interest rates is looking less and less like a transient phenomenon and is establishing itself as a feature which will influence the functioning of the markets in the years ahead. Low interest rates are the cause of what is probably the main current source of risk for financial institutions, namely reduced profitability. Such constraint makes it essential to continue the on-going process of restructuring and to boost efficiency gains without creating operational risks. It also implies a need to strengthen solvency, especially as the new Basel III and Solvency II regulations introduce additional requirements in that respect. In this context, the Bank expects credit institutions and insurance companies to limit the distribution of profits to their shareholders and policyholders if that proves necessary to increase their capitalisation to the levels required to conform to the new rules, to meet market expectations, and to preserve their ability to withstand financial shocks in the long term.

More fundamentally, the current situation in which some risk-free interest rates have become negative affects the core foundations of the financial intermediation activity. For banks, the reduction of the benefit drawn from non-remunerated sight accounts will have to be compensated by a better control of operating costs, by tariffs aligned with costs related to the provision of customer services and by maintaining appropriate interest rate margins. The profitability constraints could also foster the development of new entities providing financial intermediation services outside the scope of the regulations on credit institutions and insurance companies. While this parallel banking sector, known as "shadow banking", offers scope for diversifying funding sources, particularly through investment funds, it is also necessary to assess its potential risks. In addition to the danger of rendering financial flows opaque, this parallel sector could be tempted to take ill-considered positions in terms of liquidity or leverage which, in the event of a shock, could spread by contagion to the banking sector. The Bank encourages and participates in international initiatives towards a better surveillance of these shadow banking entities.

Financial infrastructures will also need to adjust their pricing structure because they will no longer be able to rely on the interest generated by deposits, and will have to turn to a more direct form of revenue, namely fees and commissions. Insurance companies will find it harder to offer life insurance products at attractive prices. Concerning existing contracts, compliance with guaranteed rates of return will require insurers to rely on the still relatively high yields on bonds acquired in earlier years, which implies that they must not distribute in advance the capital gains on those securities. Such interest rate constraint also entails that guaranteed rates of return on new contracts should be better aligned to current market conditions. To this end, the Bank will submit a proposal to the responsible minister to allow a downward revision of the maximum interest rate for individual life insurance contracts, in accordance with the framework defined by the insurance law, while being attentive to avoid distortions of competition. To enhance coherence, a revision of the framework of minimum guaranteed rates of return for group insurance and pension contracts, as governed by the law of 28 April 2003 on supplementary pensions, would also be required.

The recent trend in interest rates is influenced by the accommodative monetary policy stance adopted by the ECB in response to the depressed economic climate which is heightening the risks of deflation. The current aim of macroprudential policy is specifically to ensure that the interest rate policy designed to stimulate economic risk-taking does not indirectly lead to a surge in financial stability risks. Macroprudential instruments are particularly appropriate in this context because they allow to target specific sectors, countries and exposures, contrary to monetary policy, which sets a unique interest rate for the whole euro area. Nevertheless, since both monetary and macroprudential policies have implications for the operating environment of financial intermediaries, the ECB has strengthened, within the euro area, the cooperation between national macroprudential authorities; this cooperation had already been established several years ago via the ESRB for the EU as a whole.

The synchronisation of the various facets of economic policy also needs to involve the macro and micro dimensions of prudential authorities' actions, especially as the same instruments are often used at both levels. From now on, this coordination will take place in a different context, since the supervision of the main euro area banks is conducted directly by the ECB. This new situation will imply more specifically the use of macroprudential policy to prevent the largest credit institutions from accentuating systemic risk via their dominant position on financial markets and the role that they might therefore play in contagion. This concern applies to large commercial banks, but also to large financial infrastructures present in a number of euro area countries, especially Belgium.

The implementation of macroprudential policy is still work in progress. On the operational front, the European arrangements, which not only list the types of instruments that can be used, but also prescribe detailed notification and authorisation procedures, should undeniably be simplified to allow a more effective coordination between the ECB and national authorities. As regards the policy stance to be adopted, it will be necessary to devote further efforts to the monitoring of indicators signaling the need for measures, the calibration of instruments and the assessment of their effect. The initial phase of implementation of macroprudential policy is occurring in an economic climate hardly conducive to excessive credit expansion, however this does not warrant inaction. The current context characterised by a search for yield in an extremely low interest rate environment requires both the introduction of targeted actions to prevent the building up of vulnerability pockets within the Belgian financial system, and the formulation of recommendations or more general measures aimed at strengthening the overall resilience of the Belgian financial system.

Macroprudential report

1. The Bank's new responsibilities with respect to macroprudential policy

In line with a recommendation by the European Systemic Risk Board (ESRB), the law of 25 April 2014[1] appointed the Bank as the macroprudential authority. This new mandate was incorporated in the Bank's organic law as an element of its general mission of contributing to financial stability.

Within this new institutional framework, the Bank is responsible not only for the detection and monitoring of systemic risks but also for their follow-up, including taking policy action when deemed appropriate. This requires the development of a clear macroprudential strategy and operational framework, foreseeing adequate tools for systemic risk identification and assessment, as well as instruments to address identified systemic risks.

In this context, the Bank was endowed with a wide a range of instruments or macroprudential tools which may be activated to mitigate emerging systemic risks. Some of those instruments had been initially intended solely for microprudential purposes, however they may also be used for macroprudential purposes. For example, the Bank can impose additional capital requirements – such as the leverage ratio – or liquidity requirements, either applicable as policies in general or more specifically targeting certain risk exposures. Furthermore, concentration limits can be set for certain types of counterparties or exposures. Other instruments are more macroprudential in nature. Among them, there exist measures restricting the amount of mortgage debt in relation to the value of the property, or the level of debt repayments relative to income. The Bank has however no responsibility to activate this type of instruments in view of their potential distributional impacts. It is up to the Federal government to impose these types of ceilings, on the basis notably of a recommendation of the Bank (see for more information: FSR 2014[2]).

As explained in detail in the Annual report 2014[3] and in chapter 4 of this macroprudential report, these competences are shared with the European Central Bank (ECB), which might also activate macroprudential instruments. Table 1 below provides a list of the main macroprudential instruments targeting the banking sector, including their respective objectives and the authority responsible for their activation.

More generally, the Bank has the authority to address recommendations to public authorities or private entities when their policies or actions could threaten financial stability, thereby broadening its scope to tackle systemic risks emerging beyond the banking sector. In case the concerned entity does not adequately respond to the Bank's recommendation, the Federal government can proceed with the necessary measures.

To ensure the detection and appropriate monitoring of systemic risk, the Bank has the power to request the information and statistical data necessary for the accomplishment of its mission from the institutions under its supervision as well

(1) Law of 25 April 2014 establishing mechanisms for a macroprudential policy and defining the specific tasks delegated to the National Bank of Belgium as part of its mission to contribute to the stability of the financial system.

(2) Collin M., M. Druant and S. Ferrari (2014), "Macroprudential policy in the banking sector: framework and instruments", Financial Stability Review, National Bank of Belgium, 85-97.

(3) See NBB, Annual Report 2014, "Prudential regulation and supervision", Chapter A.4.

TABLE 1 MACROPRUDENTIAL POLICY INSTRUMENTS FOR THE BANKING SECTOR

Category	Objectives	Instruments	Responsible authority (1)
Capital-based	Increased loss-absorbing capacity (resilience)	Countercyclical capital buffer (CCB)	NBB and SSM (2)
		Sector-specific buffers (eg. real estate)	NBB and SSM
		Global and other systemically important institution buffers	NBB and SSM
		Systemic risk buffer (SRB)	NBB and SSM
		Leverage ratio	NBB
Liquidity-based	Increased stability of funding base, increased liquid asset holdings to cover outflows	Net stable funding ratio (NSFR)	NBB and SSM
		Other stable funding requirements	NBB
		Liquidity coverage ratio (LCR)	NBB and SSM
		Other liquid asset buffers	NBB
Lending limits	Direct restrictions on credit supply	Caps on Loan-to-value, Loan-to-income and Debt service-to-income	Federal Government
		Large exposure restrictions	NBB and SSM

Sources: ESRB, NBB.
(1) The ECB has only the possibility to impose stricter requirements.
(2) SSM: Single Supervisory Mechanism.

as from any other entity that could create systemic risks, such as financial institutions not directly subject to regulation (e.g. entities in the "shadow banking" system). Breaches of the legal provisions may result in imposition of penalties in the form of fines.

It is important to keep in mind that financial stability is not solely affected by macroprudential policy, but also by a range of other policies. First, strong coordination is required between micro- and macroprudential policy. Conflicting interests can cause tensions between macro- and microprudential policies as they use the same policy instruments but do not share the same objectives. The microprudential supervisor aims at safeguarding individual banks from risks, while the goal of the macroprudential supervisor is to preserve the stability of the banking sector as a whole. As such, the former tends to take procyclical policy measures to protect depositors, while the latter would take countercyclical measures in order to stimulate the supply of credit to the economy.

There are also strong interactions and complementarities with monetary policy. In the medium to long run, the two policies reinforce each other, both contributing to the ultimate goal of stable and non-inflationary growth. However, price stability-oriented monetary policy can under certain circumstances have undesirable side-effects for financial stability, as business cycles and financial cycles are not always aligned. As long as these side-effects only show up in specific markets, monetary policy would be too blunt to address them, while macroprudential policy is more appropriate given its targeted nature. That argument is even more relevant for the euro area, as macroprudential policy can address idiosyncrasies at national level, in contrast to monetary policy.

Well-designed fiscal and structural policies can reduce the likelihood of macroeconomic shocks and as such reduce the build-up of systemic risk. The experience of the sovereign debt crisis showed that prudent fiscal policy is essential to

maintain confidence in public finances and to avoid feedback loops between sovereign risk and the financial system. On the contrary, fiscal policies such as a favourable tax treatment of mortgage interest payments can encourage over-indebtedness and, therefore, increase vulnerabilities of households to house price shocks.

However, compared to these other elements of macroeconomic policy, macroprudential policy is much more recent. While central banks have long been analysing risk factors that could affect the soundness of the financial system, the need to take specific action, using instruments specifically designed to strengthen financial stability, became particularly apparent after the crisis. Following a conceptual development phase, the implementation of macroprudential policy recently progressed to an operational phase. A number of euro area countries have now introduced macroprudential measures, either to reduce the danger of excessive credit expansion in specific sectors, such as property markets, or to protect against a heavy concentration of risks associated, for instance, with the presence of a few very large operators who gained a systemic position on the markets. For the moment, such experience is limited, because these instruments have only been used for a short period and in a small number of situations. This lack of experience and practice entails that macroprudential policy should be viewed as work in progress. It is therefore advisable for these policy instruments to be applied gradually and with caution.

In view of the importance of the new macroprudential mandate, it is essential to ensure adequate accountability arrangements. To this end, various frameworks have been put in place. First, the Bank has the obligation at least annually to report to Parliament on the performance of its mandate. This report, finalised at the end of May 2015, aims at meeting this requirement. Second, the Bank usually publishes a press release after periodic meetings of the Board of Directors, dedicated to macroprudential policy, to assess the systemic risk outlook and the need to activate macroprudential instruments. Publication requirements aim at fostering transparency and steering expectations, thereby increasing the effectiveness of macroprudential actions. Furthermore, this allows the Bank to signal its concerns based on its risk assessment and to address "soft" recommendations to the whole Belgian financial sector. In 2014 and in the first semester of 2015, the Bank's Board of Directors met on four occasions, 14 May 2014, 7 October 2014, 26 February 2015 and 4 May 2015. Such a frequency is in line with the meetings organised at the level of the Single Supervisory Mechanism (SSM) on macroprudential matters.

Additional governance requirements have been foreseen. For instance, the Governor might also be auditioned at the request of the Parliament or on his own initiative. Moreover, to enhance transparency and accountability, recommendations made by the Bank will be made public, except in cases where they might create potential risks to financial stability. The main recommendations made so far by the Bank are detailed in section 3.2.

2. Risk assessment

2.1 Framework for the risk assessment

Safeguarding financial stability implies a twofold objective for macroprudential policy. The first – cyclical – policy dimension seeks to curb the emergence of systemic vulnerabilities in upward phases of the cycle, or when lending strongly surges. This is achieved by creating buffers intended to absorb aggregate systemic shocks and that can be used to support supply of credit to the economy even during economic downturns. The second policy dimension aims at managing fundamental systemic risks stemming from vulnerabilities such as tight interconnectedness between financial intermediaries, high concentration of exposures of these institutions and the crucial role they play in significant markets, attributing them a "too big to fail" status.

Effective macroprudential policy is not feasible without regular and comprehensive analyses of potential risks for the stability of the financial system and related vulnerabilities in systemically important financial institutions, or in the sector at large. The macroprudential risk analyses carried out in the year under review and as discussed in the Bank's various committees rested upon three pillars, detailed here below.

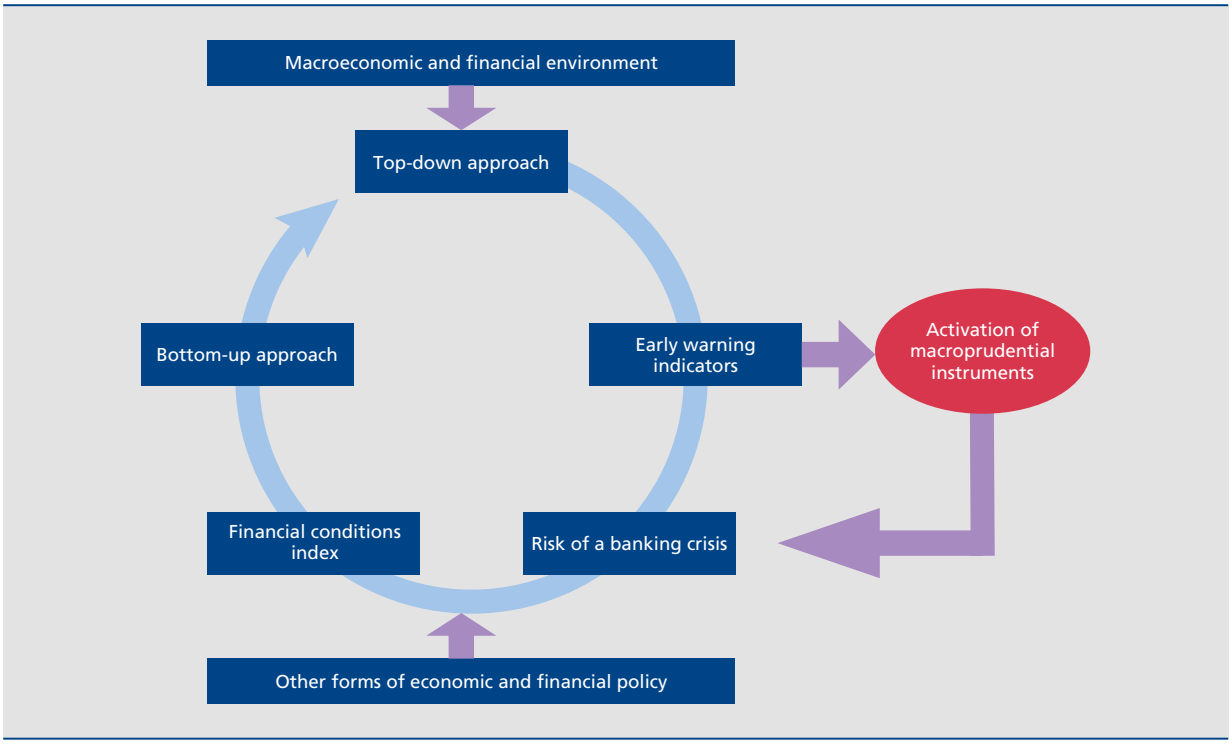
The three pillars consist of a top-down approach, a bottom-up approach, and a model-based identification of the potential threats to the financial stability in the Belgian financial sector.

- The top-down approach is based on analyses of general economic and financial developments backed by the assessment of the relevance of a broad range of economic parameters such as economic growth, macroeconomic imbalances, interest rate levels, the sustainability of public finances, credit growth, the financial position of households and businesses, growth in house prices, etc. This approach includes determining the potential risks for the sustainability and viability of Belgian banks, insurance companies and financial market infrastructures, and the associated consequences for financial stability. This also includes an analysis of the impact of a variety of economic variables on financial institutions' profit and loss accounts, balance sheets or liquidity profile.

- The bottom-up approach aims at highlighting the main points of attention in the ongoing risk analyses in the departments of the Bank responsible for the microprudential supervision of Belgian banks, insurance companies and financial market infrastructures. Such attention points result from the analysis of developments specific to various institutions on an individual basis or of sector-specific challenges, and may or may not be connected with changes in the macrofinancial parameters. Relevant information resulting from market intelligence is also part of the bottom-up approach.

- The third pillar consists in a model-based approach, intended to detect potential threats to the stability of the Belgian financial sector. As a first step, thresholds are identified for a broad range of indicators covering numerous sectors in the economy. Each threshold determines the intensity of the risk signal issued by the indicator for a specific prediction horizon. The methodology used to obtain thresholds, is based on a statistical, conditional moments-based approach, which provides an account of the early warning properties of indicators in predicting banking crises. The information conveyed by the indicators can also be aggregated in a single measure. This can result either from the estimated probability of a banking crisis over a specified prediction horizon obtained from the estimation of logit models, or through a financial conditions index (FCI) calculated on the basis of a series of indicators relating to credit trends, the banking sector, the level of debt in the economy, the property market and current developments in the financial markets. Sub-indices are calculated for each category and are then aggregated into an FCI, weighting them by their importance and accounting for any endogeneity in the risks.

CHART 1 ANALYSIS OF MACROPRUDENTIAL RISKS AT THE BANK



Source: NBB.

The three pillar-based macroprudential analysis forms the basis for prioritising risks requiring further attention, and for deciding on any measures to be taken in regard to supervision policy, such as the activation of macroprudential instruments. To this end, a framework also has to be established for the selection, calibration and assessment of macroprudential policy instruments.

In line with the forthcoming international requirements related to the countercyclical capital buffer (CCB), the Bank is developing a general framework for a CCB for Belgium which will be operationalised during the first quarter of 2016. The CCB targets cyclical systemic risks and aims at strengthening the resilience of credit institutions. Capital buffers should be built up in times when cyclical systemic risks are accumulating (e.g. in case of excessive credit growth) and released when these risks materialise or abate. In the operational framework, the Bank intends to opt for a broad approach which includes not only indicators of credit-to-GDP gaps but also a wide range of indicators considered relevant for signalling the build-up of systemic risks related to excessive credit growth in the financial system. These indicators include, inter alia, measures of credit developments, measures related to overvaluation of real estate prices, measures of structural vulnerabilities (including private sector indebtedness and banking sector leverage) and measures of potential mispricing of risks. The monitoring framework of the CCB is embedded in the broader risk assessment framework and therefore draws on a wide set of information provided by the three pillars of the risk assessment.

Regarding the policy framework established for domestic systemically important financial institutions (D-SIFIs), the Bank's Board of Directors has reviewed its identification methodology in line with the European Banking Authority (EBA) guideline and approved a list of D-SIFIs for the Belgian banking sector. The list will be published in 2016. The Bank will assess – in close cooperation with the ECB – the calibration of potential capital surcharges for D-SIFIs in function of their respective systemic relevance.

2.2 Main factors of risks

Macroprudential authorities have identified four main sources of risk affecting the operating environment of the Belgian banking and insurance sector and financial market infrastructures (FMIs). In a nutshell, the four main risks can be summarised as follows.

As economic growth remained subdued in the euro area, notwithstanding favourable financial market developments and improving financing conditions, prospects for potential growth over the medium term are lower than before the financial crisis, leading to downward pressures on the long-term profitability of financial institutions. At the same time, the rapid decrease of inflation to low or negative levels, curbing further nominal activity and income developments, pushed yields for safe-haven assets to extremely low levels, even below zero for a significant segment of the bond markets. This second factor, which partly results from the accommodative stance of monetary policy, puts further pressure on the profitability of banks and insurance companies and, in that way, tends to intensify search-for-yield behaviour, resulting in risk premium compression and price increases for a broad range of assets. Search for yield is not only directly affecting the resilience of financial institutions through a potential increase in the proportion of higher-risk assets in their balance sheets. It can also have indirect effects, by weakening the financial strength of banks' customers – whether households or corporates – or by favouring the development of less- or non-regulated entities, the so-called shadow banking sector, which could encourage build-ups of financial risks without adequate surveillance. Finally, the Bank continues to monitor very closely developments in the Belgian residential real estate market, following up on the prudential measures taken at the end of 2013 in order to strengthen the resilience of the market and credit institutions against potentially higher-than-expected credit losses on Belgian mortgage loans.

These four risks and their perceived intensity were broadly stable throughout the period under review, with some risks – namely low nominal growth and low/negative interest rates – materialising to some extent, while the intensity of the perceived risk associated with search for yield gradually intensified.

This list is certainly not exhaustive. Direct exposure to Greek sovereign debt is minor in the Belgian financial sector and has, in fact, fallen steeply since 2011. Nonetheless, developments in Greece were also included into the macroprudential analysis, to reflect second-round effects that might occur in specific scenarios and whose contagion effects through financial markets might also spread to Belgian financial institutions and their operations. Moreover, other risks with

a very low probability of occurrence could potentially have damaging effects on the stability of the financial system. This concerns, in particular, operational risks, including cyber and business continuity risks linked to the functioning of financial infrastructures[1]. Likewise, serious reputational and financial risks could result from fraud and misconduct, notably in the form of non-respect of the loyal, fair and professional treatment of clients by an institution or some of its employees. Even if these risks often have their origin at the level of individual institutions, they can very quickly spread to the whole system through the numerous existing interconnections between markets and infrastructures. Given their specific nature, these risks are less suitable to be tackled by targeted and temporary instruments and require instead the enforcement of structural guidelines, compliance requirements and governance arrangements.

The following sections will discuss the four main identified risks. Besides a detailed description of the nature of these risks, their impact on the operating environment of, respectively, banks, insurance companies and financial market infrastructures will be reviewed[2], as well as the potential related systemic risks, either because of a high probability of occurrence of the identified risk and/or because of their potential great impact on the financial system. Finally, each section will also present the measures taken or the recommendations put forward, at the international or national level, to alleviate these risks.

2.2.1 Low nominal growth

Risks

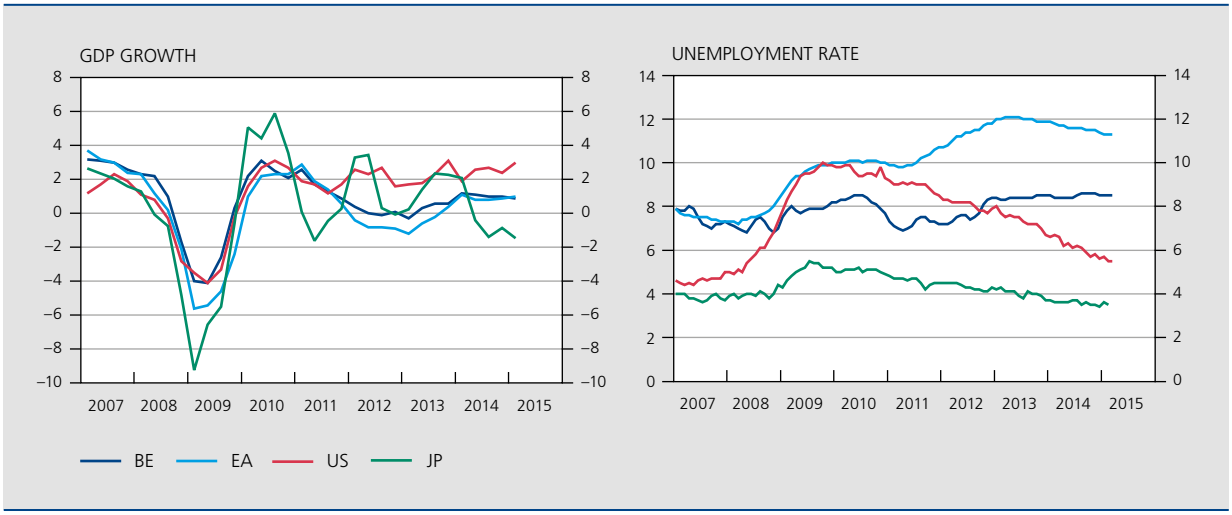
In 2014, the euro area lagged behind the main world economies, taking the Belgian economy in its wake. Although euro area GDP grew by 1 % (1.1 % in Belgium), following a 0.4 % fall in the previous year, activity remained subdued despite the accommodative monetary policy stance, the improvement in financing conditions and the less restrictive fiscal policy. This is partly attributable to temporary adverse factors, such as the increased geopolitical risk caused by the crisis in Ukraine, but more fundamentally it also reflects the economy's low potential growth and hence its difficulty to overcome the legacy of the great recession and the sovereign debt crisis. These effects are still evident in the high and still growing debt ratios of the private and especially public sectors, the slow growth of bank lending to businesses and households, and the persistently high level of unemployment and chronic under-utilisation of production capacity. In parallel with the slackening of activity, inflation continued to fall sharply in the euro area and in Belgium in 2014, thus maintaining the downward trend started at the end of 2011. Inflation in the euro area declined from 1.3 % in 2013 to an average of 0.4 % in 2014, and even dropped to -0.6 % in January 2015 before reaching zero in March 2015, a tendency similar to that observed in Belgium. This marked deceleration was due mainly to a fall in energy prices and softer increases in food prices, but core inflation also declined. Following a series of particularly low inflation figures, a downward correction of expectations occurred over the year as a whole. An unexpected fall in inflation increases the real value of outstanding debt, hampering its reduction. For 2015, economic growth is expected to accelerate somewhat – although at a moderate pace –, but downside risks remain important including as a result of geopolitical risks.

In this economic environment of low nominal growth and uncertain economic prospects, Belgium's non-financial private sector did not increase its borrowing. Overall, bank lending by resident banks – the main source of credit – remained very subdued, particularly to non-financial corporations (NFCs). In fact, in 2014 bank lending to Belgian NFCs declined, in line with developments in the euro area, while lending to households increased.

The drop in net borrowing by corporations occurred in spite of the marked improvements to both price and non-price funding conditions for corporations in the second half of 2014. This primarily resulted from subdued demand for credit, in view of relatively limited capital spending in a low-growth environment and – in the case of large corporations – substitution of bank lending by alternative sources of debt financing, particularly through the issuance of debt securities. A minor improvement in the demand for loans has started to emerge since the fourth quarter of 2014. Growth in net bank lending to households has remained positive, but stabilised at moderate levels, despite the booming gross demand for mortgage loan refinancing from the third quarter of 2014, triggered by the sharp decline in interest rates. The fourth quarter recorded a slight acceleration, possibly due to the anticipation of changes in the tax treatment of mortgage loans. The main factors underpinning subdued growth in mortgage lending are relatively weak demand and tighter (non-price) lending conditions that banks apply on mortgage loans.

(1) See the related thematic article in this FSR "Cyber risk management in financial market infrastructures".
(2) Recent developments with respect to the financial position of banks and insurance companies can be found in the Overview of this FSR.

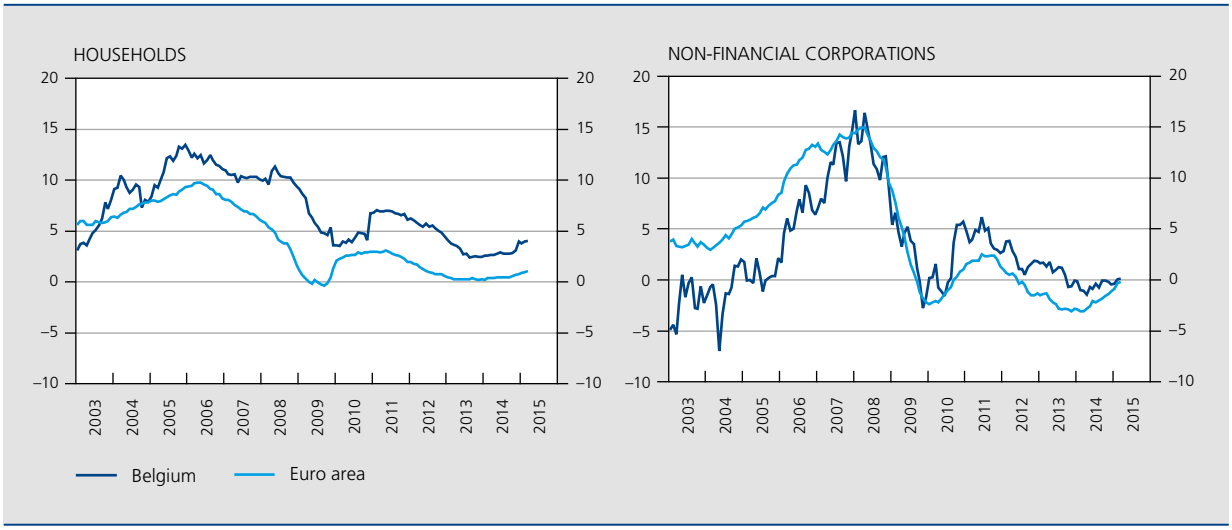
CHART 2 GDP GROWTH AND UNEMPLOYMENT RATE [1]



Sources: EC, Thomson Reuters Datastream, INR.
(1) In % of the labour force.

Against the background of low nominal growth, this moderate surge in lending further pushed up the Belgian non-financial sector's debt ratio – to 114 % of GDP in 2014 according to the narrow definition [1]. This was mostly down to a higher household debt ratio of 58 % of GDP in 2014. Despite the increase of the debt ratio, the related risks are fairly limited, although some groups – young and/or low-income households – might find their loans harder to service.

CHART 3 CREDIT TO HOUSEHOLDS AND NON-FINANCIAL CORPORATIONS [1]
(annual growth rate)



Sources: ECB, NBB.
(1) Loans granted by resident MFIs to residents. Data including securitised loans: for Belgium over the entire period, for the euro area from January 2010 onwards.

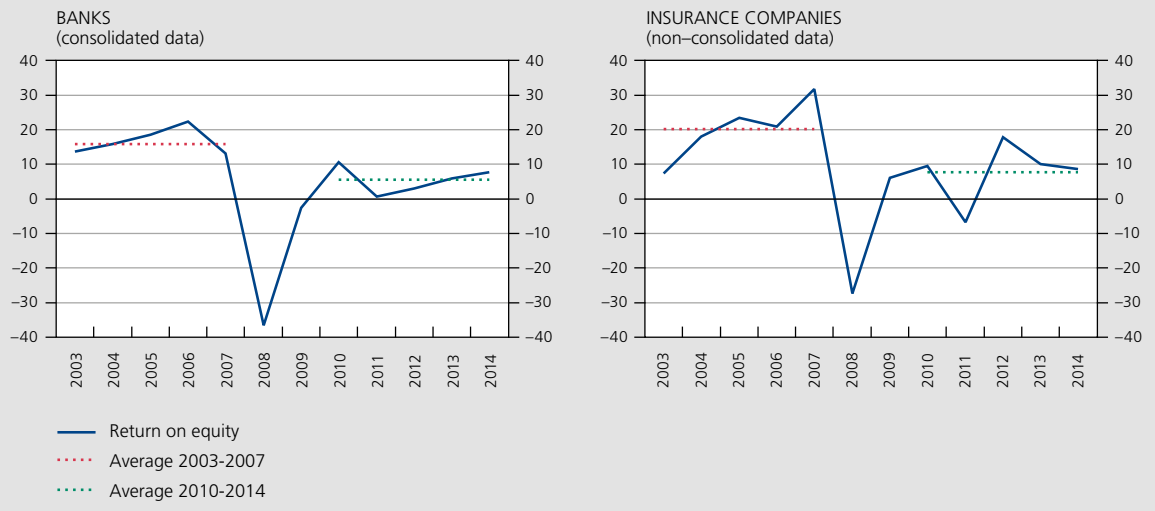
(1) Narrow debt concept = debt securities and loans, excluding loans of non-financial corporations granted by other resident non-financial corporations, "captive financial institutions and non-institutional money lenders" and the non-banking foreign sector.

Impact on the financial sector

Economic conditions in Belgium and in the rest of the euro area are not favourable for the profitability of both banks and insurance companies. For banks, the first impact is the weak demand for loans, which is weighing down interest income, but higher-than-expected credit losses might also ensue.

Weak macroeconomic conditions also continued to put a lid on the demand for life insurance products from insurance companies, as households preferred to hold liquid assets. Premium income in 2014 stalled at the very low levels recorded in 2013, when volumes were squeezed by the increase – up to 2 % – in taxes on premiums paid on life insurance products at the beginning of that year. And although both banks and insurers have taken measures to mitigate the economic impact, continued poor conditions cannot be ruled out and financial institutions might feel compelled to adjust their business models and cost structures even further, to reflect the environment of low nominal growth. Preserving financial stability implies that financial institutions need to have business models in place that ensure sustainable profitability levels, even in more challenging economic circumstances. A further reduction of banks' cost structures, in some cases through consolidation, can therefore not be ruled out in order to align costs with the decreased volume of activity.

CHART 4 RETURN ON EQUITY
(in %)



Source: NBB.

Measures taken by the NBB and international authorities

To address these risks, the Bank has undertaken a range of mitigating actions in close coordination with European authorities.

To strengthen the transparency and quality of bank balance sheets in a low-growth environment and after a profound financial crisis, the ECB and the national supervisory authorities – including the Bank – completed a full analysis of banks' assets, the so-called comprehensive assessment (CA). This exercise was aimed at ensuring that the ECB would start off the SSM on a solid basis. The CA entailed a thorough review of the quality of banks' assets and an assessment of their ability to absorb economic and financial shocks. In Belgium, six institutions were directly involved in the CA, namely Argenta, AXA Bank Europe, Bank of New York Mellon, Belfius, Dexia and KBC Group, while a number of subsidiaries of foreign groups, including in particular BNP Paribas Fortis and ING Belgium, were assessed via their parent companies.

The asset quality review confirmed that the accounting practices of the Belgian banks were generally prudent and in line with international accounting rules, as was evident in particular from the adequate credit risk provisions. A first stress test showed that these banks could withstand a baseline scenario combining the very weak growth expected in Europe in the coming years with the gradual introduction of the stricter solvency rules laid down by the Basel Committee, as the banks remain well above the minimum 8 % ratio for core capital (common equity Tier 1 or CET1) set by the CA methodology. The second test, based on a much tougher scenario, involving a downturn in growth, rising unemployment, a widespread increase in interest rates and a sudden slump in property prices, produced more variable results. Four of the banks were still well above the required minimum ratio of 5.5 % for CET1, but AXA Bank Europe and Dexia failed to meet that requirement. However, a capital increase from its parent company enabled AXA Bank Europe to fulfil the requirements, while Dexia is a special case since the bank is being orderly dismantled and is backed by a state guarantee. The ECB took these characteristics into account, and concluded that the results for that institution did not cast doubts on the plan approved by the EC, so that it did not call for additional measures. By bolstering the transparency of banks' financial statements, the CA has helped to strengthen the banking system by identifying and implementing the measures necessary to guarantee solvency, and finally, to boost confidence in Europe's credit institutions. These conditions will enable the sector to provide more effective support for economic growth.

The Bank also developed a general framework for a detailed evaluation of the structural profitability of Belgian financial institutions through in-depth analyses of their business models. By means of these assessments, the Bank aims to identify at an early stage any of the institutions' strategies which might be detrimental to the financial position and viability of the institution and to financial stability in general. This type of analysis comprises two main stages: (i) an evaluation of the institution's current business model and its viability, and (ii) an assessment of the institution's medium-term sustainability. Therefore, on the basis of well-defined data, the factors driving the profitability of individual banks were assessed against the financial results of each institution. These analyses led to microprudential measures to reinforce in a sustainable manner the profitability of some institutions. The analyses are also a SSM priority.

Finally, in its press releases, the Bank has at several occasions expressed concern about the impact of muted nominal growth coupled with persistently low interest rates on the financial position of banks and insurance companies. As a result, the Bank encouraged financial institutions to continue their restructuring process and their rationalisation programme to enhance their solvency position, while avoiding the creation of new operational risks. Further, the Bank recommended banks and insurers to limit pay-outs to shareholders and policyholders when deemed necessary to sustain their long-term structural resilience and to assess the level of their interest margins. Improvements in the solvency position of financial institutions through retained earnings and/or capital issuance are considered to be key to face the new challenges resulting from the economic environment and the increasing regulatory requirements. The Bank also expects insurance companies to carefully ponder the realisation of capital gains in view of this challenge.

2.2.2 Low/negative interest rates

Risks

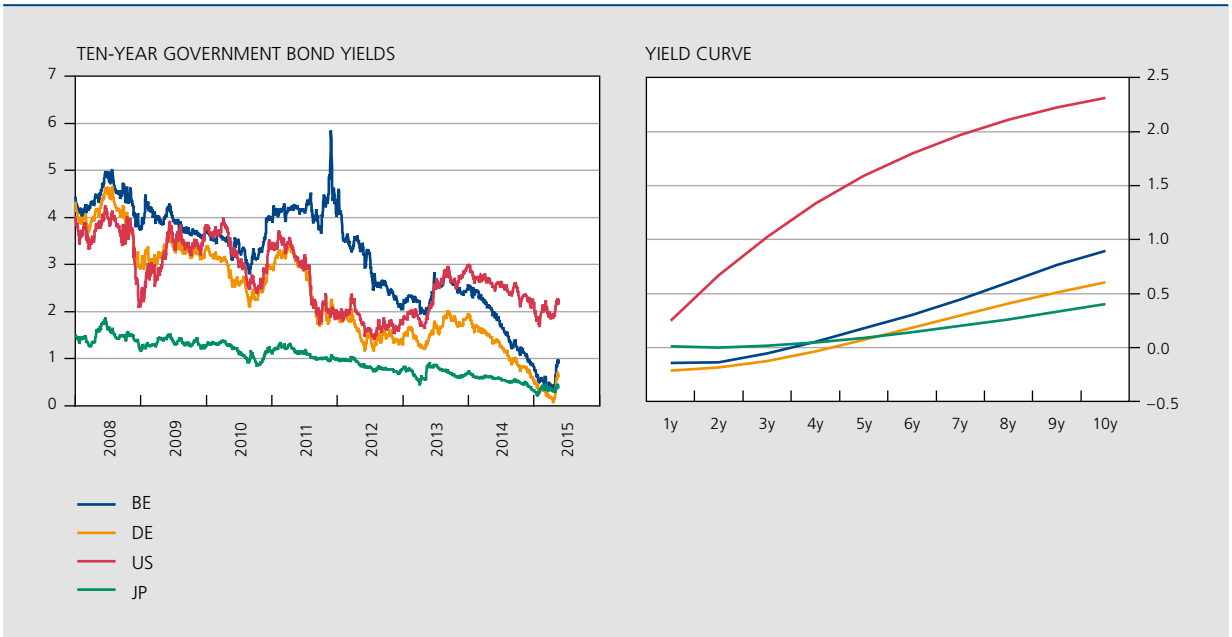
In the context of abundant savings and limited investments in the euro area economies, the prospects of a protracted period of muted growth and very low inflation pushed returns for safe-haven assets down to low (and even negative) levels. In particular, during the period under review, the ECB Governing Council's decision to implement an expanded asset purchase programme led to a substantial flattening of the risk-free yield curve.

Impact on the financial sector

Overall, the repercussions of the economic slowdown were mitigated by low interest rate levels – both short- and long-term interest rates – thus supporting the operating environment of the financial sector. That said, low interest rates adversely affect the profitability of the financial sector, particularly that of (life) insurance companies, and this was an important point of attention in the Bank's macroprudential analyses.

A long period of low interest rates can be detrimental for the insurance sector, particularly for life insurance companies, as liabilities typically have longer maturities than assets and are also often associated with high guaranteed rates of return, agreed to in the past. The outstanding volume of life insurance contracts with guaranteed rates of return is a

CHART 5 YIELDS ON SOVEREIGN BONDS[1]
(in %)

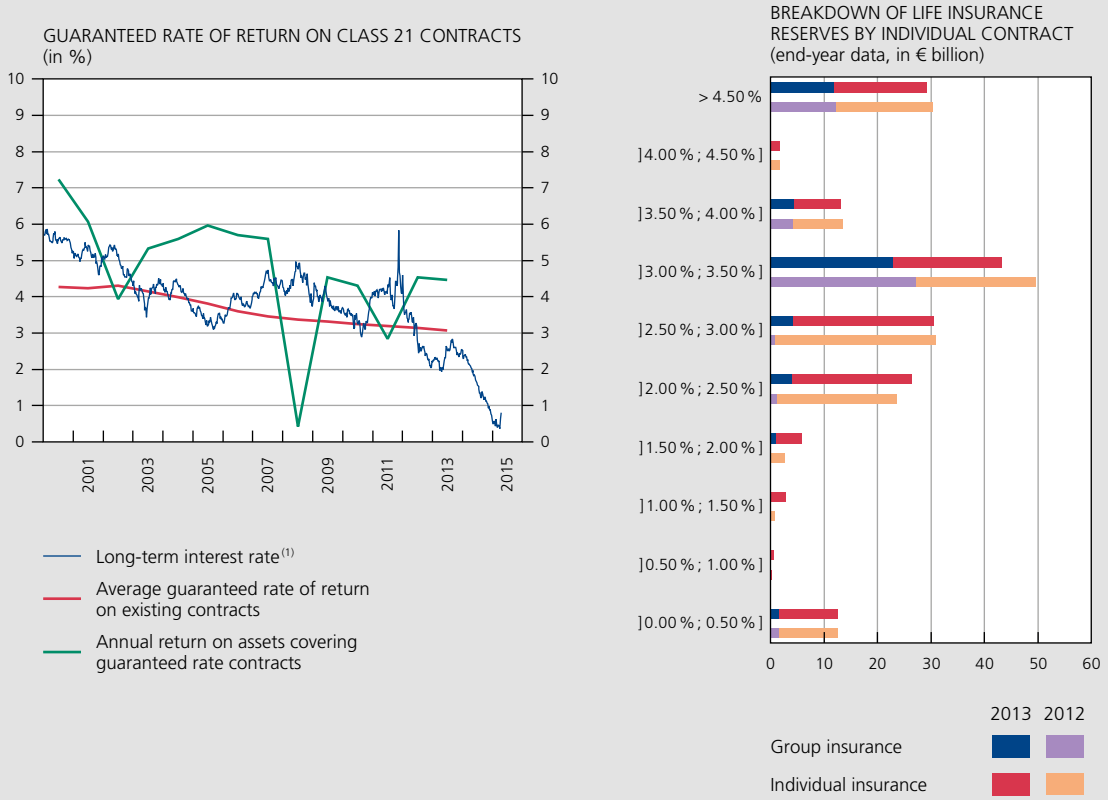


Source: Thomson Reuters Datastream.
(1) Yield curve data at 19/05/2015.

very important risk parameter if risk-free interest rates fall to very low levels. Contracts with high guaranteed rates of return that cannot currently be re-invested in a profitable manner are the biggest risk currently facing the Belgian insurance sector.

Total inventory reserves related to guaranteed-return contracts stood at € 166.3 billion at the end of 2013, the last year for which aggregate data are available. Contracts agreed in the past with guaranteed rates of return on (future) premiums-based reserves that exceed 4.5 % accounted for € 29.2 billion or 17.5 % of inventory reserves. Of these, € 26.1 billion relate to contracts with guaranteed rates of return of 4.75 %, the legal maximum for this type of contract up to June 1999. At the end of 2013, the average guaranteed rate of return of Class 21 agreements amounted to 3.04 %. The annual investment return on assets covering contracts with guaranteed rates of return dipped below the average guaranteed rate of return three times in the past. This occurred during years of severe financial market downturns in 2002 (equity markets) and 2008 and 2011 (the years of the financial crisis and the sovereign debt crisis in the euro area). In 2013, the effective investment return on Class 21 contracts (4.44 %) was high enough to cover the average rate of return guaranteed. However, effective investment returns are showing a clear downward trend in line with financial market developments and if current low interest rates were to persist, significant amounts of high-rated securities (AAA or AA) will have to be replaced by lower-yielding investments. There is a real risk then that the effective return on assets will not be enough to cover the guaranteed rates of return on contracts agreed in the past. In the short term, insurance companies might be able to sidestep the issue on the back of gains on portfolio securities or returns that they can still lock in on bonds purchased when interest rates were much higher. These positive elements need to be considered by insurance companies when formulating a preventive strategy consisting of using these gains to meet their contractual obligations, while guaranteed rates of return or premium payments on new contracts are adjusted to reflect new market conditions. The insurance sector, which is preparing for the introduction of the new Solvency II rules on capital requirements in 2016, proved very sensitive to the low interest rate environment in stress tests, confirming the Bank's analyses. In view of the industry's sensitivity to a long period of low or negative interest rates, the Bank formulated a range of recommendations in the period under review that should help mitigate the risks. These recommendations are described in Section 3.2 below.

CHART 6 GUARANTEED RATES OF RETURN AND BREAKDOWN OF LIFE INSURANCE INVENTORY RESERVES



Source: NBB.
(1) Secondary market yields on Belgian ten-year government bonds (OLOs), weekly data.

Persistently low interest rates also weighed on total interest margins generated by Belgian banks, against a backdrop of intensified competition in a saturated Belgian market following the restructurings that some credit institutions had to undertake after the start of the financial crisis and that led to a reorientation of activities towards Belgium. Credit institutions could benefit to a lesser extent from very cheap financing resources, such as sight deposits, whose remuneration is only partly linked to market rates. At the same time, high-yield securities or loans reaching maturity had to be replaced with others offering lower yields. Meanwhile, lower interest rates also induced many borrowers to refinance their mortgages in the period under review, involving only small prepayment compensations for the credit institutions, which eroded the profitability of a key balance sheet item for many Belgian banks. To date, banks have been able – at least temporarily – to offset the effects of the low interest rates on their interest income by taking compensating measures, anticipating future developments. They cut deposit interest rates, particularly on savings deposits, thereby reducing their funding costs, while still benefiting from favourable borrowing conditions in the wholesale markets. In addition, Belgian banks in general kept their commercial margins on new loans at a high level, notwithstanding intensified competition in these markets. Positive effects on total margins tend to move in tandem with the share of new business – which commands steeper commercial margins – in total outstanding loans. Notwithstanding such challenging conditions, Belgian banks still managed to increase their net interest income in 2014, both in absolute terms and as a percentage of interest-bearing assets. However, such effects are usually temporary. With balance sheets typically having more short-term liabilities relative to longer-term assets, banks benefit from falling interest rates, as the costs of their liabilities adjust more quickly to the new situation than the returns on their assets. Although the yield curve continued to be favourable – albeit less so than in previous years – funding costs are not likely to come down any further, as interest rates offered on savings deposits have hit new lows while, on the other hand, returns on assets should gradually fall. A lengthy period of persistently low interest rates would pare down the interest income of Belgian banks,

which is their most important source of net income. The banking sector's return on equity, which averaged 7.7 % in 2014, might therefore come under pressure in the future. Belgian banks tend to mitigate pressures on net interest income by relying more heavily on fee-based revenue resulting from increasing asset management activities. These developments allow customers to benefit from higher returns.

Institutions that serve as financial market infrastructures (FMIs) – such as international central securities depositories (ICSDs) or custodians – face specific challenges at times of low/negative interest rates. Their clients often perceived them as safe havens in the aftermath of the financial crisis because of their unique risk profiles (no proprietary trading, no corporate lending and no retail activities). Additionally, the low/negative interest rate environment reduced to very low levels the opportunity cost for clients holding these deposits. Therefore, professional market counterparties significantly increased their deposits, leading to a steady increase in FMIs' total assets since the financial crisis. The FMIs then had to re-invest these deposits with other market parties or with central banks.

Measures taken by the NBB and international authorities

Various measures and actions have been taken by the Bank in the context of continuously low interest rates. First of all, business model analysis was used to assess the impact of very low interest rates, especially for insurance companies. In addition, given that the business model of insurance companies – particularly in life insurance activities – is sensitive to low interest rates, stress tests conducted by the European Insurance and Occupational Pensions Authority (EIOPA) in collaboration with national authorities focused on this type of vulnerability. The results identified weaknesses at the individual company level, which have since prompted supervisory actions.

Finally, it should be remembered that the Bank had already decided in 2013, given the low level of interest rates and the forthcoming entry into force of "Solvency II", to suspend the application of the 2006[1] circular which under certain conditions exempted insurance companies from the obligation to constitute an additional technical provision for interest rate risk. Under the said circular, insurance companies could be exempted from constituting this additional provision, intended to ensure the rates of return that had contractually been guaranteed, provided they had demonstrated that the cash-flows generated by their covering assets were sufficient to cover the commitments entailed by the insurance contracts. As from now, any and all insurance companies must establish an additional provision for all contracts offering a guaranteed rate of return that exceeds by 10 basis points or more a reference rate known as "flashing rate", which is defined as being equal to 80 % of the average yield, over the last five years on the secondary market, for ten-year government bonds.

Finally, in view of persistently low interest rates, the Bank will introduce a proposal to the responsible Minister, in line with the framework envisaged by the insurance law, to adjust the mechanism governing the maximum interest rate on individual long-term life contracts, in order to better reflect current market conditions while being attentive to avoid distortions of competition. To ensure coherence, a review of the system of guaranteed interest rates on group insurance and pension contracts established in the law of 28 April 2003 governing supplementary pensions would be required.

2.2.3 Search for yield

Risks

Although the downbeat economic environment requires accommodating monetary policies, the very low nominal interest rates could give rise to renewed excesses on the financial markets and depress profits of financial corporations. To maintain their profitability, these firms may be tempted to seek extra yields offered by lower-quality assets. Such an increase in the risk appetite implies a challenge for central banks, which need to encourage economic risk-taking while ensuring that financial risks do not become excessive. This context has led the authorities to extend their range of instruments by implementing macroprudential policies. This means that monetary policy can focus on its primary objective – the maintenance of price stability – which also has important spillover effects on financial stability, while macroprudential policy can curb the side-effects of the accommodative monetary policy and the accompanying potential risks.

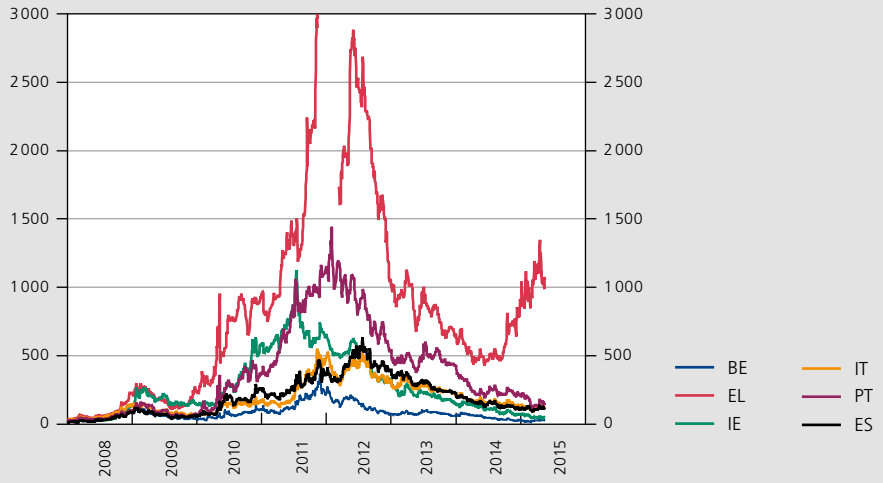
(1) Circular CPA-2006-2-CPA.

Impact on the financial sector

The prospect of a long period of low or negative interest rates is fuelling an increasing risk-taking by investors in search for yield, which could become worrisome when resulting in the build-up of imbalances. Such behaviour could expose investors to a greater sensitivity to sudden changes in global risk aversion, in particular when the liquidity on secondary markets reaches low levels. Over the period under review, prices increased for various assets and credit spreads reduced strongly. For euro area sovereign securities, spreads on 10-year bonds with respect to the German Bund declined for all countries except Greece, reaching the lowest levels since the euro area debt crisis. The drop was particularly pronounced for the countries most affected by the crisis. In line with sovereign bond spreads, corporate bond spreads also receded in the euro area. A number of other indicators mainly related to equity markets in the model-based approach of the risk assessment also provided signals of potential search-for-yield behaviour.

CHART 7 SOVEREIGN BOND YIELD SPREADS

(spreads versus German Bunds, in basis points)



Source: Thomson Reuters Datastream.

The search for yield is evident in the financial markets, but could also lead to asset portfolio shifts to riskier assets or longer-dated maturities. While Belgian banks have just overcome a period of significant restructuring – involving a winding down of a range of risky activities and a run-off or sale of exposures on non-Belgian counterparties –, the pressures on their profitability might induce financial institutions to redirect their investment policies to higher-yielding asset classes. However, there were no clear signs of such a shift in Belgium by the end of December 2014, either within banks or insurance companies.

Banks witnessed a minor rebalancing of their balance sheets in favour of foreign claims during the first nine months of 2014, but nowhere close to pre-crisis levels. Italian and Spanish government bonds were purchased at the expense of Belgian ones, reducing the high concentration in domestic government paper owned by Belgian banks that had been accumulated since the start of the sovereign debt crisis in the euro area in 2011-2012.

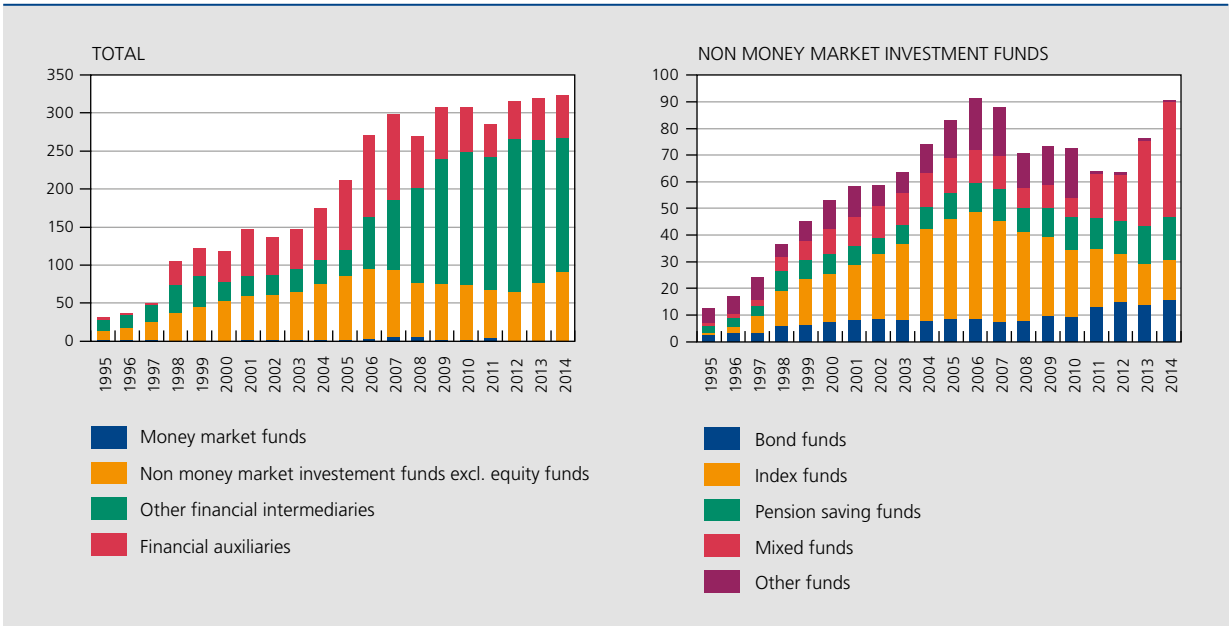
Belgian insurance companies saw the outstanding amount in their government bond portfolios decline somewhat in the course of 2014, as a result of the sale of bonds – creating capital gains – and of changes in their investment strategies focusing on riskier asset classes to maintain return levels. Low yields on fixed-income investments prompted some of them to redirect their assets to longer-term alternatives, such as corporate bonds, mortgage loans or units of collective investment (UCIs). Such alternatives promise higher yields but also imply greater credit and liquidity risks. These changes in insurance companies' investment strategies are already partly dictated by the forthcoming prudential solvency rules

due to become effective in January 2016. Class 23 products will be subject to more favourable capital requirements under the new rules. These products, which are less risky for insurance companies, have flourished since 2012.

For institutions that serve as financial market infrastructures (FMIs) – e.g. international central securities depositories (ICDSs) and custodians – the low/negative interest rates were a constant reminder to reduce their dependence on interest income and to boost the share of fee-based income. In fact, interest rate conditions reduced intermediation margins to such a degree that these FMIs themselves were compelled to apply negative interest rates on selected client deposits. The effect was immediate: after years of growth, deposits from professional market players with these FMIs finally stalled or even dropped, reducing their leverage.

The search for yield also translates into a shift of investments to investment funds. In Belgium, funds that mix equities and bonds have registered a growing success since 2011. Systemic risks from investment funds may emerge in the event of a mismatch between unit redemptions by investors and funds' assets. Investors may exit at all times, and investment funds will not always find it so easy to dispose of their investments, particularly if they have exposures in less liquid markets such as corporate and sovereign bonds from emerging economies.

CHART 8 SHADOW BANKING TOTAL ASSETS AND BREAKDOWN
(in € billion)



Source: NBB

These shifts in the type of investments are probably a symptom of a broader phenomenon in which the profitability and regulatory requirements faced by traditional financial intermediaries lead to a transfer of activities to structures subject to less stringent rules or weaker constraints. It is important to monitor the development of these new structures, often referred to as "shadow banking", otherwise risks could become concentrated on them, threatening the overall stability of the financial system. Not only can the shadow banking sector lead to complexity and opacity in the financial system, but it can also create risks if it takes excessively mismatched positions in terms of interest rate and liquidity risks. Excessive use of leverage can also contribute to higher risks. Moreover, shocks within the shadow banking sector may spill over to the rest of the financial system, due to interconnections with the traditional banking sector or by contributing to a flight to low-risk assets and fire-sales of assets. The challenge for prudential authorities is to maximise the benefits created by the shadow banking sector while minimising systemic risks. A comprehensive approach should be adopted in order to regulate the entities of the shadow banking sector, including possible application of macroprudential instruments,

without preventing a harmonious development of this sector, as it can contribute to a better balance between bank and non-bank intermediation with a view to adequate diversification of financing for the economy, an objective which is an integral part of the European project towards integration of capital markets. Any regulatory action should be coordinated at international level, as the shadow banking sector is characterised by high cross-border transactions.

Measures taken by the NBB and international authorities

Search-for-yield behaviour is a quite complex phenomenon which requires a good understanding of the pricing of financial assets – including the possibility of a structural underestimation of risks – and an in-depth analysis of investment strategies of financial institutions. The Bank has, in this context, closely monitored the evolution of institutions' balance sheets and in particular of their investment portfolios. As explained above, shifts between the categories of assets within financial institutions' balance sheets remain quite limited, although some first signs of an increased search for yield cannot be totally excluded, especially for insurance companies. The Bank considers that a close monitoring is warranted in view of the very persistent low interest rates. It started, in particular, to closely analyse the development of so-called shadow banking activities in Belgium.

To ensure that banks do not engage in new activities which might become systemic, the Bank decided to impose a capital surcharge on trading activities above a certain threshold. This measure is part of the structural reforms implemented in the banking law. This capital surcharge is applied under pillar 2 as a macroprudential measure (see section 3.1.2 for more details).

2.2.4 Residential property market

Risks

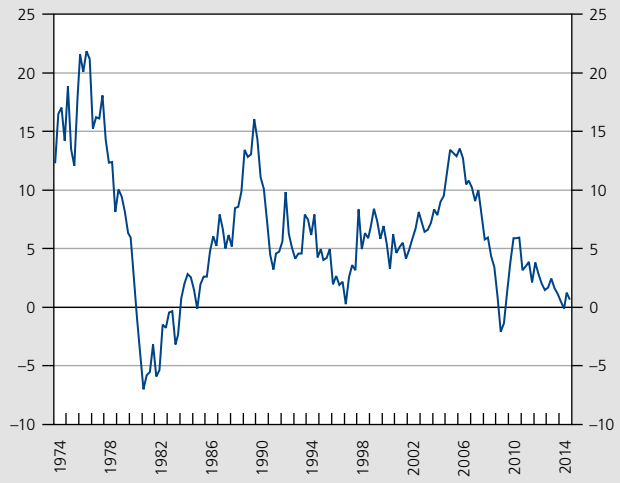
In Belgium, nominal residential property prices have practically doubled since 2000, and the decline during the great recession was very modest compared to that seen in many euro area countries. However, the pace of price rises has clearly slowed in the past two years so that, in 2014, prices only increased by 0.6 %. In real terms, prices have fallen slightly. In that context, the average proportion of household disposable income spent on mortgage loan repayments declined overall during the year under review, as a result of the slowdown in property prices and the reduction in mortgage interest rates. However, the exact degree of overvaluation of the property market is difficult to estimate with certainty, as various factors could weigh on prices, such as a decline in disposable income in adverse economic conditions, a (future) increase in interest rates, or the implementation of less generous tax advantages for mortgage loans.

Impact on the financial sector

In this highly uncertain context, and in view of the very adverse impact that a property market shock could have on financial stability, close monitoring of this market is necessary owing to its importance both for the asset position of households and for banks' loan portfolios. On average, mortgage loans represent around 15 % of the banking sector's balance sheet total. Also, apart from the impact on the financial sector, a real estate crisis is generally accompanied by serious detrimental effects for the real economy, particularly in terms of income effects, as highlighted during recent experiences of real estate market crises.

Drawing on early warning indicators for the Belgian property market and the debt ratio for Belgian households, the model-based pillar of the macroprudential risk analysis indicates the need for vigilance, even if some of these signals reflect less sophisticated indicators of house price valuations. Different methodologies lead to a wide range of results. Conventional so-called price-to-income and price-to-rent indicators, in particular, which represent deviations from the long-term average of the ratios of real estate price evolution to household income and rent developments respectively, generally tend to identify high levels of overvaluation in Belgium. These should however be viewed with caution, not only because they disregard determinants such as the level of interest rates, demographics, changes in the preferences of economic agents, characteristics of mortgage contracts, or any tax-related issues, but also because the statistical coverage of the variables taken into account is partly deficient, particularly as regards rents. Other indicators, resulting in particular from an econometric approach including a broader set of determinants, indicate that the Belgian real estate market may be closer to a state of equilibrium. The uncertainties are compounded by the context of very low mortgage

CHART 9 NOMINAL RESIDENTIAL PROPERTY PRICES
(annual growth, in %)



Source: NBB.

interest rates, as well as the effects of the reduction in tax advantages for mortgages in the Flemish Region and to a lesser extent in the Walloon Region.

Measures taken by the NBB and international authorities

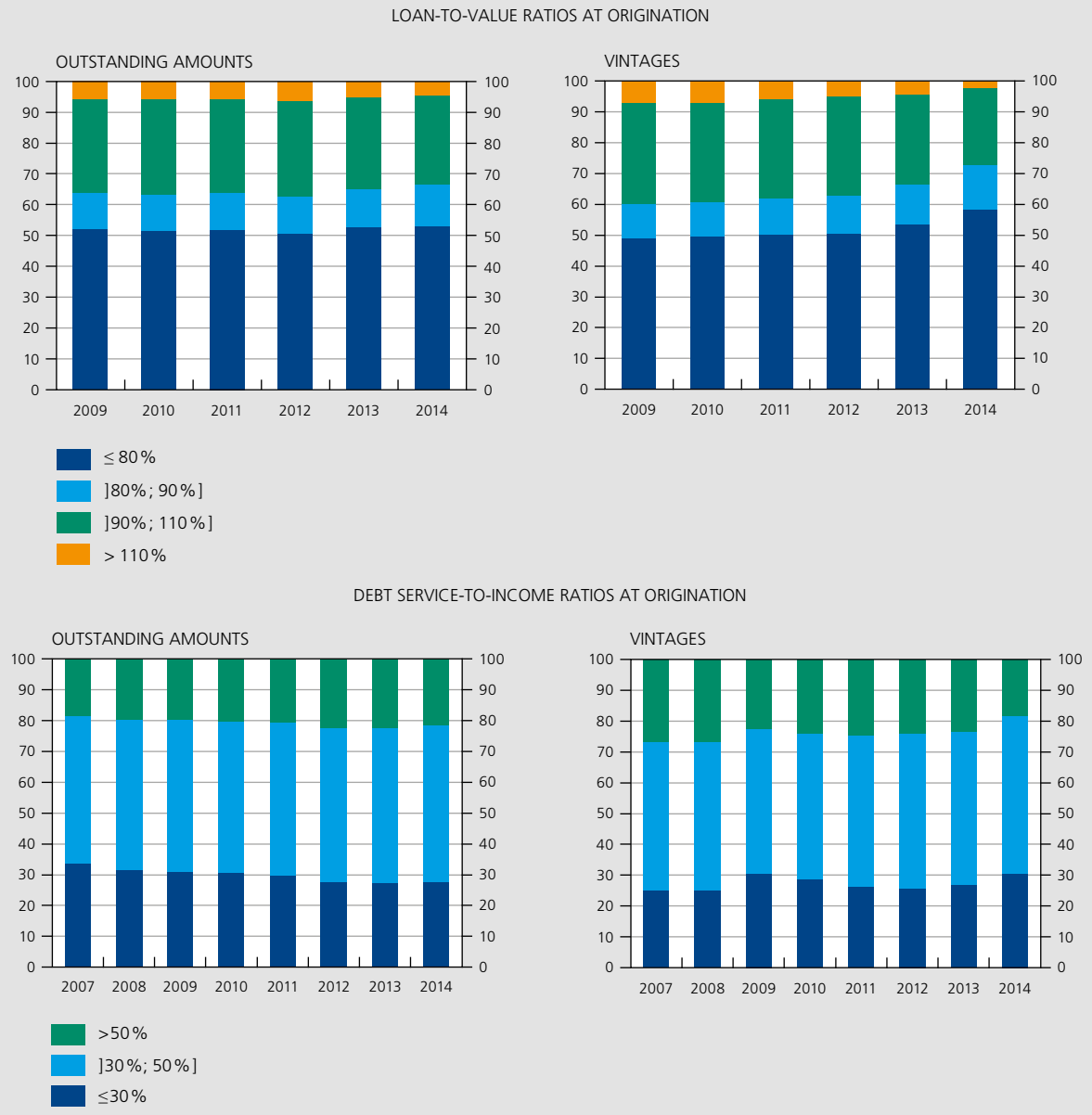
As explained in more detail in chapter 3 below, the Bank continued to devote particular attention to the residential real estate sector by closely monitoring the evolution of the house prices as well as the risk profile of banks' mortgage portfolios following the macro- and microprudential measures taken at the end of 2013. Besides the increase in minimum capital requirements – which contribute to make the system more resilient – higher margins and more conservative credit standards were observed in 2014 as highlighted by the decrease in loan maturities, average loan-to-value and debt service-to-income ratios. While figures need to be interpreted with caution in view of the impact of the massive mortgage loan refinancing, more prudent credit standards are confirmed by the recent results of the Bank Lending Survey, supporting the recommendations issued by the Bank in recent years.

The stress tests designed by the ECB took account of a scenario characterised by a 25 % cumulative fall in house prices over three years in Belgium, which would trigger a sharp rise in default rates. Belgian banks resisted well to such a scenario – which involved conservative assumptions for potential risks facing the Belgian residential property market. In fact, it was one of the toughest scenarios applied to the countries taking part in the tests, and involved a shock of unprecedented magnitude, much more severe than what Belgium experienced in the periods of most severe real estate market tensions.

The Bank also focused on commercial property market developments and the growing importance of commercial property in the portfolio of Belgian financial institutions in recent years. In that context, banks and insurance companies were asked to increase the completeness and accuracy of the data on the commercial property market and to arrange regular appraisal of their collateral by independent parties to ensure the correct and prudent valuation of those assets in their balance sheets.

CHART 10 CREDIT STANDARDS APPLIED TO BELGIAN MORTGAGE LOANS

(in % of total loans at the end of the year or total loans granted during a particular vintage)



Source: NBB.

3. Macroprudential actions taken by the Bank

3.1 Legal measures

3.1.1 Residential real estate

In its first meeting as macroprudential authority, on 14 May 2014, the Bank confirmed the macroprudential measures related to residential real estate it had taken at the end of 2013. As explained in detail in the 2013 Annual report[1],

(1) See Chapter C, Box 5 under "Prudential regulation and supervision" of the 2013 NBB Report.

given recent trends in the housing market, the Bank then considered that it was justified to take prudential measures to improve the banks' resilience and reduce the concentration risk.

The first measure was macroprudential and imposed a 5 percentage point rise in the risk weights on Belgian residential real estate exposures for banks calculating regulatory capital requirements through an internal ratings-based (IRB) approach. This measure was enforced with a Bank regulation approved by Royal Decree on 8 December 2013[(1)], and was then implemented in 2014 under Article 458 of the CRR[(2)]. This measure increased the average risk weight of banks adopting the IRB-approach from around 10 % at the end of 2012 to almost 15 % at the end of 2014. This add-on seemed in line with the generally fairly prudent credit standards that Belgian banks have applied in the past in regard to mortgage loans, and the historically low percentage of losses on such exposures. However, in view of the cyclical nature of this measure, the Bank has kept a close eye on market developments during the year under review so that it could constantly assess the appropriate level of this add-on. It concluded that the 5 percentage point add-on (corresponding to an additional capital requirement of around €600 million) still provided an adequate but necessary extra capital buffer for the risks identified.

The additional two measures adopted by the Bank at the end of 2013 were microprudential. One concerned the realisation of a horizontal assessment of the IRB-models on the basis of the results of the back-testing to be carried out by the institutions. This measure aimed to remedy potential weaknesses in the risk parameters used in the IRB approach. In this context, the Bank assessed the suitability of the calibration of the models for the probability of default and the loss given default used in calculating the regulatory capital according to the IRB-approach. Banks using unsatisfactory calibration were required to adapt their Pillar 1 models.

The second microprudential measure consisted in requiring 16 credit institutions to conduct a self-assessment on the degree of their compliance with the EBA Opinion on Good Practices for Responsible Mortgage Lending and the EBA Opinion on Good Practices for the Treatment of Borrowers in Mortgage Payment Difficulties. The Bank analysed these self-assessments regarding the degree of prudence in banks' lending standards for mortgage loans; it concluded that the Belgian banks very largely fulfilled the standards, notably thanks to the fairly strict rules on the subject and other professional codes of conduct developed by the sector concerning Belgian mortgage loans.

Besides monitoring the three prudential measures adopted at the end of 2013, the Bank regularly reviewed the latest developments on the Belgian housing and mortgage markets. The latest data confirm that, since 2012, banks have tightened some of their lending standards for mortgage loans, thus helping to maintain the high quality of Belgian mortgage loan portfolios.

The package of measures adopted and the subsequent monitoring of their impact by the Bank aim at strengthening the resilience of the market and of the credit institutions with the largest exposures to Belgian mortgage loans against the risk of potentially higher-than-expected loan losses on Belgian mortgage credit. In this connection, the recent deceleration of house prices and credit growth reduced the likelihood of further imbalances developing in the future. Since subsequent changes in the tax treatment of mortgage loans could also have a moderating effect on market developments, the Bank considered that there is currently no need for additional measures.

3.1.2 Trading activities

At its first meeting on 14 May 2014 and in the context of discussions on the need for structural reforms in the banking sector, the Bank decided to impose a capital surcharge on trading activities above a certain threshold. This capital surcharge will be applied under Pillar 2 as a macroprudential measure, in accordance with Articles 103 and 104 of the European CRD IV Directive[(3)] transposed into Article 154 of the Banking Law.

These reforms are predicated on two lines of defence. First, some trading activities will be prohibited completely. Other specific trading activities will be permitted, subject to both quantitative and qualitative conformity requirements. In addition, a capital

(1) Royal Decree of 8 December 2013 approving the National Bank of Belgium regulation of 22 October 2013 amending the National Bank of Belgium regulation of 15 November 2011 on the capital of credit institutions and investment firms.

(2) Regulation 575/2013 of the European Parlament and the Council of 26 June 2013 on prudential requirements for credit institutions and investment firms and amending Resolution 648/2012.

(3) Directive 2013/36/EU of the European Parliament and of the Council of 26 June 2013 on access to the activity of credit institutions and the prudential supervision of credit institutions and investment firms, amending Directive 2002/87/EC and repealing Directives 2006/48/EC and 2006/49/EC and repealing Directives 2006/48/EC and 2006/49/EC.

surcharge is imposed on financial institutions as a disincentive if the permitted trading activities exceed one of the following quantitative limits set by the regulation based on volume or risks parameters:

- If the volume of trading activities exceeds 15 % of total assets, a capital surcharge will be imposed commensurate with the amounts by which the limit is breached.
- If market risk capital requirements (ignoring exchange risk) exceed 10 % of total capital requirements, a capital surcharge will be imposed of three times the amount by which the limit is breached.
- The maximum of both capital surcharges will be imposed if both limits are breached.

Five categories of trading activities are permitted. The first two types of permissible trading activity concern providing customers with investment services and ancillary services, including associated hedging, and the maintenance of a liquid market on the basis of a contractual obligation by continuously quoting bid and offer prices for a particular type of security or financial instrument. Trading activities that constitute the effective economic hedging of the various risks inherent in a financial institution's own balance sheet, or those relating to sound liquidity management or resulting from strategic decisions connected with the management of a permanent, liquid investment portfolio held by the institution concerned, are also excluded from the ban so long as all these trading activities meet clearly defined criteria and standards.

The institutions have to submit a qualitative conformity report to the supervisory authority each year or upon every significant change, showing that the framework established for the permitted trading activities meets the various requirements, notably in what concerns internal control, good governance, organisation of the trading room, independent risk management, remuneration policy and exposure limits. Each individual trading unit must also have a clearly specified mandate defining the strategy and the range of permitted financial products, the authorised risk limits and the hedging strategies.

In addition, a detailed quantitative report[1] on the permitted trading activities must be submitted quarterly for each trading unit and must enable the supervisory authority to check whether the requirements concerning quantitative limits or thresholds are being respected. This report includes an analysis of the daily results, the risks incurred by each trading unit, and the degree to which hedging transactions have effectively reduced the risks for specific risk factors. That said, the Bank will factor in the relative importance of the trading activities compared with the non-trading activities, and will waive the quantitative reporting requirements either wholly or partially if the former are insignificant.

If it should emerge that certain permitted trading activities do not fulfil these quantitative and qualitative conditions or exceed a particular risk-sensitive limit, and if the capital requirements for the trading activities concerned exceed 1 % of the regulatory capital, the institution will be requested to cut back these activities within thirty days or, if appropriate, to transfer them to a separate legal trading entity.

3.2 Recommendations

In addition to the measures mentioned in section 3.1, the Bank issued different recommendations:

1. The Bank encourages financial institutions to pursue their restructuring process and efficiency gains.

2. The Bank expects that banks and insurance companies will continue to enhance their solvency position and consequently to limit pay-outs to shareholders and distributions to policyholders if this is necessary to sustain their activities in the long term.

3. The Bank also expects insurance companies to carefully ponder the realisation of capital gains in view of this challenge.

4. The Bank's Board recommends banks and insurance companies to improve the completeness and accuracy of data related to commercial real estate and to regularly arrange assessments of the quality of their loans and the value of their collateral by third parties to ensure the correct and prudent valuation of these assets in their balance sheet.

(1) NBB-2015-14 circular of 30 March 2015.

5. Banks need to ensure that the recent increase in mortgage loan refinancing does not further affect their profitability in the longer term.

6. The Bank will introduce a proposal to the responsible Minister in line with the framework foreseen in the Insurance law to adjust the mechanism of the maximum interest rate on individual long-term life contracts in order to better reflect the current market conditions while avoiding any distortion of competition.

7. In the same vein and in that context, the Bank considers that the system of guaranteed interest rates on group insurance and pension contracts foreseen in the law of 28 April 2003 governing supplementary pensions should be reviewed.

4. Organisational framework for macroprudential policy by the Bank and interaction with the SSM and the ESRB

To ensure an adequate preparation of the risk assessment and to underpin decisions on potential policy actions, including the selection and calibration of macroprudential instruments in case of the occurrence of threats to financial stability, the Bank has developed a specific in-house organisational framework relying on different internal structures.

In particular, under the aegis of the Bank's Board, which has the ultimate power to decide on macroprudential policy, two structures have been set up. The first structure is the Macrofinancial Committee (MFC), responsible for preparing the meetings of the Bank's Board acting as macroprudential authority, including its secretariat, and composed of the heads of the relevant departments.[1] The MFC discusses the risk assessment from a policy perspective and recommends policy actions if these are deemed necessary. It also submits to the Bank's Board drafts for the public communication on macroprudential decisions. The second structure is the Risk Team Macroprudential Policy (RT MPP), in which all the relevant departments of the Bank are represented, but at the technical level. The RT MPP prepares the material that serves as a background for the MFC meetings, consisting in the risk assessment – focused on the identification of potential systemic risks – and in an assessment of the potential macroprudential measures that could be implemented to address it, as well as their calibration. The cross-departmental composition of the MFC and the RT MPP ensures that risk analyses are widely discussed and that diverging views are taken into account, in view of the complexity of systemic risks.

Macroprudential policy is not meant to be conducted exclusively at the national level. Countries participating in the SSM must retain the option of taking specific measures if the stability of their own financial system is at risk, as they can no longer use the interest rate instrument for that purpose, and remain responsible for the financial consequences of a crisis afflicting their economy. However, in an integrated financial system such as that in the euro area, a national crisis can quickly spread across borders, thereby affecting the countries in the area. There is therefore all the more need for placing in a framework the autonomy of these countries, since some of the instruments available will be the same as those used for supervising individual institutions. Moreover, at overall EU level, coordination is needed to avoid uncoordinated implementation of national macroprudential measures jeopardising the functioning of the single financial market.

At the EU level, the European Systemic Risk Board (ESRB) coordinates macroprudential policies, and identifies and prevents systemic risks to the EU's financial stability. As soon as it identifies key systemic risks, it notifies European institutions, member states and the European and national supervisory authorities, and draws up recommendations as to the corrective measures that need to be taken. The ESRB had proposed eight recommendations at the time of this publication, three of which specifically related to macroprudential policies, i.e. the 22 December 2011 recommendation on the macroprudential mandate of the national authorities, the 4 April 2013 recommendation on the intermediate goals and instruments for macroprudential policies and the 18 June 2014 recommendation on operationalising the countercyclical capital buffer. The ESRB also follows up on warnings and recommendations.

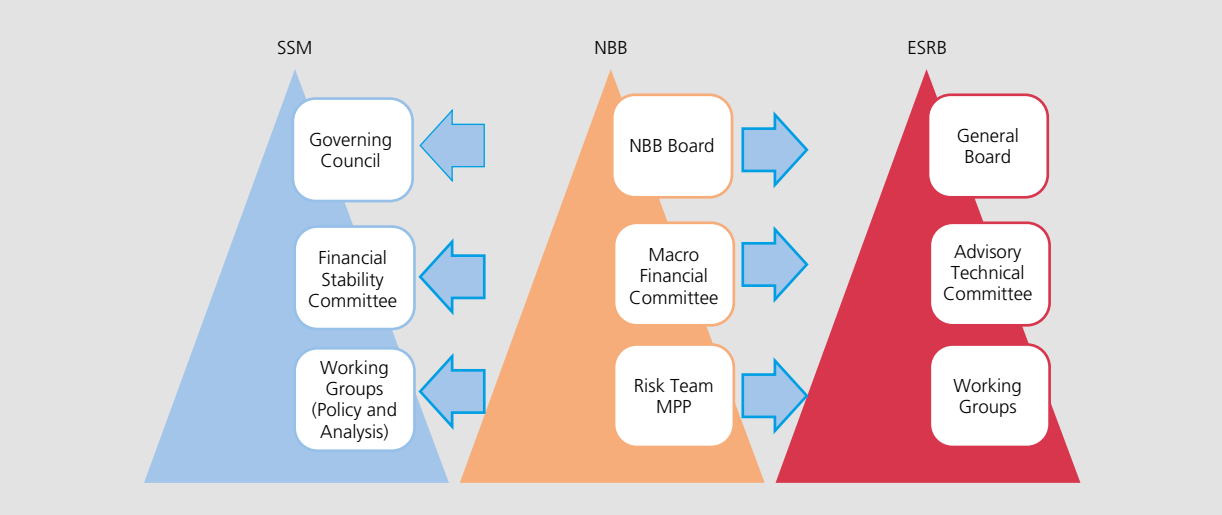
In addition, the ESRB plays a key coordinating role in macroprudential policies by drawing up guidelines on the use of specific macroprudential instruments, such as the above recommendation on the countercyclical capital buffer, by proposing recommendations on the recognition of macroprudential measures in other member states or third countries, and by drawing up recommendations or opinions on the use of specific macroprudential instruments.

(1) Prudential Policy and Financial Stability, Banking Supervision, Insurance Supervision, Prudential Supervision and Oversight of Market Infrastructure, Specific Operational Functions under Prudential Supervision, Legal, Analysis & Research, Financial Markets, Statistics, and Microeconomic Information.

As a result, the ESRB is a repository of information about the macroprudential measures taken by the European authorities. EU member states are indeed required to inform the ESRB on any measure taken. Official notification of macroprudential measures to the ESRB is compulsory when the envisaged instruments are subject to the approval of European authorities. In this case, a proposed measure will be subject to an exhaustive assessment by an ESRB team composed of members of several national authorities, including the Bank. The application of the residential property measure outlined earlier was subject to this procedure.[1] The ESRB publishes a review of all measures on its website and released its first evaluation report in March 2015, so contributing to the transparency of macroprudential policies – an essential condition of the shared responsibility of 28 countries and the ECB.

While the ESRB has the power to issue warnings and recommendations addressed to all EU countries, within the euro area, the SSM has wider powers. Indeed, since 2014, in line with SSM regulation, the ECB shares competences with the national authorities responsible for macroprudential policies, as macroprudential instruments may also be activated by the ECB. However, this power is more restricted than the competences of national authorities. First, it is limited to instruments foreseen in the CRD IV and CRR (see Table 1). Second, this responsibility is asymmetric, as the ECB may only apply more stringent requirements. As mentioned previously, this arrangement reflects the fact that national cycles are not always synchronised in the monetary union and that the costs of financial instability remain primarily national in the absence of a fiscal union. Such asymmetric arrangement thus combines the need to keep a degree of national independence in the implementation of macroprudential policy while providing the ECB with a lever to prevent policy inaction (inaction bias) on the part of national authorities.

CHART 11 INTERNAL ORGANISATION OF MACROPRUDENTIAL POLICY IN BELGIUM, THE SSM AND THE ESRB



Sources: ECB, NBB.

The coordination of the Bank with both the ESRB and the SSM in the conduct of macroprudential policy is facilitated by the fact that the institutional frameworks governing macroprudential decision-making are similar in the three institutions. At the higher level, decisions are taken by the Governing Council of the SSM and the ESRB (General Board) and, at the Bank, by the Board of Directors acting as the macroprudential authority. At a lower coordinating level, the MFC of the Bank has its counterpart in the framework developed at both SSM and ESRB level, embodied respectively in the Financial Stability Committee (FSC) and the Advisory Technical Committee (ATC). This link also exists at a more technical level, with the substructures of the FSC (Macroprudential Analysis Group and Macroprudential Policy Group)

(1) Notification of macroprodential measures to the ESRB is a voluntary matter except for a few macroprudential instruments in CRR/CRD IV. Belgium's capital surcharge on trading activities as part of Pillar 2 and implemented as a macroprudential measure was not subject to any approval procedure and was reported to the ESRB for information purposes only.

and the corresponding substructures of the ATC (Analysis Working Group and Instruments Working Group) being reflected in the RT MPP of the Bank.

Such parallel structures help smoothen the implementation of macroprudential policy within the euro area and the EU, as most macroprudential actions taken at national level need to be notified to the European Central Bank for non-objection before being submitted to the ESRB. The ECB has five working days to react if it has any objections. Given the short period of time foreseen in the SSM, it has been agreed that competent authorities – at national level or the ECB – will notify their intention to activate macroprudential instruments as soon as possible, even if the decision has not yet been formally approved and calibration is not yet final.

The Bank is participating actively in the FSC substructures by sharing (among other things) experience regarding the first macroprudential measure taken in Belgium related to residential property, in the context of the overall risk assessment framework. The Bank is also very active in developing a macroprudential database for the euro area, including indicators that may be relevant not only to risk assessment but also to assessing the effectiveness of macroprudential measures, as well as in analytical work aimed at improving the early warning toolkit.

As a member of the Analysis Working Group and the Instruments Working Group, the Bank works closely with the ATC on developing systemic risk analyses and instruments. It is also represented in a range of task forces and expert groups that focus, amongst others, on analysing the property markets or the shadow banking sector, research into financial system interconnectedness, the development of heat maps for detecting potential systemic risks, working out a policy for operationalising the countercyclical capital buffer, cross-border effects, and reciprocity of macroprudential policies.

Financial Stability Overview

Financial stability can be defined as a condition in which the financial system – consisting of financial intermediaries, markets and market infrastructures – can withstand shocks without major disruption in financial intermediation and in the effective allocation of savings to productive investment. As in previous editions of the Financial Stability Review, this article therefore reviews in detail recent developments in the Belgian banking and insurance sector, with data and analyses covering profitability, solvency and exposures to risks. A new separate section on financial market infrastructures will henceforth complement this analysis of the main intermediaries in the Belgian financial system, which this year offers a detailed introduction to the sector comprising the central securities depositories (CSDs) established in Belgium.

Since the financial performance and resilience of these main categories of Belgian financial institutions is affected by developments in financial and real estate markets and overall economic conditions, the first section of this article summarises the main developments – and potential future risks – in the operating environment of the financial sector.

1. Operating environment

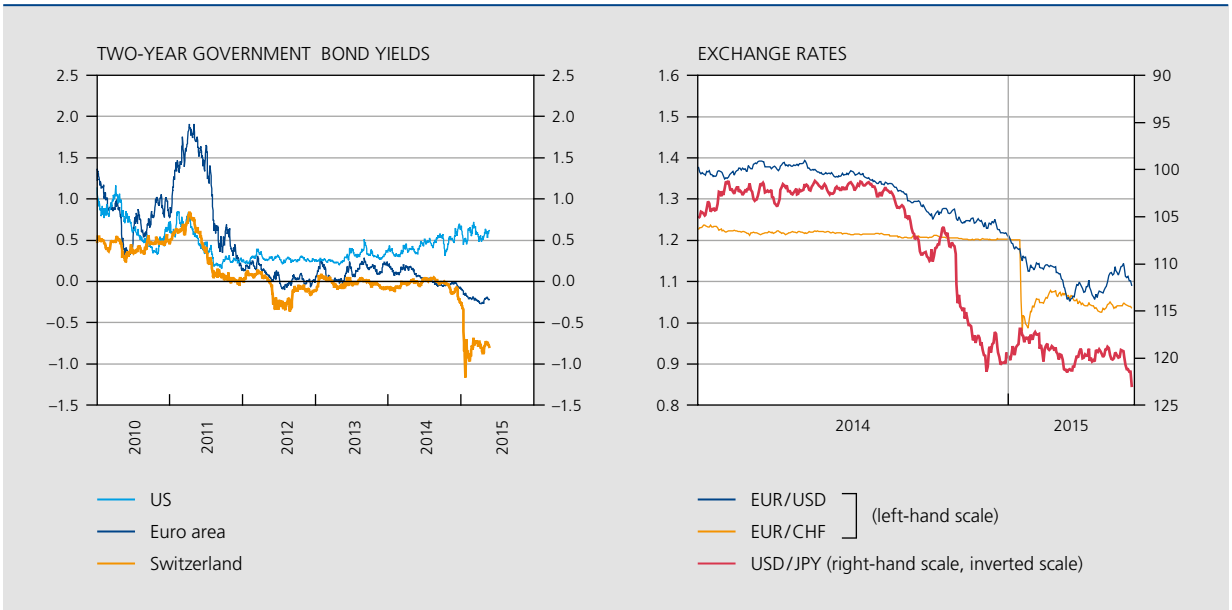
1.1 Financial markets

The monetary policy stance in the major currency areas remained a major driver of financial markets during the period under review. In the US, a gradual exit from the post-crisis accommodative monetary policy started to take shape, but in numerous other countries in Europe and Asia, central banks stepped up their monetary policy easing even further, in some cases through the introduction of negative policy rates. This increasing divergence in the monetary policy stance between the US and other currency areas contributed to a certain decoupling of government bond yields and to major changes in bilateral exchange rates (Chart 1). Yet, in all major currency areas, short-term interest rates, as proxied by two-year government bond yields, remained at very low, if not negative, levels throughout the second half of 2014 and the first months of 2015.

In spite of still very accommodative monetary policies and rock-bottom interest rates, the performance of the global economy once again fell short of expectations, with a growth rate of only 3.3 % in 2014. Worsening geopolitical tensions in the Middle East and Ukraine played a role, but a more fundamental reason for the mediocre performance was the fact that – seven years after the start of the crisis – many economies were still battling with a chronic weakness in domestic demand, excess production capacities and high levels of private and public sector debt, compounded by the challenges linked to falling long-term growth prospects. Among the advanced economies, the United States appears to have made the most progress with its recovery from the crisis, helped by an aggressive monetary policy in the immediate aftermath of the financial crisis and a relatively speedier reduction of debt in the private sector than in other crisis-hit countries. Hence, in accordance with the decision of the FOMC in December 2013 to start the tapering of its securities purchase programme, the Federal Reserve reduced the monthly amount of asset purchases by $ 10 billion per month after each FOMC meeting during 2014, leading to the termination of the programme in October.

CHART 1 TWO-YEAR BENCHMARK GOVERNMENT BOND YIELDS AND EXCHANGE RATES

(daily data, in %, unless otherwise stated)



Source: Thomson Reuters Datastream.

As the gradual winding down of the US asset purchase programme proceeded, FOMC guidance and market participants started to focus on the timing of the next step in the gradual normalisation of US monetary policy, with expectations crystallising around a first increase of interest rates in the course of 2015. Throughout the period under review, changing market expectations about the timing of this exit from the zero interest rate policy were an important driver of financial market developments, and on 15 October, contributed to a major, but short-lived, bout of market turbulence. That day, the yield on 10-year US Treasury bonds fell almost 37 basis points – more than the drop on 15 September 2008 when Lehman Brothers filed for bankruptcy – with particularly sharp market movements during a 20-minute window when yields slipped and then rose by around 20 basis points. These fluctuations were large relative to actual economic and policy surprises, as the only notable negative piece of news that day was the release of somewhat weaker than expected retail sales data for the United States one hour before the event. But the initial shock was significantly amplified by deteriorating liquidity conditions, as leveraged investors that had positioned themselves for a rise in long-term rates tried to quickly unwind some of these positions, leading to an evaporation of liquidity on the Treasury market. Although financial markets rebounded shortly afterwards, the extreme intraday price movements in the Treasury market and its ripple effects on other asset markets underscored how sensitive some markets had become to even small surprises in the context of sudden changes in available market liquidity.

The euro area economy still had to cope in 2014 with the legacies of the economic and financial crisis in the form of high private and public sector debts, weakened bank balance sheets and a substantial under-utilisation of production capacity. These factors also contributed to a sharp fall in inflation, which was exacerbated by the downward movement in energy and food prices. In response, the ECB's Governing Council took a number of measures to combat the risk of an excessively long period of low inflation and associated declining inflation expectations. In the second half of 2014, it twice cut its key interest rates (in June and September) and brought the deposit facility rate down to a floor of -20 basis points. In addition, to stimulate bank lending to the non-financial private sector, a €400 billion series of targeted longer-term refinancing operations (TLTROs) was announced (in June), followed by programmes for the purchase of asset-backed securities (ABSs) and covered bonds (in September). These purchases of ABSs and covered bonds were subsequently merged into the expanded asset purchase programme of around €1.1 trillion decided by the Governing Council at its first monetary policy meeting in 2015. This lifted the total combined monthly purchase of securities on secondary markets – including bonds issued by euro area central governments, agencies and European institutions – to €60 billion per month, as from March 2015. The programme will continue at least until September 2016 and until there

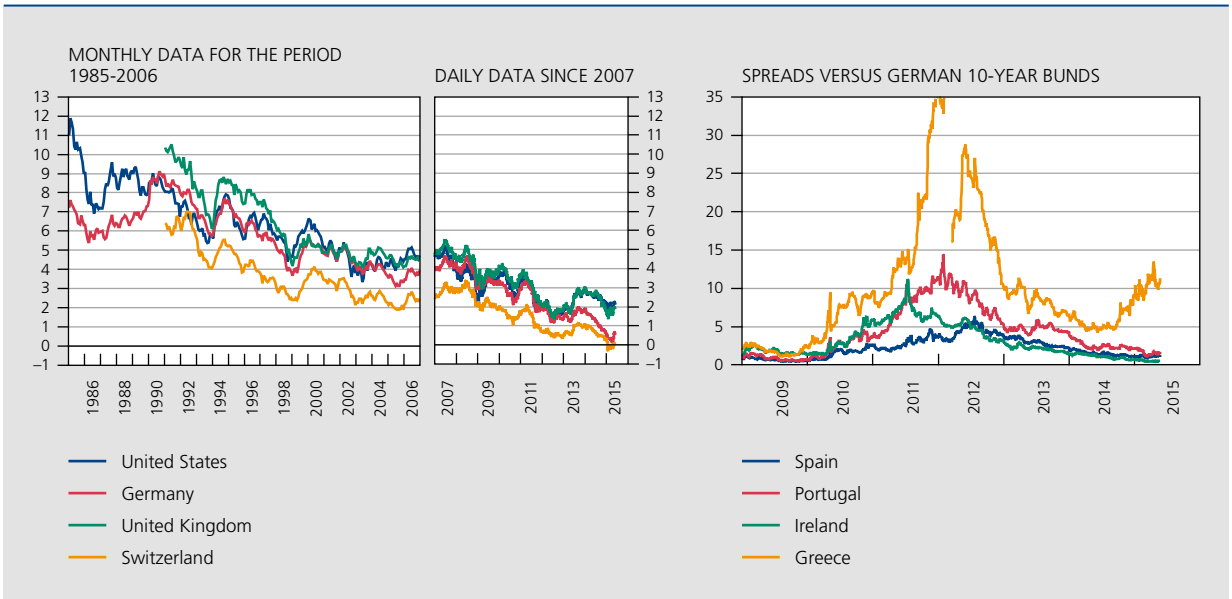
is evidence of a sustained adjustment in the inflation path – in line with the target of achieving inflation rates of below, but close to, 2 % over the medium term.

The introduction of the negative deposit rate in the third quarter of 2014 and the growing market expectations of the introduction of an asset purchase programme by the ECB drove euro interest rates down and contributed to a depreciation of the euro on the international foreign exchange markets, in particular vis-à-vis the US dollar. This dollar strength and euro weakness prompted further rounds of policy easing across the globe and put pressure on exchange rates pegged or linked to the euro, such as the Danish Krona and the Swiss franc. The Swiss National Bank – which had introduced a minimum exchange rate target of 1.20 for the EUR/CHF exchange rate – first tried to mitigate upward pressures on its currency by the introduction of a negative interest rate (-0.25 %) on large sight deposits. But when the defence of the minimum exchange rate caused a continuous increase in the Swiss central banks' assets, the SNB decided, on 15 January, to discontinue the exchange rate cap and to lower its deposit rate further to -0.75 %. Financial markets reacted strongly to these unexpected decisions taken during market hours, resulting in a sharp appreciation of the franc's exchange rate, a strong decline in the Swiss stock market, negative yields on longer-dated Swiss government bonds and substantial losses for some foreign exchange brokers (for some even to the point of insolvency). More fundamentally, the abrupt market movements constituted a second episode – three months after the turbulence in the US Treasury market –, of an unexpected upsurge in market volatility being amplified by a drying up of market liquidity and disorderly price movements.

A third episode of unexpectedly large market movements during the period under review occurred in the euro area government bond markets, driven by developments in the German Bund market, where longer-term yields experienced a sharp upward correction after reaching record low levels in mid-April (Chart 2). The 10-year German benchmark yield, for example, rebounded from less than 10 basis points in the third week of April to more than 70 basis points four weeks later, implying significant changes in the market value of the longer-dated government bonds in Germany and other euro area countries.

CHART 2 TEN-YEAR BENCHMARK GOVERNMENT BOND YIELDS

(daily data, in %, unless otherwise stated)



Source: Thomson Reuters Datastream.

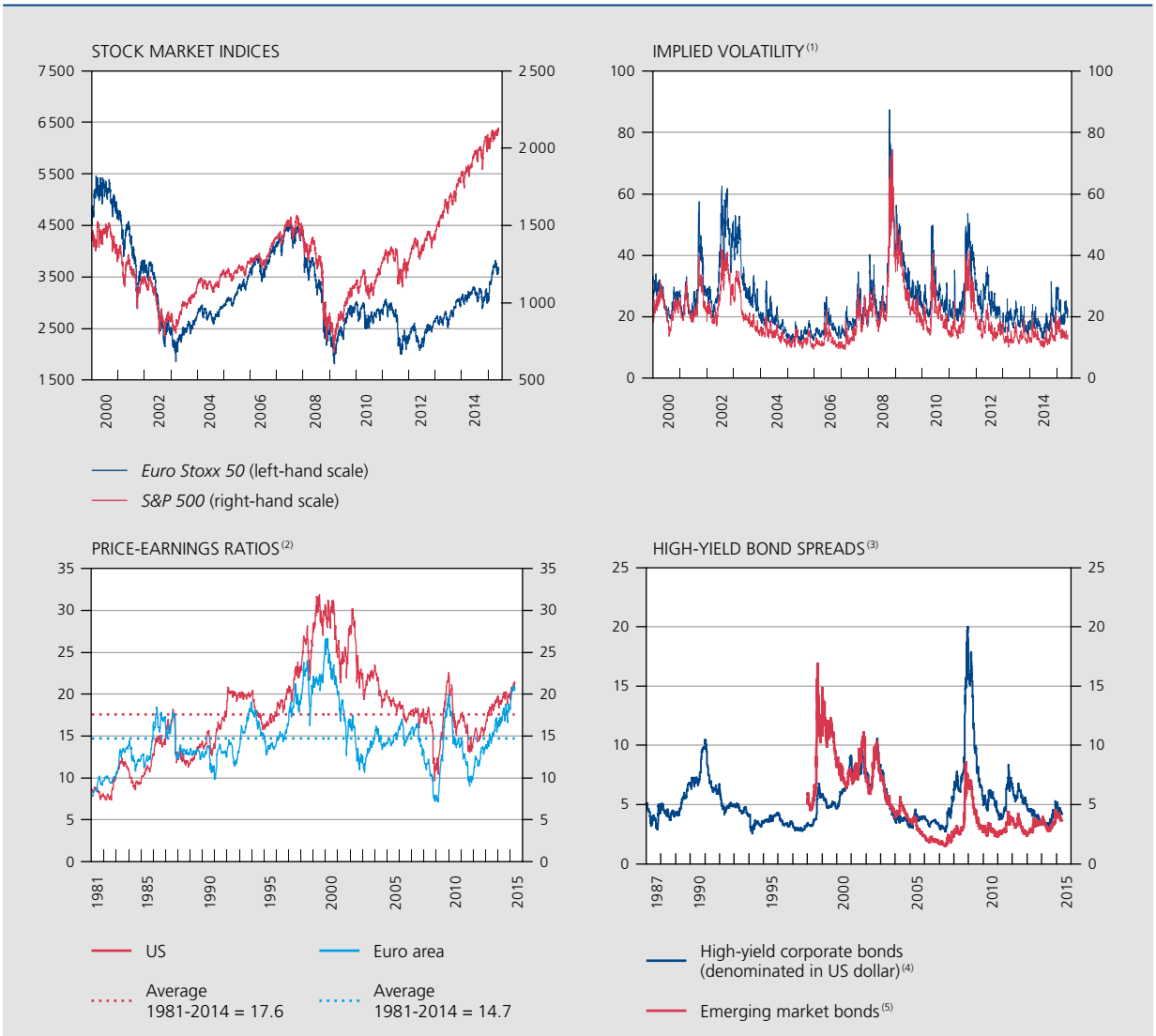
Yet, these three episodes of financial turbulence in specific market segments did not have significant long-lasting spill-over effects on other financial markets. This limited contagion may have been due to the presence of ample funding liquidity and exceptionally low risk-free interest rates, that quickly drove investors back into riskier assets, contributing to

the subsequent normalisation of market conditions. However, this benign experience in a low interest rate environment may blind investors to the risks that could occur once interest rates start increasing (for example in the US in the course of 2015) and/or when other events lead to a more permanent impairment of financial market liquidity. By fuelling an excessive search for yield and appetite for risk-taking, investor complacency about market liquidity risks in the context of a low interest rate environment may also contribute to unsustainable asset price rises and/or a further compression of already low risk premiums.

One manifestation of investors' continuing search for yield is the compression of term premiums in sovereign bond markets – notwithstanding the recent rebound in long-term yields – as investors extended their investments along the yield curve to pick up yield and/or avoid investment in short- and medium-term government bonds trading at negative yields. By extending the maturity of their investments, investors drove down the remuneration for this duration risk,

CHART 3 EQUITY AND HIGH-YIELD BOND MARKETS

(in %, unless otherwise stated)



Sources: JP Morgan Chase, Thomson Reuters Datastream.
(1) Based on the implied volatility derived from options on the S&P 500 and Euro Stoxx 50 indices.
(2) Stock market indices in local currency, calculated by Thomson Financial Datastream.
(3) Spreads relative to US Treasuries, in percentage points.
(4) Difference between the yield on corporate bonds denominated in US dollar with a rating below BBB / Baa3 and the interest rate on ten-year US Treasury bonds.
(5) JP Morgan Chase EMBI+ index; spread relative to interest rate on US Treasuries with a corresponding maturity.

leading to the emergence of negative term premiums according to some estimates. This exposes investors to potential rapid and major market movements in the case of a normalisation of this term premium, as highlighted already in part by the recent developments in the German Bund market.

Another manifestation of the search for yield was the renewed interest of investors in the government bonds of the peripheral euro area countries Italy, Spain, Ireland and Portugal, and the limited contagion that these markets experienced from the growing uncertainties regarding the financial situation of Greece after the newly elected government refused to request an extension of the EU-IMF programme and no progress was made in negotiations between Greece and its creditors over the terms of the restructuring programme required to restart financial support. Market concerns over the sustainability of Greece's financial position were also fed by the renewed outflows of deposits from the Greek banking system and the drying up of market financing for Greek banks, which had to be overcome by a resumption of (extensive) ELA support from the central bank.

Investors' search for yield was also evident in many other asset markets. In equity markets, stock prices were pushed higher by a renewed appetite of investors for shares, on the back of improving corporate earnings and still attractive dividend yields, even if this upward movement also benefited from the high amounts of stock buy-backs by corporations employing cash reserves or cheap debt financing to (re)leverage their balance sheet. As a result, several equity market indices rose to multi-year or record high levels, notwithstanding brief periods of heightened market uncertainty characterised by temporary increases in measures of implied volatility and stock price corrections (Chart 3). These developments occurred in spite of rising equity price valuation yardsticks, such as price-earnings ratios.

The pervasive search for yield in financial markets also kept a lid on risk premiums in the debt markets trading high-yielding speculative-grade corporate bonds or bonds issued by emerging market governments. The risk premiums in these markets nevertheless increased somewhat in the second half of 2014. In the case of the high-yield corporate bonds, the increase in risk spreads at the end of 2014 was mainly due to higher risk premiums on bonds issued by energy companies – which account for a significant share of the outstanding high-yield bonds – as a result of the significant decline in the oil price at that time. This lower price of oil and other commodities affected the credit standing of commodity-exporting emerging market countries and coincided with signs of less favourable economic prospects in a number of large emerging market countries (Brazil, China, Russia), leading to a limited repricing of risk on emerging market bonds in the second half of 2014 and the first months of 2015.

Due to the very low level of risk-free rates, funding costs of high-yield corporations and emerging markets nevertheless remained at historically low levels, contributing to sustained high levels of new debt issuance in these markets and a continuation of the gradual shift taking place in global credit intermediation away from the banking sector and towards the debt securities markets. This development results in part from the more subdued banking intermediation activities, as credit institutions focused on balance sheet repair and cut-backs of non-core balance sheet exposures. But this disintermediation was also fostered by investors' increasingly frantic search for yield in a low-yield environment through direct investments on the capital markets or through other financial intermediaries or financial instruments, such as Exchange-Traded Funds (ETFs).

1.2 Disintermediation and shadow banks

This structural change in the credit markets could be shifting the locus of financial stability risks from the banking sector towards the non-banking (or "shadow banking") sector and/or capital markets. In this connection, it should be noted that a greater role for non-banks in financial intermediation could have many benefits, as it provides economies with a "spare tyre" alternative to bank-based finance and potentially increased availability of risk-sharing capital. These benefits are among the principal motivations for the Capital Markets Union project in the European Union.

In terms of financial stability, a greater role for non-banks in financial intermediation could also be desirable, as banks are predominantly financed with short-term debt, exposing them to both solvency and liquidity risks, while investment funds, in contrast, mostly rely on the issuance of shares, shifting most of the investment risks to the end-investors. But because these non-banks rely to a much larger extent than banks on financial markets to manage their assets, a key issue for future financial stability is the resilience of financial market liquidity in periods of stress, and the ability of market

participants relying on this market liquidity to cope with episodes of impaired liquidity. An article in the BIS Quarterly Review of March 2015 – summarising the main findings of a CGFS Study Group on Market Liquidity – recalls in this connection that *"liquidity can evaporate quickly in financial markets"* as it *"hinges in large part on whether specialised dealers ("market-makers") respond to temporary imbalances in supply and demand by stepping in as buyers (or sellers) against trades sought by other market participants."* In this regard, the CGFS Study Group investigated recent changes in (the drivers of) the demand and supply of secondary market liquidity and their resilience in cases of market stress and concluded that *"market-making practices are clearly evolving, […] causing activity to concentrate in the most liquid instruments and move away from the less liquid ones."* This *"could make market liquidity more fragile in the short term, especially in the current low interest rate environment, in which new-issue volume and the participation of interest rate-sensitive investors have increased"*. But the report also observes that the *"industry and policy efforts can help to ensure that over time the pricing of market-making services becomes more consistent with the actual costs and risks involved' and that "for some markets, the narrow spreads seen in the past may have to give way to more realistic premia for providing liquidity to the market."*

On the market liquidity demand side are large segments of the rapidly growing non-bank (shadow) banking system, and in particular some sub-segments of the asset management industry. If investment funds hold relatively less liquid assets but give investors the right to redeem their holdings at short notice, there is a risk that, in periods of stress, investor redemptions could exhaust available liquidity in the asset management vehicle, causing the need to liquidate part of the less liquid holdings. Such pressures to liquidate assets can be magnified if leverage is used by investment funds, including through derivatives transactions. In the US, regulators have therefore recently called for better and more extensive data on the financial position of investment funds, in particular as regards the composition of the assets under management, the available share of cash or liquid assets, and the presence of leverage in the investment positions. The case has also been made for a better regulatory and supervisory framework for this sector, which reportedly features increasingly complex portfolio structures, and operations that need to be matched by adequate internal risk controls in order to avoid negative spill-over effects on other market participants in the event of severe financial difficulties in one of these vehicles.

In Belgium, too, the assets under management of the non-bank financial sector have been growing steadily in recent years and the following paragraphs will provide a first exploratory mapping of these "shadow banking" activities. First, however, it must be remembered that there is no single commonly accepted definition of shadow banking, even though definitions usually make reference to the core activities of conventional banking. The Financial Stability Board (FSB) – *Shadow banking : scoping the issues. A background note of the Financial Stability Board, 12 April 2011* – defines shadow banking as a *"system of credit intermediation that involves entities and activities outside the regular banking system"* and therefore outside the regulatory perimeter. Shadow banking entities include, for instance, money market funds, investment funds and hedge funds. Examples of shadow banking activities are securities financing transactions (repos, securities lending) and the use of derivatives (synthetic leverage, credit enhancement).

The limited degree of regulation is a potential concern, as shadow banking has become an important provider of credit to the economy. But shadow banking can also play a beneficial role as a complement to traditional banking by expanding access to credit or by supporting market liquidity, maturity transformation, and risk sharing. However, the financial crisis has also demonstrated the shadow banking system's potential to generate systemic risk. Systemic risk from shadow banking may result directly from credit intermediation activities (maturity and liquidity transformation, imperfect credit risk transfer and leverage) or indirectly through the interconnections between the shadow banking sector and the regular banking system.

The FSB strongly recommends authorities to have a monitoring framework in place for shadow banking in order to identify and assess the related risks on a regular and continuous basis. To put this approach into operation, the FSB's first step is to map shadow banking on the basis of the national flow of funds data and concepts, to obtain a broad view of shadow banking developments. The second step in this approach is to narrow the focus, in order to concentrate on credit intermediation entities/activities outside the regular banking system that have the potential to pose systemic risks. With reference to the shadow banking entities, for instance, it is important to distinguish between entities that perform shadow banking functions and entities that are part of the shadow banking system but perform functions not related to credit intermediation. While the FSB's broad definition of shadow banking is accepted, the narrower concept is still under discussion. The FSB suggests a narrower concept of shadow banking in order to focus, for policy purposes, on the subset of non-bank credit intermediation where there are (i) developments that increase systemic risk (maturity/liquidity

transformation, imperfect credit risk transfer and leverage), and (ii) indications of regulatory arbitrage undermining the benefits of financial regulation. This entails for example the exclusion of retained securitisations (no transfer of risk as asset-backed securities are held by the bank originating the assets, generally for use as eligible collateral) and of entities prudentially consolidated into banking groups.

In line with the FSB recommendation and definitions, the following paragraphs describe the shadow banking entities for which data is available in the Belgian flow of funds national accounts (see Table 1 for a typology of entities included in the broad definition of shadow banking). In Chart 4 and Box 1, the size of the shadow banking system in Belgium is approximated by the total amount of assets held by financial corporations considered as shadow banking entities in the broad FSB definition (given that no data are available for shadow banking activities).

TABLE 1 ENTITIES INCLUDED IN THE BROAD DEFINITION OF SHADOW BANKING

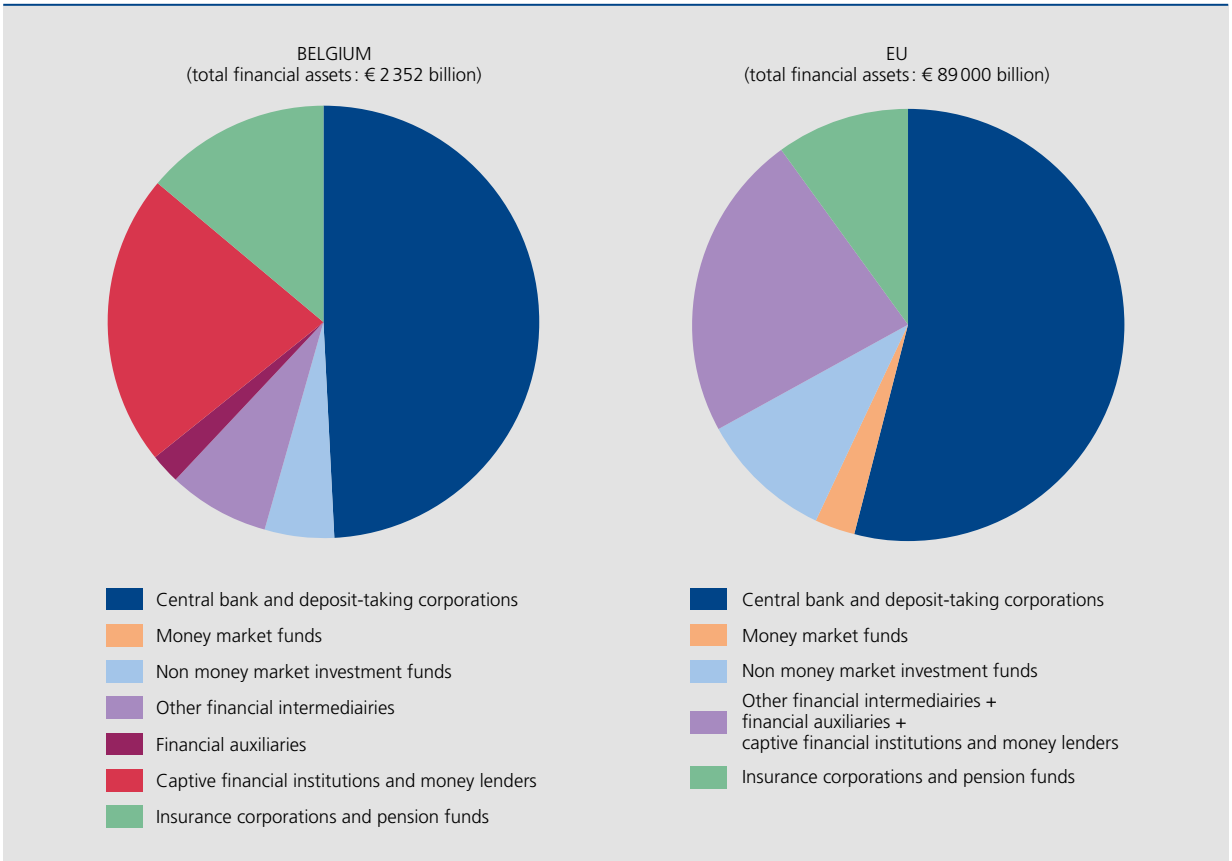
Money market funds	Issue investment fund shares or units as close substitutes for deposits from institutional units, and, for their own account, make investments primarily in money market fund shares/units, short-term debt securities, and/or deposits.
Non money market investment firms	Issue investment fund shares or units which are not close substitutes for deposits, and make investments primarily in financial assets other than short-term financial assets and in non-financial assets (usually real estate). Include open and closed-ended investments funds in bonds, shares, other funds (funds of funds) and hedge funds. Given the difficulties of defining the different investment funds in a harmonised way, the ECB has issued guidelines on how to classify the different funds. Hence, funds are classified in six categories: bond funds (investing primarily in securities other than shares), equity funds (investing primarily in shares), mixed funds (investing in both bonds and shares with no prevalent policy), real estate funds (investing in real estate), hedge funds and other funds (a residual category). Under the ECB classification, other funds includes the category 'index funds' which aim at tracking a specific benchmark. Pension saving funds are saving schemes where the money is mostly invested in bonds and shares and which offer tax advantages for the subscribers.
Other financial intermediaries	Consist of financial vehicle corporations engaged in securitisation transactions, security and derivative dealers (or stockbroking firms), financing corporations engaged in lending (leasing and provision of personal or commercial finance) and a diverse group of specialised financial corporations (export/import financing corporations, central clearing counterparties, …).
Financial auxiliaries	Include management activities for UCITS, asset management companies, Euronext, exchange offices, settlement companies, payment companies, guarantee banks, headquarters of financial institutions.
Captive financial institutions and money lenders	Mainly consist of financial holding companies and cash management companies (including coordination centers).

Source: ESA2010.

Chart 4 reports total assets of the whole financial sector in Belgium and in the EU. The broad definition of shadow banking includes money market funds, non money market investment funds, other financial intermediaries, financial auxiliaries and captive financial institutions. According to this definition, in September 2014 the Belgian shadow banking sector's assets amounted to €870 billion, representing 37 % of total financial sector assets, 80 % of total bank assets and 216 % of GDP. In the EU, the shadow banking sector's assets amounted to €32 040 billion, or 36 % of total financial sector assets and 230 % of GDP.

CHART 4 FINANCIAL SECTOR BREAKDOWN

(total assets 2014 Q3, in % of total financial sector)



Sources: JEGS (2015), A mapping and risk metrics framework for the EU shadow banking system, Draft second report of the JEGS Task Force on Risk Metrics, internal document of the ESRB, 6 March 2015, NBB.

In a first attempt to narrow down the focus to critical areas of systemic risk, entities not involved in credit intermediation such as equity funds, are excluded. Captive financial entities are excluded as well. They mainly consist of financial holding companies and coordination centres and are important in Belgium in terms of assets, as they represent 59 % of the whole shadow banking sector, a much larger percentage than in other EU countries. However, they are excluded from the narrow definition because their financial links with the banking sector are very limited – only 1 to 2 % of their liabilities are on the Belgian and EMU banking sector and these liabilities represent less than 1 % of Belgian banks' total assets – and the potential risks for financial stability therefore seem limited. By excluding these two sub-sectors, total assets of shadow banking decrease to €319 billion or 79 % of GDP in Belgium. Comparable data are not available at international level.

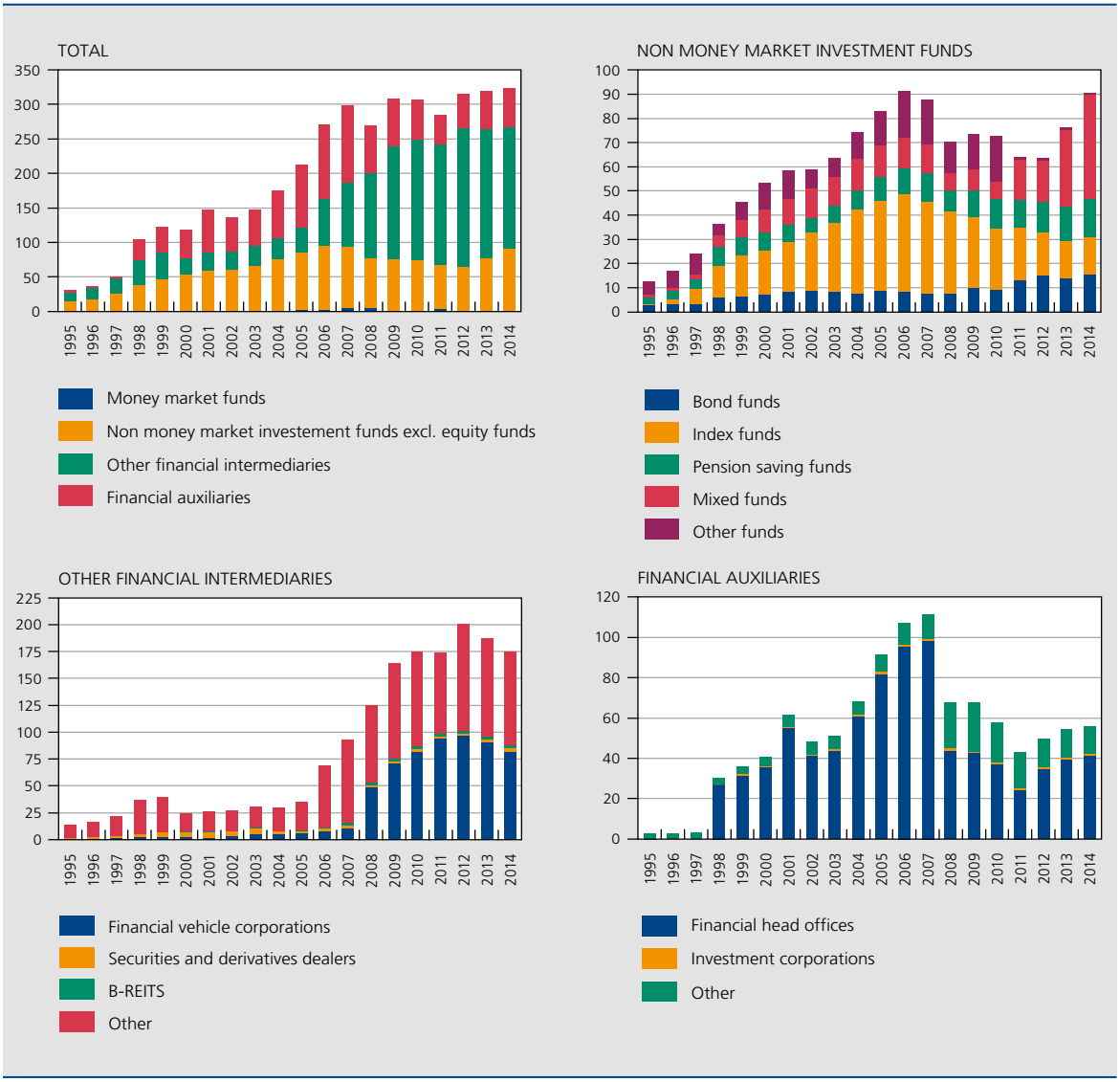
Box 1 discusses in more detail the breakdown and developments over time of the assets of the Belgian shadow banking system according to the narrow definition.

Box 1 – Breakdown of the Belgian shadow banking sector's total assets

The chart below shows the total assets of the various shadow banking sub-sectors and entities over the period December 1995 to December 2014. Total assets of money market funds have always been very small (around €1 billion), with peaks in 2007-2008 and 2011. The size of non money market investment funds (excl. equity funds) increased steadily until 2006, and remained above €63 billion thereafter, expanding further in 2013 and 2014. Total assets of the sub-sector 'other financial intermediaries' increased from €13 billion in 1995 to €200 billion in 2012, before diminishing somewhat in 2013 and 2014. Financial auxiliaries grew strongly from 1998 until 2007, when they reached a size of €111 billion, but after that they declined considerably.

SHADOW BANKING: TOTAL ASSETS AND BREAKDOWN

(in € billion)



Source: NBB

In the 'non money market investment funds (excl. equity funds)' sector, both bond funds and pension saving funds increased over the period considered, both reaching €16 billion in 2014. Index funds increased from €0.5 billion in 1995 to €40 billion in 2006, dropping to €15 billion in 2014. The size of mixed funds averaged €12 billion between 2001 and 2007, before rising almost continuously to €43 billion in 2014. 'Other funds' is a residual category that almost disappeared after 2010, due to the introduction of a new reporting system in 2010 (ESA2010) which added more granular information on the sub-entities in the non money market investment funds sector, making it easier to classify them in the appropriate sub-category. This partly explains the increase in size of mixed funds.

In the 'other financial intermediaries' sector, total assets of financial vehicle corporations jumped in 2008 and continued increasing to €97 billion in 2012, before dropping to €82 billion in 2014. Financial vehicle corporations are entities engaged in securitisation transactions, mostly on mortgage loans, which have boomed since 2008. Total assets of securities and derivatives dealers averaged €2.5 billion in recent years. The size of real estate investment companies (B-REITs) increased to €3 billion in 2014. 'Other' is a residual category, where a significant increase in terms of total assets was recorded between 2005 and 2014, from €26 billion to €86 billion. There are still some gaps in the information available on this residual category to fully explain the increase in their size, which is partly due to the creation of new entities and to reclassifications following ESA2010: for instance, entities that were once considered as non-financial holding companies and are now classified under ESA 2010 as other financial intermediaries.

In the 'financial auxiliaries' sector, total assets of financial head offices increased significantly between 2005 and 2007, when they reached € 98 billion. The subsequent sharp decrease is due to the financial crisis affecting several bank holding companies. The size of investment corporations has been always around €1 billion since 2002. 'Other' is a residual category, whose total assets reached €23 to 24 billion in 2008-2009 before declining to €14 billion in 2014.

While money market funds are very small, total assets of non money market investment funds (excl. equity funds) amounted to €87 billion in September 2014. Of similar importance were the financial auxiliaries (€52 billion of total assets), over 70 % of which consist of financial head offices. The largest shadow banking entities, in terms of assets, are the other financial intermediaries (€179 billion), of which financial vehicle corporations represent €85 billion.

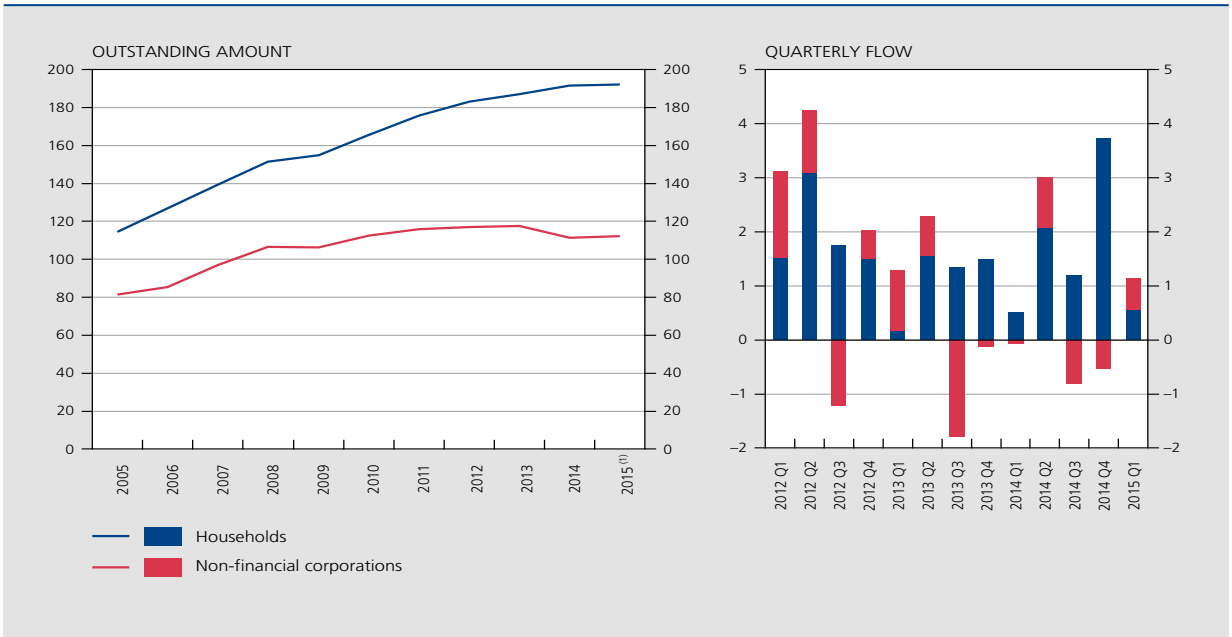
While the FSB's broad definition of shadow banking is well established, the narrower concept is thus still under discussion at international level. This is linked to the difficulties of defining shadow banking and obtaining a comprehensive assessment of the related risks; the continuing gaps in the data, particularly on shadow banking activities, are also a factor here. Work is in progress to further narrow down the Belgian definition by excluding retained securitisation, which seems to be common practice, and entities prudentially consolidated into banking groups. Taking into account these corrections, the total assets of the shadow banking sector in Belgium will be relatively small. This being said, further work is also necessary to develop a set of metrics to assess the risks related to these shadow banking activities. This risk metrics framework will focus on maturity transformation, liquidity transformation, leverage, credit intermediation and interconnectedness, taking into account the specific characteristics of Belgian regulation and market practices.

1.3 Bank credit developments in Belgium

The growing role of non-banks in credit intermediation is also evident in Belgian non-financial corporations' increasing reliance on debt securities financing instead of bank loans. In 2014, reduced borrowing from banks even led to a decline in the outstanding amount of Belgian banks' loans to domestic non-financial corporations (Chart 5); corporations able to issue bonds on the capital markets preferred this type of funding because it was cheaper than bank loans, owing to the sharp fall in interest rates on corporate bond markets.

CHART 5 BELGIAN BANKS' LOANS TO DOMESTIC HOUSEHOLDS AND NON-FINANCIAL CORPORATIONS

(data corrected for securitisation operations, in € billion)



Source: NBB.

Belgian banks' loans to domestic households, by contrast, continued to grow in 2014, albeit at the very moderate rate of 2.5 %. As shown in the right-hand panel of Chart 5, net lending to Belgian households expanded quite strongly in the last quarter of the year, mainly because of mortgage borrowers in Flanders anticipating the amendments to the "woonbonus" as from 1 January 2015 in that Region, which will reduce the tax advantage for new mortgage loans. This anticipation also explains why the amount of new household loans dropped sharply in the first quarter of 2015. Overall, this seems to indicate a continuation of the slower growth of mortgage loans apparent since 2011, when annual loan growth dropped to below 5 % from rates above that level in the preceding years.

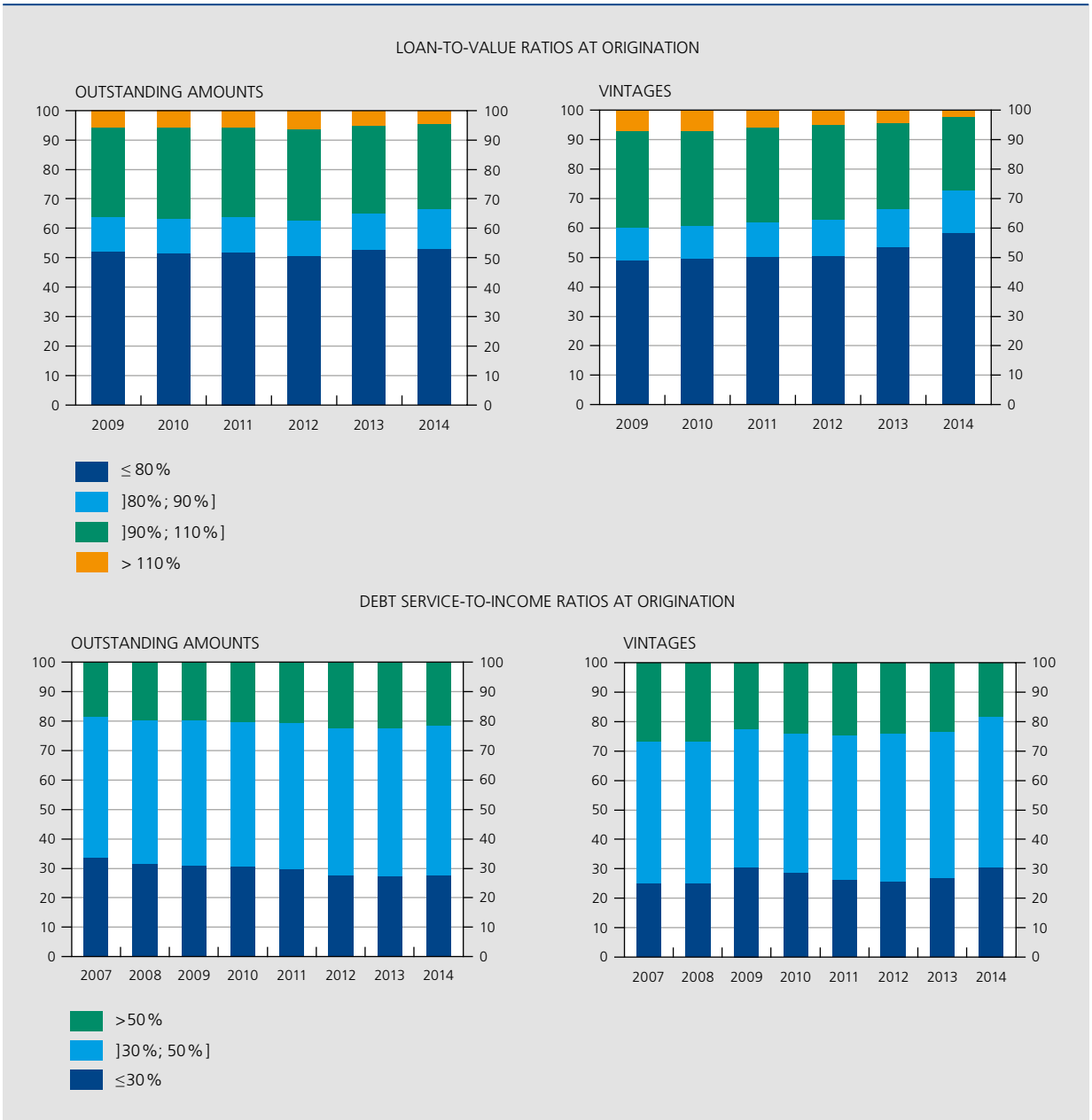
Chart 6 reviews recent developments in two main credit standards applied to new Belgian mortgage loans and shows that banks continued to reduce the production of mortgage loans with the highest LTV-ratios or debt-service-to-income ratios in their 2014 production vintage, as compared to the proportions prevailing in recent years. In 2014, almost 30 % of the new production volume was nevertheless still associated with an LTV at origination of more than 90 %. For the debt-service-ratios at origination, around one fifth of new production volumes in 2014 still concerned mortgage loans for which the debt service represents more than half of the debtors' income. More background information about the Belgian mortgage market can be found in the thematic article in the Financial Stability Review 2014.

The Macroprudential Report article in this FSR reiterates the three prudential measures that the Bank took at the end of 2013 to bolster the resilience of the market and of those credit institutions with the largest exposures to Belgian mortgage loans. Since then, the Bank has continued to closely monitor market developments, which seem to be consistent – in terms of house price growth and mortgage loan growth – with a continuation of the soft landing experienced in the most recent period. As recalled in the above-mentioned thematic article of 2014, the existing stock of Belgian mortgage loans nevertheless still contains (Chart 7) riskier loan segments that could be the source of higher-than-expected credit losses for banks if conditions on the Belgian housing market were to remain less buoyant than they have been over the past 15 years. Even though loss rates on mortgages have remained at very low levels so far, banks thus need to remain vigilant about potential risks stemming from the Belgian residential mortgage market.

In spite of the recent tightening of some credit standards for new mortgage loan production, a sizeable group of borrowers in recent years may have stretched their mortgage loan maturities, loan sizes and/or debt-service-ratios to

CHART 6 CREDIT STANDARDS APPLIED TO BELGIAN MORTGAGE LOANS

(in % of total loans at the end of the year or total loans granted during a particular vintage)



Source : NBB.

levels that could entail a higher risk of future credit losses for banks than in the past. Here, it should be pointed out that banks' internal (IRB) models, used to compute the minimum regulatory capital buffers for Belgian mortgage loans, result in risk weights (10 % on average) that are significantly lower than those applied under the standardised approach (35 %) of the Basel II framework. As banks have calibrated these internal risk models on historical credit loss data, these low risk weights can to some extent be explained by the absence of a major crisis on the Belgian housing market in the past, and by the generally buoyant market conditions of the past 15 years. Risk weights as calculated by the IRB models could thus be too low for losses that may emerge in less favourable market circumstances, as a result of the materialisation of risks embedded in certain sub-segments of banks' Belgian mortgage loan portfolios. In this context, and in view of the relatively large share of domestic mortgage loans in the balance sheets of Belgian credit institutions, the Bank thus considered it justified to maintain the macroprudential measure decided at the end of 2013 that consisted in a flat-rate

CHART 7 BREAKDOWN OF THE PORTFOLIO OF MORTGAGE LOANS OF IRB BANKS BY LTV, DSR AND MATURITY AT ORIGINATION (1) (2)

(non-consolidated data, at the end of 2014)

Source: NBB.

(1) The three indicators are calculated at the time of granting the loans.

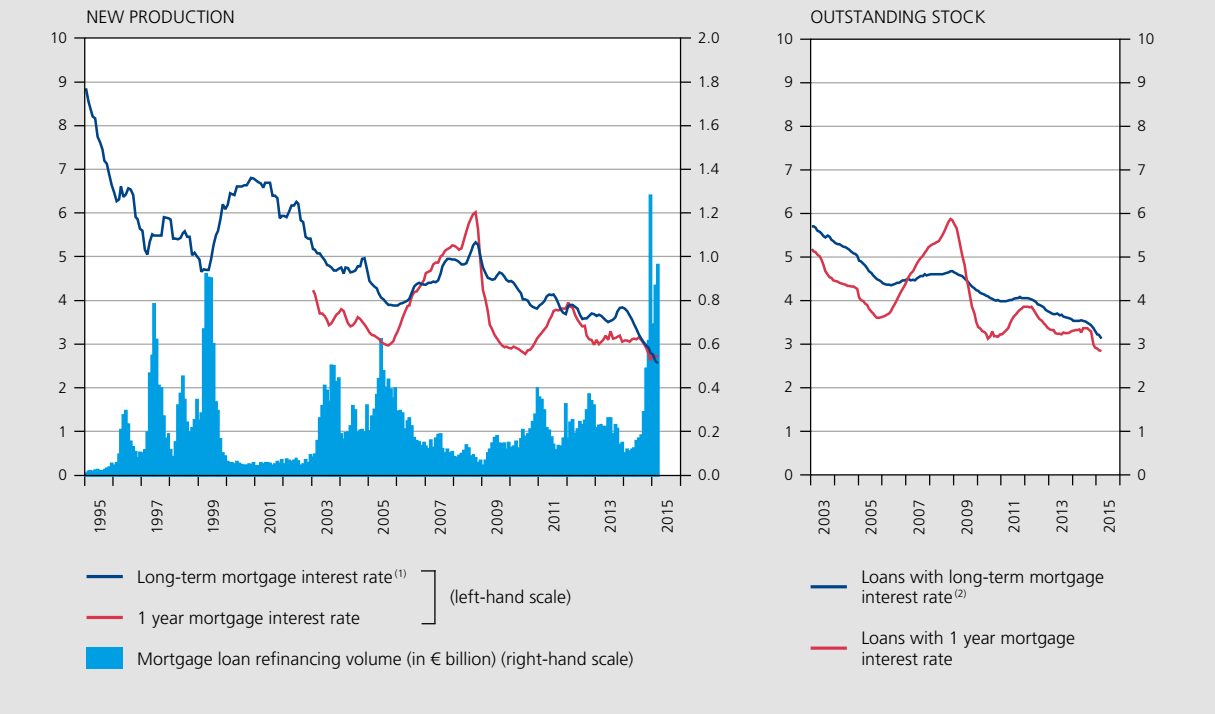
(2) The relative size of the circles reflects the relative size of the portfolios, while the level of the outstanding amount of loans in relation to the value of the property (loan-to-value, LTV) and the ratio between the debt repayments and the borrower's income at the time of granting the loan (debt service ratio, DSR) are broken down by specific intervals. In addition, each portfolio is broken down according to the initial maturity (maturity, M) of the loans expressed in years.

5-percentage-point increase in the risk weights calculated by the banks using an internal model for their minimum regulatory capital requirements for Belgian mortgage loans. In practice, if a bank using the IRB approach calculates an internal risk weight of 10 % for Belgian mortgage loans, this measure requires the minimum capital requirements to be calculated on the basis of a 15 % risk weight. As a result of the introduction of this add-on, the average risk weight of the IRB banks effectively increased by 50 % from around 10 % at the end of 2012 to about 15 % since the end of 2013. While the relatively moderate size of the add-on seemed appropriate in view of the Belgian banks' generally rather conservative policy on mortgage lending in the past, and the historically low level of losses on such loans, the Bank has kept a very close eye on market developments, in view of the cyclical character of this measure. In its most recent assessment, conducted at the end of the period under review, the NBB's Board of Directors decided that the level of the add-on was still appropriate in the light of market developments.

The monitoring of recent market developments in the Belgian mortgage market also focused on the very large amount of mortgage loan refinancing, as customers made use of the quite cheap early redemption option available under the Belgian mortgage loan regulations – prepayment fee of maximum three months of interest on the outstanding amount of capital – to refinance their existing mortgage loans at a lower interest rate (Chart 8). As shown in the left-hand panel of the chart, monthly mortgage refinancing volumes are indeed very sensitive to the level of interest rates on mortgage loans when rates on new mortgages fall below the yield on historical contracts. This remortgaging activity depresses the profitability of Belgian mortgage loan portfolios and constitutes an option-type source of interest rate risk for the Belgian banks. These interest rate risks and related hedging costs, together with an appropriate funding cost for an asset portfolio with sometimes very long-term assets, have to be included by the banks in the commercial margins taken on

CHART 8 MORTGAGE LOAN INTEREST RATES

(in %, unless otherwise stated)



Source: NBB.
(1) Initial rate fixed for at least 10 years.
(2) Rate fixed for more than five years.

mortgage loans. Since the global financial crisis, these commercial margins have been raised from very low levels to an average of around 100 basis points relative to swap rates and they were maintained at around these levels during the period under review. Notwithstanding these higher commercial margins in new production, the average yield of the Belgian mortgage portfolio is falling steadily (right-hand panel of Chart 8), highlighting one of the main challenges that the very low interest rate environment is posing for the Belgian banking sector in maintaining an adequate level of profitability, six and a half years after the major losses sustained in the wake of the failure of Lehman Brothers.

2. Banking sector

The bankruptcy of Lehman Brothers in September 2008 – and the major financial tensions that followed – led to a major transformation process for the largest credit institutions in the Belgian banking sector. This process entailed a wide-ranging balance sheet restructuring (in exchange for the state support received) and an adaptation of activities to a new, often less favourable, operating environment. It resulted in a marked decrease in banks' balance sheets and a reorientation of activities towards Belgian counterparties, achieved by cutting back the size of foreign exposures (with the main exception of a few "home markets" abroad). Claims on foreign corporates and banks were reduced the most, allowing the Belgian banking sector to end its reliance on the interbank market as an indispensable net source of funding. The size of intragroup transactions also declined, but these operations are still used to recycle a portion of Belgian banks' ample domestic deposits for investment abroad.

The developments since September 2008 have also resulted in a major de-risking of the Belgian banks' balance sheets, on the back of a rising share of exposures to the public sector – albeit more concentrated on Belgium – and a gradual further

expansion of the domestic mortgage loan portfolio. At the margin, these changes in banks' activities towards the financing of households and the public sector may have modified the intermediation role that Belgian banks play in the economy.

By fostering "low-risk" activities, this de-risking may also have led to structurally lower, but less volatile, profitability. In recent years, banks have relied to a much greater extent on net interest income to generate profits. However, this increased reliance on net interest income comes at a time when low interest rates and weak economic growth could start to weigh on this income source. This highlights the continuing challenges that banks are facing in restoring an adequate, but sustainable, level of profitability. In spite of the major changes that have already been made, Belgian banks are thus still facing the challenge of having to adapt their business models and activities to new and evolving operating conditions.

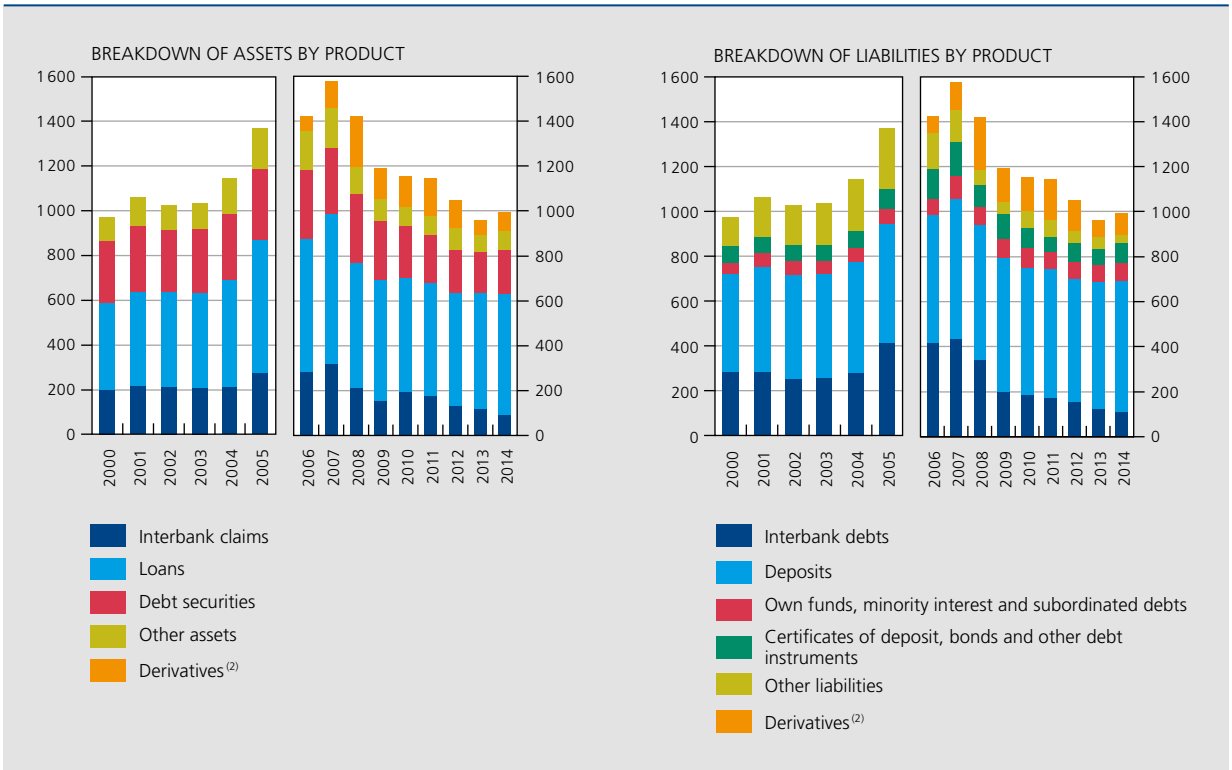
Since the introduction of the Single Supervisory Mechanism (SSM), the vast majority of the Belgian banking sector's assets are held by banks that come under SSM supervision, including the "significant institutions" KBC Bank, Belfius Bank, Argenta, AXA Bank Europe, Bank of New-York Mellon and Bank Degroof. Other banks governed by Belgian law – such as BNP Paribas Fortis and ING Belgium – are also subject to SSM supervision as they are subsidiaries of non-Belgian "significant institutions". As before, developments in these major banking institutions are a key driver of the sector aggregates used for the macroprudential supervision of the Belgian banking sector.

2.1 Deleveraging, asset restructuring and asset quality

At the end of June 2008, a few weeks before the bankruptcy of Lehman Brothers, the total assets of the Belgian banking sector amounted to € 1714 billion. Since then a major deleveraging has taken place, bringing total assets below € 1000 billion since 2013 (Chart 9). Compared to their European peers, Belgian banks started to deleverage earlier and more

CHART 9 BALANCE SHEET STRUCTURE OF BELGIAN CREDIT INSTITUTIONS [1]

(consolidated end-of-period data, in € billion)



Source: NBB.

(1) Data compiled in accordance with the Belgian accounting rules until 2005 (Belgian GAAP) and IAS / IFRS from 2006.

(2) Derivatives are recorded at their market value including, from 2007, income receivable and expenses payable.

extensively, often as part of agreements with the EC, following state aid received by some of the major Belgian players. The deleveraging of the Belgian banking sector was concentrated among the four largest credit institutions, whereas the assets of the other smaller Belgian banks continued to grow. Before the crisis, the four main credit institutions accounted for almost 95 % of the sector in terms of balance sheet size, whereas they now represent 82 % of the whole sector.

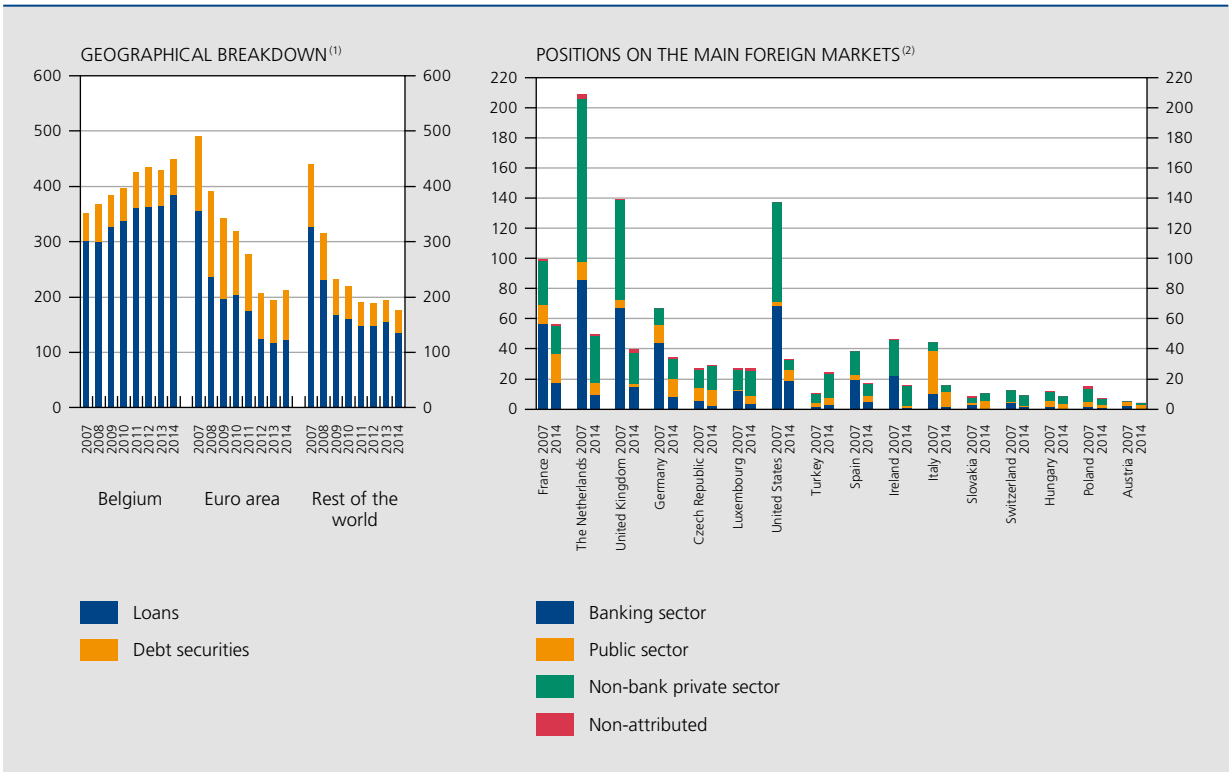
This deleveraging trend now seems to have come to an end, with total assets growing again by 4 % to € 996 billion in the course of 2014. Compared to 2008, the composition of these assets has fundamentally changed. In 2008, Belgian banks had developed their foreign activities substantially (either cross-border or through local presence), as the mature banking market in Belgium was not offering enough scope for expansion. By the end of 2014, many of these foreign activities had been stopped, sold or placed in run-off so that 77 % of the banking sector's assets were related to activities conducted in Belgium. The main remaining foreign (physical) activities are located in Eastern and South-Eastern Europe (KBC Bank, BNP Paribas Fortis), the Netherlands (Argenta), Ireland (KBC Bank), Switzerland (ING Belgium) and Luxembourg.

In line with the Belgian banks' refocusing on the Belgian market, loans to Belgian counterparties have grown further, including during the crisis years, from € 303 billion at the end of 2007 to € 385 billion at the end of 2014 (left panel of Chart 10). If debt securities are included as well, total claims on Belgian counterparties increased by € 97 billion between the end of 2007 and the end of 2014, lifting their share in total loans and debt instruments from 27 % to 54 %. In sharp contrast, loans and debt securities of foreign counterparties fell by a cumulative € 543 billion between 2007 and 2013, before stabilising in 2014 at € 389 billion.

The right panel of Chart 10 compares the Belgian banks' exposures to specific countries between the end of 2007 and 2014 and illustrates the major changes seen over that period. The marked decrease in exposures vis-à-vis Dutch

CHART 10 GEOGRAPHICAL BREAKDOWN OF ASSETS HELD BY BELGIAN CREDIT INSTITUTIONS IN THE FORM OF LOANS AND DEBT SECURITIES

(consolidated end-of-period data, in € billion)



Source: NBB.

(1) Data obtained from the consolidated reporting of Belgian credit institutions. Distribution in accordance with the FINREP prudential reporting.

(2) Data obtained from the consolidated reporting of international banking statistics. The assets are classified according to the ultimate risk, i.e. after risk transfer.

counterparties mainly reflects the exit, in 2008, of Fortis Bank Nederland from the consolidation scope of Fortis Bank, the current BNP Paribas Fortis. The reduction of exposures vis-à-vis US and UK counterparties relates to the marked reduction of activities on the wholesale market (e.g. derivative contracts, repo, reverse repo).

A large proportion of exposures vis-à-vis counterparties located in countries such as the Netherlands, Czech Republic, Turkey, Ireland, Slovakia, Hungary and Poland, are not cross-border exposures, but reflect the physical presence of Belgian banks in these countries. The exposures vis-à-vis counterparties in these countries which – in addition to Belgium – can be considered as the "home markets" of selected Belgian banks were much less affected by the deleveraging process than the other foreign exposures, at least at the level of individual banks, and in some cases the exposures even increased.

The exposures vis-à-vis emerging markets are rather limited and amounted to € 32 billion at the end of 2014. They are mainly concentrated on Turkey (€ 24 billion) given the presence in BNP Paribas Fortis' consolidation scope of BNP Paribas' Turkish activities. Besides Turkey, the main exposures to emerging markets concern China, India and Russia (€ 2 billion each). Just under half of these exposures are vis-à-vis corporates which could be partly subject to foreign exchange rate fluctuations if they funded themselves extensively in foreign currencies (e.g. US dollar).

Tables 3 and 4 below use the new FINREP reporting to provide a more detailed breakdown of foreign exposures – in particular of those grouped as "non-bank private sector" in Chart 10 – between exposures to households, non-financial corporations and non-bank financial corporations.

EXPOSURES TO DOMESTIC AND FOREIGN CORPORATIONS

At the end of 2014, domestic and foreign non-bank corporate exposures – presented in more detail in Box 2 – represented a total of € 271 billion (slightly more than a quarter of total assets), of which 91 % was in the form of loans and 9 % in the form of debt securities. Of this total, foreign non-financial corporations (NFCs) and non-bank financial corporations (NBFCs) accounted for respectively € 98 billion and € 31 billion. While these exposures were greatly reduced between 2008 and 2013 – despite the transfer of some portfolios from its parent company to one large Belgian bank – they still account for some sizeable concentrated risk exposures. Loans to Turkish NFCs, for example, represent € 11 billion or 12 % of Belgian banks' total loans to foreign NFCs. In comparison, the total exposures to Belgian NFCs and NBFCs amounted to € 121 billion and € 22 billion at the end of last year.

Credit deterioration in the corporate loan portfolio played an important role in the increasing percentage of impaired claims among total loans, from 1.5% at the end of 2007 to 4.3 % at the end of 2013 (Table 2). In 2014, this ratio fell back again to 3.9 %. On the one hand, this reflected the fact that the Asset Quality Review (AQR), undertaken in the course of 2014 in preparation for the SSM, did not lead to any significant correction in the percentage of loans that had to be recognised as impaired. On the other hand, it also reflected a decrease in the total amount of impaired loans at one of the largest banks. Looking ahead, however, it cannot be excluded that the prevailing low growth could lead (albeit with a lag) to increased default rates. The increase in 2014 in the coverage ratio, which had until then remained around 40 % for some years, can be explained by changes in the composition of impaired loans at the same large bank.

TABLE 2 CREDIT QUALITY INDICATORS OF EXPOSURES IN THE FORM OF LOANS
(consolidated data)

	2007	2008	2009	2010	2011	2012	2013	2014
Percentage of impaired claims (1)	1.5	2.0	2.9	2.8	3.3	3.8	4.3	3.9
Coverage ratio (2)	32.3	41.1	43.0	42.8	41.5	41.4	39.5	43.3

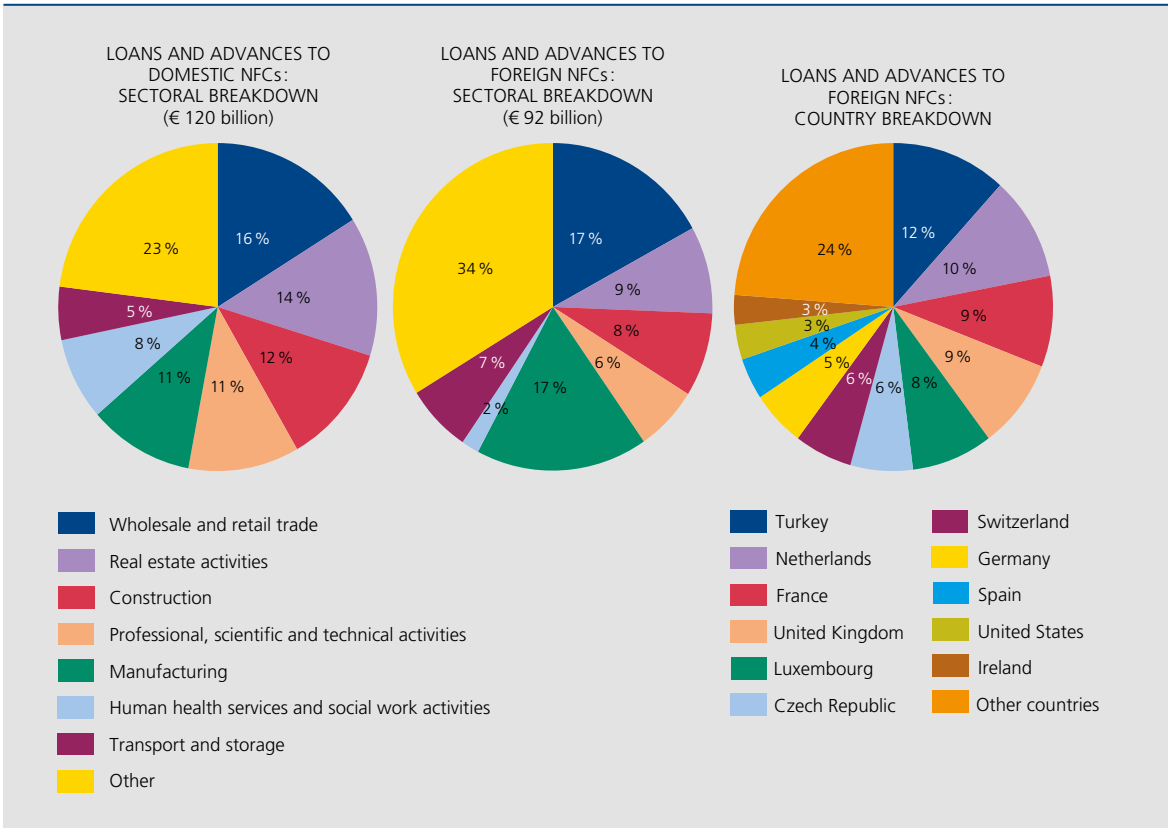
Source: NBB.
(1) Impaired claims (according to IAS 39 definition) as a % of total loans.
(2) Percentage of impaired claims covered by specific provisions.

Box 2 – Geographical and sectoral breakdown of claims on non-bank corporations

The new FINREP reporting allows a breakdown of corporate exposures between exposures vis-à-vis non-financial corporations (NFCs) and exposures vis-à-vis non-bank financial corporations (NBFCs).

Exposures on foreign NFCs in the form of loans, which amounted to € 92 billion at the end of 2014, are mainly concentrated on Turkey, the Netherlands, France, the United Kingdom and Luxembourg (see chart below). From a sectoral point of view, loans to counterparties active in manufacturing, wholesale and retail trade, (commercial) real estate and construction account for more than half of total loans to foreign NFCs. While showing some similarities with foreign exposures, loans to Belgian NFCs, which amounted to € 120 billion at the end of 2014, focus to larger extent on (commercial) real estate, construction and professional, scientific and technical activities, and less on manufacturing. Data from the Central Credit Register capture these domestic exposures, as well as some cross-border lending. These data show that banks' exposures vis-à-vis counterparties in real estate related sectors nearly doubled over the last 10 years and increased again in 2014 by 2.4 %. These counterparties prove very heterogeneous, ranging from public social housing companies to real estate investment trusts and promotors. The exposures are heavily concentrated on the four largest Belgian banks.

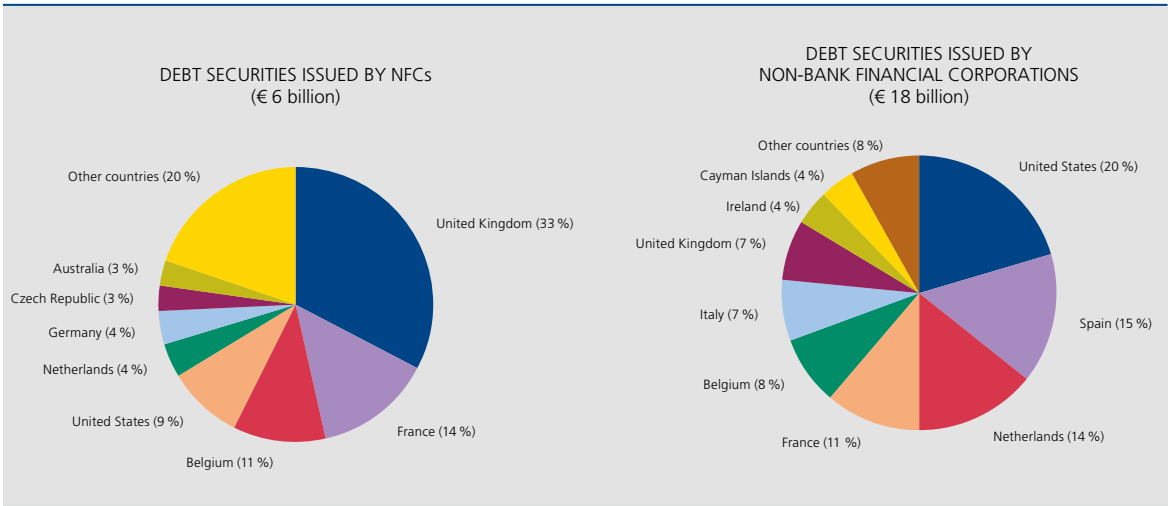
BREAKDOWN OF ASSETS HELD BY BELGIAN CREDIT INSTITUTIONS IN THE FORM OF LOANS TO NON-FINANCIAL CORPORATIONS
(in %, at the end of December 2014)



Source: NBB.

BREAKDOWN OF ASSETS HELD BY BELGIAN CREDIT INSTITUTIONS IN THE FORM OF DEBT SECURITIES ISSUED BY NON-FINANCIAL CORPORATIONS AND NON-BANK FINANCIAL CORPORATIONS

(in %, at the end of December 2014)



Source: NBB.

Significant exposures to non-bank corporates are also held in the form of debt securities (see chart above). While debt securities issued by NFCs amounted in the Belgian banks' books to barely € 6 billion at the end of 2014, those issued by non-bank financial corporations amounted to € 18 billion, including inter alia asset-backed securities issued by special purpose vehicles (SPVs). In addition, exposures on non-bank financial corporations in the form of loans amounted to € 35 billion, of which € 20 billion were vis-à-vis Belgian counterparties, the remainder being mainly vis-à-vis firms in the United Kingdom (€ 5 billion), Germany (€ 3 billion) and the Netherlands (€ 2 billion).

Table 3 provides some further details about the share of non-performing claims, using the somewhat broader EBA definition of non-performing exposure[1]. The percentage of non-performing loans and advances is higher for the portfolio of loans to NFCs than for the loan portfolio as a whole. Hence, loans to Belgian SME and non-SME NFCs show relatively high NPE rates of 5.6 % and 5.2 % respectively at the end of 2014, compared to 2.9 % for the total loans to domestic counterparties. These shares are even higher for foreign SME and non-SME NFCs at 11.2 % and 6.3 % respectively, compared to 5.9 % for the total loans to foreign counterparties. The share of non performing debt securities is much lower.

EXPOSURES TO OTHER CREDIT INSTITUTIONS

Claims on credit institutions have also decreased significantly since the onset of the crisis, from € 321 billion at the end of 2007 to € 91 billion at the end of 2014. The decrease in these exposures, that to a very large extent concerned foreign counterparties, partly stemmed from the decrease in the market value of derivatives, as that led to a reduced need for cash collateral posting at derivatives counterparties. More generally, it showed the reduction in Belgian banks' wholesale activities.

At the end of last year, Belgian banks' biggest exposures to the foreign banking sector (excluding central banks) were to the United States (€ 19 billion), France (€ 18 billion), the United Kingdom (€ 15 billion), the Netherlands (€ 9 billion) and Germany (€ 8 billion). Although they are still significant, these amounts have been greatly reduced since 2007. These

(1) Impairment is defined according to International Financial Reporting Standards (IFRS). The concept of non-performing exposure (NPE) has been defined by the European Banking Authority (EBA) and builds on the definitions of impairment and default (according to the Capital Requirements Regulation – CRR), while being broader than these two concepts.

TABLE 3 EXPOSURES ON NON-FINANCIAL CORPORATIONS AND NON-BANK FINANCIAL CORPORATIONS IN THE FORM OF LOANS OR DEBT SECURITIES

(consolidated data, at the end of December 2014)

	Domestic			Foreign		
	Outstanding exposure (in € billion)	NPE (in € billion)	NPE (in %)	Outstanding exposure (in € billion)	NPE (in € billion)	NPE (in %)
Loans and advances to:						
NFCs non-SME	68.9	3.6	5.2	60.1	3.8	6.3
NFCs SME	51.5	2.9	5.6	32.1	3.6	11.2
Other financial corporations	20.2	0.9	4.4	14.9	0.1	0.8
Debt securities issued by:						
NFCs	0.7	0.0	1.7	5.3	0.1	1.7
Other financial corporations	1.4	0.0	0.2	16.2	0.1	0.7

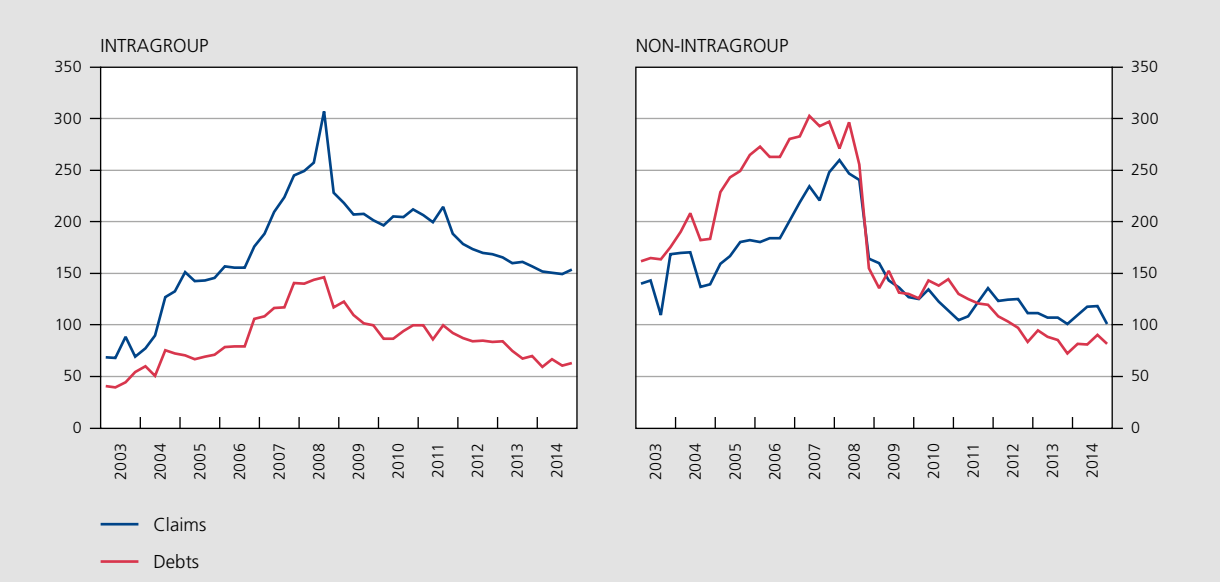
Source: NBB.

cross-border interbank exposures include both intragroup and non-intragroup claims, as some of the above-mentioned consolidated data capture intragroup interbank exposures, for example when Belgian consolidating credit institutions are part of a larger financial group, as in the case of BNP Paribas Fortis or ING Belgium or, in the past, in the case of Dexia Bank Belgium, now Belfius, within the Dexia group.

Chart 11 looks more closely at the scale of this intragroup financing, using data compiled on a territorial basis, whereby intragroup flows between banking entities located in Belgium and those based abroad are distinguished from non-intragroup interbank transactions. The data reveal that Belgian banking entities are, on aggregate, still large net providers of liquidity

CHART 11 CROSS-BORDER INTERBANK INTRAGROUP AND NON-INTRAGROUP POSITIONS

(data on a territorial basis, in € billion)



Source: NBB.

to other entities of the banking groups to which they belong, as they provide significantly more intragroup financing than they receive, even if on a much smaller scale than in 2007 and 2008. This largely reflects the fact that Belgian banks still recycle a part of their domestic liquidity (e.g. deposits) to fund activities abroad within their group, as domestic customer deposits are larger than loans to those counterparties. Yet, there has been a major change in the level of these transactions since the onset of the crisis. In particular, whereas in the third quarter of 2008, net intragroup financing by Belgian counterparties amounted to € 161 billion, there was a big reduction in intragroup financing following the exit of Fortis Bank Nederland from the consolidation scope of Fortis Bank and the termination of the associated intragroup flows. After remaining relatively stable at around € 110 billion until the end of the third quarter of 2011, net intragroup interbank claims then dropped to € 90 billion at the end of December 2014. Following its takeover by the Belgian State, with effect from the fourth quarter of 2011, Belfius Bank no longer booked its exposures to Dexia SA as intragroup financing but recorded them as non-intragroup financing. The drop in intragroup claims also stemmed from the Bank's regulation on the own funds of credit institutions and investment firms which entered into force on 31 December 2012 and which stipulated that unsecured exposures of Belgian subsidiaries in relation to their parent company or subsidiaries of their parent company based abroad may not exceed their regulatory capital. In 2012, some banks took steps in anticipation of the entry into force of these measures. Since Belfius' categorisation of its remaining exposures on Dexia as non-intragroup funding, Belgian credit institutions also became net providers of funding for non-intragroup entities, i.e. they cease to rely, in net terms, on the interbank market to fund activities. However, these exposures of Belfius on Dexia were gradually reduced to zero in the first quarter of 2015. At the end of last year, the Belgian banks' net non-intragroup interbank claims amounted to € 19 billion.

EXPOSURES ON THE PUBLIC SECTOR

While the reduction of the balance sheet focused on exposures vis-à-vis foreign corporates and credit institutions, the opposite applied in the case of other types of counterparties. As for exposures to the public sector, Belgian banks reacted to the turbulence in the euro area sovereign bond markets in 2011 and 2012 by reconsidering the composition and the size of their sovereign bond portfolios (Chart 12). In particular, they reduced their investments in the government bond markets of those countries subject to the strongest market pressures, leading to a sharp drop in exposures to sovereign debtors from peripheral countries. The counterpart of these reduced investments in peripheral government bonds was an increase in banks' holdings of Belgian government bonds. In 2014, however, exposures to peripheral public sectors increased again to € 16 billion at the end of the year, though that was still far below the levels of 2008-2010. Italian government bonds form the major part of these residual peripheral public sector exposures, at € 10 billion. Exposures to the Greek public sector are close to zero. Claims on other foreign public sectors also increased in 2014, though the picture was more volatile as these exposures partly reflect investments made by Euroclear Bank and Bank of New York Mellon, according to developments in collected wholesale deposits.

The exposures to the Belgian public sector in the form of debt securities (which mainly reflect the exposures to the federal government) were progressively reduced from the end of 2012, when they totalled € 69 billion, to reach € 60 billion at the end of 2014. Combined with the exposures towards other Belgian public entities, they represented 52 % of overall exposures to the public sector. Even though the concentration of public sector exposures on Belgium is decreasing, it thus remains high, implying a great sensitivity to any widening of the spreads on Belgian government bonds.

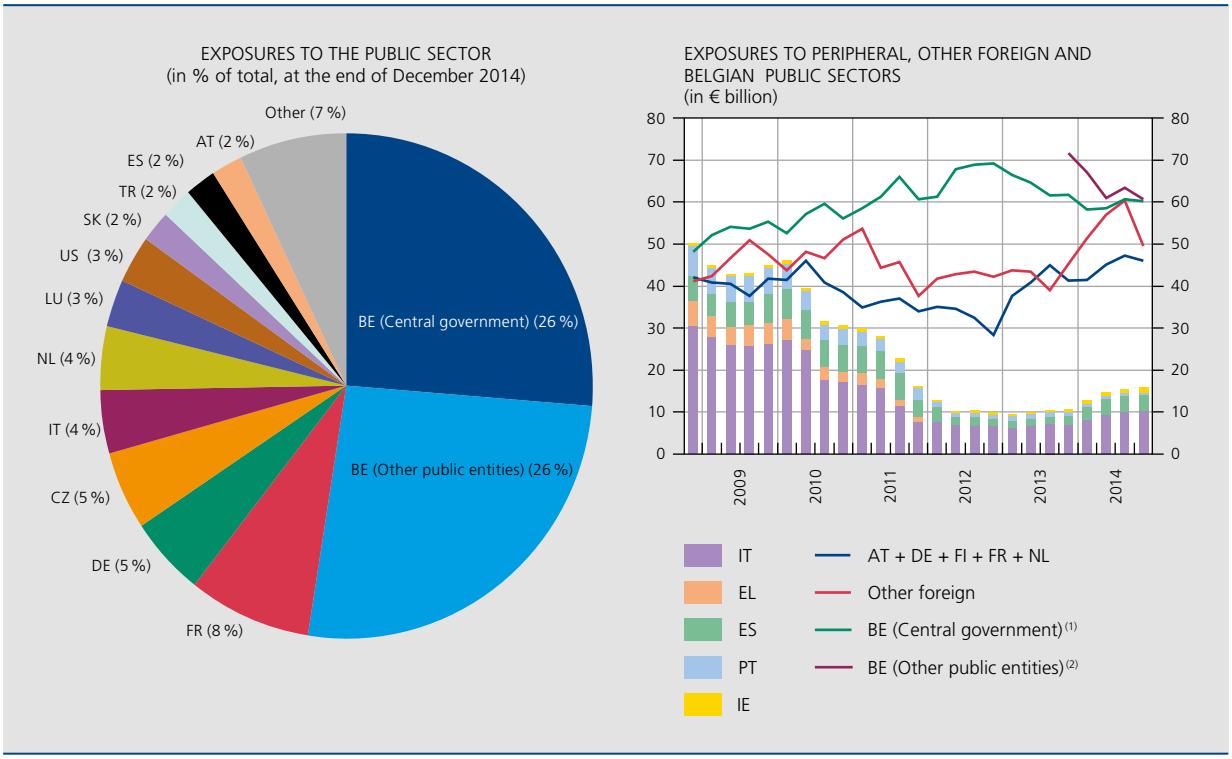
Assuming that exposures towards the non-federal public sector have remained constant since 2007, a period for which this information is not available, the share of exposures towards public sector counterparties in total assets increased from 15 % at the end of 2007 to 23 % at the end of 2014. As liquidity requirements were made more stringent over time, this increase partly reflects the build-up by Belgian banks of larger liquid asset buffers.

MORTGAGE LOANS

The share of Belgian mortgage loans in total assets has also grown very strongly over the last few years, as outstanding amounts rose from € 111 billion at the end of 2007 to € 170 billion at the end of 2014 (Chart 13). This robust growth also took place in the early years of the global financial crisis, when Belgian banks reoriented their business models towards more traditional activities and domestic exposures. In 2013 and the first half of 2014, the growth of exposures slowed down, partly reflecting a tightening of credit standards on new loans. One of the most visible areas where banks tightened credit standards concerned new mortgage loan maturities. In the 2013 and 2014 vintages of new loans, the share of loans with maturities above 25 years dropped to 8 % and 4 % respectively compared to 20 % or more in the previous vintages.

CHART 12 BELGIAN BANKS' EXPOSURES TO THE PUBLIC SECTOR

(consolidated end-of-period data)

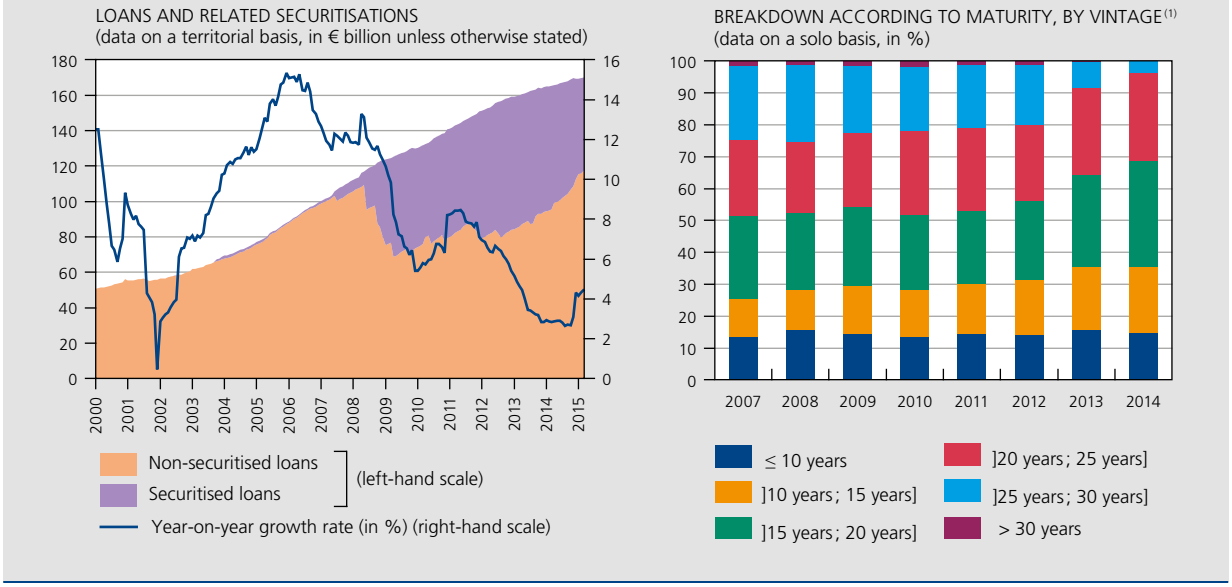


Source: NBB.

(1) Exposures to central government until Q2 2014 and exposures to public authorities in the form of debt securities since Q3 2014.

(2) Exposures to public authorities not taken under "exposures to central government".

CHART 13 BELGIAN BANKS' DOMESTIC MORTGAGE LOANS



Source: NBB.

(1) Vintages group together loans granted during the same year.

However, during the second half of 2014, there was a new acceleration in production of mortgage loans as households in Flanders anticipated the future change (from 1 January 2015) in the tax regime for mortgage loans, and as, in the light of the prevailing low interest rate environment, a significant share of the borrowers decided to refinance their loans to benefit from lower monthly instalments (see also the operating environment section). Hence, at the end of 2014 the annual growth rate of the Belgian mortgage loans portfolio had increased to 4.3 %, compared to 2.8 % at the end of 2013, though it was still below the 8.7 % rate observed on average over the last 10 years.

TABLE 4 EXPOSURES TO HOUSEHOLDS IN THE FORM OF MORTGAGE LOANS AND CONSUMER CREDIT
(consolidated data, at the end of December 2014)

	Domestic			Foreign		
	Outstanding exposure (in € billion)	NPE (in € billion)	NPE (in %)	Outstanding exposure (in € billion)	NPE (in € billion)	NPE (in %)
Mortgage loans	156.1	2.7	1.7	45.3	6.7	14.7
Consumer credit	11.1	0.3	3.1	5.7	0.3	5.5

Source: NBB.

No significant deterioration has been observed recently in the credit quality of Belgian mortgage loans. The share of non-performing domestic mortgage loans in the total stock of these loans was 1.7 % at the end of 2014, lower than the corresponding ratio for domestic consumer credit (3.1 %) (Table 4). This percentage is much higher for exposures vis-à-vis foreign households, a large proportion of which are mortgage loans in countries such as Ireland, the Netherlands, Czech Republic, Luxembourg, Turkey, Slovakia or Hungary. Almost 15 % of these foreign mortgage loans were considered non-performing at the end of 2014.

2.2 Solvency

Chart 14, covering the exposures of the four largest banks, confirms that balance sheets were reoriented towards less capital-consuming counterparty types, as proxied by the average regulatory risk weights according to internal models (IRB-approach). For these four banks, the IRB exposures at default corresponding to mortgage loans increased from € 123 billion at the end of 2007 to € 164 billion at the end of 2014, and the corresponding amounts for central governments and central banks only decreased slightly from € 159 billion to € 146 billion. In the meantime, exposures on corporates were reduced from € 377 billion at the end of 2007 to € 233 billion at the end of 2014.

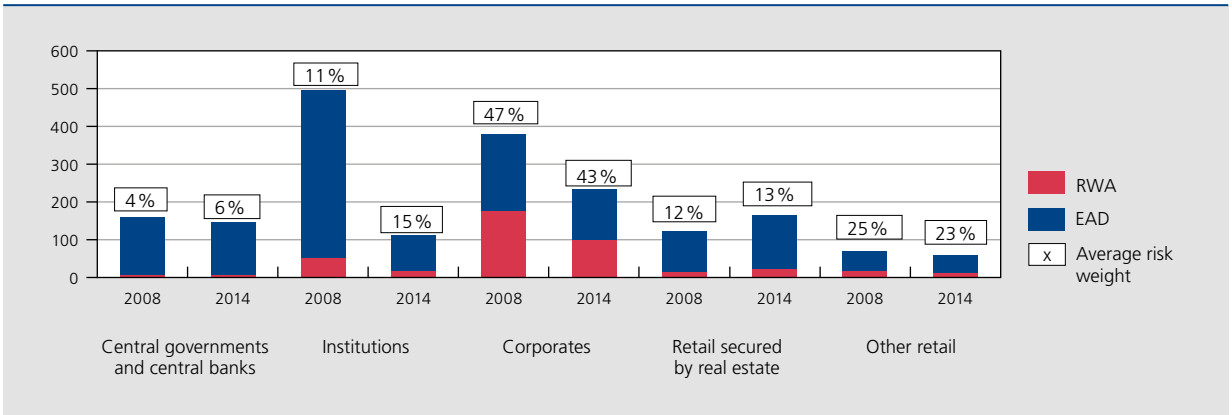
It should be noted that the low average risk weights applied to mortgage loans increased from the end of 2013 when the Bank decided to apply a 5 percentage point add-on to Belgian mortgage loans weighted according to the IRB approach. This add-on is not included in the average risk weight for retail exposures secured by real estate shown in Chart 14.

These shifts led to a reduction in the average risk weight for exposures vis-à-vis non-bank counterparties, demonstrating a de-risking of Belgian banks' activities with exposures concentrated more on public sectors and collateralised mortgage loans, and less on (non)-financial corporations. However, as exposures towards institutions (which also had a low average risk weight) were also reduced, the overall average risk weight of the Belgian banks' balance sheet remained fairly stable.

The reduction in the balance sheet total and the associated decline in activities generating market risk risk-weighted assets (RWAs) led to a significant decline in Belgian banks' total RWAs from € 480 billion at the end of 2008 to € 350 billion at the end of 2014 (Table 5). Before 2008, banks were already able to make significant reductions in their total RWAs (which amounted to around € 600 billion at the end of 2007) by applying the Basel II framework instead of

CHART 14 IRB CREDIT RISK RWA AND EAD FOR THE FOUR LARGEST BELGIAN BANKS[1], BY COUNTERPARTY TYPE

(consolidated end-of-period data, in € billion, unless otherwise stated)



Source: NBB.
(1) BNP Paribas Fortis, KBC Bank, Belfius Bank and ING Belgium.

the tougher Basel I framework, in place until then. Basel III rules, applied since January 2014, are more stringent than Basel II rules. Hence, the new framework imposes an increase in the risk weights to be applied to certain exposures, notably interbank positions and counterparty credit risks incurred in connection with derivatives business (i.e. Credit Valuation Adjustment – CVA), but the capital charges for exposures to small and medium-sized enterprises (SMEs) are reduced. Credit risk RWAs were also increased following the Bank's decision whereby, from 2014, it would phase out a waiver that allowed IRB banks to apply to sovereign exposures the risk weight that would have been applied under the SA approach (i.e. 0 % for some countries), except if certain materiality thresholds are not reached. Risk-weighted assets relating to operational risk (which includes IT risks) have been stable around € 35 billion since 2010.

TABLE 5 BREAKDOWN OF TIER I CAPITAL AND RISK-WEIGHTED ASSETS

(consolidated end-of-period data, in € billion, unless otherwise stated)

	2008	2009	2010	2011	2012	2013	2014
Tier I capital	55.1	53.9	57.8	56.5	55.9	55.6	53.6
composed of:							
Core Tier I capital	47.3	47.1	50.9	49.8	51.4	52.1	–
Hybrid capital	7.8	6.8	6.9	6.6	4.5	3.5	–
Common equity Tier I capital	–	–	–	–	–	–	51.7
Risk-weighted assets	480.4	407.5	372.5	373.8	352.7	339.4	350.0
composed of:							
Credit risk	409.2	352.3	322.8	312.9	301.0	287.7	290.1
Market risk	30.1	16.1	10.7	21.9	16.6	9.9	7.3
Operational risk	41.0	38.8	35.1	35.2	35.0	34.2	34.9
CVA	–	–	–	–	–	–	8.2
Other	0.1	0.2	3.9	3.8	0.1	7.6	9.5
Tier I capital ratio (in %)	11.5	13.2	15.5	15.1	15.9	16.4	15.3
Core Tier I capital ratio (in %)	9.8	11.6	13.7	13.3	14.6	15.3	–
Common equity Tier I capital ratio (in %)	–	–	–	–	–	–	14.8

Source: NBB.

As RWAs declined and regulatory capital remained fairly stable over the last six years, the Tier I ratio increased from 11.5 % at the end of 2008 to 16.4 % at the end of 2013 before dipping slightly to 15.3 % at the end of 2014, close to the EU median, on the back of the new elements introduced by the shift from Basel II to Basel III rules. In 2014, the solvency position of major Belgian banks was subject to a stress-testing exercise coordinated by the European Banking Authority (EBA) and the European Central Bank (ECB). The results and methodology of this exercise are presented in detail in this FSR's thematic article "Supervisory stress tests of banks and insurance companies".

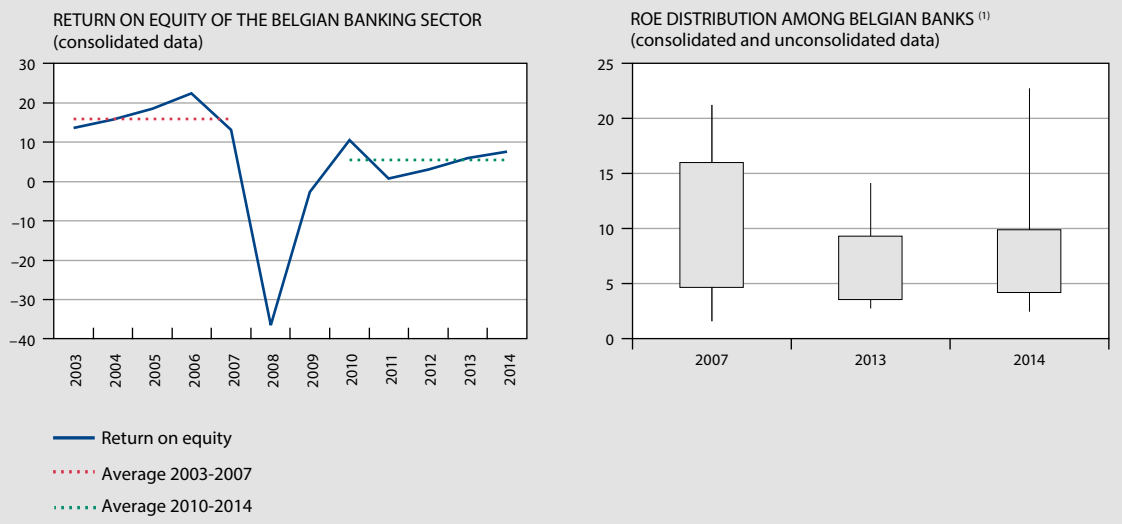
In January 2015, the Basel Committee altered the definition of the leverage ratio. This ratio determines the minimum amount of capital in relation to the total volume of assets and off-balance sheet items. The leverage ratio was introduced in order to reinforce the risk-based capital framework and to restrict the build-up of debt in the banking sector, to avoid destabilising deleveraging processes that could damage the broader financial system and the economy. The Basel Committee text provides for a compulsory leverage ratio from 2018. The European Commission adopted this new Basel Committee definition in a delegated act so that this version of the leverage ratio is being introduced as an observation ratio and must be published by institutions from 2015. At a later stage, following an evaluation and an impact assessment study, the European Commission may also initiate legislation to make this ratio binding, from 2018, for European credit institutions and investment firms.

Another element which will influence the capital planning decisions of credit institutions is the calibration of the Financial Stability Board's TLAC (total loss absorbency capacity) and of its European counterpart, the MREL (minimum requirement of eligible liabilities). Both the TLAC and MREL require banks to hold a sufficient level of liabilities to which a bail-in could be applied. A separate thematic article in this FSR "The new recovery and resolution framework in Belgium" provides more details about both the TLAC and the MREL. However, there are still uncertainties surrounding the MREL and the TLAC, which were both subject to a consultation phase. Both the EBA and the FSB should finalise their position by the end of the year, especially as the MREL will be binding as from 2016.

2.3 Profitability

The deleveraging of the Belgian banking sector's balance sheet was accompanied by an overall de-risking of the banks' activities, but it also brought lower levels of return on equity (ROE). While the banking sector's ROE averaged almost 16 %

CHART 15 RETURN ON EQUITY
(in %)



Source: NBB.
(1) Unweighted distribution among banks governed by Belgian law. The chart shows the first and third quartiles and the tenth and ninetieth percentiles.

from 2003 to 2007, it declined to an average 5.6 % from 2010 to 2014 (Chart 15). In 2014, the ROE reached 7.7% as net profit amounted to € 4.5 billion. Around 30 % of this could be attributed to the Belgian banks' foreign activities. Figures for the first six months of 2014, for which the last comparable data are available, show that Belgian banks performed relatively better than their EU peers, as their ROE for this period (7.8 %) was higher than the EU average (4.9 %) and median (6.1 %).

However, these averages hide significant differences between individual institutions. Even though these differences already existed back in 2007, the level of the third quartile of the distribution was higher than it has been recently. Hence, in 2014, three-quarters of the banks governed by Belgian law (irrespective of their size) had an ROE close to or lower than 10 %, while a quarter of them had an ROE equal to or lower than 4.2 %. Belgian banks, or at least some of them, face a major challenge in attaining higher and more sustainable profit levels in the current challenging operating environment.

Not only the net profit but also the composition of the banking sector's income statement has changed during the last 8 years (Table 6). The major difference in the income sources between 2007 and 2014 is the share of non-interest income, which was almost 50 % of operating income in 2007 whereas it diminished to 30 % in 2014. While this

TABLE 6 MAIN COMPONENTS OF THE INCOME STATEMENT
(consolidated data)

	In € billion								In % of operating income (2014)
	2007	2008	2009	2010	2011	2012	2013	2014	
Net interest income	**13.30**	**14.48**	**14.89**	**13.77**	**13.99**	**13.57**	**13.29**	**14.53**	**70.2**
Non-interest income	**12.57**	**4.18**	**3.29**	**5.57**	**4.75**	**4.49**	**7.05**	**6.16**	**29.8**
Net fee and commission income (including commissions paid to bank agents)	6.90	6.14	5.02	4.34	4.38	4.48	4.97	5.34	25.8
(Un)realised gains or losses on financial instruments [1]	3.76	–3.83	–2.74	–0.04	–0.80	0.04	0.79	–0.06	
Other non-interest income	1.91	1.86	1.01	1.28	1.17	–0.03	1.28	0.88	
Total operating income (bank product)	**25.89**	**18.66**	**18.18**	**19.34**	**18.73**	**18.05**	**20.34**	**20.68**	**100.0**
Total operating expenses (–)	**15.59**	**15.97**	**13.98**	**12.48**	**12.32**	**13.01**	**12.36**	**12.66**	**61,2** [2]
Staff expenses (excluding commissions paid to bank agents)	8.63	8.58	7.30	6.59	6.57	6.86	6.53	6.52	
General and administrative expenses (including depreciation)	6.93	7.39	6.67	5.90	5.75	6.15	5.83	6.14	
Total impairment and provisions (–)	**3.18**	**13.31**	**7.36**	**1.83**	**5.02**	**2.61**	**2.95**	**1.35**	
Impairments on loans and receivables	0.38	2.84	5.59	1.76	3.05	1.98	2.31	1.30	
Impairments on other financial assets	2.50	7.46	0.29	–0.09	1.37	–0.84	0.00	0.00	
Other impairments and provisions	0.30	3.01	2.06	0.16	0.60	1.46	0.64	0.05	
Other components of net operating income [3]	**0.66**	**–0.81**	**0.11**	**0.45**	**–0.37**	**0.25**	**0.32**	**0.22**	
Net operating income	**7.71**	**–11.43**	**–3.04**	**5.48**	**1.02**	**2.68**	**5.35**	**6.89**	
Total profit or loss on discontinued operations	**0.00**	**–9.04**	**0.00**	**0.97**	**–0.31**	**0.00**	**0.00**	**0.00**	
p.m. Net profit or loss (bottom-line result)	*6.66*	*–21.21*	*–1.22*	*5.56*	*0.36*	*1.59*	*3.28*	*4.52*	

Source: 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-to-income ratio of the Belgian banking sector.

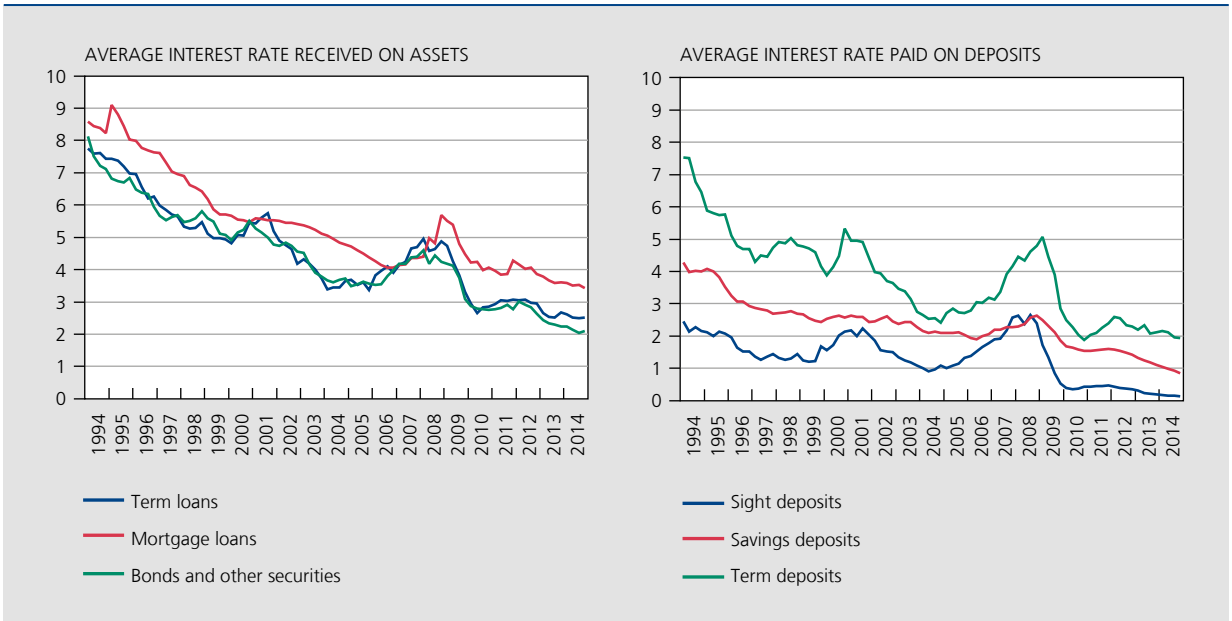
(3) Other components of net operating income comprise the share in profit or loss of associates and joint ventures accounted through the equity method, and the profit or loss from non-current assets, disposal groups classified as held for sale, not qualifying as discontinued operations and the negative goodwill recognised immediately in profit or loss.

decrease could be explained by significant trading losses in the first years of the crisis, it now reflects the lower level of activities generating trading income for the banking sector, as banks now rely to a much greater extent on interest income.

NET INTEREST INCOME

In 2014, the net interest income of Belgian banks exceeded € 14.5 billion, in part due to the further decline in interest rates and its favourable impact on the cost of funding, in particular the rates paid on deposits. Implicit rates on sight and savings deposits decreased by 6 and 27 basis points respectively in 2014 to 0.1 % and 0.8 % (Chart 16). However, these annual averages to some extent conceal the more drastic decreases that took place near the end of the year.

CHART 16 IMPLICIT RATES ON ASSETS AND DEPOSITS [1]
(unconsolidated data, in %)



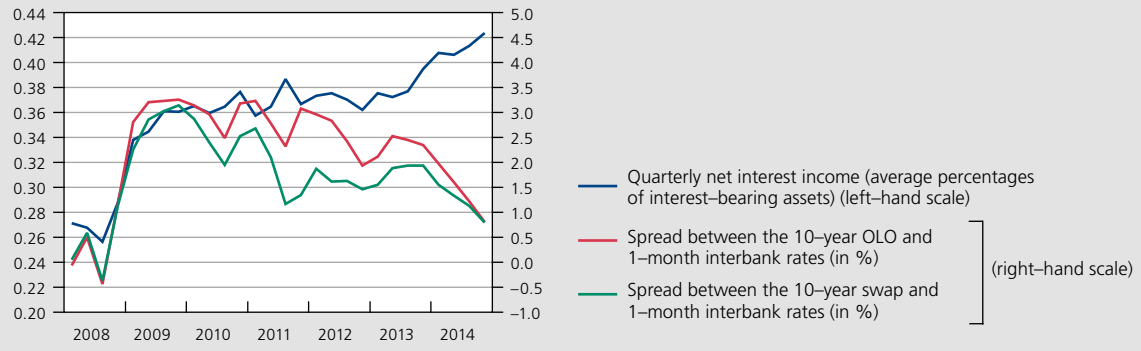
Source: NBB.
(1) Implicit rates are calculated as the ratios between the 12-month cumulative flows of interest actually received and paid and the average volume of corresponding assets or liabilities during the same period.

However, the increase in net interest income is largely a one-off effect. With deposit rates and other funding costs already close to 0 %, the scope for additional cuts in funding costs seems limited (assuming that borrower rates do not become negative), so that the further repricing of the assets in the low interest rate environment will start to dominate (assuming that banks do not fully compensate by raising commercial margins for new production). Implied rates on different types of assets declined further in 2014. While (implied) rates on mortgage loans have remained above 3% on average, they have been boosted by the one-off inclusion in interest income of the penalties related to the refinancing of a significant share of the portfolio. The low interest rates offered by banks on new mortgage loans have given many borrowers an incentive to refinance their loans and thus to benefit from the current low interest rate environment. In this case, borrowers have to pay a penalty equal to three months' interest payments. This penalty is then taken into account in net interest income. Although implicit rates on bonds and other securities have already fallen significantly, further declines are expected, in light, inter alia, of the negative rates that were applied in 2015 on a large segment of the euro area government bonds.

In addition, the yield curve became much less steep as shown by the narrowing of the spread between 10-year and 1-month rates (Chart 17). Such a flatter yield curve is less favourable to banks' traditional maturity transformation activities between short-term liabilities and long-term assets.

CHART 17 INTEREST MARGIN AND YIELD CURVE

(consolidated data, in %)



Source: NBB.

Looking ahead, the net interest margin, computed in Chart 17 as the ratio between the net interest income generated during a quarter and the average level of interest-bearing assets during that quarter, is therefore expected to decrease from the high level reached in the fourth quarter of 2014, as margins will adapt at least partly to the new yield curve profile. It should also be noted that the increase in the margin was not widespread among credit institutions and was largely attributable to changes in the consolidation scope of one large bank, as margins on certain foreign markets are higher than on the domestic market.

Not only is the "margin factor" expected to weigh on net interest income in the coming years, but the volume of interest-bearing assets could also be under pressure. Recent sluggish economic activity, combined with a gloomy outlook, curbed demand for core banking products, resulting in overall weak demand for loans. Although some banks are/have been able to offset the shortfall with repo operations (loans collateralised by a temporary transfer of securities), margins on these transactions are typically much slimmer than those on traditional financial intermediation services.

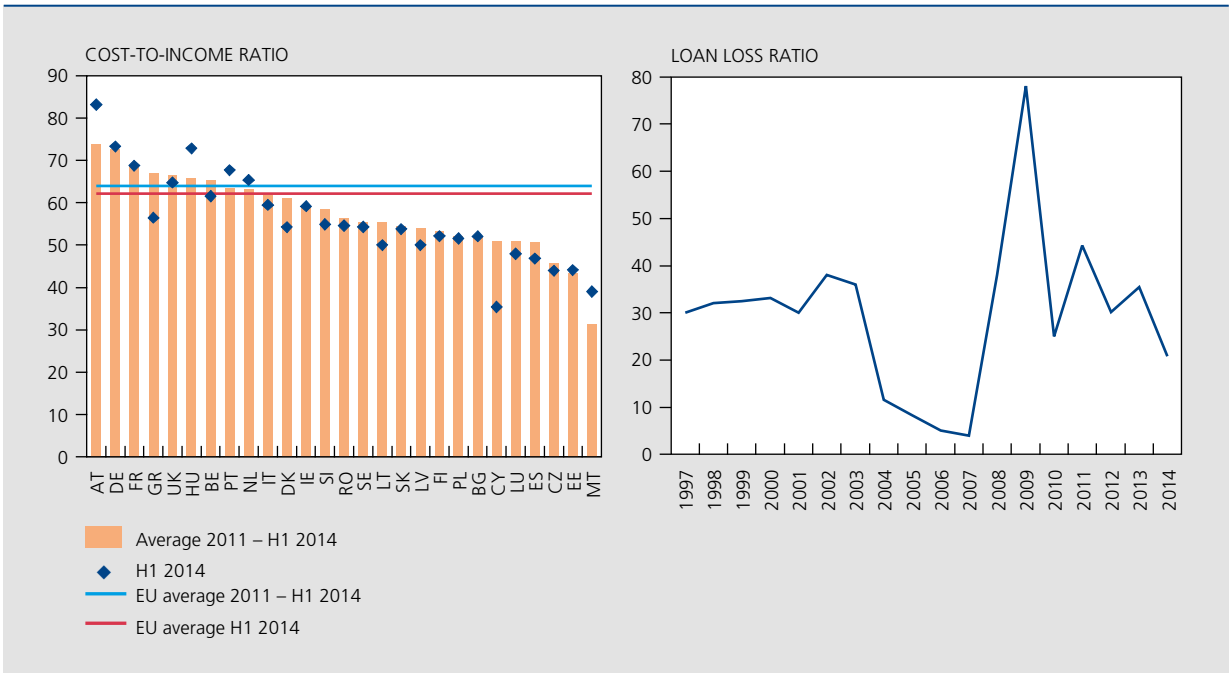
While the persistence of the current low interest rate environment would be detrimental to banks' net interest income generation, an abrupt increase in interest rates could also have a negative impact on profitability. If and when the exit from the current low interest rate environment occurs, interest rate increases could be quite disorderly and sustained. If a lot of assets were taken on at fixed rates during the low interest rate period, funding costs could outpace the repricing of assets and put pressure on net interest income. As regards mortgage loans, this phenomenon would be amplified by the caps applied to interest rates, limiting any increases, especially if borrowers recently refinanced their contracts to take advantage of a very low basis rate (to which caps will apply). A (sudden) rise in interest rates would also lead to mark-to-market losses on fixed-income assets stated at fair value.

OTHER INCOME AND COSTS

Banks have started to anticipate the future expected decrease in net interest income by promoting other sources of income-generating activities. In 2014, net fee and commission income was up again as banks increasingly tried to steer customers towards products which generate fees for the banks and avoid the need to manage interest flows, as in the case of deposits, for instance. Hence, the increase in net fee and commission income was driven by an increase in the fees charged, e.g. via asset management and products distributed but not issued by the banks. However, as Belgian banks ceased to notch up large gains on financial instruments, in contrast to the gains booked on sales of securities in 2013, total non-interest income decreased from € 7.0 billion in 2013 to € 6.2 billion in 2014.

To cope with the negative impact of the current economic climate on their profitability, banks can also adjust their cost structure. While Belgian banks significantly reduced the scope of their activities, particularly abroad, between 2008 and 2013, they have yet to prune costs to the same degree. The major institutions have announced cost-cutting measures in the past and are making further progress with their implementation. Yet so far, they were not sufficient to keep a lid on operating costs: these increased by 2.5 % in 2014 compared with 2013. However, due to increasing operating income, the cost-to-income ratio of the Belgian banking sector stabilised around the 2013 level, reaching 61 % in 2014, which was lower than the ratios observed from 2010 to 2012. As income is partly related to one-off factors, cost structures should remain a point of attention in the future. Even though the cost-to-income ratio of the Belgian banking sector is improving, and approaching the EU average for the first half of 2014, it still exceeds that in many other European countries (Chart 18).

CHART 18 COST-TO-INCOME RATIO AND LOAN LOSS RATIO [1]
(consolidated data, in %)



Sources : ECB, 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). From 2006 onwards, the figures are the loan loss ratio for the IAS/IFRS category Loans and receivables.

With operating income and operating expenses close to the 2013 levels, a reduction in impairment was a major driver of the increased net profit observed in 2014. Loan loss provisions totalled € 1.35 billion in 2014, markedly below the figure for 2013, resulting in a decrease in the sector's loan loss ratio. This was largely due to the slowing of the deterioration in the quality of certain foreign portfolios, such as Irish portfolios. Still, the majority (€ 1 billion) of the impairments were taken on portfolios booked in foreign entities of Belgian banks. To some extent, unexpected provisions were required in the Hungarian retail loan portfolios, in the wake of measures announced by the local government in the first half of 2014; among other things, those measures required retroactive corrections for the past use of exchange rate margins and unilateral changes in interest rates and fees, and ultimately led to borrowers being repaid a share of amounts collected.

INCENTIVES AND RISKS OF SEARCH-FOR-YIELD BEHAVIOUR

The current low profitability level (at least for some institutions) and its expected vulnerability in the years to come provide incentives for institutions to find new ways to boost their net profit (search-for-yield). Sustainable higher profits are indeed needed to ensure that banks will be able to play their role in tomorrow's economy. Shifts in the composition of the sovereign portfolio and the promotion of off-balance sheet products are possible ways to increase income. However,

while there has been no sign of a major search for yield by Belgian banks so far, it is important to keep that search within reasonable bounds as it is often also accompanied by various specific risks.

First, increased credit risk could be the consequence of a shift towards investments which are of lower quality but generate higher yields. In this sense, increased repo / reverse repo activities or changes in the composition of debt securities portfolios can induce higher credit risk if directed towards less creditworthy counterparties. Second, notwithstanding the credit quality of a bank's exposures, the maturity of these exposures could be extended to capture higher yields, increasing the maturity mismatch between assets and liabilities, and hence the sensitivity to interest rate shocks. Adjustments to the hedging policy could have a similar effect. Third, investment policy might also be redirected towards less liquid (e.g. non-government bonds), but again higher-yielding assets, and that would have a negative impact on the banks' liquid asset buffer and possibly lead to substantial mark-to-market losses if prices were to fall strongly in these markets.

2.4 Liabilities and funding structure

As regards liquidity risks, the Bank's current liquidity stress test ratio and the upcoming Liquidity Coverage Ratio (LCR) and Net Stable Funding Ratio (NSFR) act as risk mitigating measures. The LCR, designed to attenuate short-term liquidity risks, will be phased in from October 2015, while the NSFR, intended to improve the banks' structural liquidity position, is likely to enter into force in 2018. In methodological terms, the LCR is comparable to the Bank's regulatory liquidity ratio though it is based on different parameters, definitions and assumptions for the simulated liquidity crisis scenario.

The importance of maintaining a good liquidity position is highlighted by the worries relating to certain markets that could prove illiquid in a scenario of sudden interest rate reversals.

The liquidity buffers formed in the context of the Belgian regulatory liquidity ratio should enable the institutions concerned to meet the full 100 % LCR immediately from 1 October 2015, as required by the Bank. Belgium is thus using the possibility foreseen in the Capital Requirements Regulation (CRR) to impose stricter requirements until the full implementation of the LCR in 2018.

The current NBB ratio, which will be replaced as of October 2015, requires banks to hold sufficient high-quality liquid assets – assets which can be mobilised in repo transactions on private markets or with central banks – in order to cope with a crisis which may hamper the refinancing options of those institutions for one month. The ratio's denominator shows the liquidity available to an institution in such exceptional circumstances compared to the liquidity required in one month under a stressed scenario, indicated in the numerator. To meet the requirements, this ratio should be 100 % or lower.

The liquidity stress test ratio on a consolidated basis deteriorated from 73 % at the end of 2013 to 80 % at the end of 2014, as a slight increase in the buffer of unencumbered liquid assets did not offset the larger rise in the liquidity required in one month (Table 7). This level is however still much lower than at the end of 2009 when it reached more than 100 %. Nevertheless, it should be noted that this ratio was only made binding in 2011, while previously it was simply an observation ratio.

Since then, the buffer of unencumbered liquid assets available to the Belgian banks has continually increased (from € 223 billion at the end of 2009 to € 257 billion at the end of 2013 and € 266 billion at the end of 2014). The rise observed in 2014 was possible despite the increased collateral Belgian banks had to post to compensate for mark-to-market changes on interest rate swaps, as a consequence of the decreasing long-term interest rates.

Additional collateral postings are also taken into account when calculating the requested liquidity under the one-month scenario foreseen in the computation of the Bank's ratio, effectively worsening the results by lowering the available liquid asset pool. A higher recourse of Belgian banks to unsecured short-term funding also worsens the results since such funding sources are heavily penalised under the assumptions underlying the ratio. While recourse to short-term unsecured funding amounted to € 162 billion at the end of 2012, it increased to € 187 billion at the end of 2013 and € 208 billion at the end of 2014. Under current benign funding conditions, banks are easily able to find such short-term funding sources which prove cheaper than longer-term financing. They have thus been able to cut their funding cost by reducing their recourse to longer-term financing, in particular central bank funding, as was evident from the banks'

limited use of the two Eurosystem targeted longer-term refinancing operation (TLTROs), which came to a cumulative amount of € 6.3 billion, even though new covered bonds were issued.

Retail deposit levels remained stable on a consolidated basis. However, on an unconsolidated basis, customer deposits (which also include corporate deposits) increased by 5 % in 2014, supported mainly by higher sight deposits rather than by savings deposits, which grew by 3.4 % in 2014 (Chart 19). Sight deposits increased by 14 %, for both households and corporates (partly including transferred deposits of foreign counterparties).

TABLE 7 FUNDING STRUCTURE, LIQUIDITY BUFFER AND REGULATORY LIQUIDITY RATIO

(consolidated end-of-period data, in € billion, unless otherwise stated)

	2010	2011	2012	2013	2014
Total assets	1 151	1 147	1 049	961	996
of which:					
Unencumbered liquid assets	232	191	248	257	266
Total funding (1)	849	816	784	759	783
of which:					
Retail deposits	300	304	321	334	334
Short-term wholesale funding (2)	362	308	224	231	251
Unsecured	222	162	163	187	208
Secured	140	146	61	44	43
p.m. Covered bond funding					*17*
Regulatory liquidity stress test ratio (in %) (3)	78	83	69	73	80
"Customer" loan-to-deposit ratio (in %) (4)	90	90	92	92	93

Source: NBB.

(1) Defined as the sum of total deposits and total debt certificates issued (including bonds).

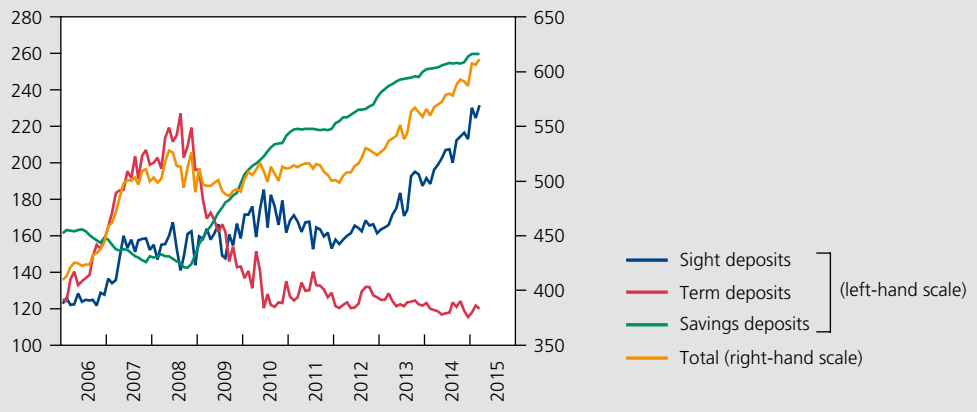
(2) Financing maturing within one year of the reporting date. This wholesale financing includes funding received from various counterparties, ranging from banks and institutional investors to public sector entities and larger corporates.

(3) Regulatory stress test ratio for the one-month horizon. It is a ratio between net cash outflows in a liquidity stress test scenario – simulated inter alia by applying stressed run-off rates to various sources of funding – and the available unencumbered liquidity buffer. The ratio should be 100 % or lower.

(4) Ratio between customer loans and customer deposits.

CHART 19 CUSTOMER DEPOSITS

(unconsolidated data, in € billion)



Source: NBB.

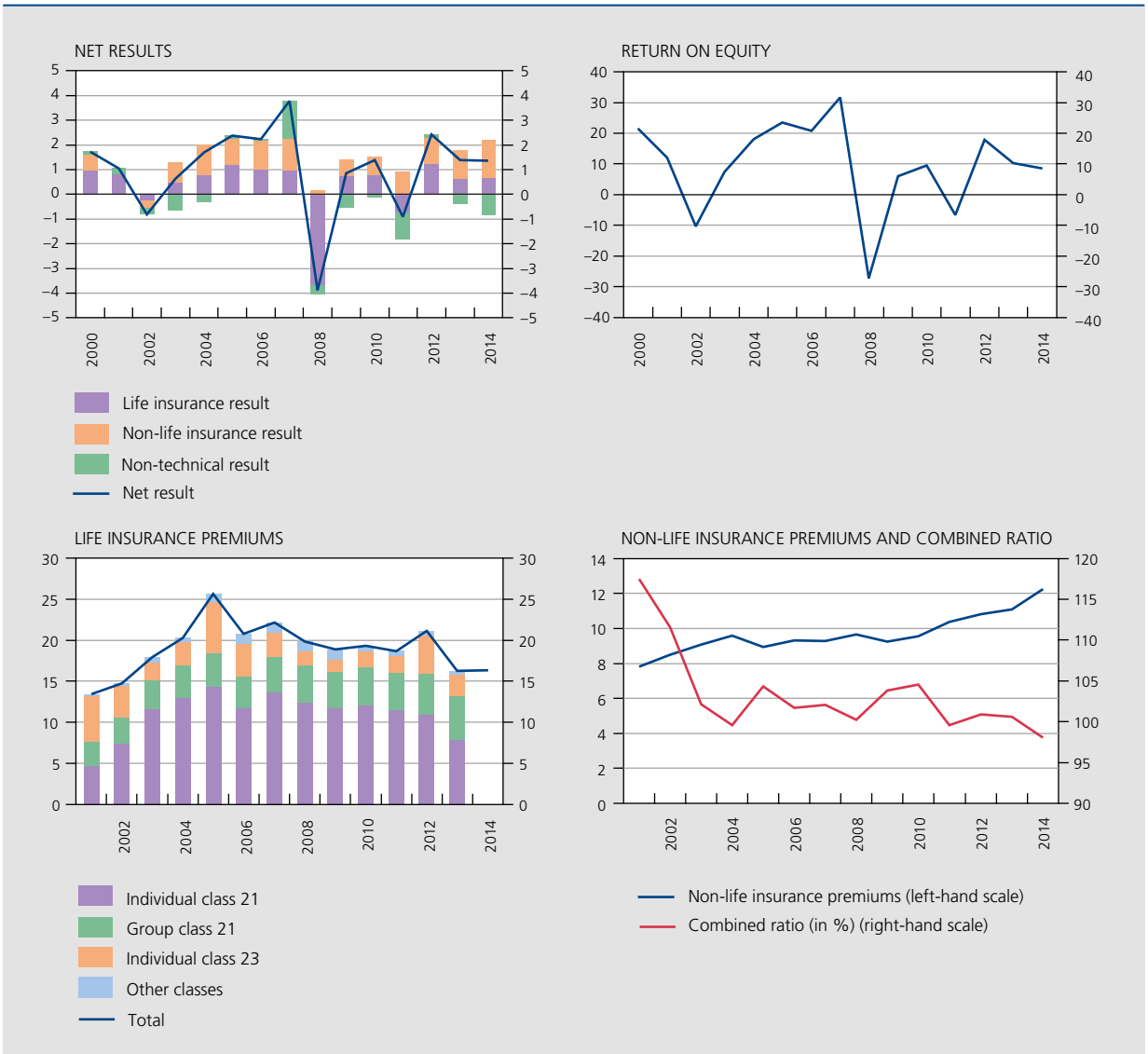
3. Insurance sector

3.1 Profitability

In 2014, the Belgian insurance sector recorded a net profit of € 1.36 billion, roughly stable compared to the € 1.4 billion recorded in 2013 but well below the 2012 figure of € 2.4 billion. The sector's return on equity amounted to 8.6 %, down from 10 % in 2013 and 18 % in 2012.

As shown in Chart 20, profitability in 2014 was affected by a deterioration in the non-technical account, which recorded a deficit of € 0.9 billion. This was significantly worse than in the previous two years, but it mainly reflected extraordinary charges taken at one individual insurance company. The non-technical result includes the investment income that is not imputed to the life or non-life insurance activities, but also the exceptional results and taxes, traditionally a quite volatile element in the overall result of the Belgian insurance sector.

CHART 20 NET RESULTS, PREMIUM INCOME AND COMBINED RATIO [1]
(non-consolidated data, in € billion unless otherwise stated)



Source: NBB.
(1) The combined ratio is the ratio of the sum of the cost of claims plus operating expenses to net premium income.

The net results in the technical accounts for the life and non-life activities showed a varied picture last year, with an almost stable result in the life business – where the result increased from € 0.6 billion to € 0.7 billion, mainly sustained by € 1.2 billion of realised capital gains – and a significant rise in the result in the non-life business. Non-life insurance thus recorded its best technical result ever (€ 1.5 billion). However, this outstanding non-life result reflected to some extent the impact of the merger of one Belgian insurance company with its foreign group affiliates, leading to a one-off positive accounting effect on the net result and premium levels. For example, the merger accounts for 2.5 percentage points of the 10 % increase (to € 12.2 billion) in the non-life insurance premiums shown in Chart 20. With underlying premium growth of 7.5 %, the non-life business nevertheless confirmed once again its strong performance of recent years, which was also reflected in the fact that the combined ratio stabilised at around 100 % thanks to companies' efforts to maintain a sound balance between insurance costs and premium income.

In contrast to the further increase in non-life insurance premiums, total life insurance premiums stabilised last year at a low level (€ 16.3 billion). This seems to confirm a structural weakening of demand for life insurance products in recent years, mainly in the case of individual (rather than group) policies. While the large fall in 2013 premium income could be explained by the increase in the tax on premiums paid on life insurance products to 2 % at the beginning of that year, the downward trend in life premiums also reflects the low yields offered by insurance companies on new individual life insurance contracts, as a result of the low interest rate environment. The further sharp decline in interest rates in 2014 – which continued in the early months of 2015 – is likely to have weighed again on Belgian households' demand for life insurance investment products. The available, albeit partial, information on surrender/lapse rates shows in this connection that, in recent years, in an increasing percentage of class 21 life insurance contracts, policy-holders have renewed their contract only partially, if at all, when the policy matures. A persistence of the low interest environment is thus likely to continue to weigh on the new volumes of life insurance products that Belgian insurance companies will be able to sell, and eventually on their profitability if cost structures are not adapted to the reduced business volume. In response to this, some insurance companies are increasingly trying to promote their unit-linked insurance business by introducing new unit-linked insurance products or mixed products, combining features of both class 21 and class 23 contracts.

Table 8 provides more details about the two main elements composing the life insurance technical result, which traditionally features a negative result on pure insurance activities, counterbalanced by a positive result on investment activities. It shows that the stabilisation of the overall life insurance technical result at around € 0.65 billion in 2014 benefited from a significant improvement in net investment income, which rose from € 8.9 billion to € 10 billion. This improvement in net investment income is, however, to some extent due to value adjustments relating to class 23 contracts. Changes in the net asset value of these investments, which are comparable to mutual funds, are recorded in

TABLE 8 MAIN COMPONENTS OF THE PROFIT AND LOSS ACCOUNT OF BELGIAN INSURANCE COMPANIES
(non-consolidated data, in € billion)

	2009	2010	2011	2012	2013 (1)	2014 (1)
Life insurance technical result	0.7	0.8	–0.7	1.2	0.6	0.7
Result of insurance activities	–8.0	–7.1	–4.8	–8.3	–8.2	–9.3
Net investment income	8.8	7.8	4.1	9.5	8.9	10.0
Non-life insurance technical result	0.7	0.7	0.9	1.0	1.2	1.5
Result of insurance activities	–0.4	–0.4	0.1	–0.1	–0.1	–0.2
Net investment income	1.0	1.2	0.8	1.1	1.2	1.3
Non-technical result (2)	–0.5	–0.1	–1.1	0.1	–0.4	–0.9
Net investment income	–0.7	0.2	–0.9	0.9	0.3	0.4
Other results	0.2	–0.3	–0.2	–0.7	–0.7	–1.2
Net result for the financial year	**0.9**	**1.4**	**–0.9**	**2.4**	**1.4**	**1.4**

Source: NBB.
(1) Data from quarterly reporting.
(2) The non-technical result includes investment income not imputed to life and non-life insurance activities, and exceptional results and taxes.

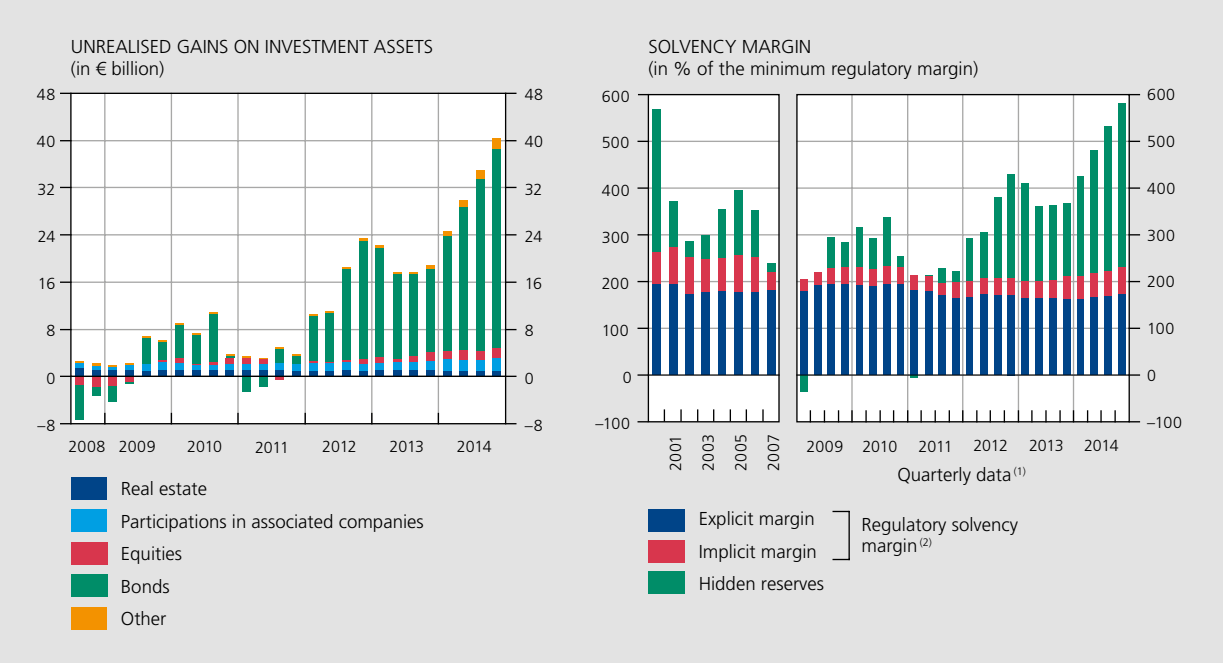
the income statement of insurance companies in both the result of insurance activities and the net investment income, but they fully offset each other, because these value adjustments are for the account of the client-investor and not for the insurance company. Excluding these class-23-related value adjustments, the increase in net investment income was more limited (from € 7.6 billion to € 8.0 billion), but still substantial, bringing the average for the period 2012-2014 to € 7.8 billion. This is significantly higher than the average of € 5.4 billion recorded in the period 2006-2011, when impairments on financial assets (€ 1.3 billion on average per year) weighed heavily on life insurance net investment income, with particularly high losses in 2008 (the Lehman Brothers default and subsequent market turbulence) and 2011 (losses on Greek and other peripheral government bonds). The better average in 2012-2014 nevertheless also reflects a growing amount of net capital gain realisations, which increased from € –0.2 billion in 2012 to € 0.7 billion in 2013 and € 1.2 billion in 2014. In comparison, net capital gains averaged € –0.25 billion during the crisis years 2008-2011. The large capital gains realised between 2013 and 2014 have thus masked a 2 % decline (from € 6.8 billion to € 6.7 billion) in the underlying net income on financial investments, which is made up of dividend income and interest payments – with pro rata adjustments of differences between book and face value for fixed-income instruments – but excludes capital gains. This underlying net income on financial investments declined from € 7.2 billion in 2012 to € 6.8 billion in 2013 and dipped further to € 6.7 billion in 2014, mainly as a result of the low interest rate environment and the gradual materialisation of repricing risk in the bond portfolios (see below for more details on this issue).

3.2 Solvency

Given the low interest rate environment, the bond portfolios contain large unrealised capital gains (Chart 21). Some of these unrealised capital gains on the investment portfolio – which are not recorded in the income statement – can be included in the regulatory solvency margin, subject to the approval of the Bank. The solvency margin for insurance companies consists of an explicit margin which includes own funds, subordinated debts and certain other balance sheet items, and an implicit margin which, subject to the approval of the Bank, essentially comprises part of the gross

CHART 21 SOLVENCY MARGIN OF BELGIAN INSURANCE COMPANIES

(non-consolidated data)



Source: NBB.

(1) The figures reported quarterly are not entirely comparable with the final figures reported annually. In particular, they take no account of any redistribution of profits to shareholders and policy-holders.

(2) 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 Bank, comprises certain other specific elements, the principal one being a part of the unrealised gains on investment portfolios.

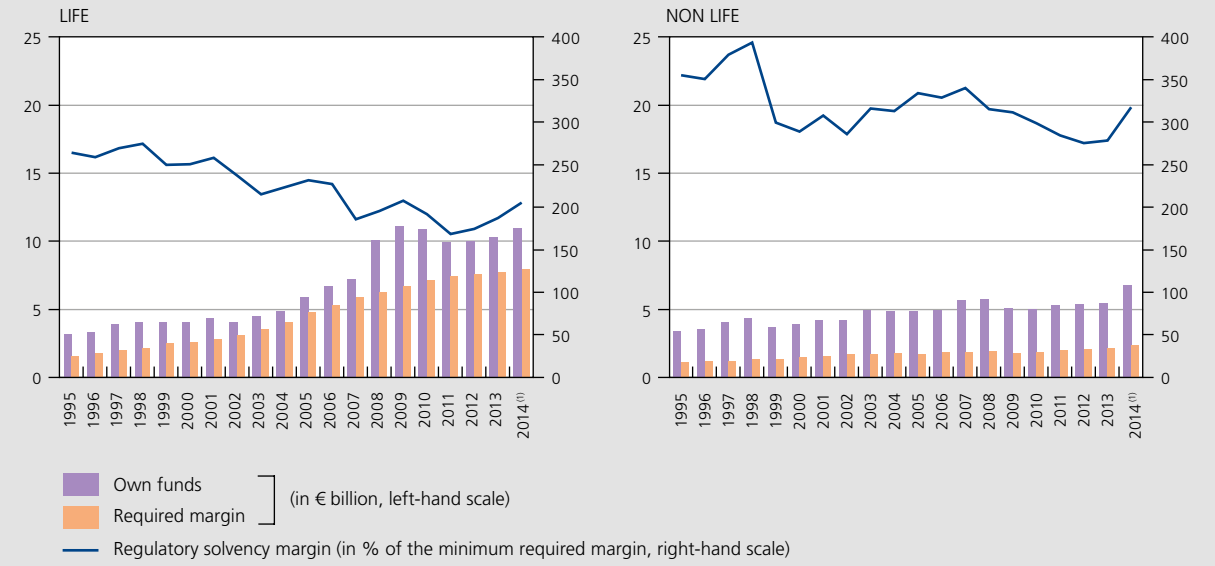
unrealised gains on investment portfolios. The explicit margin, which had benefited in 2008 and in the first half of 2009 from capital increases carried out by a number of insurers in the context of state support measures for Belgian financial institutions, dropped to a low of 163 % at the end of 2013, before recovering in the course of 2014 to 173 % at the end of the year, mainly due to the above-mentioned merger of a Belgian insurance company with its foreign group affiliates, resulting in a substantial increase in the available own funds. This level of 173 % is comparable to that recorded in 2011, on the basis of the quarterly figures. However, these quarterly figures underestimate the official explicit margin reported in the annual accounts, because they do not include the reserved profit or the *Fonds pour dotations futures* in the explicit margin, as in the case of the annual accounts. The total solvency margin, comprising both explicit and implicit elements, has remained above 195 % of the minimum required in each quarter since the end of 2007, and reached 231 % at the end of December 2014, the highest level since September 2010.

When account is taken of all unrealised gains or losses on the investment portfolio, including those not included in the implicit margin, an adjusted solvency margin can be calculated. This so-called hidden reserve (or deficit) has been very volatile in recent years and peaked at € 40.4 billion at the end of 2014. This is mainly the result of the much higher unrealised capital gains on bonds in the investment portfolio (at € 33.9 billion), due to the sharp drop in secondary market yields for euro area government bonds and for other bonds in Belgian insurance companies' portfolios. However, the improved solvency position shown in Chart 21 as a result of the decline in interest rates should be interpreted cautiously, as it does not take into account the adverse impact of lower interest rates on the economic value of the liabilities. Indeed, in accordance with the Solvency I prudential framework, the effect of lower interest rates on the discounted value of insurance companies' liabilities towards policy-holders is currently not taken into account in the calculation of the regulatory solvency margin. By adopting a more comprehensive approach, centred on the economic value, for assessing insurance companies' capital adequacy, the Solvency II framework will better reflect the challenges relating to the valuation of insurance companies assets and liabilities, and the potential effects on the volatility of own funds. In the meantime, by taking partial account of unrealised capital gains on financial investments, but not adjusting the valuation of liabilities at current interest rates, the current Solvency I regulations may not accurately reflect the challenges that a low interest rate environment presents for insurance companies.

Under the future prudential framework, Solvency II, both assets and liabilities will be measured on a market-consistent valuation basis. In the case of long-term insurance contracts, such as life insurance or disability insurance, interest rate levels and changes may then have a major impact on the economic value of the balance sheet, since the potential long-term liabilities generally have a maturity that is longer than the associated financial investments. The Long-Term Guarantee (LTG) package of Solvency II partly corrects this mark-to-market principle by defining the way long-term products will be valued under Solvency II under certain circumstances, allowing insurers to not recognise the full extent of short-term volatility in asset prices. These LTG adjustments include the matching adjustment (a mechanism, subject to supervisory approval, that prevents changes in the value of assets caused by spread movements) and the volatility adjustment (which covers insurance products that would not be eligible for the matching adjustment). The Solvency II rules also provide for transitional measures concerning the technical provisions and the discount rate, allowing insurers to gradually phase in, over a period of 16 years, some Solvency II regulations.

While life and non-life insurance activities each face different challenges in their convergence to the Solvency II standards, their starting points in terms of regulatory solvency margins also seem to be very different, at least on the basis of the Solvency I standards (Chart 22). In the non-life insurance business, the required margin has been quite stable over the past 20 years, and available regulatory own funds have exceeded this margin by a factor of at least 2.5 (and again more than 3 since the second quarter of 2014). In life insurance, the required margin widened considerably between 1995 and 2010, requiring a concurrent increase in regulatory own funds in order to keep the regulatory solvency margin stable. In 2008 and 2009, the recapitalisation efforts made by some Belgian insurance companies thus appear to have been used primarily to strengthen the regulatory own funds for their life insurance business. Yet this was not sufficient to arrest the overall negative trend in the regulatory solvency margin, as additional crisis-related losses in the period 2010-2011 and a further moderate increase in the required margin kept the regulatory solvency margin below 200 % between 2010 and the third quarter of 2014. It is only in the last quarter of 2014 that the regulatory solvency margin for life insurance activities again reached the threshold of 200 %. This development – the margin reaching 206 % at the end of 2014 – was driven primarily by a marked improvement in the implicit margin as a result of an increased amount of unrealised gains on bonds being recognised in this margin (conditional on approval by the Bank in its capacity as prudential regulator). By including part of the unrealised capital gains on bonds in their regulatory solvency margin, life insurance companies have thus (temporarily)

CHART 22 REGULATORY OWN FUNDS, REQUIRED MARGIN AND REGULATORY SOLVENCY MARGIN
(non-consolidated data)



Source: NBB.
(1) Data from quarterly reporting.

boosted their regulatory solvency margins, but – given the challenges faced by these companies in the very low interest rate environment – it is vital that they take advantage of this breathing space to ensure a return to higher after-tax profitability and to achieve, through retained earnings or other measures, a recovery in the explicit solvency margin.

3.3 Covering assets and reinvestment risk in a low interest rate environment

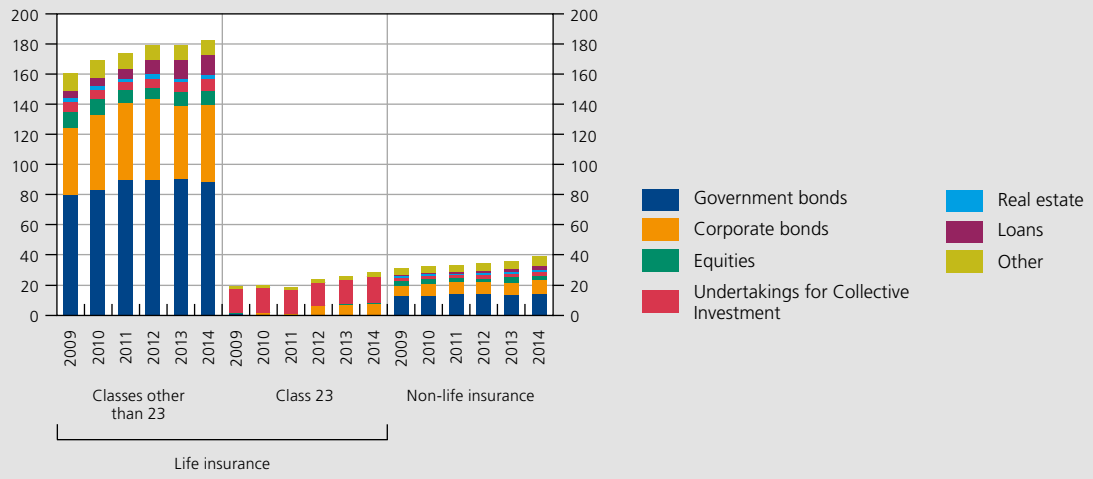
Due to the sometimes very long-term nature of some of their liabilities, (life) insurance companies have difficulty in finding enough corresponding assets with the same long maturities, even if the bulk of asset and liability cash-flow profiles are well matched. That good matching of assets and liabilities was confirmed by a partial analysis linking the maturity profile of the outstanding amounts of life insurance policies offering guaranteed rates of return with the corresponding maturity profile of the public and corporate sector bonds included in the covering assets of these life insurance liabilities. For the other assets included in the covering assets – such as bank deposits, loans, real estate assets or equity investments – detailed information on the maturity structure was not available, so that these assets could not be integrated the analysis. As public sector and corporate bonds account for a very large part of the covering assets in the life insurance classes with guaranteed rates of return, the scope of the analysis was nonetheless sufficiently large to confirm that the life insurance assets and liabilities in the maturity segments between 1 year and 30 years are relatively well-matched. This maturity segment covers 78 % of the total life insurance liabilities. This partial analysis also confirmed that public and corporate bonds are less able to provide a good match for the shortest (up to one year) and the longest life maturities (over 30 years), which is not a surprising result given the traditional maturities of these bonds. Yet, alternative asset classes with no or very long fixed maturities – such as equity holdings or real estate investments, not covered in the analysis – could help to match these very long-term liabilities.

The extent of asset/liability mismatches is likely to vary from one insurance company to the other, making some insurance companies' net economic value and profitability more sensitive than others to a low interest rate environment. This sensitivity comes from the fact that maturing assets will have to be rolled over in new financial investments to match the cash-flow profiles of all outstanding liabilities, exposing the insurance company to reinvestment risk. This reinvestment risk is particularly relevant for life insurance activities, where some of the liabilities can be far in the future and where

premiums are generally collected under long-term contracts, unlike most non-life insurance premiums which are collected under contracts renewed annually. Investment of the life insurance premiums collected during the contract period explains why the investment portfolios built up to cover those future liabilities are much larger in the case of life insurance than non-life insurance. The covering assets – shown in Chart 23 – are the assets that insurance companies hold on their balance sheet in order to honour future liabilities towards life and non-life insurance policy-holders, as represented by the technical reserves on the liabilities' side of insurance companies' balance sheets. At the end of 2014, these covering assets totalled € 241 billion, or 89 % of the Belgian insurance sector's total balance sheet (equal to € 271 billion). The majority of the covering assets are composed of investments in public sector and corporate bonds, but also include investments in other assets, such as real estate or mortgage loans.

CHART 23 COMPOSITION OF THE COVERING ASSETS PER INSURANCE ACTIVITY

(non-consolidated data, in € billion)



Source: NBB.

The chart distinguishes between the covering assets of life insurance and non-life insurance activities, and, within the former, between two classes of life insurance (class 23 and other classes). The great majority of life insurance premiums – for both individual and group policies – are collected on contracts under which the insurer bears at least part of the risks relating to financial market developments. The other life insurance policies with variable capital, better known as class 23 products or unit-linked products, are comparable to mutual investment funds, since the policy-holders/investors bear all the investment risks. The financial assets covering these class 23 insurance policies represent only around 14 % of the total assets covering the life insurance liabilities and are mainly constituted of Undertakings for Collective Investment (UCIs).

Most life insurance contracts – predominantly class 21 policies – thus entail a market risk for the insurance companies, as they offer policy-holders a guaranteed rate of return, even if this is just a guarantee on the capital invested (i.e. when the minimum guaranteed rate of return is 0 %). To meet these guarantees, the life insurance companies must choose in their asset and liability management an asset mix that is the most appropriate for both the structure and the characteristics of the associated liabilities, while establishing a balance between the risks on the investment portfolio and the expected rates of return. According to the composition of the covering assets for life insurance activities excluding class 23 as at the end of 2014, they invest mainly in government and corporate bonds, accounting for respectively 49 % and 28 % of the total covering assets for the other classes of life insurance shown in Chart 23. After cutting back their investment in corporate bonds by around 5 billion in 2013, life insurance companies increased their investments in corporate bonds again in the course of 2014, resulting in a net increase in the outstanding stock of around € 2 billion to € 50.6 billion. The portfolio of government bonds declined slightly (by around € 2 billion), but remained the largest asset class with an outstanding stock of € 88.8 billion. Holdings of mortgage loans by life insurers stabilised at € 8.0 billion, while other

loans increased by around € 1 billion, so that total loans in 2014 accounted for an increasing share of covering assets in life insurance (10 %).

The covering assets relating to non-life insurance activities are a little less dominated by government bonds (36 %) and corporate bonds (24 %), in favour of a slightly larger proportion of equities and other types of assets, particularly short-term instruments and bank deposits. Other assets increased by 25 % to € 6.3 billion mainly due to the merger of one Belgian insurance company with its foreign group affiliates. Holdings of mortgage loans by non-life insurers increased by a quarter to € 1.4 billion in 2014, and their share in total non-life covering assets reached 4 %. These changes in asset allocation may result in a higher average yield on investment, but may present greater credit and liquidity risks for the companies.

The percentage of the investment portfolio of the various insurance activities composed of equities, including shares in associated or non-associated companies, declined from 8 % of the total covering assets at the end of 2008 to 5 % at the end of 2014.

PUBLIC SECTOR BONDS

The reason for the substantial presence of government bonds in the investment portfolios held by life and non-life insurance companies is that, in the past, these bonds were regarded as risk-free assets owing to the very low probability of default. In addition, government bonds are available in a wide range of maturity dates (from 1 year to 30 years and sometimes longer), increasing the scope for matching the typically long-term liabilities in the life insurance business. Furthermore, as an exception, the prudential regulations regarding investment and concentration limits in covering assets do not apply to the government bond asset class. These bonds often also meet the preference of insurance companies for steady and regular sources of investment income. In line with this view of government bonds as a long-term investment, the accounting rules for the covering assets specify valuation at historical cost in the case of government bond holdings, as opposed to all the other financial assets in the covering assets, which have to be recorded at market value on the reporting date.

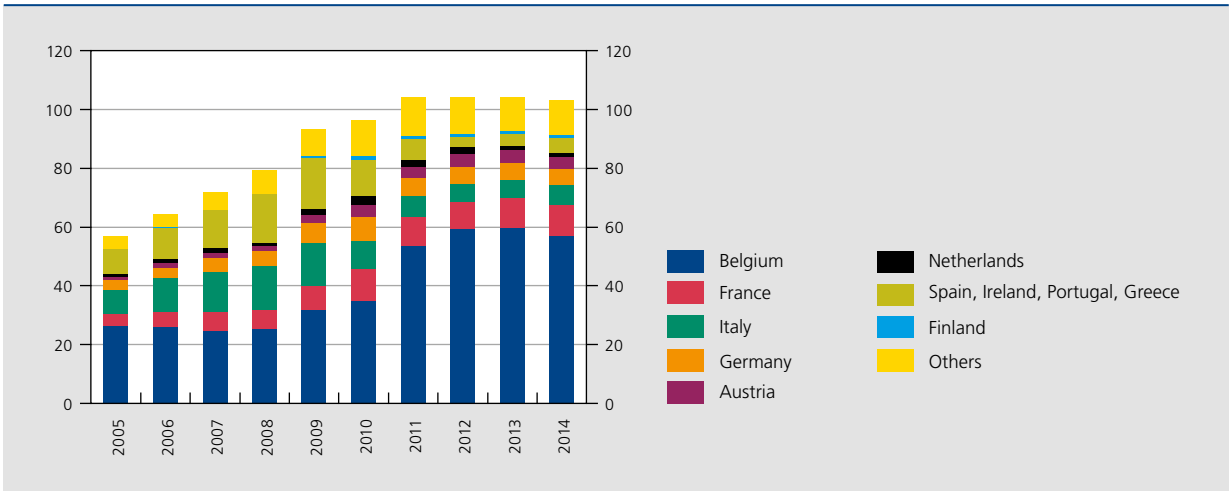
By the end of 2014, investments in fixed-income instruments issued by public sector entities, which include central and local government authorities, as well as international public institutions, amounted to € 114 billion, of which € 103 billion was assigned as covering assets, including for class 23 contracts. The difference between the total government bond portfolio and the bonds considered as covering assets is due to the free assets (€ 0.8 billion) and to specific lending/repurchase operations involving a temporary transfer of the ownership of the securities (€ 10.2 billion). These repo operations – 83 % of which concern Belgian government bonds – cannot be considered as covering assets for the duration of the repo transaction.

An article in the 2013 Financial Stability Review analysed in more detail the composition and main features, as at the end of 2012, of insurance companies' investment in fixed-income instruments issued by public sector entities. The analysis was based on detailed information on the individual financial securities included in the public sector bond portfolio, combined with data on the ratings of the individual bonds and their issuance date, maturity date, coupon rate, currency, etc., as available in the Bloomberg information system. By mapping the maturity profile and coupon rates of public sector bonds in the portfolio, it showed the amounts that insurance companies may have to reinvest in coming years at yields that may be lower than the maturing coupon rates if the current low interest rate environment were to persist.

Charts 24 and 25 and Table 9 below provide an update of the main developments in the public sector bond portfolio of the insurance sector following the analysis presented in the 2013 FSR article. The breakdown of the public sector bonds according to the country of issuance (Chart 24), shows in this regard that the insurance sector maintained its high investment in Belgian government bonds in 2014, after the major reallocations that took place between 2010 and 2012 and that resulted in a significantly lower exposure to public sector bonds from peripheral euro area countries. At the end of the year under review, investments in government bonds of Italy, Spain, Ireland, Portugal and Greece – which had been reduced markedly after June 2009 by bond sales or write-downs of the book value of the securities – reached € 5.3 billion. Investments in Spanish public sector bonds posted an increase from € 2.2 billion at the end of 2013 to € 3.5 billion in 2014. The exposures on Ireland and Portugal represented respectively € 1.4 billion and € 0.7 billion at the end of 2014, while the exposure on Greece remained negligible.

CHART 24 GEOGRAPHICAL BREAKDOWN OF THE PUBLIC SECTOR BONDS IN THE COVERING ASSETS

(non-consolidated end-of-period data, at book value, in € billion)



Source: NBB.

At the end of last year, Belgian government bonds represented 55 % of the total public sector bonds in the covering assets (up from 34 % in 2009). This concentration exposes the insurance sector to idiosyncratic shocks concerning the sovereign risk premium on Belgian government bonds. In 2011, investments in Belgian government bonds rose by around € 21 billion. This major reallocation of exposures towards Belgium echoed developments in other countries, as insurance companies in many euro area countries showed an increased home bias as a result of the intensification of the euro area debt crisis. This reallocation of government bond investments towards the home country occurred at a time of relatively high yields on Belgian government bonds (OLOs), due to the prevailing political uncertainties. In 2011, the ten-year OLO yield reached an average of 4.2 % (versus 3.4 % in 2010), even peaking at levels above 5 % in November. As a result, at the end of 2014, the average coupon of Belgian government bonds – accounting for € 57.0 billion in the insurers' covering assets – still amounted to 4.1 %. A mechanical simulation shows in this connection that, all other things being equal, if these Belgian sovereign bonds were to be reinvested when they arrive at maturity at the current low OLO-yields, in line with the original lifetime of the matured OLOs, it will be 2021 before the total weighted average coupon of the OLO portfolio would fall below 3 %. But this would be followed, as from 2028, by a quite steep fall in the total weighted average coupon rate.

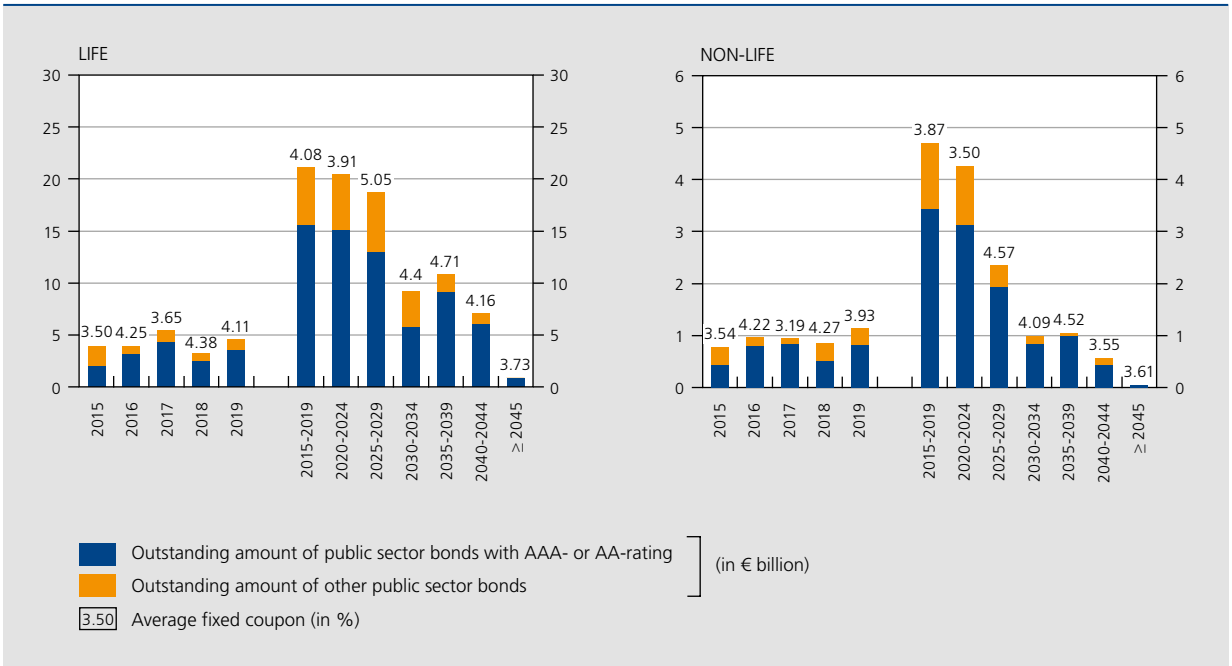
Chart 25 maps the credit rating composition, maturity profile and average coupon rates of the public sector bonds included in the covering assets of both life and non-life insurance activities.

Between 2012 and 2014, the credit rating composition of the public sector bond portfolio in life insurance showed a downward trend with the share of AAA/AA-rated bonds decreasing by almost 5 percentage points in favour mainly of BBB bonds and speculative-grade bonds (increasing respectively by more than 3 and almost 1 percentage points). In this connection, a very partial analysis of life insurance companies' transactions in public sector bonds showed that in 2014, around one third of new government bonds bought had a BBB-rating, which is a significantly higher share than the weight of these BBB-bonds in the stock of these companies' covering assets (11 %). While this may be seen as a manifestation of companies' search for yield in the current low interest rate environment, these developments are taking place at the margin, and still within the investment-grade universe of the public sector bonds. These investment-grade ratings account for approximately 89 % of the total book value of public sector bonds in life insurance. The other 11 % is composed of either speculative-grade bonds (2.8 %) or bonds without a rating (8.6 %). Public sector bonds with a AAA rating amount to € 12 billion or 14 % of the total. This is largely the reflection of holdings of public sector bonds issued by Germany, Austria, the Netherlands and Finland, with a residual category including various types of AAA-rated instruments, including issues by international financial institutions. Bonds with a AA rating are the largest category of total public sector bonds in covering assets, accounting for € 53.6 billion or 61 % of total book value. This exposure is mainly the counterpart of the

€ 43.8 billion invested in Belgian AA-rated public sector bonds for the assets covering life insurance, but it also includes € 7.1 billion of AA-rated bonds issued by French public sector entities. Within the remaining investment-grade ratings of A and BBB, the main issuers behind the BBB-rated public sector bonds are Italy (€ 4.9 billion) and Spain (€ 2.9 billion).

CHART 25 BREAKDOWN OF PUBLIC SECTOR BONDS BY YEAR OF MATURITY AND AVERAGE FIXED COUPON RATE

(non-consolidated data at the end of 2014, book values, excluding class 23 contracts)



Sources: Bloomberg, NBB.

As regards the coupon rates and repricing risks, the left-hand panel of Chart 25 shows that, in the coming years, Belgian life insurance companies may have to reinvest significant amounts of maturing AAA- and AA-rated bonds at yields that may be lower than the maturing coupon rates if the current low interest rate environment were to persist. The information in Chart 25 thus presents some orders of magnitude of the reinvestment risks in a low interest rate environment – and in particular of the potential challenges related to the relatively high guaranteed rates of return on some life insurance contracts – even if these coupon rates are not necessarily a reliable indicator of the effective yield to maturity of these public sector bonds in the covering assets of Belgian insurance companies. This yield to maturity depends not only on the coupon rate but also on the price at which the bond was acquired. Moreover, it disregards all other aspects of insurance companies' asset and liability management, including hedging policies, that would have to be considered in order to arrive at well-informed conclusions about current investment yields and the associated reinvestment risks in a low interest rate environment. That said, as in many other countries, the 2014 EIOPA stress test – subjecting insurance firms to a low interest rate scenario, sub-divided into two modules – confirmed that the Belgian insurance sector is sensitive to a very low interest rate environment. While the sector was able to withstand the low interest rate scenario without too much trouble, there were wide variations between companies, with about 20 % of them failing to meet the future regulatory requirements (see the related thematic article in this Financial Stability Report for more details).

For life insurance activities, the left-hand panel of Chart 25 shows that, within the next five years, around € 21 billion of public sector bonds will come to maturity, accounting for 24 % of public sector bonds in the covering assets. This € 21 billion includes € 16 billion of AAA- and AA-rated bonds, which are likely to be the most sensitive to downward repricing risks if the current low interest rate environment were to continue for a long time.

For non-life insurance activities, the right-hand panel of Chart 25 shows that around € 4.7 billion of public sector bonds will come to maturity during the first five years, representing 33 % of public sector bonds in the covering assets. This

€ 4.7 billion includes € 3.4 billion of AAA- and AA-rated bonds. The credit rating composition of the public sector bond portfolio in non-life insurance activities changed somewhat between 2012 and 2014, as it did in life business, but the change was even clearer: here, the share of BBB-rated bonds rose by almost 7 percentage points at the expense of investment in AAA/AA-rated bonds (minus 4 percentage points) and speculative-grade bonds (minus 3 percentage points).

While the predominance of public sector bonds with a AAA or AA rating has limited the spillovers of the euro area's sovereign debt crisis on the Belgian insurance sector, continuation of such an asset allocation may thus expose insurance companies to significant profitability pressures if maturing AAA and AA public sector bonds are rolled over in similar investments at the current historically low primary or secondary market yields on these public sector bonds. However, as was shown in Chart 25, the Belgian insurance companies' public sector bond portfolio is well laddered in terms of maturities, in both life and non-life insurance activities. In life insurance, it is only at the end of 2025 that half of the portfolio will have come to maturity, suggesting that the entire public sector bond portfolio of the life business is repriced, on average, every 20 years. For non-life insurance activities, half of the portfolio will only come to maturity by the end of 2021, suggesting that the entire public sector bond portfolio of the non-life business is repriced, on average, every 12 years.

At the end of 2014, the average coupon on all the public sector bonds in the life insurance covering assets was 4.3 %, about 0.1 percentage point lower than at the end of 2012. As shown in Table 9, this average is the result of a wide distribution of coupon rates on individual public sector bonds, where the bulk of them still carry a fixed coupon of more than 3 % (up to 6 %). The average remaining time to maturity of these bonds is still quite high, ranging from almost 10 years for bonds with fixed coupons between 3 % and 4 % and almost 14 years for bonds with fixed coupons between 4 % and 6 %. In non-life, an 11 percentage point reallocation of the portfolio composition from bonds carrying a coupon higher than 3 % to bonds with a coupon up to 3 % led to a decline in the average coupon of all the public sector bonds in the covering assets from 4.1 % at the end of 2012 to 3.9 % at the end of 2014.

TABLE 9 COUPON AND MATURITY BREAKDOWNS OF THE PUBLIC SECTOR BONDS IN COVERING ASSETS

(non-consolidated data at the end of 2014, book values, in € billion)

	Life				Non-life			
	Amount outstanding	Average age	Average remaining time to maturity	Average maturity	Amount outstanding	Average age	Average remaining time to maturity	Average maturity
Zero-coupon bonds	6.8	13.9	13.3	27.2	0.1	13.2	8.9	22.0
Variable-rate bonds	0.8	5.4	11.4	16.8	0.3	6.3	6.6	12.9
Fixed coupon]0 % – 3 %]	7.4	2.4	9.8	12.2	3.1	4.1	8.5	12.6
Fixed coupon]3 % – 4 %]	26	5.8	9.1	15	4.5	6.3	7.7	14.0
Fixed coupon]4 % – 5 %]	31	6.8	14.3	21.1	4.1	6.6	10.6	17.2
Fixed coupon]5 % – 6 %]	13.4	14.5	12.3	26.8	1.5	15.1	12.0	27.1
Fixed coupon]6 % – 11 %]	2.8	18	8.6	26.7	0.4	18.9	7.5	26.3
No coupon info	0.1	3.7	6	12.7	0.1	2.8	7.2	10.0
Total	**88.4**	**8.2**	**11.8**	**20.0**	**13.9**	**7.3**	**8.1**	**16.4**

Sources: Bloomberg, NBB.

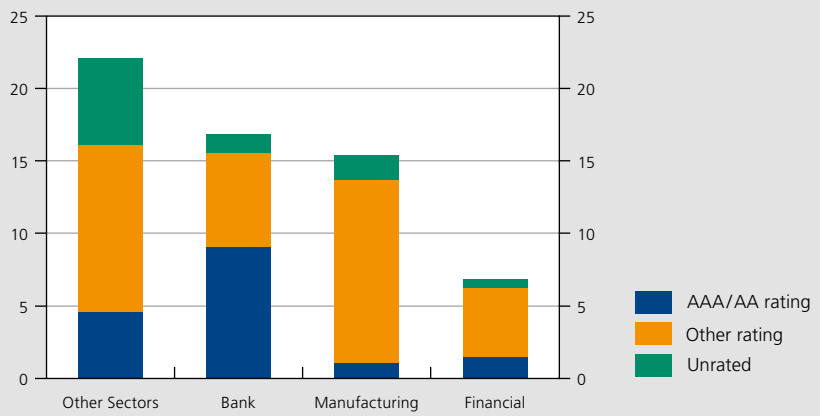
As Belgian insurance companies may have to reinvest significant amounts of maturing AAA- and AA-rated public sector bonds at lower yields than the maturing coupon rates if the current low interest rate environment were to persist, the large unrealised capital gains on their bond portfolio should be treated with caution and not be used to enhance short-term payouts to policy-holders or shareholders. They should rather be seen as a (high-coupon) buffer for the years ahead, should the current low interest rate environment continue over the medium term.

CORPORATE BONDS

As mentioned before, Belgian insurance companies also hold a large portfolio of corporate bonds. At the end of 2014, these corporate bonds represented a total amount of respectively € 51 billion and € 10 billion in the life and non-life covering assets, excluding Class 23. Chart 26 provides a breakdown by sector of issuer of these corporate bonds in the covering assets. With a share of 28 %, corporate bonds issued by credit institutions dominate the Belgian insurance sector's corporate bond portfolio, followed by corporate bonds issued by manufacturing companies (25 %) and non-bank financial institutions (11 %). The remaining 36 % are spread over residual sectors gathered in the category "other sectors". The breakdown by credit rating shows that banking sector bonds have the highest proportion (55 %) of high-rated bonds (AAA/AA), in contrast to the manufacturing sector where this proportion barely reaches 7 %. A partial analysis of Belgian life insurance companies' recent transactions in corporate bonds confirmed that very few speculative-grade bonds are bought, but that around one third of bonds acquired carried a BBB-rating, a share slightly higher than the corresponding weight of BBB-bonds (a quarter) in the outstanding stock of life insurance companies' corporate bonds. The high-rated bonds issued by the non-bank financial sector or other sectors account for respectively 22 % and 21 % of the total book value. If the corporate bonds are consolidated according to the corporate group to which the individual bond issuer belongs, it is evident that the corporate bonds held by the Belgian insurance sector are not concentrated on any specific individual groups.

CHART 26 BREAKDOWN OF THE CORPORATE BONDS BY SECTOR OF ISSUER

(non-consolidated data at the end of 2014, book values in € billion, excluding class 23 contracts)



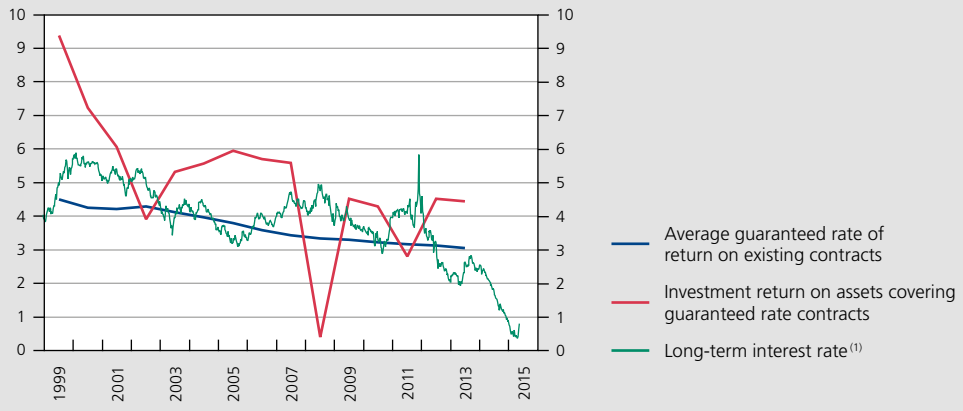
Sources: Bloomberg, NBB.

At the end of 2014, the average coupon on these corporate bonds amounted to 4.0 % in life and 3.8 % in non-life, slightly lower than the above-mentioned average coupon rates for the public sector bond portfolio.

3.4 Life insurance contracts with minimum guaranteed rates of return

Chart 27 compares the annual investment return on assets covering class 21 contracts with the average rate of return guaranteed to policy-holders on these contracts. Preliminary figures for the year 2014 show only a slight improvement in the investment return in 2014 compared to the 4.4 % recorded in 2013, in spite of the increased amount of capital gain realisations in 2014 (see section 3.1 above). In the period 1999-2012, the average net investment return amounted to 5.1 %. This period included three years during which the annual return on investment was lower than the prevailing average guaranteed rate of return on outstanding contracts. This occurred during years of severe financial market downturns in 2002 (equity markets), 2008 (Lehman Brothers) and 2011 (euro area debt crisis). Yet even disregarding these exceptional years, the trend in investment returns is downward, in line with the overall development in Belgian government bond yields.

CHART 27 GUARANTEED RATE OF RETURN ON CLASS 21 CONTRACTS



Sources: Thomson Reuters Datastream, NBB.
(1) Yield on the secondary market in ten-year Belgian government loans (OLOs).

The outstanding amount of life insurance policies offering guaranteed rates of return and the level of these guaranteed rates of return are particularly important risk parameters for insurance companies when risk-free interest rates fall to very low levels, as has happened in the recent period. In the 1990s, insurance companies had tended to offer their customers a guaranteed rate of return of 4.75 %, which was the statutory ceiling in force up to the end of June 1999. In July 1999, this ceiling was reduced to 3.75 %. In the case of an exit from a supplementary pension plan, the current legislation requires companies to guarantee a minimum return of 3.25 % on employers' contributions and 3.75 % on personal contributions. While the profitability of insurance contracts guaranteeing such returns was eroded when long-term interest rates began to drop below those levels, the sector has gradually modified that adverse structure by marketing contracts offering guaranteed rates of return which are more in line with risk-free interest rates, and containing clauses which provide for a revision on the basis of changing market conditions. Moreover, some contracts specify that the guarantee is limited in time, and that, at the end of that period, the contract reserve (i.e. the amount of savings built up) is technically regarded as a new premium with a new guaranteed interest rate in line with prevailing market conditions. All these measures contributed to a reduction in the average guaranteed rate of return on class 21 contracts from 4.5 % at the end of 1999 to 3.12 % at the end of 2012 and 3.04 % at the end of 2013.

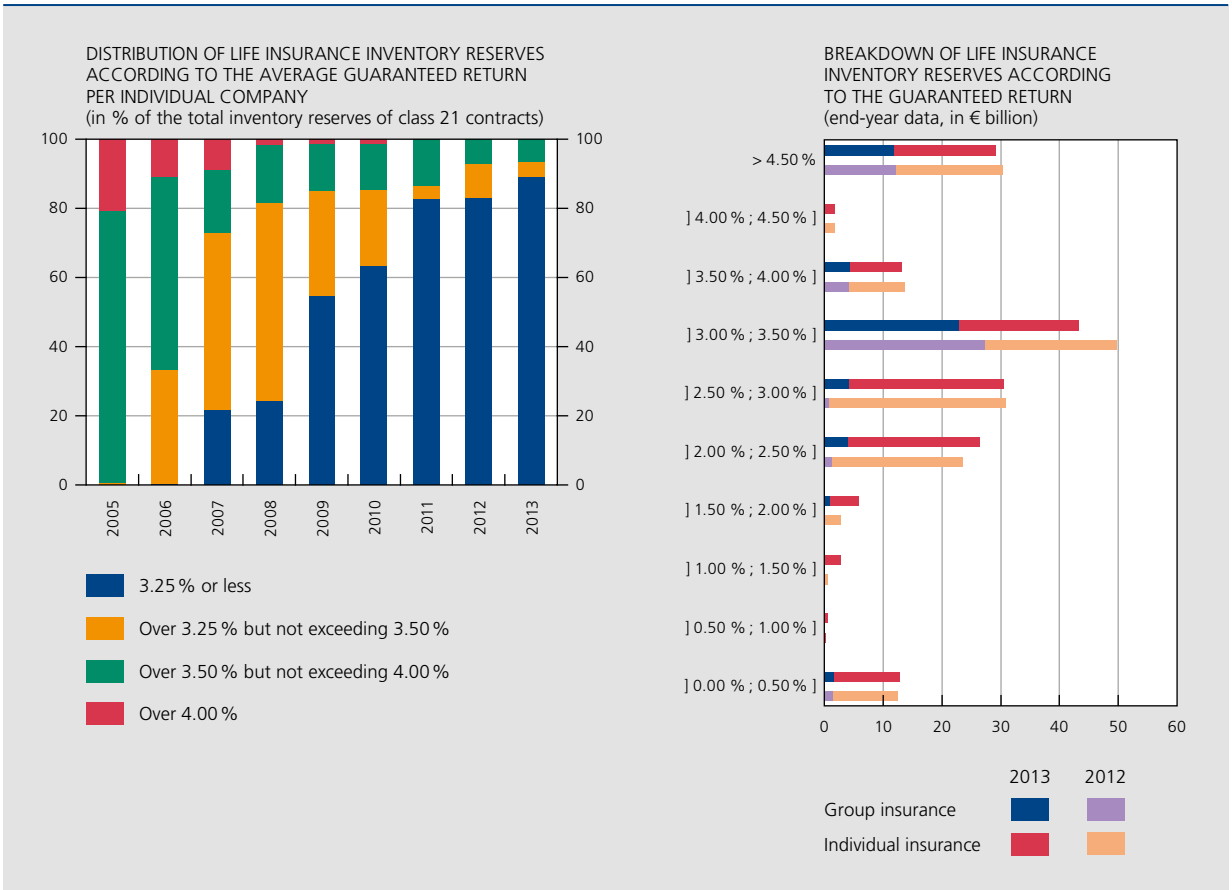
Chart 28 provides some more information on the structure of the guaranteed rates of return on life insurance policies, giving the situation at the end of 2013. At that time, the Belgian insurance sector still had large numbers of contracts offering high guaranteed rates of return for policyholders. These liabilities are to a significant extent the legacy of contracts concluded a long time ago, in most cases guaranteeing these rates of return on future premiums as well. Analysis of the data broken down by contract in the right-hand chart reveals that contracts concluded in the past and still offering a guaranteed return of 4.75 %, the legal maximum for that type of contract up to June 1999, represented inventory reserves for an amount of € 26.1 billion at the end of 2013. Taking into account all contracts offering more than 4.5 %, this increases to an amount of € 29.2 billion, or around 17.6 % of the inventory reserves. With reserves of € 32.6 and € 10.1 billion, contracts offering a guaranteed return of respectively 3.25 % and 3.75 % also account for large proportions of life insurance liabilities with guaranteed rates of return. The liabilities in these two categories include most of the class 21 group insurance contracts, because insurance companies, spurred on by competition, tended to offer in these group insurance policies a guaranteed rate of return that was in line with the minimum rates that companies sponsoring group insurance policies have to guarantee on employer (3.25 %) and employee (3.75 %) contributions according to the law on the supplementary pension system (second pillar). The inventory reserves corresponding to 3.25 % group insurance contracts rose until 2012, before falling slightly (–5 %) in 2013, while the inventory reserves corresponding to 3.75 % group insurance contracts continued to rise gradually in 2013. However, in the case of individual insurance, the inventory reserves relating to contracts with a guaranteed rate higher than 3 % fell by 7 % in favour of contracts offering a lower rate of close to 2 %. In particular, the inventory reserves of 4.75 %,

3.75 % and 3.25 % individual guaranteed rate contracts respectively declined by 3 %, 6 % and 8 % between 2012 and 2013, representing a decrease of € 1.8 billion.

The left-hand chart analyses the same data, but broken down by company rather than by contract. It focuses on the average guaranteed rate of return offered by each individual insurance company, taking all class 21 life insurance contracts together. The chart confirms that, for some years now, insurance companies have adapted to the lower interest rate environment by offering contracts more in line with market conditions, resulting in a decline in the average guaranteed rates of return. At the end of 2013, around 89 % of the class 21 inventory reserves were held by insurance companies offering an average guaranteed return of 3.25 % or lower, whereas in 2005, hardly any companies had an average guaranteed rate of return lower than 3.5 %.

Life insurance companies have succeeded in reducing their average guaranteed rate of return by lowering the guaranteed rates of return for new life insurance premiums, including for a large number of policies providing only a capital guarantee while offering a larger range of profit-sharing rates and mechanisms. However, the biggest reduction

CHART 28 DISTRIBUTION OF CLASS 21 LIABILITIES WITH GUARANTEED RATES OF RETURN
(non-consolidated data)



Source : NBB.

in the interest rate risk for insurance companies resulted from the introduction of greater flexibility in the determination of the guaranteed rate of return. Whereas, in the 1990s, the guaranteed rate of return prevailing at the time of conclusion of the contract generally also applied to all future premiums, most of the contracts concluded during the past decade have only guaranteed the rate of return prevailing at the time of collection of the premium, so that the guaranteed rate of return can be adjusted according to changing market conditions. However, some of these contracts also offer policy-holders more flexibility, allowing them to terminate their policies more easily or to reduce them without

incurring heavy penalties. That means that some insurance companies are exposed to a greater risk of surrender or cancellation, especially if interest rates rise strongly. In those circumstances, they would face a choice between raising the rate of return on their contracts or accepting a reduction in their volume of business. In both cases, that would impair the profitability of class 21 life insurance policies.

In order to protect themselves against the effects of low interest rates on the profitability of guaranteed-rate-of-return contracts, insurance companies have to form an additional provision for contracts offering a guaranteed rate of return 10 basis points higher than the so-called flashing-light rate, defined as 80 % of the average yield on ten-year Belgian government bonds on the secondary market over the past five years. Insurance companies can spread the amounts to be allocated to this provision over a maximum of ten years. The flashing-light rate for this additional provision, which is calculated once a year by the supervisory authority, was 2.38 % at the end of 2014. At the end of 2013, the cumulative additional provisions that the Belgian insurance companies had constituted in this framework amounted to € 3.8 billion. Income from the assets corresponding to that provision is added to that generated by the covering assets representing the life insurance provision so as to guarantee the return promised in the contract. A Circular from September 2006 that exempted insurance companies from forming that supplementary reserve for interest rate risk – if they could show that the cash flows generated by their covering assets will cover the commitments given in their insurance contracts – was suspended by the NBB in 2013 for two important reasons. The first concerns the current economic situation, which implies that the low level of interest rates could persist for a long time, both on the Belgian capital market and on the euro-swap market. The second reason is the need to establish a mechanism tailored more closely to the principles of the future supervision regime to be introduced on transposition of the Solvency II Directive.

As the Bank expects that insurance companies will increasingly come under pressure as a result of the low interest rate environment – because market rates have dropped well below the guaranteed yields on many life insurance contracts dating from previous years – the Bank has recommended that insurance companies should treat carefully and cautiously decisions that lead to the realisation of capital gains, and should take advantage of them by adopting a preventive strategy and allocating most of their capital gains to covering their contractual obligations, preferably before the payment of dividends or profit shares, and by adjusting the guaranteed rates to the new market conditions. The Bank will submit a proposal to the competent minister – in accordance with the insurance law – to adjust the mechanism of maximum interest rates on individual long-term life contracts in order to better reflect the current market conditions. In that connection, it would also be appropriate to review the system of guaranteed interest rates on group insurance and pension contracts under the law of 28 April 2003 governing supplementary pensions, to align the conditions more closely with the life insurance contracts.

4. Financial market infrastructures – (I)CSD sector overview

The NBB is responsible for the prudential supervision – including the issuance of authorisations – vis-à-vis settlement institutions and equivalent settlement institutions that are established in Belgium. Settlement institutions with credit institution status, such as Euroclear Bank, are also regulated and supervised as credit institutions.

Due to their critical role in the financial system in the settlement of monetary and other financial transactions, (I)CSDs could be potential sources of systemic risk or might act as channels for risk contagion in the event of financial turbulence, if they are not secure and efficient.

This section focuses on Financial Market Infrastructures (FMIs), in particular Central Securities Depositories (CSDs), which have a prominent position in the Belgian and EU financial system. These FMIs will henceforth be a standard part of the FSR overview. This time, a didactic approach is taken to introduce the various relevant actors.

CSDs play a central role in the financial system for the settlement and registration of securities transactions such as repos. A CSD provides securities deposit accounts for its participants to hold securities. Physical securities may be held in custody in immobilised form by the CSD, or securities may be dematerialised to exist only as electronic records. CSDs are considered as the "top of the pyramid" of the securities custody chain as they are – in their role as notaries – contractually connected with the issuers of securities and responsible for the integrity of the issuance. An International CSD (ICSD) acts as the notary for international private and public debt securities such as Eurobonds.

Many countries have only one (I)CSD[1] within their jurisdiction. Belgium, however, hosts three (I)CSDs: the securities settlement system operated by the NBB (NBB-SSS), Euroclear Belgium (formerly CIK[2]) and Euroclear Bank[3]. Although each Belgian (I)CSD has a distinct business profile, their common feature is that they are all considered as critical infrastructures for the Belgian financial system. The impact of international regulatory and technological changes is expected to lead to a gradual transformation of the (I)CSD sector in the EU.

Given the proportion of foreign participants in their systems, the proper functioning of the Belgian (I)CSDs is not only relevant for the domestic market. Moreover, the level of systemic risk of an (I)CSD, including cross-border, will also depend on the interconnections between an (I)CSD and other securities markets and FMIs, its settlement volumes, and its role in the provision of critical services such as collateral management.

Euroclear Bank is by far the largest (I)CSD in Belgium (and in Europe) in terms of settlement volumes. The number of links Euroclear Bank has established with other securities markets to allow its participants to hold and settle securities issued in those markets gives rise to legal and operational risks. Moreover, as a single purpose bank, Euroclear Bank can grant credit to its participants to support settlement in more than 50 currencies.

The risk profiles of NBB-SSS and Euroclear Belgium, operating in central bank money and in a single currency context, differ substantially from Euroclear Bank's risk profile. The potential systemic cross-border impact of a failure of either NBB-SSS or Euroclear Belgium is considered smaller. However, whereas Euroclear Belgium has a large number of foreign participants, NBB-SSS (as an issuer CSD) is also eligible to transfer and mobilise collateral for Eurosystem monetary policy and credit operations for both Belgian and foreign financial institutions.

The (I)CSDs have to comply with requirements for a sound and comprehensive risk management framework for managing legal, credit, liquidity, operational and other risks. FMIs need to identify scenarios that may potentially prevent them from being able to provide critical operations and services, and have to assess the effectiveness of a full range of options for recovery or orderly wind-down. In that context, the NBB is analysing the recovery plan for the Euroclear Group, in cooperation with the other Euroclear Group regulators.

Since all (I)CSDs established in Belgium are considered as critical infrastructures, operational reliability and information security are key in their risk management. Business continuity plans should aim for timely recovery of operations and fulfilment of the FMI's obligations. In that regard, cyber resilience continues to be one of regulators' priorities.

The remainder of this section is organised as follows. Sub-section 1 clarifies the roles of the relevant actors in the post-trade environment. Sub-section 2 considers the various characteristics of the (I)CSDs established in Belgium. Sub-section 3 provides an overview of the development of the Belgian (I)CSDs' main business activities. Sub-sections 4 and 5 deal with the future challenges and opportunities for the (I)CSD sector, and how it may respond to them. Finally, sub-sections 6 and 7 cover the regulatory agenda of the NBB, as overseer and prudential supervisor.

4.1 Typology: CSDs, ICSDs, custodians and CCPs

CSDs and ICSDs can be distinguished according to the securities for which they act as notary. In general, CSDs act as the register of securities issued in their domestic market. As a result, CSDs have until now been able to operate as natural monopolies. This situation may change due to the impact of new EU legislation (see further). The current practice is different in the case of international securities such as Eurobonds, for which issuers can choose the currency or country of issue. In this case, a duopoly exists as there are two ICSDs in the EU which act as notary for Eurobonds; i.e. Euroclear Bank established in Belgium and Clearstream Banking Luxembourg. Both ICSDs have a banking status.

Another distinction between CSDs and ICSDs can be made based on the range of securities that they accept and hold in their systems. Whereas CSDs, as a rule, have so far been operating in a rather domestic environment, ICSDs are – by the

(1) The term (I)CSD is used to cover both CSDs and ICSDs.
(2) Caisse Interprofessionnelle de Dépôts et de Virements de Titres.
(3) A new CSD was established in Belgium by Bank of New York Mellon (BNYM) in December 2012. This infrastructure, BNYM-CSD, is reviewing its strategy and business case in accordance with forthcoming regulatory changes in the EU.

nature of their business model – internationally oriented. They aim to provide their participants with a single gateway to access many local foreign markets (i.e. foreign CSDs which act as notary for securities issued in the local foreign market). When (I)CSDs offer their participants access to foreign securities markets, they are considered as "investor (I)CSDs", whereas the foreign (I)CSDs are referred to as "issuer (I)CSDs".

Investors in domestic or international securities can access (I)CSDs directly (direct holding) or indirectly via intermediaries that participate in a (I)CSD. Such intermediaries are often custodian banks that provide custody and settlement services for their clients. Like investors, (I)CSDs can choose to access foreign securities markets directly or via custodian banks.

In the EU, (I)CSDs operate securities settlement systems (SSS) which transfer or settle financial instruments between the securities accounts of the counterparties held with the CSD to register a buy or sell transaction. Settlement is the last phase in the processing chain of a transaction in a financial instrument, concluded on a stock exchange or over-the-counter. With settlement, the transaction is completed through a final transfer of securities and funds between the buyer and the seller on their respective accounts in an SSS. By organising "delivery versus payment" (DVP), principal risk[(1)] in the settlement process is eliminated. The successive stages of trading, clearing and settlement are explained in the thematic article *"The role of central clearing in systemic risk reduction"* in this FSR.

Apart from the settlement of securities transactions, an (I)CSD typically provides asset servicing activities, for example the settlement of income and redemption payments. Due to often specific local market practices in asset servicing, (I)CSDs may also choose to use custodian banks for that purpose. Some (I)CSDs and custodian banks have developed collateral management services, which have grown in importance and will continue to do so due to the impact of new regulations (see further).

The cash leg of a securities buy or sell transaction processed by an (I)CSD can be settled in "central bank money" or "commercial bank money". In the former, cash is transferred between accounts of both counterparties at the central bank. In the latter, cash is transferred in the books of the (I)CSD which for that purpose has a banking status. When settlement takes place in central bank money, cash settlement is typically limited to the currency of issue of the central bank. Settlement in different currencies requires an (I)CSD to offer multicurrency cash accounts to settle transactions in its own books.

Custodian banks offer similar safekeeping and settlement services to their own clients. Securities settlement can also be internalised in the custodian bank's own books if the counterparties in a buy or sell transaction are both clients of that bank. In that case, settlement is by definition in commercial bank money.

(I)CSDs with a banking licence can provide credit to their participants to enhance settlement efficiency. Credit extended by (I)CSDs to fund securities purchases is typically short-term (intraday), as such credit exposures are reimbursed in the course of the day by the settlement proceeds of other securities transactions. As a rule, any lending by (I)CSDs is subject to credit limits which can be revised (downward) by the (I)CSDs when deemed necessary. There are only a limited number of (I)CSDs with banking status in the EU: Euroclear Bank, Clearstream Banking Luxembourg and Clearstream Banking Frankfurt, CSD Austria (OeKB) and Keler (Hungary). As those (I)CSDs provide credit only in order to facilitate securities settlement, they are referred to as "single-purpose banks". As custodian banks can provide many additional banking or other services to their clients, they are not considered as "single-purpose banks".

Central Counterparties (CCPs) usually participate in one or more (I)CSDs to settle transactions with their members or to collect margin collateral. Unlike (I)CSDs which, in contrast, facilitate the settlement of securities transactions without legally interposing themselves between participants, a CCP becomes a counterparty to every participant transaction, as it guarantees the settlement of obligations. CCPs are exposed to credit risk should a clearing participant fail to comply with a financial or contractual obligation. Therefore, any CCP, with or without a banking licence, does provide credit for its members. Such exposures can be very long term, for example, because of the length of derivative positions. Moreover, outstanding exposures can be impacted by market volatility in the price of the security or commodity after trade execution and, as a result, could therefore change daily. CCPs with a banking licence may have access to routine credit at their home central bank for their own liquidity purposes.

(1) Principal risk is the risk that a seller delivers a security, but does not receive the corresponding payment.

Under the European Market Infrastructure Regulation (EMIR), market participants are obliged to clear positions via a CCP in the case of standardised OTC derivatives. However, no similar obligation has been introduced in the settlement layer of the post-trade process. Indeed, there is no obligation for market participants to settle in an (I)CSD. Settlement could occur in the books of an intermediary (custodian bank) without any involvement of an (I)CSD.

The main differences between CSDs, ICSDs, custodians and CCPs are summarised in Table 10 below.

TABLE 10 TYPOLOGY: CSDs, ICSDs, CUSTODIANS AND CCPs

Activities / Post-trade actors	CSD [1] without banking status	(I)CSD [2] with banking status	Custodian	CCP with/without banking status [3]
Notary function	√	√		
Settlement	√	√	√	
Securities lending	√	√	√	
Asset servicing	√	√	√	
Collateral management services	√	√	√	
Banking services – Credit provision (single purpose) – General banking		√	 √	√
Clearing				√

Source: NBB.
(1) NBB-SSS, Euroclear Belgium, Euroclear France, Euroclear Nederland, etc.
(2) Euroclear Bank, Clearstream Banking Luxembourg, Clearstream Banking Frankfurt, CSD Austria and Keler (HU).
(3) LCH.Clearnet SA / Ltd, Eurex, EuroCCP, etc.

4.2 (I)CSDs in Belgium

At an aggregate level, the Belgian (I)CSD sector represents a significant share of the EU (I)CSD landscape which comprises 40 (I)CSDs in total. Based on 2013 data [1], securities deposits held in Belgian (I)CSDs represent more than 25 % of total securities deposits reported by the EU (I)CSDs. Box 3 shows data for the ICSDs Euroclear Bank and Clearstream Banking Luxembourg, as well as for the top-20 CSDs in the EU, by the value of securities deposits held in each (I)CSD. Euroclear Bank is by far the largest entity among the EU (I)CSDs.The (I)CSDs NBB-SSS, Euroclear Belgium and Euroclear Bank can be characterised according to the following parameters: governance structure, participants, type of eligible financial instruments and settlement model.

GOVERNANCE STRUCTURE

The governance structure of the Belgian (I)CSDs varies significantly. NBB-SSS is operated by the NBB. Euroclear Bank and Euroclear Belgium are part of the Euroclear Group which also includes the CSDs Euroclear UK and Ireland, Euroclear France, Euroclear Netherlands, Euroclear Sweden and Euroclear Finland. Euroclear plc, the ultimate holding company of the Euroclear Group, is user-owned and user-governed. The current structure of the Euroclear Group, as well as the relevant importance of each Euroclear Group (I)CSD within the Group in terms of business activity, are presented in Box 4 below.

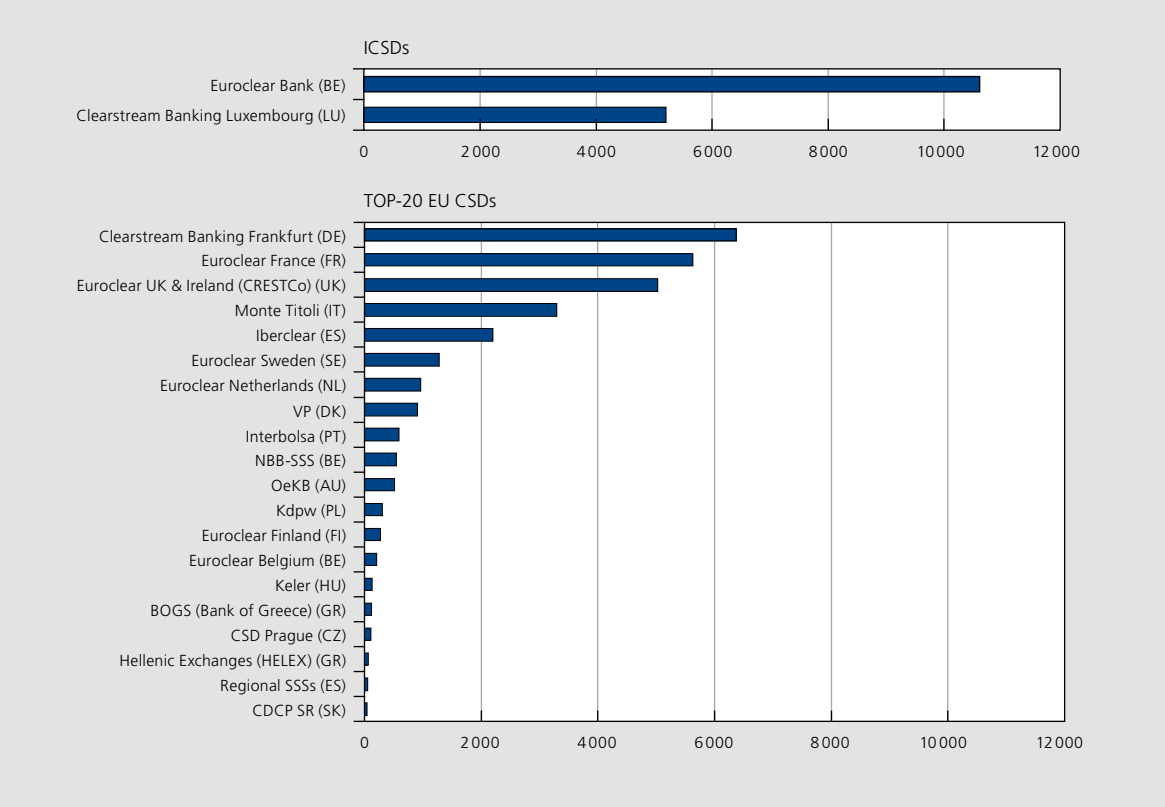
(1) ECB, Blue Book.

Box 3 – Size of the (I)CSD sector in the EU in terms of securities deposits

The ECB Blue Book publishes key data for all EU (I)CSDs[1]. The graph below ranks the ICSDs Euroclear Bank and Clearstream Banking Luxembourg and the top-20 EU CSDs in terms of securities deposits in value reported to be held by the (I)CSDs at the end of 2013.

ICSDS AND TOP 20 – EU CSDS: SECURITIES DEPOSITS

(in € billion, at the end of 2013)



Source: ECB, Blue Book.

(1) Blue Book methodology can be consulted at http://sdw.ecb.europa.eu/reports.do?node=1000003511.

PARTICIPANTS[1]

Based on the analysis conducted by the European Central Securities Depositories Association (ECSDA)[2], European CSDs, outside the ICSDs, have, on average, slightly above 110 participants in their systems, of which about 23 % are non-domestic participants. In NBB-SSS and Euroclear Belgium the number of participants is smaller at 81 and 78 respectively. As shown in Chart 29 below, almost 75 % of Euroclear Belgium participants are foreign, whereas NBB-SSS has a majority of participants established in Belgium. According to ECSDA, CSDs operating in small countries or markets

(1) Data provided refers to direct participants, not of the underlying clients of those participants.
(2) ECSDA, CSD Factbook 2013.

Box 4 – Euroclear Group corporate structure and group key statistics

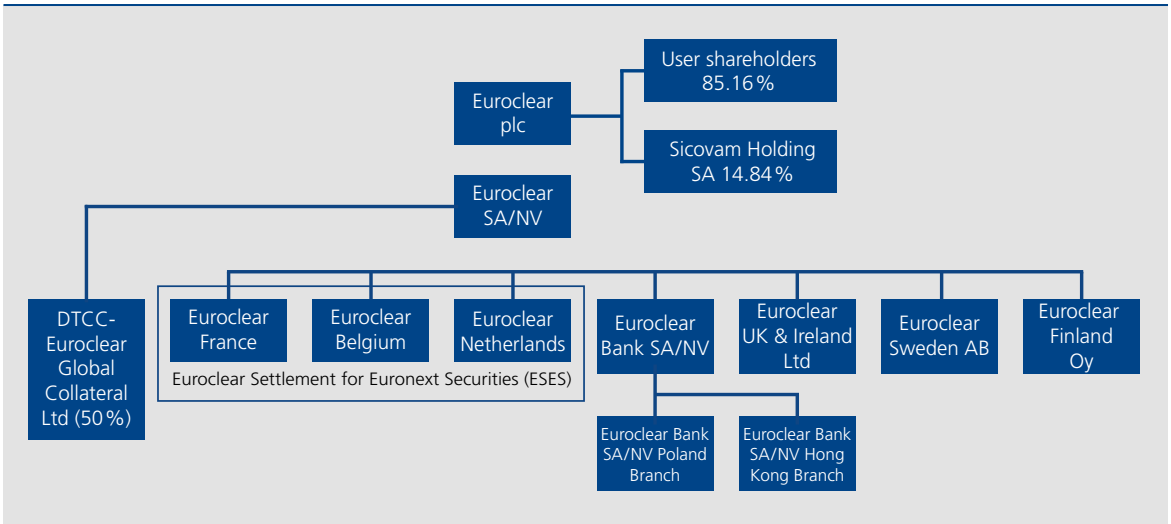
The capital of Euroclear plc, the ultimate holding company of the Euroclear Group, is for the most part held by user-shareholders. The remainder is held by Sicovam Holding SA, a holding company that brings together the former shareholders of Euroclear France, which is the single largest shareholder of Euroclear plc.

Euroclear SA/NV (ESA) is the parent company of the Euroclear Group (I)CSDs; i.e. the CSDs in Belgium, Finland, France, the Netherlands, Sweden, the UK & Ireland, and of the ICSD Euroclear Bank. The latter has branches in Poland and Hong Kong. Euroclear Group (I)CSDs have outsourced the IT platform operations to ESA. ESA also delivers common services, such as risk management, internal audit, and legal and human resources services to the Group (I)CSDs.

Euroclear Belgium, Euroclear France and Euroclear Netherlands are operating a common settlement platform; i.e. the Euroclear Settlement of Euronext-zone Securities system (ESES). Besides a common IT platform, these ESES CSDs share harmonised settlement and custody services, and apply a harmonised Euroclear services pricing model. Daily settlement operations of Euroclear Belgium and Euroclear Netherlands are outsourced to Euroclear France.

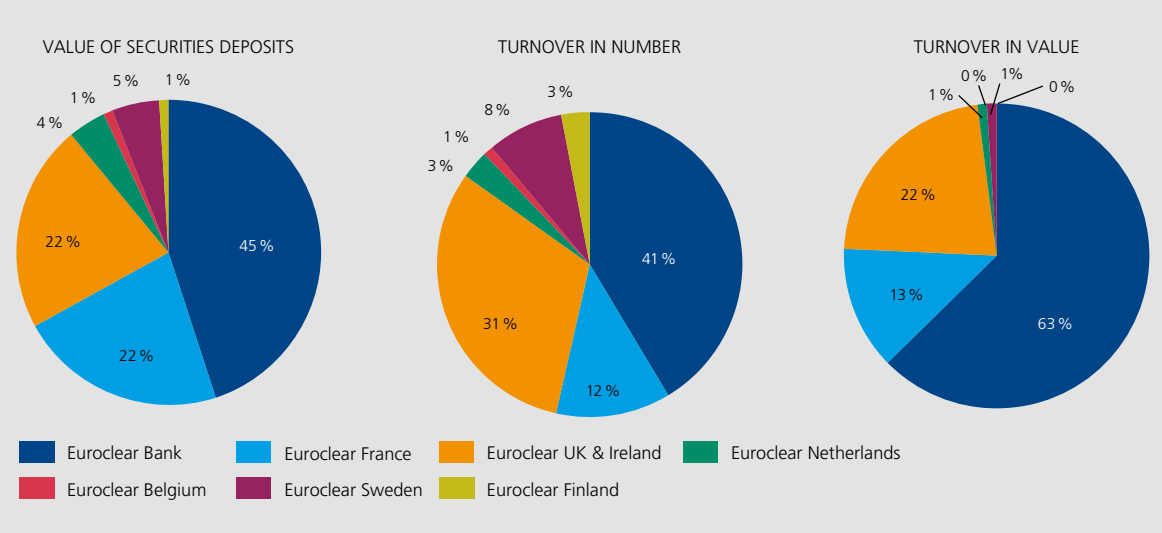
In September 2014, ESA and the US Depository Trust & Clearing Corporation (DTCC) set up the joint venture DTCC-Euroclear Global Collateral Ltd. The ultimate aim of this entity is to create a joint collateral processing service whereby mutual clients of DTCC and Euroclear Bank manage collateral held at both depositories as a single pool, to meet obligations in both the European and the North American time-zone.Euroclear Bank represents the largest share in terms of business activity within the Euroclear Group. At year-end 2014, the Euroclear Group held close to € 26 trillion in euro equivalent of securities deposits under custody, of which 45 % was held by Euroclear Bank. The Euroclear Group covers more than 60 % of outstanding eurobond holdings worldwide, more than 50 % of European domestic fixed-income debt securities, and 65 % of Eurotop-300 equity holdings. The yearly total number of securities transactions settled in 2014 in the Euroclear Group was nearly 182 million, whereas their value represented 633.6 trillion in euro equivalent. The share of Euroclear Bank in the Group's total turnover in number and value was 41 % and 62 % respectively.

EUROCLEAR GROUP CORPORATE STRUCTURE
(simplified, situation at the end of 2014)



Source: Euroclear.

RELEVANT SHARE OF EUROCLEAR GROUP (I)CSDS IN BUSINESS ACTIVITIES OF THE GROUP (FY 2014)[1]

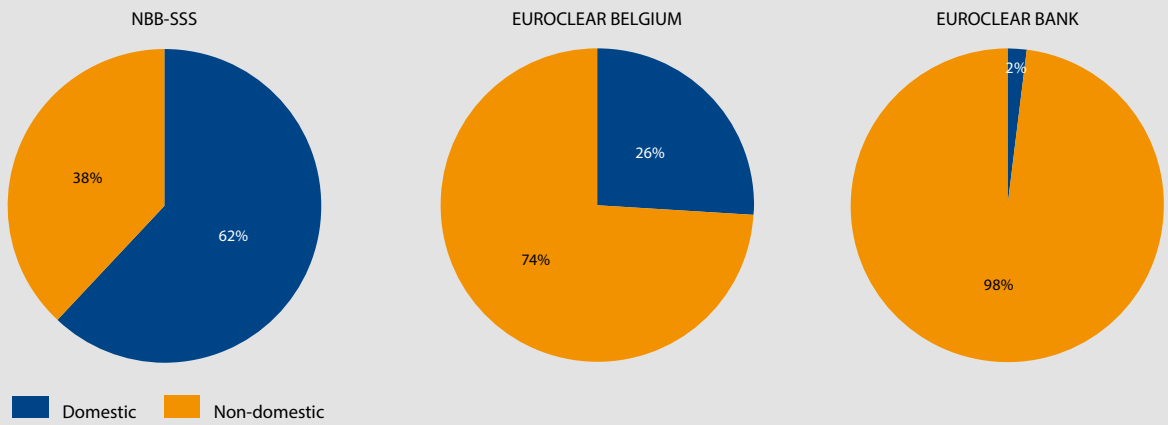


Source: Euroclear.
(1) Data for Euroclear UK & Ireland excludes self-collateralised repos; Data for Euroclear France excludes 'pensions livrées' with the central bank of France.

within the EU tend to have a higher share of non-domestic participants, compared to CSDs operating in larger countries or markets. The level of regional integration (e.g. Euronext markets) is also put forward as a factor for the high proportion of non-domestic participants.

Euroclear Bank is by far the largest (I)CSD in Belgium (and in the EU) in terms of participants. It comprises about 1,500 participants, including more than 100 central banks. Its participant base consists mainly of non-domestic participants, including CCPs, CSDs, broker-dealers and investment banks. As concluded by the ECSDA analysis, the

CHART 29 PERCENTAGE OF DOMESTIC VERSUS NON-DOMESTIC PARTICIPANTS IN BELGIAN (I)CSDS



Sources: NBB-SSS, Euroclear.

nature of its business model means that Euroclear Bank, acting as an ICSD and issuer CSD of Eurobonds, does not operate in a purely domestic environment, and that explains the high proportion of non-domestic participants.

ELIGIBLE FINANCIAL INSTRUMENTS

NBB-SSS and Euroclear Belgium focus on the Belgian securities market. NBB-SSS is the CSD for government and other fixed income securities in Belgium. Euroclear Belgium primarily holds equities, but it also holds warrants and rights, corporate bonds and commercial paper as well as exchange-traded funds.

Euroclear Bank, together with Clearstream Banking Luxembourg, is an issuer ICSD for international securities such as Eurobonds. As international investors are among its main participants, it has also established links with other securities markets to allow its participants to hold and settle domestic securities issued in those markets. Currently, it is connected with 46 markets worldwide, typically for government and other fixed income securities, but also for equities, warrants, investment funds and other types of securities.

Insofar as (I)CSDs hold and settle securities in their system that are part of the ECB list of eligible marketable assets and those (I)CSDs are assessed by the Eurosystem central banks according to a specific assessment framework, they can be used to transfer and mobilise collateral for Eurosystem monetary policy and credit operations [(1)]. In Belgium, NBB-SSS and Euroclear Bank can be used for such collateral operations by both Belgian and foreign financial institutions. As Euroclear Belgium mainly settles equities, which are not ECB eligible marketable assets, it is not used for Eurosystem monetary policy purposes.

SETTLEMENT MODEL

Participants of the Belgian (I)CSDs can settle securities transactions against payment. Chart 30 shows how transactions are settled by the (I)CSDs in Belgium in "central bank money" or in "commercial bank money". The payment leg of securities transactions in NBB-SSS is settled in the books of the NBB and therefore only in EUR. Since 2009, Euroclear Belgium's settlement activity has been integrated in the ESES system, the joint platform with Euroclear France and Euroclear Netherlands, for both stock exchange and OTC trades. The central banks of the Euronext markets provide a dedicated cash account on the ESES platform to carry out settlement against payment. NBB-SSS and Euroclear Belgium settle in "central bank money".

Euroclear Bank provides cash accounts for its participants, accepts more than 50 settlement currencies in its system, and provides settlement against payment in its own books. Settlement therefore occurs in "commercial bank money". The resulting payment flows generated by participants' settlement activity are processed via Target2 (EUR) or via Euroclear Bank's network of cash correspondents. Euroclear Bank operates with a banking licence and has an AA+ (Fitch) and AA (S&P) rating.

4.3 Activity of (I)CSDs in Belgium

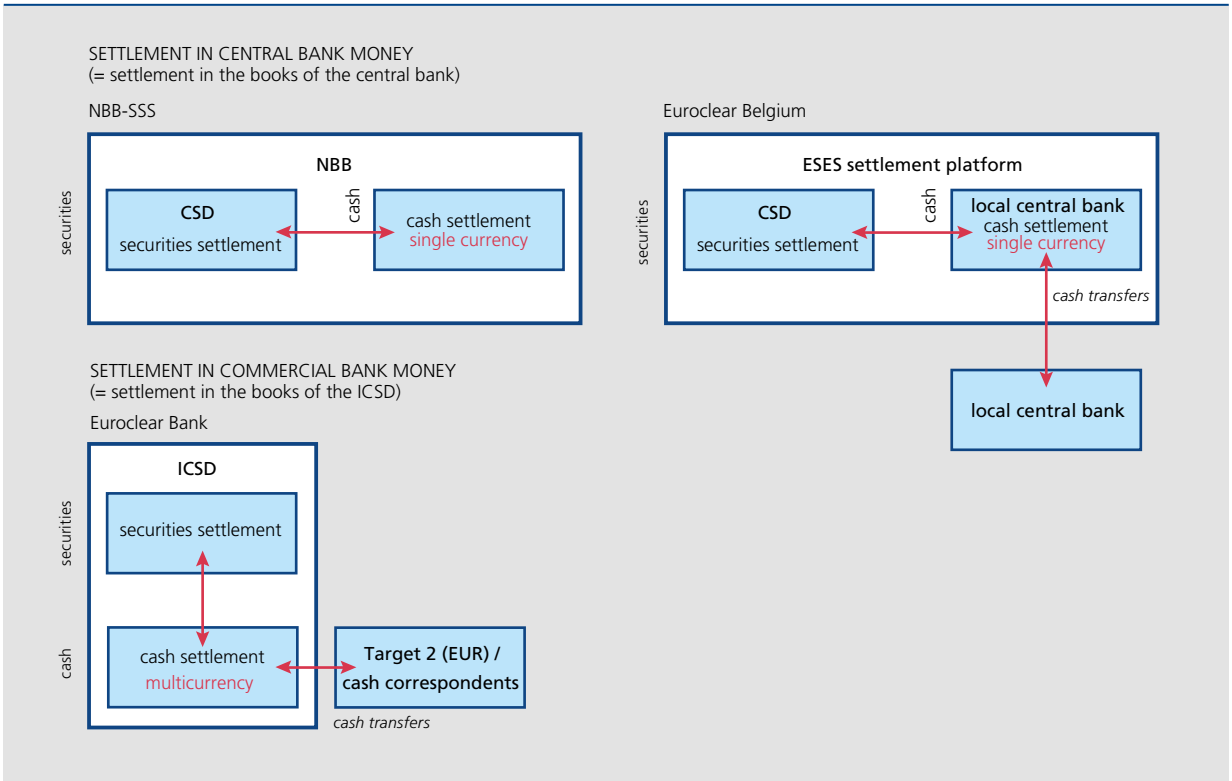
The sub-section below provides an overview of the Belgian (I)CSDs' activities in terms of securities deposits, new issue activity, and settlement turnover. The value of securities deposits is measured at the end of the reporting year (unless annotated otherwise), while new issue activity and settlement turnover is aggregated for the full reporting year.

4.3.1 NBB-SSS

Both public and private sector fixed-income debt is held and settled in NBB-SSS. Public sector debt includes securities issued by the Belgian federal government and by regional or local governments. Private sector debt eligible in NBB-SSS can be issued by corporates, credit institutions or other entities.

(1) For the purposes of the assessment framework, the Eurosystem central banks are viewed as "users" of the SSS in conducting their monetary policy. The list of "eligible" CSDs is published on the website of the ECB http://www.ecb.europa.eu/paym/coll/coll/eligiblesss/html/index.en.html.

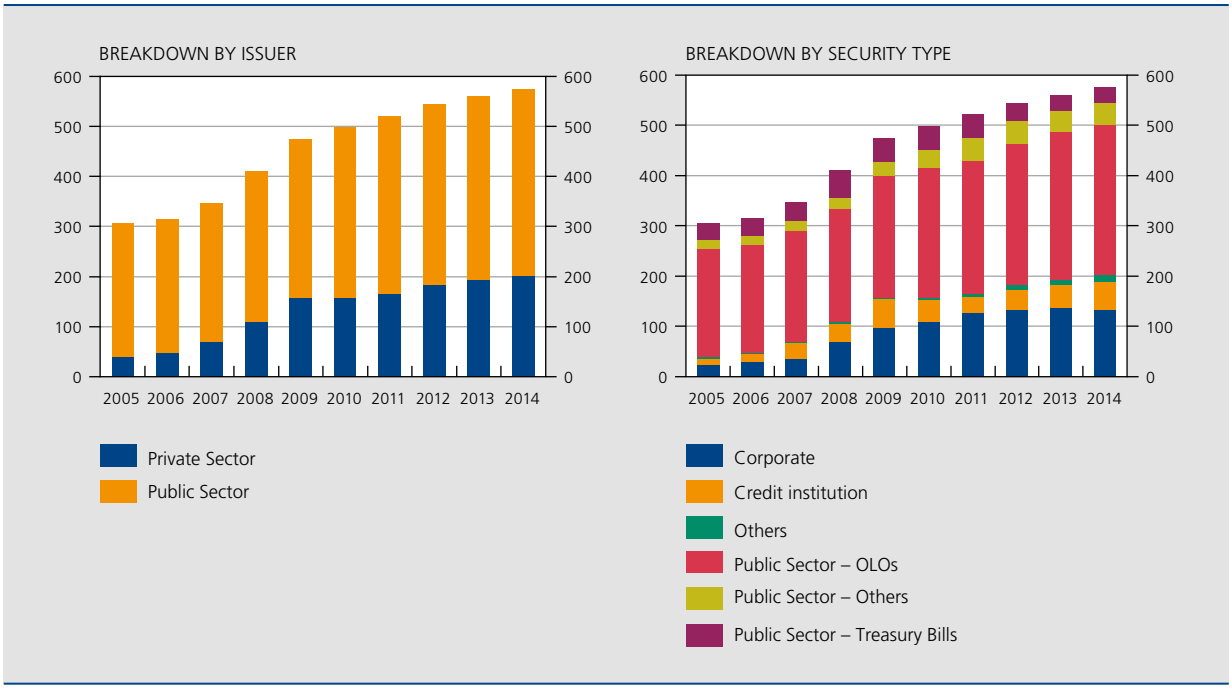
CHART 30 SETTLEMENT IN CENTRAL BANK MONEY VERSUS COMMERCIAL BANK MONEY



Source: NBB.

CHART 31 VALUE OF SECURITIES DEPOSITS IN PRIVATE AND PUBLIC SECTOR DEBT

(in € billion)



Source: NBB-SSS.

SECURITIES DEPOSITS

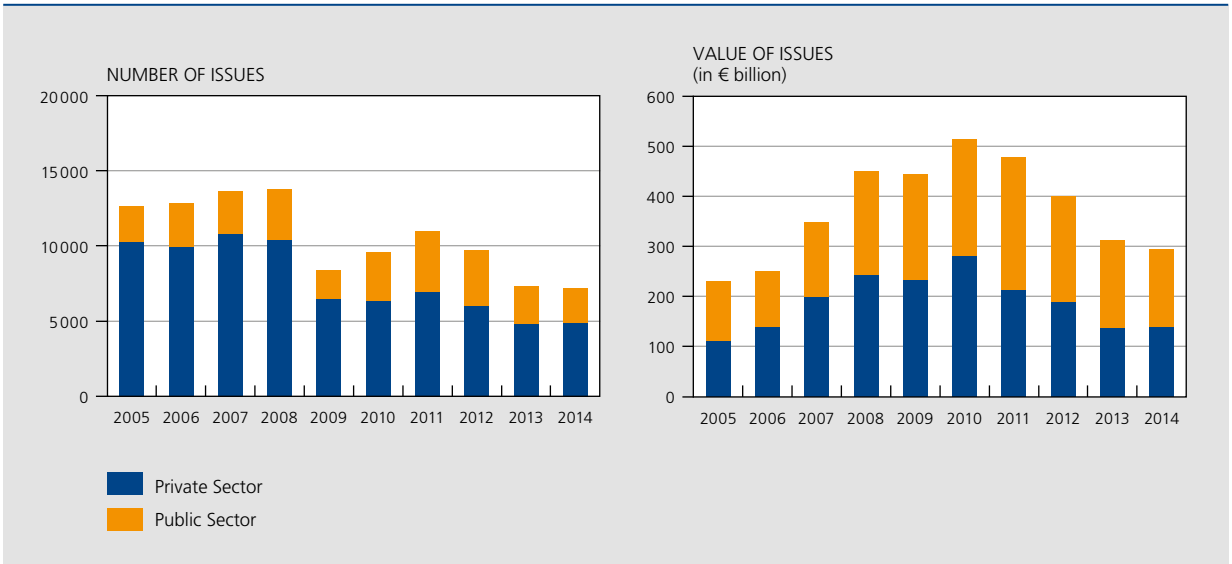
More than 2 000 different fixed-income debt securities are held in the system of NBB-SSS. The total outstanding amount in value of securities held in NBB-SSS increased from € 560 billion in 2013 to € 576 billion in 2014 (nearly +3 %). Chart 31 provides more details on the trend in the value of the outstanding securities deposits held in NBB-SSS, both for public and private sector debt, and gives a breakdown between the main issuer categories and security types.

At the end of 2014, 65 % of outstanding securities deposits in NBB-SSS were public sector debt securities. The outstanding amount of such securities has increased steadily over the years, but the pace has quickened since the Belgian banking crisis in 2008. To some extent, the dematerialisation of State Bonds also increased the outstanding amount. Linear bonds (OLOs) represent 80 % of total public sector debt, compared to about 8 % for Treasury Bills (or Certificates). Fixed-income securities issued by regional and local governments account for 3.7 % of total public sector debt. Outstanding securities deposits in these securities amount to € 13.6 billion. Public sector debt is mainly issued in euro; i.e. only a small part (1.4 %) is issued in foreign currencies. In 2005, private sector debt represented only about 13 % of total outstanding securities deposits held in NBB-SSS. At year-end 2014, the figure was about 35 %, the majority being issued by corporates (66 %) and credit institutions (27 %).

NEW ISSUE ACTIVITY

Chart 32 illustrates new issue activity in NBB-SSS in number and value. Although the number of new private sector debt issues generally exceeds the number of public sector issues, since 2011 the total value of new issues in public sector debt has exceeded the figure for private sector debt.

CHART 32 NEW ISSUE ACTIVITY IN PRIVATE AND PUBLIC SECTOR DEBT



Source: NBB-SSS.

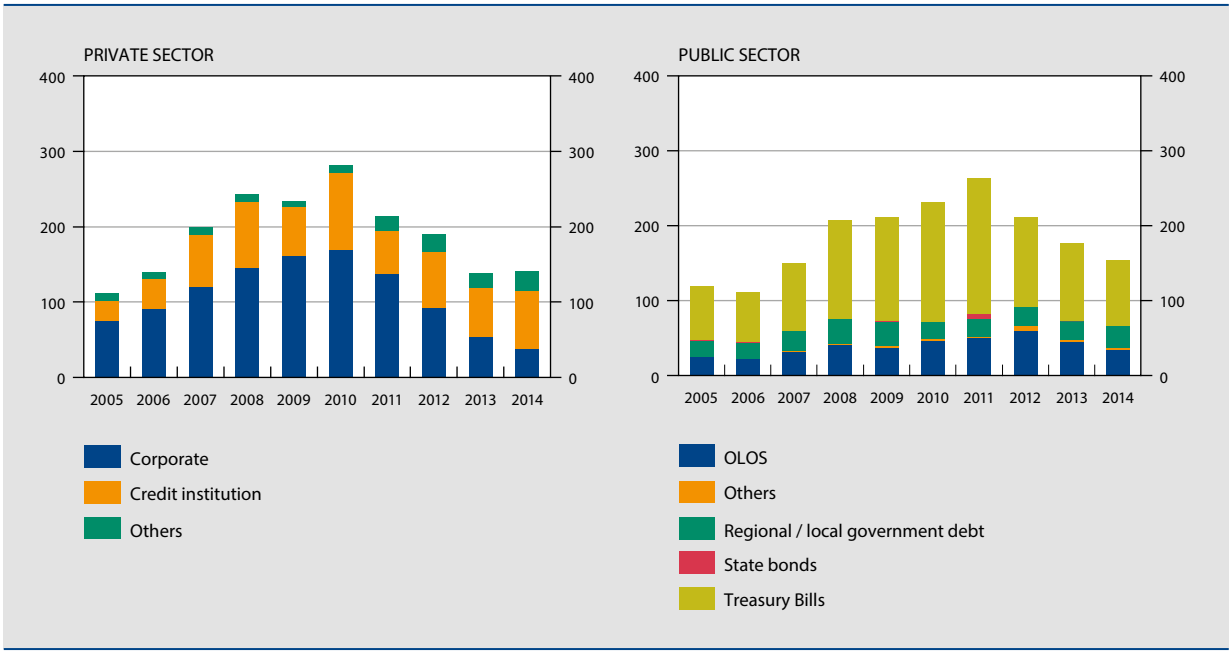
New issue activity in private sector debt

The value of new issue activity in private sector debt held in NBB-SSS peaked in 2010 but then declined until 2013. In 2014, as Chart 33 illustrates, the level of new issue activity was more or less stable. Private sector debt issued by credit institutions has grown steadily in relative importance; i.e. it currently represents the major share of private sector debt (i.e. about 55 % in 2014). This rise has been at the expense of new issue activity in corporate debt which continued to decline in 2014, dropping below pre-crisis levels. In 2014, the largest issuance programmes by private sector issuers or credit institutions were those of Anheuser-Bush INBEV SA, Belfius Bank, EANDIS and KBC.

New issue activity in public sector debt

Chart 33 shows that the majority of public sector debt is issued by the Belgian federal government; i.e. about 80 % in 2014. The remainder is issued by regional and local governments. Total new issue activity by Belgian federal government increased in 2008 and peaked in 2011. Since 2012, that activity has been decreasing. The exceptional peak in state bonds, issued in December 2011 and totalling € 5.7 billion, relates to the favourable conditions prevailing at the time in terms of yield and withholding tax (i.e. the so-called "Leterme" state bonds).

CHART 33 NEW ISSUE ACTIVITY PER SECURITY TYPE
(in € billion)



Source: NBB-SSS.

SETTLEMENT TURNOVER

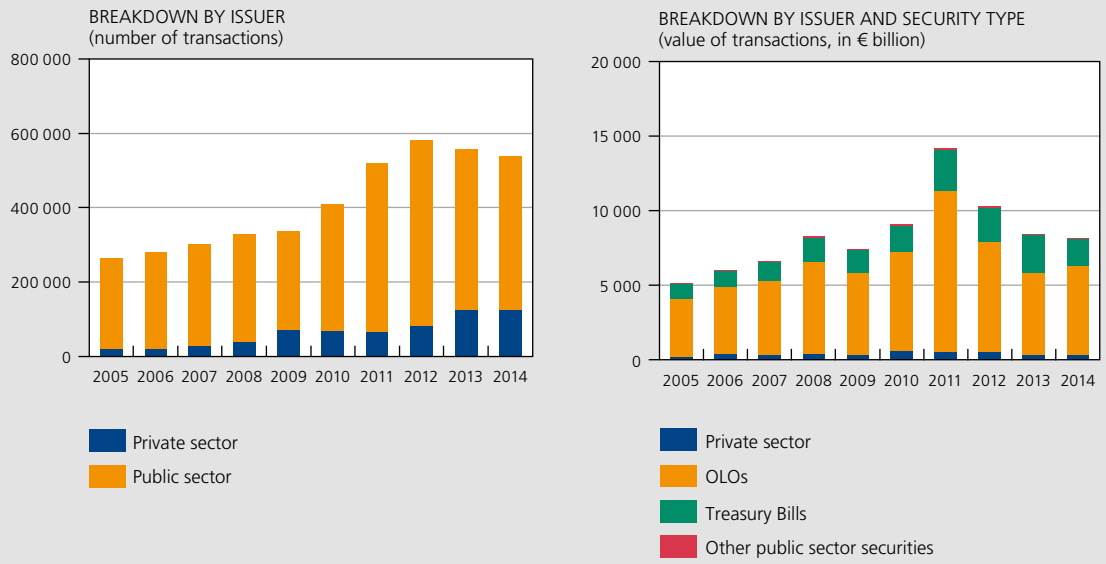
Chart 34 shows the settlement turnover between direct participants of NBB-SSS, both in number and in value. In 2014, daily average settlement in fixed-income debt securities held in NBB-SSS amounted to 2 100 in number and € 31.9 billion in value. Public sector debt accounts for more than 75 % of the number of transactions settled in NBB-SSS and 96 % in terms of value. In terms of number, settlement turnover in private sector debt held in NBB-SSS has increased during recent years. Nevertheless, in value terms, settlement in private sector debt is typically much lower.

Settlement turnover in public sector debt primarily concerns OLOs. In 2014, about 77 % of settlement related to OLOs and 22 % to Treasury bills. The historical peak in NBB-SSS settlement activity in 2011 coincided with the euro area sovereign debt crisis and the Belgian government crisis. In that year, market turbulence hit the OLO market with (10-year) OLO rates peaking at up to 5.51 %.

4.3.2 Euroclear Belgium

Nearly all activity in Euroclear Belgium, in terms of both securities deposits and settlement, is in equities. New issue activity in Euroclear Belgium is limited, and this section will therefore not go into further detail on the subject.

CHART 34 SETTLEMENT TURNOVER IN PRIVATE AND PUBLIC SECTOR DEBT



Source: NBB-SSS.

SECURITIES DEPOSITS

Euroclear Belgium holds about 1 000 different securities in its system. At the end of 2014, the value of securities deposits held by Euroclear Belgium totalled nearly € 225 billion, an increase of almost 10 % compared to 2013. As 99 % of securities deposits are in equities and are valued at market prices, the value of securities deposits is strongly influenced by market volatility. As illustrated in Chart 35, the value of securities deposits in Euroclear Belgium tracks the BEL-20 index (in which financial institutions represent a significant share). BEL-20 equities account for about 80 % of total securities deposits in Euroclear Belgium. The value of securities deposits dropped sharply in 2008 and reached their lowest level in 2011, but has increased since 2012 as the equity markets have recovered.

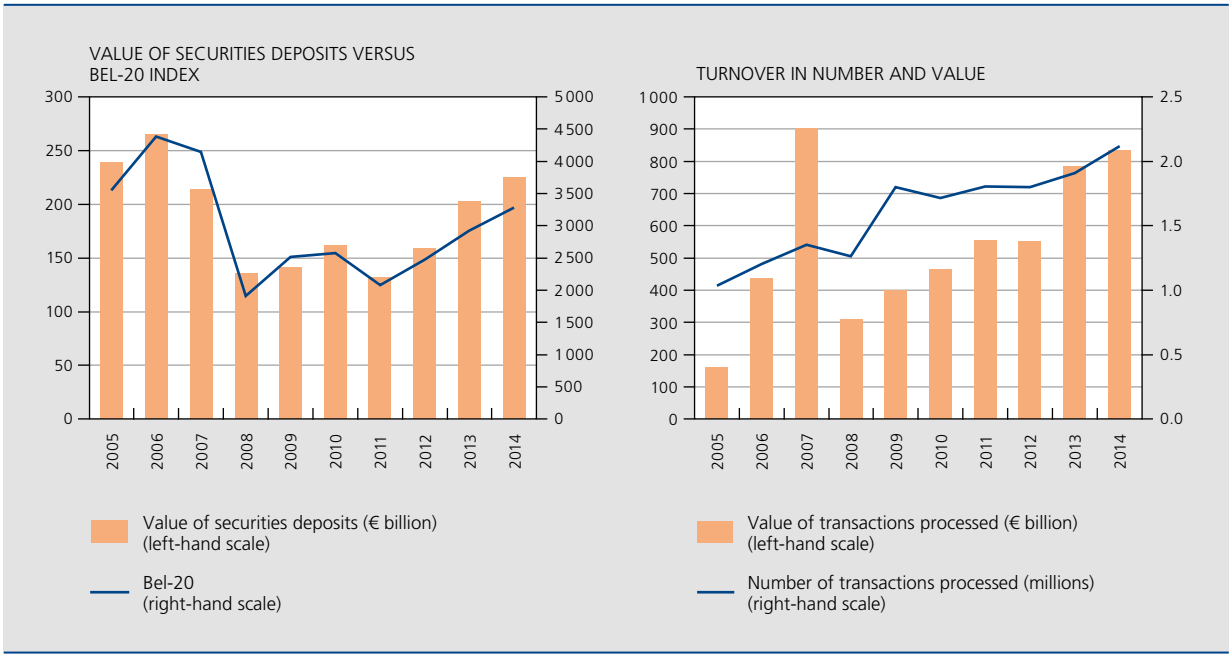
SETTLEMENT TURNOVER

In 2014, Euroclear Belgium settled on average about 8 300 transactions on a daily basis, for a value of € 3.3 billion. The main part of the settlement value (70 % in 2014) comes from over-the-counter (OTC) trades. Stock exchange transactions are settled in Euroclear Belgium only after netting; i.e. after the central clearing by the Paris-based CCP LCH.Clearnet SA. As the securities settled are nearly all equities, the value of the settlement turnover also depends on the market value of the securities. The 2007 peak shown in Chart 35 was due not only to the rise in number of transactions but also to the rise in equity prices at that time.

4.3.3 Euroclear Bank

Euroclear Bank is an issuer ICSD for international securities, but it also acts as an investor ICSD by connecting with 46 securities markets worldwide. Due to these links with domestic markets, Euroclear Bank's participants can hold and settle domestic securities issued in all those markets, typically government bonds and other fixed-income securities.

CHART 35 SECURITIES DEPOSITS AND SETTLEMENT TURNOVER



Source: Euroclear.

SECURITIES DEPOSITS

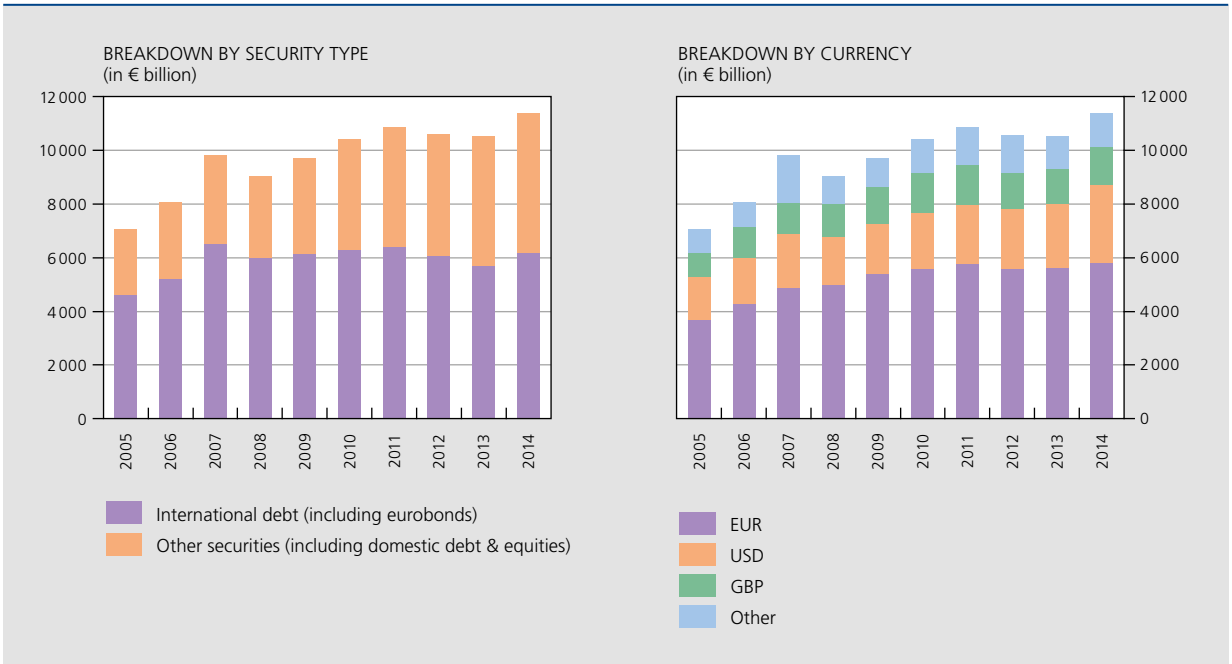
More than 200 000 different securities, both international and domestic, are held as securities deposits in the books of Euroclear Bank. The total value of outstanding securities deposits at year-end 2014 amounted to nearly € 11.4 trillion equivalent. In 2014, Euroclear Bank participants could obtain Panamanian government bonds, Mexican corporate bonds, Taiwanese-issued RMB bonds, Russian municipal and corporate bonds, as well as equities, via new or extended Euroclear Bank links to the respective domestic CSDs. As a result, these domestic capital markets have increased access to global investors that are participants in Euroclear Bank.

Chart 36 illustrates that in 2014 about 55 % of securities deposits in Euroclear Bank were international securities. In 2005, the share of international securities was still around 65 %. Most of such securities deposits are denominated in EUR, USD and GBP. Those currencies represent about 90 % of total securities deposits in value. This share has been more or less stable over the years. Although the increase in securities deposits still mainly concerns the three major currencies, deposits in other currencies are also growing rapidly (e.g. CNY/RMB). Euroclear Bank claims to represent 44 % of total off-shore RMB-denominated securities holdings.

NEW ISSUE ACTIVITY

Together with Clearstream Banking Luxembourg, Euroclear Bank is the issuer ICSD for international securities, such as Eurobonds. Since the issuers can originate from different countries, trends in new issue activity depend on the extent to which Euroclear Bank can attract new issue activity (or market share vis-à-vis Clearstream Banking Luxembourg), as well as on the economic situation of those markets in which issuers of international securities operate. New issue activity in Euroclear Bank rose slightly from € 2.14 trillion equivalent in 2013 to almost € 2.18 trillion in 2014. International securities can be issued in various currencies. In 2014, EUR represented around 45 % of all new issues. EUR, USD and GBP are the major currencies in which international securities are issued in Euroclear Bank, representing more than 90 % of total new issue activity. However, other currencies are gaining in importance. For example, in December 2014, an offshore RMB bond worth RMB 12 billion was issued with Euroclear Bank.

CHART 36 VALUE OF SECURITIES DEPOSITS (1)



Source: Euroclear.
(1) 2005-2011: value at the end of December, 2012-2014: average value in December; Currency = denomination currency; EUR excludes "in-currencies" (BEF, DEM, FRF, etc.).

SETTLEMENT TURNOVER

On average, Euroclear Bank settled almost 300 000 transactions a day in 2014, for an amount of nearly € 1.5 trillion equivalent. For the full year, turnover increased by about 8.5 % in number (up to 75.2 million) and 13 % in value (up to € 395 trillion). As shown in Chart 37, the number of transactions settled in Euroclear Bank almost tripled between 2005 and 2014. 2008 and 2009 were the only years in which the number of transactions did not rise.

The main driver of settlement turnover in value has been the increase in domestic securities. This type of securities represented about 75 % of settlement turnover in 2014. Settlement turnover in international securities has also risen gradually since 2012. In 2014, the value of settlement turnover was more than 2.5 times higher than 10 years ago. From a currency perspective, Chart 37 illustrates that the main denomination currencies are EUR, USD and GBP, representing about 95 % of total settlement turnover. The share of these major currencies has been stable over the years.

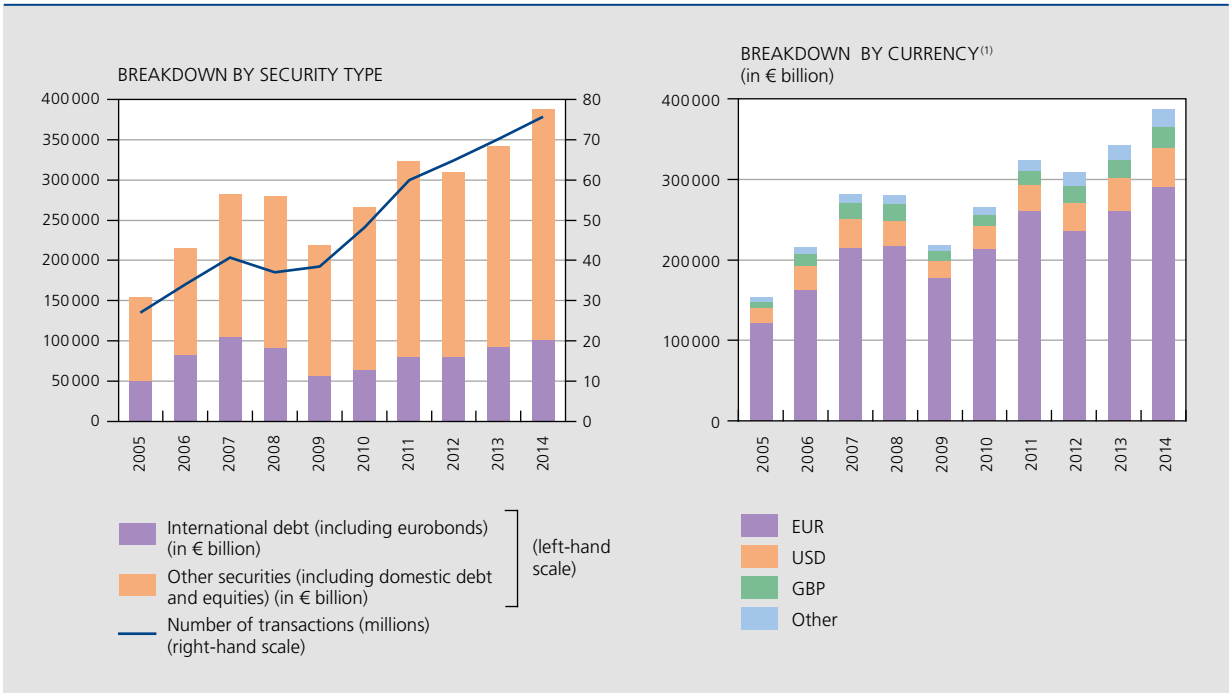
New developments have been initiated for other currencies, in particular for the offshore RMB market. In 2014, Euroclear Bank and the Taiwan Depository & Clearing Corporation (TDCC) launched a new service allowing international investors that are clients of Euroclear Bank to settle Taiwanese-issued RMB bonds.

Settlement turnover includes internal settlement (i.e. both counterparties to a securities transaction are Euroclear Bank participants) as well as external settlement (i.e. one of the counterparties to a securities transaction is a Euroclear Bank participant, the other is a participant of another (I)CSD). Due to its large participant base, a significant proportion of securities transactions can be handled internally, which creates economies of scale. About 85 % of settlement turnover is currently settled internally in the books of Euroclear Bank.

4.4 Future challenges and opportunities in a changing landscape

(I)CSDs in the EU are facing a number of possible challenges and opportunities for their business models in the short to medium term. Their operating landscape is changing due to new regulations such as the CSD Regulation or public

CHART 37 SETTLEMENT TURNOVER



Source: Euroclear.
(1) Currency = denomination currency; EUR excludes "in-currencies" (BEF, DEM, FRF, etc.).

initiatives such as TARGET2-Securities. As explained above, there are many differences between CSDs and ICSDs, as well as between CSDs themselves, in terms of business size, the range of services provided, or the level of internationalisation of their activities. Due to such distinct business profiles, some (I)CSDs will be better prepared than others to adapt to the new landscape. Economies of scale may prove to be a decisive factor for (I)CSDs to maintain or gain market share in the future.

CSD REGULATION

The CSD Regulation (CSDR) lays down new standards for the safe and efficient functioning of CSDs in the EU[1]. While the CSDR came into force in September 2014, its technical regulatory standards are expected to be published in the third quarter of 2015. Some requirements of the CSDR will have an impact on the business model of (I)CSDs. The CSDR aims to set the rules for an EU-wide passport for the provision of (I)CSD services beyond an (I)CSD's home country. Also, the CSDR offers issuers the freedom to issue their securities in any (I)CSD of their choice in the EU, while fair and open access should be ensured for EU (I)CSDs to any other EU (I)CSD or market infrastructure (such as trading venues or CCPs) regardless of the country where they are based. The implementation of the CSDR will therefore affect the natural monopoly of national CSDs in Europe. They will have to compete with each other in attracting new issues as the issuer (I)CSD, and in attracting investors via an investor (I)CSD approach by linking with other infrastructures. With the CSDR, the current national CSDs may become more "international" – or at least European – CSDs reaching out to issuers from different countries.

(1) http://eur-lex.europa.eu/legal-content/EN/TXT/?uri = OJ:JOL_2014_257_R_0001.

TARGET2-SECURITIES

Nearly 10 years after the decision of the ECB Governing Council to evaluate the feasibility of building a common platform for the settlement of securities transactions in Europe, TARGET2-Securities (T2S) is expected to be launched in 2015[1]. T2S is focused on the harmonisation of the settlement function in central bank money. Initially, only EUR will be accepted as the settlement currency. T2S is expected to bring benefits to the market, as cross-border settlement will be internalised within the T2S platform at a lower cost. Market participants can also use a single gateway to T2S, eliminating the operational burden of accessing and maintaining multiple relationships with CSDs and/or custodians.

However, the "commoditisation" of settlement by T2S creates a challenge for European CSDs' business models. The loss of CSDs' revenues generated from settlement fees will have to be compensated and, for that purpose, alternative revenues will have to be found. While the national CSDs will still organise the custody function, they will have to compete on the basis of other value-added activities, such as asset servicing or collateral management services, which are at the same time provided by custodian banks which may have direct access to T2S themselves.

NEED FOR HIGH QUALITY COLLATERAL

In the aftermath of the financial crisis, new sets of regulations have been issued to promote financial stability. The G20 regulatory agenda focused initially on the OTC derivatives markets which led to new regulations in the US (Dodd-Frank Act) and the EU (EMIR). EMIR lays down rules regarding the mandatory use of a CCP to clear standardised OTC derivative contracts. In that regard, CCPs will manage the initial and variation margins (collateral) collected from their members that CCPs are obliged to hold with an (I)CSD. For non-centrally cleared (i.e. non-standardised) OTC derivative contracts, EMIR also requires counterparties to provide sufficient margin. Both for centrally and non-centrally cleared OTC derivative contracts, collateral posted by market participants should be high-quality collateral, with minimum credit and market risk, to mitigate the risks for CCPs or counterparties. To comply with this set of EMIR rules, market participants will have to mobilise or source the collateral matching the EMIR criteria from custodians or (I)CSDs where the collateral is located.

Other prudential regulation requirements will also intensify the search for high quality collateral. Under new Basel III/CRD IV requirements, the Liquidity Coverage Ratio (LCR) requires banks to have sufficient high quality liquid assets to withstand stress scenarios.

FUTURE PERSPECTIVE

As the launch date of T2S is approaching, national European CSDs are preparing their migration to the new common settlement platform. This often requires considerable investments in their own systems in order to be compatible with T2S system features. The new rules of the CSDR will also demand from the EU (I)CSDs the necessary investments to achieve compliance with the new regulatory requirements and to obtain their authorisation under the CSDR.

For many national European CSDs, there will be major hurdles to overcome in absorbing the technical migration to T2S plus the implementation of the CSDR. As T2S will affect current CSD revenues, it is expected that CSDs' natural monopolies will erode, and that will put further stress on traditional revenue sources in a post-CSDR environment. Competition between CSDs will occur in other value-added activities, such as collateral management services, for which regulations such as EMIR or CSDR can provide new business opportunities. However, larger (I)CSDs that can benefit from economies of scale are expected to be better positioned to address the future challenges in an increasingly competitive market and to capitalise on the business opportunities that might emerge.

Since national CSDs will need to invest in developing value-added services, while costs will need to be cut because of lower revenues, a further consolidation among (smaller) CSDs in the EU cannot be ruled out. However, CSDs may also decide to form alliances with other market infrastructures – for example with the ICSDs for collateral management services – instead of developing their own proprietary systems (see further in this article).

(1) The migration of CSDs to the T2S platform is planned in four waves. NBB-SSS and Euroclear Belgium (together with the other ESES CSDs) are expected to join T2S in the second wave currently scheduled for some time in 2016. The ICSDs, Euroclear Bank and Clearstream Banking Luxembourg, decided not to join T2S.

4.5 Development of collateral management services

In order to exploit market participants' greater need for high quality collateral, and since it is becoming more complex for them to allocate the right collateral to the right place (while definitions of high quality collateral may differ depending on the applicable regulatory framework), (I)CSDs have invested in (further) developing their collateral management services. One of the core common elements in their strategies is to take over some of the collateral management tasks of the market counterparties.

As collateral has to cover the risk between two counterparties during the life span of the transaction, it needs to be valued regularly to make sure risks are still covered. This requires active collateral management including (at least) daily marked-to-market valuation techniques, the application of agreed eligibility criteria and haircuts, or the processing of margin calls to collect additional collateral. Counterparties could agree to manage all administrative obligations regarding the valuation of collateral between themselves on a bilateral basis, or they could opt to appoint a triparty collateral management agent. In that case, counterparties outsource collateral management tasks during the life of the transaction, such as the selection and valuation of the collateral based on the eligibility conditions and limits agreed by the underlying counterparties. Such a triparty agent acts on behalf of the collateral giver and taker while remaining neutral in regard to the underlying transactions; i.e. the triparty agent does not change the relationship (and obligations) between the two counterparties[(1)].

Since 2014, Eurosystem central banks have also been able to use triparty agents for the conduct of their monetary policy and credit operations. In this context, Eurosystem counterparties serve as collateral givers, and Eurosystem national central banks act as collateral takers. In practice, the latter outsource their collateral management services to the triparty agent. Euroclear Bank, Clearstream Banking Luxembourg and other large European CSDs are eligible triparty agents for the Eurosystem[(2)].

The focus of new collateral management services is generally on two areas: collateral optimisation and collateral sourcing[(3)].

COLLATERAL OPTIMISATION

Collateral optimisation covers a wide range of services which basically aim at optimum matching of collateral supply and demand for a market participant. A fragmented approach to collateral management leads to a sub-optimal use of collateral by market participants, as securities are often 'locked' in a particular local market, entity or time zone. Based on an ECB publication, around 25 % of the overall supply of high-quality assets are so-called "idle" securities; i.e. securities held in non-actively managed collateral portfolios[(1)]. New services being developed by FMIs and custodians aim to unblock these collateral sources and to enhance collateral management efficiency in view of the increased demand for collateral since the financial crisis, and to anticipate future needs due to new regulations.

Key for the collateral service provider is to have sufficient information on an individual market participant's collateral supply and the range of obligations faced by that client. Collateral optimisation processes should ensure that the right collateral (based on eligibility criteria defined by the market participants) is mobilised at the right time. Other processes that aim to optimise the use of collateral assets include collateral substitution (i.e. replacing collateral needed elsewhere with other collateral meeting the initial eligibility criteria), collateral re-use (i.e. enabling the collateral receiver to re-use collateral for another transaction), or collateral transformation services (i.e. exchanging lower quality assets for higher quality collateral).

Such collateral optimisation services are not necessarily new, but are being further enhanced by collateral management service providers in order to meet increased demands from market participants to optimise the usage of their available collateral, thereby maximising their access to sources of liquidity while minimising their overall cost of funding. Over

(1) In Belgium, Euroclear Bank and the custodian BNYM SA/NV are critical players in international triparty collateral management services. According to the International Capital Market Association (ICMA) (www.icmagroup.org), between 10 and 12 % of the estimated European repo market is managed by triparty agents. This is relatively low compared to the US, where the triparty agents (Bank of New York Mellon and JP Morgan) represent 2/3 of the repo market.

(2) The list of eligible triparty agents is published on the ECB website http://www.ecb.europa.eu/paym/coll/coll/triparty/html/index.en.html.

(3) See also CPMI, Developments in collateral management services, September 2014.

time, Euroclear Bank has developed a set of collateral optimisation features in its triparty collateral management environment. In some cases, instead of developing their own proprietary systems, national CSDs may form alliances with other collateral management service providers to rely on their advanced technology. Euroclear France and Euroclear Netherlands, for example, provide collateral management services for their participants, using the Euroclear Bank triparty collateral management system.

SOURCING OF COLLATERAL

The sourcing of collateral, in particular cross-border, often implies that linkages need to be created between different FMIs. As an example, the Euroclear Group launched its "Collateral Highway" concept that aims to provide an open global market infrastructure allowing market participants to mobilise pools of assets more efficiently for the purpose of their collateral management, in cases where the assets are fragmented across various holding locations. Collateral supply can be aggregated by sourcing collateral from other (I)CSDs and custodian banks where the assets are held (i.e. highway "entries"). Once collateral is sourced into the Euroclear system, participants can allocate it to their counterparties to support a range of transactions, including central bank operations, repos, securities lending or margins for CCPs or bilaterally cleared OTC derivatives trades (i.e. highway "exits"). CCPs and central banks participating in the Euroclear system contribute to an aggregation of the collateral demand side as well. Other CSDs can also plug into the "Collateral Highway" to gain access to a large pool of collateral assets held in the Euroclear Group. In early 2015, the Euroclear Group announced that it managed collateral assets amounting to more than 1 trillion euro equivalent. Other (I)CSDs and custodians are also developing similar collateral management services for their clients.

4.6 Regulatory perspective

The NBB is responsible for the prudential supervision – including the issuance of authorisations – vis-à-vis settlement institutions and equivalent settlement institutions established in Belgium. The NBB also acts as the overseer of Belgian securities settlement systems operated by Belgian settlement institutions or equivalent settlement institutions to ensure that the clearing and payment systems operate properly and that they are efficient and sound. Settlement institutions that have credit institution status, such as Euroclear Bank, are also regulated and supervised as credit institutions.

The NBB has adopted the CPMI-IOSCO Principles for Financial Market Infrastructures (PFMIs) that were issued in April 2012. Due to their critical role in the financial system in settling monetary and other financial transactions, (I)CSDs could be potential sources of systemic risk or possibly act as channels for risk contagion in the event of financial turbulence, if they are not safe and efficient. The PFMIs have therefore strengthened the applicable international standards for systemically important payment systems, (I)CSDs, SSSs and CCPs.

The Belgian (I)CSDs are considered as critical infrastructures for the Belgian financial system. As summarised in Table 11, the key features of these (I)CSDs vary greatly, resulting in different risk profiles. Given the proportion of foreign participants in their systems, the proper functioning of the Belgian (I)CSDs is not only relevant for the domestic market. Moreover, the level of systemic risk of an (I)CSD, including cross-border, will also depend on the interconnections between an (I)CSD and other securities markets and FMIs, its settlement volumes, and its role in the provision of critical services such as collateral management.

Euroclear Bank is by far the largest (I)CSD in Belgium (and in Europe) in terms of settlement volumes. The number of links that Euroclear Bank has established with other securities markets to allow its participants to hold and settle securities issued in those markets gives rise to legal and operational risks. Moreover, as a single purpose bank, Euroclear Bank can grant credit to its participants to support settlement in more than 50 currencies. Euroclear Bank needs to have sufficient liquidity sources to meet its minimum liquidity requirements in case of default by a borrower participant. Such liquidity sources need to fulfil certain criteria specified in the PFMIs in order to ensure that Euroclear Bank can still rely on them in exceptional but plausible circumstances. Credit and liquidity risks in Euroclear Bank continue to be monitored closely

(1) ECB, Collateral eligibility and availability, Follow-up to the report on "Collateral eligibility requirements – a comparative study across specific frameworks" dated July 2013, July 2014.

by the NBB, in particular the multi-currency dimension. From a prudential supervision perspective, the implementation of new Basel III regulatory requirements such as the Liquidity Coverage Ratio (LCR) is also being analysed.

Euroclear Bank acts as a source of interdependencies due to its linkages with other security and currency markets, as mentioned above. In addition, many other FMIs such as CCPs and CSDs are participants in Euroclear Bank. Other interdependencies arise from its role in the provision of collateral management services. In that context, the Euroclear-DTCC project dedicated to collateral management services, involving the establishment of mutual links between Euroclear and DTCC together with interconnected collateral management platforms, is subject to authorisation by the NBB.

The risk profiles of NBB-SSS and Euroclear Belgium, operating in central bank money and in a single currency context, are very different from Euroclear Bank's risk profile. The potential systemic cross-border impact of a failure of either NBB-SSS or Euroclear Belgium is considered smaller. However, whereas Euroclear Belgium has a large number of foreign participants, NBB-SSS (as an issuer CSD) is also eligible to transfer and mobilise collateral for Eurosystem monetary policy and credit operations for both Belgian and foreign financial institutions.

Due to the international scope of Euroclear Bank's activities and its resulting interdependencies, the NBB will be further engaged in international cooperation arrangements with other authorities in line with CPMI-IOSCO Responsibility E that

TABLE 11 KEY FEATURES OF (I)CSDS IN BELGIUM, RELEVANT RISKS AND REGULATORY FOCUS

Risks	Euroclear Bank (EB)	NBB-SSS	Euroclear Belgium
Legal risk (conflict of laws)	97 % foreign participants 46 investor links	38 % foreign participants 0 investor link	74 % foreign participants 1 investor link (to EB)
Operational risk	46 investor links Daily avg transactions[1]: ±290 000 EUR 1.5 trillion equiv.	0 investor link Daily avg transactions: ±2 100 EUR 31.9 billion	1 investor link Daily avg transactions: ±8 300 EUR 3.3 billion
Credit / liquidity risk	Commercial bank money (Multicurrency) Single purpose bank	Central bank money (EUR)	Central bank money (EUR)
Interdependencies	46 investor links 9 CCP/21 (I)CSD participants Multicurrency Collateral management for Eurosystem monetary policy & credit operations[2] Triparty agent	0 investor link 2 CCP/6 (I)CSD participants Single currency Collateral management for Eurosystem monetary policy & credit operations[3]	1 investor link (to EB) 1 CCP/5 (I)CSD participants Single currency

Interest in cooperating with other authorities in line with CPMI-IOSCO Responsibility E.

Systemic risk →

Smaller cross-border impact	Larger cross-border impact	Systemic cross-border impact

Source: NBB.
(1) Settlement turnover, excluding new issue activity.
(2) Both as issuer and as investor CSD.
(3) As issuer CSD.

requires authorities to cooperate in promoting the safety and efficiency of FMIs. This will also be relevant in connection with the CSDR implementation, with the designation of competent and relevant authorities of (I)CSDs.

As all (I)CSDs established in Belgium are considered as critical infrastructures, operational reliability and information security are key in their risk management. According to the PFMIs, business continuity plans should aim for timely recovery of operations and fulfilment of the FMI's obligations. In that regard, cyber resilience continues to be one of regulators' priorities. The NBB is analysing Belgian FMIs' policies and procedures designed to withstand cyber threats, and participates in international policy fora on cyber resilience (see article "Cyber resilience in FMIs" by Filip Caron in this FSR). In addition, developments concerning the migration by NBB-SSS and Euroclear Belgium to T2S, envisaged in 2016, are being monitored closely, including their related project management. As Euroclear Belgium is part of the ESES platform, such analysis is conducted together with the regulators of the ESES CSDs.

The PFMIs also specify the requirements for a sound and comprehensive risk management framework for managing legal, credit, liquidity, operational and other risks. FMIs need to identify scenarios that may potentially prevent them from being able to provide their critical operations and services, and assess the effectiveness of a full range of options for recovery or orderly wind-down. In that connection, the NBB is analysing the recovery plan for the Euroclear Group, in cooperation with the other Euroclear Group regulators.

The NBB ensures that the Belgian CSDs/SSSs are periodically assessed against the PFMIs and, as a rule, makes the assessment results public[1]. In the case of ESES, each ESES authority ensures that its own CSD/SSS is periodically assessed against the PFMIs. The results of the coordinated assessment of the ESES CSD/SSS are summarised in section 7.

Finally, the NBB is involved in different policy fora to discuss the CSDR (which is based on the CPMI-IOSCO Principles) as well as recovery and resolution schemes. A new CPMI-IOSCO workstream is also focusing on the review of the 2011 CPSS-IOSCO market-wide recommendations intended to cover risks in asset servicing (advanced income and redemption proceeds) provided by (I)CSDs and custodians.

4.7 Assessment of the ESES CSDs/SSSs against the CPMI-IOSCO Principles for FMIs

The ESES CSDs/SSSs (central securities depositories/securities settlement systems) comprise Euroclear Belgium (EBE), Euroclear France (EF) and Euroclear Netherlands (ENL), and belong to the Euroclear Group. Since 19 January 2009, the ESES CSDs have operated an integrated settlement platform, the Euroclear Settlement of Euronext-zone Securities (ESES) platform.

The ESES CSDs/SSSs have been assessed against the 2012 CPMI-IOSCO Principles for Financial Market Infrastructures (FMIs), in as far as they are applicable to a CSD or SSS. The assessment does not constitute a direct assessment of their direct holding company Euroclear SA (ESA). However, as ESA is both the parent company of the ESES CSDs/SSSs and their service provider, ESA is partially within the scope of the assessment. ESA is also the parent company of the other Euroclear Group entities (i.e. the CSDs in Finland, Sweden, the UK & Ireland and of the ICSD Euroclear Bank) but these (I)CSDs and their respective securities settlement systems are outside the scope of this assessment.

The assessment of ESES was conducted jointly by the French, Dutch and Belgian securities commissions and central banks; i.e. the Autorité de Marchés Financiers (AMF), the Banque de France (BdF), the Autoriteit Financiële Markten (AFM), De Nederlandsche Bank (DNB), de Financial Services and Markets Authority (FSMA) and the National Bank of Belgium (NBB). Nonetheless, the opinion on the compliance of each respective national ESES CSD/SSS with the CPMI-IOSCO Principles for FMIs is that of their respective central bank and/or securities commission that supervises and/or oversees that CSD/SSS, in accordance with its supervisory and oversight competency.

The assessment report was finalised in March 2015 on the basis of information available up to mid-2014, and in some specific cases – as regards the ESES CSDs' recovery plans – up until the end of October 2014. The following sections

(1) The results of the assessment of Euroclear Bank against the PFMIs were published in the FSR of 2013.

present a high-level overview of the Belgian, Dutch and French settlement landscape, together with the key findings of the assessment of the ESES CSDs against the CPMI-IOSCO Principles for FMIs.

OVERVIEW OF THE BELGIAN, DUTCH AND FRENCH SETTLEMENT LANDSCAPE

The ESES platform settles not only transactions executed on the Paris, Amsterdam and Brussels Euronext stock exchange cash markets, cleared centrally by the Paris-based LCH.Clearnet SA, but also bilaterally concluded over-the-counter (OTC) trades, including fixed income transactions and repo trades.

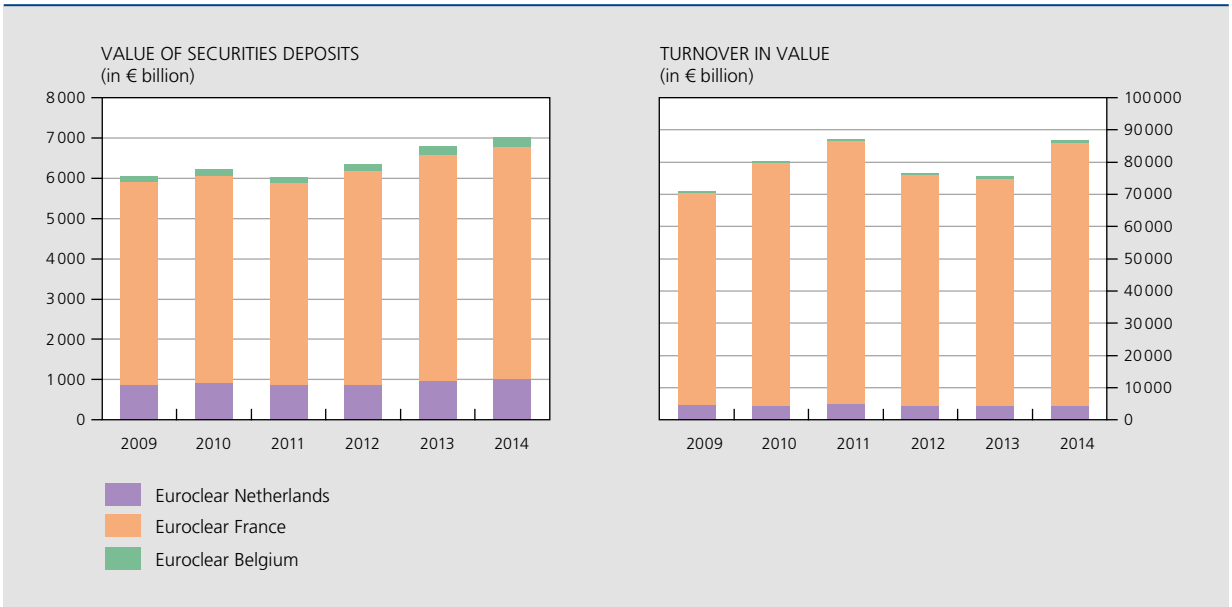
The ESES settlement system offers Delivery Versus Payment (DVP) book-entry settlement in central bank money (DVP model 1), providing real-time settlement. The transactions are settled in central bank money, on cash accounts legally held with the NBB, the BdF and DNB, and operated respectively by EBE, EF and ENL. For their settlement in central bank money, the ESES CSDs are linked with TARGET2, which is a real-time gross settlement (RTGS) system owned and operated by the Eurosystem.

The ESES CSDs also maintain direct and indirect (or relayed) international links for the settlement of cross-border transactions in foreign securities. The majority of foreign securities are held with Euroclear France as an investor CSD, via relayed links through the ICSD Euroclear Bank. Moreover, each ESES CSD has a direct link with Euroclear Bank.

The core business services offered by the ESES CSDs/SSSs include settlement and custody services. EBE is the only ESES CSD/SSS that holds and settles primarily equities.

Chart 38 provides an overview of the value of securities deposits held in the ESES CSDs as well as their settlement turnover. In 2014, the value of securities held in custody amounted to € 225 billion for Euroclear Belgium, € 1 033 billion for Euroclear Netherlands and € 5 757 billion for Euroclear France. The value of settlement turnover in ESES amounted to € 835.5 billion for EBE, € 4 366 billion for ENL and € 81 722 billion for EF.

CHART 38 RELEVANT SHARE OF SECURITIES DEPOSITS AND SETTLEMENT TURNOVER PER ESES CSD



Source: Euroclear.

(1) EBE, EF and ENL are subject to the regulation and oversight of their respective national competent authorities. The competent Belgian, Dutch and French central banks and securities commissions signed a Memorandum of Understanding (MoU) in October 2009 that sets out principles for the co-ordination of their respective responsibilities for regulating and overseeing Euroclear SA (ESA), the parent company of the ESES CSD. This ESA MoU was also signed by the other central banks and securities regulators which regulate and oversee Euroclear entities in the UK, Sweden, and Finland. The ESA MoU was also, at the level of ESES, complemented in March 2010, when working arrangements were agreed between the ESES authorities on the co-operation and co-ordination of oversight and supervisory activities related to the ESES CSD/SSS.

SUMMARY ASSESSMENT

This section summarises the key findings of the detailed assessment of principles (Table 12), and sets out the recommendations to the ESES CSDs (Table 13).

TABLE 12 SUMMARY OF THE RESULTS OF THE PRINCIPLE-BY-PRINCIPLE ASSESSMENT OF OBSERVANCE

(ratings summary for principles: ESES CSD)

Assessment category	Principles
Observed	1, 2, 3, 4, 7, 8, 9, 10, 11, 12, 13, 15, 16, 17, 18, 21, 22
Broadly observed	19, 20, 23
Partly observed	None
Not observed	None
Not applicable	5, 6, 14, 24

General organisation (Principles 1 to 3)

Principle 1 – Legal basis – The ESES CSDs have a well-founded, clear, transparent, and enforceable legal basis for each material aspect of their activities in all relevant jurisdictions. However, in as far as the stipulation of the operational details of the contractual framework via Detailed Service Descriptions (DSDs) and Newsletters is concerned, it is not always clear for both the CSDs and the clients which of the rules are binding, given that the Newsletters do not always state precisely which DSDs should be changed and how that should be done, given that DSDs are not updated promptly.

Principle 2 – Governance – The ESES CSDs' governance arrangements are deemed to be clear and transparent. The description of the governance arrangements is clear and they have been made available via the Euroclear website as well. The governance arrangements also clearly promote the safety and efficiency of the ESES CSDs through the Board objectives. The objectives support the role of the ESES CSDs in the broader financial system and take into account public interest considerations and the objectives of relevant stakeholders.

Principle 3 – Framework for the comprehensive management of risks – The ESES CSDs have a sound risk-management framework in place for comprehensively managing legal, credit, liquidity, operational, and other risks. The ESES CSDs devised an operational recovery plan. However, this assessment does not include compliance with the CPMI-IOSCO guidance on FMI recovery, issued in October 2014. Euroclear should check the ESES CSDs' recovery plan for compliance with this guidance.

Credit and liquidity risk management (Principles 4 to 7)

Principle 4 – Credit risk – The ESES CSDs have a risk framework in place that includes credit exposure monitoring. However, since the ESES CSDs activities do not include any activity that generates credit exposure to their participants, apart from the monthly invoicing, such a risk is deemed acceptable, since it relates only to revenues stemming from their activities.

Principle 5 – Collateral and **Principle 6 – Margin** are not applicable as regards the ESES CSDs.

Principle 7 – Liquidity risk – The ESES CSDs are not directly exposed to liquidity risk stemming from their settlement activity. Liquid resources are held by each of the ESES entities to cover their general business risk. Throughout the operating day, participants are provided with reports and messages so that they can effectively manage their cash positions.

Settlement (Principles 8 to 10)

Principle 8 – Settlement finality – The ESES CSDs do provide clear and certain final settlement, either during the night batch that precedes the intraday settlement window, or in real time in the course of the settlement day. While the legal soundness of the settlement finality rules is backed by legal opinions, the ESES CSDs should establish a formal policy for updating these legal opinions.

Principle 9 – Money settlements – The ESES CSDs conduct their money settlements in central bank money. The ESES participants are able to use their single central bank cash account with their respective ESES country central bank to settle transactions of securities held in each ESES CSD.

Principle 10 – Physical deliveries – The ESES CSDs clearly state their obligations with respect to the delivery of physical instruments. The ESES CSDs country laws no longer allow the withdrawal of physical instruments. Furthermore, the ESES CSDs identify, monitor, and manage the risks associated with holding physical paper or global note securities.

Central securities depositories and exchange-of-value settlement systems (Principles 11 and 12)

Principle 11 – Central securities depositories – The ESES CSDs have appropriate rules and procedures to ensure the integrity of securities issues and to minimise and manage the risks associated with the safekeeping and transfer of securities. While not all securities are dematerialised as yet, new issuances are to be in book-entry form. Adequate controls prevent the unauthorised creation or deletion of securities, and the ESES settlement system prohibits debit balances in securities accounts. The rights of securities holders are safeguarded in the relevant jurisdictions

Principle 12 – Exchange-of-value settlement systems – The ESES CSDs settle transactions that involve two linked obligations on a Delivery-versus-Payment basis. In that case, securities are exchanged against cash, thereby eliminating principal risk.

Default management (Principles 13 and 14)

Principle 13 – Participant-default rules and procedures – The ESES CSDs have effective and clearly defined rules and procedures to manage participant insolvency procedures. While the participant insolvency procedures are updated regularly, the ESES CSDs should establish a formal policy for reviewing the rules and procedures related to the handling of a participant's insolvency. ESES tests the default procedures internally, but not with its participants. The ESES CSDs should engage in testing and reviewing the default procedures with their participants.

Principle 14 – Segregation and Portability – is not applicable for CSD/SSS.

General business and operational risk management (Principles 15 to 17)

Principle 15 – General business risk – The ESES CSDs identify, monitor and manage their general business risk. They hold sufficient liquid net assets to cover potential general business risks, and to ensure a recovery or an orderly winding down of the critical operations and services.

Principle 16 – Custody and investment risks – Participants' assets are protected and are held with other (I)CSDs. Legal opinions back the protection of the participants' ownership rights in regard to securities. The ESES CSDs' investment policy as regards their own cash deposits is sound. The ESES CSDs safeguard their own assets and minimise the risk of loss and delay in access to these assets. Nonetheless, the ESES CSD should document and formalise the fact that their cash deposits can be withdrawn on demand in case of need.

Principle 17 – Operational risk – The operational risk management framework, system set-up and business continuity management framework of Euroclear are sound and adequate. The risk management framework allows the ESES CSD to identify the plausible sources of operational risk, both internal and external, and manage and mitigate their impact. The systems used ensure a sufficient level of security and operational reliability and have adequate, scalable capacity. The

business continuity management framework allows for timely recovery of operations and fulfilment of the ESES CSDs' obligations, including in the event of a widespread or major disruption.

Access (Principles 18 to 20)

Principle 18 – Access and participation requirements – The ESES CSDs allow fair and open access to their services, based on reasonable risk-related participation requirements. All rules are stated clearly and publicly on the ESES CSDs' website. The ESES participants' admission criteria give the ESES CSDs unnecessary discretionary power to decide on additional conditions or requirements regarding a participant's technical and operational capability. The ESES CSDs should review this aspect of their contractual framework. Furthermore, the sponsorship review should be executed on a more regular basis than every five years.

Principle 19 – Tiered participation arrangements – The ESES CSDs have no formal tiered participation arrangements since they enter into a contractual relationship only with their direct participant, and they monitor and manage risks at an aggregate level. Information about indirect participants that the ESES CSDs have available is dependent on the level of segregation that a direct participant has chosen for its clients' assets. No contractual right is in place to gather basic information on tiered participation from the direct participant. There is no sufficient guarantee that the information available to the ESES CSDs is complete and correct, while the collection of information on tiered participation is useful to detect dependencies relevant to the sound and smooth functioning of the securities settlement system. The ESES CSDs should collect basic information about indirect participation, and potential material dependencies between direct and indirect participants should be identified on the basis of all available information.

Principle 20 – FMI links – ESES CSDs have established links with foreign (I)CSDs. Where they act as investor CSDs, these links are mostly relayed links via Euroclear Bank. While external legal opinions are available, the legal and operational risk reviews of the links where an ESES CSD acts as an investor CSD are not adequately documented by the ESES CSDs. The ESES CSDs should perform and document the risk reviews that are said to be performed before establishing a new link.

The ESES CSDs are responsible for selecting with due care the foreign CSDs with which they establish links as well as for identifying, monitoring and managing the risks of these links. Nevertheless, Euroclear Bank actually carries out much of this task, while no outsourcing arrangement is in place between the ESES CSDs and Euroclear Bank. Where the diligences are outsourced to Euroclear Bank, the ESES CSDs should formalise this both for the direct links and for the relayed links that they maintain. After formalisation, the ESES CSDs should be able to get all relevant information derived from the outsourcing of activities.

Efficiency (Principles 21 and 22)

Principle 21 – Efficiency and effectiveness – The ESES CSDs are efficient and effective in meeting the requirements of their participants and the markets they serve.

Principle 22 – Communication procedures and standards – The ESES CSDs use internationally accepted communication procedures and standards to facilitate settlement and recording. Like other Euroclear group entities, they apply international ISO 15022 communication standards, procedures and recommendations. Furthermore, automatic interaction with the ESES platform occurs via two channels, either EuroclearConnect for straight-through-processing applications, or EuroclearConnect for screen-based applications. The services offered via both of these channels are reachable through BT/Radianz and SWIFT.

Transparency (Principles 23 and 24)

Principle 23 – Disclosure of rules, key procedures, and market data – The ESES CSDs adopt clear and comprehensive rules that are fully disclosed to the participants via their website. These include the ESES CSDs' contractual framework, consisting of the ESES CSDs' Terms and Conditions, Operating Manuals and Detailed Service Descriptions. The ESES CSDs consult with clients on changes that may have a material effect on them. The ESES CSDs also disclose on their website the system's design and operations, as well as the CSD's and participant's rights and obligations, and the fees for the services provided. ESES participants can assess the risks and costs they incur by participating in ESES. In regard

to the stipulation of the operational details of the contractual framework via Detailed Service Descriptions (DSDs) and Newsletters, it is not always clear for both the CSDs and the clients which of the rules are binding. When updating their contractual framework, the ESES CSDs should ensure, via adequate references, that the Newsletters and DSDs are always coherent, so that all the information disclosed to clients is fully transparent, comprehensible, and unambiguous.

Principle 24 is not applicable for CSD/SSS.

TABLE 13 PRIORITISED LIST OF RECOMMENDATIONS FOR THE ESES CSDs/SSSs

Principle	Issue of concern or other gap or shortcoming	Recommended actions and comments	Time frame for addressing recommended action
19	There is no guarantee that the information available to the ESES CSDs about indirect participation is complete and correct. The collection of information on tiered participation remains useful to detect dependencies relevant to the sound and smooth functioning of the securities settlement system.	Basic information about indirect participation should be gathered and potential material dependencies between direct and indirect participants should be identified on the basis of all available information.	By the end of 2015.
20	While external legal opinions are available, the legal and operational risk review of the links where an ESES CSD acts as an investor CSD is not adequately documented by the ESES CSDs. The ESES CSDs are responsible for selecting with due care the foreign CSDs with which they establish links as well as for identifying, monitoring and managing the risks of these links. Nevertheless, Euroclear Bank actually carries out much of this task, while no outsourcing arrangement is in place between the ESES CSDs and Euroclear Bank.	The ESES CSDs should perform and document the risk reviews of the links. As some of the diligences are outsourced to Euroclear Bank, the ESES CSDs should formalise this both for the direct links and the relayed links that they maintain. After formalisation, the ESES CSDs should be able to get all relevant information derived from the outsourcing of activities.	Before the migration of the ESES CSDs to the Target2Securities platform.
23, 1	Regarding the stipulation of the operational details of the contractual framework via Detailed Service Descriptions (DSDs) and Newsletters, it is not always clear for both the CSDs and the clients which of the rules are binding, given that the Newsletters are not always precise on what DSD should be changed and how the DSD is changed, given that DSDs are not updated promptly.	When updating their contractual framework, the ESES CSDs should ensure, via adequate references, that the Newsletters and the DSDs are always coherent, so that all the information disclosed to clients is fully transparent, comprehensible and unambiguous.	By the end of Q2, 2015. The ESES CSDs started to include precise references to the DSDs in the newsletters that update the contractual framework.
3, 15	This assessment does not include compliance with the CPMI-IOSCO guidance. This point will be followed-up further in 2015 by the ESES authorities.	The ESES CSDs' recovery plan should be checked on its compliance with the CPMI-IOSCO guidance on recovery of FMIs. Among other things, it should be verified whether each of its recovery tools exhibits the five criteria of appropriateness to the greatest extent possible.	By the end of 2015.

TABLE 13 PRIORITISED LIST OF RECOMMENDATIONS FOR THE ESES CSDs/SSSs (continued)

Principle	Issue of concern or other gap or shortcoming	Recommended actions and comments	Time frame for addressing recommended action
8, 1	No formal policy for updating the legal opinions on settlement finality is in place. In particular, the legal opinion covering EBE as regards the nature and governing law of entitlements in securities, liability of the SSS and finality, was delivered on 4 September 2008.	The ESES CSDs should formalise their policy for updating the legal opinions relevant for their sound and adequate operation. Even if no material changes seem to have occurred after this period, it is appropriate to provide regular updates.	By the end of 2015.
13	Although the participant insolvency procedures are updated regularly, there is no formal policy determining the review of the internal plans. ESES does not test and review the default procedures with its participants. Testing the procedures raises awareness and may detect possible shortcomings in the procedures.	The ESES CSDs should formalise the policy they have in place for reviewing the internal plans and governance arrangements related to the handling of a participant's insolvency. The ESES CSDs should engage in testing and reviewing the default procedures with their participants.	By the end of 2015.
16	The investment policy as regards cash deposits is not always clearly articulated.	The ESES CSDs should further document how the investment policy will be safeguarded, in particular as regards their ability to withdraw cash deposits on demand when necessary.	By the end of 2015.
18	The ESES participants' admission criteria give the CSDs discretionary power to decide on additional conditions or requirements regarding technical and operational capability.	The related Article in the contractual framework should be adapted so as to avoid discretionary powers that are not based on risk considerations.	By the end of 2015.

Statistical annex

List of tables

Tables relating to Belgian credit institutions

Tables relating to Belgian insurance companies

TABLE 1 NUMBER OF CREDIT INSTITUTIONS

	2007	2008	2009	2010	2011	2012	2013	2014
Credit institutions governed by Belgian law with Belgian majority shareholding	25	23	21	21	20	16	15	15
Credit institutions governed by Belgian law with foreign majority shareholding	27	28	27	27	27	26	24	22
EU Member States	21	21	19	20	20	19	18	16
Other States	6	7	8	7	7	7	6	6
Belgian branches of foreign credit institutions	58	56	56	59	61	62	65	66
EU Member States	49	47	47	50	52	53	55	56
Other States	9	9	9	9	9	9	10	10
Total	**110**	**107**	**104**	**107**	**108**	**104**	**104**	**103**

Source: NBB.

TABLE 2 KEY FIGURES

(consolidated end-of-period data)

	2003	2004	2005	2006 (1)	2007 (1)	2008 (1)	2009 (1)	2010 (1)	2011 (1)	2012 (1)	2013 (1)	2014 (1)
A. Large banking groups												
Balance sheet total (in € billion)	913.2	1 010.7	1 229.2	1 348.0	1 488.8	1 326.8	1 092.0	1 003.2	967.8	857.1	774.7	815.6
Customers' holdings (in € billion)	453.9	482.1	532.0	667.4	700.9	612.8	622.5	559.8	518.4	518.2	516.5	528.2
Loans and advances to customers (in € billion)	384.9	433.2	535.1	553.8	619.0	505.0	481.7	450.7	441.4	432.8	444.7	464.4
Risk asset ratio (in %)	12.4	12.6	11.1	11.2	10.8	16.2	17.0	19.2	18.2	17.9	18.5	16.9
Net after tax results (in € billion)	3.6	4.6	5.7	9.2	6.2	–20.9	–1.5	5.0	–0.1	1.2	2.6	3.9
Return on average assets (in %)	0.4	0.5	0.5	0.7	0.4	–1.4	–0.1	0.5	–0.0	0.1	0.3	0.5
Return on average equity (in %)	14.2	17.3	19.9	23.1	13.7	–40.8	–3.8	11.1	–0.1	2.7	5.6	7.8
Cost-income ratio (in %)	72.8	70.6	72.3	54.1	59.8	87.1	77.1	64.2	65.2	71.5	60.0	60.9
B. Total of Belgian credit institutions												
Balance sheet total (in € billion)	1 033.0	1 143.2	1 369.3	1 422.0	1 578.4	1 422.1	1 190.5	1 151.1	1 147.3	1 048.7	960.6	996.3
Customers' holdings (in € billion)	531.9	570.1	622.1	715.7	761.6	681.8	691.9	636.7	615.2	620.4	622.1	659.1
Loans and advances to customers (in € billion)	428.8	482.9	591.3	591.0	666.2	555.6	536.5	506.6	509.4	504.7	518.1	540.2
Risk asset ratio (in %) (2)	12.8	13.0	11.5	11.9	11.2	16.2	17.3	19.3	18.5	18.2	18.7	17.6
Net after tax results (in € billion)	4.0	5.2	6.6	9.7	6.7	–20.6	–1.2	5.6	0.4	1.6	3.3	4.5
Return on average assets (in %)	0.4	0.5	0.5	0.7	0.4	–1.3	–0.1	0.5	0.0	0.1	0.3	0.5
Return on average equity (in %) (2)	13.6	15.8	18.5	22.4	13.2	–36.5	–2.6	10.5	0.7	3.0	5.9	7.7
Cost-income ratio (in %)	73.9	72.0	72.6	54.4	60.2	85.6	76.9	64.5	65.8	72.1	60.8	61.2

Source: NBB.

(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 NUMBER OF INSURANCE COMPANIES

	2007	2008	2009	2010	2011	2012	2013	2014
A. By the location of their registered office								
Belgium[1]	106	100	97	97	95	88	84	81
European Economic Area[2]	50	51	50	48	47	45	45	46
Rest of the world[3]	0	0	0	0	0	0	0	0
Total	**156**	**151**	**147**	**145**	**142**	**133**	**129**	**127**
Free service provision[4]	791	878	885	910	927	949	939	950
B. By specialisation[5]								
Life insurance	30	30	29	28	26	25	23	23
Non-life insurance	103	99	94	92	90	83	81	79
Life and non-life insurance	23	22	24	25	26	25	25	25
Total	**156**	**151**	**147**	**145**	**142**	**133**	**129**	**127**

Source: NBB.
(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 4 MAIN COMPONENTS OF INSURANCE COMPANIES' ASSETS

(data on a company basis, in € billion)

	2007	2008	2009	2010	2011	2012	2013	2014
Investments	201.7	202.7	214.9	229.5	233.8	242.1	249.6	258.3
All activities with the exception of class 23	177.2	184.6	195.8	210.0	215.2	218.4	223.5	229.6
Shares (1)	19.8	13.4	11.4	12.0	9.6	9.3	11.6	12.6
Debt securities	130.0	136.6	151.5	165.9	172.0	173.3	171.7	173.8
Land and buildings	2.6	3.1	3.1	3.0	3.2	3.4	3.2	3.1
Mortgage loans	5.4	5.4	5.3	5.2	5.8	9.4	10.1	10.4
Investments in affiliated undertakings	14.2	15.7	16.9	16.8	15.5	15.7	16.6	18.3
Others	5.2	10.5	7.7	7.1	9.1	7.4	10.2	11.3
Class 23	24.6	18.1	19.1	19.5	18.6	23.7	26.2	28.7
Shares (1)	19.5	13.6	14.9	15.2	14.6	13.8	14.7	
Debt securities	4.6	4.2	3.9	4.1	3.6	9.1	10.7	
Others	0.5	0.3	0.3	0.2	0.4	0.8	0.7	
Reinsured part of technical provisions	4.8	7.0	6.6	6.8	7.2	7.4	6.1	6.6
Claims and other assets	13.8	14.1	12.9	12.2	15.6	15.1	15.0	16.5
Total	**220.4**	**223.8**	**234.4**	**248.5**	**256.6**	**264.5**	**270.7**	**281.4**

Source: NBB.
(1) Including shares in UCITS.

TABLE 5 MAIN COMPONENTS OF INSURANCE COMPANIES' LIABILITIES

(data on a company basis, in € billion)

	2007	2008	2009	2010	2011	2012	2013	2014
Own funds	11.9	14.2	14.5	14.6	13.7	13.7	13.7	15.9
Technical provisions	185.5	188.0	198.5	211.0	218.3	226.6	231.6	239.7
Life insurance (with the exception of class 23)	130.6	139.4	149.2	160.4	167.7	170.9	172.6	175.4
Class 23	24.7	18.2	19.2	19.6	18.7	23.7	26.2	28.7
Non-life insurance	24.0	24.8	24.2	24.9	25.9	25.4	25.8	27.8
Others	6.2	5.5	5.9	6.1	6.0	6.6	7.0	7.8
Reinsurance companies' deposits	2.7	4.8	4.7	4.9	5.1	5.3	4.3	3.9
Creditors' claims	17.6	14.5	14.3	15.5	16.7	16.3	18.6	18.9
Other liabilities	2.6	2.3	2.5	2.6	2.8	2.7	2.5	3.0
Total	**220.4**	**223.8**	**234.4**	**248.5**	**256.6**	**264.5**	**270.7**	**281.4**

Source: NBB.

TABLE 6 COMPONENTS OF THE INCOME STATEMENT OF INSURANCE COMPANIES

(data on a company basis, in € billion, unless otherwise stated)

	2007	2008	2009	2010	2011	2012	2013	2014
A. Technical account in life insurance								
Net premiums written	21.9	19.5	18.6	19.0	18.4	20.7	15.9	16.0
Claims paid (–)	13.0	15.3	13.5	12.7	15.5	18.4	18.3	–18.1
Change in the provisions for claims (–)	13.3	2.9	11.5	11.7	6.1	9.0	4.2	–5.6
Premiums after insurance costs	**–4.4**	**1.3**	**–6.5**	**–5.5**	**–3.2**	**–6.6**	**–6.6**	**–7.6**
Net operating expenses (–)	1.6	1.6	1.6	1.6	1.6	1.7	1.7	–1.6
Result before investment income	**–6.0**	**–0.3**	**–8.0**	**–7.1**	**–4.8**	**–8.3**	**–8.2**	**–9.3**
Net investment income	6.9	–3.4	8.8	7.8	4.1	9.5	8.9	10.0
Technical result life insurance	**1.0**	**–3.7**	**0.7**	**0.8**	**–0.7**	**1.2**	**0.6**	**0.7**
B. Technical account in non-life insurance								
Net premiums written	9.3	9.7	9.2	9.5	10.4	10.8	11.1	12.3
Claims paid (–)	6.3	6.5	6.6	6.8	7.2	7.2	7.3	–8.1
Change in the provisions for claims (–)	0.5	0.4	0.4	0.4	0.1	0.6	0.7	–0.4
Premiums after insurance costs	**2.5**	**2.8**	**2.2**	**2.3**	**3.1**	**3.0**	**3.2**	**3.9**
Net operating expenses (–)	2.7	2.8	2.6	2.7	3.0	3.1	3.2	–3.6
Result before investment income	**–0.2**	**0.0**	**–0.4**	**–0.4**	**0.1**	**–0.1**	**–0.1**	**0.2**
Net investment income	1.5	0.2	1.0	1.2	0.8	1.1	1.2	1.3
Technical result non-life insurance	**1.3**	**0.2**	**0.7**	**0.7**	**0.9**	**1.0**	**1.2**	**1.5**
C. Non-technical account								
Total technical result life and non-life insurance	2.2	–3.5	1.4	1.5	0.2	2.3	1.8	2.2
Residual net investment income	1.7	0.3	–0.7	0.2	–0.9	0.9	0.3	0.4
Other and exceptional results and taxes	–0.1	–0.7	0.2	–0.3	–0.2	–0.7	–0.7	–1.2
Net result	**3.8**	**–3.9**	**0.9**	**1.4**	**–0.9**	**2.4**	**1.4**	**1.4**
p.m. Return on equity (in %)	*31.7*	*–27.3*	*6.3*	*9.7*	*–6.7*	*17.8*	*10.2*	*8.6*

Source: NBB.

TABLE 7 LEVEL AND COMPOSITION OF INSURANCE COMPANIES' AVAILABLE SOLVENCY MARGIN

(data on a company basis, in € million, unless otherwise stated)

	2007	2008	2009	2010	2011	2012	2013	2014 (1)
Explicit margin	14 199	16 834	17 393	17 323	16 495	16 896	17 153	17 737
In % of required margin	*182*	*206*	*205*	*193*	*174*	*174*	*173*	*173*
Implicit margin	3 144	1 407	1 999	1 886	1 771	2 208	3 387	5 964
Future profits of life insurance activities	484	360	288	226	213	195	184	1434
Unrealised capital gains	2 660	1 047	1 711	1 660	1 558	2 013	3 203	4 530
In % of required margin	*40*	*17*	*24*	*21*	*19*	*23*	*34*	*58*
Total margin	**17 343**	**18 241**	**19 392**	**19 209**	**18 266**	**19 104**	**20 540**	**23 700**
In % of required margin	***222***	***223***	***229***	***214***	***193***	***197***	***207***	***231***

Source: NBB.

(1) Data from quarterly reporting.

TABLE 8 COMPOSITION OF INSURANCE COMPANIES' COVERING ASSETS FOR ALL TYPES OF ACTIVITIES

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

	2007	2008	2009	2010	2011	2012	2013	2014
Bonds	64.1	66.2	69.0	70.4	73.0	72.8	70.1	68.1
Equities	10.1	7.7	6.6	6.1	4.8	4.2	5.0	5.0
Real estate	1.4	1.6	1.7	1.7	1.7	1.7	1.5	1.5
Loans	2.3	2.8	2.6	2.7	3.3	4.7	6.0	6.5
UCITS	16.1	12.5	12.1	11.3	9.9	9.6	10.4	11.5
Others	5.9	9.2	8.0	7.8	7.3	7.0	7.0	7.3
Total (in € billion)	**193.1**	**196.5**	**210.8**	**221.3**	**225.5**	**236.8**	**240.5**	**250.2**

Source: NBB.

Thematic Articles

Supervisory stress tests of banks and insurance companies

Emrah Arbak
Dieter Hendrickx
Patrick Van Roy
Cristina Vespro

Introduction

Stress testing refers to a range of techniques used to evaluate the vulnerability of a portfolio, a financial institution or an entire financial system under a set of adverse, yet plausible, economic developments. Stress tests can assess the impact of such developments on the capital or liquidity position of financial institutions, and they can be either run by financial institutions as part of their own risk management or by supervisors (possibly with the help of financial institutions) as part of their regulatory oversight, in which case they are referred to as "supervisory stress tests". Unlike macro-prudential stress tests, which are used by supervisors to determine the entire financial system's resilience to shocks, micro-prudential stress tests are used by supervisors to determine the vulnerabilities to adverse developments of individual financial companies. This article is primarily about the latter type of stress tests, i.e. supervisory stress tests assessing the capital position of financial institutions, and, more particularly, banks and insurance companies. (1)

Several facts help explain the growing attention that the supervisory stress tests of financial institutions have been receiving. First, the failure of such tests to detect the 2007/08 financial crisis put a spotlight on stress testing as an important prudential tool, as well as on the methodological challenges that they present. Second, their increasing role in surveillance work: stress testing has become an important component of the IMF Financial Sector Assessment Program (FSAP), covering both banks and insurance companies. Third, there were two major European stress test exercises in 2014, one for banks, coordinated by the European Banking Authority (EBA) and by the European Central Bank (ECB) for the Single Supervisory Mechanism (SSM), and one for insurance companies, coordinated by the European Insurance and Occupational Pensions Authority (EIOPA).

These developments have spurred interest in supervisory stress tests and more generally in the risks faced by banks and insurance companies. Banks and insurers are indeed exposed to different risks due to the nature of their activities, the composition of their balance sheets, and the accounting and market valuation rules used. Even when a risk is common to both types of institution, it may be desirable to stress test it differently, e.g. in the case of interest rate risk envisaging rising interest rates for banks and falling interest rates for insurance companies.

We therefore start by providing an overview of the different risks to which banks and insurance companies are exposed. We then discuss the methodologies used in the 2014 EBA and EIOPA exercises to stress risks in banking and insurance and summarise the results of such tests for Belgian financial institutions.

(1) Although this article concentrates on supervisory stress tests, some aspects it discusses – e.g. the typology of risks in banking and insurance – are obviously also relevant for stress tests carried out by financial companies as part of their internal risk management.

This article is structured as follows. Section 1 discusses key risks in banking and insurance activities, with Section 2 introducing the respective stress test methodologies used for banks and insurers. Section 3 presents the results of the 2014 EBA and EIOPA stress tests exercises, and the last section discusses the respective differences in outcome of both these stress tests before summarising the way forward.

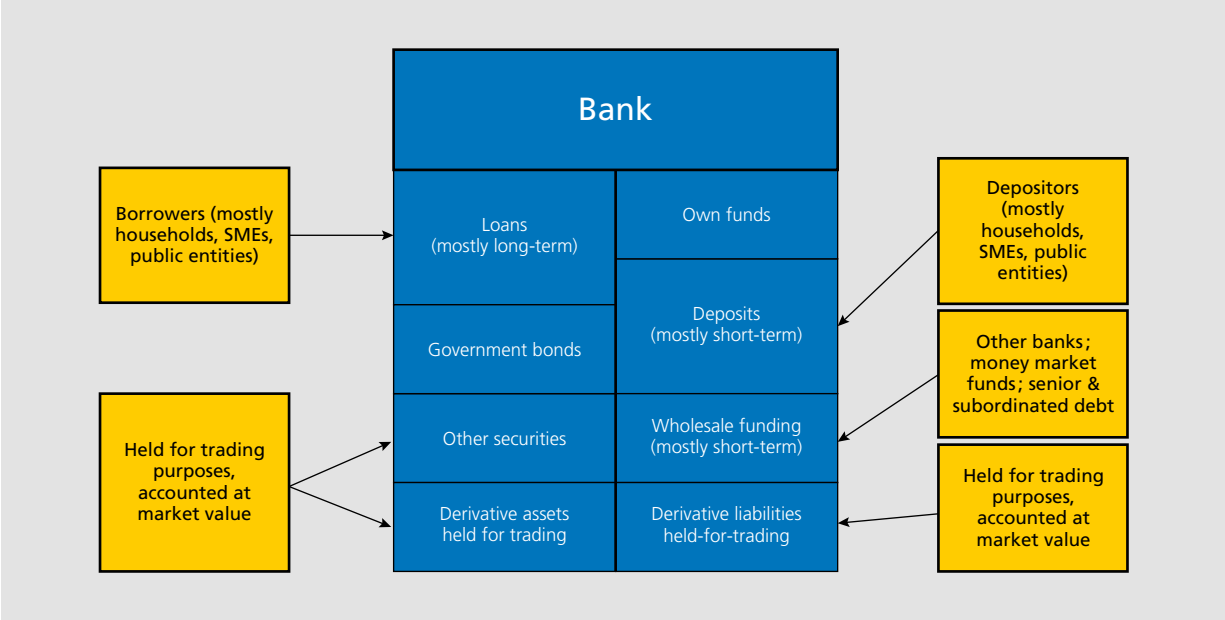
1. Risks in banking and insurance

This section presents the key risks of banking and insurance activities. It focuses primarily on those risk drivers which were the subject of the 2014 EBA and EIOPA stress test exercises, but also includes a description of liquidity risk for banks and insurers and of other risks for which the exposures were not significant enough to justify separate calculations or calibrations in the stress tests (e.g. counterparty default risk for insurance companies).

1.1 Banking

To understand the main risks that banks face, we will refer to the simplified bank balance sheet shown in Chart 1 (ignoring off-balance sheet items for reasons of simplicity).

CHART 1 SIMPLIFIED BANK BALANCE SHEET



A typical bank's balance sheet shows deposits and other sources of financing on the liabilities side and loans on the asset side. Banks pay interest on the funding they attract from savers and others, and receive interest on the loans they offer to borrowers using the funds received through deposits and other sources of financing. The maturities of most deposits are relatively short-term. For example, sight deposits and many savings products have open maturities, allowing depositors to withdraw their balances any time and with little or no cost. In turn, the loans have relatively long-term maturities, implying that the full repayment of the principle and the interest payments will take a long time.

The inherent maturity mismatch between a bank's traditional funding and lending activities highlights one of the most fundamental risks faced by all banks. The anticipation of a bank failure may force depositors to rush to their banks to withdraw their deposits. Since a substantial portion of a bank's assets have a long-term maturity, they cannot be exchanged for cash in a timely and lossless manner. This implies that a general expectation of failure, even if it may be

ill-founded, may bring a bank to default. To ensure that such a self-fulfilling prophecy does not materialize among the smaller depositors, governments have provided deposit guarantees to provide insurance for the retail depositors.

In addition to the traditional deposit-taking and loan-making activities, many banks also invest in a wide variety of securities and bonds. To the extent that traditional sources of funding, i.e. deposit funding, are inadequate, banks finance these positions using wholesale funding, which also have relatively short-term maturities. Unlike retail deposits, these positions are not insured and may thus be subject to sudden outflows.

A bank's securities may be held either in its banking book or trading book. Those held in the banking book are expected to be held to maturity. Current accounting rules allow banks to value these longer-term positions using historical cost accounting, which are less sensitive to market conditions. In turn, securities held in a bank's trading book are marked-to-market, implying that their prices are endemically linked to market conditions and the supply-demand mechanics.

Many banks also hold a variety of derivative instruments, whose value derives from other underlying market variables. Banks use these instruments for a variety of reasons, including to lock-in prices of future investments, smooth out risks, or simply to bet on market conditions. Owing to their two-sided nature, a derivative can be an asset (implying a net positive value) or a liability (implying a net negative value).

The following risks emerge from this brief description of activities:

Credit risk arises from the possibility that counterparties indebted to the institution will default on their loans or securities and may not be able to meet their financial obligations. This will cause the bank to lose all or part of the potential interest income as well as the amount that was lent to the borrower. To absorb these losses, banks set aside loan loss reserves in their balance sheets. Any additions to these reserves take the form of provisions, which appear as losses in a bank's profit and loss (P&L) account. Determining the amount of provisioning is part of a bank's internal policy, depending on its evaluation of losses and implying a certain degree of judgment. As a consequence, the amount of provisions may differ from the actual losses occurring when a borrower actually defaults.

Regulatory standards aim to ensure that capital is set aside as a buffer against unexpected losses. A major innovation of the Basel II regulatory standards has been the increased risk sensitivity of capital requirements. The risk weights can be internally calibrated by the institutions using their own estimates of key risk parameters, including probability of default (PD) and loss given default (LGD). The provisions made by banks provide an additional layer of absorption over and above capital requirements, aimed to correspond to expected losses under international accounting standards.

Another key risk component that banks face is the **interest rate risk** in the banking book. Interest rate risk management is the management, over time, of the difference (spread) between the interest paid on a bank's liabilities (such as deposits) and the interest received on its assets (such as loans). When the interest that a bank earns is greater than what it pays on funding, the bank generates a positive spread or net interest income (NII). NII is a major income item in the P&L accounts of most banks. This makes interest rate risk a key risk component, reflecting how changes in underlying market rates affect NII.

It is important to note that a change in underlying rates may cause a number of effects, including changes in the composition of interest-earning products offered to clients or the types of funding that the banks rely on. Interest rate risk has therefore a number of facets. Since a typical bank's liabilities (including most notably its deposits) often have shorter maturities than its assets (most notably loans), NII will increase when the spread between long-term rates and short-term rates becomes larger, or when the yield curve is steepening. However, since a bank's liabilities have shorter maturities, they have to be re-priced more frequently, implying that rising rates may lower a bank's NII in the short term. Options embedded in certain transactions may also play a key role. For example, interest rates on floating-rate residential mortgages are often subject to legal thresholds, which lower the extent to which interest incomes from those assets may react to changes in underlying rates. Clients often choose to refinance their existing loans before those contracts reach their maturity when interest rates drop but not to do so when rates increase, implying that the interest income on those assets may react asymmetrically to interest rate changes.

Market risk is another component of risk faced by most financial institutions, and corresponds to mark-to-market (MtM) changes in the value of assets in a bank's trading book. These changes impact a bank's P&L through net trading income (NTI). Since a bank's trading book typically depends on a range of market indicators, including equity prices, interest rates, market liquidity, foreign exchange rates and aggregate credit quality, there are close interactions between market risk and other risk components.

Beginning with the original Basel I standards, international regulatory standards have been developed to ensure that banks have adequate capital to address market risk. A key innovation of Basel II, parallel to the internal models approach to credit risk, was to allow banks to estimate the maximum losses that institutions may face within a given time frame, i.e. the value-at-risk (VaR) approach. Due to the heavy losses suffered by financial institutions amid the financial crisis that started in 2007/08, several rounds of revisions were made to achieve the current Basel III framework, including additional charges for securitisation activities, losses implied by VaR on stressed historical data, losses due to increased counterparty default probabilities (i.e. credit value adjustments, or CVA), correlations and rating migration risks.

Liquidity and funding risks arise when a bank has difficulties meeting its short-term obligations.[1] One common difficulty is the substantial capital loss that may occur if, in order to satisfy their liquidity needs, banks have to sell assets or use a portion of their assets as collateral, often at a large discount, in exchange for cash. A parallel risk relates to the cost of funding, or how much a bank has to pay to gain access to market funding. This cost may increase for a variety of reasons, including a decline in investor confidence in the bank, either due to lower expectations or questions as to the bank's ability to pay back its debt, or more generally when market conditions deteriorate to the point that certain forms of funding (such as unsecured wholesale funding) become too expensive.

While credit, interest rate and market risks are the main risks banks face, other forms of risks operate through these three components. **Foreign exchange risk** arises due to fluctuations in currencies other than the relevant bank's reporting currency. A major risk component for cross-border institutions, rapid currency appreciation or depreciation can lead to potentially detrimental MtM and interest income movements in an institution's foreign currency-denominated exposures. Borrowers with foreign currency-denominated loans and debt may face increased default likelihoods if their home currency strongly depreciates, leading to increased credit risk for the lender. Similarly, **sovereign and country risk** relates to the possibility that even a debtor with a relatively low stand-alone credit risk may fail to honour its financial obligations due to the decisions of its sovereign government, including foreign debt moratoria, repudiation or rescheduling. More generally, sovereign risk may also include the credit risk relating to the credit and MtM losses on sovereign debt.

1.2 Insurance

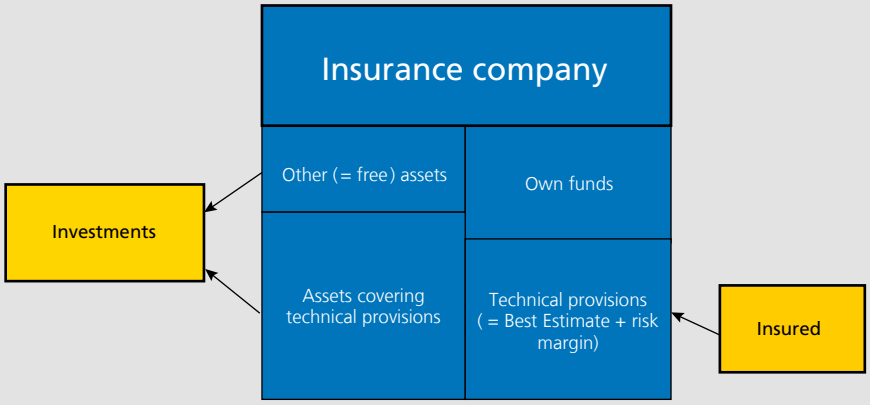
Insurance companies face broadly the same risks as banks except that: (i) they are generally better able to diversify them (through idiosyncratic insurance risks) and (ii) they are less exposed than banks to credit and liquidity risks. This section provides an overview of the key risk drivers of insurance activities. To understand these risk drivers, we will first take a look at the overall structure of a simplified balance sheet of an insurance company, which is shown in Chart 2.

Insurers' balance sheets are mainly characterised by their technical provisions on the liability side, reflecting the estimate of the amounts due from the insurers towards their clients, i.e. the insured. These amounts can represent various activities ranging from savings-like activities in the form of insurance products (life insurance) to amounts that would have to be paid following damages suffered by the insured, e.g. damages following a fire (non-life insurance) or following the hospitalisation (health insurance) or the death (life insurance) of the insured.

The technical provisions of an insurance company are covered by assets. As insurers are allowed to invest in a wide range of activities, different kinds of investments can regularly be found on the asset side of the balance sheet, including government bonds, corporate bonds, equities, loans, real estate and bank deposits. The proportion of the assets which are not needed to directly cover the technical provisions are considered to be 'free surplus'. The total excess of assets over liabilities (mainly composed of the technical provisions) thus forms the own funds of the insurance company, the latter being used to cover the relevant capital requirements.

(1) Even though solvency stress tests typically do not include a liquidity stress component per se, the availability of cheap liquidity and funding is considered as part of the scenarios under both exercises.

CHART 2 SIMPLIFIED INSURANCE COMPANY BALANCE SHEET



The main quantifiable risks in an insurance company can be defined as follows:[1]

Market risks: These can be defined as the risks arising from changes in the level or volatility of market prices of financial instruments which have an impact upon the value of the assets and liabilities of the insurance company. As such, market risks need to reflect all risks relevant to the investment portfolio of the insurer. In general, the most significant market risks are the interest rate risk and the spread risk due to the (often large) bond exposures of insurance companies. Other relevant market risks may include equity risk, property risk, currency risk and concentration risk. The actual exposures to these different risks depend on the structure and diversification of the insurer's investment portfolio, which may differ drastically between different companies. Market risks, however, are not only relevant to the asset side of the balance sheet. Insurers also need to consider market risks on the liability side, as these can also potentially impact the technical provisions either directly or indirectly; for example, the market value of the technical provisions is directly determined by the level of risk-free interest rates, among other factors. Moreover, in the case of life insurance savings products the amount of technical provisions also often depends on the expected amount of profit sharing, which is determined by the performance of the assets covering these technical provisions and, as such, also subject to market risk.

Counterparty default risk: This risk reflects possible losses due to unexpected default by or deterioration in the credit standing of the counterparties and debtors in insurance and reinsurance companies. The Solvency II Directive defines counterparty default risk in a rather limited way and only covers risk-mitigating contracts, such as reinsurance arrangements, securitisations and derivatives, and receivables from intermediaries, as well as any other credit exposures which are not covered by the spread risk definition under the scope of the market risks.

Technical insurance risks: This is the set of risks ensuing from the technical underwriting of insurance contracts themselves. Some of these risks are typical of a certain type of business, e.g. premium risk and reserve risk for non-life business, and longevity risk, morbidity risk and mortality risk for life business. Other risks are relevant across all lines of business, e.g. lapse risk, expense risk and catastrophe risk. Finally, there is the health business, which can be exposed to both life and non-life technical insurance risks depending on the characteristics of the health product.

Other risks: As well as risks directly associated with the asset and liability side of a typical insurance company, one also needs to consider all risks related to the general conduct of business, e.g. operational risk and risks related to intangible assets.

Another relevant risk is **liquidity risk** – the risk that insurance and reinsurance companies are unable to promptly realise investments and other assets in order to settle their financial obligations (i.e. insurance contracts) when they fall due. Often, however, this risk is not quantified for an insurance company and, as such, not considered as a separate quantifiable risk type against which capital needs to be held – an exception that is recognised under Solvency II.

(1) See article 105 of the Solvency II Directive for the exact definitions. Note that the definitions and typology of risks used for insurance are different from those used for banking.

As should be evident on the basis of the risk typology defined above, an insurance company's balance sheet is, preferably, measured on a fully market-consistent basis. Under Solvency II, the 'market-consistent' prudential balance sheet requires that the assets are valued at observable market prices and the liabilities are valued at their transfer value. The notion of transfer value was introduced because there is no active financial market for insurance liabilities and therefore market values cannot be directly observed. The transfer value represents the current amount insurance companies would have to pay if they were to transfer their insurance obligations immediately to a willing buyer. This value is determined as the sum of a best estimate of the value of liabilities and a risk margin. The best estimate is derived as the expected present value of future cash flows, using a risk-free discounting curve. The risk margin reflects the amount of capital necessary to cover the risks related to an existing insurance portfolio which cannot be hedged in the financial markets (i.e. non-hedgeable risks). As highlighted above, the difference between the market value of the assets and liabilities defines the amount of own funds, eligible to cover the capital requirements of an insurance company. In the case of Solvency II, these consist of two levels whose breach will trigger intervention: the MCR (minimum capital requirement) and the SCR (solvency capital requirement). This type of balance sheet is preferably used as the starting point for an insurance stress test exercise, as explained in more detail below.

2. 2014 EU-wide stress tests: methodology

Generally speaking, solvency supervisory stress tests of banks and insurance companies involve two major trade-offs in terms of the way they can be conducted. First, solvency supervisory stress tests can be run either by financial institutions themselves, possibly with some constraints imposed by the supervisor, in which case they are often referred to as bottom-up stress tests, or by the supervisor, possibly with detailed input coming from the financial institutions, in which case they are typically known as top-down stress tests. Second, solvency supervisory stress tests can rely either on some kind of sensitivity analysis (i.e. "what if" scenarios mainly dealing with changes in one variable or assumption) or on a full-fledged macroeconomic scenario.

The 2014 EBA and EIOPA stress tests are both examples of solvency supervisory exercises conducted in a bottom-up fashion based on macroeconomic scenarios, though the EIOPA stress test also relied on sensitivity analyses.[1]

In the remainder of this section, we detail the respective methodologies of the EBA and EIOPA stress tests before further highlighting key differences between them.

2.1 Banking

The purpose of the 2014 EBA stress test was to determine the ability of credit institutions to withstand macroeconomic and financial shocks over a three-year horizon (2014-2016). For these tests, two main scenarios were considered. The first, known as the baseline scenario, was based on economic forecasts produced by the European Commission and corresponds to a relatively difficult situation for the banks, in view of the predicted weak economic growth. The second, called the adverse scenario, simulates a severe deterioration in the economic situation: GDP declining slightly at first in 2014, but then very sharply in 2015 before stagnating in 2016, with this leading to a steady rise of 2 % in the unemployment rate over the period as a whole, both in Belgium and in the euro area. The increase in consumer prices initially slows and then ceases in 2016. This adverse scenario assumes a rise in both short-term and long-term interest rates, accompanied by widening sovereign and corporate spreads over the period of the exercise. The main difference in parameters between the Belgian economy and the economies of other countries concerns housing market prices, which decline by a cumulative total of 25 % over three years in Belgium, compared to 15 % on average in the euro area. Such extreme assumptions show that the stress tests must be seen as a prudential exercise, and in no way a prediction of future events.

In order to determine whether the financial institutions participating in the stress test needed to adopt corrective measures, a minimum solvency ratio in terms of common equity tier1 (CET1) capital was fixed at 8 % for the baseline

(1) The bottom-up nature of the EBA 2014 exercise was limited by some constraints (see next section); for this reason it was sometimes referred to as a "hybrid" approach between pure bottom-up and pure top-down.

scenario and at 5.5 % for the adverse scenario; this was 1 % higher than the minimum set by the Basel III rules, in order to take account of the systemic risk.

In concrete terms, banks were required to translate the impact of the stressed macro variables and associated stress scenarios on the six types of key banking risks discussed in Section 1.1, in the following way:

Stressed macro variables lead to an increase in stressed **credit risk** parameters (PD, LGD), which were used to estimate potential credit losses (provisions). Stressed macro variables also lead to foregone interest income on defaulted loans. These different impacts affect CET1 capital via the P&L. Given their potential to cause credit rating migration, stressed credit risk parameters can also increase a bank's risk-weighted assets (RWA) thereby further decreasing its CET1 ratio through the impact on the denominator. The scope of the credit risk methodology included all assets held in the banking book exposed to credit risk, including counterparty risk and off-balance sheet activities, for internal-ratings based (IRB) as well as for standardised portfolios.

For banks with significant trading activities, the so-called **comprehensive market risk** component principally captured a bank's net trading income losses and increased risk exposures. A total of six scenarios were considered, based on historical events that have affected market prices in the past, including the Southeast Asian crisis of 1997, the dot-com crisis of 2000/01, and more recently the subprime crisis of 2007/08 and the EU sovereign debt crisis of 2010/11.

Banks with insignificant trading activities and those that do not have internal VaR models faced a much simpler approach. Under the so-called **simplified market risk** component, the historical volatility in a bank's overall NTI was used as a measure of its sensitivity to market conditions. The simplified approach also served as a starting point for banks that were subject to comprehensive approach.

Securitisation risk covered all securitisation and re-securitisation positions assessed at fair value (held for trading, available for sale, designated at fair value through profit and loss) and amortised cost positions. Securitisation exposures held in the banking book were subject to the credit risk approach and used in the calculation of estimated provisions over the stress test horizon. The market risk methodology applied instead to securitisation positions held at fair value. RWA impact was calculated depending on risk profile of the positions, based on predefined risk buckets.

As regards **sovereign risk**, sovereign exposures held in the banking book were stressed using the credit risk methodology, thereby resulting in an increase in provisions affecting CET1 capital via the P&L and in rating migration, increasing RWA and further dampening the CET1 ratio. This part of the methodology was an improvement on the 2011 EBA exercise, which did not affect bonds held in the banking book. In the adverse scenario, sovereign available for sale or fair value options (AFS/FVO) exposures were subjected to further haircuts (resulting in a CET1 impact) but no stress on their RWA (except for AFS).

A **cost of funding** stress test was designed to capture the extent to which a bank's net interest income depends on the underlying benchmark interest rates. As in other parts of the stress test, banks were provided with two series of changes in interest rates, one corresponding to the baseline scenario and another to the adverse scenario. These rate changes were translated into an overall impact on each bank's interest income and interest expenses. A number of checks and balances were applied, most notably in terms of how the changes in underlying rates were passed through to interest income earned from loans and other relevant asset classes. These changes related almost entirely to the banking book (with the exception of interest hedges) and were not translated into changes in risk-weighted assets.

Finally, some constraints (essentially caps and floors) were applied to other P&L items (e.g. operational expenses, fees and commissions) and regulatory changes were envisaged to cover non-interest income and expenses, capital requirements for operational risk, and dividends. The methodology used a simple approach here, imposing a cap at the 2013 value for several of the other P&L items.

As a key assumption, banks were not allowed to change the composition and total size of their balance sheets. The so-called "static balance sheet" assumption implied that the banks would calculate the stress test impacts by assuming that they would continue to rely on the same types of funding and provide the same types of products. While in a real-world scenario banks may be able to respond to stress conditions by turning to cheaper funding sources and more profitable

products, or even changing their business models altogether, the stress test methodology aimed at removing this layer of complication and the resulting discretion that would make the results potentially less comparable across banks.

Even though the EBA stress test exercise improved on several fronts between its 2011 and 2014 variants (e.g. more appropriate treatment of sovereign exposures and a more rigorous quality check process conducted by NCAs and the ECB), it was still criticized for a number of reasons. First, due to its focus on solvency, the EBA stress test did not explicitly model liquidity risk, even though it indirectly accounted for it through an increase in funding costs. Second, the static balance sheet assumption was generally perceived as undermining the realism of the exercise, even though allowing for a dynamic balance sheet would require a degree of judgement that is both resource demanding and prone to inconsistency. Third, some commented that the lack of clarity regarding public backstops in Europe may have induced NCAs and the ECB to water down the stress test methodology (see e.g. de Faria e Castro *et al*. (2014) for a theoretical analysis of the differences between EU and US stress tests in this respect). These different elements illustrate the fact that the design of stress tests is an evolving process, and that more work is undoubtedly needed to improve their methodology and convince market participants that they are realistic.

2.2 Insurance

The risks to stress and the way to stress them primarily depend on the solvency regime and the stress test approach chosen. As explained above, under a Solvency II regime, one can work with a fully market-consistent balance sheet and the different stress impacts can be directly translated into their impact on the market value of the assets and/or liabilities. Once this impact is derived, one can determine the new amount of own funds (= market value of assets after stress – market value liabilities after stress) and, consequently, the new resulting SCR ratio after stress (= own funds after stress/solvency capital requirements after stress). The impact on the SCR ratio then determines the magnitude of the impact of the defined stress and whether or not the insurance company still has sufficient own funds to cover its capital requirement after stress. This methodology was used for the 2014 EIOPA stress test.

The 2014 EIOPA stress test exercise further consisted of two different modules aiming at capturing the financial resilience of insurance companies to several relevant quantifiable risks and identifying their main potential vulnerabilities. **The first module** was the **core** module which developed two types of stresses. The scenario stresses which were focused on calculating the impact of a series of simultaneous **market risk** stresses (i.e. the so-called "core stress 1" and "core stress 2"), and, as a second type of stress, an entire set of sensitivities stresses for the **technical insurance risks**. The **second module** was a **satellite module** focusing on **interest rate risk** (= part of the market risks) by measuring the sensitivity of the balance sheet of an insurance company to different levels of the risk-free curve, with a particular focus on the low-yield environment.

The scenario stresses defined as part of the core module were derived assuming a simultaneous and instantaneous occurrence of all shocks. As it is still difficult to develop a sound simultaneous calibration of both market risks and insurance-specific risks, due to the lack of reliable data combining these two effects, the calibration of the EIOPA scenario stresses did not consider the potential combined effect of the market risks and insurance-specific risks. For the future, a combination of both market risks and technical insurance risks in one overall simultaneous scenario will probably need to be considered, e.g. a severe market stress combined with a mass lapse event in life insurance or a large natural catastrophe impacting the financial markets, e.g. the equity market and the bond market.

For each of the market scenarios a different "shock-originating source" was chosen. In the core stress 1 scenario, the EU stock market was assumed to be the source of distress while it was the non-financial corporate bond market for the core stress 2 scenario. The final calibration of both scenarios, taking into account the potential spill-overs across the different financial markets, aimed at reflecting the impact of the main market risk exposures of the EU insurance market as assessed by EIOPA and the European Systemic Risk Board (ESRB). This resulted in a series of market stresses for the following asset classes: government bonds, corporate bonds (separately for financial bonds, covered financial bonds and non-financial bonds), swap rates, equity exposures and real estate exposures (separately for commercial real estate and residential real estate). For some of these asset categories a range was defined, e.g. corporate bond spread stresses differed per rating; for other asset categories only one stress level was defined for the entire portfolio, e.g. equity stress.

Core stress 1 was characterised by the so-called "double hit" scenario, aiming at capturing the potential impact of a combined effect of a continued low-yield environment (lower risk-free swap rates) and a series of severe market stresses for other asset classes, i.e. government bonds (higher spreads), equities (lower prices) and real estate (lower prices) stresses. Core stress 2 mainly focused on severe market stresses for the corporate bond markets (higher spreads) and resulted in an overall milder impact for the other market risks compared with core stress 1.

For the insurance-related sensitivity tests, it was decided to introduce two sensitivity levels for each of the following technical insurance risks: longevity risk, mortality risk and lapse risk for life insurance and inflation risk for non-life insurance. The insurance companies were furthermore asked to disclose the specific impact of a series of pre-defined natural catastrophes and the general impact of the natural or man-made catastrophe (whichever was the highest) which, according to their risk profile, determined their one in 100 and one in 200 years overall catastrophe loss.

For the second module of the 2014 EIOPA stress test, different levels of the risk-free rate curves were considered, with the aim of capturing the potential vulnerability of insurance companies to a low-yield environment. A first curve finally reflected a prolonged, long-lasting low-yield environment including low rates for all maturities. For this purpose, the December 2011 Japanese curve was chosen as a model. A second curve reflected an atypical reverse-shocked interest rate curve, i.e. an upwards shock for short-term maturities and a downwards shock for mid- to long-term maturities. Such an atypical instantaneous shift/pivot of the curve aimed at illustrating unanticipated effects on asset and liability values. A detailed overview of the final stress test levels for all risk factors mentioned above can be found in the 2014 stress test specification document (EIOPA, 2014).

2.3 Key methodological differences

Three major differences between the EBA and the EIOPA stress test exercises emerge from the description of their respective methodologies.

First, and like any other bank or insurance stress test, the EBA and EIOPA stress tests differ in the way they quantify the impact of risk factors. For banks, risks materialise under the stress scenario in the form of losses (lower NII, NTI, provision losses from credit, etc.) with direct impact on the evolution of banks' P&L and therefore on their capital. For the insurers, risks materialising under the stress scenario have an impact on the balance sheet, in the form of an increasing difference between the value of the assets and the value of the liabilities, from which derives, as explained in Section 1.2, the amount of own funds eligible to cover the capital requirements.

A second difference is that the EBA and the EIOPA stress test exercises involved a differentiated evolution of certain macroeconomic variables. For example, long-term interest rates were assumed to increase in the macro scenario for banks but were assumed to decrease in the macro scenario for insurance companies. At first glance, this differentiated evolution may seem counterintuitive given that the macro scenarios were designed almost in parallel by the same bodies, i.e. the European Commission, the ECB and the ESRB. In fact, this illustrates the need to find a compromise between the coherence of the scenario and its relevance (i.e. its toughness) across sectors. To continue with the same example, a differentiated evolution of interest rates was necessary to hurt banks and insurance companies, as a rise in long-term interest rates is generally positive for insurers (since they have a negative duration gap) whereas it is negative for banks (since they have a positive duration gap). To some extent, a similar trade-off between the consistency and the severity of the scenario also exists within each sector (i.e. banking and insurance). For instance, the EBA exercise assumed a sharp decline in GDP and, at the same time, a rise in short-term and long-term interest rates. While these evolutions, which imply the absence of any monetary policy or even market reaction to a deteriorating economic situation, may at first appear contradictory, they were nevertheless introduced to increase the relevance of the scenario for the solvency position of banks.

A third difference between the EBA and EIOPA stress tests relates to the outcome of both exercises: while the EBA stress test led to an increase in Pillar 1 capital for banks not meeting the baseline and adverse hurdle rates, the EIOPA stress test served mainly as a tool to identify potential vulnerabilities of the European insurance sector and was only a mere solvency assessment with no formal request for insurance companies to increase their capital. This difference is inherent to the

nature of both exercises: unlike the EIOPA stress test, the EBA stress test is often referred to as a crisis management tool aimed at identifying capital shortfalls. This last aspect is discussed more fully in the last section.

3. 2014 EU-wide stress tests: results

3.1 Banking

In the euro area, the EBA stress test exercise was, together with the asset quality review (AQR), part of the comprehensive assessment (CA) exercise, a prudential exercise in line with the provisions regarding the SSM, which became operational in November 2014. In Belgium, 6 home banks participated in the CA exercise: Investar (holding of Argenta Bank-Verzekeringsgroep), Axa Bank Europe, Belfius Bank, The Bank of New York Mellon, Dexia and KBC Group.[1] In the whole euro area, the number of participating banks amounted to 130.

Chart 3 compares the average CET1 ratio of Belgian (excluding Dexia) and SSM banks. The average CET1 ratio of Belgian banks in 2013 (post-AQR) is substantially above the SSM average. In the baseline scenario, the average CET1 of Belgian banks deteriorates, but nevertheless remains above the SSM average and well above the 8 % threshold, confirming the improvement in Belgian banks' financial positions in recent years. The negative impact is mainly due, in the baseline, to repayment of state aid by one bank (KBC). In the adverse scenario, the additional impact of legacy operations and credit retail exposures implies a further deterioration, rendering the 2016 average CET1 ratio of Belgian and SSM banks comparable. However, in the adverse scenario, the Belgian banking sector remains on average above the 5.5 % threshold, with a comfortable capital buffer.

CHART 3 AVERAGE CET1 RATIO
(in %)

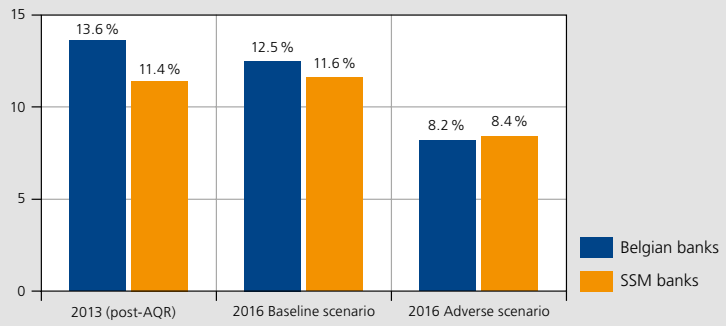


Table 1 shows the average impact of the stress test on the CET1 ratio of Belgian banks (excluding Dexia), in the baseline and adverse scenarios. More precisely, the table first gives the average CET1 ratio of Belgian banks as of end 2013 before showing how their key activities and portfolios contribute to the evolution of the CET1 ratio over the stress test horizon and finally giving the average CET1 ratio as of end 2016. In analysing stress test results, it is usual to look at the difference between the adverse and the baseline scenarios, as this shows the additional CET1 contribution of each activity or portfolio in the worst economic environment. The discussion of the results will therefore concentrate on the last column of Table 1.

(1) Two host banks (BNP Paribas Fortis and ING Belgium) were included in the exercise via their parent companies (BNP Paribas and ING, respectively). Their results are therefore not consolidated in the Belgian averages shown in this section.

TABLE 1 CONTRIBUTION FROM DIFFERENT ACTIVITIES AND PORTFOLIOS TO THE CHANGE IN CET1 RATIO FROM 2013 TO 2016 (BELGIAN BANKS EXCL. DEXIA)

(in %)

	Baseline scenario	Adverse scenario	Adverse vs. Baseline
Start 2013 CET1 ratio	13.55	13.55	
Intermediation activities	9.14	8.41	–0.72
Credit portfolio	–2.16	–4.85	–2.69
of which:			
Domestic RRE P&L	–0.28	–0.64	–0.36
Foreign Credit P&L	–1.00	–2.30	–1.30
Credit RWA	–0.25	–0.59	–0.34
Market activities	–0.78	–1.33	–0.54
Securitisation portfolio	–0.05	–0.28	–0.23
Sovereign portfolio	–0.02	–0.82	–0.81
Others	–7.18	–6.50	0.68
of which:			
Regulatory changes (1)	–0.60	–0.73	–0.13
Other P&L impacts (2)	–5.00	–4.49	0.51
CET1 or RWA impacts (3)	–1.59	–1.28	0.30
Total CET1 ratio impact	–1.05	–5.36	–4.31
End 2016 CET1 ratio	12.49	8.18	
Memo item: legacy activities (4)	–1.16	–1.74	

(1) Impact of regulatory changes is calculated as impact resulting from prudential filters and transitional floor application, unrealised gains/losses in the AFS portfolio (including sovereigns), and DTAs that rely on future profitability.

(2) Other P&L impacts include dividend income, net fee and commission income, other income and expenses and effects from tax, attributable to minority interests, and estimated dividends.

(3) Other CET1 impacts include changes in other reserves, etc.

(4) Legacy activities include YES repayment (KBC), structured portfolio and Hungarian loan exposures (AXA), and AFS reserve (Belfius).

"Intermediation activities" indicates how the benchmark underlying interest rates posited in the stress test have, on average, affected the Belgian banks' net interest income, which is one of the main items in a bank's P&L. The small but not insignificant CET1 impact of the adverse scenario over the baseline (–0.72pp) can be explained by the funding structure and lending practices of Belgian banks. For one thing, Belgian banks are predominantly funded by deposits. Since deposit rates are less elastic to underlying rates, higher interest rates translate into a relatively small rise in funding costs. Moreover, most Belgian institutions have interest hedges in place to absorb the impact of higher rates, which further reduced the impact of the adverse stress scenarios on the NII. Nevertheless, the overall impact reported in the last column of Table 1 is nontrivially negative since a relatively large proportion of existing loans are fixed-rate contracts with long maturities, which implies that the interest incomes on those loans increase relatively gradually.

The rows labelled "Credit portfolio" and those below show the impact of the worsening of the credit risk parameters implied by the stress test on Belgian banks' credit activities. The additional CET1 impact of the adverse scenario over the baseline is large and significant (–2.69pp), and is mainly driven by the higher loan loss provisions for Belgian retail mortgages exposures and foreign exposures (mostly mortgage and corporate-related), which negatively impact the P&L. This result reflects the relative importance of these types of activities for Belgian banks as well as the severe assumptions that were applied in the adverse scenario, e.g. on Belgian real estate prices as well as on Eastern European and Irish credit exposures. The last row of the credit section further shows the impact of the increase in credit RWA on the CET1

ratio of Belgian banks. Consistent with what is observed for impairments in the P&L, this impact can be mainly ascribed to Belgian retail mortgages exposures and foreign exposures, which 'migrate' more strongly in the adverse than in the baseline scenario.

The impact of the stress test on Belgian banks' "Market activities" is only 0.54pp more negative in the adverse scenario than in the baseline. While different elements of the market risk methodology (e.g. risk scenarios under the comprehensive approach) result in slightly higher NTI losses in the adverse than in the baseline scenario, others (e.g. default of the largest counterparty) lead to a very similar impact, thereby smoothing the differential between the two scenarios. More generally, the negative results of the stress test both in the baseline (–0.78pp) and in the adverse (–1.33pp) scenario highlight the fact that Belgian banks have limited trading results enabling them to offset losses due to market risk assumptions.

Belgian banks are barely affected by the "securitisation" part of the stress test methodology, either in the baseline or in the adverse scenario, owing to their limited exposures in this field of activities.

"Sovereign portfolio" captures the impact of the stress related to sovereign risk, with the additional CET1 impact of the adverse scenario over the baseline amounting to –0.81pp. This result is explained by the EBA methodology, which foresees a stress in line with the credit risk methodology for sovereign exposures in the HTM category both in the baseline and in the adverse scenario, but haircuts on sovereign exposures in the AFS category only in the adverse scenario. Owing to their traditionally relatively large sovereign portfolio holdings, most of which are held in the AFS portfolio, Belgian banks were thus more strongly impacted in the adverse scenario. In a number of cases, though, this effect was mitigated by the recognition of hedges.

The row labelled "Others" includes different P&L elements (such as dividend income, net fee and commission income, other income and expenses and effects from tax, attributable to minority interests, and dividends) as well as the application of transitional measures to Basel III. The positive CET1 impact of the adverse scenario over the baseline (+0.68pp) is explained, among other things, by the fact that administrative and operating expenses of Belgian banks decreased following the depreciation of Eastern European currencies assumed in the stress test scenario. [(1)] For other P&L items, the EBA methodology used a simple approach based on caps and floors and historical averages, applicable both in the baseline and in the adverse scenario, limiting the divergence in results between them.

Table 1 finally reports as a "Memo item" the impact of legacy activities, which include the impact of shocks applied to portfolios that are in run-off or already sold and the repayment of government intervention during the crisis.

Given that Belgian banks end-2016 CET1 ratio is well above the threshold (5.5 %) set in the adverse scenario, the overall conclusion of the exercise is that Belgian banks are resilient to severe economic stress, but need to continue their restructuring and rationalisation efforts to make sufficient and sustainable profits, which should help them strengthen their capital positions.

3.2 Insurance

In Belgium, a total of 19 insurance companies took part in the stress tests, nine of them for the core module and 17 for the low interest rate module. On a solo basis in Belgium, the participation rate thus reached 62.6 % for the core module (in terms of premium volume) and 96.35 % for the low interest rate module (in terms of volume of technical provisions). [(2)]

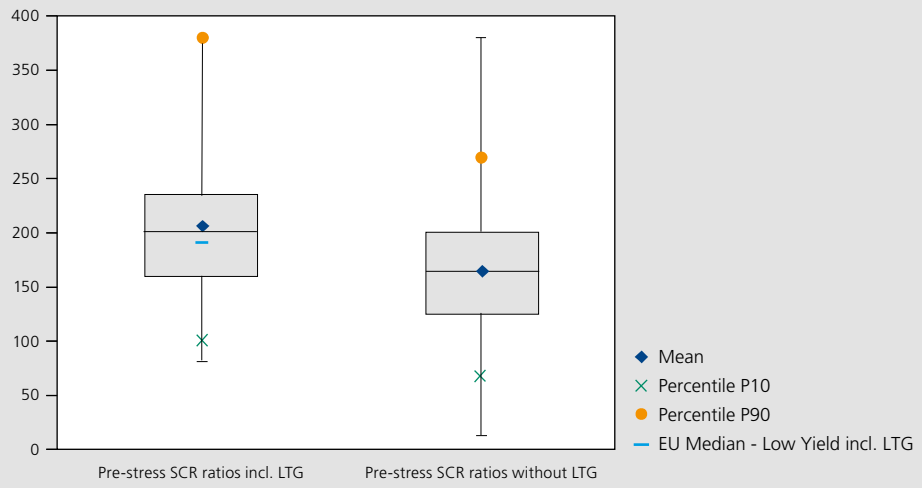
A discussion of the main stress test results starts with an overview of the pre-stress results. Chart 4 shows a box plot of the distribution of the SCR ratios, for all Belgian participants, as well the EU median results, on a pre-stress basis. An important caveat: in determining the SCR ratio of an insurance company, the so-called long-term guarantee (LTG) measures are important factors. This is a set of measures impacting the risk-free discounting curve used in Solvency II,

(1) Conversely, the depreciation of these currencies negatively affected the net interest income of Belgian banks, an effect which was reported under "Intermediation activities".
(2) EIOPA was only given the results for some of these firms – enough to satisfy the minimum participation required by EIOPA, namely a market share of at least 50 %. In total, this entailed 3 insurance groups or companies for the core module and 5 insurance companies for the low-interest rate module.

often by adjusting the discount rates to be applied for the calculation of the technical provisions. Given the material importance of the technical provisions for the balance sheet total, these LTG measures impact available own funds and the resulting SCR ratios significantly. It should be noted that, for stress test purposes, the insurance companies were free to apply these LTG measures. Once the Solvency II regime enters into force, most of those LTG measures will have to be approved by the supervisory authority. That is why Chart 4 makes a distinction between the pre-stress results with and without the LTG measures for which an approval is required. Of the 19 Belgian companies, five opted not to apply these LTG measures. On the basis of the pre-test results, these LTG measures had an average impact of 40.8 % on the SCR ratio for the Belgian companies. For the remainder of this note and the further discussion of the stress test results, the SCR ratios will always include the 'freely used' LTG measures.

CHART 4 SCR RATIOS – SITUATION BEFORE THE STRESS TEST

(box plot[1], in %)



(1) A box plot is a simplified presentation of the data distribution; read from the bottom to the top, it shows the minimum, the first quartile, the median, the third quartile, and the maximum of the distribution.

The average SCR ratio including LTG measures, calculated on the basis of the Solvency II standard formula, reached 204.39 % on a pre-stress basis for the Belgian participants. The median SCR ratio equalled 199 %. Both of these figures indicate a comfortable starting position. These results are based on a pre-stress sample combining both the participants of the core stress test and the low yield module. For information, the median results of the EU sample (separate for the core and the low yield module) were also included.[1]

Chart 5 gives an overview of the results after stress for the market risk scenarios (core stress 1 and core stress 2) and the low-yield scenarios (Japanese scenario and Inverse scenario).

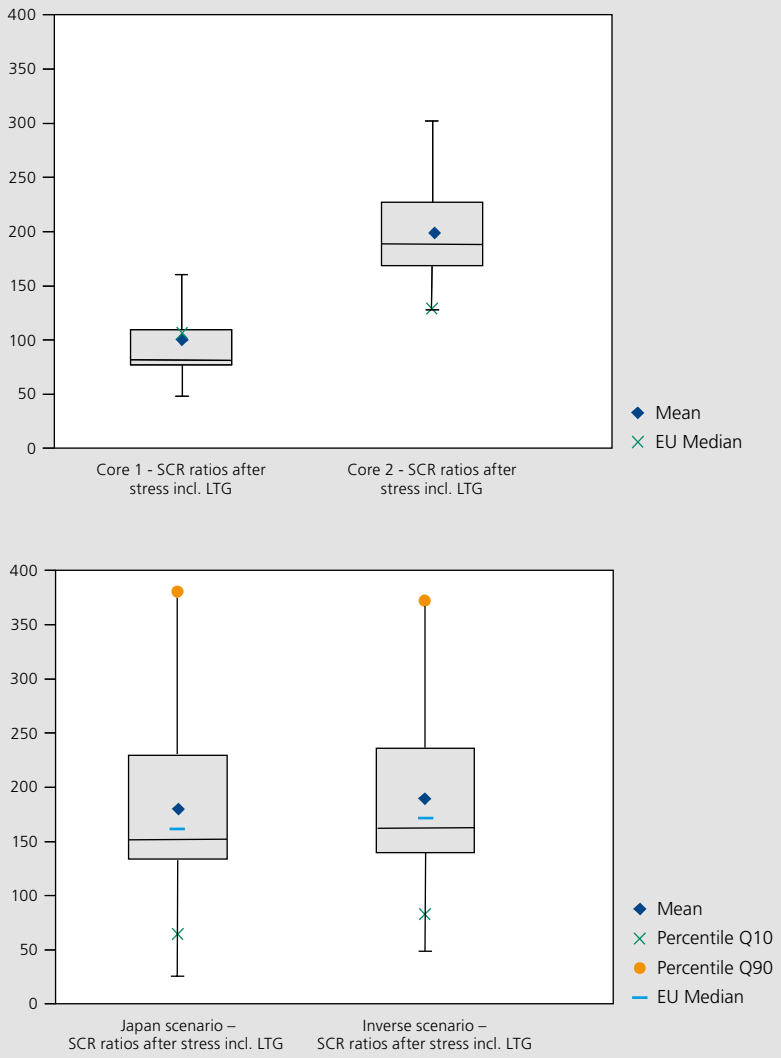
For the core module's nine Belgian participants, it is mainly the first core scenario that has a significant impact. The average and median SCR ratios including LTG measures reached 99.1 % (average) and 83 % (median) after core 1, and 201.3 % (average) and 190 % (median) after core 2. For the sake of comparison, the EU median ratios were also disclosed.

For core stress 1, this exercise resulted in a decrease of the Belgian participants' average SCR ratio of about 105 % to a level slightly below the minimum required 100 % SCR ratio. For core stress 2, the impact was much milder and ratios generally stayed well above the minimum required 100 % SCR after stress. As expected, the sudden shock to spreads on government bonds, combined with the shock affecting equities (–41 %) and real estate (–49 % for commercial real

(1) The EU median of the core module for the pre-stress SCR ratios incl. LTG equalled the Q25 results for the Belgian market (= 159 %).

CHART 5 SCR RATIOS – SITUATION AFTER THE STRESS TEST

(box plot, in %)



estate) and the downward effect on swap rates, had a significant impact on the solvency ratios of the Belgian insurers in the first core scenario. Indeed, Belgian insurance companies are still characterised by a significant amount of exposure to government bonds on the asset side and by high fixed guaranteed rates on the liability side, making them particularly vulnerable to such a "double hit" scenario.

The low-yield plots show the results for the 17 Belgian participants in the low-interest-rate module, together with the EU median results. The impact of the two low-yield curves was generally similar for Belgian life insurance companies, which can be explained by the low rates of both curves for the long-end maturities having a similar impact on the long-term liabilities of these companies. The Japanese-style scenario proved to be the most severe for the Belgian insurance sector. The average and median SCR ratio including LTG measures reached 181.3 % (average) and 152 % (median) for the Japanese scenario and 189.1 % (average) and 163 % (median) for the inverse scenario. For these two scenarios, the proportion of Belgian firms failing to meet a 100 % SCR ratio reached 24 % and 18 % respectively, which is a considerable proportion. This is comparable to the EU results, which showed 24 % of the companies not meeting the SCR ratio after the Japanese scenario and 20 % following the inverse scenario. Overall, the results are as expected given the still high guaranteed rates on certain life insurance products prevailing on the Belgian market. Compared with those

of other countries characterised by such high fixed-interest-rate guarantees, the Belgian results were actually positively influenced by Belgian insurers' good asset-liability matching on average.

When interpreting the results of the low-yield module and deriving the potential impact of a low-yield environment on the regulatory solvency ratios, it is important to note that both stressed low-yield curves were constructed without the so-called 'ultimate forward rate'. This rate is part of the LTG package and equals 4.2 %. As such, it aims to reflect the rate to which the Solvency II discounting rates will evolve in the long run and it has become an integral part of the Solvency II regulatory framework. However, to adequately test the potential economic impact of a low-yield environment, it was deemed important to construct a low-yield stress test without the impact of this 'ultimate forward rate'. In view of the current economic reality, which reflects an even more severe low-yield environment than the one tested in the Japanese scenario, this effect should be taken into account when analysing and comparing the current solvency ratios with that following the stress test.

Overall, the results of the low-yield module have shown that the Belgian insurance industry can be expected to take the necessary steps to make sure that it is adequately prepared for the challenges of a potentially long-lasting low-yield environment.

Conclusion

The main difference in outcome between the bank and insurance stress tests relates to the actions that had to be undertaken following the completion of both exercises.

In the case of the EBA stress test, banks displaying a capital shortfall against the thresholds were required to present a capital plan with corrective measures to the ECB within two weeks of the completion of the exercise. In Belgium, two banks (Axa Bank Europe and Dexia) failed to meet the threshold in the adverse scenario (5.5 %), but no further action was required given that measures had already been taken. Axa Bank Europe had, for instance, already issued Tier 1 and additional Tier 1 capital to the tune of EUR 225 million and undertaken significant de-risking before the end of the stress test. As for Dexia, its specificities were recognised by the ECB, which considered that no further capital measures needed to be taken beyond the approved Orderly Resolution Plan (ORP).

In the case of the EIOPA stress test, insurance companies were not obliged to proceed with any capital raising (no thresholds were specified). Rather, the EIOPA issued a set of stress test recommendations following the exercise. These recommendations aimed at fostering an enhanced framework for supervisors by creating a coherent follow-up to the findings of the stress test exercise while taking into account the preparations which companies and supervisors need to make in order to get ready for the upcoming Solvency II regime. Following EIOPA's finding that large companies have, on average, used more LTG measures than smaller companies within the scope of the stress test exercise, national supervisors were also asked to set up dialogues with companies to inform them about these LTG measures. Finally, and given that both the core module and the low-yield module showed a major impact on a significant number of insurance companies across Europe, supervisors and companies were recommended to adequately prepare for circumstances under which such a hit is suffered. These recommendations, alongside others, are considered as important inputs to the day-to-day supervisory tasks of the NBB and have begun to be followed up.

In terms of the way forward, a comprehensive assessment, comprising an asset quality review and a stress test, will be organised by the ECB in 2015 for 9 euro area banks which joined the SSM after the launch of the 2014 comprehensive assessment.[1] The conduct and methodology of this year's exercise is intended to be very similar to that of last year. The EBA, for its part, is currently analysing options for an EU-wide stress test in 2016, based on lessons learnt from the 2014 exercise and some of the limitations mentioned in Section 2.1. As far as insurance companies are concerned, a European-coordinated exercise is also envisaged for 2016. In developing its new exercise, EIOPA not only intends to improve on the organisational aspects, but also to set up, already in 2015, a first top-down stress test using the cash flow outputs obtained in scope of the low-yield module. This can be considered as an important first step in developing a robust future EU stress test framework for insurance companies, which should include both bottom-up and top-down calculations.

(1) One Belgian bank (Banque Degroof) will participate in the 2015 comprehensive assessment.

These internationally coordinated exercises will be further complemented by the stress tests which banks and insurance companies conduct as part of their ongoing internal management process. These stress tests, which are part of the Individual Capital Adequacy Assessment Process (ICAAP) of banks and of the Own Risk Solvency Assessment (ORSA) of insurance companies, continue to be regularly assessed by supervisors in the context of their Supervisory Review and Evaluation Process (SREP or SRP).

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The new recovery and resolution framework in Belgium

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Introduction

The global financial crisis of 2007-2008 resulted in massive losses for many large banks and equally massive government bailouts of the banks. Indeed, in many European countries initial government funding for bank bailouts, including government guarantees, amounted to double-digit proportions of GDP, reaching fifty percent or higher in certain countries. While a number of inadequacies in micro-prudential and macro-prudential regulation were identified as having contributed to the causes of the crisis, the absence of appropriate insolvency frameworks for financial institutions was one of the key explanations for the belief on the part of many governments that they had no choice but to bail out the banks. Inconsistencies across countries in supervisory powers and in the legal frameworks for insolvent financial institutions also posed serious obstacles to the treatment of insolvent cross-border banking groups.

As a result, new regulations aimed at improving crisis management frameworks for financial institutions have been passed in many countries. These frameworks are based on the Key Attributes of Effective Resolution Regimes for Financial Institutions, first published by the Financial Stability Board (FSB) in 2011, and they include special procedures, referred to as resolution procedures, that should be seen as an alternative for insolvency proceedings. In Europe, the Bank Recovery and Resolution Directive (BRRD)[1] aims at establishing an effective framework for crisis preparation and crisis management that is harmonized across European member states for both credit institutions and investment firms. In this article we focus on credit institutions.

Within the framework created by the BRRD are four key areas: (1) crisis preparation and prevention; (2) early intervention; (3) resolution powers and tools; and (4) the funding of resolution. Crisis preparation and prevention, which is the subject of this article, involves the drafting of recovery and resolution plans for credit institutions, as well as assessments by authorities of the resolvability of credit institutions. The early intervention component of the BRRD aims to provide authorities with appropriate responsibilities and powers in ensuring that the financial difficulties faced by credit institutions are addressed as soon as they arise. The resolution tools represent new tools and powers foreseen for resolution authorities when faced with a failing credit institution or, in other words, an institution for which early intervention or other preventive measures have not succeeded in restoring its financial health. The BRRD also creates a system of national resolution funds, which can be used under certain conditions to provide the funding necessary to finance resolution actions. Finally, in order to ensure effective resolution procedures the BRRD imposes new cooperation and information sharing requirements on both competent and resolution authorities.

(1) Directive 2014/59/EU EP and Council 15 May 2014 establishing a framework for the recovery and resolution of credit institutions and investment firms and amending Council Directive 82/891/EEC, and Directives 2001/24/EC, 2002/47/EC, 2004/25/EC, 2005/56/EC, 2007/36/EC, 2011/35/EU, 2012/30/EU and 2013/36/EU, and Regulations (EU) No 1093/2010 and (EU) No 648/202.

This article describes the Belgian recovery and resolution planning framework for credit institutions, which reflects the relevant provisions of the BRRD – transposed to a large extent into the new Banking Law of April 25, 2014[1] – as well as some national specificities. However, as the transposition of the BRRD occurred prior to its formal adoption by the European Parliament and the Council, the Banking Law covers only the provisions for credit institutions and not for banking groups. The transposition of the group dimension of the BRRD, including the articles on group recovery and resolution planning, dispositions on bail-in, and the application of similar rules to investment firms, are currently under preparation.

Recovery and resolution plans serve different purposes. Recovery plans are drafted and owned by credit institutions. These plans analyse the different options that can be envisaged by a credit institution in response to a major shock to its liquidity or solvency. The options specified in the recovery plan should not involve any presumption of extraordinary state support or extraordinary central bank intervention. The requirements regarding the content of recovery plans are specified by the supervisor, who also makes an assessment of the quality of each institution's recovery plan.

Resolution plans are drafted by the resolution authority and analyse options that authorities may consider in cases where a resolution procedure is initiated for an institution. The options specified in the resolution plan, which like recovery plans must not involve any presumption of extraordinary central bank intervention or state support, are designed to permit an orderly resolution of the financial institution while minimizing the impact on the financial system. For each institution, resolution authorities must also undertake a resolvability assessment on the basis of the resolution plan.

The remainder of this article is organized as follows. Sections 1 and 2 discuss the content of recovery plans, with Section 2 treating the question of recovery plans for financial groups. Section 3 describes the supervisor's assessment of the recovery plan. Sections 4 and 5 discuss, respectively, the content of resolution plans and the resolvability assessment undertaken by the resolution authority. The last section concludes.

1. Content of recovery plans

The recovery plan represents a management strategy aimed at preventing a credit institution from failing when faced with severe stress. The objective of a recovery plan is not to forecast the factors that could prompt a crisis but rather to identify the options that might be available in responding to a crisis and to assess whether these options are sufficiently robust. The recovery plan should thus aid credit institutions in preparing their responses to potential crises, although in an actual crisis, specific decisions will need to be taken as a function of the particular features of the crisis. The recovery plan must exclude from consideration any extraordinary form of state or central bank support.

Specific requirements regarding the content of recovery plans for European credit institutions and investment firms are specified by the European Banking Authority (EBA) Regulatory Technical Standards[2] and Guidelines[3]. The NBB has also issued a communication to credit institutions in order to provide additional detail relative to the implementation of the EBA RTS[4]. According to the EBA RTS and the NBB communication, recovery plans must contain the following components: (1) a summary of the recovery plan; (2) a governance section describing the development of the recovery plan and the framework for activating it; (3) a strategic analysis section, consisting of a description of the institution's core business activities and critical functions and analysing the potential options it has to recover from a severe shock; (4) a communication plan; and (5) a description of any preparatory measures taken to facilitate the potential implementation of recovery options. We discuss each of these components in turn.

(1) Wet 25 april op het statuut van en het toezicht op kredietinstellingen, BS 7 mei 2014 (ed. 2). Hereinafter referred to as 'Banking Law'.
(2) EBA/RTS/2014/11 July 18, 2014 on the content of recovery plans under Article 5(10) of Directive 2014/59/EU establishing a framework for the recovery and resolution of credit institutions and investment firms, www.eba.europa.eu/regulation-and-policy/recovery-and-resolution/draft-regulatory-technical-standards-on-the-content-of-recovery-plans.
(3) EBA/GL/2014/06 July 18, 2014 on the range of scenarios to be used in recovery plan, www.eba.europa.eu/regulation-and-policy/recovery-and-resolution/draft-regulatory-technical-standards-specifying-the-range-of-scenarios-to-be-used-in-recovery-plans.
(4) NBB Communication April 8, 2015 'Recovery Plans – Guidelines for credit institutions', www.nbb.be/doc/cp/eng/2015/nbb_2015_17_Cools.pdf.

1.1 Summary of the recovery plan

The summary offers an overview of the key conclusions from the analysis contained in the plan and summarizes the institution's assessment of its recovery capacity. The summary of the recovery plan is important not only because it offers a rapid overview of the extensive analysis that is incorporated in the plan but also because it provides the reader with the conclusions that the institution itself has drawn regarding its ability to recover from a crisis. Such conclusions can indicate, for example, whether the institution judges that it would be better able to recover from certain types of scenarios or shocks than from others. The summary should also indicate the key assumptions that the institution has made in deriving its quantitative estimates of the impacts of the stress scenarios and recovery options analysed in the plan and the sensitivity of the institution's scenario and recovery option impacts to these assumptions. Elaboration of the key assumptions underlying the analysis is critical in order to allow readers to assess the credibility of the analysis and conclusions of the recovery plan.

1.2 Governance

The governance section describes the process of developing the recovery plan, including the departments and staff involved in drafting the plan, as well as the procedures undertaken for approval and validation of the plan. An important element of this section is the extent of involvement of senior management. It is critical that senior management be integrally involved in the conception and elaboration of the plan, so that the recovery plan exercise gains the necessary credibility within the institution and is embedded in its operations. This will help to guarantee that the recovery plan process has indeed provided the intended benefits for the institution.

A second element of the governance section, and a crucial component of the plan, is a description of the process for triggering the activation of the recovery options included in the plan. The framework for recovery plan activation must include a set of qualitative and quantitative indicators designed to detect stress at a sufficiently early stage to allow institutions to take actions to redress their situation. Institutions are expected to describe the early warning system in the recovery plan monitoring framework, the relevant threshold values of the quantitative indicators, and the points at which the escalation process to the recovery phase should be activated.

Minimum requirements for the indicators that must be included in the monitoring frameworks of recovery plans will be determined in forthcoming EBA guidelines on recovery plan indicators. At a minimum, credit institutions will be required to include indicators of solvency, liquidity, and profitability. EBA recommends that a "traffic light" approach be adopted with respect to setting threshold values for the quantitative indicators. This approach would ensure that the institution establishes "early warning" threshold values for the indicators, as well as threshold values which would trigger the recovery plan process within the institution. Institutions are allowed to determine their own indicator threshold values; however, they must be able to justify their calibrations. Recovery plan trigger threshold values for capital and liquidity indicators must nevertheless be set at levels above capital and liquidity regulatory requirements.

In addition to the indicators specified by EBA, the Belgian Banking Law requires that institutions include indicators of asset encumbrance in their recovery plan monitoring frameworks. Increases in asset encumbrance often accompany the onset of stress for financial institutions, as the demand for secured credit on the part of an institution's creditors rises relative to the demand for unsecured credit. Asset encumbrance indicators can help to ensure that banks will maintain sufficient unencumbered assets on their balance sheets to cover their deposit and other unsecured liabilities in the case where the institution enters resolution.

The inclusion of asset encumbrance indicators in credit institutions' recovery plan monitoring frameworks represents a Belgian specificity and is not a requirement of the BRRD. Article 110 of the Banking Law requires credit institutions to include indicators of asset encumbrance in their recovery plans, in order to ensure that banks maintain sufficient unencumbered assets to cover the deposits that have been granted a preference according to Article 389 of the Banking Law; i.e., the deposits eligible for deposit insurance coverage. Article 110 also specifies that the supervisor must determine, for each credit institution, a progressive scale of threshold values for the asset encumbrance indicators.

Box 1 provides details regarding the asset encumbrance indicators that Belgian credit institutions must include in their recovery plan monitoring frameworks.

Box 1 – Asset encumbrance indicators

The Regulation on asset encumbrance, which accompanies the Banking Law, defines the two asset encumbrance indicators that must be included in Belgian banks' recovery plan monitoring frameworks and specifies the range of values for each indicator in which the bank-specific thresholds must lie. The NBB is then tasked with defining the bank-specific threshold values for each indicator, such that the bank-specific values lie within the intervals specified in the Regulation.

Indicator definitions. Credit institutions must include two asset encumbrance indicators in their recovery plan frameworks: a narrow indicator and a broad indicator. Each indicator is calculated on a solo basis, as a ratio of unencumbered assets over deposits eligible for the deposit guarantee ("eligible deposits"). While each indicator is defined as the ratio *Unencumbered Assets/Eligible Deposits*, the two indicators differ in their definition of unencumbered assets. The narrow indicator contains a more conservative measure of unencumbered assets than does the broad indicator. The definitions of unencumbered assets for the two indicators are as follows.

Narrow indicator measure of unencumbered assets: *Total assets – Encumbered assets – Contingent encumbrance (as measured by regulatory liquidity requirements; i.e., outflows excl. those for eligible deposits) – Nonperforming loans – Intangible assets*

Broad indicator measure of unencumbered assets: *Total assets – Encumbered assets + Assets encumbered in the course of hedging + Assets pledged in borrowing from the central bank – Nonperforming loans – Intangible assets*

Both indicators deduct from total assets the assets that are currently encumbered. Both indicators also deduct nonperforming loans and intangible assets, since these categories represent assets that will likely not be available to meet depositors' claims in the case of the bank's failure.

The narrow indicator also subtracts assets that are likely to become encumbered in a stress period (contingent encumbrance), before the credit institution enters into resolution; i.e., assets that are likely to become encumbered as a result of the institution's need to cover outflows in the period of stress that would likely precede failure. The proxy used for this category is the amount of regulatory liquidity requirements associated with all outflows, except retail deposits. The narrow indicator, therefore, provides a conservative estimate of the assets that would be available to cover eligible deposits in the case of bank resolution.

In contrast, the broad indicator does not subtract contingent encumbered assets from total assets. In addition, the broad indicator allows credit institutions to exclude from the definition of encumbered assets (hence to "add back in" to the category of unencumbered assets) any assets that are pledged in the course of hedging of the institution's positions and any assets that have been pledged for loans from the central bank. The motivation for excluding these categories from the definition of encumbered assets is to avoid penalizing banks from prudent hedging or from borrowing from the central bank during periods of stress.

Movements in these indicators, when considered together, can help to detect a period of stress that may cause the institution to turn to the central bank for additional liquidity. The indicators can also help to signal when the level of a credit institution's unencumbered assets is falling to the point where its ability to satisfy its claims to unsecured creditors comes into question.

Threshold values for each indicator. The Banking Law and accompanying regulation specify for each indicator an interval of values in which all bank-specific thresholds must lie. The need to specify an interval of possible threshold values arises from the fact that banks with very high proportions of deposits can never have ratios

of unencumbered assets to deposits that are as high as the ratios that banks with low proportions of deposits can have. For example, a bank with 90 % of its funding in deposits could never have a ratio of unencumbered assets over deposits that exceeds 111 %, and this value could only be achieved if none of the bank's assets were encumbered. In contrast, a bank with 50 % of its funding in deposits could have a ratio of unencumbered assets to deposits that reaches 200 %. Ranges of values have thus been specified for each indicator in order to enable authorities to assign lower threshold values to banks with high proportions of deposits. In this way, a level playing field is maintained, and small savings banks will not be penalized by a requirement to take certain actions when indicator thresholds are exceeded even though the bank is not actually facing a situation of stress.

The Banking Law and accompanying Regulation specify that for each indicator, two institution-specific threshold values must be specified: an "early warning" threshold and a "recovery plan" threshold. The early warning threshold is intended to serve as a warning signal at an early stage of stress, allowing the institution to analyze the underlying cause of decline in the indicator value and to begin monitoring the situation more closely. If the "recovery plan" threshold is breached, the institution must activate its recovery plan escalation process, implying at a minimum that the recovery, or crisis, committee must come together to determine whether the institution is in or approaching a recovery phase and whether any recovery options should be activated. While the credit institution must notify the supervisor if either the early warning or the recovery plan thresholds are breached for either indicator, it is nevertheless important to emphasize that there is no automatic link between breaching an asset encumbrance indicator threshold and activating recovery options.

The range of threshold values for the asset encumbrance indicators in which all bank-specific thresholds must lie are specified in the Regulation as follows: 80 % to 100 % for the narrow indicator and 100 % to 135 % for the broad indicator.

For the purposes of determining the bank-specific threshold values, the NBB has decided, for the current period, to define a small number of categories of banks, as a function of their proportion of funding obtained through eligible deposits, and to specify indicator thresholds for each category. This implies that banks in a given category all have the same indicator threshold values.

The categories and associated threshold values are as follows:

Category 1: Banks with a proportion of eligible deposits to total liabilities of less than 70 %

Narrow indicator	Early warning threshold: 100 %	Recovery plan trigger threshold: 95 %
Broad indicator	Early warning threshold: 135 %	Recovery plan trigger threshold: 130 %

Category 2: Banks with a proportion of eligible deposits to total liabilities of at least 70 % and less than 90 %

Narrow indicator	Early warning threshold: 95 %	Recovery plan trigger threshold: 90 %
Broad indicator	Early warning threshold: 110 %	Recovery plan trigger threshold: 105 %

Category 3: Banks with a proportion of eligible deposits to total liabilities of at least 90 %

Narrow indicator	Early warning threshold: 85 %	Recovery plan trigger threshold: 80 %
Broad indicator	Early warning threshold: 105 %	Recovery plan trigger threshold: 100 %

In the recovery plan the institution should also discuss the consistency of the recovery plan monitoring framework with the institution's regular risk management framework. Some of the indicators in the recovery plan monitoring framework will already be included in the risk management framework; however, the threshold values in each framework would be expected to differ, since the recovery plan will only be triggered when the institution is entering into a crisis situation and its viability comes into question.

1.3 Strategic analysis

The first component of the strategic analysis is a description of the institution's core business lines and critical functions. Core business lines are the business lines and activities which represent the main sources of revenue or profit for the institution. Critical functions are defined as those activities or services for which discontinuation by the institution would likely have a significant, negative impact on the financial sector or the economy. When the recovery plan is being drafted for a group, this part of the strategic analysis also contains a description of the activities undertaken by the entities of the group and the interconnections between the entities.

The second component of the strategic analysis, which represents in many ways the core of the recovery plan, consists of specifications of stress scenarios in which the institution would suffer a severe shock, and of an analysis of potential recovery options the institution could activate in order to recover from the shock. The scenarios included in the recovery plan should involve shocks to capital as well as to liquidity, and they should also incorporate both systemic and idiosyncratic shocks. The recovery options should include not only measures to strengthen capital but also more radical measures such as disposing of certain activities or business lines, selling subsidiaries, or restructuring debt. These options should not involve any assumption of extraordinary forms of state aid or extraordinary central bank support.

1.4 Communication plan and preparatory measures

The institution is required to develop a communication and disclosure plan outlining how it would communicate the activation of its recovery plan to interested parties both within and outside the institution. Appropriate and effective communication regarding the activation of a recovery plan is crucial in order to avoid any adverse effects on the institution and the financial system. The communication plan should also include any specific communication that would be judged necessary for particular recovery options.

The institution is also required to specify any preparatory measures that it has taken or plans to take in order to facilitate the implementation or effectiveness of its recovery options. These measures are likely to result from the qualitative analysis of recovery options, which is required in the recovery plan in addition to the quantitative analysis. In the context of the qualitative analysis of each recovery option, the institution must indicate the timing required in order to implement the option, as well as any legal or operational obstacles to implementation. Such an analysis can help to indicate preliminary arrangements, analyses, or measures that institutions can undertake in order to reduce the obstacles associated with the eventual implementation of a given recovery option. Institutions are asked to include discussion in their recovery plans of such preparatory measures.

2. Group recovery plans

For banking groups, the BRRD favours the drafting of group recovery plans over the alternative of a collection of individual subsidiary-level recovery plans. In practice, most groups also favour this option. In any event, parent undertakings must draft a group recovery plan, whereas additional recovery plans at the level of bank subsidiaries are merely optional. This section explores several issues relating to group recovery plans, including the purpose of this choice, the legal issue of the scope ratione personae of the obligation to draft a group recovery plan, the (limited) role of a subsidiary level recovery plan, and the additional content of group recovery plans relative to a plan for an individual institution.

2.1 The group perspective and the drafting of a group recovery plan

The purpose of the BBRD's bias for group recovery plans is to have a group-wide perspective. The recovery plan should first and foremost aim at the stabilization of the group as a whole. This should give a better view of potential crisis scenarios that might impact the critical functions or the core business lines of the group. In addition, adopting a group perspective should increase the range of potential recovery options.

Yet, the BRRD requires that the group recovery plan not only aim at the stabilization of the group as a whole, but also at the stabilization of the individual entities. This may, at first glance, appear to represent an internal contradiction. This wording, however, should not be read as a requirement for the group to guarantee the continued survival of each and every banking entity within the group, as such an interpretation would amount to denying the specific group perspective of the group recovery plan. It would also transform the group recovery plan into a consolidated amalgam of several self-standing individual recovery plans. In this regard, the sale or disposal of an entity within the group can constitute a legitimate recovery option for the group recovery plan, as long as the continuity of the critical functions exercised by the entity in question is guaranteed.

The group plan is to be drafted by the parent undertaking, which can be a credit institution or a mixed financial holding company. This choice to adress the obligation to the parent undertaking is somewhat novel in European prudential law. Indeed, the Capital Requirements Regulation has chosen the opposite route for capital and liquidity requirements, which are addressed to credit institutions, and these institutions have to monitor them both at the individual level and at the consolidated level of the parent institution or parent holding company. (1)

2.2 Recovery plans for individual subsidiaries

Admittedly, the BRRD still leaves the door open for recovery plans at the level of the individual subsidiary, in addition to the group recovery plan. If a solo recovery plan is required, the entities covered by the solo recovery plan should not be covered by the group recovery plan. Such a solo recovery plan, however, can only be requested upon agreement by the consolidating supervisor and the competent authorities of the banking subsidiaries. In case of disagreement between supervisors, the EBA can mediate between the supervisors to reach an agreement. In doing so, EBA is expected to follow the BRRD bias against individual recovery plans. For groups located entirely within the euro zone, the ECB will make the decision regarding individual recovery planplans (see Box 2 on the new institutional framework for banking supervision). Similarly, for less significant groups located in a single jurisdiction within the euro zone, the national competent authority will make all decisions relating to individual recovery plans. In this sense, it may be expected that different national practices on individual recovery plans may emerge.

2.3 Content of group recovery plans

As a general rule, the group recovery plan should contain the same elements as those in the recovery plan of a self-standing credit institution. The requirements described in Section 2 above are indeed applicable both to solo recovery plans and to group recovery plans.

There are nevertheless additional elements specific to the group that should be contained in the group recovery plan. First, the group should map its core business lines and critical functions onto its legal entities, which can be both credit institutions and branches. The entities that do have critical functions or contain core business lines are deemed 'material', and only those entities should be covered in the group recovery plan. Second, in the event where individual recovery plans are requested, the group plan and the individual plans should be shown to be consistent with each other. Finally, when intragroup financial support agreements have been concluded, the recovery plan should detail them.

Along these lines, the BRRD limits the degree of intragroup financial support that can be provided once a receiving entity within the group is in a situation of distress that would justify early intervention by the supervisor. Such a situation

(1) Articles 6 and 11 of Regulation (EU) No 575/2013 of the European Parliament and the Council of 26 June 2013 on prudential requirements for credit institutions and investment firms and amending Regulation (EU) No 648/2012, *Pb.* L321/6.

signifies that the entity is in breach, or will in the foreseeable future likely be in breach, of its regulatory requirements.[1] Intragroup financial support can be an acceptable recovery option; however, it should not endanger the viability of the providing entity. It is for this reason that the BRRD attaches stringent limitations to intragroup financial support agreements. The agreements on intragroup financial support should be included in the group recovery plan. Any provision of support pursuant to this agreement should be approved by the supervisor of the providing entity.

3. Supervisory assessment of recovery plans

Upon receipt of the recovery plan, the supervisor has a six-month period in which to assess the plan and to communicate its assessment to the institution. Subsequent to the creation of the single European supervisor in November 2014, the supervisor making this assessment will be either the NBB or the ECB, depending upon which authority has the responsibility for direct supervision of the financial institution. Box 2 describes the new supervisory institutional framework.

(1) Art. 27 BRRD and art. 234-235 Banking Law.

Box 2 – The New Institutional Framework for Banking Supervision

In June 2012 the European Council announced a decision to establish a single supervisory mechanism (SSM) in Europe. The motivations for the decision were several, including a desire to better harmonize banking supervision across Europe, to reverse the apparent national re-fragmentation of the single market following the financial crisis, to break a negative feedback loop between indebted sovereigns and the credit institutions in their jurisdictions, and more generally, to restore confidence in the euro.

On November 4, 2014 the Single Supervisory Mechanism (SSM) came into existence. This supervisory framework, which includes in its scope all credit institutions in the Eurozone, is comprised of the European Central Bank and national supervisory authorities (i.e., national competent authorities). Within the SSM, the ECB is responsible for the direct supervision of large, significant banking groups, a category which encompasses all banking groups with total assets greater than 30 billion € or with total assets exceeding 20 % of domestic GDP, as well as institutions not meeting these criteria but with significant cross-border activities. While the criteria for designating significant institutions are applied on a group basis, all subsidiaries of the banking groups meeting these criteria are also subject to the direct supervision by the ECB. This means that for banking groups located entirely within the Eurozone there is no longer a distinction between home and host supervisory authorities, as the ECB is the single supervisor. National competent authorities (NCAs) are responsible for the supervision of all of the credit institutions that do not fall into the category of significant institutions and which are referred to as "less significant" institutions (LSIs).

Within the SSM the ECB is also competent for all common procedures; i.e., procedures for which the distinction between significant and less significant institutions is not relevant. Examples of common procedures include the granting and withdrawal of banking licenses.

The supervision of significant institutions by the ECB is conducted via joint supervisory teams, composed of multinational groups of supervisors, together with supervisors from the relevant NCAs. The NCAs play an important role in the day-to-day supervision of the significant institutions as well as in on-site inspections.

While the NCAs are responsible for the direct supervision of the LSIs, the ECB nevertheless issues regulations, guidelines or general instructions to the NCAs determining how to perform their supervisory tasks. The ECB can also request information regarding LSIs from the NCAs and participate in on-site inspections. Finally, the ECB can choose to place troubled LSIs under its direct supervision.

3.1 Nature of the recovery plan assessment

EBA has issued draft regulatory technical standards regarding the supervisory assessment of recovery plans. This assessment covers three key dimensions: completeness, quality, and credibility. The completeness check first involves verifying that the institution has included in the plan all of the elements required for recovery plans, as noted in the BRRD and in the various EBA documents further detailing the necessary content. A second prong of the completeness check is a determination of whether sufficient detail has been provided with respect to each of the required elements of the plan and whether the information provided is up to date.

The second dimension of assessment is a quality check. This part of the assessment involves the following types of considerations. Is the plan clear and self-explanatory? Are all quantitative estimates of scenario or recovery option impacts sufficiently motivated and justified? Are all assumptions underlying the estimated impacts clearly identified and the sensitivity of the estimates to changes in the assumptions analysed? Is a sufficiently broad range of recovery options included, given the business model of the institution and/or the group structure if the plan is for a group?

The final dimension of the recovery plan assessment is the supervisory evaluation of the credibility of the plan. This dimension requires an overall supervisory judgment as to whether the recovery plan is likely to achieve the goal of restoring the institution to health quickly and effectively in a stress situation. In this part of the assessment, the following questions enter into consideration. Do the scenarios included in the plan cover all of the institution's key vulnerabilities? Are the estimated impacts of the scenarios sufficiently severe? Is there a sufficient number of recovery options and are the estimated impacts of these options plausible? Are there certain scenarios in which the institution would be better able to recover than others?

In addition to evaluating the credibility of the plan from the point of view of restoring the institution to health, it is also important that the supervisor assess whether the recovery options can be successfully implemented without endangering financial stability. This involves not only determining whether activation of any of the institution's recovery options would negatively affect the critical functions it performs but also whether the institution's recovery plan can be implemented in a crisis scenario in which other institutions with similar business models are hit at the same time and may be activating similar options.

A final element of the recovery plan assessment is determining the degree to which the recovery plan is credibly embedded in the corporate governance and the risk management of the institution. This aspect is critical to ensuring that the process of developing the recovery plan has been accorded the appropriate importance within the institution and that the necessary procedures are in place to identify the onset of stress and to activate the recovery plan at an early enough stage to ensure its effectiveness.

Following submission of the first recovery plan to the supervisor, institutions are required to submit an updated plan yearly, as well as an updated plan following any significant change in the institution's structure or activities.

3.2 Procedure in case the recovery plan is determined to contain material deficiencies

The Belgian Banking Law sets out the procedure, including strict time limits, for revising the plan for cases in which the competent authority has determined that the plan contains material deficiencies or impediments to implementation. In the event that the competent authority has identified such deficiencies or impediments, it can require that the institution submit a revised plan within two months (extendable by one month), after having given the credit institution the opportunity to state its opinion on that requirement. If the revised plan is still insufficient, the competent authority can specify specific changes to the recovery plan and accord the credit institution a thirty-day period in which to make the revisions. This thirty day period is a constraint imposed by the Belgian Banking Law but not by the BRRD. This requirement reflects the intention of the Belgian legislator to tighten the post-assessment recovery plan sequence.

If these final changes are still insufficient to remedy the problems identified, the supervisor can direct the credit institution to make changes to its business operations. Whereas the BRRD gives the credit institution a 'reasonable timeframe' to identify the changes to be made, the Banking Law has again tightened the rules by providing credit institutions with

only a thirty-day period to identify the changes to be made. If what is proposed by the credit institution is again below standard, the competent authority can impose far reaching measures on the credit institution. It can impose the reduction of the institution's risk profile, enable timely recapitalisation measures, review the institution's strategy and structure, make changes to the funding strategy, or make changes to the institution's governance structure. The competent authority is under an obligation to provide a rationale for these measures and to apply them in a proportionate manner.

It is advisable for both supervisors and credit institutions to keep the strict timing schedule of the Belgian Banking Law in mind when discussing the drafting of the recovery plan. These discussions also offer the opportunity to engage in an intense dialogue, which should then lead to a plan that meets the regulatory requirements when submitted.

4. Content of resolution plans

In certain situations early intervention measures implemented by authorities and recovery options activated by the institution may not be successful in avoiding the institution's failure, in which case an insolvency procedure would be expected to be initiated. However, since normal insolvency proceedings are not fit or not always applicable to financial institutions given their specific role in the economy, the BRRD has created a new resolution framework as an alternative to insolvency procedures of credit institutions and investment firms. The resolution framework has as its primary objectives: 1) ensuring continuity of critical functions; 2) avoiding a significant adverse effect in the financial system as a whole; and 3) protecting public funds, depositors and investors as well as client funds and assets.

Resolution plans, which are drawn up by resolution authorities for each institution prior to the occurrence of a crisis, are intended to facilitate the resolution procedure, by ensuring the continuation of critical functions performed by the institution while avoiding severe disruption to the financial system or economy and without exposing taxpayers to loss. As will be discussed below, an important means of avoiding recourse to taxpayer funds for an institution in resolution is the ability of authorities to impose losses on the institution's shareholders and creditors through "bail-in", which refers to the write-down of capital instruments and debt claims or conversion of debt to equity.

The BRRD requires resolution plans to be developed by resolution authorities. Resolution authorities are distinct and operationally independent from supervisory authorities. Following passage of the BRRD, all European jurisdictions have had to either establish a resolution authority or reorganise the existing one. In addition to the national resolution authorities and within the context of the banking union, a Single Resolution Mechanism (SRM) has been created, which mirrors the Single Supervisory Mechanism (SSM). Box 3 describes the new institutional framework for resolution.

Although the drafting of resolution plans is the task of resolution authorities, their development will necessitate close cooperation between the supervisor and the resolution authority, for example, in terms of information transmission. Indeed, cooperation is explicitly required in the BRRD and can also be inferred from the list of elements to be analysed in resolution plans as required by the BRRD[(1)]. These elements include for instance the following:

- an explanation as to how the institution's critical functions and core business lines could be legally and economically separated from other functions, in order to ensure continuity of the former upon failure;
- a detailed description of the resolution strategies that could be applied, depending on the scenarios, including those linked to idiosyncratic failure and to systemic crises;
- a description of the processes for determining the value and marketability of the institution's critical functions, core business lines and assets;
- the means of financing of resolution options;
- an estimated timeframe for implementing the plan;
- a detailed description of a resolvability assessment of the institution;
- a description of the measures required to remove potential impediments to resolvability identified in the resolvability assessment;
- a description of critical interdependencies;
- the minimum level of own funds and liabilities eligible for bail-in and the timing required to reach this level;
- a description of essential operations and systems for maintaining the continuous operational functioning of the institution.

(1) The elements to be analysed in resolution plans have been further elaborated by the EBA in its Final Draft RTS on the content of resolution plans (European Banking Authority, *Final Draft RTS on the content of resolution plans and the assessment of resolvability*, 19 December 2014, EBA/RTS/2014/15).

Box 3 – The New Institutional Framework for Resolution

The BRRD requires all Member States to establish a national resolution authority. In Belgium the National Bank of Belgium (NBB) has been appointed as the Belgian resolution authority, and a separate Resolution College has been established within the NBB for this purpose. Members of the Resolution College include five members of the NBB Board of Directors, the Chairperson of the FSMA, the Chairperson of the Board of the Federal Public Service of Finance, the Chairperson of the Belgian resolution fund, four external experts and one magistrate.

In the countries participating in the banking union, national resolution authorities operate within the Single Resolution Mechanism (SRM). The SRM consists of the Single Resolution Board (SRB), the national resolution authorities, the European Commission and Council and the Single Resolution Fund. As of 1 January 2016 the SRB will acquire full resolution powers for the institutions supervised directly by the ECB in the context of the SSM[(1)].

The SRB convenes in plenary or executive session. The plenary session is composed of the SRB Chair, its permanent board members and representatives of participating NRAs (the European Commission and the ECB are observers). In the executive session, only the Chair and the permanent board members are represented, with the exception of deliberations concerning individual institutions where the national resolution authorities of the relevant countries are also represented. The SRM Regulation foresees that the preparatory work related to a certain group or institution can be performed by Internal Resolution Teams (IRTs) which could be compared to the Joint Supervisory Teams (JSTs) within the SSM.

The SRB replaces the resolution colleges for groups that operate only within the SRM countries. The SRB represents the national resolution authorities of the SRM countries in the resolution colleges of groups that operate in both SRM and non-SRM countries.

(1) Until that date, the NBB will be the competent resolution authority with almost full resolution powers for all Belgian credit institutions. The SRB is already competent as of January 2015 for preparing and drafting resolution plans.

Resolution plans thus address a variety of complex issues. Hence, when drafting resolution plans, resolution authorities will have to take into consideration a wide range of legal and economic factors, including the creditor hierarchy applicable in insolvency proceedings, the institution's capacity to absorb losses and the prepositioning at parent and/or local level of the loss absorbing capacity, the operational and legal structure of institutions, the independence of a group's operating subsidiaries, the resolution powers available in each jurisdiction where the group is present and the enforceability and implementation of bail-in.

The remainder of this section discusses in more detail three key aspects of resolution plans; namely, the resolution tools available to resolution authorities, the choice of resolution strategy for a financial group, and the level of minimum required eligible liabilities (MREL), a concept which is linked to the minimum amount of an institution's liabilities potentially subject to bail-in.

4.1 Resolution tools

According to the BRRD, institutions may enter into resolution when the following three conditions are met: (1) the institution is failing or likely to fail; (2) no alternative measures (private sector or prudential) can be taken; and (3) resolution is necessary in the public interest. In such situations, the institution may be put into resolution proceedings. Resolution authorities can then use four specific tools as specified in the BRRD: (1) the sale of business tool; (2) the bridge institution tool; (3) the asset separation tool; and (4) the bail-in tool. A combination of different tools is also possible. For example, the asset separation tool must always be combined with another tool.

The actual recourse in a resolution procedure to one or more of the above mentioned tools must respect several principles: (1) shareholders bear losses first; (2) creditors bear losses after the shareholders in accordance with the order of priority of their claims under normal insolvency proceedings; (3) management of the institution is replaced and shall provide all necessary assistance to the resolution authority; (4) persons are made liable for their responsibility in the failure of the institution; (5) creditors of the same class are treated in an equitable manner; (6) no creditor shall be worse off than in normal insolvency proceedings; (7) deposits covered by deposit insurance are fully protected; and (8) safeguards are respected (e.g. valuation by an independent person of potential difference in treatment of shareholders and creditors, protection of financial collateral and security arrangements, protection for counterparties in case of partial transfer).

The first of the resolution tools, the sale of business tool, permits resolution authorities to transfer some or all of the institution's assets or liabilities to a purchaser. Such a sale can take place without shareholders' consent.

The bridge institution tool is one through which a new institution is created, containing the activities of the entire failing institution or a part of it, such as for example its critical functions, and which will be entirely owned by a public authority until it can be sold to a private purchaser (e.g. when market conditions improve). The bridge institution is by definition a temporary arrangement which envisages a new institution based on the viable part of a failing institution.

The asset separation tool is one whereby certain high-risk assets of a failing institution are transferred to an asset management vehicle owned by a public authority. This tool is also generally referred to as a "bad bank" and should always be combined with one or more other resolution tools.

The bail-in tool is the most innovative and challenging tool from the perspective of resolution authorities, institutions and creditors. It can be applied in several circumstances. First, it can be used in order to recapitalise an institution fulfilling the conditions for resolution, in order for it to continue to meet the requirements for maintaining a banking licence and to carry on as a going concern. Alternatively, it can be used to convert debt to equity or to reduce the principal amount of debt claims that are transferred to a bridge institution (in view of providing capital) or under the sale of business tool or the asset separation tool.

Some liabilities are automatically excluded from bail-in, including deposits that are covered by the deposit guarantee scheme, secured liabilities, interbank liabilities that are not intra-group liabilities and that have a remaining maturity of less than seven days, liabilities with a remaining maturity of less than seven days owed to CCPs, payment systems or security settlement systems, and liabilities to employees. In addition, certain liabilities may be excluded by the resolution authorities on a discretionary basis, albeit only in exceptional circumstances; namely due to timing constraints, considerations relating to the protection of critical functions, or avoidance of contagion or destruction of firm value. As explained further below, these per se and discretionary exclusions create a tension between bail-in and the principle that no creditor should be worse off in resolution than in insolvency, which is one of the general resolution principles as mentioned above.

An essential part of the resolution planning exercise is to assess the extent to which each of these resolution tools could be used in the resolution of a specific group. As explained in the next section, the choice of the resolution tools will depend to a large extent on the group resolution strategy on which the plan relies.

4.2 Resolution strategy for groups: single point of entry (SPE) vs multiple point of entry (MPE)

When the resolution plan concerns a cross-border financial group, a highly important choice to be made relates to the preferred resolution strategy: single point of entry (SPE) versus multiple point of entry (MPE) strategy. In an SPE strategy the resolution powers are applied at the top of a group by a single resolution authority, whereas in an MPE strategy resolution tools are applied to different parts of the group by several resolution authorities, although in a coordinated manner.

SPE strategy: In an SPE strategy resolution powers will be applied at the level of the parent or holding company by one single resolution authority[1] and the absorption of losses within the group will take place at the level of the parent or holding company.

(1) The single resolution authority in an SPE strategy will be the national resolution authority of the top parent or holding company. If an SPE strategy is chosen in the context of the Single Resolution Mechanism, the SRB will be the single resolution authority for institutions under the supervision of the ECB.

The FSB has developed a series of assumptions and pre-conditions for an SPE strategy to be effective.[2] The first is the designation of the parent or holding entity as the point of entry for resolution. Second, the jurisdiction of the point of entry entity should grant effective resolution powers to the jurisdiction's authorities. Third, the amount and nature of the institution's loss-absorbing capacity (LAC) should be determined and then assessed to be sufficiently high to absorb the losses sustained by operational subsidiaries or other affiliates that need to be maintained in resolution.

One of the difficulties with the SPE strategy lies with the need for sufficient comfort to be given by the home resolution authority to the host resolution authorities regarding the treatment of local subsidiaries and, in particular, the reassurance that sufficient capital and liquidity will be down-streamed to the operating subsidiaries in the host jurisdictions in an actual resolution process. It is therefore crucial that the SPE strategy specifies beforehand how losses may be up-streamed to the level of the parent or holding company. This may be achieved by the provision of debt funding by the parent to subsidiaries so that sufficient local LAC is made available. It could also be required that the set-off of claims between parent and subsidiary and between subsidiary and parent is not allowed, so that losses can be up-streamed effectively. In addition, limits on intragroup exposures may also be desirable to avoid a situation in which a subsidiary would indirectly finance its own LAC.

MPE strategy: The MPE strategy implies that resolution powers will be exercised at the level of different legal entities of a group, whereby the group can be split into separate parts, either on a geographical basis or along business lines, depending on the case at hand. This does not mean, however, that the different resolution authorities involved in an MPE strategy do not need to cooperate. Indeed, cooperation is necessary in order to ensure the effectiveness of the resolution process or to avoid a run on assets in other locations or contagion across the group.

The FSB has identified the following pre-conditions for an MPE strategy to be effective.[3] First, at each point of entry, the approaches that are likely to be used to resolve the entity and any sub-groups beneath it should be specified. Second, each legal entity that is also the point of entry should possess sufficient LAC to cover not only its own likely losses in resolution, but also those of subsidiaries below it, for which no separate resolution is planned.

A third pre-condition is that the debt issued at the local points of entry is likely to be issued to third parties. This contrasts with an SPE strategy, where the parent entity is likely to subscribe a predefined part of the debt issued by the local subsidiaries. In practice this means that in an MPE strategy the application of the power to convert debt into equity will result in a dilution of the ownership of the parent company, with potential loss of control by the parent and dismantlement of the group.

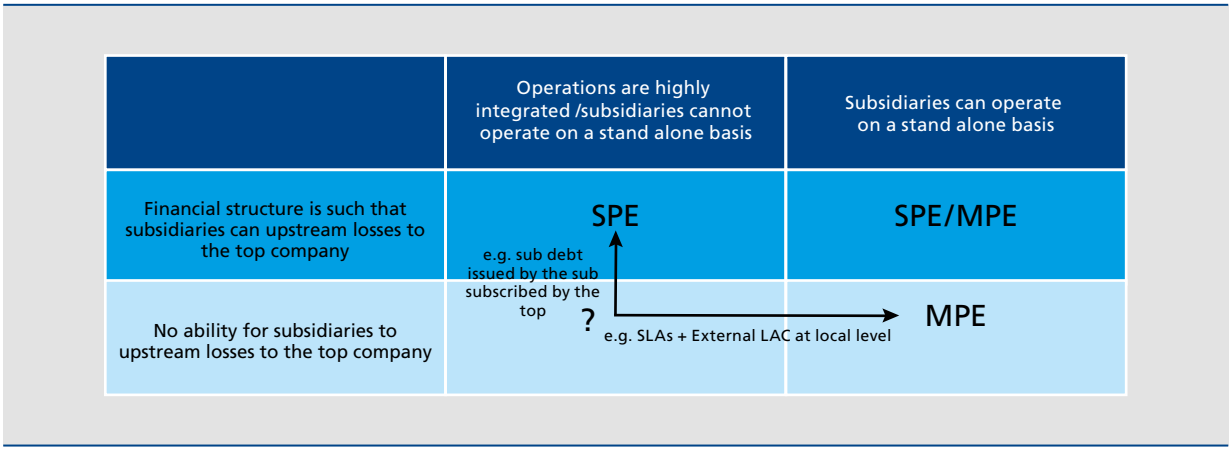
As a consequence, an MPE strategy also requires a certain degree of financial and operational independence of the legal entities that will serve as a point of entry. Interdependencies within a group, concerning for example the provision of critical shared services or access to infrastructure, should be kept to a minimum in order for an MPE strategy to be effective. Finally, the local point of entry and its subsidiaries should have sufficient funding capacity at solo level, implying that intra-group financial interdependencies (loans, guarantees) should be avoided.

Chart 1 illustrates the main drivers influencing the choice between an SPE or MPE strategy. The choice will mostly depend on the degree of integration of operations within the group and the possibility for the subsidiaries to upstream losses to the top company. For the subsidiaries that are not operationally independent and that can easily upstream losses (which are located at the top left of the figure) the logical choice will be SPE. For subsidiaries that can operate stand-alone and cannot upstream losses MPE will be the evident strategy (see bottom right of the figure). SPE or MPE are equally possible for subsidiaries that can operate on a stand-alone basis and that can upstream losses (top right in the figure). For the groups in which subsidiaries cannot upstream losses but where they also do not have the capacity to operate on a stand-alone basis (bottom left in the figure), a choice will have to be made between an SPE or MPE approach. An SPE approach may be made possible through the issuance by the subsidiary of subordinated debt subscribed by the parent. An MPE approach may become viable via the conclusion of service-level agreements and the availability of sufficient external LAC at local level.

(1) Financial Stability Board, *Recovery and Resolution Planning for Systemically Important Financial Institutions: Guidance on Developing Effective Resolution Strategies*, 16 July 2013, p. 14-16.

(2) Financial Stability Board, *Recovery and Resolution Planning for Systemically Important Financial Institutions: Guidance on Developing Effective Resolution Strategies*, 16 July 2013, p. 17-19.

CHART 1 CHOICE BETWEEN SPE OR MPE RESOLUTION STRATEGY



Other factors affecting the choice between MPE and SPE: In addition to the pre-conditions set out above, the choice of preferred strategy will also depend on other aspects, such as an individual institution's particular characteristics; the legal framework and the level of legal harmonization within all jurisdictions in which a group is active; and, potential conflicts between home and host authorities.

- The SPE strategy is aligned with the increasing trend to centralise functions at group level.
- The MPE strategy is perceived to be more consistent with retail banking, deposit funding and stand-alone entities under the legal form of subsidiaries, whereas the SPE strategy is better applicable to investment banks relying basically on wholesale funding and intra-group support.[1]
- The current resolution framework leaves room for quite a few cross-border legal challenges. Whereas some jurisdictions have started transposing resolution frameworks in their local law (namely the EU and the US), successful implementation has not yet been attained, for three main reasons: incomplete and divergent regimes; territorial approaches to national insolvency and resolution laws; lack of transposition of resolution frameworks on a global scale. These legal issues do not represent a major challenge under an MPE strategy, but they can pose difficulty for an SPE strategy since they may hamper an effective resolution, making the SPE strategy operationally infeasible.
- Conflicts between home and host authorities might also occur. For instance, when the MREL at the parent level is not subordinated, implying that some unsecured senior liabilities, such as for instance corporate deposits, may need to be bailed-in, the home resolution authority may be reluctant to apply the bail-in at the top level to address problems at a local operational subsidiary that are purely idiosyncratic (e.g. fraud related). In such a situation, it is not certain that the home resolution authority would be ready to absorb the losses due to the fraud and to pass them on to national creditors, whereas it could also choose to let the local subsidiary fail.

In a resolution procedure, resolution authorities have the flexibility to apply one or more of the resolution tools discussed in Section 4.1; however, for groups, the preferred resolution approach (SPE vs MPE) will have an impact on that choice. While the bail-in tool can be applied easily both at the level of the parent or holding company and at the level of the separate legal entities, the other tools depending on the circumstances may not display such flexibility. For instance, if only one business line of an operating subsidiary is subject to difficulty, the transfer of the business line to an asset management vehicle will take place at the level of the legal entity – instead of at the level of the parent or holding company – implying that it should be carried out by the local resolution authority.

In practice a resolution strategy will combine features of both SPE and MPE strategies. The choice of a resolution strategy actually involves determining the level of losses that could be up-streamed by a subsidiary to its parent company under an SPE strategy. Above that level of losses, which can be legally enforced, there is no certainty that the SPE strategy would continue to work. For instance, because of the no creditor worse off principle, the debtholders of the parent could require that losses exceeding the pre-agreed level be absorbed at the level of the local entity, thereby triggering an MPE

(1) See also BBVA, *Regulation Outlook: Compendium on resolution strategies: a multiple-point of entry view*, December 2014, p. 4.

resolution. The choice of a resolution strategy is thus more a calibration exercise than the choice of one single strategy that could be applied in every crisis situation.

4.3 Determining the level of liabilities eligible for bail-in : MREL

When determining the liabilities that could potentially be subject to bail-in, reference is generally made to the capacity to absorb losses, or the LAC. In the FSB context, which is focused on global systemically important financial institutions (G-SIFIs), the required amount of LAC is formulated as the Total Loss Absorbing Capacity (TLAC). At European level the BRRD, which applies to all credit institutions and investment firms, makes reference to Minimum Requirements for Eligible Liabilities (MREL). Both the FSB and the BRRD acknowledge that in order for an institution to be effectively resolved without access to taxpayer funds, a sufficient amount of LAC needs to be available.

Although the objectives of MREL and TLAC are similar, several aspects of their specification appear to differ. For example, the FSB foresees a common minimum level of TLAC for G-SIFIs (namely 16-20 % of an institution's RWA or at least twice the minimum leverage ratio, i.e. 6 %), whereas the BRRD does not explicitly specify a minimum level but does implicitly set a minimum of 8 % of the institution's total liabilities, since the Resolution Fund cannot be used until 8 % of the institution's liabilities have been bailed in. As to the scope, the TLAC only applies to G-SIFIs, while the MREL applies to all European credit institutions and investment firms. Another difference between TLAC and MREL is that TLAC will be defined in terms of an institution's risk-weighted assets, while MREL is defined in terms of the institution's total liabilities. While the TLAC should be essentially subordinated, this does not seem to be a requirement for the MREL. Whereas the TLAC should be composed of at least 33 % long term unsecured debt (i.e. longer than one year), this is not foreseen for the MREL. Finally, whereas MREL must become effective as of January 2016, TLAC will not take effect before January 2019.

Whether the TLAC or MREL is held at the parent or holding company level or at the level of the different legal entities within the group will depend upon whether an SPE or an MPE strategy has been adopted. With an SPE strategy, the level of MREL/TLAC will need to be sufficiently high at the parent or holding company, whereas with an MPE strategy, every legal entity of the group will need to have sufficient MREL/TLAC to cover its likely losses. The BRRD requires both individual institutions and EU parent undertakings to comply with the MREL requirement.

Regardless of the chosen strategy, the LAC should ideally consist of equity or long-term debt and should not be held disproportionately by other financial institutions, in order to avoid contagion across the financial system associated with debt write downs for a given institution. In addition, because of the No Creditor Worse Off-principle (NCWO) as discussed below, it is advisable that the debt subject to write-down ; i.e., that is designated as LAC or that is eligible as MREL, respects the creditor hierarchy that would exist in an ordinary liquidation of the institution. While this is recognised in the TLAC, which should be essentially subordinated, one may question whether the MREL also offers the same level of confidence, given that some debts eligible for MREL rank *pari passu* with some purely operational debts.

4.4 Bail-in and the principle of no creditor worse off

The use of resolution tools, in particular bail-in, may result in the position of a creditor being worse off than would have been the case if the institution had undergone a winding-up under normal insolvency proceedings. The NCWO-principle is one of the general principles governing resolution. The FSB Key Attributes acknowledge the principle that no creditor should be worse off in resolution than in liquidation. The BRRD also stipulates that the choices made during resolution must not violate the NCWO-principle. Moreover, as already mentioned above, the BRRD explicitly foresees, as a general principle governing resolution, that shareholders of the institution should bear losses first and that its creditors should bear losses after the shareholders but in accordance with the order of priority of their claims in normal insolvency proceedings. This principle is standard in bankruptcy frameworks and will likely play an important role in resolution since, although relatively easy to express, it appears less easy to actually apply in practice.

Under the NCWO-principle, and in order to ensure an effective and orderly resolution, creditors will receive compensation for any losses suffered in resolution that exceed the losses they would have been expected to experience in a liquidation procedure.[1]

This means that when exercising their resolution powers, resolution authorities will have to respect the hierarchy of claims in liquidation.[2] Therefore, creditors that are lower in the ranking should be bailed in before creditors with a higher ranking in the creditor hierarchy. However, as already mentioned above, the BRRD excludes some liabilities *per se* from bail-in. In addition, resolution authorities may in exceptional circumstances also exclude certain liabilities on a discretionary basis, yet they must still respect the NCWO-principle.

Chart 2 describes the tension between bail-in and the NCWO-principle. The left-hand column illustrates creditor hierarchy in liquidation, while the right-hand column reflects the sequence applied in bail-in. Since the BRRD foresees that some senior unsecured liabilities must be excluded from bail-in (e.g. interbank liabilities with an original maturity of less than seven days) and others may be excluded (e.g. derivatives, corporate deposits or retail deposits above 100.000 euros), a tension is created between bail-in and NCWO. Indeed, when combining these *per se* and discretionary exclusions with the NCWO-principle, the chart shows that bail-in and NCWO only seem to be reconcilable if the amount of losses does not exceed the amount of capital instruments (on which the NCWO-principle has no adverse effect); or the amount of losses in resolution is lower than the amount of losses in liquidation, which could be difficult to ascertain both before and after a resolution procedure. Another way to address the potential tension between bail-in and NCWO is to better align the hierarchy in insolvency on the bail-in sequence, as proposed in Germany, where a draft law transposing the BRRD includes a statutory subordination of senior unsecured debt in the event of liquidation, by rendering senior bonds issued by German credit institutions subordinated to other creditors.

5. Resolvability assessment

The obligation for the resolution authority to undertake a resolvability assessment of financial institutions is an element of the FSB Key Attributes and is also mandated by the BRRD. The elements of the resolvability assessment are further elaborated in the EBA Final Draft RTS on the content of resolution plans, which introduces four stages to make such an assessment. First, an assessment of the feasibility and credibility of liquidation under normal insolvency proceedings should take place. Second, if liquidation is found to be neither credible nor feasible, a preferred resolution strategy (SPE vs MPE for groups, and for all institutions the potential resolution tools to be used) should be determined. Third, an assessment of the feasibility of the selected resolution strategy should be undertaken. Last, the credibility of the selected resolution strategy must be assessed.

The BRRD ensures a dialogue between financial institutions and the resolution authority concerning the means of addressing any identified impediments to resolvability[3]. If the resolvability assessment reveals impediments to resolvability for a given institution, the resolution authority will, as a first step, require the institution to propose possible measures to address the impediments. If the measures proposed by the institution do not effectively reduce or remove the impediments, the resolution authority may then require the institution to take specific measures, which may range from modifying intra-group financing agreements or limiting individual or aggregate exposures to more far-reaching and intrusive measures, such as requiring divestment of specific assets or a limit or halt to certain activities. The resolution authority's powers in this regard may even go as far as requiring changes to the institution's legal or operational structure and the establishment of a parent financial holding company. Since these measures can be applied even before the conditions for resolution are fulfilled and since some of them are quite intrusive, they will require careful consideration. Hence, before imposing a measure on a given institution, the resolution authority should also consult with the competent authority and, if appropriate, with the macro-prudential authority as well.

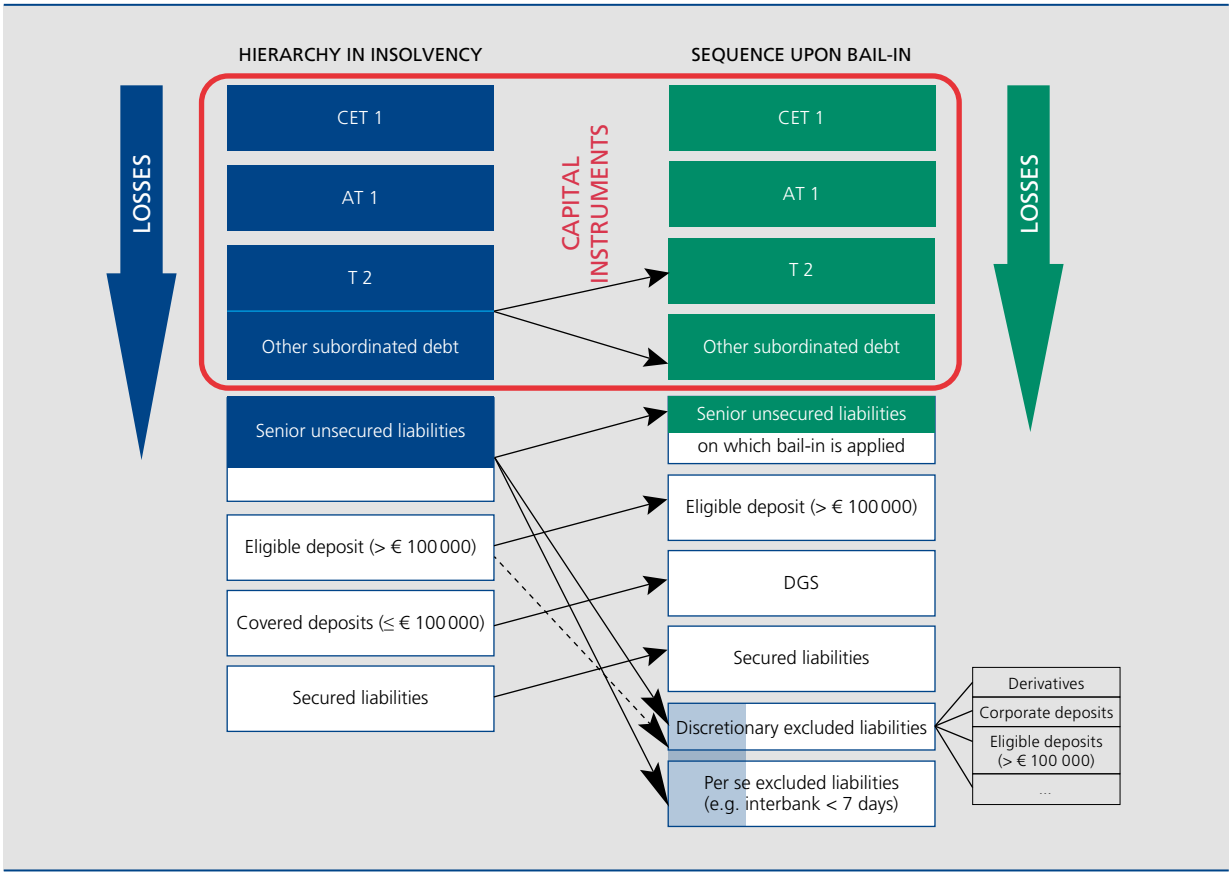
While the establishment of resolution plans and resolvability assessments represents a promising step forward in improving the ability to deal with credit institutions in crisis, it should nevertheless be kept in mind that the resolution

(1) A similar mechanism is foreseen in the FSB Key Attributes (Financial Stability Board, *Key Attributes of Effective Resolution Regimes for Financial Institutions*, 15 October 2014, nr. 5.2, p. 11). BBVA, *Regulation Outlook: Compendium on bank resolution regimes: from the FSB to the EU and US frameworks*, June 2014, p. 8-9.

(2) See Financial Stability Board, *Key Attributes of Effective Resolution Regimes for Financial Institutions*, 15 October 2014, 3.5.

(3) See also European Banking Authority, *Guidelines on the specification of measures to reduce or remove impediments to resolvability and the circumstances in which each measure may be applied under Directive 2014/59/EU*, EBA/GL/2014/11, 19 December 2014.

CHART 2 TENSION BETWEEN BAIL-IN AND THE NCWO-PRINCIPLE



framework is relatively new and is still being set up in many countries. A sound legal basis now exists at European and national level for efficient planning for resolution for credit institutions. It will nevertheless be crucial for authorities to effectively apply the new powers and competences assigned to them and to effectively foresee crisis scenarios to which institutions could be subject. For some institutions or groups, resolution plans have already been drafted and will be negotiated in the coming months in the resolution colleges. Although it is impossible to take into account *ex ante* all potential types of crises or to plan for all potential remedies in advance, the resolution plan nonetheless offers a tool to resolution authorities at least to have some different options on the table. In addition, resolution authorities may be able to remove at least some impediments to resolvability, thereby facilitating an actual resolution event.

Conclusion

This article describes the new framework of recovery and resolution that has been established by the European Bank Recovery and Resolution Directive to help prevent financial crises or better manage them if they occur. Recovery and resolution plans help both financial institutions and authorities prepare for severe shocks and crisis situations, through analysis of institutions' vulnerabilities and identification of the options available to redress the institution's health following a shock or to handle a bank failure if necessary.

The BRRD has also led to the establishment of resolution authorities, which are distinct and independent from supervisors. New powers have been attributed to these authorities to deal with failing institutions. These powers should help authorities to deal effectively with failing banks, allowing them to fail while maintaining the performance of their critical functions and avoiding recourse to taxpayer funds.

Although recovery plans are drafted by banks and resolution plans are drafted by resolution authorities, these two documents may be more closely linked in practice than might appear at first glance. Indeed, the recovery options in banks' recovery plans that would imply the sale or disposal of activities or business lines frequently pertain to activities that do not represent critical functions. Moreover, in identifying their potential recovery options, banks often consider the sale of all non-critical activities. This identification on the part of the bank of its non-critical activities can then facilitate the task of the resolution authority in identifying the bank's critical functions.

The drafting of recovery and resolution plans and the functioning of resolution authorities are still at an early stage. They offer the hope that in any future crisis the burden on taxpayers and the associated burgeoning of government debt can be avoided.

The role of central clearing in systemic risk reduction

Steven Van Cauwenberge

Introduction

Potential counterparty and liquidity risks in the derivatives market are still a focal point for the regulators and supervisors. In a bid to better manage these risks, the G20 countries agreed, back in 2009, on mandating the use of a central counterparty (CCP) for clearing standardised over-the-counter (OTC) derivatives trades. As a CCP is systemic by definition and as CCPs will get a monopoly on the clearing of these products, at least collectively, the central counterparty's ability to manage the ensuing risks is crucial. Worldwide, and in the EU in particular, the increasing concentration of risk with central counterparties called for tougher risk management requirements for CCPs, as well as for closer supervision.

Box 1 provides an overview of the relevance of the biggest EU CCPs, based on their 2014 clearing activity. For the European Union at least, Eurex Clearing in Frankfurt, LCH.Clearnet Ltd in London and LCH.Clearnet SA in Paris can be considered the most relevant ones, given their share in clearing activity for listed derivatives, OTC derivatives and repos. Currently, there is no CCPs established in Belgium, but EU CCPs do clear Belgian markets, have Belgian clearing members and use Belgian CSDs to settle.

Box 1 – Clearing activity in selected EU CCP

While listed derivatives are standardly cleared by a central counterparty, their outstanding notional amounts – 6,300 billion euro per end 2014 in Europe – are dwarfed by their OTC counterparts. Nowadays, the main OTC derivative product categories cleared by CCPs are interest rate or credit default products. While this is less the case for exchange-listed derivatives, OTC derivatives markets can be considered as worldwide markets. The clearing activity of these OTC trades tends to be concentrated in the hands of a few CCP. Mid 2014, the worldwide outstanding notional amount in interest rate swap contracts (IRS) and forward rate agreements (FRAs) – that accounts for 75 pct. of the overall OTC derivatives market activity – came to 375,000 billion EUR (in EUR equivalents)[1]. According to the end 2014 data provided by the London based CCP LCH.Clearnet Ltd, its SwapClear service cleared 50 pct. of all OTC IRS, and even 95 pct. of the contracts cleared by a CCP. As for CDSs, the worldwide outstanding notional amount comprised 14,300 billion EUR mid 2014, with around 3,500 billion being centrally cleared[2]. By

(1) Source: BIS data.
(2) Source: BIS and FSB data

the end of 2014, the outstanding amount of CDS cleared by the London based CCP ICEClear Europe had reached 500 billion in EUR equivalent, compared to 800 billion EUR for its US based sister CCP, and 37 billion EUR for the Paris based CCP LCH.Clearnet SA.

TABLE 1 LISTED AND OVER-THE-COUNTER DERIVATIVES CLEARING VOLUMES IN MAIN EU CCP
(notional amounts outstanding end 2014, in € billion)

	Listed options & futures		OTC derivatives	
	Interest rate	Equity	Interest Rate Swaps and Forward Rate Agreements	Credit Default Swaps
LCH.Clearnet SA (PAR)			n.a.	37
LCH.Clearnet Ltd (LDN)			147 500	n.
ICEClear Europe (LDN)			n.a.	500
Europe	5 800	479		

Source: Futures Industry Association volume studies 2014, BIS

As regards secured euro lending, mainly repo-trades, the European Union market turnover amounted to an estimated 120,000 billion euro over the year 2014. Overall, around 75 pct. of these trades were CCP-cleared[(1)]. The CCP-clearing of repo-trades is quite heavily concentrated as can be seen from the table 2 containing the 2014 repo-trades volumes (over all currencies) cleared by Eurex Clearing, and the fixed income volumes cleared by LCH. Clearnet Ltd (including the RepoClear service) and LCH.Clearnet SA. The total value of repo contracts (over all currencies) outstanding amounted to 5,500 billion euro in December 2014[(2)].

TABLE 2 REPO CLEARING VOLUMES IN MAIN EU CCP
(cleared volumes over 2014, in € billion)

CCP	Cleared volume[(1)]
Eurex Clearing (FFT)	102 000
LCH.Clearnet SA (PAR)	65 000
LCH.Clearnet Ltd (LDN)	81 000

Sources: Eurex Clearing Monthly clearing volumes, LCH.Clearnet Fixed Income volumes 2014.
(1) Trade (gross) volumes are double counted due to the CCP interposition.

(1) Source: ECB Euro Money Market Survey 2014 (second quarter data) of 17 October 2014.
(2) Source: December 2014 European repo-market survey of the International Capital Market Associaiton. This survey can not readily be compared with the ECB Money Market survey, as they differ with regard to the reporting entities and the reported business.

In this article, we look at how the use of a central counterparty (CCP) compares to bilateral clearing arrangements, what the goals and advantages of CCP clearing are, and how CCP risks are managed, both by the CCP itself and by its users. The introduction of the mandatory use of a CCP for standardised derivatives contracts further concentrates the risk with CCPs and heightens the need for a stringent risk management. EU CCPs are now required to be able to withstand the simulateneous default of their two biggest clearing members under extreme but plausible market conditions, and to cope with the solvency and liquidity risks thereof. Even so, CCPs are not to be considered risk free institutions and their resilience remains a point of attention. For the first time, capital requirements have been set for exposures of financial institutions to EU CCP. Also, a legislative initiative is underway to set minimum standards for enabling the recovery, or if needed, the orderly resolution of a CCP in case the CCP itself would encounter difficulties. Lastly, we look at how the National Bank of Belgium is involved in the supervision of a number of EU CCPs via its participation in their supervisory colleges.

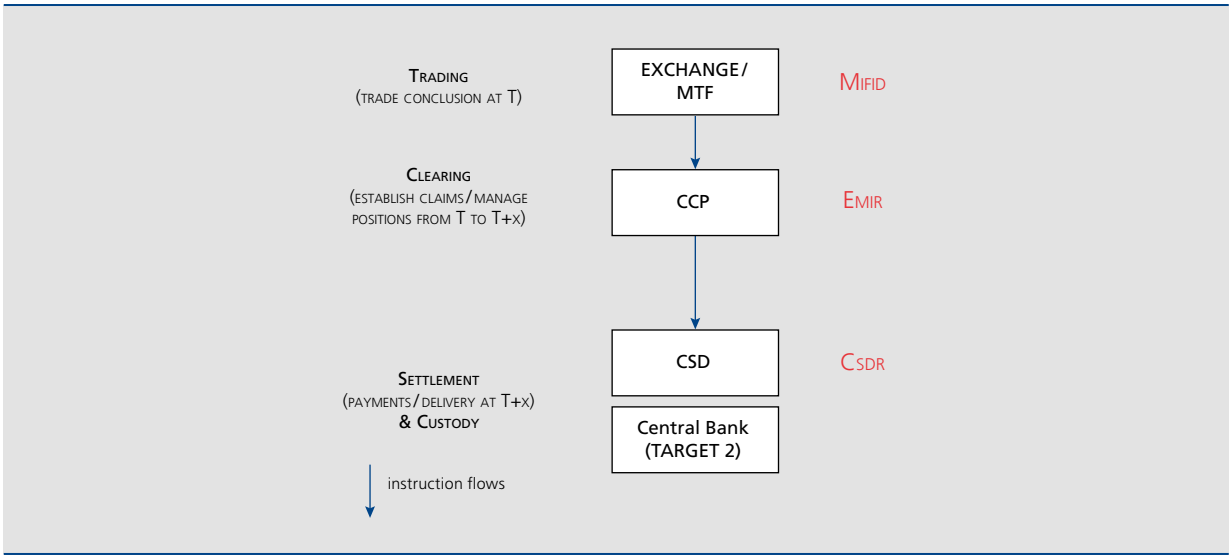
1. Central clearing in the "value chain"

The processing chain of a transaction in a financial instrument involves the successive "value chain" stages of trading, clearing and settlement. After the conclusion of a transaction, the parties will settle the trade. In between the time that trading and settlement occur, clearing takes place. This may involve the intervention of a central counterparty, though this is not strictly necessary.

A trade in a financial instrument is concluded between a buyer and a seller by agreeing the price and the contract terms. *Trading* can occur on-exchange, i.e. in a centralised market infrastructure designed to optimise the price-discovery process and to concentrate market liquidity, and where the trading usually takes place anonymously. Markets can also function bilaterally or over the counter (OTC), whereby the counterparties make the bid and accept the offer to conclude contracts directly among themselves. In both cases, buyer or seller members are usually banks or investment firms. They can act for their own account (for instance, as a market maker) or for their clients' account (for investment funds, or for an individual end investor, for example).

The *clearing* of a trade generally means that the obligations of the buyer and the seller are established. The counterparty risk that the buyer and seller incur vis-à-vis each other from the outset up until the maturity of the contract can be

CHART 1 CCP IN THE VERTICAL FMI VALUE CHAIN



For the European Union, regulatory requirements related to the functioning of the trading markets, including whether a requirement to trade on-exchange will apply, and on the market participants' obligations are set out in the Directive on Markets in Financial Instruments (MiFID I & II) and the (draft) Regulation on Markets in Financial Instruments (MiFIR). Furthermore, the EU requirements that relate to the functioning of a central counterparty, including whether the use of a CCP is compulsory, and market participants' obligations are set out in Regulation 648/2012 of 4 July 2012 (the so called "EMIR" Regulation). Finally, the EU requirements concerning the functioning of payment and settlement systems, including whether the use of a CSD is mandatory, and market participants' obligations are set out in the ECB Regulation 795/2014 of 3 July 2014 on oversight of systemically important payment systems and in Regulation 909/2014 of 23 July 2014 on securities settlement (the so-called CSD Regulation).

standardised via the intervention of a CCP. That way, the CCP becomes the buyer counterparty for the seller and the seller counterparty for the buyer. Legally speaking, this CCP interposition occurs via novation[1]. Both original counterparties then have a claim on the CCP. Besides standardising the risk of the counterparties, CCP interposition allows counterparties to trade on an anonymous basis, as the credit risk profile of the original trade counterpart is no longer relevant to set the price. This is clearly relevant for contracts with a long duration; OTC IRS for example are concluded with a maturity of up to fifty years. But even for contracts with a shorter maturity, CCP intervention is relevant in stressed and volatile markets.

After conclusion of the trade, settlement has to take place. *Settlement* is the transfer of cash and/or of a financial instrument between the parties. In the case of a cash market trade, this implies that the seller has to deliver the securities to the buyer and the buyer has to pay the agreed price to the seller. This usually takes place on a rolling basis two or three days after the trade day. In the case of a derivative instrument, settlement usually occurs not via delivery of the underlying instrument but with a mere cash payment representing the loss incurred or profit made. When a CCP has intervened, settlement takes place between the buyer and the CCP, and between the seller and the CCP. Settlement can take place in dedicated financial market infrastructures of which the CCP is a participant itself. In that case, the securities are settled in a central securities depository (CSD), while the cash is transferred in a payment system such as Target2.[2]

Market participants can be either direct or indirect participants from a financial market infrastructure (FMI). At trading level, they can go through a trading member to conclude a trade while at settlement level they can use the services offered by a payment agent (that processes the cash payment of a trade) or a custodian (that also handles the securities leg). These intermediaries are themselves direct participants of the exchange or of the payment system – in the Euro-zone in most cases, TARGET2 – or the CSD/SSS. The direct participant of a CCP – usually a bank or an investment firm – is called a clearing member (CM). The clearing member may clear not only its own trades via the CCP, but also those of its clients. Clients can be banks or investment firms themselves, or buy-side firms such as investment funds. Even when a clearing member clears for a client, this member is still a counterparty and guarantor vis-à-vis the CCP, as the clearing member' binds itself vis-à-vis the CCP on behalf of the buyer – or, alternatively, for the seller. The chart below presents this relationship. In practice, longer clearing chains may be in place, whereby a direct clearing member clears for an indirect clearing member that in turn clears on behalf of its client.

CHART 2 HORIZONTAL CLEARING CHAIN

2. Bilateral clearing

To give an indication of the extent to which a central counterparty enhances the risk management of outstanding positions between counterparties, one can take the bilateral clearing situation – i.e. where clearing takes place with no CCP intervention – as a benchmark on which further risk management enhancement is based. Bilateral clearing involves both the establishment of claims between the counterparties and the management of the exposures.

The *establishment of claims* is in part an operational activity. A straightforward component of this aspect of clearing concerns the prompt confirmation of the conclusion of a trade or of its novation. In the mid-2000s, for instance, backlogs in confirmation posed a problem in the then fast-growing credit default swaps (CDS) market. In the absence of any confirmation, the validity of the contract or its terms might be disputed. A further aspect of clearing is contract

(1) Novation is the act of replacing one or more participating member of a contract with another, and/or the exchange of new debts or obligations for older ones.
(2) Target2 is the interbank payment system for processing euro cross border transfers in the EU via central bank cash accounts.

or position netting. Contracts can be set off bilaterally between the original counterparties whereby they are replaced with new contracts representing the same positions. Counterparties can also look for a third party to intervene, usually a prime broker[1]. The prime broker becomes a counterparty to the trade after its conclusion, by intervening between its client and the counterparty with which the client concluded the trade. The client can only give up, i.e. transfer, trades with selected counterparties accepted by the prime broker. By delivering this clearing service, the prime broker acts as a kind of mini-central counterparty. The client centralises all its trades with one counterparty – its prime broker – so that he can subsequently net and set off its positions bilaterally with the prime broker, and benefit from the ensuing diminishing collateral requirements, for instance. Finally, the establishment of claims does benefit from a regular reconciliation of outstanding positions. Third parties offer these services, referred to as "portfolio reconciliation" services.

The second component in bilateral clearing is the *management of exposures*. Broadly speaking, this can be done either via collateralisation of exposures or via capital reservations. In the case of collateralisation, the residual exposures to be collateralised are calculated. This margin calculation can be done on a portfolio basis, whereby the assumptions used as regards correlation between products or even product classes, determine the outcome of the calculation. Margining has two components. The so-called variation margin represents unrealised profit or loss on the contract/portfolio, calculated by its mark-to-market value. While not (yet) realised, the loss or profit is incurred at the very moment of its calculation. The initial margin component represents the future exposure of the contract or portfolio to changes in market prices. This future exposure is calculated over the liquidation period, i.e. the time needed to hedge or close the position in the market. The length of that period depends on the product involved, and will generally be shorter for liquid financial instruments. The margin obligation is fulfilled via the transfer of collateral. Under the assumption that the collateral is, in the event of default, held in a bankruptcy-remote way, collateralisation constitutes a "defaulter pays" mechanism. The collateral is in fact provided upfront by the defaulter and is assumed to be sufficient to cover any losses incurred. Both the quality and the liquidity of the collateral provided are relevant; to cover exposure to these risks, securities collateral is routinely given "haircuts". The second mechanism used to manage exposures is the use of capital requirements.[2] Capitalisation is a "survivor pays" mechanism, as the party that incurs the loss in this case is the surviving counterparty of the defaulter that uses its reserved capital to cover that loss. As opposed to collateral, capital reserved does not target any specific position of a predetermined counterparty, nor is it intended to cover all potential losses on positions over all counterparties that could be incurred during the set liquidation period.

3. Goals and advantages of CCP clearing

Generally speaking, a CCP reduces the overall risk via legal risk enhancements, increased transparency, operational risk reduction and, last but not least, an enhanced counterparty risk management. We look at each of these components.

3.1 Legal risk enhancements

Central counterparty clearing enhances the legal safety of clearing in a number of ways Firstly, the CCP's rulebook that stipulates the contractual framework for the provision of clearing services constitutes an adhesion contract that equally and uniformly binds all its clearing members. Secondly, within the EU at least, a central counterparty is considered to be a system that has to be designated by its home Member State under the Settlement Finality Directive, implying that the netting and finality rules set out in the CCP's contractual framework can be enforced against third parties too. The CCP is a protected "system" under European Community law, and its arrangements, specifically its default handling rules, have precedence over EU or national bankruptcy law. One of its elements consists of the CCP's mandatory practice to segregate in its books the positions and the related collateral of the clearing member from those of the clients of that clearing member. This in turn allows the CCP to port the clearing member's client exposures and related collateral to another clearing member in the event of that clearing member defaulting

(1) Prime brokerage is the generic name for a bundled package of services offered by investment banks and securities firms, most frequently to hedge funds and other professional investors. Prime brokers offer financing or collateral services, via securities and cash-lending facilities, and provide clearing services for contracts in financial instruments.

(2) Minimum level capital requirements are imposed for financial institutions, for example via the banking regulation, but are not applied for all categories of market participants.

3.2 Increased transparency

The use of a CCP rulebook first of all implies that the contract terms under which the CCP provides its clearing services are public, and are thus not only known to the clearing members, but also to their clients and other market participants. In that respect, the CCP's working rules and its risk management framework are transparent.

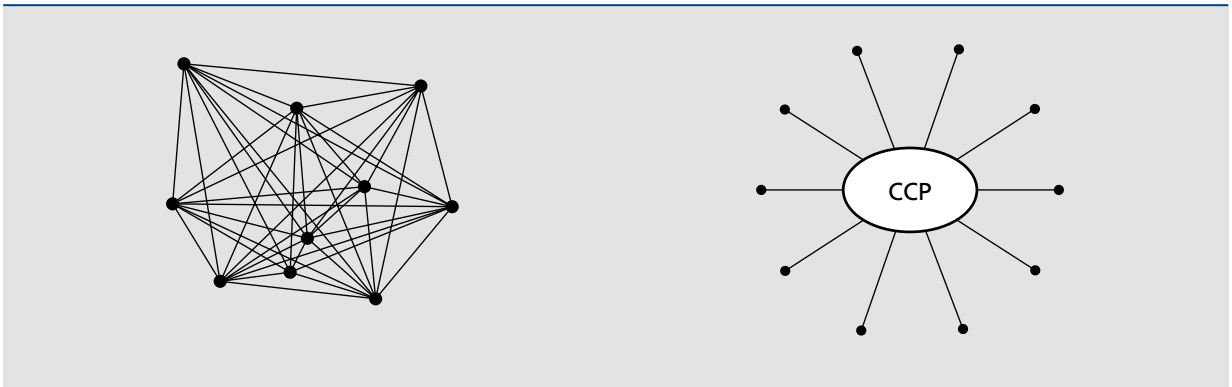
Besides, the use of a CCP enhances market liquidity at trade level. It can be argued that the obligation to use a CCP leads to either wider use of standardised contracts or to the "standardisation" of the terms of existing but not yet centrally cleared contracts, thus making these more apt to be also centrally cleared. The use of a CCP also allows pre-trade anonymity, as the counterparty risk is ultimately a risk on the CCP and thus standardised as regards the counterparty to the trade, whereby price discrimination in this respect is no longer needed, nor even possible. The ensuing enhanced market liquidity facilitates the price discovery process for these contracts, and subsequently, makes it easier to value a position in the contract appropriately.

Finally, a CCP will also be an instrument to enhance post-trade market transparency. To that end, it has to publicly disclose the aggregate volumes and open interest positions of the contracts it clears, together with the relevant price information.

3.3 Operational risk reduction

Even in the absence of a clearing obligation, clearing members use a CCP because the overall risk monitoring and managing benefits are greater than in cases where a CCP does not intervene. A CCP has an information advantage to gain some insight into the outstanding risk as the CCP centrally follows up the risk positions. The tiered network structure with the CCP in the middle makes clearing operationally more efficient. The use of a CCP reduces the number of exposures and clearing relationships to manage. The chart below, representing the clearing relationships among ten clearing market participants with and without a CCP, makes clear to what extent things are made operationally less burdensome. For ten market participants, the clearing relationships that need to be managed decrease from 89 to 10.

CHART 3 CLEARING RELATIONSHIPS WITHOUT AND WITH A CCP

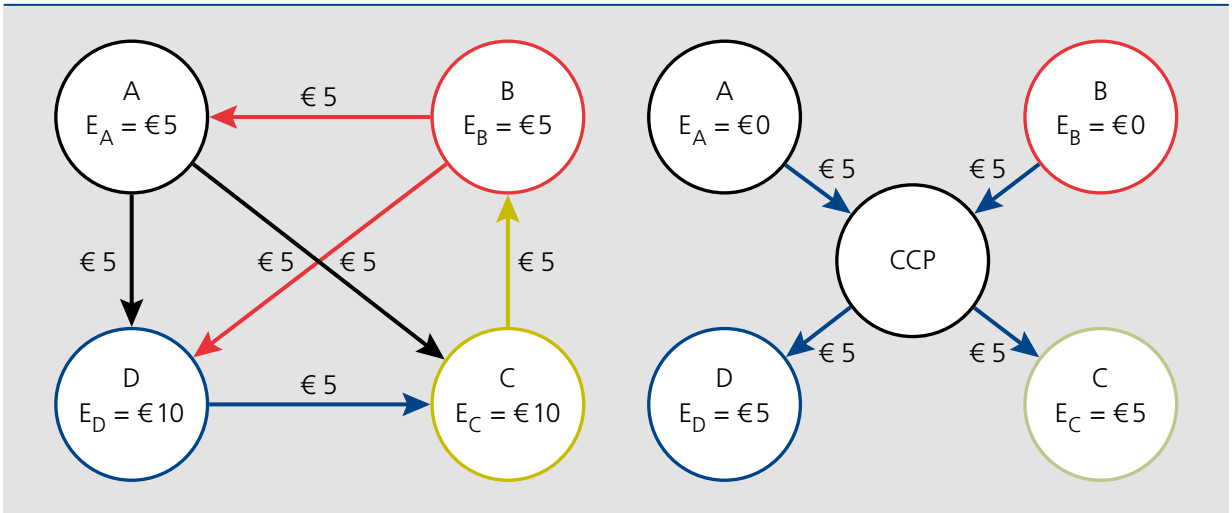


A clearing relationship involves multiple operational tasks. The CCP provides its clearing members with reports that detail the trade information and the outstanding positions that counterparts have to reconcile and the related margins that are to be covered via margin calls. A CCP can also more easily arrange that novation (i.e. CCP intervention) occurs in real time. Overall, an important element of the CCP operation is its ability to cope efficiently with "business continuity" standards. A CCP has to comply with a minimum two-hour recovery time objective and its recovery site has to have a distinct risk profile from the first site.

3.4 Enhanced counterparty risk management

Managing the counterparty risk on the outstanding trades is the main reason for the CCP's intervention and the domain where the advantages of CCP clearing are most pronounced. Under bilateral contractual netting, counterparties remain exposed to the financial soundness of their own counterparties, which can of course have differing credit risk profiles. Under a ring arrangement (also called "portfolio compression" arrangement), counterparties belonging to the ring agree that they will accept each other as substitutes for the original counterparties to the trade[1]. Even after substitution, the (substituted) individual counterparties, that still have different risk profiles, remain mutually responsible. In a CCP scheme, all clearing members now have a direct claim on the CCP only. Also a CCP makes it possible to efficiently net obligations multilaterally, via a bilateral set-off of the contracts between the intervening CCP and each clearing member. A CCP thus allows enhanced contractual netting, or alternatively, enhanced position netting. This netting usually leads to a reduction in the overall outstanding exposures, as the gross contract amounts or the gross positions are replaced by net contract amounts or positions.

CHART 4 CONTRACT NETTING WITHOUT AND WITH A CCP



The arrows represent obligations from one party towards the other. An arrow from A to D means that A has the obligation to pay or deliver € 5 to D. Therefore, D has an exposure of € 5 on A (incoming arrow for D).

By acting as an intermediary, the CCP standardises the counterparty risk as it ultimately takes on the counterparty risk itself. Also, a CCP enhances the management of that counterparty risk. A CCP is a "single-purpose" entity, providing clearing services and nothing else, something which distinguishes it from, for instance, prime brokers that also have other activities, such as lending or own position-taking. In the absence of a clearing member default, a CCP has a "matched book" : its net CCP position – consisting of the sum of the positions of the CCP over all its clearing members – is zero. This matched book is nonetheless lost in the event of a clearing member defaulting. The CCP requires the collateralisation of its exposures vis-à-vis its clearing members to cope with this eventuality. The calculated margins include both variation margin payments that cover incurred profits or losses, and initial margin payments, that cover potential future price changes. These margins are due by each clearing member as coverage for the trades it clears. A further loss coverage mechanism consists of the default fund. Here all clearing members contribute to the default fund to cover the obligations that another defaulting clearing member has vis-à-vis the CCP. Via this fund, the clearing members mutualise losses amongst each other. Finally, the CCP has clear and pre-established clearing member default-handling procedures.

(1) Under a ring arrangement, the counterparties belonging to the ring do accept each other as substitutes for the trade, i.e. they consider their respective counterparty credit risk profiles as interchangeable, abstraction being made of concentration concerns. Portfolio compression is a more developed kind of ring arrangement whereby the multilateral netting can occur across participants with a different credit standard whereby the substitution with a less creditworthy counterparty is compensated via an upfront payment. Both ring and compression arrangements go beyond mere multilateral netting, in that the contracts themselves can be substituted by a contract with distinct terms provided that it represents the same position. For example, a 10-year IRS and a 9-year opposite IRS may be cancelled out, provided compensation is paid (representing the actual value of the future one-year IRS) and provided the counterparties have indicated their acceptance to cancel out their swap positions.

4. CCP Risk management and EMIR

Back in 2009, the G20 leaders sought to strengthen the safety and transparency of the derivatives markets through a significant regulatory initiative. The crisis had shown that the opacity of the over-the-counter derivatives market in particular was one of the causes of the valuation problems encountered and of the miscalculations as regards market liquidity and counterparty risk. With the overall aim of reducing systemic risk, the G20 agreed that, wherever appropriate, standardised OTC derivative contracts should not only be traded on exchanges or electronic trading platforms, but should also be cleared through central counterparties. Besides, all derivative contracts should be reported to trade repositories. Finally, non-standardised derivative contracts that could not prudently be centrally cleared should be subject to both higher capital requirements and to bilateral margining requirements. As a result of the G20 decision, regulatory and legislative changes were introduced worldwide. In the US, under the Dodd-Frank legislative umbrella[(1)], a clearing obligation was introduced, while in the European Union, the EMIR Regulation was adopted.

A CCP is by definition a systemically important FMI: a CCP standardises the risk but also concentrates it. The relevance of CCPs in this respect increased with the measures taken worldwide as a follow-up to the credit crisis. Mandatory central clearing for standardised contracts, together with collateralisation and higher capital requirements for non-centrally-cleared contracts are set to become the cornerstones of the new derivatives risk management. At EU level, EMIR sets a clearing obligation for standardised OTC derivatives and its implementation for standardised OTC interest rate derivatives, credit default swaps and – likely – FX non-deliverable forwards are expected to enter into force from late-2015 onwards.

As a correlation to the imposition of mandatory CCP clearing, EMIR sets strict CCP risk management requirements and requires the recognition and ongoing supervision of CCPs. The EMIR requirements are based on the CPSS-IOSCO[(2)] *Principles for Financial Market Infrastructures* (PFMI) that were published in April 2012 as an international reference point. Even though the market has not witnessed any massive problem with a CCP, the financial crisis prompted regulators to take a prudent stance by setting even stricter CCP requirements.

The box below provides a general overview of the EMIR risk management requirements for CCPs. We then take a closer look at a selection of the most relevant CCP risk management techniques and requirements.

Box 2 – Main CCP risk management requirements under EMIR

- Organisational requirements (Art. 26-35 EMIR), incl.
  - Mandatory risk committee – with clearing member/clients participation with an advisory role
- Conduct rules (Art. 36-39), incl.
  - Participation requirements based on the operational and financial capacity of the clearing member.
  - Segregation of assets and positions and Portability to back-up clearing member via
    - Clearing member own account / Client omnibus account – segregation; or
    - Individual client account segregation (optional)
- Prudential requirements (Art. 40-50), incl.
  - Capital requirements (incl. for recovery/orderly winding down of CCP) (Art. 16)
  - Variation Margin (VM) & Initial Margin (IM)
  - Default Fund (DF) – clearing member mutualisation
  - Collateral requirements
  - Waterfall & Default handling procedures
  - Liquidity, investment, settlement asset requirements

(1) The legislation governing the clearing obligation can be found in Title VII of the Dodd-Frank Wall Street Reform and Consumer Protection Act of 21 July 2010. This elaborate piece of federal legislation made changes in the American financial regulatory environment affecting almost every part of its financial services industry. Its aims include promoting the financial stability of the United States by improving accountability and transparency in the financial system, to end the «too big to fail» scenario, to protect the taxpayer by preventing bail-outs and to protect consumers from abusive financial services practices.

(2) This is, the Committee on Payments and Settlement Systems, now the Committee on Payments and Market Infrastructures (CPMI), and the International Organization of Securities Commissions.

4.1 CCP risk management – Selected topics

4.1.1 CCP risk management – Counterparty risk management

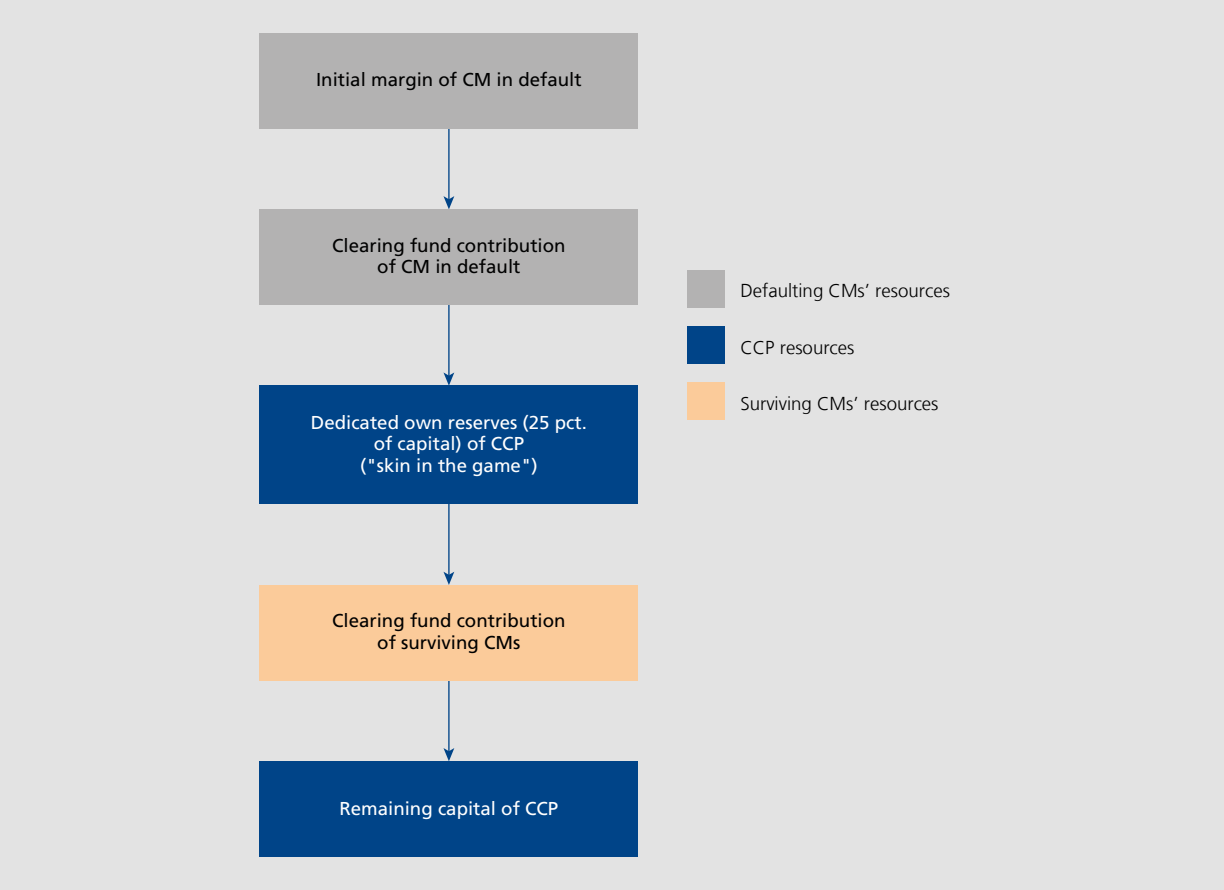
The basis of the CCP's counterparty risk management consists of the collection of variation and initial margins and default fund contributions.

The collection of *variation margin* typically occurs daily. Contracts are marked-to-market and the net profits or losses are transferred between the CCP and its respective clearing members. Variation margin flows can go both ways, from the clearing member to the CCP, or vice versa, and the net flow is calculated over all outstanding positions. It limits the build-up of exposures over the contract's life. Position measurement and the ensuing margin calculation should occur continuously. In the event of substantial position or price changes, the CCP has the ability to call margins intraday.

Initial margin is collected "one-way" by the CCP from the clearing member. The collected amount is intended to cover the potential future exposures on a contract, or on a portfolio of contracts, over the "liquidation period" – i.e. the period needed to hedge or close that contract or portfolio – in "normal markets". EMIR sets out to what extent netting is allowed in a portfolio. It further requires that the length of the liquidation period is set in accordance with the contract type, and imposes a minimum length of two or five days respectively for on-exchange and OTC contracts. Margin add-ons are further imposed to discourage the clearing member from holding excessively concentrated positions. Further, to smoothen out the pro-cyclicality when calling margins, its calculation is to be sufficiently conservative and sudden calls or cliff effects are to be avoided.

It would not be prudent to expect that defaults will occur in "normal markets" only. To cover the CCP's exposure to so-called "extreme but plausible" markets, clearing members contribute to the CCP's *default fund*. This fund is paid up

CHART 5 CCP DEFAULT WATERFALL



upfront. It constitutes a "survivor pays" mechanism whereby clearing members mutualise losses amongst each other so as to cover the CCP's exposure to the defaulter. To size the default fund, the "cover 2 principle" applies. This means that the fund size[1] should be sufficient to cover the losses of the two biggest clearing member positions that are not covered by initial margins. Both historical "extreme but plausible" markets over the last thirty years and scenarios of such markets have to be taken into account. Each clearing member contributes to the default fund on a pro rata basis from its outstanding position. A multi-product CCP may have more than one default fund, for example one for listed products and one for OTC derivatives, as usually clearing members clearing only cash market products are not prepared to mutualise losses due to OTC derivatives clearing.

The chart 5 represents the resources the CCP disposes of to cover its obligations in case of a clearing member default. It is called the CCP default waterfall, as the layers of coverage are successively used when the preceding cover is exhausted. Before using the default fund contributions of surviving members the CCP has to contribute a quarter of its own minimum equity resources. This so-called "skin in the game" mechanism discourages the CCP from relying too easily on surviving clearing members to contribute, in using a minimum approach when setting the margin requirements. In the occurrence that the default fund might not provide sufficient cover, the CCP's remaining capital is at stake.

4.1.2 CCP risk management – Handling of a clearing member default

While the CCP needs sufficient resources to cover a member default, it also has to specify *ex ante* the procedures for handling such a default in an orderly way. The goal of the CCP is to return to a matched book, the situation prior to the clearing member default. In this way, the CCP will also minimise market distortions. To handle the default, the segregation regime is relevant. Normally, in its books, a CCP has to separate the positions and the related collateral of the clearing member from the positions and the related collateral of the joint clients of that clearing member. This is called "client omnibus segregation". The CCP also allows each client of a clearing member to hold its positions and collateral with the CCP on an individual basis, the so-called "individual client segregation". In the event of a clearing member default, the CCP will handle the own positions of the clearing member and the clients' positions differently. It will hedge the defaulting clearing member's own positions, which will subsequently be split up and auctioned off to the surviving clearing members, so as to get a matched book again. In doing so, depending on price movements, the CCP may have to pay the clearing member to take over the position, thereby using the collected margins of the defaulter or eventually the default fund contributions. Usually, the CCP rulebook ensures that clearing members are encouraged to take part in the auction. To the extent that (employees of) a clearing member will participate to handle the default on behalf of the CCP, as is generally the case for big portfolios in OTC derivative positions, the responsibility of the CCP and the default committee clearing members should be evident. If the position cannot be auctioned, it will have to be closed out anyway. On the contrary, client positions and the related collateral will standardly be ported to a surviving clearing member, assuming no client is simultaneously in default. This will always occur in case of individual segregation. In the case of omnibus segregation, all clients have to agree to be ported. Also, the (surviving) clearing member always has to agree to take over the positions. To ensure a timely transfer, this engagement can be taken upfront before any default. Client position liquidation will nonetheless occur if porting is not feasible.

4.1.3 CCP risk management – Liquidity risk management

Due to netting effects, the use of a CCP also reduces the overall liquidity needs, as the payment obligations between the CCP and its clearing member that are due at maturity or over the life cycle of the contract are also netted. Again, as a CCP concentrates risk and is systemically relevant, it is paramount that it adequately measures its liquidity requirements and has adequate liquidity back-up lines in case of need. EMIR requires CCPs to measure their liquidity needs and have a liquidity plan. *Measurement* should take into account intraday payments, both in "day-to-day" and in stress situations. Day-to-day cash transfers consist of contract settlements or life-cycle payments and margin payments, including the replacement of cash collateral with securities collateral by the clearing member. Liquidity measurement has to take into account stress situations. Here too, the cover 2 principle applies: the CCP must be able to cover its liquidity needs at all times under the assumption that the two parties having the biggest liquidity impact for the CCP simultaneously default. The liquidity plan has to be in place for each currency in which the CCP has substantial clearing

(1) It is not entirely correct to present this as an unabridged EMIR requirement, as besides the default fund, other comparable and pre-funded resources available to the CCP can also be taken into account for the "cover 2".

activity. Access to adequate liquidity for these currencies should be in the same currency as the contracts cleared. Among the possibilities listed by EMIR here are central bank cash deposits, deposits with private sector banks that are collateralised, committed credit lines or very liquid financial instruments that are readily available to the CCP for conversion in cash on a timely intraday basis and this even in stressed markets. EMIR does not require access to central bank liquidity in the currency the CCP clears. In the euro area, the Eurosystem provides TARGET2 liquidity in euro on a collateralised basis to CCPs established in the euro area. The Bank of England provides liquidity in pounds sterling for the CCPs that clear UK markets.[1]

4.1.4 CCP links

A CCP link is an arrangement whereby two or more CCPs become mutual counterparties. Eventually, several CCPs could constitute a chain in this way. It allows a market participant clearing contracts via one CCP to clear a contract with a market participant that clears via another CCP. Compared to unlinked CCPs, this brings better market liquidity, as the market in a given instrument is not split between the sub-set of participants that clear solely via one or the other CCP. As a consequence, there are more netting options for exposures held by market participants and their related collateral needs diminish. EMIR envisages that a CCP has a right to link with a CCP clearing the same product, in so far as it regards "cash market" clearing and provided there are no risk ground impediments. EMIR provides for ESMA to report back on the appropriateness of an extension of this arrangement to derivatives clearing.

A CCP link also brings risks, as it gives rise to inter-CCP exposures. Problems with one CCP may lead to contagion and problems for the other CCP. This occurs directly via the link arrangement, as opposed to indirect contagion if the two CCP have common clearing members, for instance. Given the systemically relevant nature of a CCP, EMIR establishes risk mitigation for coping with this reciprocal exposure between CCPs[2]. CCPs are required to mutually exchange initial margin, and this has to be held in a bankruptcy-remote way, both for the provider and the taker of the collateral and without any right to re-use the collateral. A link arrangement is also subject to a prior regulatory approval.

4.2 CCP recovery

In October 2014, the CPMI and IOSCO issued their final report on "Recovery of Financial Market Infrastructure", containing supplementary guidance on the April 2012 CPMI-IOSCO PFMI regarding recovery planning, including for CCPs. In the same month, the Financial Stability Board (FSB) issued a report on this topic[3]. In the European Union, the Commission is working on draft legislation in this respect. As it stands, EMIR requires a CCP to reserve capital so as to ensure an orderly restructuring or winding down of the CCP, but – unlike the CPMI-IOSCO Principles for FMI – it does not require the CCP to have a full recovery plan.

Such a recovery plan should enable the CCP to continue its critical operations should the survival of the CCP itself be threatened, while minimising the overall market distortions. In practice, the CCP will be at risk if it is no longer able to fulfill its contract payment obligations or to pay the variation margin it is due. To recover, the CCP has to have the tools to allocate uncovered losses, to cover liquidity shortfalls, and to re-establish a matched book or alternatively to tear up contracts if this is no longer feasible, all on a pre-agreed and enforceable basis. Recovery is the responsibility of the CCP, and should be distinguished from the "further stage" statutory resolution regime for a CCP, whereby resolution would take place outside the general insolvency rules and with the involvement of the authorities.

The recovery scheme should give all stakeholders an incentive to manage the risk they bring into the system. The starting point of a recovery plan is that an orderly, i.e. predictable and transparent, loss allocation is preferable from a financial stability perspective, as the loss will have to be borne by someone anyway.

(1) The modalities for the Eurosystem routine cash credit extension to CCPs are set out in the ECB Guideline of 5 December 2012 on TARGET2, as amended. For the UK, see the Bank of England News Release of 5 November 2014 – Widening access to the Sterling Monetary Framework: broker-dealers and central counterparties. In this context, it can be mentioned that the ECB and the BoE also announced end March 2015 to extend the scope of their standing swap line in order, should it be necessary and without pre-committing to the provision of liquidity, to facilitate the provision of multi-currency liquidity support by both central banks to CCPs established in the UK and euro area respectively. CCP liquidity risk management remains first and foremost the responsibility of the CCPs themselves.

(2) Although only for cash market clearing. ESMA, however, has issued guidelines for CCP links that also apply to derivative products. See ESMA/2013/322 Guidelines and Recommendations of 10 June 2013 for establishing consistent, efficient and effective assessments of interoperability arrangements.

(3) CPMI-IOSCO guidance of October 2014 on "Recovery of Financial Market Infrastructure". FSB report of 15 October 2014 on Key Attributes of Effective Resolution Regimes for Financial Institutions, Annex 1 – Resolution of FMI and FMI participants.

The CCP and its stakeholders have to agree who will bear the loss, existing shareholders, clearing members or other creditors. For instance, general business losses could logically be borne by the shareholders. Losses due to a clearing member default – that can be deemed to be the most relevant for a CCP – could be borne by both the CCP owners – a "skin in the game" approach – and by surviving clearing members.

As regards the management of losses due to a clearing member default, a clear line has to be drawn for the resources that constitute the default waterfall, as recovery refers to the allocation of losses that go beyond the use of these pre-funded resources. If the CCP's default fund has been used, the surviving clearing members are normally required to replenish the fund, as otherwise the CCP could no longer cover its future stress risk exposure. Further tools can be considered to allocate uncovered losses due to a participant default, each with their advantages and drawbacks. Additional capped cash calls, so-called "assignments", are used by several CCPs. Under the default waterfall regime, margins of surviving clearing members are not used in the event of a clearing member default. Under recovery, the CCP could nonetheless limit its liabilities to cover the loss via margin haircutting. Initial margin haircutting implies contributions by the clearing member based on its exposures. Variation margin haircutting implies reducing the margins the CCP has to pay out to those clearing members that "gained" on their exposures.

5. Use of a CCP & risks outside the CCP perimeter

Clearing risks are not exclusively managed by a central counterparty, even when one is used for the involved contract. As appears from the above, the use of a CCP still implies a risk for the clearing member or its client.

Clearing members and their clients have to manage their counterparty risk vis-à-vis the CCP[1]. Using a CCP certainly enhances their counterparty risk exposure but it does not remove it altogether. This is recognised in EMIR and under the CRD IV framework – implementing Basel III –, whereby exposures of financial institutions to CCP attract own funds requirements for the first time.

For contracts cleared via a CCP, the clearing member has to reserve capital both for the trade exposures, including collateral exposures, and for the clearing member's contribution to the default fund. Trade exposure own funds requirements are set at a lower level than for bilateral clearing, thereby also incentivising central clearing. Where a clearing member clears client trades and passes the risk of a CCP default on to its client, as is standard practice, this is also taken into account. For its default fund contribution, the clearing member has a *de facto* risk on all other clearing members of the CCP, and given this equity-like exposure, the capital requirement is set at a much higher level to take this into account. The capital requirements will also increase if a CCP is no longer considered to be a qualifying CCP, i.e. in case the CCP does no longer comply with the requirements to be authorised under EMIR. In this case, trade exposures will be set at the level required for bilateral exposures.

In addition, the client of a clearing member has to calculate its own funds requirements for its trade exposure on the clearing member. Counterparties to trades can actually use a CCP as a clearing member or as a client of a clearing member or even as a client of a client of a clearing member. In cases of individual client segregation, where the client's positions and related collateral are held directly in the CCP's books, the client benefits from lower capital requirements.

Non-standardised OTC derivatives cannot safely be cleared by a CCP, given their lack of market liquidity. The clearing risks for these bespoke products have to be managed bilaterally. EMIR – implementing a BCBS-IOSCO[2] recommendation – envisages among other things that systemically relevant counterparties shall have risk management procedures in place to exchange, above a set threshold, initial margin on these contracts, and in a timely, accurate and appropriately segregated, i.e. bankruptcy-remote, way[3]. The ultimate goal of this requirement is to reduce systemic risk, as collateral requirements should lead to a deleveraging of positions taken. Purposes further include the incentivisation of central clearing and – via an apt calibration – reducing the pro-cyclicality effects of the margin calls. To soften the liquidity impact of this margining requirement, a minimum initial margin threshold of €50 million has been set, and the implementation

(1) The exposure that a CCP clearing member has on its clients is also still relevant.
(2) This is, the Basel Committee on Banking Supervision and the International Organisation of Securities Commissions.
(3) ESMA, EBA and EIOPA consulted the market on the technical standards needed to implement this requirement. The application of the margin requirement is expected from September 2016 onwards.

will be phased in over four years, starting with the biggest derivatives market participants. Finally, given the global nature of these markets, worldwide coordination is necessary here too, so as to avoid regulatory arbitrage and ensure a level playing field.

6. EU CCPs – Relevance for Belgium & supervisory/oversight role of NBB

EMIR requires any EU central counterparty to be authorised by its designated national competent authority on the basis of the EMIR requirements for CCPs[1], as stipulated in EMIR and in its implementing Regulations. Once authorised, the CCP will be able to provide services throughout the European Union. This initial authorisation procedure, any additional authorisation to provide new services, and the subsequent supervision of the CCP, including the review of risk models and tests, are carried out with the involvement of authorities that have a clear interest in the sound functioning of the CCP. To that end, for each EU CCP, a supervisory college is set up and chaired and managed by the CCP's national competent authority. That college has an advisory right to the national competent authority and an escalation right to ESMA as regards the above-mentioned authorisation and supervision aspects. The college is also the place where relevant information is exchanged between the participants, including in emergency situations.

The college participation depends on the CCP's potential impact. Any problem with a CCP will not only have an impact on its clearing members and their clients but also on linked financial market infrastructures – i.e. the markets it clears, the CSD where it settles and any linked CCP. Furthermore, it may affect the currency that the CCP clears. Therefore, the EMIR Regulation requires each CCP to have a college and the supervisor, overseer or central bank of the above-mentioned entities or currency to be part of the college. Such participation is mandatory.

Currently, the Bank is involved in eight CCP supervisory colleges, as listed in the table below. Its participation is based either on its capacity as supervisor of a CSD that the CCP settles in, or as supervisor of clearing members of the CCP that contribute in a substantial way to the default fund on a country-by-country basis. Even when each CCP is by

TABLE 1 EU CCP SUPERVISORY COLLEGES WITH NBB PARTICIPATION

CCP	Main clearing services relevant for Belgium	Number of direct Belgian clearing members	EMIR criterium for NBB participation in the CCP's supervisory college	
			Contribution of Belgian clearing members to the CCP default fund	CCP settles in a Belgian CSD
LCH Clearnet SA (FR)	Euronext cash and derivatives trades	9		X (EB, EBE, NBBSSS)[2]
LCH Clearnet Ltd (UK)	Interest Rate Swaps/Repos	3		X (EB, NBBSSS)
EurexClearing (DE)	Listed interest derivatives / Repos	2[1]		X (EB)
Euro CCP (NL)	Main European stocks	none		X (EB)
Iceclear Europe (UK)	Credit default swaps	none		X (EB)
CC&G (IT)	National CCP of Italy	none		X (EB)
Keler (HU)	National CCP of Hungary	1	X	
KDPW_CCP (PL)	National CCP of Poland	1	X	

(1) Five Belgian banks participate indirectly.
(2) EB: Euroclear Bank CSD, EBE: Euroclear Belgian CSD, NBBSSS: securities settlement system of the NBB.

(1) Third country CCPs operating in the Union have to be recognised by ESMA.

definition systemically important, three of these CCPs – Eurex Clearing, LCH.Clearnet SA, LCH.Clearnet Ltd – can be said to be very important from a financial stability perspective. These same CCPs are also the most relevant ones as regards their "Belgian" impact, via the presence of Belgian clearing members and given the type of products or markets they clear.

Conclusion

CCPs are concentrators of risk and are systemically relevant by their very nature. Their role will be further increased with the implementation of the clearing obligation for standardised OTC derivatives in the European Union.

In comparison with direct clearing arrangements between market participants, CCP clearing makes it possible to standardise and enhance the risk management of exposures between market participants. CCPs reduce legal risk, increase transparency and, most importantly, improve the counterparty risk management through wider netting possibilities and better collateralisation arrangements.

It is paramount for CCPs to be adequately regulated and supervised. In the EU, the EMIR Regulation – implementing the CPMI-IOSCO standards – sets out the main framework of standards that a CCP has to respect so as to remain liquid and solvent even in stress situations. While CCPs currently have to be able to withstand the simultaneous default of their two biggest clearing members under stressed market conditions, CCP resilience remains a point of attention and the EU regulator – thus implementing the international guidance from the FSB and the CPMI and IOSCO – is now preparing legislation for the unlikely event that this requirement might not be enough so that even under more severe conditions CCPs can recover, or eventually be resolved, in an orderly way, while minimising systemic disruption.

A problem with a CCP will be felt also outside its home jurisdiction. While there is currently no CCP established in Belgium, there are EU CCPs that clear Belgian markets, have Belgian clearing members and settle through a Belgian CSD. The sound functioning of EU CCPs is thus also relevant for the Belgian financial markets. The Bank thus has a clear interest as a supervisor and as an overseer to be involved in the supervisory college arrangements that EMIR has set up for EU CCPs.

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Cyber risk management in financial market infrastructures : elements for a holistic and risk-based approach to cyber security

Filip Caron

Introduction

Dependence on technology is becoming a defining feature for modern financial institutions. Financial market infrastructures (FMIs) provide the clearance, settlement and recording services for financial transactions between other institutions, creating a strongly interconnected financial system. This heavy dependence on technology and communication networks (1) exposes the FMIs to a variety of cyber threats, which are elements in the cyber ecosystem (2) that could cause harm to an organization, industry or system as a whole.

The cyber threat landscape describing all relevant cyber threats has changed a great deal in recent years. Today, FMIs are confronted with actors specialized in mass-exfiltration and manipulation of sensitive data. Increasingly, the fear is that FMIs might become targets for nation-sponsored espionage and political retaliation. Attacks against the FMIs are expected to become more frequent, sophisticated, targeted and persistent. Cyber risks (3) should be considered as an important operational risk category.

Belgian authorities have identified large FMIs as systemically important organizations in our financial system (4). In addition to their very heavy dependence on technology, FMIs are characterized by both a high degree of interdependence and complexity. Operational failures due to cyber attacks can result in FMIs that are unable to meet their clearance, payment, settlement or recording obligations (i.e. negative network externalities). Because of the interconnectedness, a cascading failure might threaten the overall financial stability.

Structured and innovative governance approaches are crucial in coping with cyber security. The Committee on Payments and Market Infrastructures (CPMI) indicated that effective cyber resilience is the direct result of comprehensive cyber security strategies, covering cyber incident prevention, detection, response and recovery components. Directors with a high proficiency in cyber security are needed to actively monitor and review cyber governance. Overseers of the FMIs are reviewing which structured approaches will enable FMIs to deal effectively with cyber risk, taking into account the impact on financial stability.

(1) The lack of uniform legal and regulatory regimes and the absence of any international policy further aggravates the situation.

(2) The cyber ecosystem comprises the interactions among persons, processes, data and ICT technologies, and is influenced by a variety of conditions (e.g. regulation, political decisions or available resources).

(3) Cyber risk is the possibility that the actor behind the cyber threat is successful in causing this harm (i.e. successful cyber attack). The potential loss of trust after a successful cyber attack is an important factor to take into consideration.

(4) Additionally, the Belgian Law on the security and protection of critical infrastructure (1 July 2011) categorizes the financial sector as critical infrastructure. (http://www.nbb.be/doc/cp/nl/bcp/law_01-07-2011.pdf)

This article focuses primarily on the governance of cyber-induced operational risk at FMIs. The remainder of the article is structured as follows: section 1 defines cyber security and provides an overview of the security standards that could form the basis of a comprehensive cyber security strategy. An overview of the general risk management cycle for cyber security will be provided in section 2. The components of holistic cyber security governance are discussed in section 3. Section 4 concludes the paper.

1. Cyber security

Cyber security is the process of defining strategies and implementing measures to protect the organization's assets from occurrences in the cyber ecosystem that have an adverse impact, i.e. cyber attacks. The organization's assets include the information and communications technology, the infrastructure (e.g. buildings and equipment), the personnel, the applications and the totality of information stored and processed by the organization.

In developing cyber security strategies it is crucial to foster the ability to repel cyber attacks, to adapt rapidly, and to recover and/or limit the impact in the event of disruptions caused by such attacks, i.e. cyber resilience. For cyber attacks affecting the FMI's information and communications technology, there is a risk of spreading to other data centres and the fall-back infrastructure of the FMI. While physical damage caused by cyber attacks remains extremely rare, their potential impact could be significant. The most renowned and confirmed cyber attack that intended to cause physical damage is Stuxnet (Falliere, Murchu, & Eric, 2011). This piece of malware was designed to sabotage the centrifuges of a uranium enrichment plant.

A comprehensive cyber security strategy is usually deployed on the basis of security standards. Different standard-setting bodies propose a wide variety of broad security-related concepts for which specific guidance is offered. Typically, these standards cover the following five functional domains:

- Identification: focuses on developing a deep understanding of the cyber ecosystem and the related risks. The former deals with managing the organizational assets (e.g. enterprise architecture, inventory or information system acquisition policy) and analysing the threat landscape (e.g. by actively participating in information sharing and analysis centres). Cyber risk management deals with assessing both the likelihood and the potential impact of the various risks.

- Prevention: covers the activities that deal with developing and implementing safeguards against specific cyber security risks. Firstly, governance-related safeguards that are composed of a broad set of policies and procedures, for example for information security, teleworking or supplier relationships. Secondly, measures concerned with human resources such as personnel vetting, training and awareness. Thirdly, the set of technology-oriented measures that consists of both the implementation of protective technology (e.g. firewalls or network intrusion detection systems) and information system maintenance.

- Event detection: stimulates the adoption of technology and processes to identify cyber security events and incidents [(1)]. Typically, standards cover the collection of cyber events for forensic purposes and the continuous monitoring of the information systems' behaviour.

- Incident response: focuses on dealing with cyber security events that are taking place. For example, the development of incident response plans (which include escalation procedures), establishing incident communication (including contact with external cyber incident experts), root cause analysis, direct incident mitigation (e.g. information system patching and removal of harmful software), and learning.

- Recovery from incidents: relates the ability to identify and restore the services that have been impaired due to a cyber security incident. Typically, this includes activities related to the development of a recovery plan (e.g. fall-back infrastructure), the introduction of structural improvements and the necessary communication with the various stakeholders.

(1) A **cyber security event** represents an occurrence of importance for the cyber security of an FMI (e.g. rejected access request), whereas a **cyber security incident** describes an event with a negative impact on the organization's assets (e.g. a successful cyber attack).

There are important differences in the type of guidance provided by the various standards: guiding principles, control concepts, implementation guidance and maturity model. For example, in order to preserve the confidentiality and integrity of sensitive information, the cyber security framework of the National Institute of Standards and Technology (NIST, institute affiliated to the U.S. Department of Commerce) includes the following guiding principle: "Data-at-rest is protected" (code PR.DS-1 in the framework). Similarly ISO 27001 prescribes the control of documented information as follows "it is adequately protected (e.g. from loss of confidentiality, improper use, or loss of integrity)" (section 7.5.3 (b) in the ISO 27001 standard). ISO 27002 provides control concepts linked to the principle, e.g. "access control policy" (section 9.1.1 in the ISO 27002 standard). Implementation guidance is provided for example in ISO 13569, which details multiple options for the components of logical access control (section 9.3): identification, authorization and authentication. The Control Objectives for Information and Related Technology (COBIT) and NIST frameworks provide a maturity model for cyber security strategies. The level of maturity describes the completeness, thoroughness and complexity of the activities and tools used for a specific cyber security component (e.g. access control).

Table 5 in the annex describes the characteristics of a selection of the major security standards that provide relevant guidance for the financial sector. Recently, efforts have been made to develop integrated frameworks that cover all concepts described in the various standards. NIST proposed the cyber security framework for operators and owners of critical infrastructures (NIST, 2014), which includes the financial industry. The CPMI provides guidelines for governance and operational risk in the Principles for Financial Market Infrastructures (PFMIs), which are also relevant for and apply to cyber resilience. Guidance on governance and sound operational risk management are respectively discussed in principles 2 and 17. The CPMI confirmed that cyber risk falls within the scope of both principles. Additionally, both the CPMI and the International Organization of Securities Commissions (IOSCO) have conducted research in order to better understand the FMIs' cyber resilience capabilities and views (CPMI, 2014a) (IOSCO, 2013). The reports indicated that coordinated action and possibly guidance in addition to PFMI principles 2 and 17 may be justified. The adoption of a comprehensive framework might also provide some assurance from a legal perspective, e.g. protecting the FMI against cyber security negligence claims from external parties (Shackelford, Proia, Martell, & Craig, 2014).

2. Stimulating a risk-based cyber security approach

Organizations need to protect themselves against risks originating from cyber threats. The previous section explored the various security guidelines and standards upon which FMIs can structure their cyber risk framework. Cyber security investment decisions should take into account the criticality of the FMI (determinant of proportionality) and the maturity of the existing cyber security infrastructure. This section argues that adopting a risk-based approach can assist an FMI in making cyber security investment decisions and determining priorities.

In the context of FMIs, negative network externalities should be taken into account in the risk-based cyber security approach. The overseer stimulates the development of structured and formal cyber risk management procedures to protect the FMI, and will ensure that the negative network externalities have been appropriately taken into account.

Building a risk-based cyber security approach typically involves an iterative process. The resulting risk management cycles usually consist of four components: risk framing, assessment, response and monitoring. The following paragraphs further detail these components and outline the activities that should be performed at the various organizational levels. Activities at different organizational levels may be interdependent.

2.1 Risk framing

The first component deals with establishing the context and developing a common perspective on how organizations will manage cyber risk. Activities performed in the context of risk framing will result in the specification of a risk management strategy, which details the methodology as well as the assumptions, constraints, risk appetite and (investment) priorities of the organization. This strategy is further defined at three different organizational levels involved in the decision-making process, i.e. the strategic, tactical and operational level. Table 1 provides an overview of the risk framing activities per organizational level.

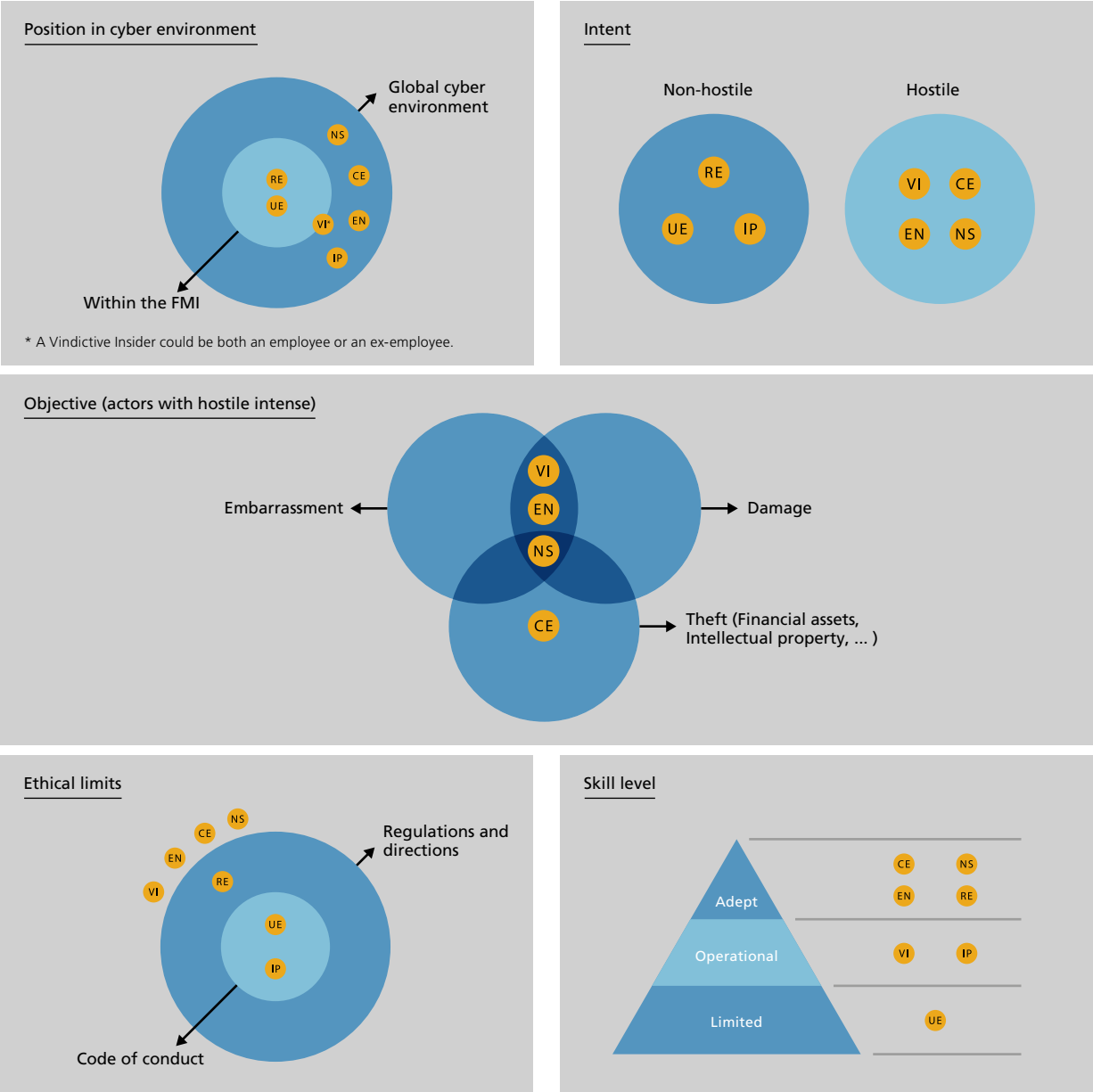
TABLE 1 RISK FRAMING ACTIVITIES

Strategic	• Provide a common perspective by developing the **risk management methodology** (including for example the scope, techniques, risk appetite, priorities, level of detail and communication procedures). • Identify and describe the **broad categories** of threat actors and vulnerabilities. Categorize the types of impacts (i.e. broader than the financial impact). Reviewing trend reports and participating in information sharing and analysis centres (ISAC) will assist in this activity. • Determine the **sources of constraints** for the risk management strategy. A multitude of constraint types can be considered, including financial limitations, regulatory / contractual requirements, organizational policies and limitations originating in the organizational culture.
Tactical	• Identify the **business processes** that support the achievement of the organizational objectives. • Translate the risk appetite into **process-specific risk tolerances**. Differentiation in the risk appetite may be desirable, e.g. extremely low tolerance for processes that could impact on financial stability. • Establish business **process specific context**, analyse which specific threats, vulnerabilities and constraints are relevant for each of the business processes. • Establish the general **risk assessment methodology**, which should ensure consistency in the risk assessments and enable a correct prioritization of the mitigating measures. • Refine the **enterprise architecture** and define the **cyber security components** e.g. including segmentation, creating redundancy and removing single points of failure.
Operational	• Gather **detailed contextual information on the assets**, e.g. asset inventory, owners, network diagrams, data flows, interfaces and existing controls. • Review organizational **responsibilities** for each asset; clarify the accountability for managing the cyber risk.

The specific characteristics of a threat actor determine to a large extent the likelihood and the potential impact of a successful cyber attack initiated by that actor. Therefore, it is crucial to acquire a deeper insight into the threat actors.

Multiple threat actor classifications have been presented in the literature and could be consulted during the risk framing stage, e.g. (Casey, 2007), (Borg, 2014) or (NIST, 2011a). They typically provide information on the specific characteristics of a threat actor type, such as the actor's intent (hostile versus non-hostile), objectives (including theft, business/technical advantage, damage/destruction of assets and embarrassment of the organization), legal and ethical considerations that might constrain the actor, resources (time, money and people) and skill level. Successful cyber attacks require teams with a broad skill set. In addition to expertise in hacking, the team should possess considerable business and process expertise to maximize the outcome (e.g. damage/liabilities or financial gain). Note that these classifications all provide a limited set of archetypes, each with a specific combination of characteristics. Real-life environments may require different combinations of characteristics, e.g. various combinations of resources and skills. Chart 1 provides some examples of threat actor categories.

CHART 1 IMPORTANT THREAT ACTOR CATEGORIES



Threat actor category

- **VI** **Insider**
  An (ex-)employee who feels unfairly treated by the organization.
- **CE** **Criminal enterprise**
  Criminal organization that is looking for a maximal financial profit.
- **EN** **Ethno-nationalists**
  Experts who share an ethnic identity and feel oppressed or disrespected. Usually a galvanizing incident takes place.
- **NS** **Nation states**
  States looking for military, economic or geographical advantage.
- **RE** **Reckless employee**
  (Over motivated) employees who take undesired shortcuts or misuse their authorizations.
- **UE** **Untrained employee**
  Employee who unknowingly misuses the systems or safeguards.
- **IP** **Information partner**
  External contractor with poor data protection with whom the organisation shared sensitive data.

2.2 Risk assessment

Cyber risk assessments are based on the development of cyber threat scenarios. The process of identifying, prioritizing and estimating the risks to which the FMI is exposed, is covered in the risk assessment component.

TABLE 2 RISK ASSESSMENT ACTIVITIES

Strategic	• Identify and describe **threats** to and **vulnerabilities** of an organization. Consulting with cyber threat intelligence companies that are specialized in identifying hostile groups should be an option. • Develop cyber risk **scenarios** and design **potential attack trees**. Sufficient attention should be paid to extreme scenarios.
Tactical	• Identify the **impact of the cyber risk** scenarios on the various business processes. • **Prioritize the business processes** based on impact for both the organization and for financial stability as a whole. The cyber security risk assessment report developed at the operational level should provide the required input.
Operational	• Perform a **cyber security risk assessment** according to the methodology specified by the tactical level in the risk framing component. • Develop a cyber security risk assessment **report** that provides estimates for both the likelihood of a specific scenario and its impact on the assets. The risk assessment estimates should afterwards be aggregated to provide meaningful information for the tactical and strategic level.

Cyber threat scenarios are defined as detailed descriptions of how a threat actor can exploit an organization's dependence on ICT infrastructure to produce an undesirable outcome (e.g. a system take-over or destruction of a service/reputation). For example, scenarios in which a criminal organization acquires access to the FMI's infrastructure and afterwards compromises the integrity of customer transaction data, blackmails the FMI by threatening to destroy critical infrastructure, or extorts money from the FMI by threatening to make sensitive client data public (i.e. confidentiality attack with a significant reputation risk). By refining scenarios like these, an FMI could obtain meaningful risk assessments. Extreme scenarios with combinations of idiosyncratic and sector-wide events that could have a catastrophic impact on the FMI should be taken into account[1].

The FMI should estimate the likelihood of each cyber risk scenario. Is the FMI considered a legitimate object of attack for a specific threat actor? FMIs that would be considered a legitimate object for attack have either (indirectly) offended the actor or symbolically represent an adversary (e.g. a group of nations). In the context of the latter, the threat actor might be more inclined to target systemic infrastructures. Moreover, FMIs should determine whether the information they process or the intellectual property they possess would be of particular value for the threat actor. Acquiring (external) intelligence on the capabilities of the threat actors may also improve the accuracy of the likelihood estimations.

Scenarios should be further refined by producing a set of attack trees, which depict the logical steps and mechanisms involved in a cyber attack. These attack patterns define the challenges that the threat actor might face and how they would be solved. The Common Attack Pattern Enumeration and Classification (CAPEC)[2] provides extensive knowledge on how specific parts of an attack are generally designed and executed. These patterns present the adversary's perspective on the problem and provide guidance on ways to mitigate the attack's effectiveness.

After describing the attack trees, it is possible to determine the business processes and organizational assets that will be impacted in the scenario. The impact will be determined at the operational level based on a dual assessment. The first part of the assessment deals with determining the current level of exposure with regard to the risks identified in

(1) Details on extreme scenarios can be found in the CPMI's recovery for FMIs guidance (CPMI, 2014b).
(2) http://capec.mitre.org/about/index.html (visited on 16/03/2015)

the scenario. Typically, the operational level reviews whether effective controls are currently in place. The effectiveness of the current configuration can be tested by means of penetration testing, vulnerability assessments, code reviews, software reviews or any other appropriate testing procedures. In the second stage, analysts should quantify the costs related to the occurrence of a specific scenario. The value and costs should be defined as broadly as possible, and take account of financial losses, down-time, customers switching to competitors, damage to the FMI's reputation and brand image, indirect costs for other processes and businesses, and other costs. By definition, statistical analyses on historical data (e.g. trend lines, normal distributions, statistical significance or Bayesian corrections), which are traditionally used in operational risk management, will not be adequate in this type of black swan[1] scenario.

2.3 Risk response

Developing risk responses refers to the process of deciding upon and implementing the appropriate courses of action regarding the assessed risks. Traditionally, an FMI has the following risk response options: to accept, avoid, mitigate, share or transfer the risks. Table 3 provides an overview of the risk response activities per organizational level.

TABLE 3 RISK RESPONSE ACTIVITIES

Strategic	• **Decide on the course of action** for the sets of risks related to specific scenarios, taking into account the organization's objectives and the risk appetite. The impact analyses and prioritization exercises of the tactic and operational levels can function as an input. An FMI can opt for one (or a combination of) the following response actions: risk acceptance, avoidance, mitigation, sharing of transfer.
Tactical	• Determine the optimal **risk responses** that translates the generic courses of action into actionable measures (e.g. access control). • Define a **cyber security programme** and propose an implementation **planning** that conforms with the priorities set in the risk assessment component. • Develop a methodology for monitoring the implementation of the cyber security programme, as well as for measuring its effectiveness. • Specifying (design) **requirements, principles and procedures** for the implementation of the actionable measures.
Operational	• Refine each actionable measure into **concrete cyber security controls**. • Determine which cyber security controls need to be added and which existing controls need to be **enhanced**. • **Document the intended application** of each cyber security control. • Draft a **cyber risk mitigating plan**, including the activities for enhancing the cyber defence, the milestones, the required resources and a schedule. • **Enhance the cyber defence** according to the cyber risk mitigation plan.

The international standards on information, ICT and cyber security, discussed in section 1, can provide inspiration for suitable cyber security controls. FMIs should however remain cautious; simply keeping up with compliance requirements as stipulated in standards, directives and regulation will not automatically result in a secure environment. Conversely, non-compliance with these standards, directives and regulation should be considered a significant cyber-related risk in the risk management processes.

Traditionally, cyber defence focuses strongly on developing control structures for mitigating cyber security risks. Alternatively, the FMI could work towards removing some of the motives of potential attackers.

(1) The concept of black swans was developed by Nassim Nicholas Taleb in his books 'Fooled by Randomness' and 'The Black Swan'. Black swans refer to extremely rare events of large magnitude and consequence.

2.4 Risk monitoring and incident response

Typically, the risk monitoring component is composed of the activities related to continuously assessing the appropriateness of the risk responses (i.e. assessing their effectiveness and determining whether emerging changes in cyber risk will be covered) and verifying compliance with a wide set of internal and external directives. Table 4 provides an overview of the risk monitoring activities per organizational level.

TABLE 4 RISK MONITORING ACTIVITIES

Strategic	• Develop a **risk monitoring strategy**, which defines the purpose, type and frequency of the monitoring activities. • Monitor the implementation and **effectiveness of the risk responses** at an organizational level (independent opinions and assurance could be obtained from external consultants or an internal audit function).
Tactical	• Evaluate the **validity of the framework** provided in the cyber security components of the enterprise architecture. If necessary fine-tune or adapt the architecture. • Assess the **tactical effectiveness of the controls implemented** against the framework provided in the cyber security components of the enterprise architecture. • Monitor **changes in the (cyber) environment**, e.g. emerging new threats, cyber incidents and new vulnerabilities such as zero-days.
Operational	• Implement strict **configuration and change management** processes for cyber security controls. • **Assess the effectiveness of the cyber security controls** according to the risk monitoring strategy developed at the strategic level. Reassess controls after changes in order to confirm the appropriateness of the corrective actions. • Review and respond to **vendor or industry warnings/alerts**. • Monitor the information systems for deviations from the standard observed behaviour (i.e. baseline), e.g. with security information and event management (SIEM), applications collecting and correlating events from a wide variety of information systems (i.e. firewalls, network behaviour analysis tools, honeypots, intrusion detection software, and any other event generating system). • Report on the **cyber security status** in terms of both effectiveness and efficiency. This reporting can be both event and time driven. • Implement a **decommissioning strategy**, which includes for example media sanitization and an update of the inventory and configuration management systems.

Incident response capabilities form a key component in the organization's cyber resilience (NIST, 2012). Sound cyber risk management processes can significantly reduce the number of incidents, but there will be incidents that can be neither anticipated nor avoided (i.e. black swan events). Effective incident response handling is based on thorough planning and governance. FMIs should prepare for handling incidents, they should design the incident handler communication infrastructure (e.g. contact information of stakeholders and external experts) and acquire incident analysis hardware and software (e.g. digital forensic software and blank removable media), incident analysis resources (e.g. baselines/normal behaviour, lists of critical assets and network diagrams) and incident mitigation software (e.g. access to uninfected versions of applications). The actual incident response handling consists of incident analysis, containment, eradication and recovery activities.

Incident response handling starts with analysing incident indicators (e.g. network behaviour analysis tools that pick up deviating behaviour) and determining whether an incident has taken place. Initial analyses also specify the scope of the incident, including for example the impacted networks, systems and applications.

At an early stage the team has to decide on a containment strategy to prevent an incident from spreading and to limit the amount of damage. While containment strategies are incident-specific, the decision-making process is usually based on the potential damage caused by the incident (e.g. financial, loss of trust, availability of services), the effectiveness of the strategy, and the time/resources needed to implement the strategy.

After containing the incident, the incident response team can start with the eradication. This phase commonly includes the elimination of the remaining elements of the incident (e.g. breached user accounts or malicious software) and mitigation of the vulnerabilities that have been exploited. The recovery phase deals with restoring the systems' normal operation and may consist of restoring from clean back-ups, rebuilding systems, changing passwords, etc.

This section presented the various components of a risk-based approach to cyber security. Each component will provide input for the next component. Furthermore, risk-based approaches are grounded in continuous processes. Shortcomings of the current set of cyber security controls or changes in the environment identified in the monitoring component will trigger a new iteration of the risk management cycle.

3. Encouraging holistic cyber security governance

Technical cyber security controls and adequate architectures can significantly reduce the cyber risk as acknowledged in most cyber security strategies, but they should be part of a more comprehensive solution. The materialization of cyber risks does not always result from ineffective technical mitigation measures, but can often be directly linked to faulty human behaviour or to external factors. This section first explores the human factor in cyber security before proceeding to discuss the impact of the business environment.

3.1 Senior involvement and accountability

The mission of the board of directors is to secure the future of the FMI and protect the (digital) assets of that organization (Westby, 2004). Currently, this future is increasingly jeopardized by sophisticated cyber threats. Hence, both the board of directors and the management need to develop the ability to cope with future cyber events and to anticipate the impact of those events (IIARF, 2014). This sub-section further outlines the specific actions that need to be undertaken.

The board of directors needs to oversee cyber risk at the FMI and thus to assume its role as the fourth line of defence beyond the 'three lines of defence' model (line management, enterprise-wide risk management, audit). The board's role needs to be underscored. The board should treat cyber risk as an integral component of enterprise risk management (ISF, 2013). Consequently, the directors should oversee the identification of the cyber risks and obtain a clear understanding of the potential impact and the legal implications of their materialization. Activities that should be performed by the directors in this context include:

- Gain insight into the critical business services, applications and data.
- Determine which third parties are involved in providing critical services and review their cyber risk profile.
- Analyse management's cyber security programme and oversee the risk identification, mitigation and management processes developed by the FMI's management. The board can conduct this activity through one of its sub-committees, e.g. the Risk Committee.
- Review annually a cyber posture report requested from the internal audit and/or an external security organization. The board can conduct this activity through one of its sub-committees, e.g. the Audit Committee.
- Discuss key cyber security topics directly with the chief information security officer (CISO) and the chief risk officer (CRO), including cyber events and security breaches.

It has been argued that supporters and sponsors with board credibility can significantly accelerate board engagement in effectively overseeing the cyber risk management (ISF, 2013).

FMIs are confronted by the increasing complexity of their information systems, and by the growing importance of their systems within the financial sector overall. This should be reflected in the composition of the board of directors. Boards

could benefit significantly from having directors with a sophisticated understanding of cyber security who are willing to maintain sufficient expertise in the matter.

Even if they are reporting to the board and seeking board guidance, senior managers are ultimately responsible for the identification, assessment, mitigation and monitoring of the risks that threaten their organization, including cyber security risks. Research has indicated that a positive correlation exists between explicitly defining and implementing a comprehensive cyber security strategy and the effectiveness of cyber event detection mechanisms (discussed in (Gregory, 2014)). Effective detection mechanisms in turn can improve the ability to limit the average impact per incident.

In order to develop an effective cyber security strategy, senior managers should engage in the following activities:

- Build a thorough understanding of the ecosystem of the organization's IT operations, which should include trusted partners and customers.
- Identify critical business processes, functions, services and assets.
- Establish a chief information security officer position (or equivalent), reporting directly to the CEO or executive management committee and providing extensive guidance on strategic decisions related to information and cyber security.
- Develop an understanding of the types of potential cyber events and security incidents, and actively monitor the cyber security landscape.
- Ensure that sufficient resources are devoted to the mitigation of cyber risks and to the creation of cyber security awareness in the organization.
- Review the effectiveness of the cyber risk mitigations implemented (e.g. by means of external security audits).
- Sponsor and directly oversee the development of cyber incident response plans.

The senior managers are assisted by the risk managers, who are responsible for facilitating the efficient and effective governance of significant risks, including risk consolidation, and for ensuring risk management uniformity throughout the organization. Internal auditors are considered the third line of defence and conduct assurance activities. They are able to provide an independent assessment of the effectiveness of a broad spectrum of risk management and governance activities and techniques.

3.2 Cyber security culture and insider threats

In The Art of Deception, Keven Mitnick and William L. Simon argue that the impact of social engineering is systematically underestimated in cyber security (Mitnick & Simon, 2002). This seminal work on social engineering states that many cyber-related losses are not caused by a lack of effective technical controls, but by people and faulty human behaviour. The development of cyber security awareness and culture is therefore an important cyber security measure and a means to reduce the insider threat.

A cyber security culture can be defined as a set of shared values, goals and behaviour with regard to the cyber environment. Stimulating the internalization of desired behavioural patterns towards security[(1)] should improve both the cyber security awareness of the employees and their reaction to unforeseen cyber events. This reduces the risk of reputational and financial damage caused by successful cyber attacks. Management should therefore:

- Ensure that the employees perceive cyber security as an important organizational matter, in which they are engaged and should take responsibility. This could be effectively achieved by providing adequate training and information on

(1) For example, the systematic reporting of irregularities in the operation of information systems or reporting activities of concern.

how their own behaviour could contribute to safeguarding the organization's objectives (e.g. training session for new staff or seminars focused on a specific target audience).

- Provide adequate training and education on cyber security. Different target groups exist, including the regular employees, security experts and IT professionals exposed to the cyber environment such as system administrators.

- Inform (key) employees on the emergence of important threats (e.g. through security alerts).

- Explicitly endorse the cyber security policies and consistently apply them in their own function. Tone-at-the-top is often mentioned as an important driver for success.

- Ensure that cyber security policies are adequate and up-to-date (e.g. new trends such as bring-your-own-device should be addressed).

- Regularly test compliance with the cyber security policies (e.g. hire external consultants to advise employees on dealing with social engineering practices.

FMIs should provide a security-enabling environment. There exists a wide variety of elements that can either enable or inhibit compliance with desired behaviour. Measures that make compliance easier, e.g. taking user-friendliness into account when selecting security tools or providing secured hardware free of charge, are perceived as strong signals of support.

The vindictive insider risk is the second significant human factor that a cyber security strategy should take into account. These (former) employees/contractors will have acquired deep insight into the organization and its information systems. As insiders they obtained an overview of valuable information and have operational knowledge of the processes, controls and technologies that have been implemented to protect this information. Due to this advanced knowledge, cyber security breaches triggered by (former) company insiders tend to be more costly and/or cause more (reputational) damage. The insider as a type of threat actor was described in more detail in section 2 (table 3). In order to mitigate insider threats, management should look into the following risk-mitigating actions:

- Conduct extensive vetting of employees and external contractors, use non-invasive background assessment techniques (e.g. determine the employees' level of satisfaction during the yearly performance evaluation).

- Implement strict access management systems with a least privilege option, monitor failed attempts for unauthorized access, and develop strong access privilege management (e.g. remove authorizations after job rotation or dismissal).

- Introduce four-eyes split responsibility for crucial parts in the processes.

- Employ analysis tools to detect unwanted behaviour (e.g. activity monitoring, confirming the application of the four-eyes principle and data loss prevention tools).

3.3 Third party risk

In addition to acquiring hardware from third parties, organizations increasingly rely on commercial-off-the-shelf software, open source software components, and consultants. Lack of insight in the security procedures of partners, lack of enforcement or ownership, and suppliers that bypass IT security policies, are some of the issues commonly observed in third party relationships. Adversaries may take advantage of these issues to infiltrate FMIs through one of their third-party partners and set up mechanisms for long-term exfiltration of confidential data (e.g. business plans, financial documents and trade secrets).

Consequently, effective attention to cyber security risk throughout the value chain becomes a key requirement for a holistic approach to cyber security governance. For instance, an important aspect is to monitor the behaviour of

hardware and software components and ensure that it is completely compliant with set specifications and does not contain any vulnerabilities. Typical examples of cyber risk mitigation activities throughout the value chain include:

- Establish security baselines for external partners (i.e. customers, suppliers and vendors) and legally enforce them through security assurance clauses in agreements.
- Require integration with the third party's incident response processes that handle/have access to critical data.
- Conduct compliance audits with third parties and assess vendor risk.
- Require third parties to comply with the FMI's data privacy policies.

Note that the FMI should also be aware that significant issues can arise further down the value chain, e.g. when the FMI's partners in turn rely on third party agreements.

3.4 Integration and alignment of business processes

Cyber security governance must ensure that the various stakeholders, key processes and strategies work in tandem. The integration and alignment of different business processes focuses on developing a shared understanding of the relevant cyber risks and mutual coordination.

Firstly, cyber security should be fully integrated with the risk management strategies for different domains, i.e. it should become an integral component of enterprise risk management strategy (Bodeau, Boyle, Fabius-Greene, & Graubart, 2010). An integrated approach should result in:

- The positioning/prioritization of cyber security investments compared to other types of investments.
- A clear specification on how the cyber security investments fit into the broader concepts of mission assurance and/or business continuity. Additionally, a distinction will be made between investments that support mission assurance and investments that focus primarily on demonstrating compliance.
- Concise, better coordination between cyber security and other (ICT) investment decisions.

Secondly, in order to ensure a timely and coordinated response to cyber security events, it is advisable to align and integrate cyber risk management with other related business processes. Cyber incidents often have distinct characteristics (e.g. malicious, often persistent, sometimes concealed and usually resulting from the external environment), which should be taken into account in the detection, triage and analysis of the incident. Alignment and integration with well-established incident, problem and crisis management processes directly results in the following benefits:

- Capturing non cyber-specific events that might indicate an underlying cyber origin, such as failed login attempts or crashing applications;
- Access to more complete information on the business and service impact in the event of an information system (component) failure;
- Opportunity to leverage the proven procedures, for example procedures related to communication with the various stakeholders, escalation and ownership, and incident reporting.

Furthermore, cyber security effectiveness is to a certain extent determined by the effectiveness of business processes outside the cyberspace; e.g. employee hiring and screening processes and physical security processes (e.g. to avoid tailgating[1]).

(1) Tailgating refers to the act of entering a restricted area by following an authorized person without his/her consent.

3.5 Information sharing

Early warnings and expert advice on cyber events are crucial in ensuring that cyber security objectives are met. Information sharing and analysis centres (ISAC) are institutions that focus on providing this type of cyber intelligence. These institutions build strategic partnerships between companies, governments, universities and non-profit organizations.

FMIs are encouraged to participate in these ISACs. An independent participant, e.g. a governmental institution, ensures that the information is non-attributable and thereby avoids (further) reputation damage. A good example is the American FS-ISAC, which focus on incumbents of the financial sector. In the European Union the Network and Information Security (NIS) Directive aims to foster ISACs and to provide a concrete structure for sharing information between market participants and the various authorities. The implementation of the NIS directive is expected in early 2017.

Conclusion

Cyber threats have emerged as important drivers of risk for FMIs. Furthermore, cyber attacks against systemically important FMIs pose serious threats to financial stability. This is due to a number of reasons, including the heavy dependence on technology, the high levels of interdependence and the complexity of the FMIs. In addition, cyber attacks are becoming more frequent, sophisticated and persistent.

While standards provide a wealth of recommendations to improve the cyber security of an organization, FMIs are encouraged to implement a rigorous risk-based approach to cyber security and extreme scenarios. Risk-based approaches permit better coordination between the various investments in cyber security and improve the allocation of scarce resources. The role of the overseeing authorities is to ensure that the operational risk of the FMIs remains within the acceptable risk appetite, and that the negative network externalities are adequately addressed.

The overseeing authorities encourage a more holistic perspective on cyber security governance. The cyber security strategies of the FMIs should not focus exclusively on improving the technical cyber security controls, but should also include initiatives to develop a security culture and awareness, to stimulate senior involvement, to manage third party risk and to integrate the cyber security efforts in the broader (inter/intra)organizational context.

Annex

TABLE 5 INFORMATION (TECHNOLOGY) SECURITY STANDARDS COMMONLY ADOPTED IN THE FINANCIAL SERVICES INDUSTRY

Standard	Reference	Author			*Identify*			*Prevent*						*Detect*		*Respond*					*Recover*			Guidance				Industry	
		Governmental	Industry	Independent	ICT assets management	Threat environment analysis	Cyber risk assessment	Access control & HR	Training and awareness	Information security	Maintenance ICT systems	Protective technology	Policies and procedures	Events collection	Continuous monitoring	Response planning	Incident communication	Incident analysis	Incident mitigation	Learning	Recovery planning	(Structural) improvement	Communications	Principles	Controls	Implementation	Maturity model	All industries	Financial industry
COBIT 5 (1)	(ISACA, 2012)		X		X	X	X	X	X	X	X	X	X	X	X	X		X		X	X	X	X		X		X	X	
CSC (SANS)	(SANS, 2013)			X	X		X	X	X	X		X	X		X	X					X				X (2)			X	
ISO13569:2005	(ISO, 2005)			X			X	X				X	X		X			X	X		X				X	X			X
ISO/IEC27001:2013	(ISO/IEC, 2013)			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X (3)			X	
ISO/IEC27002:2013	(ISO/IEC, 2013)			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X				X	X		X	
ISO/IEC27005:2011	(ISO/IEC, 2011)			X		X	X																	X		X		X	
ISO/IEC270152012	(ISO/IEC, 2012)			X	X			X	X	X	X	X	X	X	X										X	X			X
NIST SP 800-39	(NIST, 2011)	X				X	X		X						X									X				X	
NIST SP 800-53 v4	(NIST, 2013)	X			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X		X	
NIST Cyber Security	(NIST, 2014)	X			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X (4)	X	
PCI DSS	(PCI, 2010)		X					X		X		X	X		X										X	X			X

(1) COBIT 5 organizes IT governance objectives and good practices in controls over information technology in a logical framework of IT related processes. While COBIT is not an information technology security standard as such, it contains risk and security processes that have been often implemented in the financial sector.

(2) The CSC guidelines do not claim to provide a comprehensive control catalogue; they provide a small number of actionable controls which considerably increases the organization's level of protection.

(3) A high-level overview of the control concepts elaborated in ISO/IEC27002:2013 is presented in annex A of ISO/IEC27001:2013.

(4) The NIST cyber security framework includes a tiers-based scheme that strongly resembles a maturity model.

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