Contents

Executive summary 7

Macroprudential Report 9

A. Introduction 9
B. Main risks and points for attention and prudential measures adopted 10

Financial Stability Overview 43

   Banking sector 43
   Insurance sector 68
   Additional charts and tables for the banking and insurance sector 80

Thematic articles 89

   Transaction-level data sets and monitoring of systemic risk: an illustration with Securities Holding Statistics 91
   Climate-related risks and sustainable finance. Results and conclusions from a sector survey 107
   A risk dashboard for detecting and monitoring systemic risk in Belgium 129

Statistical Annex 149
Executive summary

1. In the current macro-financial context, monitoring financial stability risks continues to be of great importance. In addition to the growing relevance for financial stability of a range of structural trends and risks – such as the intensive digitisation of the financial sector or risks related to climate change – the macro-financial impact of a persistent low interest rate environment is becoming increasingly apparent. Although a highly accommodative monetary policy on the part of the ECB is justified, given the current macroeconomic situation, the acceleration of the credit cycle in many EU countries, including Belgium, is an important warning that such a policy can also have adverse spillover effects and present potential risks to financial stability. The build-up of vulnerabilities in Belgium in the form of an increasing debt ratio of households and companies or rising exposure of the financial sector to undervalued or under-priced financial risks may, in the long term, affect the resilience and absorption capacity of the Belgian economy in the event of major shocks.

2. In this context, and in view of the high level of economic uncertainty and persistent (geo)political tensions, it is important to ensure that the financial sector, and in particular Belgian banks, remain resilient. It is therefore recommended to maintain large liquidity and capital buffers, and to ensure appropriate buffers for bail-in. These buffers provide banks with the necessary flexibility to absorb negative shocks, preserve continuity in the provision of financial services, and thus limit the impact on the real economy of phenomena such as forced deleveraging. The creation (or maintenance) of buffers by Belgian banks is also becoming increasingly important in the light of the persistent low interest rates, the continued need for an accommodative monetary policy and the limited scope for fiscal policy.

3. In this context, the National Bank of Belgium, in its capacity as macroprudential authority, introduced a new macroprudential measure in May 2018 that increases the risk weights of exposures to the Belgian housing market. This measure ensures the creation of significant, specific capital buffers that should enable the banks concerned to absorb significant negative shocks on the Belgian property market as well as credit losses, and to limit the impact of such a scenario on the real economy.

4. Although this macroprudential measure is crucial for maintaining resilience in the banks concerned and ensuring that the necessary buffers are created, it is so far not (or only insufficiently) reflected in mortgage lending rates and/or lending criteria. Belgian banks – driven inter alia by low interest rates and strong competition on their core markets – continue to grant mortgage loans on very flexible credit terms, and often at interest rates and margins that are not in line with the inherent risks and cost of equity. These developments could lead to the build-up of large portfolios of low-yield loans which, in the long run, may jeopardise the structural profitability in the banking sector as is in line with market requirements, thereby weakening the sector’s intermediation capacity and resilience. In this context, the Bank calls for correct pricing in line with the risks inherent in the (mortgage) loans, i.e. determining a sufficient price for the inherent risks and guaranteeing returns that are in line with market requirements. In addition, the Bank is of the opinion that a substantial decrease in the share of risky mortgages and, in particular, a reduction in high LTV ratio loans (more than 90 %) remains necessary.
5. Moreover, the build-up of systemic risks is not limited to the Belgian real estate market. In Belgium, as in a number of other euro area countries, the credit cycle is accelerating sharply, among others as a result of an increase in non-financial corporate loan growth. The acceleration in the credit cycle is also reflected in the credit gap – a key indicator for monitoring the credit cycle – which now exceeds the 2% of GDP threshold. This threshold is recommended by the ESRB for the activation of the countercyclical buffer. The countercyclical buffer is activated in a proactive and preventive manner in order to build up sufficient additional capital buffers (resilience) that can be used in the event of a financial recession to absorb possible credit losses and hence ensure the continuity of financial bank intermediation. The Bank is closely monitoring developments and stands ready to activate the countercyclical buffer should the acceleration of the credit cycle be confirmed in the most recent data. Due account should, however, be taken of current economic uncertainties and risks, and any pro-cyclical impact of such a measure should be avoided. A possible activation of the countercyclical buffer therefore requires rigorous risk monitoring and the possibility of immediately revoking such a measure in the event of a significant negative shock.

6. A series of structural economic trends deserve particular attention on the grounds that they may ultimately also have an impact on financial stability. In addition to a number of risks related to concrete political processes (such as Brexit), developments in the digitisation of the economy, climate change and related policies, as well as specific risks related to money laundering or terrorist financing, deserve due attention.

7. The risks associated with Brexit remain at the centre of attention. The extensive preparatory work carried out by both the financial sector and the relevant supervisory authorities has undoubtedly provided the necessary measures and contingency plans to protect the sector in many possible exit scenarios. It cannot be ruled out that Brexit could ultimately lead to a disorderly outcome that could have an impact on the Belgian financial sector.

8. Due to the intensive digitisation and increasing (digital) interconnection of the different sectors of the economy, the importance of IT risks and cyber risks is increasing considerably. Although these risks primarily affect the companies concerned, they are becoming more systemic in the financial sector (due to concentration on specific counterparties or as a result of correlated incidents) and their impact on financial stability is increasing.

9. In addition, the importance of climate change risks – whether due to direct exposure to climate change or due to the transition to a low-carbon economy or related economic policies – is also increasing. An integrated implementation of the required measures, starting with the Paris Climate Agreement, requires substantial additional investment and far-reaching technological innovations to effectively support this transition. Its financing will be a major challenge for the financial sector. But this transition also involves financial risks that the financial sector must duly take into account in a timely manner. In this context, rigorous monitoring of the potential risks associated with a profound transformation of the economy becomes essential to monitor the risk exposures of institutions and the sector as a whole. The financial sector should pay particular attention to the structural integration of these risks into its risk policy and risk analysis.

10. Finally, the financial sector must comply with the highest standards and best practices in money laundering and terrorist financing. Indeed this is also in the interest of the sector. Infringements of the relevant legislation, as has been uncovered in some European systemically important banks, may have significant prudential consequences due to the extent of possible sanctions or the risks of loss of confidence and reputation for the institution. In extreme cases, an impact on the financial stability of the sector cannot be ruled out. Comprehensive, risk-based supervision, in close consultation with microprudential authorities, as well as sustained attention by the financial sector to these risks, is therefore more recommended and necessary than ever.
A. Introduction

The Law of 25 April 2014 officially designated the Bank as the Belgian macroprudential authority. On the basis of that mandate, the Bank keeps a close watch on developments in the financial sector and focuses in particular on detecting any risks that could endanger the stability of the financial sector – and of Belgian banks especially. When such systemic risks arise, the Bank is authorised to take the necessary macroprudential measures to prevent the continuing build-up of those risks and reduce the financial sector’s vulnerabilities and exposure to those risks. These measures include not only the use of instruments for which the Bank is directly responsible, but also the publication of recommendations to other authorities that have the power to implement certain specific provisions.

In exercising its macroprudential mandate, the Bank has access to a wide range of instruments targeting the various types of risks to financial stability. One set of these instruments is geared to the structure of the financial market and intended to attenuate the risks arising from a significant concentration of exposures in certain institutions or from a high level of interdependence between financial institutions. For instance, as the macroprudential authority, the Bank defines each year the supplementary capital buffers for Belgian banks which are of systemic importance to the Belgian financial sector and may have a major influence on the real economy. Other measures in its arsenal are aimed more at the cyclical systemic risks which may for instance arise from the self-perpetuating interactions between lending, on the one hand, and the valuation of the real and financial assets used as collateral for the loans in question, on the other. Finally, the Bank has at its disposal – in some cases jointly with other competent authorities – a range of instruments aimed more particularly at specific risks. These are used, for example, for adjusting the capital requirements in line with developments on the property markets, the latter being a particularly likely source of systemic risk.

An effective macroprudential policy is therefore unthinkable without regular, detailed analysis of the potential risks threatening the stability of the financial system, as well as of the associated vulnerabilities for individual systemically important financial institutions or for the sector as a whole. Further information on the Belgian macroprudential policy framework is available on the Bank’s website.

In view of the importance of the macroprudential authority mandate and the extent of the means of action available to the Bank, the legislator has laid down various provisions to ensure transparency in the arrangements for performing this new function. For instance, the Bank is required to publish its decisions and recommendations, stating the reasons for them. It also has to publish and submit to the President of Chamber of Representatives an annual report specifying how it has fulfilled its mission of ensuring the stability of the financial system.

1 Law of 25 April 2014 establishing the mechanisms of a macroprudential policy and defining the specific tasks conferred on the National Bank of Belgium in connection with its mission of contributing to the stability of the financial system.
The present Report meets that requirement. The rest of this Report deals with the various points for attention and the different (macroprudential) measures taken by the Bank.

B. Main risks and points for attention and prudential measures adopted

Belgian financial institutions enjoy a sound financial position, as shown in particular by their comfortable solvency position, yet they face significant challenges. The various risks and points for attention covered in this Macroprudential Report could, in the long term, pose a threat to the financial stability. It is therefore essential that they are monitored and that, where appropriate, various (macroprudential) measures are activated.

Recently, the economic context (section 1) has been marked by a slowdown in euro area GDP growth in a climate of increasing uncertainty related, in particular, to international commercial tensions and to the withdrawal of the United Kingdom from the European Union. In this context, the ECB has maintained an accommodative monetary policy characterised mainly by low policy rates.

However, a prolonged period of low interest rates (section 2) weighs on banks’ primary source of income, namely their intermediation margin. The risk of a search for yield persists. For financial institutions, that search for yield may result specifically in a significant increase in lending, supported in part by loose lending standards, or in investment portfolio shifts in favour of riskier assets. A rise in cyclical systemic risks could, if it persists in the future, justify activating the countercyclical capital buffer.

On the property market (section 3), the low interest rates continued to sustain the dynamism of the past few years. These low interest rates prompted some investors to refocus their strategy on the property sector while, at the same time, the borrowing rates charged for residential or non-residential projects reached record low levels, which can affect the sustainability of lenders’ long-term profitability, and no longer fully reflected the risk associated with the loans granted. Furthermore, monitoring the evolutions on the Belgian residential property market showed that previously identified vulnerabilities had increased, which, given the extent of the banking sector’s exposures, led to the introduction of a new macroprudential measure in May 2018. As regards Belgian commercial property, significant progress has been made in filling data gaps.

Like other sectors, financial services are undergoing a digital transformation. This transformation generates both cyber risks, such as cyberattacks, and IT risks linked to, for example, outdated systems (section 4). If these risks were to materialise simultaneously in different institutions, this could have systemic consequences.

The risks associated with climate change (section 5) that have been identified for the Belgian financial sector primarily concern – at least in the short term – the challenges related to the transition to a low-carbon economy. Based on a survey of a representative sample of the financial sector, the Bank has addressed a series of recommendations to the Belgian banks and insurance companies.

An updated analysis of the systemic risks associated with the shadow banking sector and/or with the asset management sector (section 6) shows that these risks remain relatively limited but that non-contractual obligations within conglomerates are still a point for attention.

In additions to the analyses performed and the measures adopted with regard to the risks mentioned above, the Bank has established the list of domestic systemically important banks (section 6), as it does every year. These institutions are subject to additional capital requirements since their failure could have a significant impact on the financial system or the real economy. The Bank also reciprocated two new measures adopted by foreign macroprudential authorities (section 7).
1. Economic and financial context

A more uncertain macroeconomic environment

For more than four years, the large and continued expansion in the euro area was sustained by a relatively stable economic and financial environment. However, a series of risk factors and various uncertainties manifested themselves more intensely over the course of 2018. On the international level, the threat of an escalation in commercial tensions persisted. In Europe, the introduction of new regulations led to disruptions in automobile production. Certain countries such as France and Italy were also confronted with social pressure and uncertainties regarding their budgetary policy. Finally, in March 2019, the possibility of a disorderly Brexit without a transitional period strengthened the uncertainties related to the withdrawal of the United Kingdom from the European Union. The six-month extension granted to the United Kingdom in April has prolonged this period of uncertainty.

This combination of factors led to a slowdown in global trade and to a deterioration in business and consumer confidence. In this context, the economic slowdown in the euro area was more pronounced than initially expected. Euro area GDP growth fell from 2.5% in 2017 to 1.9% in 2018 and will reach 1.1% in 2019 according to the ECB projections of March 2019.

Chart 1

Economic conditions

Annual GDP growth in volume

Business confidence in the manufacturing industry

Sources: Eurostat, Federal Reserve Bank of St. Louis, ISM, Markit, NAI.
1 Synthetic curve for the entire manufacturing sector, standardised data.
2 Purchasing Manager’s Index (PMI), standardised data.
The baseline scenario for most projections assumes a slight strengthening in activity in 2020 with a growth rate close to 1.5%, which is in line with the growth potential. However, this scenario rests on the assumption that the impeding factors that recently appeared are mitigated and that, among other things, an agreement on Brexit has been reached. In Belgium, GDP growth reached 1.4% in 2018 and is expected to slow down slightly in 2019. In general, potential growth in Europe and Belgium remains constrained by low productivity gains and by the growing impact of population ageing on the labour supply.

The marked improvement in labour market conditions alongside the expansion of activity has recently started to lead to slightly more pronounced wage increases. To date, however, these increases have hardly been reflected in the evolution of consumer prices. Furthermore, the underlying trend of inflation is not yet in line with the central bank’s objective. Total inflation in the euro area fell slightly in early 2019 as the global demand slowdown weighed on oil and other commodity prices.

To date, however, these increases have hardly been reflected in the evolution of consumer prices. Furthermore, the underlying trend of inflation is not yet in line with the central bank’s objective. Total inflation in the euro area fell slightly in early 2019 as the global demand slowdown weighed on oil and other commodity prices.

The ECB maintains a highly accommodating monetary policy

Even though it has stopped net securities purchases on the market, the ECB maintains a highly accommodating monetary policy by continuing to reinvest the proceeds of matured securities, by announcing the implementation of a third targeted longer-term refinancing operations programme (TLTRO-III), by maintaining low policy rates and, finally, by providing forward guidance on the subject.

The risk factors are reflected in financial asset prices

The various elements described above strengthened the feeling of uncertainty among stock market participants in the final quarter of 2018. Increased market uncertainty was already apparent at the beginning of the year, when the publication of statistics relating to inflation and employment in the United States seemed to indicate that the monetary policy would be normalised faster than expected. This incident showed that markets are sensitive to macroeconomic or policy-relevant information, and even more so in a low interest rate environment and when risk premiums are low. In such a situation, an interest rate hike or a return to risk aversion could prompt investors to quickly change the composition of their portfolios, which would cause a sharp price correction for the riskiest assets. That is precisely what happened in the final quarter of 2018, when stock prices fell precipitously following commercial and political tensions. In the United States, for instance, the S&P 500 index dropped 14% between the end of September and the end of December while, in Europe, the Euro Stoxx 50 index lost a tenth of its value. This period was also marked by growing uncertainty, as illustrated by the evolution of the implied volatility indicators derived from options prices on the stock market indices. This increased uncertainty manifested itself in a flight to safety, where investors shifted to less risky assets, particularly sovereign bonds, thereby depressing the yields of those bonds.

Despite the mitigation of certain risk factors at the turn of 2018/2019, the long-term yields of the highest-rated euro area sovereign bonds remained low, reflecting the ECB’s decision to keep its rates unchanged in light of the recent developments of the economic indicators as well as, more generally, the still relatively pessimistic economic outlook of the markets.

Although equity prices recovered in the first quarter of 2019, certain events that occurred in 2018 continued to influence investors’ risk assessment. On the one hand, there are the uncertainties resulting from the significant rise in the budget deficit announced by the new Italian government in May, which led to a substantial increase in the interest rates on the government debt securities issued by Italy. On the other hand, although the risk premiums required by investors for corporate bonds have fallen since the beginning of 2019 after having increased in 2018, their levels remain higher than at the end of 2017, especially for bonds of low average quality i.e. bonds with a BBB rating.
Chart 2

Equity markets

Major stock market indices
(2 January 2015 = 100)

Implied volatility

Sources: Thomson Reuters, Refinitiv.

1 Volatility measures derived from options prices on the Euro Stoxx 50 and S&P 500 indices.

Chart 3

Risk premiums on sovereign and corporate bonds
(spreads compared to swap rates\(^1\), in %)

Sources: IHS Markit, Thomson Reuters, Refinitiv.

1 The 10-year OIS rate is used as a proxy for the risk-free rate.
2. Low interest rate environment and search for yield

2.1 Description of the risks

As indicated in the previous section, the downside risks to economic growth and inflation became more prevalent in 2018 and at the start of 2019. Consequently, two scenarios should be considered in the short to medium term: that of an abrupt increase in risk premiums and that of a prolonged low interest rate environment. The first scenario could become a reality if certain downside risks were to materialise, particularly if the data indicated a marked slowdown in economic growth. Financial market risk premiums could then rise rapidly, which could increase credit risk by tightening real economy financing conditions and by reducing the value of the financial assets held by economic agents.

Based on recent announcements from the American Federal Reserve and the ECB, however, market expectations suggest a higher probability of a prolonged low interest rate environment scenario. In the United States, the Federal Open Market Committee announced at the start of 2019 that, in light of global economic and financial developments and muted inflation pressures, it would be patient in determining what future adjustments to the target range for the federal funds rate may be appropriate to support the sustained expansion of economic activity, strong labour market conditions and inflation near the 2% objective. As regards the euro area, the Governing Council of the ECB decided at the same time to further loosen its monetary policy in order to ensure that inflation remains on a sustainable path towards inflation rates below but close to 2% over the medium term. The Governing Council now expects policy rates to remain unchanged at least until the end of 2019 and has decided to launch a new series of TLTROs.

![Yield curves](chart4.png)

**Chart 4**

**Yield curves**

(in %)

**United States**

- December 2016 (average)
- September 2018 (average)
- 29 April 2019

**Euro area**

- December 2016 (average)
- September 2018 (average)
- 29 April 2019

Sources: Thomson Reuters, Refinitiv.

1 Government bond yields.
2 OIS rates.
The yield curve was largely influenced by the (expectations regarding) monetary policy in 2018 and at the beginning of 2019. In the United States, the yield curve – based on government bond yields – continued to flatten. Until September 2018, this flattening was entirely due to the rise in short-term rates in the context of the normalisation of monetary policy and, subsequently, it was caused by the decrease in long-term rates in a context of volatile stock markets and the revision of (expectations regarding) the monetary policy strategy. In April 2019, the American yield curve was mostly flat. This phenomenon should be followed closely given that, historically, a flat or inverted yield curve has been a predictor of recessions: the yield curve in the United States has flattened or even inverted approximately one year before each of the nine recessions identified by the National Bureau of Economic Research since 1955. In the euro area, the yield curve – based on the overnight indexed swaps (OIS) – remains steeper due to the persistently low short-term rates, which primarily reflect the delay in the timeframe expected by the markets for the normalisation of monetary policy. In this regard, it should be noted that the recent decrease in long-term rates has led to a slight flattening of the curve, as a result of which the forward yields indicate that the 1-year OIS rate will remain negative until 2022 (without accounting for risk premiums).

Maintaining the policy rates of the ECB at their current levels could – through the monetary policy transmission mechanisms – affect the other types of interest rate, including the interest rates on bank loans granted to the real economy. A prolonged low interest rate environment therefore also entails certain risks for the financial stability, specifically because such an environment weighs on the profitability of financial intermediaries and encourages them to search for yield. In general, this search for yield manifests itself in a rebalancing of the portfolios in favour of riskier and/or less liquid assets with higher yields.

Chart 5
Annual credit growth rate

(in %)

The relatively strong growth of credit to the real economy partially reflects a search for yield by the Belgian banks

Sources: ECB, NBB.
1 Loans, including securitised loans, granted by domestic banks to Belgian residents.

1 More information on the mechanisms underlying the link between the yield curve and recessions can be found in an article published in the Bank’s Economic Review in June 2019.
The relatively strong growth of credit to the real economy partially reflects a search for yield by the Belgian banks. These high growth rates are the result of, in particular, the use of the additional resources that were at the banks’ disposal following a new increase in households’ regulated savings deposits. Despite their low yields, these deposits grew from €260.9 billion in January 2018 to €274.0 billion in March 2019, as households favoured the safety and liquidity of bank deposits in a context of exacerbated economic uncertainty. At the same time, the growth of bank credit to the non-financial private sector continued to stand at high levels. More specifically, the annual growth of credit to households as well as the growth of credit to non-financial corporations stood at 5.7% in March 2019.

2.2 Impact on the financial sector

In general, Belgian banks enjoy a sound financial position. The sector’s return on equity reached 8% in 2018, which, while certainly below its 2017 level (8.9%), is still substantially higher than the average ratio in the euro area. The prolonged period of low interest rates nevertheless weighs more and more on banks’ intermediation margins, which are their primary source of income. The low interest rate environment also poses a significant challenge to insurance companies, particularly for life insurance products offering a guaranteed rate of return. In a context of severe (internal or external) competitive pressures, both Belgian banks and insurance companies are required to make further efforts to continue adapting their business models. Low short- and long-term interest rates remain crucial to supporting economic activity. However, the low – and sometimes even negative – interest rates are rather detrimental to the profitability of the financial sector. Financial institutions could be tempted to compensate for the negative consequences of the interest rate environment by taking greater risks.

Chart 6
Interest rates on the various types of outstanding assets and liabilities of Belgian credit institutions

(Non-consolidated data; in %)

The prolonged period of low interest rates weighs more and more on banks’ intermediation margins

Source: NBB.

1 Rates calculated as the ratio of the cumulative flows of interest paid and received over twelve months to the average outstanding volume of the corresponding assets or liabilities during the period under review.
Until 2017, the pressures on the interest rate margins (driven mainly by the flattening of the yield curve) had led to a drop in banks’ interest income. Faced with falling rates of return on their assets, Belgian banks were no longer able to reduce their funding costs, and the net interest income of credit institutions declined. In 2018, however, this income began to rise again. While this development can be explained in part by the income from derivatives or foreign activities, it also reflects the significant amounts of credit to the Belgian non-financial private sector. In this way, banks have compensated for a negative “price” effect by using a “volume” effect.

To some extent, this “volume” effect is accompanied by a loosening of the lending standards applied by banks. Although this is especially true for mortgage loans (see section 3), it is more generally the case for all credit to the non-financial private sector. As a result of the intense competition, for example, the commercial margins applied to this credit decreased further to levels that no longer fully reflect the risk associated with the loans granted. The reduction in commercial margins creates new pressure on interest income, prompting institutions that have not sufficiently diversified their sources of income to maintain or increase production volumes.

The insurance sector, and especially the life insurance business, is also negatively impacted by the low level of interest rates. The life insurance business features liabilities with a maturity that tends to be longer than that of the assets, as well as historical liabilities which, in some cases, offer high guaranteed rates of return.

In 2018, however, the premiums registered for life insurance increased after having declined almost continuously since 2007. This renewed increase is almost entirely due to the growth in class 23 (life insurance linked to investment funds with no guaranteed rate of return) while class 21 (life insurance with guaranteed rate of return) registered a very slight increase.

Chart 7
Life insurance business
(non-consolidated data; in € billion unless otherwise specified)

The premiums registered for life insurance increased and the average guaranteed rate of return on class 21 contracts decreased further

Source: NBB.
mainly due to group insurance contracts. Moreover, the average guaranteed rate of return on class 21 contracts decreased further in 2018, particularly as a result of programmes for the surrender of contracts with a high guaranteed rate of return. In this way, insurers ensured that they could honour their commitments to the policy-holders.

Belgian insurance companies are gradually shifting towards assets that offer higher yields but are often riskier and/or less liquid

Considering the low interest rate environment and the intense competition (e.g. with regard to non-life business), Belgian insurance companies are nevertheless gradually shifting towards assets that offer higher yields but are often riskier and/or less liquid. In 2018, for instance, Belgian insurers once again increased their holding of assets held in the form of mortgage loans or loans to related or unrelated companies.

2.3 Prudential measures

One of the Bank’s main tasks as a macroprudential supervisor is to identify and monitor cyclical systemic risks. When it identifies an excessive accumulation of such risks (vulnerabilities), the Bank must propose the necessary macroprudential corrective actions to prevent a further build-up of such systemic risks and/or to limit the impact that such risks may have on the real economy. The Countercyclical Capital Buffer (CCyB) is one of the Bank’s main instruments for intervening – in the event of an accumulation of cyclical risks – in a timely and preventive manner. Such buffers, which are established and put in place when such systemic risks accumulate (during the upward phase of the credit cycle), generate additional absorption capacity for banks so that, in the event of a financial recession, they can absorb the additional losses and thus ensure continuity of credit provision to the real economy.

The Bank therefore closely monitors developments in the credit and financial cycles. These cycles can get out of hand if – as was the case before the financial crisis – banks (and/or the shadow banking sector), under pressure from intense competition or unjustified profit-seeking, grant too many relatively or wholly unproductive investment projects on excessively loose terms. In particular, the Bank monitors developments

Chart 8

Credit/GDP gap
(percentage of GDP)

Source: NBB.
in the provision of credit in combination with developments in financial markets, real estate markets and the real economy, and examines whether this provision of credit is excessive and whether it gives rise to an accumulation of systemic risks.

In this context, the Bank notes that the credit cycle continues to be on an upward trend in Belgium – as in several other countries. The provision of credit to the Belgian non-financial sector is increasing rapidly, particularly following the persistent low interest rate environment, and its growth rate (5.7 %) is well above that of the euro area (3.4 %). Such credit growth is not necessarily in line with the low (potential) growth of the Belgian economy and is partly due to (too) low interest rates (partly due to underestimation of risks) and too loose credit conditions. The acceleration of the credit cycle is confirmed by the credit/GDP gap, which (on the basis of the Belgian banking law and ESRB guidelines) occupies a central place in the analysis. The most recent figures for the credit/GDP gap in Belgium show a further increase in the gap to 2.2 %, which is more particularly due to a significant acceleration in the growth of loans to non-financial corporations in Belgium. At 2.2 % of GDP, the Belgian credit/GDP gap exceeds the 2 % threshold – recommended by the ESRB – for the activation of the CCyB.

In light of the accelerating credit cycle, it is becoming more important to build up additional counter-cyclical capital buffers in the banking sector in a timely manner. In particular at a time when economic uncertainty and volatility on the financial markets are increasing and vulnerabilities in Belgium (in particular increasing indebtedness) are accumulating, it is recommended to ensure the resilience of banks and thus to guarantee a stable credit supply to the real economy. In this respect, a balance must be struck between, on the one hand, the need to put such buffers in place in time and, on the other hand, the possible pro-cyclical effects of such buffers in the event of a further slowdown in economic growth or the materialisation of significant risks. The Bank continues to closely monitor developments in the credit cycle and could – like some other EU countries such as France, Luxembourg or Ireland – consider activating the CCyB if the acceleration of the credit cycle (and the accumulation of systemic risks) is confirmed.

As regards the insurance companies, the reorientation of their assets and investments is monitored at the microprudential level. At this stage, in particular in view of the current lack of directly applicable macroprudential instruments but also of the limited systemic impact of the developments observed, no macroprudential measures have been taken in this respect.

3. Developments in the real estate markets

3.1 Description of the risks

Residential real estate market

Residential property prices have been rising strongly in Belgium in recent decades. Housing prices have more than doubled since the early 2000s. Contrary to what has been observed in a number of other European countries, the economic and financial crisis has not led to a genuine downward correction of house prices in Belgium. However, the rise in house prices slowed down somewhat in the wake of the crisis. This deceleration ended in 2015, although it was expected that reforms in the tax deductibility of mortgage loans would have a downward effect on prices in that year. In 2016 and 2017, house prices increased by 1.6 % and 3.8 % respectively in nominal terms. In 2018, prices rose by 3.6 % in nominal terms, which is similar to the growth rate in 2017. In real terms, i.e. taking into account the private consumption deflator, the increase was 1.8 % in 2018.

The Bank continues to closely monitor developments in the credit cycle and may consider activating the CCyB if the acceleration of the credit cycle is confirmed.
According to the estimates of an econometric model that takes account of various demand factors – household disposable income, mortgage rates, demographic trends and key changes in taxes on real estate –, house prices in 2018 are believed to have been approximately 5.9% higher than their estimated equilibrium value. This figure is in line with those of the previous two years, indicating that property prices have generally moved in parallel with the main determinants of demand for property. A level of property prices that corresponds to the equilibrium value does not imply that there is no risk for the property market. If one of the determinants of house prices were to deteriorate significantly, for example in the event of a rise in interest rates or a negative shock on household incomes, house prices could fall sharply.

**The Belgian residential real estate market remains dynamic**

The annual number of real estate sales on the secondary market has increased significantly in recent years. After the surge in the number of real estate transactions at the end of 2014 and their subsequent significant decline in 2015, following the reforms of the tax deductibility of mortgage loans, the number of transactions rebounded significantly in 2016 and continued to rise thereafter. In 2018, real estate activity was about 4.5% higher than in 2017. The primary market also showed a higher dynamism. In 2018, almost a quarter more building permits were issued than in 2017. In the majority of cases, these were building permits for apartments.

The trends observed in recent years in the residential real estate market can be explained by the dynamics of various factors. At the macroeconomic level, the pronounced fall in mortgage interest rates, combined with rising household income and generally favourable economic conditions, supported demand for real estate. Population growth and the steady decline in average household size have undoubtedly also contributed to this. Lastly, against a backdrop of low elasticity of housing supply, the anticipated advantage of the real estate tax reforms, intended to encourage property purchases, was to a large extent passed on in prices.
Commercial real estate market

The investment trends observed in the commercial real estate market (offices, commercial premises, industrial buildings, retirement homes, etc.) are also influenced by the low interest rate environment, in which commercial real estate offers an attractive return compared to so-called “traditional” assets. Indeed, despite the weaker yields due to the low interest rates, and investors’ growing appetite for this type of asset, broker Jones Lang LaSalle’s reports indicated average yields for 2018 ranging from 3.25% to 5.25% depending on the type of asset.

The investment volumes observed in 2018 confirm this attractiveness, since the amounts of transactions for 2018 reached €4.6 billion, a level equivalent to that observed in 2007. This increase in 2018 can be explained in particular by the conclusion of three major transactions in commercial premises (shopping centres), each involving foreign investors.

Chart 10
Investment in commercial real estate in Belgium

Foreign investors have been key players in the Belgian commercial real estate investment landscape for several years now. In 2018, the majority of them were institutional investors or real estate professionals seeking stable long-term returns. They came from a variety of countries, including the Netherlands (12% of total investment in Belgium in 2018), South Korea (10%) and the United States (8%). While the presence of foreign investors makes it possible to introduce some diversification of risk in the sector, it may also lead to greater volatility because these actors would be more inclined to withdraw their investment from Belgium, particularly in the event of a price shock.

Foreign investors contributed to the dynamism of the commercial real estate market in Belgium.
Domestic investors also contributed to the dynamism of the investment market. Real estate investment trusts (REITs), in particular, generated more than € 850 million in transactions in 2018, despite their growing activity abroad (mainly in neighbouring countries). At the end of 2018, these companies accounted for more than € 16 billion in real estate investment, including € 10 billion in Belgium. Despite its strong growth in recent years, this sector remains highly capitalised, with an average debt ratio of 46 %, which is well below the regulatory threshold of 65 % applicable to these companies.

Other Belgian players such as construction companies, real estate developers and property dealers have made a significant contribution to the dynamism of the real estate sector in Belgium in recent years. Although they are not always directly involved in transactions, they are included in the scope of commercial real estate as defined by the Bank, since they engage in real estate activities aimed at generating income. These companies contribute significantly to the expansion of the stock of residential and non-residential property on the Belgian market, sometimes on a speculative basis (i.e. by building with own funds). Between 2011 and 2017 (the latest year for which complete data are available), the total assets of these companies increased by more than 35 %. However, this increase is mitigated by an improvement in the sector's debt ratio, a development which contrasts sharply with what was observed in some EU countries before the burst of a housing bubble.

Despite the dynamism of the construction and investment markets, commercial property prices in Belgium have shown moderate developments over the past few years. According to the index calculated by the ECB, these prices still reach, for all types of property combined, levels below those of 2011, unlike the average prices recorded for the European Union, which are 20% higher than those of 2011.

**Chart 11**

**Developments in commercial property prices**

*ECB Commercial Property Price Index*  
(2011 = 100)

*Price index for commercial real estate sub-segments*  
(index based on REITs’ returns, 2009 = 100)

Sources: ECB, NBB.

1 The price index based on REITs’ returns is calculated according to the methodology described by Eurostat in its document “Commercial property price indicators: sources, methods and issues” (2017).
However, this overall price trend for Belgium hides significant disparities according to the type of property concerned. In fact, while office prices have generally fallen in recent years, as a result of the financial crisis, prices recorded for commercial premises showed a sharp increase until 2016, before falling slightly, notably as a consequence of the terrorist attacks in Brussels or the breakthrough of e-commerce. As regards the prospects for these two segments, which represent the bulk of commercial property stock in Belgium, professional players are less than enthusiastic: after several years of decreases, vacancy rates ( % of unoccupied space) could indeed increase in 2019, for offices on the one hand, due to the arrival of new constructions on the market, and on the other hand for commercial premises, as a result of the search for smaller locations under the pressure of e-commerce.

3.2 Impact on the financial sector

Banking sector

The Belgian banking sector is widely exposed to the Belgian residential and commercial real estate markets. It is therefore very sensitive to possible shocks on these markets, such as a sudden drop in house prices, but also to more general changes in economic conditions in Belgium, such as an increase in unemployment, which would affect borrowers’ repayment capacity. Such events could thus have serious consequences for the Belgian banking sector and for financial stability in general.

Since a large part of the real estate activity is financed by mortgage loans, the outstanding amount of mortgage loans granted to households on Belgian banks’ balance sheets has risen sharply in recent decades. The outstanding amount of Belgian mortgage loans continued to rise during the economic and financial crisis, albeit at a slower pace. Their annual growth rate fell from over 10 % in the years before the crisis to less than 3 % in 2014. However, it started to rise again at the end of 2014, as the further decline in interest rates and the favourable economic conditions encouraged Belgian households to borrow (more). Since then, the net increase (i.e. taking into account amortisations) in mortgage loans granted by Belgian banks to Belgian households has been around 5 to 6 % on an

Chart 12
Exposure of the Belgian banking sector to the Belgian real estate market

(non-consolidated data, € billion, unless otherwise stated)

Source : NBB.

1 Authorised exposure amounts (maximum loan balance or authorised credit limit).
At the end of 2018, outstanding mortgage loans amounted to more than €200 billion, about four times the amount at the beginning of 2000. This increase is explained both by a rise in the number of outstanding contracts and by the constant increase in average amounts borrowed, which is correlated with the increase in house prices. Between 2000 and 2018, the average amount borrowed for the purchase of a house increased from less than 75,000 to nearly 160,000 euro.

The strong dynamism in the residential real estate market has also been accompanied by incentives for construction companies, real estate developers and real estate property dealers to build, renovate, buy and sell real estate. Since these companies are partly financed by bank credit, the outstanding amount of loans granted by Belgian banks to such companies has also increased significantly in recent years. Between the end of 2004 and the end of 2018, loans granted to Belgian companies active in the construction and real estate sector increased from €23 billion to €55 billion. The sub-sector of construction companies, real estate developers and real estate property dealers recorded an increase from €9 billion to €21 billion during the same period. Belgian banks are also indirectly exposed to the commercial real estate market. For instance, they also grant loans to companies active in other sectors for which commercial real estate (such as offices, shops, etc.) is provided as collateral.

The extent of Belgian banks’ exposures to the Belgian real estate sector has therefore increased significantly in recent years. Between the end of 2007 and the end of 2018, the importance of Belgian mortgage loans in total assets increased from 8% to 21%. At the same time, the importance of loans to companies active in the construction and real estate sector increased from 2% to 5.5%.

**Chart 13**

**Developments in credit standards for new mortgage loans to Belgian households**

*(percentages of total loans granted during a particular vintage)*

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**Loan-to-value ratio**

- ≤ 80%
- [80% ; 90%]
- [90% ; 100%]
- [100% ; 110%]
- > 110%

**Maturity**

- ≤ 10 years
- [10 years ; 15 years]
- [15 years ; 20 years]
- [20 years ; 25 years]
- [25 years ; 30 years]
- > 30 years

**Debt-service-to-income ratio**

- ≤ 30%
- [30% ; 50%]
- > 50%

Source: NBB.
In recent years, the dynamic credit growth has also been accompanied by increasing competition among Belgian banks and by an easing of credit standards in the mortgage market. Data from the mortgage loan survey conducted by the Bank among credit institutions show that, until 2012, Belgian banks granted a relatively high proportion of new loans with a long maturity (more than 25 years) and new loans with a high ratio (more than 100%) between the amount borrowed and the value of the property provided as collateral (loan-to-value or LTV ratio). During the period from 2012 to 2014, when the Bank first expressed its concerns about the Belgian housing market and introduced a first macroprudential measure to increase the capital that banks had to set aside for this purpose, their share in the total production of new loans fell significantly: from 20% to 4% for loans with a maturity of more than 25 years and from 13% to 7% for loans with an LTV ratio above 100%.

However, since 2014, the year in which credit growth started to accelerate again, a further easing of credit standards has been observed. Between 2014 and 2018, the proportion of loans for which the amount borrowed represented more than 80% of the value of the property provided as collateral increased from 41% to 53% of new production. This increase mainly concerned loans with LTV ratios between 90% and 100%, while those with ratios above 100% remained contained. Maturities have also been lengthening again: the share of loans with a maturity of more than 20 years has risen from 29% in 2016 to 39% in 2018. At the same time, a large proportion of new loans remain associated with a high monthly debt burden compared to the borrower’s monthly disposable income (debt-service-to-income ratio – DSTI). Between 2014 and 2018, the DSTI ratio of more than 20%

**Chart 14**

**Gross commercial margin on new mortgage loans and breakdown of outstanding mortgage loans by interest rate level and type**

(billions of euros, unless otherwise stated)

<table>
<thead>
<tr>
<th>Year</th>
<th>Annual production of mortgage loans (left-hand scale)</th>
<th>Difference between client rate and swap rate (percentages)</th>
<th>Swap rate (percentage)</th>
<th>Client rate (percentage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
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<td>2019</td>
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</tr>
</tbody>
</table>

**Source:** NBB.

1 Weighted by volume over the various maturities.
of new loans was higher than 50%, which means that the borrower spends more than half of his monthly disposable income on repaying his loans.

Pressure from the low interest rate environment and increased competition on the Belgian mortgage market have also led to a narrowing of profit or commercial margins on new mortgage loans. The average interest rate on new mortgage loans offered to clients (client rate) fell from 2.7% at the end of 2014 to 1.8% at the end of 2018. By comparing the development of the client rate with that of the swap rate, both weighted over the various maturities, one can approximate the development of the gross commercial margin. Although this gross margin increased sharply after the economic and financial crisis, after having fallen back to very low levels shortly before the crisis, it has systematically declined again in recent years, to a level of around 100 basis points. After deducting all other costs, such as costs associated with credit and liquidity risk and costs related to the capital held, for many banks only a very small net commercial margin remains. In addition, little differentiation is observed in the pricing of loans with different risk profiles. Therefore, there are concerns about whether banks set their pricing correctly when granting new mortgage loans.

Belgian banks are trying to offset to a certain extent the negative impact of these low margins on their interest income by pushing up volumes, which further intensifies competition. In addition, by doing so, banks build up a large portfolio of assets with a very low interest rate, often fixed for the whole maturity of the loan. Due to the decline in interest rates on new loans and the high degree of refinancing of outstanding loans at a lower interest rate in recent years, the average interest rate on the total amount of mortgage loans outstanding fell to around 2.3% at the end of 2018.

**Chart 15**

**Household debt ratio and default rate of Belgian mortgage loans**

Belgian banks offset the negative effect of low margins on their interest income by pushing up volumes
Since mortgage loans account for the major part of household debt, the strong growth of the banking sector's mortgage portfolio also led to a gradual increase in the debt ratio of Belgian households. Between the end of 2009 and the end of 2018, the debt ratio of Belgian households increased from 52% to 61% of GDP, whereas it fell from 64% to 58% of GDP in the euro area as a whole. However, so far, the mortgage default rate remains low and even continues to fall against the backdrop of favourable economic conditions. At the end of 2018, the share of defaults in the number of mortgage contracts was only 0.9%, compared to 1% a year earlier, which is a historically low rate.

However, it cannot be excluded that the default rate will increase in future. Given the extent of exposures to the Belgian real estate market, recent developments in the credit standards for new mortgage loans and the continued rise in Belgian households’ debt ratio, the potential impact of a shock affecting the real estate market or the economic conditions in general is significant for the Belgian banking sector and for financial stability in general.

Should house prices suddenly fall (e.g. as a result of a sudden interest rate shock), banks could suffer higher than expected losses from borrowers who are no longer able to repay their loans, as the value of the collateral provided would have fallen to a level potentially below the residual value of the outstanding loan. In this context, it should be noted that, for more than 25% of the total outstanding Belgian mortgage loans, the remaining outstanding amount is more than 80% of the current value of the property provided as collateral. Similarly, if the economic situation would deteriorate (leading e.g. to an increase in the unemployment rate), banks may face higher credit losses since the probability increases that borrowers will no longer be able to repay their loans. In addition, a sudden drop in house prices or a deterioration in economic conditions also leads to a higher risk of default for construction and real estate companies, as the risk increases that they will no longer be able to sell renovated or newly constructed buildings, or will only be able to do so at a lower than expected price.

Although the potential impact of a negative interest rate shock on the private sector's repayment capacity is limited due to the high proportion of loans with a fixed interest rate or a limited interest rate variability, such a shock could have a significant impact on the banking sector. Indeed, a sudden interest rate increase would lead to higher financing costs, while asset returns would only adjust gradually, given the large proportion of long-term assets (with low interest rates) on banks’ balance sheets. This could threaten future profitability of the banking sector.

Since a decline in house prices would also compress the wealth of households (which consists for a large part of real estate) and businesses, it could also affect the real economy (and thus the banking sector) through the private sector's consumption, their investment and savings behaviour and their borrowing capacity. However, it should be noted that the estimated impact of house prices on economic growth in Belgium is generally considered to be relatively limited compared to some other countries.

Insurance sector

Like banks, Belgian insurance companies also invest significantly in the real estate sector. In addition, in search of an alternative to their traditional investments that have become less profitable, Belgian insurers have gradually increased their exposure to this sector, either directly through the holding of buildings or indirectly through the holding of mortgage loans or the purchase of financial instruments issued by companies operating in the construction and real estate sectors.

Since March 2016, these exposures have increased by more than 33%, to reach more than €39 billion in December 2018. Once again, insurance companies’ attraction to real estate investment can be explained by the low interest rates but also by the fact...
that real estate is, at least in principle, a long-term investment that allows insurers to cover certain commitments in the very long term. According to EIOPA estimates, at the end of September 2018, the total real estate assets of Belgian insurers amounted to 12% of the sector’s total investments, excluding class 23, compared with only 9% on average for all insurers in the European Union.

3.3 Prudential measures

Residential real estate

Given the extent to which the Belgian financial sector is exposed to the residential and commercial property markets in Belgium and, as a corollary, the potentially significant impact of developments in those markets on the Belgian financial sector and on financial stability in general, the Bank has been closely monitoring developments in the real estate and mortgage markets for several years.

In 2013, the Bank, in its capacity as Belgian macroprudential authority, decided, on the basis of its risk analysis, to introduce a specific macroprudential measure for the residential real estate market. This measure consisted of a five-percentage point increase in the risk weight calculated by Belgian banks using internal models for their Belgian mortgage loan portfolio. The Bank had noted that the average risk weight of the Belgian banking...
sector as calculated in accordance with internal models was very low and might therefore prove insufficient to absorb the potential losses that banks could incur in the event of a deterioration in market conditions. The aim of the measure therefore was to increase banks’ resilience to a potential materialisation of the risks that had accumulated in the Belgian mortgage portfolio.

The low average risk weight as calculated in accordance with internal models results from the fact that banks calibrate their models according to historical data for credit losses, which have never been high on the Belgian market as there has not been any real crisis period. As the Bank’s analysis showed that the differences in internal risk weights of individual banks were largely due to variation in their risk profiles, the Bank decided to increase the risk weights as calculated by the banks by a fixed percentage rather than imposing the same minimum fixed risk weight on all banks. As such, banks continue to have an incentive to maintain sound lending standards.

Following the introduction of this measure, the average internal risk weight of Belgian mortgage loans in the Belgian banking sector increased from around 10% at the end of 2012 to around 15% at the end of 2013 and in the following years. In 2016, the Bank decided to extend the application of this measure for one more year, until the end of May 2017.

In view of the persistence of vulnerabilities and the further deterioration of credit standards, the Bank introduced a new measure, which entered into force in May 2018. This tightened measure has two components. The first one is a linear component, i.e. targeting all mortgage loans in the same way, that exists of a five-percentage point increase in the internal risk weight, thus ensuring continuity with the previous measure. The second, more targeted, component applies according to the average risk of each bank’s portfolio, using a multiplier. In this case, the initial (microprudential) risk weight is multiplied by a factor of 1.33. This means that banks holding a riskier mortgage loan portfolio and therefore contributing more to systemic risk are subject to a proportionately higher capital requirement.

Given the persistence of vulnerabilities, the Bank introduced a new macroprudential measure in May 2018

Chart 17
Average risk weight, as calculated in accordance with internal models, of Belgian mortgage loans in the Belgian banking sector

(Percentages)

![Chart showing average risk weight as calculated in accordance with internal models, of Belgian mortgage loans in the Belgian banking sector]

Source: NBB.
The introduction of this measure led to an increase in the average internal risk weight of Belgian mortgage loans from 10% to 18% (5 percentage point increase due to the first component and 3 percentage points due to the second component), i.e. slightly higher than the European average.

In addition to this capital-based measure, the Bank also set up a monitoring framework for risks in the Belgian mortgage market in 2012. This monitoring framework firstly consists of a detailed six-monthly data collection (the "PHL survey") for credit institutions with the largest mortgage loan portfolios. The survey collects a wide range of information on outstanding amounts and production of new mortgages, such as the level and variability of interest rates, type of collateral, lending standards, risk weights used for the calculation of capital requirements, and various other parameters. The PHL survey is currently being expanded and adapted based on the ESRB recommendation of 2016 on closing real estate data gaps. Following the recommendation of the IMF’s FSAP report on the monitoring of exposures to mortgage loans in the insurance sector, the Bank also developed a reporting for the main insurers concerned in Belgium (see Box 2 in the “Insurance sector” section of the Financial Stability Overview of the Financial Stability Report).

Secondly, the monitoring framework comprises a regular exchange of information between the banks concerned and the Bank, inter alia through interviews. In this context, the Bank has repeatedly communicated within the sector the importance of maintaining sound credit standards and setting correct pricing for new mortgage loans. Recent interviews have shown that the differences in the level and development of credit standards between banks largely reflect the extent to which banks have a well-developed framework for monitoring their risks and credit acceptance policies. Banks with less conservative credit standards are generally those with a less granular, less effective and less multifaceted risk control framework.

The Bank calls for correct, risk-based pricing of mortgage loans and for a reduction of loans with high loan-to-value ratios.

The measures taken by the Bank with regard to the Belgian real estate market aim, on the one hand, to sufficiently strengthen banks’ resilience (through the capital measure) and, on the other hand, to encourage them to maintain a conservative credit policy and to reduce the proportion of riskier loans in their portfolios (through the second – targeted – component of the capital measure and through the monitoring framework). In order to avoid the further build-up of vulnerabilities, the Bank therefore expects credit institutions to make the necessary adjustments to their credit policy and pricing. However, recent developments in credit standards and commercial margins for new mortgage loans show that banks have so far failed to achieve their share of the required adjustments. In this context, the Bank reiterates (with urge) its call for a correct and risk-based pricing of (mortgage) loans, where inherent risks are sufficiently priced in and returns that are in line with market requirements are guaranteed. In addition, the Bank believes that a substantial reduction in the share of risky mortgages and, in particular, a reduction of loans with high LTV ratios (i.e. above 90%) remains necessary.

The risks related to developments in the Belgian residential real estate market as well as those related to banks’ mortgage loan portfolios are also closely monitored by international institutions such as the ECB and the European Systemic Risk Board (ESRB). At the end of 2016, the ESRB issued a warning to eight Member States, including Belgium, on the basis of an analysis of the medium-term risks.

Commercial real estate

As highlighted in the thematic article on developments in the real estate markets in the Bank’s Financial Stability Report 2018, closing data gaps is the first essential step in the macroprudential process for commercial real estate in Belgium. These data, which are both quantitative and qualitative, will allow the Bank to obtain a more complete overview of market developments and, if necessary, will help develop measures appropriate

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Several advances have been made in filling gaps in commercial real estate market data

Nevertheless, in recent months, several advances have been made in this area. For example, the Bank has acquired access for a renewable period of two years to a database developed by Real Capital Analytics. Since 2007, this database has included data on the main commercial real estate transactions concluded in Belgium, as well as on the activity of Belgian players abroad. The data collected as part of the AnaCredit\(^1\) project will also provide a more granular view of the banking sector’s exposures to the markets concerned. In addition, in the coming months, the Bank plans to contact several key players in the real estate and financial sectors in order to define the outlines of a new survey to be submitted to the sector that will make it possible to supplement the existing data. At the end of 2019, the Bank will provide the ESRB with a report on its progress in this area\(^2\).

4. Cyber risks and IT risks

4.1 Description of the risks and impact on the Belgian financial sector

The digitisation of the operational processes of the financial sector, which is already highly computerised, progressed further in 2018. The degree of interconnectivity between the operational processes of the various financial players also remained very high. Moreover, financial institutions are increasingly opting for business models in which IT services are outsourced according to operational or functional specialisation. The increased and more diversified digitisation of access channels for customers of financial institutions and financial market infrastructures (FMIs) is another factor adding to the complexity of the financial landscape and the rise in operational risk.

Throughout the world, cyber attacks are becoming ever more sophisticated and powerful, and the financial sector is one of the potential targets. The number of targeted, long-term cyber attacks is likely to grow further in the future. Cyber attacks may come from inside or outside the institution, and the attackers may have various motives, ranging from financial theft to geostrategic espionage and sabotage, and including terrorism and activism. Cyber criminals’ ability to conceal the attack in certain cases permits misappropriation over long periods and without anyone noticing, intentional disclosure, and the modification or destruction of sensitive or critical financial data. A cyber and/or IT incident, which may occur simultaneously in different institutions, could have a systemic impact (depending on the importance of the institutions and/or counterparties involved).

In these circumstances, it is hard for financial institutions and FMIs to provide adequate protection against the various attacks for their IT systems and services. As cyber threats are evolving very rapidly, it is more important than ever to ensure that the defence capabilities of institutions and FMIs enable them to respond flexibly to the changing attack methods. In this context, solutions for gathering information on the potential threats, attackers and types of attack are vital. In addition, it is useful for financial institutions to know the customer’s and/or counterparty’s risk profile in order to determine the risk of fraud associated with certain transactions. In retail banking, for example, that is achieved by means of security mechanisms integrated in the internet or mobile banking application. In the case of correspondent banking activities, one example is the Customer Security Programme (CSP), set up by SWIFT to facilitate assessment of the counterparty risk.

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1 AnaCredit is the new dataset containing detailed information on bank loans in the euro area.
Apart from cyber risk, the financial sector’s heavy dependence on IT solutions also presents other challenges. Under pressure from innovative players, new technologies, customer expectations or growing security risks, traditional institutions are encouraged to renew relatively quickly their sometimes very obsolescent IT architecture, but the complexity of their IT environment makes it very hard to achieve that aim swiftly and responsibly, i.e. without taking disproportionate risks. There is likewise a high risk of growing dependence on third parties for IT services and standardised IT system components. In particular, cloud solutions are increasingly being used, and for ever more important processes. The need for sufficiently representative testing of recovery solutions – which must guarantee continuity following incidents – remains another key point for attention.

It is therefore essential for the management bodies of the financial players to have the necessary expertise and information to enable them to keep a proper watch on the risks and contain them within acceptable limits. In addition, all the staff of these businesses must be aware of cyber risks and IT risks in order to understand how those risks may arise and how they are expected to respond to them.

4.2 Prudential measures

Assessing cyber risks and IT risks and promoting their control are similarly absolute priorities for the prudential supervision and oversight of financial institutions and FMIs, with European and international cooperation becoming ever more important. Individual institutions are strongly recommended to continue stepping up their protective measures and efforts against IT risks and cyber risks. This approach has therefore predominantly a microprudential character and aims mainly to ensure the prevention of such risks. Nevertheless, the necessary attention is also given to intersectoral control strategies being developed in Belgium and abroad.

In recent years, the Bank has made a substantial contribution to the preparation of a regulatory framework aimed at improving the control of cyber risks and IT risks. On 1 January 2016, the prudential Circular on the Bank’s expectations concerning the operational continuity and security of systemically important institutions came into force. The Bank also made an active contribution to establishing a European regulatory framework for the management of IT risks and cyber risks under the aegis of the EBA. That work culminated in the publication by the EBA of guidance for supervisory authorities on the assessment of the ICT risk in the SREP (Supervisory Review and Evaluation Process) of credit institutions and investment firms, which came into force on 1 January 2018. It also led to EBA recommendations on outsourcing by financial institutions to cloud service providers, which have since been incorporated into more general recommendations on outsourcing. In addition, the EBA published various technical recommendations, guidelines and standards in connection with the second European Payment Services Directive (PSD2), covering cyber and IT aspects. Furthermore, the EBA is preparing guidelines on the management of ICT risks and security risks.

Various initiatives were also taken for FMIs in this respect. In June 2016, the Committee on Payments and Market Infrastructures (CPMI) and the International Organisation of Securities Commissions (IOSCO) published guidelines on cyber resilience, which are applicable immediately to FMIs. On the basis of these guidelines, the Eurosystem drew up the Cyber Resilience Oversight Expectations (CROE), which were finalised in December 2018 after a public consultation cycle. In May 2018, the CPMI published a strategy for reducing the risk of wholesale payments fraud. This strategy proposes measures for preventing, detecting and remediying fraud, and highlights the need for proper communication on the subject by all the public and private sector players concerned. As co-chair of the CPMI working group, the Bank made a significant contribution to that strategy. Like the other member central banks, the Bank is also working on the implementation of this strategy.

The operational approach concerning individual institutions under prudential supervision is two-pronged. On the one hand, institutions are required to hold capital to cover their operational risks, including cyber risks and IT risks. Also, the operational security and robustness of the critical processes of financial institutions and FMIs are subject to close monitoring. The availability, integrity and confidentiality of the IT systems and data play a central role here. In 2018, the Bank conducted a number of inspections (for banks under the SSM) to check on compliance with the regulatory framework and the proper management of IT systems in relation to cyber
risks and IT risks. In addition, the Bank monitors these risks in financial institutions and FMIs in the course of its ongoing and recurrent supervisory activities.

The Bank also devotes increasing attention to sector-wide initiatives. For instance, the SSM regularly conducts cross-sectoral analyses on subjects relating to IT and cybernetic aspects. In 2018, for example, it asked all the significant banks and the largest less significant banks to answer a questionnaire which should supply important information on IT aspects for the annual SREP, and will also permit cross-sectoral analyses.

In its role as the sectoral authority for application of the law on the security and protection of critical infrastructures (principally systemically important banks and FMIs), the Bank also assesses the effectiveness of the control systems of these infrastructures, organises sectoral exercises and coordinates operational incidents of a systemic nature for the Belgian financial sector.

In order to implement the recommendation of the High-Level Expert Group (HLEG) on the future of the Belgian financial sector, namely to pay sufficient attention to cyber security, the Financial Sector Cyber Council (FSCC) was set up under the chairmanship of the Bank. It comprises representatives of the Centre for Cyber Security Belgium, Febelfin, Assuralia and the financial sector. The FSCC endeavours to boost the cyber resilience of the Belgian financial sector via a range of initiatives.

One practical achievement here is the establishment of an ethical hacking framework by the Bank, namely TIBER-BE (Threat Intelligence-Based Ethical Red Teaming Belgium). This programme forms the Belgian part of a methodology devised by the Eurosystem and aiming to increase the cyber resilience of individual financial institutions and FMIs by means of sophisticated tests, and to supply important observations on the cyber security of the Belgian financial sector as a whole. The Bank encourages these exercises in its capacity as the guardian of financial stability, and these tests are therefore conducted independently of its prudential supervision and oversight responsibilities.

5. Climate-related risks

5.1 Description of the risks

The challenges relating to climate change and the transition to a low-carbon economy are attracting ever-increasing attention, and there are growing numbers of initiatives aimed at achieving the goals of the Paris Climate Change Agreement (COP21). The financial sector plays a crucial role in funding the transition to a low-carbon economy. The transition offers many new funding opportunities for banks, insurers and other investors. Conversely, climate change itself, i.e. the so-called physical risk, and a potentially abrupt transition to a more sustainable economy, due to sudden, unexpected changes in policy, market sentiment or available technologies, i.e. the so-called transition risk, may pose risks for financial institutions and financial stability.

Both the climate change itself and a possible abrupt transition to a more sustainable economy can pose risks for financial institutions and financial stability

Physical risks are associated with an increase in claims and losses due to climatic events (such as floods, droughts, storms), and changes in climatic trends (such as changing weather conditions or sea level rise). They can affect financial institutions and financial stability in a variety of ways. First, they are expected to have a significant impact on the liabilities of non-life insurers, who will face higher claims. However, the assets of insurers, banks and investment firms may also be affected by the impact on the various economic actors to which they are exposed. At the macroeconomic level, losses due to physical risks may influence the availability of resources as well as the productivity and profitability of different sectors. They may therefore induce cascading effects in the financial system, especially when uninsured.
Transition risks are related to asset value losses and increased operating costs resulting from disruptions and shifts associated with a (sudden) transition to a low-carbon economy. Under the Paris Climate Agreement, political commitments have been made to reduce physical risks, making this transition inevitable. In addition, market sentiment is shifting significantly towards more sustainable activities and products, and technological innovations are likely to offer opportunities to respond to changing demand. However, the longer we wait to act, the stricter the measures will have to be in order to achieve the objectives set in the long term. Transition risks will arise in particular in the event of sudden changes in policies, market sentiment and available technologies. Although the largest losses are expected in the sectors that consume the most fossil fuels, energy plays a very important role in many sectors, so that a sudden transition can have important implications for a wide range of sectors. In addition, investments in green technological innovations can also generate losses when newer and more efficient technologies emerge or if investments are found to be less green than initially expected (greenwashing), which can also lead to reputation risks for financial institutions.

Both physical risks and the risks arising from the transition could considerably amplify the traditional risks, such as credit risk, market risk, operational risk, liquidity risk and insurance risk. For example, credit risk could increase if large-scale droughts or flooding increased the probability of default in the agricultural sector, or if the value of buildings taken as collateral declined as a result of stricter energy performance standards.

5.2 Impact on the financial sector and prudential measures

On the basis of the data currently available, it is possible to estimate – albeit imperfectly – the Belgian financial sector's exposure to risks related to climate change. While the physical risks that could impact insurers' liabilities due to increased claims are currently difficult to estimate, those on the assets side of financial institutions' balance sheets – measured on the basis of the exposures in countries vulnerable to climate change – seem relatively low. However, the same does not apply to transition risks. Indeed, at the end of 2018, financial institutions' exposures to the most polluting sectors in Belgium (in terms of greenhouse gases) represented a significant portion of banks' corporate loan portfolios (31%) and of shares, corporate bonds and loan portfolios held by insurers (23%). However, it should be noted that these estimates are imprecise due to the lack of granularity of the available data. Indeed, in sectors identified as vulnerable to transition, such as agriculture, transport or energy production, there may be a wide disparity in terms of energy intensity of companies. Similarly, exposures to energy-intensive buildings, including from mortgage lending, could also be considered vulnerable to a transition to a low-carbon economy.

In order to better understand the importance of these exposures for the Belgian financial sector in the short term, the Bank sent, at the end of 2018, as part of its macroprudential mandate, a questionnaire to financial institutions on the various risks associated with climate change and the extent to which they already take them into account in their risk strategy and policy. In addition, this sector survey aimed to raise awareness in the financial sector of the importance of these risks, thereby encouraging financial institutions to monitor, assess and manage such risks.

The results of the sector survey are discussed in detail in the thematic article on climate related risks and sustainable finance in the 2019 Financial Stability Report. Although financial institutions seem to be aware of the potential risks, they have so far made relatively little progress in quantifying and integrating them into their risk management. The share of green investments in their portfolio also seems very limited. Nevertheless, institutions are indicating their willingness to contribute to a more sustainable economy.

Although financial institutions seem to be aware of the potential risks, they have so far made relatively little progress in integrating them into their risk management.

The lack of common definitions (“taxonomy”), a standard framework for disclosure of climate-related risks and international standards and labels for green products is a major obstacle to adequately monitor and assess these risks. In this context, the Bank actively participates in the working groups responsible for developing the EU action plan for sustainable finance and the appropriate regulatory framework, including taxonomy and disclosure standards.
requirements. In addition, the Bank also participates in various working groups, both at the microprudential level (EBA, EIOPA, SSM) and at the macroprudential level (ECB, ESRB) and in working groups within the framework of the Network for Greening the Financial System (NGFS) and the Sustainable Insurance Forum (SIF), where supervisory authorities from different countries exchange information and discuss the prudential approach to climate-related risks and support for sustainable finance. However, assessing these risks remains very complex due to the prospective and long-term nature of climate-related risks, the uncertainty about whether these risks will materialise and, most importantly, the lack of sufficient qualitative and granular data.

As most financial institutions are still at an early stage in their assessment of climate-related risks, the Bank makes several recommendations to the financial sector, in the above-mentioned thematic article, to broaden its horizon and integrate longer-term thinking into its strategy. More specifically, financial institutions are encouraged to collect information on the energy intensity of their exposures, the energy intensity of buildings used as collateral for loans and the vulnerability of their exposures to physical risks, to publish information on climate-related risks, to include climate-related risks in their risk analysis, to participate in discussions with regulatory and supervisory authorities to jointly improve the data and methods to best capture and mitigate these risks, and finally to support the greening of the financial system through financing sustainable investments.

Supervisory authorities are also beginning to consider ways to include climate-related risks in their risk assessments. Where appropriate, capital requirements under the second pillar could be imposed in the long term. Capital requirements under the first pillar could also be adapted in future, but they should continue to be based solely on prudential risks. Therefore, changes in capital requirements must be sufficiently justified by evidence of the higher or lower risks associated with the exposures to which they relate.

Collecting sufficiently granular data is a first necessary step for both financial institutions and supervisors to be able to take these risks into account. Awaiting the methodologies to be developed in international working groups, the Bank will start discussions with the financial sector in view of obtaining, in the short term, a first indication of the most important concrete climate-related risks to which Belgian financial institutions can be exposed, and to collect data in order to be able to estimate the magnitude of these risks.

6. Other risks and points for attention

6.1 Buffers imposed on domestic systemically important banks

Since 1 January 2016, the Bank has compiled a list of Belgian domestic systemically important banks (D-SIBs) each year on the basis of the EBA Guidelines on the designation of O-SIs\textsuperscript{1}. The list of eight institutions previously designated as domestic systemically important banks remains unchanged in 2019. BNP Paribas Fortis, KBC, Belfius Bank, ING Belgium, Euroclear and The Bank of New York Mellon were automatically identified as D-SIBs on the basis of their quantitative score for systemic importance. This rating is a weighted average of the market share according to a number of indicators that reflect the systemic importance of Belgian banks\textsuperscript{2}. Argenta and AXA Bank Belgium were classed as D-SIBs on account of their share in deposits and/or loans in Belgium.

\textsuperscript{1} EU regulations define D-SIBs as “other systemically important institutions” (O-SIs).

\textsuperscript{2} That score is calculated as a weighted average of mandatory indicators relating to the size, complexity, interdependence and substitutability of the banks, the indicators being assigned fixed weighting factors. The score can range from 0 to 100\%: the higher an institution’s score, the greater its systemic importance. Where a bank’s systemic importance score exceeds a certain threshold, the institution is automatically classified as a D-SIB. Nevertheless, the authorities can use other indicators or apply different weighting factors to the indicators stipulated by the EBA to designate additional banks as O-SIBs. For a more detailed description of the EBA methodology, readers are referred to the Annual disclosure regarding the designation of and capital surcharge on Belgian O-SIs (1 December 2018) (www.nbb.be).
The Bank also checks each year whether the capital surcharges imposed on Belgian D-SIBs are in proportion to the systemic importance of those institutions. The high economic and social costs that the failure of those institutions would entail are the reason for boosting their resilience by means of additional capital requirements. As no significant change in the systemic importance of Belgian D-SIBs has been observed, the capital surcharges imposed on these institutions are maintained. Common Equity Tier 1 (CET1) capital surcharges are 1.5% for BNP Paribas Fortis, KBC, Belfius Bank and ING Belgium, and 0.75% for Euroclear, The Bank of New York Mellon, Argenta and Axa Bank Belgium respectively. The levels of these capital surcharges for Belgian D-SIBs are in line with the average capital surcharges for D-SIBs in Europe.

### Table 1

<table>
<thead>
<tr>
<th>Institution</th>
<th>Systemic importance score</th>
<th>Capital surcharge</th>
</tr>
</thead>
<tbody>
<tr>
<td>BNP Paribas Fortis</td>
<td>26.0</td>
<td>1.50</td>
</tr>
<tr>
<td>KBC</td>
<td>24.5</td>
<td>1.50</td>
</tr>
<tr>
<td>ING Belgium</td>
<td>14.7</td>
<td>1.50</td>
</tr>
<tr>
<td>Belfius Bank</td>
<td>14.5</td>
<td>1.50</td>
</tr>
<tr>
<td>Euroclear</td>
<td>6.4</td>
<td>0.75</td>
</tr>
<tr>
<td>The Bank of New York Mellon</td>
<td>4.2</td>
<td>0.75</td>
</tr>
<tr>
<td>Argenta</td>
<td>2.9</td>
<td>0.75</td>
</tr>
<tr>
<td>Axa Bank Belgium</td>
<td>2.6</td>
<td>0.75</td>
</tr>
</tbody>
</table>

Source: NBB.

1 The system relevance score is a weighted average of the market share based on a number of indicators that show the system relevance of the Belgian banks and can take values from 0 to 100%.

6.2 The shadow banking and asset management sector

**Description of the risks**

In September 2017, the Bank and the FSMA submitted to the Belgian Minister of Finance a first joint report on asset management and shadow banking in Belgium. This in-depth study followed a recommendation in the 2016 High-Level Expert Group (HLEG) report on the future of the Belgian financial sector. The recommendation requested the Belgian supervisory authorities to report on the risks related to the shadow banking sector and its interconnectedness with other (financial) sectors in Belgium, and in particular the systemic risks relative to the development of the asset management sector in Belgium.

In September 2018, the Bank and the FSMA published an update of the report on asset management and shadow banking in Belgium. This second report updates the figures, developments and conclusions related to the potential systemic risks associated with the asset management and shadow banking sector, as well as an overview of recent developments in relevant national and international regulations and policies. This update is part of the periodic monitoring of activities to which the Bank and the FSMA have committed themselves following one of the recommendations of the first report.

The updated figures show that the shadow banking and asset management sector in Belgium continued to grow in size in 2017. The size of these two, overlapping but distinct, sectors in Belgium can be defined and measured in various ways.

The size of the asset management sector in Belgium, i.e. the proportion of the financial system where financial assets are managed on behalf of investors – whether in the form of collective management of investment funds, discretionary management of individual investor portfolios or investment advice – can be measured in different ways, depending on what is considered a Belgian activity. The net asset value of Belgian investment funds, which form the core of the asset management sector, increased by 22% in 2017, from € 144 billion at the end of 2016 to € 175 billion at the end of 2017. At the same time, foreign fund units held by Belgian residents rose from € 189 billion to € 214 billion. Total assets under management of Belgian asset managers, including both collective management (of Belgian and foreign investments funds) and discretionary management, increased in the same proportion, from € 248 billion to € 292 billion. Finally, at the end of 2017, Belgian banks were involved in the sector for an amount of € 582 billion compared with € 531 billion a year earlier, both by managing assets themselves (via a Belgian or foreign asset manager which they owned, or via their own private and institutional banking activities) and by distributing third-party funds. The growth of all these different measures of the Belgian asset management sector in 2017 is due to several factors, including an increase in fund investments by Belgian residents and positive valuation effects resulting from the favourable market conditions in 2017.

The growth of Belgian investment funds is also the main reason for the increasing size of the Belgian shadow banking sector, as calculated according to the methodology of the Financial Stability Board (FSB). It should be noted in this regard that international bodies no longer use the term “shadow banking sector”, preferring the expression “non-bank financial intermediation”. This concept clearly indicates that this is financial intermediation involving entities and activities outside the traditional banking system. Moreover, it does not have the negative connotation of the term “shadow banking”, which wrongly suggests that these entities and activities are not subject to any regulatory framework. In this respect, it should be recalled that the asset management and the shadow banking sector are duly subject to regulatory requirements, although not in the same manner as financial institutions such as banks.

The FSB methodology starts with all non-bank financial assets and then narrows them down to the targeted indicator of non-bank financial intermediation (the new term for the shadow banking sector) effected by entities outside the prudential consolidation scope of a banking group and posing bank-like risks to the financial system. At the end of 2017, the size of the Belgian shadow banking sector according to this methodology was € 144 billion (34% of GDP), compared to € 128 billion (30% of GDP) a year earlier. Most of this amount still consists of money market and other funds, with the exception of equity funds (€ 132 billion, compared with € 111 billion at the end of 2016). The vast majority of these funds are subject to supervision by the Belgian authorities. In addition, the amount includes other financial intermediaries such as leasing and factoring companies, lenders in consumer and mortgage credit, with the exception of those entities that are consolidated in a banking group (€ 8 versus € 7 billion at the end of 2016), and securitisation vehicles, with the exception of securitisation retained on Belgian banks’ balance sheets (€ 7 versus € 10 billion at the end of 2016).
For the delineation of the non-bank financial intermediation sector in Belgium, the report also uses, in parallel with the FSB methodology, the EBA methodology. According to that methodology, the overlap between the asset management sector and the shadow banking sector is considerably smaller, since it only considers as shadow banking entities money market funds and alternative investment funds (AIFs)\(^1\) with a leverage of more than 300\%, or that are granting or buying loans. As a result, the total Belgian shadow banking sector represented, according to this approach, only € 17.5 billion at the end of 2017 compared to € 19.4 billion at the end of 2016. While investment funds represented only 15\% of the non-bank financial intermediation sector in Belgium in 2017 according to the EBA methodology, they represent nearly 90\% according to the FSB methodology.

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1 Alternative investment funds are funds which are not covered by the European rules on UCITS (undertakings for collective investment in transferable securities). They are generally funds that invest in alternative strategies, such as hedge funds, private equity funds and property funds.
Impact on the Belgian financial sector

The asset management and the shadow banking sector form part of a more market-based financial system where part of the financial intermediation takes place outside the banking sector. This method of financing offers a valuable alternative to bank financing and thus creates greater diversity in credit sources and investment opportunities for investors. However, it may create systemic risks, particularly if it is involved in bank-like activities such as liquidity and maturity transformation and/or the creation of credit and leverage, and may raise points for attention concerning investor protection.

Analysis of the reasons for the recent developments in the key statistics of the Belgian asset management and shadow banking sector shows that the qualitative findings and conclusions from the 2017 report regarding the systemic risks associated with the asset management sector and the shadow banking sector remain largely unchanged.

For the part of non-bank financial intermediation that overlaps with the asset management sector, the liquidity risk, and particularly the risk of sudden, large-scale redemptions, remains the main risk. However, this risk, which arises because most of these funds are open-ended and therefore comprise a variable number of units (open-ended funds\(^1\)), is already partly addressed by some of the legislation in force and that being prepared on such subjects as asset diversification. Over the past period, the FSMA has continued its efforts to ensure that managers of investment funds properly monitor and manage their liquidity risks. To this end, a Royal Decree of 15 October 2018 made available to all Belgian investment funds specific additional tools for liquidity risk management (i.e. swing pricing, anti-dilution levies and redemption gates), which can be used in the event of liquidity problems\(^2\).

In addition to the direct risks, the asset management sector and the non-bank financial intermediation sector may also generate (systemic) risks indirectly, in particular via their interconnections with other financial institutions and the real economy. Those interconnections, which may take the form of both contractual and non-contractual debts and claims, tend to be relatively limited for households and non-financial corporations (e.g. investment in funds). However, for financial institutions, they are more significant and more complex, particularly in the case of interconnections that exist within conglomerates. In the case of the risks relating to interconnections within conglomerates, and more particularly those resulting from non-contractual obligations, supervision of the adequacy of risk management within financial conglomerates needs to be further strengthened and extended. This relates to the so-called step-in risk, which means that conglomerates may feel obliged to remunerate their clients without being contractually obliged to do so, for example for the risks associated with the investment funds they offer to clients. However, this is an international point of attention on which the Basel Committee on Banking Supervision (BCBS) published final guidelines in October 2017\(^3\). It should be noted that no Belgian-specific issues of systemic relevance have been identified other than those already being addressed at the international level.

However, the dynamic development of some of the key statistics of the asset management sector and non-bank financial intermediation sector in Belgium again highlights the need to continue to closely monitor these two

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\(^1\) An open-ended fund is an investment fund that offers the possibility of issuing or redeeming shares. People investing in these funds can easily enter or leave, and many open-ended funds permit daily redemptions.


\(^3\) BCBS Guidelines – Identification and management of step-in risk (www.bis.org/bcbs)
sectors in the future, including their interconnections with other financial and non-financial sectors in Belgium. In that context, the Bank and the FSMA further undertake to arrange the annual updating of the statistics and, as far as possible, to refine and supplement the data and risk analyses. In view of the international character of the non-bank financial intermediation sector, that exercise will be included in the activities of the international authorities such as the FSB and IOSCO (International Organisation of Securities Commissions) on monitoring, risk assessment and policy implementation. The Bank and the FSMA will therefore continue to contribute to these international activities.

In addition, the Bank and the FSMA will continue their efforts to close the data gaps for monitoring the activities of the asset management sector and non-bank financial intermediation sector, in order to allow for a more adequate delineation and supervision of these sectors. Significant progress has already been made in this area in the past period. First, the FSMA has adapted and expanded the statistical information that investment funds are required to report. Since October 2017, all open-ended public funds under Belgian law are subject to the same new reporting standards in accordance with the European AIFMD standard 1, which enables the FSMA to better assess certain risks in investment funds. In addition, the Bank continued its efforts to map the Belgian sector of other financial intermediaries (OFIs). In this context, the Bank also participates in the work of the ECB and the ESRB, which aims to better understand this large component of the non-bank financial intermediation sector. The Bank and the FSMA will therefore continue to contribute to these international activities.

7. Recognition of macroprudential measures

7.1 Recognition of foreign measures by the Bank

The Belgian financial sector features some major international players. Belgian banks also have significant exposures to counterparties situated in other EU Member States. That is why the Bank takes account of cross-border aspects in its macroprudential policy, and supports the efforts to ensure a level playing field at the international level by applying the principle of reciprocity. Reciprocity implies that the macroprudential rules of a given Member State apply equally to branches of foreign banks and to direct lending by foreign banks (under the freedom to provide services) in the Member State concerned, whereas the macroprudential measures adopted by the Member States do not generally apply in that country.

The Bank adheres to the framework of the European Systemic Risk Board (ESRB) on voluntary reciprocity for macroprudential measures 2 and issued a regulation 3 on that subject in 2016, introducing a flexible recognition procedure for three types of macroprudential measures if the ESRB recommends their recognition. They are (1) national measures to combat macroprudential or systemic risks, adopted on the basis of Article 458 of the CRR; (2) countercyclical capital buffers in excess of 2.5%; and (3) buffers for macroprudential or systemic risks (if not specific to systemically important institutions).

In 2016, the Bank thus recognised the 1% systemic risk buffer applicable to exposures to counterparties situated in Estonia and, at the beginning of 2018, the minimum average risk weight of 15% applicable to mortgage loans to individuals in Finland for credit institutions using the internal ratings based approach. In 2019, the Bank...

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1 FSMA Regulation of 16 May 2017 on statistical information to be transmitted by certain open-ended public undertakings for collective investment.
2 ESRB Recommendation of 15 December 2015 on the assessment of cross-border effects of and voluntary reciprocity for macroprudential policy measures.
3 Regulation of 24 February 2016 of the National Bank of Belgium on the recognition of macroprudential measures, approved by Royal Decree of 20 May 2016. For more information, the reader is referred to the article “Reciprocity of macroprudential measures: general framework and application in Belgium” (www.nbb.be).
recognised two new measures adopted by foreign authorities. Firstly, in March 2019, the Bank reciprocated the tightening of the limit on large exposures to 5% of eligible own funds, for exposures to large non-financial corporations with a high debt ratio and whose registered office is in France. In May 2019, the Bank also recognised the minimum average risk weight of 25% applicable to mortgage loans to individuals in Sweden for credit institutions using the internal ratings based approach. Recognition of these measures applies to exposures above the materiality thresholds specified in the ESRB Recommendation. The Bank’s decisions on the recognition of macroprudential measures adopted by other countries are published on its website.

7.2 Recognition of Belgian measures by foreign authorities

In connection with Belgium’s macroprudential measure on the risk weighting of residential mortgage loans introduced in 2018, the Bank has asked the ESRB to recommend that the other Member States apply reciprocity for this measure. Within this framework, the Bank has set a materiality threshold of €2 billion to guide other Member States in applying any exemption. Recognition implies that the surcharge also applies to mortgage loans granted in Belgium by banks from other Member States, either through branches or by direct lending. Five countries (Denmark, France, Lithuania, the Netherlands and Portugal) recognised the Belgian measure. The other Member States did not recognise the measure, in view of the non-material exposures of their banking sector to Belgian residential mortgage loans.

1 The measure applies only to banks using the internal ratings based approach to define the risk weight applicable to mortgage loans in Belgium.

Financial Stability Overview

Financial stability can be defined as a condition in which the financial system – made up of financial intermediaries, markets and market infrastructures – can withstand shocks without major disruption to financial intermediation or the effective allocation of savings to productive investment. This article reviews recent developments in the Belgian banking and insurance sector, with data and analyses covering profitability, solvency and risk exposures. In this way, it complements the Macroprudential Report (MPR) article, which summarises the main elements of the Bank’s macroprudential risk assessment and reviews the macroprudential measures taken in response to the identified risks. Developments in Belgian financial market infrastructures are covered in the separate Financial Market Infrastructures and Payment Services Report, available on the Bank’s website.

1. Banking sector

With a return on equity of 8%, a CET 1 ratio of 15.6% and a non-performing loan (NPL) ratio of 2.3%, the Belgian banking sector continued to outperform the relevant euro area averages last year, albeit with a gradually narrowing margin. This relatively good performance compared with counterparts in previous years can be explained by the favourable macroeconomic and financial conditions in the principal home market but also, and even more so, by the fact that the Belgian banking sector moved generally faster in addressing the vulnerabilities revealed by the crisis. The quicker return to sounder financial positions gave the Belgian banks a better starting position in facing new challenges in their operating environment. Nevertheless, other countries are gradually catching up and the gap between the Belgian banking sector and the euro area banking sector has narrowed in recent years. The growing similarity between Belgian and euro area banks also applies to the many (potential) headwinds and structural weaknesses that banking systems are coping with in their endeavour to restore more resilient profitability and sustainable business models (against the backdrop of a challenging operating environment characterised by slowing economic growth and very low interest rates). Some structural features that characterised the Belgian banking sector in the past also seem to be changing due to an increased focus on (domestic) lending activities with potential implications for its risk profile going forward. These elements are illustrated and discussed in more detail in the paragraphs below.

Due to dynamic growth in lending to the Belgian private sector over the past several years – outpacing the parallel growth in deposits – some structural features which long characterised the Belgian banking sector may be gradually disappearing. One example is the loan-to-deposit ratio, which used to be well below 100% but has been increasing since 2015. Having redirected their balance sheet to more (fixed-rate) lending and (retail) deposit funding, banks may also have widened their exposure to interest rate risk because of the bigger repricing mismatch between assets and liabilities, making them more vulnerable to large and abrupt interest rate increases. However, banks’ profitability will also come under pressure if interest rates remain at their current low levels, since it will be difficult to maintain the current increase in loan volumes – through which banks have managed to partly offset the decline in their net interest margins over the past quarters – without...
an undesirable continuation of weak credit standards in lending to the private sector (in particular in mortgage lending), hence putting into jeopardy asset quality going forward.

The increased lending activity also means that Belgian banks have become more exposed to credit risk, so that they could be facing higher credit losses if the economic and financial cycle turns. In fact, the recent slowdown in economic growth and the (geo)political uncertainties in Europe (e.g. Brexit) and the rest of the world may indicate that the generally favourable conditions which have characterised Belgian banks’ operating environment in the past decade could slowly start to reverse. Such developments could weigh severely on banks’ profitability, especially against the background of the relatively high private-sector debt levels and the deterioration of lending standards observed in recent years, given that low credit costs have also played a major part in Belgian banks’ good results in the past.

Several cyclical and more structural challenges may thus weigh on Belgian banks’ future capacity to generate enough returns to cover their capital costs, as demanded by shareholders. To keep profitability at satisfactory levels, banks will need to pursue their cost-cutting efforts and carefully manage the challenges and opportunities arising in the rapidly changing operating environment, which will also call for them to strike a better balance between loan volumes, commercial margins and risk-based loan pricing, and to ensure a sufficiently long-term view on potential risks building up in their balance sheets.

The first subsection below discusses the main developments in the Belgian banking sector in 2018 regarding profitability, assets and liabilities, asset quality and solvency. The next two subsections focus on the implications of Belgian banks’ increased lending to the (Belgian) private sector, which has led to some structural changes in banks’ business models (Section 1.2) and to some consequences for their profitability prospects, e.g. the potential future development of net interest income and credit costs (Section 1.3).

1.1 Main developments in the Belgian banking sector in 2018

**Profitability**

After the good results registered in 2017, the bottom-line profit of the Belgian banking sector declined somewhat in 2018, from €6.0 billion to €5.6 billion. Therefore, and due also to a slightly higher average equity base during the year, the return on equity (RoE) amounted to 8.0% in 2018, i.e. a decline of 90 basis points with respect to 2017 (Chart 1). Similarly, the return on assets (RoA) receded to 0.55% in 2018.

Over the past several years, Belgian banks’ key profitability indicators have been constantly better than the euro area averages. However, as RoE started to decline slightly from 2015 while the average RoE in the euro area improved – especially in some southern European countries which suffered a lot from the crisis – the gap with the average profitability of euro area banks has gradually narrowed over the past three years. Nevertheless, in 2018, Belgian banks’ RoE and RoA were both still higher than the euro area averages, the latter amounting to 6.7% and 0.47% respectively in September 2018.

Looking more closely at developments in the different components determining Belgian banks’ bottom-line profit in 2018 (Chart 2 and Table B1 in section 3.1), it turns out that, despite the low interest rate environment, net interest income closed on a level slightly above that of 2017 (€14.4 billion versus €14.1 billion). This is somewhat surprising, given that banks’ net interest margins remain squeezed in the context of the historically low interest rates in financial markets. On the one hand, interest expenses have reached a floor (also due to the legal minimum rate on retail saving deposits), preventing banks from further decreasing the interest costs for their funding. On the other hand, the average interest rates earned on Belgian banks’ main components of gross interest income (i.e. loans to households and loans to non-financial corporations, which account for 42% and 36% of gross interest income, respectively) have continued their descent, due to the lower interest rates on new loans and the refinancing of existing loans at lower rates.
However, as explained in Section 1.3, Belgian banks have succeeded in partly compensating for the decline in their net interest margins by boosting loan volumes, especially those of loans to the Belgian private sector. In addition, an increase in foreign lending activities – sometimes in non-euro area markets with more favourable interest rate developments – has also helped to mitigate the impact from the decline in net interest margins. Lastly, the overall negative impact from derivatives was a bit lower in 2018 than in 2017, so that the net interest margin after the impact of derivatives was more resilient. Yet there are significant differences between individual Belgian banks. In general, smaller banks that are less diversified in terms of activities and locations and use less sophisticated hedging strategies tend to perform more poorly and experience more pressure from the low interest rate environment.

To reduce pressure on their profitability, Belgian banks have in recent periods also tried to diversify their income sources by directing more commercial efforts to increasing fee and commission income – with varying degrees of success, however, since the extent to which banks can grow their asset management services and their distribution of investment products largely depends on market circumstances. Whereas many banks succeeded in increasing their fee and commission income in 2017 when market conditions were favourable, this trend was not continued in 2018 due to greater turbulence in the financial markets. In 2018, banks’ assets under management – which consist of client assets managed on a discretionary basis and of collective investment products either managed by the banks (and their subsidiaries) themselves or sourced from other parties and distributed to their clients – declined by € 34 billion to € 548 billion due to negative valuation effects as well as reduced investment appetite on the part of clients (Chart 3).
Financial Stability Overview

NBB Financial Stability Report

Chart 2 shows that a decline in other non-interest income was the main driver behind the fall in Belgian banks’ net profit in 2018. In 2017, the transfer of a leasing institution from the parent company to its Belgian subsidiary had inflated the sector’s non-interest income. While this activity has continued to generate income in 2018, it was counterbalanced to a greater extent than in 2017 by other factors, \textit{in casu} by lower or even negative exchange differences related to the devaluation of several currencies in 2018. This development also partly explains the increase in the value of financial instruments, reflected in the gains and losses on financial instruments (€ 1.2 billion in 2018 versus € 0.9 billion in 2017), which encompass held-for-trading instruments covering exchange rate fluctuations.

As a result of these developments, Belgian banks’ total operating income – the sum of net interest income and non-interest income – fell by € 300 million in 2018, from € 23 billion to € 22.7 billion. This decline in operating income was not offset by a reduction in operating costs, indicating that Belgian banks are still finding it difficult to enhance efficiency in the short term and to relieve pressure on their profitability by saving costs and becoming more efficient. Despite the many restructuring plans undertaken in the last couple of years, for example to restructure their branch networks or workforces, banks’ operating expenses – which include staff costs, administrative costs and general expenses – continue to climb. They went up by € 500 million in 2018, from € 13.4 billion to € 13.9 billion.

Due to the adverse developments in operating income and operating expenses in 2018, Belgian banks’ cost-to-income ratio has increased to 61%, up from 58% in 2017, reaching again the levels seen in 2013 and 2014 (Chart 4). However, as in the past several years, the cost-to-income ratio of the Belgian banking sector continues to be slightly below the euro area average, which amounted to 65% in September 2018. This euro area average is largely influenced by developments in its largest banking sectors, such as Germany and France, where cost-to-income ratios are very high (above 70%).
For the first year since 2013, Belgian banks’ new impairments and provisions — net of reversals — did not decline further. On the contrary, new net impairments and provisions were slightly higher in 2018 (€0.8 billion compared with €0.7 billion in 2017). Despite the further reversal of some impairments and provisions booked in the past (e.g. following the sale of a portfolio of non-performing loans located abroad by one large bank), which were also observed in previous years, new net additions were slightly up on last year’s level because overall reversals were lower and new gross impairments higher. This development partly related to the impact of economic troubles in some Belgian banks’ key foreign markets (e.g. Turkey), which have led to an increase in foreign impairments and provisions and was also magnified by the more conservative rules imposed by IFRS 9. Nevertheless, higher provisions and impairments were also booked for domestic portfolios during 2018.

As a consequence, the loan loss ratio of the Belgian banking sector, which is defined as the ratio between new net impairments on financial assets and the total volume of financial assets, increased slightly in 2018 (8 basis points compared to 6 basis points in 2017). Although banks continue to benefit from a low level of credit costs, the latest developments indicate that the trend of continuously declining credit costs — which contributed to Belgian banks’ good results over the past several years (in contrast to several euro area countries where significant impairments had to be taken) — might have come to an end.

Operating expenses and net new impairments and provisions together were €600 million higher in 2018 than in 2017 but their impact on bottom-line profit was entirely offset by a decline in the taxes booked by
Belgian banks (€ 2 billion in 2018 versus € 2.6 billion in 2017). In 2017, these taxes were exceptionally higher due to a one-off negative impact from the Belgian corporate tax reform, as the future tax decline resulted in a reassessment of the deferred tax assets and liabilities recorded in the income statement. In 2018, Belgian banks benefited from the lower Belgian corporate tax rate and their effective tax rate went down. The corporate tax rate will continue to decline gradually to 25% by 2020.

**Balance sheet: asset side**

Over the period under review, Belgian banks’ total assets remained stable at € 993 billion on a consolidated basis (the same level as at the end of 2017). This stability was, however, accompanied by further underlying changes in the composition of assets (Chart 5).

In 2018, holdings of government bonds shrank further while loans to the private sector increased, a pattern which has been observed consistently in previous years and relates both to favourable economic conditions – which increase borrowers’ appetite for lending –, the expansionary monetary policy of the central banks, and also banks’ willingness to increase lending activities for various reasons (including trying to compensate for the decline in their net interest margins, see also Sections 1.2 and 1.3). On the one hand, the prolonged period of low interest rates has put downward pressure on the yields of safe assets, from which banks have progressively turned away either by realising capital gains through the sale of some of their holdings or by not rolling over instruments that matured. On the other hand, banks have increasingly focused on supplying loans
to the domestic market, where demand has been sustained both by improved economic conditions, given also
the lower returns on alternative portfolio investments for the banks. Therefore, the outstanding amount of
customer loans on the balance sheet of Belgian banks is progressively moving towards pre-crisis levels, with 2018
being the first year in which it has moved above the figure for 2006.

The rise in customer loans was largely driven by the increase in loans to the private sector. At the end
of 2018, loans to the private sector represented 55 % of Belgian banks’ total assets, up from 52 % at the
end of 2017. This growth, which represents an amount of € 24 billion, was distributed fairly evenly between
loans to non-financial corporations (mainly in the sectors of construction and real estate activities, wholesale
and retail trade, and manufacturing) and households (mainly mortgage loans). Although most of the higher
lending activity was located in Belgium, banks have also stepped up lending in some of their key foreign
home markets, such as the Netherlands and the Czech Republic. Loans to other customers (i.e. non-bank
financial institutions and the public sector) were characterised by a more moderate increase of € 5 billion
in 2018.

Chart 5
Balance sheet structure

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

Breakdown of assets by product

<table>
<thead>
<tr>
<th>Year</th>
<th>Interbank claims</th>
<th>Loans</th>
<th>Debt securities</th>
<th>Other assets (including assets held in current accounts with central banks)</th>
<th>Derivatives</th>
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Breakdown of liabilities by product

<table>
<thead>
<tr>
<th>Year</th>
<th>Interbank debts (including central banks)</th>
<th>Deposits and savings certificates</th>
<th>Own funds, minority interests and subordinated debts</th>
<th>Certificates of deposit, bonds and other debt instruments</th>
<th>Other liabilities</th>
<th>Derivatives</th>
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Source: NBB.
1 Data compiled according to Belgian accounting rules (Belgian GAAP) until 2005 and according to IAS/IFRS standards from 2006.
2 “Other assets” mainly comprise balances with central banks, shares, tangible and intangible assets and deferred tax assets. “Other liabilities”
are primarily short positions, liabilities other than deposits and debt securities, provisions and liabilities for defined benefit obligations. From the
third quarter of 2014, liabilities linked to transferred assets are no longer recognised under “other liabilities” but are included under different
items on the liabilities side.
3 Derivatives are recognised at market values, including – from 2007 – income receivable and expenses payable.
4 From the third quarter of 2014, savings certificates are no longer included in “deposits and savings certificates” but are recorded under
“certificates of deposit, bonds and other debt instruments”.

2019 • Financial Stability Overview
At the same time, holdings of debt securities fell by € 11 billion, from € 143 billion at the end of 2017 to € 132 billion at the end of 2018. The decline was entirely driven by government bonds, which shrunk by a total of € 17 billion during the year under review (see also Box 1 in this connection). New acquisitions of other bonds (i.e. corporate bonds and bank bonds) have to a certain extent mitigated the decline in the debt securities’ portfolio, increasing by € 6 billion in 2018, with more than 90% being issued by counterparts located abroad.

**BOX 1**

**Developments in Belgian banks’ government bond portfolio**

Over the past couple of years, Belgian banks’ holdings of government bonds fell significantly. By the end of 2018, the portfolio of government paper stood at € 88 billion, compared with € 136 billion at the end of 2014. The drop was steeper in the portfolio of Belgian government paper (minus € 28 billion during this period) than for government paper of other euro area countries (minus € 19 billion).

**Belgian banks’ portfolio of government bonds**

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

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<tr>
<td><strong>Geographical breakdown</strong></td>
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<td>Belgium (%) total assets, right-hand scale</td>
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<td>Rest of the world</td>
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<td><strong>Breakdown by rating (% of total)</strong></td>
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Source: NBB.
The increase in loans of € 24 billion was thus partly compensated by a decline in debt securities holdings of € 11 billion in 2018, but also by a further fall in the fair value of derivatives. This trend, which was also observed in the years before, partly relates to market developments since most Belgian banks’ derivatives consist of interest rate swaps. Portfolio compression and restructuring of banks’ derivative positions (fostered by the EMIR regulation, among other factors) also contributed to the overall decline in the value of derivatives. Overall, in 2018, the value of derivatives shrank by € 9 billion on the assets side and by € 6 billion on the liabilities side, to reach € 35 billion and € 43 billion, respectively. It should be mentioned that a large part of these derivatives is concluded through central clearing parties in the United Kingdom,
so that Brexit creates uncertainty over the continuity of those cross-border agreements and over the mutual recognition of and access to those central counterparties. The European Commission however mitigated this uncertainty by having initiated at the end of 2018 a process for the temporary recognition of British central counterparties, ensuring that cross-border derivative transactions will continue uninterrupted in the event of a hard Brexit.

Because of the decline in the derivatives’ market value in the past few years, banks also had to provide less collateral for their derivatives with a negative market value. Nevertheless, the asset encumbrance ratio has remained relatively stable (more details on the sources of encumbrance and collateral provided can be found in Table B3 in Section 3.1). This is because, at the same time, collateral provided for covered bonds (mainly in the form of mortgage loans) has increased in line with banks’ increased covered bond funding. Moreover, banks have in the past few years also locked in some cheap, long-term funding from the ECB TLTRO auctions, so that the collateral provided for central bank funding, largely in the form of (securitised) bank loans, has risen. Although there have been fluctuations in the asset encumbrance ratio from time to time, these have been largely related to the volatility of repo transactions (for which collateral is mainly provided in the form of government bonds). By the end of 2018, the asset encumbrance ratio, calculated according to the EBA definition, stood at 13% (up 50 basis points from the 12.5% observed last year), compared with an average 19% in the euro area. As encumbered assets are neither liquid nor accessible to unsecured debtors (such as depositors), this ratio should preferably not get too high.

After their significant growth over the previous couple of years, Belgian banks’ cash balances at central banks had by the end of 2018 fallen back to their level at the end of 2016 (around € 70 billion). These deposits are a relatively volatile component of the balance sheet for which significant changes may be observed from one month to another, depending on banks’ cash management strategies, the rates offered by central banks relative to those on the interbank market and Belgian banks’ repo activity. The cash management strategy of a bank is often decided at group level, so that the geography of deposits may vary, and may also involve deposits at non-euro area central banks that still offer a positive rate (although placing liquidity there could imply a foreign exchange risk). The decline in deposits at central banks in the last quarter of 2018 largely reflected a decline in liquidity received in the context of repo activities with financial institutions.

Disregarding seasonal patterns, however, the increase in central banks’ deposits that has unfolded over the last several years is a sign of Belgian banks’ excess liquidity, in line with the ample liquidity available in the market. With cash amounts placed at central banks accounting for around 7% of assets, banks continue to enjoy a comfortable liquidity position, stemming from past years’ TLTRO intakes and generous deposits from their clients. This is also shown by the liquidity coverage ratio (LCR) of Belgian banks, which is defined as the ratio between the stock of high-quality liquid assets (HQLA) within the banking sector – representing the unencumbered assets that can be converted into cash on private markets in times of severe liquidity stress (such as central bank reserves and government bonds) – and the net cash outflows in a 30-day stress scenario (e.g. from collateral and deposits). At the end of 2018, Belgian banks’ LCR amounted to 145%, up from 137% at the end of 2017. This was comfortably above the 100% requirement but lower than in many other euro area countries.

**Balance sheet: liability side**

Belgian banks’ deposits from the private sector increased by € 23 billion last year and reached € 529 billion at the end of 2018 (Chart 6), of which € 389 billion stems from households and € 140 billion from non-financial corporations (a complete overview of the funding structure is available in Table B3 in Section 3.1). Although the vast majority of this growth related to Belgian counterparts (90%), banks have also expanded their deposit base in some of their foreign home markets such as the Czech Republic and the Netherlands. The sustained growth of retail deposits, when seen through the lens of the dynamic lending pattern, corresponds to an intensification of the traditional intermediation activity undertaken by the sector.
Partly counterbalancing this progress, wholesale deposits receded by €10 billion during 2018, a development which was partly related to a decline in deposits received in the context of repo activities (which led also to a parallel decline in cash deposited at central banks). Interbank debts are usually more volatile, since they depend on arbitrage opportunities and funding needs at the group level of banks.

Given that, all in all, deposits have increased to a lesser extent than loans, Belgian banks' customer loan-to-deposit ratio has climbed to 97.5%, compared with 95.5% at the end of 2017 (see also Section 1.2).

**Chart 6**

**Stock of customer deposits\(^1\) and interest rates applied to retail deposits\(^2\)**

(unconsolidated end-of-period data)

Funding through debt securities is much smaller than the deposit funding and remained more or less stable in 2018 at 10% of the balance sheet. In a context of limited rate differentiation between sight, savings and fixed maturity deposits, banks have, however, reduced their reliance on deposit certificates. In 2018, one large institution reduced its deposit certificates by almost one third, contributing largely to the €10 billion drop. In contrast, the outstanding amount of covered bonds rose by €10 billion during the same period due to multiple issuances over the year, reaching €28 billion at the end of last year. Consequently, the total amount of financing through debt securities amounted to around €100 billion at the end of 2018, a level comparable to the end of 2017.

To date, Belgian banks are still making significant use of central bank funding (Chart B5 in Section 3.1). At the end of 2018, Belgian banks' outstanding amounts in TLTRO auctions amounted to €23 billion, which will mature in 2020 and 2021. However, the ECB has recently announced a new round of TLTRO III issuances.
While Belgian banks in principle do not need this central bank liquidity to continue their activities, they might make use of this possibility to (partly) replace their TLTRO II amounts – probably in combination with other funding sources such as new covered bonds issuances – as such transactions give them access to cheap funding over a longer term.

**Asset quality**

In 2018, Belgian banks pursued their efforts to reduce their legacy of non-performing loans (NPLs). At the end of the year, the NPL ratio, which corresponds to the share of loans that may not be repaid – due to their borrower getting into financial trouble – or that are already in arrears, had fallen to 2.3% from 2.7% one year earlier (Chart 7).

The fall in this ratio was mainly due to a decline in foreign NPLs, which tend to be higher than those for Belgian counterparties. The generally better credit quality of domestic loans is partly explained by the absence of a real estate crisis in Belgium in the aftermath of the financial crisis, in contrast with some other European countries. Therefore, the Belgian banking sector also displays one of the lowest overall NPL ratios in the euro area, where the average amounted to 4.1% in September 2018.

**Chart 7**

**Asset quality**

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

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Sources: ECB, NBB.

1 Figures refer to September 2018.
Forbearance, or the amount of exposures for which Belgian banks have made concessions (modifications of the contract or debt refinancing) towards debtors facing or about to face financial difficulties in meeting their commitments, also remains very limited in Belgium. At the end of 2018, the ratio of forborne performing loans, which can be an indication of future NPLs, amounted to 0.4 %, as against 0.9 % in the euro area.

During the course of 2018, the NPL ratio of loans to foreign households and non-financial corporations declined, from 7.1 % to 5 % and from 5.1 % to 4 % respectively, while the NPL ratio of loans to Belgian households and non-financial corporations remained rather stable at 1.5 % (versus 1.7 % at the end of 2017) and 3.4 % (3.7 %) respectively. This implies that most of the efforts undertaken in the past several years to reduce NPLs were indeed located in foreign markets, as also illustrated by the sell-off of an Irish NPL portfolio by a large bank this year. However, geopolitical and economic turmoil in some key foreign markets where Belgian banks are locally active may hamper this effort, as is for example the case in Turkey.

The risks linked to existing non-performing exposures are mitigated by the extent to which banks have created reserves to cover the expected losses stemming from the failure of borrowers. At the end of 2018, Belgian banks’ coverage ratio amounted to 45 %, which means that accumulated impairments on non-performing loans cover almost half of the gross outstanding amount of non-performing loans. This ratio has remained relatively stable over the past years and is also close to the euro area average. Since the introduction of IFRS 9, impairments and provisions must be calculated based on expected rather than incurred losses, as was the case under the IAS 39 standard.

Non-performing loans can also be covered by collateral received, such as the value of the properties which serve as collateral for mortgage loans. Including collateral received, the coverage ratio of the Belgian banking sector amounted to 78 % at the end of 2018. Note, however, that the value of collateral can change rapidly when conditions become less buoyant and financial and real asset prices decline.

**Solvency**

While NPL ratios have further improved over the year under review, indicating that banks’ expected losses are declining, the capacity of Belgian banks to face unexpected losses as measured by their total solvency ratio has remained relatively stable at around 19 % (Chart 8). While Belgian banks strengthened their capital after the onset of the financial crisis to a significant extent and at a more rapid pace than other euro area countries, the gap with the euro area average has narrowed in recent years. In September 2018, the total solvency ratio of euro area banks amounted to 18 %.

In 2018, Belgian banks’ Tier I capital ratio decreased from 16.9 % to 16.5 %. At the same time, the leverage ratio, which expresses the relationship between Tier 1 capital and non-risk-weighted assets, has remained stable at 5.9 %. With Tier I capital having remained constant at € 63 billion, the slight deterioration in the Tier 1 capital ratio was entirely due to the growth in risk-weighted assets (RWAs) in 2018 from € 373 billion to € 382 billion. While accounting for the largest share of RWAs, credit risk contributed only modestly (+€ 500 million) to the increase in overall RWAs, indicating that higher lending volumes have been largely offset by the lower probability of default associated with enhanced credit quality, resulting in lower risk weights calculated by banks’ internal models (based on historical losses). Secondly, some banks increased their RWAs for operational risk in 2018 (+€ 1.9 billion in total). Finally, the new macroprudential measure for the Belgian mortgage market introduced by the Bank in 2018, which consists of a uniform 5 percentage point increase in the risk weights calculated by banks’ internal models (a prolongation of a previously existing measure) and of a more targeted component in the form of a risk weight multiplier (of 1.33), has led to the addition of € 7 billion in RWAs in 2018 (see MPR, Section B.3.3).
The stabilisation of Tier 1 capital was related to a decline in its biggest subcomponent, i.e. Common Equity Tier 1 (CET 1) capital which was subject to several changes at the start of 2018. Firstly, several transitional provisions for the implementation of Basel III ended, which meant that some elements now have to be fully phased in when CET 1 capital is calculated (such as minority interests and some unrealised gains and losses on financial instruments). Secondly, the definition of CET 1 capital also changed slightly due to the introduction of IFRS 9. The new rules on classifying and measuring financial instruments prompted changes to "other comprehensive income" (a sub-component of CET 1 capital), while higher impairments caused a decline in retained earnings (another sub-component). However, the precise impact of the new accounting standard on CET 1 capital via both components varied greatly from one bank to another.

Consequently, the CET 1 capital ratio of the Belgian banking sector decreased slightly, from 15.9 % at the end of 2017 to 15.6 % at the end of 2018. This compares with an average CET 1 ratio in the euro area banking sector of 14.7 % in September 2018. While some peer countries show lower ratios than Belgium, such as Austria (14.8 %) and France (14.1 %), many show higher ratios. The average CET 1 ratio of German and Dutch banks stood, at the end of September 2018, at 15.8 % and 16.7 % respectively.

These ratios show Belgian banks to be comfortably fulfilling their (minimum) capital requirements. At the end of 2018, the minimum capital ratio required in accordance with CRD IV amounted to 9.875 %, including 1.875 % for the capital conservation buffer which is being gradually phased-in (to rise to 2.5 % when fully implemented at the beginning of 2019). In addition, the Bank can opt to activate several additional buffers. Firstly, in its function of macroprudential authority, the Bank can impose a countercyclical capital buffer (CCyB). While the Bank closely follows developments regarding Belgian credit growth, this buffer was...
Financial Stability Overview

Belgian banks also must apply the CCyB rates imposed by foreign authorities for their credit risk exposures in those countries. Secondly, the Bank requires Belgian banks to hold additional capital against their domestic mortgage loan exposure, for which capital requirements are calculated according to an internal ratings-based model (see also above). Thirdly, the Bank also imposes additional buffers on eight banks designated as systemically important in Belgium (the so-called O-SII buffer, see MPR, Section B.6.1). At the end of 2018, these buffer requirements amounted to 1.5% for the four most systemically important banks and to 0.75% for the four other systemically important banks. On top of all these so-called Pillar 1 requirements, banks are also subject to Pillar 2 capital requirements, which differ from bank to bank depending on their risk profile.

1.2 Structural changes in Belgian banks’ business models

Since the start of the financial crisis, Belgian banks have undertaken a wide-ranging transformation of their business models and activities. These post-crisis reforms included an extensive deleveraging and derisking, which led to a strengthening of their resilience in terms of both capital and liquidity. Notwithstanding this restructuring, they continued to finance the real economy without interruption as they redirected the focus of their activities towards traditional banking intermediation in their key markets and concentrated their restructuring on wholesale activities and activities in non-strategic foreign markets. Even during periods of severe stress on the global financial markets, banks continued to provide loans to the Belgian private sector and to counterparties in their foreign home markets. Consequently, banks’ asset concentration on loans has increased.

Table 1

Solvency ratios and breakdown of capital and risk-weighted assets

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

<table>
<thead>
<tr>
<th></th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier I capital</td>
<td>55.9</td>
<td>55.6</td>
<td>53.4</td>
<td>55.1</td>
<td>60.0</td>
<td>63.0</td>
<td>63.0</td>
</tr>
<tr>
<td>Common equity Tier I capital</td>
<td>–</td>
<td>–</td>
<td>51.5</td>
<td>53.3</td>
<td>58.1</td>
<td>60.4</td>
<td>59.7</td>
</tr>
<tr>
<td>Risk-weighted assets</td>
<td>352.7</td>
<td>339.4</td>
<td>349.8</td>
<td>345.4</td>
<td>369.5</td>
<td>373.1</td>
<td>382.2</td>
</tr>
<tr>
<td>of which:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Credit risk</td>
<td>301.0</td>
<td>287.7</td>
<td>290.1</td>
<td>282.8</td>
<td>308.1</td>
<td>315.3</td>
<td>315.7</td>
</tr>
<tr>
<td>Market risk</td>
<td>16.6</td>
<td>9.9</td>
<td>7.1</td>
<td>9.5</td>
<td>6.1</td>
<td>7.3</td>
<td>7.2</td>
</tr>
<tr>
<td>Operational risk</td>
<td>35.0</td>
<td>34.2</td>
<td>34.9</td>
<td>36.0</td>
<td>38.7</td>
<td>36.7</td>
<td>38.6</td>
</tr>
<tr>
<td>CVA</td>
<td>–</td>
<td>–</td>
<td>8.2</td>
<td>6.9</td>
<td>5.5</td>
<td>4.3</td>
<td>4.4</td>
</tr>
<tr>
<td>Other</td>
<td>0.1</td>
<td>7.6</td>
<td>9.5</td>
<td>10.3</td>
<td>11.0</td>
<td>9.5</td>
<td>16.4</td>
</tr>
<tr>
<td>of which: based on Art. 458¹</td>
<td>0.0</td>
<td>8.0</td>
<td>8.5</td>
<td>8.8</td>
<td>9.2</td>
<td>16.1</td>
<td></td>
</tr>
<tr>
<td>Tier I capital ratio (in %)</td>
<td>15.9</td>
<td>16.4</td>
<td>15.3</td>
<td>16.0</td>
<td>16.2</td>
<td>16.9</td>
<td>16.5</td>
</tr>
<tr>
<td>Common equity Tier I ratio phased-in (in %)</td>
<td>–</td>
<td>–</td>
<td>14.7</td>
<td>15.4</td>
<td>15.7</td>
<td>16.2</td>
<td>15.6</td>
</tr>
<tr>
<td>Common equity Tier I ratio fully-loaded (in %)</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>14.8</td>
<td>15.2</td>
<td>15.9</td>
<td>15.6</td>
</tr>
<tr>
<td>Leverage ratio phased-in</td>
<td>–</td>
<td>–</td>
<td>4.7</td>
<td>4.8</td>
<td>5.5</td>
<td>5.9</td>
<td>5.9</td>
</tr>
</tbody>
</table>

Source: NBB.

¹ Additional stricter prudential requirements based on Article 458 due to modified risk weights for targeting asset bubbles in the residential and commercial property sectors.
More recently, the low interest rate environment and favourable economic conditions have led to an acceleration of credit growth in many euro area countries. In Belgium, the annual growth rate of loans to households and non-financial corporations started to rise at the end of 2014 and the beginning of 2015, reaching a level of more than 5% and 6% respectively at the end of 2018 (see MPR, Section B.2.1).

This acceleration in credit growth is the result of greater appetite for borrowing in the private sector, but also stems from a deliberate strategy of banks, which are looking to increase their lending volumes for various reasons. First, in the current environment of historically low rates, loans still offer relatively favourable interest rates compared with other alternatives, such as investments in government bonds or on the interbank market. Moreover, banks are sitting on a large amount of (excess) liquidity, partly due to the continuing accommodating monetary policy pursued by the ECB, which – on top of keeping the euro area’s key interest rates low – also provides direct liquidity to banks in the form of TLTROs (long-term loans which are targeted at financing lending to the real economy). Given that the cost of TLTRO borrowing is linked to how much a bank lends – if a bank sufficiently increases borrowing to households (except for house purchases) and non-financial corporations, it even has to “pay” a negative rate – banks are thus encouraged to extend credit to the real economy. In addition, since the low interest rate environment puts pressure on banks’ net interest income (their main source of revenue), banks have in recent years tried to offset the decline in net interest margins by boosting their loan volumes. These developments have led to intensified competition for private sector loans and has also been accompanied by an easing of credit standards in those markets.

**Chart 9**

Loan-to-deposit ratio
(consolidated data, in %, unless otherwise stated)

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1 Ratio between loans to and deposits from all counterparties except central banks and credit institutions.
2 Ratio between loans to and deposits from households and non-financial corporations.

Sources: ECB, NBB.
The recent acceleration in credit growth has clearly led to an increase in Belgian banks’ loan-to-deposit ratios (Chart 9). This ratio is an indicator of liquidity that measures the extent to which banks can finance their lending activities with deposits. A such, a ratio above 100% means that a bank needs other funding sources on top of deposits to finance its outstanding amount of loans, for example debt instruments or other wholesale funding sources. Such market funding is generally less stable than deposits in terms of both availability and costs, since the extent to which banks can attract market funding and the price at which they can do so very much depends on banks’ financial health, as well as on global economic and financial conditions more generally. Lower loan-to-deposit ratios are thus generally better, as this means that banks do not have to rely so much – or not at all – on volatile market funding to finance their illiquid loans.

In the build-up to the financial crisis, Belgian banks’ loans to customers (i.e. all counterparties except central banks and credit institutions) increased strongly, mainly due to growth in foreign markets (also related to acquisitions) as the Belgian market became more and more saturated. Since credit expanded much faster than deposits, the customer loan-to-deposit ratio rose significantly in the years leading up to the financial crisis, from around 90% in 2002 to above 100% in the 2005-2007 period. Due to the restructuring of balance sheets that started in the wake of the crisis, the loan-to-deposit ratio fell back again and remained within a range of between 90% and 92% until 2015.

The new acceleration in credit growth that took off at the end of 2014 and the beginning of 2015 has, however, started to once again outpace the simultaneous increase in deposits. Whereas loans to customers grew by €80 billion from €539 billion at the end of 2014 to €619 billion at the end of 2018, i.e. an average annual growth rate of 3.5%, customer deposits only grew by €48 billion, from €581 billion to €629 billion, i.e. a growth rate of 2% per year on average. As a result, the Belgian banks’ customer loan-to-deposit ratio gradually increased. By the end of 2018, it amounted to 98%, up from 92% at the end of 2014.

The growth in customer loans was entirely due to growth in loans to the private sector (households and non-financial corporations), since loans to other customers (public sector and other financial institutions) remained stable or even declined slightly. Since 2014, the outstanding amount of private sector loans has grown by 4.2% on average, whereas deposits from those counterparties increased by an average 3.1%. As a consequence, the ratio between private sector loans and private sector deposits in the Belgian banking sector increased and from the end of 2016 even started to slightly surpass 100%, reaching 103% at the end of last year, which means that there is now more or less a balance between loans to and deposits from the private sector. This suggests that the low loan-to-deposit ratio that has been a structural feature of the Belgian banking sector might be gradually disappearing due to the dynamic lending of the past several years. Nevertheless, when compared to banking sectors in other European countries, this ratio is still relatively low. The average private sector loan-to-deposit ratio in the euro area stood at 114% at the end of 2017. Peer countries such as the Netherlands and France show ratios of 125% and 114% respectively.

In contrast to the credit expansion that took place in the build-up to the financial crisis, Belgian banks’ recent acceleration in credit growth has been mainly concentrated in the Belgian market. Since 2014, loans to Belgian households and non-financial corporations have increased at an average pace of more than 5% per year. The ratio between Belgian private sector loans and Belgian private sector deposits has also risen gradually over the past four years, from 75% at the end of 2014 to 80% at the end of 2018 (Chart 10). Dynamic lending to the Belgian private sector has thus been the major driving force behind the recent increase in the loan-to-deposit ratio.

Since Belgian households are relatively wealthy and tend to invest a large amount of their financial assets in deposits, the ratio between loans granted to the Belgian private sector and deposits collected from them is typically well below 100%. Therefore, banking entities active in Belgium tend to transfer part of these “excess” deposits from the Belgian private sector to intragroup entities abroad in order to finance (lending) activities in their foreign home markets. This is in line with the observation that, at a consolidated level (i.e. including foreign activities), the private sector loan-to-deposit ratio is higher (103% at the end of 2018) than at Belgian territorial level (80%).
Looking at the intragroup flows between banking entities active in Belgium and entities abroad, it does indeed appear that Belgian banks are large net providers of liquidity to foreign entities of the banking groups to which they belong. Belgian banks thus grant more loans to intragroup entities abroad than they receive intragroup funding from them. This net funding position reflects business models where Belgian (parent) banks fund the activities of their branches / subsidiaries abroad but also models where Belgian branches of foreign banks transfer saving deposits and other funding collected in Belgium to their parent companies abroad.

In the years prior to the crisis, intragroup transactions (i.e. both claims and debts) rose significantly, but they have largely fallen back again since then. This drop reflects the restructuring of balance sheets after the crisis, but also partly stems from the introduction of an NBB large exposure regulation limiting the amount of unsecured intragroup exposures to the amount of regulatory capital. Even though the net (direct) financing of foreign entities of the same group has declined over the past decade, it still amounted to €63 billion at the end of 2018. The recent lending dynamics have not resulted in a significant decline in the net intragroup flows, suggesting that Belgian banks continue to draw on their large domestic deposit base to finance their foreign lending. If the current dynamism continues, however, and Belgian deposits are increasingly needed to finance domestic activities, Belgian banks might in the future have less potential to recycle Belgian liquidity to expand their activities abroad.

Belgian banks’ main exposures to private sector loans abroad are located in Belgium’s neighbouring countries (the Netherlands, Luxembourg, France, Germany, the United Kingdom), in Eastern Europe (Czech Republic,
Slovakia) and in Ireland and Turkey (Chart 11). The exposure to the British private sector, which could be affected by the Brexit developments, amounted to €15 billion at the end of 2018 (mainly relating to non-financial corporations). In some of these markets, the loan portfolios have also grown significantly over the past four years (such as in the Czech Republic, Luxembourg and Slovakia) whereas exposures in other markets were reduced (e.g. Ireland). When comparing the deposits received from the private sector in these countries to the loans granted to the same counterparties, it can be observed that in some foreign strategic markets, such as the Czech Republic and Luxembourg, deposits collected from the private sector are enough to finance the stock of domestic loans. In most of the countries, however, loans granted also draw on other funding sources, including Belgian deposits. This is the case, for example, in the Netherlands and Ireland.

**Chart 11**

**Geographical breakdown of assets held by Belgian banks**

(consolidated data, in € billion)

Source: NBB.

1 Gross carrying amounts, excluding exposures to central banks.
2 Ultimate risk basis, i.e. after guarantees and other risk transfers.

As also mentioned in Section B.3.2 of the MPR, a large part of Belgian banks’ increased lending activities relates to real estate markets. With consumer credit accounting for less than 10 %, mortgage loans make up most of the household loans. In the corporate loan portfolio, loans to companies that are active in the construction and real estate sectors account for 22 % of the exposure, with the stock of the latter having grown from €47 billion at the end of 2014 to €55 billion at the end of 2018, an average annual increase of around 4 %. Other large exposures to sectors in the corporate portfolio are wholesale and retail trade (19 %) and manufacturing (15 %).
The exposure of Belgian banks to real estate markets is thus quite significant. On a consolidated level, mortgage loans and loans to companies active in the real estate activities and construction sector now represent almost 30% of banks' total assets. This is above the euro area average of around 24%, and that of many of the country's peers (e.g. 22% in France and 19% in Germany). The exposure is highly concentrated on the Belgian real estate market, where lending has been very dynamic over the past couple of years.

1.3 Profitability prospects

Net interest income

Initially, Belgian banks mainly benefited from the low interest rate environment and falling interest rates due to their balance sheet structure, which typically has longer durations on the assets side than on the liabilities side (Chart 12). While funding costs declined sharply, the average yield on assets remained relatively resilient due to the higher historical interest rates on assets (with a longer time to reprice). Moreover, banks increased their commercial margins for certain assets, such as new mortgage loans, from their low levels before the financial crisis. Consequently, the falling interest rates initially led to an increase in Belgian banks’ net interest margins.

Chart 12

Implied yields on banks’ assets and deposits\(^1\)

(unconsolidated data, in %)

<table>
<thead>
<tr>
<th>Average interest rate received on different types of assets</th>
<th>Average interest rate paid on different types of deposits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Term loans</td>
<td>Sight deposits</td>
</tr>
<tr>
<td>Mortgage loans</td>
<td>Saving deposits</td>
</tr>
<tr>
<td>Bonds and other securities</td>
<td>Term deposits</td>
</tr>
</tbody>
</table>

Source: NBB.

\(^1\) Implicit yields 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 in the same period.

Yet, gradually, the negative effects of the low interest rate environment and the falling interest rates started to outweigh these benefits, especially in the period after the client rate on saving deposits – a major source of funding for Belgian banks – reached its lower bound, so that the room for further cuts in funding costs became
limited. At the same time, the average yield on assets declined steadily as more and more assets had to be repriced at lower rates, a development which was accelerated by loan prepayments and refinancing of (mainly) mortgage loans, which constitute a major proportion of the Belgian banking sector’s assets. Moreover, in recent years, banks have once again started to lower their commercial margins on (mortgage) loans (see MPR, Section B.3.2). The low interest rate environment has thus started to weigh on banks’ net interest margins, resulting in a lower net interest income following the peak reached in 2016.

This being said, Belgian banks’ net interest income has remained relatively resilient so far, which might seem rather surprising since net interest income was expected to suffer relatively severely from shrinking interest margins (Chart 13). In the past decade, net interest income has fluctuated at around €14 billion, without major changes. In 2018, it amounted to €14.4 billion, which is even slightly higher than in 2017 (€14.1 billion).

The net interest margin, however, is only one driver of banks’ net interest income. Volumes, type of assets generating interest income and interest rate hedging policies are other important elements. Between 2009 and 2013,

**Chart 13**

*Net interest income including future projections\(^1\), and its determinants: net interest margin\(^2\) and growth in interest-bearing assets*

(consolidated data)

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1. Future projections of Belgian banks’ net interest income for the next three years are available in the supervisory reporting that covers the measurement of interest rate risk in the banking book (IRRBB). In this reporting, the net interest income development over a three-year horizon is reported under strict constraints – detailed in the related circular letter – and according to different interest rate scenarios, including a scenario of interest rates remaining constant at the levels recorded at the time of reporting. The constraints of the IRRBB reporting consist, for example, in the assumption of a static balance sheet (the balance sheet should be kept constant, in size and composition) and strict hypotheses as regards the behaviour of client rates on sight and savings deposits in the various simulated interest rate scenarios.

2. The net interest margin is calculated as the ratio between yearly net interest income (including net interest income on derivatives) and average interest-bearing assets over the year.
for example, Belgian banks’ net interest income declined from around € 15 billion to around € 13 billion, as the deleveraging in the aftermath of the financial crisis resulted in a significant decline in interest-bearing assets. Nevertheless, the net interest margin rose during that period – although not enough to make up for the decline in asset volumes – given that the type of assets that were disposed of largely concerned interbank and wholesale activities, which tend to generate lower interest income relative to their volume compared to, for example, loans to the private sector.

To compensate for the more recent decline in net interest margins, Belgian banks have in recent years increasingly relied on growing the volumes on which interest income is earned, especially those of loans to the Belgian private sector. Although this strategy has allowed banks to levy additional interest income and keep their net interest income relatively stable, competition between banks has intensified a lot in recent years in several subsegments of the loan market (in particular in the Belgian mortgage market), resulting in a new decline in banks’ commercial margins.

Not only in the domestic market, but also in some of their key foreign markets, Belgian banks have increased lending volumes, which has helped to mitigate the impact from the low interest rate environment on banks’ net interest income. This was in part also due to the favourable interest rate developments in some of the non-euro area markets where they are active (e.g. the Czech Republic).

In contrast to private sector loans, Belgian banks have significantly reduced their volumes of government bonds over the past several years. However, the associated negative impact on net interest income has been relatively limited given their smaller share in gross interest income (around 10 %) and given that average interest rates earned on banks’ holdings of government bonds declined less rapidly than those on loans, due also in part to the relative change in the composition of the portfolio towards somewhat lower-rated (and higher-yielding) bonds (as discussed earlier).

Finally, net interest income associated with (interest rate) derivatives, which also forms part of total net interest income, was less negative in 2018 than in 2017, and thus also contributed to the slight increase in net interest income last year. In fact, without considering net interest income on derivatives, the average net interest margin declined slightly in 2018, while it remained stable when derivatives’ net interest income is taken into account.

Expectations are that it will become difficult for banks to maintain their current level of net interest income in the coming years. First, if the low interest rate environment continues, their net interest income is likely to start declining, especially if banks maintain their current low (commercial) margins. The recent increase in loan volumes is expected to be difficult to maintain without an undesirable further continuation of weak credit standards in lending to the private sector (in particular in mortgage lending), hence putting into jeopardy asset quality going forward. In order to secure their current net interest income, banks will thus need to strike a better balance between loan volumes, commercial margins and risk-based loan pricing that correctly reflects the risks assumed.

Once interest rates start to increase, banks will face an increase in funding costs while many of their assets have been locked in at low margins for a very long time. Over the past several years, Belgian banks have redirected their balance sheets towards more loans (Chart 14). Often, these have relatively long maturities and low interest rates that are fixed for the whole maturity of the loans, as in the case of mortgage loans. But even when those mortgage loans are granted at variable rates, the current low commercial margins will remain locked in and, more importantly, the regulatory cap on the client rates of mortgage loans ensures that the rate charged to borrowers may never exceed a level that is twice the initial client rate, which is currently very low. Although the ECB has recently announced that it will not increase policy rates this year, and, in addition, that it will issue a new long-term refinancing package for banks (TLTRO III), providing an opportunity for banks to lock in cheap funding for longer, the large proportion of banks’ long term loans at very low margins will expose banks to the risk of rate increases for a very long time, far beyond the period of TLTRO III (up to four years).
Moreover, other funding sources, such as sight and savings deposits, on which Belgian banks have heavily increased their reliance in the past years so that they now constitute a vast proportion of their funding sources, are bound to be subject to earlier interest rate changes once interest rates start to rise. In contrast to other funding sources such as debt securities, lower rates directly apply to the whole stock of sight and savings deposits and not only to new business. To adequately manage this risk, it is important that banks understand the repricing behaviour of these deposits. Banks develop models to estimate such repricing behaviour and thus the average maturity of their deposits. Yet the use of these models also brings its own risk (i.e. model risk), since banks’ current non-maturity deposit models are calibrated on customer behaviour in a context of falling interest rates. It remains to be seen to what extent this past depositor behaviour in a falling (and low) interest rate environment is a good indicator of future customer behaviour and clients’ sensitivity to changing interest rates on non-deposit investments in a rising interest rate environment.

By redirecting their balance sheets over the past several years to more (fixed-rate) lending and (retail) deposit funding, Belgian banks might thus have widened their exposure to interest rate increases. To reduce the repricing mismatch between the asset and the liability sides of their balance sheets, Belgian banks primarily use interest rate derivatives to hedge the accompanying interest rate risk. It is not excluded that banks, in their search for yield in the current low interest rate environment, have been inclined to increase their duration gaps by leaving a larger share of their positions unhedged, so that their transformation margin and net interest income can increase when interest rates remain low. A larger duration gap, however, makes banks more vulnerable to a large and abrupt interest rate increase.
Other components of the income statement

Due to the increase in loan volumes over the past several years, Belgian banks have also widened their exposure to credit risk. Given that the share of non-performing loans is currently at a very low level, banks have in recent years added very few new impairments and provisions, and this has contributed to their solid performance. But if credit losses increase in the future, the concomitant increase in impairments and provisions – from historically low levels – might have a potentially significant downward impact on results.

Indeed, there are indications that the generally favourable conditions which have marked Belgian banks’ operating environment in the past decade might slowly start to reverse. European economic growth started to slow in 2018 and several political and geopolitical uncertainties in Europe and the rest of the world continue to weigh on the economic outlook, such as political tensions in Italy, the ongoing uncertainty over Brexit, deteriorating conditions for international trade and increasing protectionism, and developments in emerging markets.

It is thus possible that less favourable economic conditions could coincide with a decline in loan demand and with growing losses in Belgian banks’ loan portfolios, especially against the background of the relatively high private sector debt levels and the deterioration in lending standards observed in the last couple of years when lending was dynamic, including in the Belgian mortgage loan portfolio (see MPR, Section B.3.2). If economic activity declines and also ushers in higher unemployment, for example, this might spark an increase in NPLs, potentially severely impacting Belgian banks’ profitability.

There are already some first signs that the cost of credit in the Belgian banking sector might have bottomed out and could, from now on, start to increase. For the first time in a long while Belgian banks’ impairments and provisions did not fall in 2018, as reflected in the loan loss ratio (rising from 6 basis points in 2017 to 8 basis points in 2018). Moreover, while the NPL ratio of the Belgian banking sector continues to improve, a closer look at underlying developments suggests that this positive development should be qualified to some extent.

For one thing, an artificial improvement in the ratio can occur when the denominator, i.e. the stock of loans, increases while the NPL amount remains stable. This is what has been observed for Belgian private sector loans, since their NPL amount remained more or less stable at €9 billion in 2018 while their outstanding gross loan amount increased by €21 billion. In fact, the absolute amount of non-performing loans to Belgian non-financial corporations even slightly increased in 2018, from €4.9 billion to €5.2 billion, a development which was not visible from the NPL ratio due to the significant parallel increase in outstanding loans. When credit is growing dynamically, NPL ratios can thus initially improve, even when accompanied by a parallel deterioration in lending standards, since the potential increase in non-performing exposures would only be observed at a later stage.

Secondly, it seems that risks have started to materialise or are about to materialise in some specific foreign exposures of Belgian banks. For example, the NPL ratio of loans provided by Belgian banks to the Turkish private sector climbed significantly in the second half of 2018, from 3.0% to almost 6.6% for loans to non-financial corporations and from 2.8% to 3.7% for loans to households. In addition, on top of potential losses linked to Belgian banks’ direct exposures to the UK (such as loans to British non-financial corporations), Brexit might result in an increase in loan defaults for (Belgian) non-financial corporations that have trading links with the UK.

To counterbalance the pressure on their profitability, Belgian banks have – as well as increasing their lending activities, in particular to the Belgian private sector – also tried to diversify their income in the past couple of years, for example towards more fee and commission income. But while banks have managed to grow their assets under management and their distribution of investment products, any increases in entry and asset management fees still largely depend on financial market developments. Therefore, fees and commissions are a more volatile source of income: future uncertainty on financial markets could greatly impact on the extent to which banks are able to generate such income. Moreover, growth in asset management activities exposes banks to additional step-in and reputational risks.
In recent years, Belgian banks have not really succeeded in increasing the share of fee and commission income in their total operating income: this has remained relatively stable at 25% (Chart 15). Since 2017, the share of other operating income increased with the transfer of a leasing entity from a parent company to its Belgian subsidiary: however, with a share of 63%, net interest income generally remains the largest component of banks’ net operating income.

While a reduction in operating expenses might also help to relieve profitability pressures, Belgian banks are struggling to enhance efficiency, despite the many restructuring plans announced in recent periods. In fact, the average cost-to-income ratio of the Belgian banking sector has hovered around 60% in the past several years, without major changes. Although this compares with an average of 65% for the euro area, on a country-by-country basis only five other euro area countries (Germany, France, Italy, Austria and Ireland) have banking sectors with a higher cost-to-income ratio. For several of the countries where the number of inhabitants by bank branch is higher than in Belgium (such as in the Baltic states, the Netherlands, Slovakia), the cost-to-income ratios are lower than in Belgium.

The fact that the cost-to-income ratio in the Belgian banking sector remains high can be explained by several factors, such as an increase in indexed salaries, a rebalancing of the workforce towards higher average wages, and increasing activities abroad. Moreover, large banks are investing heavily in IT infrastructure to keep up with, and prepare for, the (future) transformation of banks’ business models, which includes the digitalisation
of processes, services and products and the introduction of technological innovations. These developments will probably continue for a while.

To determine the appropriate level of profitability that banks should pursue, profitability should be assessed in the light of the equity returns demanded by banks’ shareholders, as business model sustainability requires the ability to access capital markets. For the recipients of the funds invested by shareholders, these returns correspond with capital costs, which for many institutions represent a profitability target that can have an impact on banks’ internal management. Capital costs are difficult to measure, though, as they are influenced not only by the institution’s risk profile but also by elements that cannot be observed, such as market uncertainty. However, most European banks estimate their capital costs at between 8 % and 10 %.

For the moment, with their RoE amounting to 8 % at the end of 2018, Belgian banks in general still generate more or less sufficient results to cover their cost of equity. However, the cyclical and more structural challenges discussed above – which include the persistently low interest rate environment, the slowdown in economic growth and the (geo)political uncertainties around the globe, the transformation in the financial sector and the need to fit existing cost structures and business organisations to new business models – could weigh on Belgian banks’ future capacity to generate returns sufficient to cover their capital costs as demanded by shareholders. Moreover, Belgian banks’ current pricing and commercial margins in several subsegments of their lending to the private sector (e.g. in the mortgage loan market) may already now be insufficient to cover their cost of capital if all risks (and costs) are priced correctly in the internal transfer price for these loans.

To keep profitability at satisfactory levels, Belgian banks will thus need to pursue their cost-cutting efforts and carefully manage the challenges and opportunities arising in the rapidly changing operating environment, which will also call for them to strike a better balance between loan volumes, commercial margins and risk-based loan pricing, and to ensure a sufficiently long-term view on potential risks building up in their balance sheets in view of adverse scenarios around a baseline scenario.

2. Insurance sector

Like 2017, 2018 ended up with solid results for the Belgian insurance sector. This can be explained by, among other factors, the efforts undertaken by the sector to gradually adapt to the low-yield environment, together with the further expansion of Belgian economic activity and increasing household wealth. In 2018, the sector as a whole recorded a positive result of € 3.2 billion (or € 2.4 billion excluding new companies included in the 2018 reporting scope), compared with € 2.3 billion in 2017. At the same time, solvency ratios remained well above the minimum 100 % level required under Solvency II, with an average solvency capital requirement (SCR) ratio of 219 % at the end of 2018.

These good results provide a buffer to cope with several headwinds and challenges that could test the sector’s resilience in 2019 and beyond. Section 2.1 focuses on these risk factors and points of attention for the Belgian insurance sector, while Section 2.2 provides an overview of the main developments in the sector in 2018.

2.1 Risk factors and challenges facing the Belgian insurance sector

Risks and challenges are still very much present for the insurance sector and its supervision in Belgium. For one thing, 2018 saw the decision of several British insurers to set up activities in Belgium because of Brexit.

1 The inclusion of newly authorised insurance and reinsurance companies with specific business models in the reporting scope in 2018 has brought quite substantial changes to sectoral figures, especially regarding income, investment and solvency indicators. For the sake of comparison, figures for the reporting scope in 2017 will be presented as much as possible. Note that some figures for 2017 were also revised compared with FSR 2017.
The Bank dealt with four cases of this type during the year under review. This involved close consultation with the companies concerned in order to gain an understanding of the activities and plans for their Belgian companies. The prudential supervision of these new Belgian insurers and reinsurers will present a major challenge for the Bank in the future.

For the “traditional” insurance sector in Belgium, the main challenges or points of macroprudential focus concern the persistence of a low interest rate environment, the strong growth in unit-linked life insurance business and the increased exposure of the insurance sector to the residential and commercial real estate markets. Insurtech and climate change are also areas that need to be monitored closely. These aspects are discussed in more detail in the sections below.

**Uncertainties around the low interest rate environment**

As interest rates remained at historically low levels in 2018, the interest rate discount curve for Belgium, calculated by the European Insurance and Occupational Pensions Authority (EIOPA), rose only slightly between December 2017 and December 2018. Section B.2.1 of the Macroprudential report notes in this connection that uncertainties regarding the development of interest rates in the coming years remain quite high, even if the most likely outcome of the most recent macroeconomic developments and central bank policy announcements is the persistence of a low interest rate environment in the short to medium term.

In this context, the low interest rate environment is putting pressure on insurers’ investment income (Chart 16). Insurers, then, need to adapt further to this environment and proceed with the reduction of average guaranteed rates on existing and new contracts as they have done over the past few years. As a reminder, in 2018, various Belgian insurance companies ended their so-called “buy-back” programmes for contract surrenders, some of which they had started many years ago. These programmes offered incentives to persuade policyholders to surrender contracts with high guaranteed returns – sometimes as high as 4.5% – that had become particularly onerous for insurers in a low interest rate environment. In some cases, insurers sold on these contracts to other insurance companies if they had been unsuccessful in persuading their clients to surrender them. Consequently, at the end of 2018 the average guaranteed rate on class 21 contracts worked out at 2.33% (preliminary figure), compared with 2.47% at the end of 2017.

**Chart 16**

**Life insurance (class 21) guaranteed and investment returns**

![Chart showing life insurance (class 21) guaranteed and investment returns]

Source: NBB.
At the same time, the current interest rate environment, associated with historically low levels of volatility on financial markets, implies a high risk of a sudden increase in assets’ term/risk premiums, as could be observed to some extent in the last quarter of 2018. Although the consequences for the sector were limited back then, an abrupt increase in term or risk premiums could have a sizeable impact on insurers’ balance sheets and solvency levels.

A scenario of a sudden shift in the yield curve, associated with higher risk premiums for several asset classes and significant increases in policy lapses and claim inflation, informed a stress test carried out by the Bank for seven Belgian insurance companies in 2018. Based on an EIOPA scenario called “yield curve up” (or YCU), the exercise showed that the Belgian insurance sector would be particularly vulnerable to the type of shocks included in this scenario, among which, an upward shift of 167 basis points in ten-year Belgian government bond spreads.

As depicted in Chart 17, the SCR ratio for the observed sample, accounting for 75% of total assets in Belgium, would decrease from 199% to 126% after the shocks. This can mainly be explained by the substantial reduction in the excess of assets over liabilities (minus €9.6 billion or –46%), mainly driven by the mark-to-market losses recorded on government bonds (Belgian insurers having usually a larger home bias on government bonds than other insurers) that would not be offset by the reduction in technical provisions. At the same time, the solvency capital requirement for the sector as a whole only decreases by €0.4 billion, due to lower capital requirements for market risk given the reduced post-stress value of assets.

It should however be mentioned that depicted results for European and Belgian insurers take into account long-term guarantee measures that include, among others, the “volatility adjustment” mechanism that does not compensate much for increases in Belgian spreads (as opposed to increases in larger countries’ bond spreads). The volatility adjustment (VA) adds an artificial spread, determined by EIOPA, to the risk-free rate curve used by companies to calculate their technical provisions, in order to compensate for the change in spread level on the assets side. When spreads widen, VA increases as well, and the value of technical provisions is therefore reduced. However, as the VA is computed for an average European insurer’s portfolio
(which does not comprise large amounts of Belgian bonds, unlike other large countries' bonds), it only slightly takes increases in Belgian spreads into account, meaning that the post-stress results are not fully comparable for insurers of different nationalities.

While the post-stress SCR ratio calculated for the sector remains above 100 %, some companies would come very close to this lower limit, meaning that the risks covered in the YCU scenario should be monitored very closely in the months ahead.

**Revived interest in unit-linked and index-linked products (class 23)**

In 2018, insurance companies saw their life insurance premium income climb back up after having fallen for five consecutive years. This revival was almost entirely due to new business in class 23 contracts (so-called "unit-linked or index-linked contracts") that do not offer guaranteed returns to their policyholders (see also Section 2.2 below). At the end of 2018, assets covering such contracts accounted for 11 % of insurers' total assets. Although policyholders stand to earn potentially higher returns on these contracts than they do on class 21 products, they run a much bigger risk, as they alone bear any losses on the investment underlying the contracts. Granted, these contracts come with an insurance component – e.g. death cover – but in practice they bear a strong resemblance to investment fund units and are often also managed by the group asset management company to which the insurer belongs.

The recent success of these products is attributable to two factors. The first is that insurers are no longer willing to run excessive risks, such as those that have come to light in contracts offering policyholders guaranteed returns and that have proven unfeasible in a low interest rate environment. What is more, class 23 contracts, whose risks are squarely taken by policyholders, do not come with any capital requirements for insurers. Secondly, for policyholders these contracts offer an alternative to traditional life insurance agreements, which currently offer very low guaranteed returns. Demand for these contracts has been fuelled by the results locked in by these assets in the past few years – thanks, in part, to flourishing equity markets – and by the fact that they are exempt from tax on securities accounts.

Although the rise in class 23 contracts should not in itself be a concern for the insurance sector, some risks may still stem from the observed developments. First, even if class 23 investments do not involve any market risks for insurers, they do run a reputation risk should policyholders suffer heavy losses on these contracts as a result of developments in the underlying financial market investments. Secondly, as assets offering class 23 contracts are often invested in investment funds, interconnectedness between the insurance and asset management sectors increases in turn. As a result, risks of contagion from one sector to the other in case of financial distress may be higher than in the past.

**Increased exposure to loans, mortgages and real estate**

In the context of the low interest rate environment, insurers have gradually re-allocated their assets towards corporate loans – both to companies in their own groups and to non-financial companies – and mortgages over the past two years (see also Section 2.2 below for more details on the composition of the investment portfolio). Although offering attractive returns and being a close fit with the investment horizons of insurance companies, these assets have less favourable liquidity profiles than more traditional investments. Another concern related to such assets is that they may be the source of regulatory arbitrage happening at the level of the “banking-insurance” conglomerate groups, which are very much present in Belgium. Consequently, in 2018 the Bank launched a new survey to capture the risks related to mortgages in insurers’ portfolios, as outlined in Box 2.
Financial Stability Overview

The Belgian financial market has always had a strong presence of financial conglomerates. This may contribute to the shift of investment portfolios from banks to insurers in a context of intensified capital requirements for banks’ mortgage loans.

As part of its horizontal review of Belgian insurers’ investment portfolios, the Bank decided to analyse the risks involved in a shifting of residential mortgage loan portfolios between banks and insurers. Differences in capital requirements and valuation were both analysed. This revealed that there is a risk of regulatory arbitrage. Relative to bank sector capital requirements, the Solvency II standard formula requires no capital to be held when the loss-given-default (often assessed through the indexed loan-to-value, ILTV) of the residential mortgage loan is below 80%, which is the case for the bulk of residential mortgage loans exposures in Belgium. Moreover, the probability of default (often measured by debt-service-to-income, DSTI) is not considered in the Solvency II standard formula capital requirements for residential mortgage loans. For this reason, loans with a low ILTV and high DSTI receive a more beneficial capital treatment for insurers than for banks, creating the possibility for regulatory arbitrage, especially within a financial conglomerate.

On top of the differences in capital requirements, valuation methods are different for European banks versus insurers: banks have to value their mortgages at the outstanding amount adjusted for expected losses (introduced in IFRS 9 in 2014), whereas insurers have to value their mortgages at the Solvency II value, which is equal to the fair value where no market value is available. Which valuation is most beneficial depends on a number of parameters including the extent of loss provisioning, the amount of interest rate payments, discount rates, etc.

The outcomes of this analysis, as well as the key recommendations regarding the Belgian insurance sector following the IMF’s 2018 Financial Sector Assessment Program, led the Bank to develop a comprehensive monitoring and reporting framework for the risks arising from mortgage lending by insurers. The new framework consists of both a micro- and a macroprudential dimension and adds important information to that currently collected through the Solvency II quantitative reporting templates. The microprudential dimension focuses on the risks of residential mortgage lending for individual insurers, whereas the macroprudential dimension serves to monitor developments in the real estate market in Belgium. This annual reporting focuses on the positions as of 31 December of each calendar year and must be submitted to the supervisor before 30th April of the following year. The first results of this new reporting were reported to the Bank in April 2019.

The macroprudential tables of this new reporting only need to be reported by institutions with a portfolio of residential mortgages that exceeds a minimum threshold. They are very comparable to the already existing macroprudential mortgage loan reporting for the banking sector and focus on various credit standards, such as the maturity, loan-to-value or debt-service-to-income ratios of these mortgages, as well as on the underlying real estate guarantees or the variability and level of the client interest rates. By extending the macroprudential reporting to insurance companies (including for loans included in unit-linked investment portfolios), the Bank ensures the continuation of a comprehensive monitoring of the Belgian mortgage market for the purpose of assessing related macroprudential risks and the need for policy measures.
The microprudential tables of the new mortgage loan reporting focus mainly on the associated risks for the insurance companies and collect information on forward-looking risk drivers, related to three key risks: default risk, interest rate risk and prepayment risk. It covers all insurance firms for which the share of residential mortgages in their total investment portfolios (excluding unit-linked investments) is higher than 5% or exceeds €650 million in absolute terms.

To cover default risk, the reporting requests information on total outstanding amounts and new business, the amount of impairments, the average loan-to-value, debt-to-income, loan-to-income and debt-service-to-income ratios and the estimated probability of default and loss-given-default of the residential mortgage loan portfolios. To cover interest rate risk and prepayment risk, the reporting focuses on questions related to the average original and residual maturity, the average duration, the average interest rate and discount rate, the internal rate of return, the age of borrowers and the expected number of prepayments over a one-year horizon.

Going forward, the new reporting will help the microprudential supervisors to identify and monitor developments in mortgage loan exposures over time. This should help assess how mortgage lending fits into the insurance companies’ asset-and-liability management, investment policy and prudent person principle.

Chart 18
Belgian insurers’ real estate exposures
(in % of total investment excluding unit-linked assets1)

Source: NBB.

1 With class 23 life contracts posing no risk to insurers, the investment portfolio under review only refers to assets held for the purposes of non-life insurance contracts and class 21 life insurance contracts.
Alongside this gradually increasing exposure to mortgages (Chart 18), insurers have also acquired other assets in past years that expose them directly or indirectly to developments on real estate markets (see also section B.3. of the Macroprudential report devoted to real estate risks). The insurance sector in Belgium, for instance, has become one of the key players in the market for commercial property (offices, retail), both directly – as it now owns € 8 billion in buildings – and indirectly through loans, shares or bonds of professional real estate firms to the tune of nearly € 17 billion. Added to mortgage exposures, these amounts bring the Belgian insurers’ total exposure to real estate to € 39 billion, or 14% of investments (excluding assets covering unit-linked contracts).

With a view to maintaining the financial soundness of the Belgian insurance sector on the one hand, and closing real estate data gaps on the other, the Bank will continue to monitor insurers’ exposures to real estate very closely.

**Additional upcoming challenges**

For some years now, risks related to technological developments and the rise of so-called “fintechs” have attracted the attention of supervisors. In the case of the insurance sector, these new players, called “insurtechs”, may significantly disrupt traditional insurance markets. The report entitled “Fintech developments in the insurance industry” of the International Association of Insurance Supervisors (IAIS) describes innovations relevant to the insurance industry and presents an overview of their potential impacts on the sector and supervisory approaches. It finds that insurtech innovations have the potential to deliver a wide range of benefits, in particular efficiency improvements, cost reductions, improved risk assessment, superior customer experience and greater financial inclusion. However, the IAIS report also signals that some of these innovations could present threats to the consumer and the financial stability of insurance markets. Yet, at this stage, the report concludes, too many unknowns and uncertainties make that it is difficult to draw any conclusion on the most likely outcome, and hence on the impact for insurance regulation and supervision.

Climate-related risks are also increasingly cited by institutions and supervisors as a potential threat to the financial stability of the insurance sector. Indeed, insurance companies could be affected by such risks both in terms of their assets (through depreciation of investments) and their liabilities (through increasing claim levels). To get a clearer view of the sector’s approach towards these risks, in 2018 the Bank launched a survey directed at Belgium’s main insurance companies and credit institutions. The survey revealed that, while financial institutions are generally aware of the existing risks and willing to adapt to the coming changes, they are currently not very advanced in terms of quantifying and integrating these risks in their risk management (see the related thematic article in this Financial Stability Report for further details). In this context, the closing of data gaps, both on institutions’ and supervisors’ sides, is a key priority.

**2.2 Main developments in the Belgian insurance sector in 2018**

This section provides an overview of the main results (and related drivers) recorded for the Belgian insurance sector in 2018 in terms of activity, profitability, solvency and risk exposures. Recent developments in the key aggregates of the life and non-life activities are reviewed in a first subsection. This is followed by a stock-take of changes in the balance sheet and investment portfolio in a second subsection. The third subsection summarises the main results for profitability and solvency.

**Premiums and combined ratio**

In 2018, gross written premiums for the Belgian insurance sector as a whole amounted to € 30.8 billion, a clear rise from € 28.8 billion in 2017. As explained below, this increase was mainly due to the good performance of the life insurance business.

In the non-life sector, net earned premiums stabilised at levels comparable with the three previous years, amounting to € 11.9 billion in 2018, up 1% from 2017 (Chart 19). This premium stabilisation was due to market saturation
and severe competition in the traditional segments of the non-life business. As shown in Chart I2 in Section 3.2, premiums stemming from vehicle-related insurance (i.e. motor vehicle liability and other motor insurance) still represent the largest share of non-life premiums, with 32% of total premiums in 2018. Fire and property damage insurance ranked second, with 22% of total premiums. The combined ratio – which is defined as the ratio of claims and expenses over total earned premiums – of the non-life market has trended mainly downwards since 2011. This indicates that non-life insurers — despite strong competition — overall succeeded in maintaining a sound balance between insurance costs and premium income through various measures such as risk prevention (and related incentives for policyholders), targeted changes in premium tariffs and cost control measures. For 2018, the combined ratio reached 96%, a level very close to the one observed in the previous year. This stabilisation can be explained by diverging developments in the main lines of business of non-life insurance. On the one hand, motor vehicle liability insurance and medical expenses insurance lines displayed better combined ratios, benefitting from lower claim amounts and better expenses management respectively. On the other hand, the combined ratio for the fire and property damage insurance and the other motor insurance deteriorated compared to last year as a result of higher claim amounts for extreme weather-related events recorded during the first quarter of 2018.

Chart 19

Premiums\(^1\) and combined ratio\(^2\)

(non-consolidated data, in € billion, unless otherwise stated)

1 Life insurance gross written premiums under Solvency II are somewhat larger than under BGAAP because of the inclusion of some health insurance premiums (which are part of non-life premiums under BGAAP). Net earned premiums for non-life insurance differ between the two reporting formats for the same reason. This also applies to the combined ratio, for which the formula calculation has been adapted to the available data in Solvency II.

2 The combined ratio expresses the sum of the cost of claims plus operating expenses relative to net premium income.

3 Class 21 products are life insurance contracts with minimum guaranteed rates of return, while class 23 refers to unit-linked or index-linked contracts.
For the life insurance sector, gross written premiums rose in 2018 for the first time since 2012 and amounted to € 16.2 billion (Chart 19). This rebound in demand for life insurance products was mostly due to the class 23 segment (index-linked and unit-linked contracts for which there are no guaranteed returns and risks are mainly borne by policyholders) and to a lesser extent to class 21 contracts. Class 23 gross written premiums amounted to € 3.6 billion (up 32 % from 2017, although this percentage increase may be slightly overestimated due to reporting errors in 2017) while class 21 contracts gross written premiums increased 2.8 % to € 10.8 billion. Individual class 21 contracts with minimum guaranteed rates of return have become less attractive for Belgian households due to the low interest rate environment affecting the level of the guarantee being offered by insurance companies, as well as to the higher tax on individual life insurance premiums introduced in 2012. The supply of these contracts also dried up as some insurance companies decided to put class 21 business into run-off (no new production) and directed their customers towards class 23 products instead. However, in their choice of new investment options for 2018, Belgian households displayed some increased risk aversion and focused primarily on low risk assets and liquidity, which partly explains why the demand for class 21 contracts rose slightly last year. In addition, demand for class 21 contracts is still strongly supported by group insurance contracts, for which recorded premiums increased by 6.4 % in 2018 to reach € 5.4 billion.

Balance sheet and investment portfolio

In 2018, Belgian insurers’ investment portfolio (excluding investments related to class 23) reached € 273 billion, comparable to the € 271 billion recorded at the end of 2017.

As shown in the left-hand panel of Chart 20, 70 % of this investment portfolio – or approximately € 190 billion – is composed of government and corporate bonds. This share of bonds in the Belgian insurers’ investment portfolio is slightly higher than the European average, which amounts to 64 %.

In Belgium, government bonds remain by far the largest asset class within the investment portfolio, with € 131 billion invested at the end of 2018 (i.e. 48 % of the overall portfolio). This share, down from 50.5 % in 2016 and 49.6 % in 2017, has continued to decline. While the decrease from 2016 to 2017 was mainly due to a rebalancing of insurers’ portfolios (from risk-free to more risky assets), the further decline in 2018 was mainly due to a price effect resulting from slightly rising interest rates and widening spreads at the end of 2018 (see also the right-hand panel of Chart 20). The share invested in government bonds remains relatively high in comparison with the European average of 31 %. The government bond portfolio also exhibits a strong home bias, with approximately 55 % of government bonds held by the Belgian insurance sector being domestic bonds. The remaining part of this sub-portfolio was invested in sovereign bonds issued by European countries, particularly France (12 %), Italy (5 %) and Spain (5 %). Further details are provided in Chart I6 in Section 3.2.

Investments in corporate bonds are mainly concentrated in the banking, manufacturing and electricity & gas sectors, which together account for around half of all exposures (further details are given in Chart I7 in Section 3.2). Generally speaking, investments in corporate bonds have a diversified international profile, with exposures to countries both inside and outside Europe. Nearly 85 % of these bonds are investment-grade (i.e. with credit ratings of at least BBB- or higher). Regarding exposures to the banking sector, Belgian insurers’ exposures to banks as a percentage of their total investments amounted to 8 % at end-2018. This exposure is one of the lowest in the European Economic Area, according to figures compiled by EIOPA. More than 90 % of the bank bonds held by Belgian insurers are issued by banks located outside Belgium, mainly in neighbouring countries but also in the UK, Spain and the US. Only 8 % of these bank bonds are subordinated bonds, meaning that they have a lower priority than the issuer’s senior bonds and other higher-ranking claims in the event of recovery or resolution.

The right-hand panel of Chart 20 illustrates the shifts in asset allocation between 2017 and 2018, adjusted for the price effect. With insurers’ balance sheets expressed at market values under Solvency II, all portfolio value changes break down into a price effect – which arises from fluctuations in the value of the asset in the financial markets – and a volume effect (or net flow), which is calculated as the difference between the purchase and sale amounts of the asset.
Chart 20

Investment portfolio, excluding unit-linked contracts
(non-consolidated data, in € billion, unless otherwise stated)

Investment portfolio (end 2018)

<table>
<thead>
<tr>
<th>Investments</th>
<th>273.26</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government bonds</td>
<td>1%</td>
</tr>
<tr>
<td>Loans and mortgages</td>
<td>11%</td>
</tr>
<tr>
<td>Investment funds</td>
<td>8%</td>
</tr>
<tr>
<td>Corporate bonds</td>
<td>4%</td>
</tr>
<tr>
<td>Shares and equity participations</td>
<td>22%</td>
</tr>
<tr>
<td>Real estate (buildings)</td>
<td>27%</td>
</tr>
<tr>
<td>Cash and deposits</td>
<td>1%</td>
</tr>
<tr>
<td>Other</td>
<td>48%</td>
</tr>
</tbody>
</table>

Changes since end 2017

- Price effect
- Government bonds
- Corporate bonds
- Loans and mortgages
- Shares and equity participations
- Investment funds
- Real estate (buildings)
- Cash and deposits
- Other
- Residential real estate
- Commercial real estate

Source: NBB.

Chart 20 shows that the amount invested in corporate bonds and funds decreased in net terms in 2018 while the amount invested in shares and equities increased, as did overall investments in loans and mortgages. With respect to shares and equities, the significant rise in volume is mainly attributable to the inclusion of a reinsurance company that was previously excluded from the reporting scope and whose portfolio mainly consists of participations (€ 5.9 billion). The only clear reallocation in 2018 was thus in the shift from corporate bonds and investment funds to loans and mortgages, confirming the ongoing rebalancing of insurers’ portfolios in favour of less liquid assets in their search for higher-yielding investments.

Belgian insurers’ exposure to loans and mortgages continues to grow year on year, and amounted to € 31 billion at the end of 2018, i.e. 11% of the total investment portfolio (excluding class 23 investments). Mortgages represented 48% of this amount, while the remainder comprised loans. In 2018, the increase in this segment was mainly due to net investments in mortgage loans by large market players. By comparison, the exposure to loans and mortgages in the insurance sectors of Belgium’s neighbouring countries averaged 5%, with the notable exception of the Netherlands, where it reached 27% in September 2018.

Belgian insurance companies’ exposure to residential and commercial real estate increased by 7% between 2017 and 2018. At the end of 2018, total exposure to the real estate sector amounted to € 39 billion, representing 14% of total investment (excluding unit-linked assets) – significantly above the average exposure of European
insurance companies (9%). It consists of exposures to residential real estate through mortgage loans (€ 14 billion or 5% of total investment) and to commercial real estate (€ 25 billion or 9% of total investment) through direct investment in property (€ 8 billion) or via equities and bonds issued by companies involved in the construction and real estate sectors (approximately € 6 billion each).

Rising class 23 premiums contributed to a further increase of investments underpinning class 23 contracts (assets of € 36 billion at the end of 2018). As shown by Chart 21, approximately 88% of these assets are invested in funds, particularly in equity funds, debt funds and mixed funds. Over 85% of these asset holdings are foreign exposures, mainly to Luxembourg. Belgian insurers are thus closely interconnected with international investment fund sectors by way of their asset holdings. Further details on the composition of the covering assets per insurance activity are also shown in Chart I5 in Section 3.2.

**Chart 21**

**Investment breakdown of class 23 assets**
(non-consolidated data, in € billion, unless otherwise stated)

![Chart showing investment breakdown of class 23 assets](chart.png)

Source: NBB.

**Profitability and solvency**

In 2018, the insurance sector recorded a net bottom-line profit of € 3.2 billion, equivalent to a 16.3% return on equity, as shown in Chart 22, in comparison with a net profit of € 2.3 billion in 2017. However, corrected for the inclusion of new companies in the 2018 reporting scope, this net profit would reach € 2.4 billion. This improvement was mainly achieved on the back of higher statutory\(^1\) premium revenues and lower total claims (including changes in technical provisions) in the life and non-life sectors, despite decreasing investment returns in the context of the low interest rate environment (see section 2.1). For the life activity, this was thanks to a rebound in demand for life insurance products as well as the fact that several buy-back programmes, related to contracts with very high guaranteed returns that had weighed on insurers’ profitability in previous years, came to an end.

\(^1\) Please note that Solvency II and statutory premium amounts may slightly differ due to different definitions of the life and non-life insurance scope.
For the non-life segment, claim amounts and expenses remained under control, despite the extreme weather-related events that occurred in the first quarter of the year.

As shown in Table 2, the solvency capital requirement (SCR) ratio, which shows the ratio of an insurer’s own funds to the minimum regulatory own funds requirement, amounted to 219% at the end of 2018, up from 192% in 2017. This improvement was mainly due to the inclusion of a reinsurance company with a high solvency ratio in the reporting scope. Without this, the sector’s average solvency ratio would stand at 203%, benefiting from an increase in the sector's total eligible own funds as a result of the slight uptick in interest rates. Indeed, with insurers’ balance sheets calculated at market values under the Solvency II framework, any increase in interest rates implies that insurers’ liabilities fall in value faster than their assets, as liabilities typically have longer maturities than assets. In net terms, this pushed up own funds calculated at market values. However, although the solvency position at sector level was relatively strong, this varied considerably from one insurer to the next. In fact, individual solvency ratios ranged from 118% to 393% and the 2018 sector’s median ratio amounted to 200%.

| Source: NBB. |
### 3. Additional charts and tables for the banking and insurance sector

#### 3.1 Banking sector

**Table B1**

Main components of Belgian banks’ income statement

(consolidated data, in € billion, unless otherwise stated)

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-interest income</td>
<td>4.75</td>
<td>4.49</td>
<td>7.05</td>
<td>6.16</td>
<td>7.10</td>
<td>7.62</td>
<td>8.94</td>
<td>8.29</td>
<td>36.5</td>
</tr>
<tr>
<td>Net fee and commission income(^1)</td>
<td>4.38</td>
<td>4.48</td>
<td>4.97</td>
<td>5.34</td>
<td>5.87</td>
<td>5.63</td>
<td>5.62</td>
<td>5.58</td>
<td>24.6</td>
</tr>
<tr>
<td>(Un)realised gains or losses on financial instruments(^2)</td>
<td>-0.80</td>
<td>0.04</td>
<td>0.79</td>
<td>-0.06</td>
<td>1.17</td>
<td>1.50</td>
<td>0.86</td>
<td>1.22</td>
<td>0.65</td>
</tr>
<tr>
<td>Other non-interest income</td>
<td>1.17</td>
<td>-0.03</td>
<td>1.28</td>
<td>0.88</td>
<td>0.06</td>
<td>0.50</td>
<td>2.46</td>
<td>1.49</td>
<td>1.05</td>
</tr>
<tr>
<td>Total operating income (bank product)</td>
<td>18.73</td>
<td>18.05</td>
<td>20.34</td>
<td>20.68</td>
<td>21.97</td>
<td>22.44</td>
<td>23.05</td>
<td>22.69</td>
<td>100.0</td>
</tr>
<tr>
<td>Total operating expenses (−)</td>
<td>12.32</td>
<td>13.01</td>
<td>12.36</td>
<td>12.66</td>
<td>12.87</td>
<td>13.11</td>
<td>13.42</td>
<td>13.88</td>
<td>61.2(^1)</td>
</tr>
<tr>
<td>Staff expenses (excluding commissions paid to bank agents)</td>
<td>6.57</td>
<td>6.86</td>
<td>6.53</td>
<td>6.52</td>
<td>6.54</td>
<td>6.47</td>
<td>6.74</td>
<td>6.84</td>
<td></td>
</tr>
<tr>
<td>General and administrative expenses (including depreciation)</td>
<td>5.75</td>
<td>6.15</td>
<td>5.83</td>
<td>6.14</td>
<td>6.33</td>
<td>6.64</td>
<td>6.68</td>
<td>7.05</td>
<td></td>
</tr>
<tr>
<td>Total impairments and provisions (−)</td>
<td>5.02</td>
<td>2.61</td>
<td>2.95</td>
<td>1.35</td>
<td>1.30</td>
<td>1.76</td>
<td>0.67</td>
<td>0.83</td>
<td>0.59</td>
</tr>
<tr>
<td>Impairments on financial assets at amortised cost(^3)</td>
<td>3.20</td>
<td>1.99</td>
<td>2.31</td>
<td>1.30</td>
<td>1.15</td>
<td>0.90</td>
<td>0.41</td>
<td>0.61</td>
<td></td>
</tr>
<tr>
<td>Impairments on other financial assets</td>
<td>1.22</td>
<td>-0.84</td>
<td>-0.00</td>
<td>0.00</td>
<td>0.02</td>
<td>-0.04</td>
<td>-0.07</td>
<td>-0.01</td>
<td></td>
</tr>
<tr>
<td>Other impairments and provisions</td>
<td>0.60</td>
<td>1.46</td>
<td>0.64</td>
<td>0.05</td>
<td>0.13</td>
<td>0.90</td>
<td>0.34</td>
<td>0.23</td>
<td></td>
</tr>
<tr>
<td>Other components of net operating income(^4)</td>
<td>-0.37</td>
<td>0.25</td>
<td>0.32</td>
<td>0.22</td>
<td>0.24</td>
<td>0.37</td>
<td>0.29</td>
<td>0.23</td>
<td>0.08</td>
</tr>
<tr>
<td>Net operating income</td>
<td>1.02</td>
<td>2.68</td>
<td>5.35</td>
<td>6.89</td>
<td>8.04</td>
<td>7.94</td>
<td>9.25</td>
<td>8.21</td>
<td>3.64</td>
</tr>
<tr>
<td>Tax and extraordinary profit or loss</td>
<td>-1.79</td>
<td>-1.22</td>
<td>-1.56</td>
<td>-2.64</td>
<td>-2.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total profit or loss on discontinued operations</td>
<td>-0.31</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>-0.05</td>
<td>0.03</td>
<td>0.00</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>Net profit or loss including minority interest</td>
<td>0.66</td>
<td>1.94</td>
<td>3.73</td>
<td>5.10</td>
<td>6.76</td>
<td>6.41</td>
<td>6.61</td>
<td>6.20</td>
<td>2.88</td>
</tr>
<tr>
<td>p.m. Net profit or loss (bottom-line result)</td>
<td>0.36</td>
<td>1.59</td>
<td>3.28</td>
<td>4.52</td>
<td>6.14</td>
<td>5.75</td>
<td>5.95</td>
<td>5.60</td>
<td></td>
</tr>
</tbody>
</table>

Source: NBB.

1 Including commissions paid to bank agents.

2 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.

3 Data for the years before 2018 relate to impairments on loans and receivables (under IAS 39).

4 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.

5 This figure is the cost-to-income ratio of the Belgian banking sector.
Table B2

Belgian banks’ asset encumbrance in 2018
(amounts of collateral provided by source of encumbrance, consolidated data, in € billion, unless otherwise stated)

<table>
<thead>
<tr>
<th>Source of encumbrance</th>
<th>Collateral type</th>
<th>Collateral provided</th>
<th>Ratio of over-collateralisation (in %)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Government bonds</td>
<td>Other bonds</td>
<td>Loans to households</td>
</tr>
<tr>
<td>Derivative transactions</td>
<td>13.1</td>
<td>1.1</td>
<td>0.0</td>
</tr>
<tr>
<td>Repo transactions and other deposits (excluding central banks)</td>
<td>11.5</td>
<td>4.7</td>
<td>0.2</td>
</tr>
<tr>
<td>Issuance of covered bonds</td>
<td>0.1</td>
<td>0.0</td>
<td>34.7</td>
</tr>
<tr>
<td>Issuance of ABS</td>
<td>–</td>
<td>–</td>
<td>1.4</td>
</tr>
<tr>
<td>Central bank funding (of all types: TLTROs, repos)</td>
<td>0.8</td>
<td>0.5</td>
<td>9.6</td>
</tr>
<tr>
<td>Other sources of encumbrance</td>
<td>6.0</td>
<td>1.5</td>
<td>3.2</td>
</tr>
<tr>
<td>Total encumbered assets and collateral received</td>
<td>31.5</td>
<td>7.9</td>
<td>49.2</td>
</tr>
<tr>
<td>Asset encumbrance ratio (in %)</td>
<td>24.3</td>
<td>10.9</td>
<td>13.4</td>
</tr>
</tbody>
</table>

Source: NBB.

1 Asset encumbrance ratio as defined in the Commission Implementing Regulation (EU) No 2015/79 (paragraphs 9-11 of Annex III), calculated as total encumbered assets + total collateral received and reused / total assets + total collateral received and available for encumbrance.

Here, as in the EBA methodology, assets are measured at the carrying amount and collateral is measured at fair value.
### Table B3

**Belgian banks’ funding structure and liquidity ratios**

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

<table>
<thead>
<tr>
<th></th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total liabilities</td>
<td>996</td>
<td>970</td>
<td>1,022</td>
<td>994</td>
<td>993</td>
</tr>
<tr>
<td>Deposits</td>
<td>692</td>
<td>702</td>
<td>725</td>
<td>736</td>
<td>745</td>
</tr>
<tr>
<td>Central banks</td>
<td>18</td>
<td>16</td>
<td>23</td>
<td>29</td>
<td>26</td>
</tr>
<tr>
<td>General governments</td>
<td>20</td>
<td>22</td>
<td>24</td>
<td>26</td>
<td>27</td>
</tr>
<tr>
<td>Credit institutions</td>
<td>91</td>
<td>82</td>
<td>105</td>
<td>89</td>
<td>85</td>
</tr>
<tr>
<td>Other financial corporations</td>
<td>95</td>
<td>93</td>
<td>76</td>
<td>85</td>
<td>79</td>
</tr>
<tr>
<td>Non-financial corporations</td>
<td>134</td>
<td>148</td>
<td>133</td>
<td>132</td>
<td>140</td>
</tr>
<tr>
<td>Household deposits</td>
<td>334</td>
<td>340</td>
<td>364</td>
<td>374</td>
<td>389</td>
</tr>
<tr>
<td>Debt securities issued</td>
<td>104</td>
<td>99</td>
<td>106</td>
<td>106</td>
<td>98</td>
</tr>
<tr>
<td>Certificates of deposits</td>
<td>26</td>
<td>25</td>
<td>35</td>
<td>40</td>
<td>30</td>
</tr>
<tr>
<td>Covered bonds</td>
<td>17</td>
<td>21</td>
<td>24</td>
<td>23</td>
<td>28</td>
</tr>
<tr>
<td>Other debt securities issued</td>
<td>62</td>
<td>52</td>
<td>48</td>
<td>43</td>
<td>40</td>
</tr>
<tr>
<td>Derivatives</td>
<td>96</td>
<td>72</td>
<td>67</td>
<td>49</td>
<td>43</td>
</tr>
<tr>
<td>Other liabilities 1</td>
<td>38</td>
<td>33</td>
<td>51</td>
<td>28</td>
<td>31</td>
</tr>
<tr>
<td>Equity</td>
<td>66</td>
<td>66</td>
<td>72</td>
<td>75</td>
<td>76</td>
</tr>
<tr>
<td>Liquidity coverage ratio (in %)</td>
<td>–</td>
<td>137</td>
<td>140</td>
<td>138</td>
<td>145</td>
</tr>
<tr>
<td>Customer loan-to-deposit ratio (in %)</td>
<td>92.7</td>
<td>90.8</td>
<td>94.9</td>
<td>95.5</td>
<td>97.5</td>
</tr>
<tr>
<td>Asset encumbrance ratio (in %) 2</td>
<td>14.0</td>
<td>12.0</td>
<td>11.6</td>
<td>12.5</td>
<td>13.0</td>
</tr>
</tbody>
</table>

Source: NBB.

1 Including, among other tax liabilities, liabilities included in disposal groups classified as held for sale, short positions, and provisions and liabilities for defined benefit obligations.

2 Asset encumbrance ratio as defined in the Commission Implementing Regulation (EU) No 2015/79 (paragraphs 9‑11 of Annex III), calculated as $\text{total encumbered assets + total collateral received and reused} / \text{total assets + total collateral received and available for encumbrance}$.

Here, as in the EBA methodology, assets are measured at the carrying amount and collateral is measured at fair value.

### Table B4

**Belgian banks’ impairment ratio and coverage ratio**

(consolidated end-of period data, in %)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Impairment ratio 1</td>
<td>1.5</td>
<td>2.0</td>
<td>2.9</td>
<td>2.8</td>
<td>3.3</td>
<td>3.8</td>
<td>4.3</td>
<td>3.9</td>
<td>3.6</td>
<td>3.4</td>
<td>2.8</td>
<td>2.4</td>
</tr>
<tr>
<td>Coverage ratio 2</td>
<td>32.3</td>
<td>41.1</td>
<td>43.0</td>
<td>42.8</td>
<td>41.5</td>
<td>41.4</td>
<td>39.5</td>
<td>43.3</td>
<td>44.1</td>
<td>44.4</td>
<td>43.9</td>
<td>44.5</td>
</tr>
</tbody>
</table>

Source: NBB.

1 Ratio between impaired claims and total loans. Under IAS 39, the figures related to impaired claims according to the IAS 39 definition. Since the introduction of IFRS 9 (2018), the figures relate to Stage 3 loans according to the IFRS 9 definition.

2 Ratio between the accumulated impairments on impaired claims, expressing the extent to which impaired claims are covered by impairments. Under IAS 39, the figures related to impaired claims according to the IAS 39 definition. Since the introduction of IFRS 9 (2018), the figures relate to Stage 3 loans according to the IFRS 9 definition.
Chart B5
National bank of Belgium’s claims on euro area credit institutions
(non-consolidated data, in € billion)

Source: NBB.

Chart B6
Government bond, public sector and central bank exposures of Belgian banks
(consolidated data)

Source: NBB.
3.2 Insurance sector

Table I1
Main components of the profit and loss account
(non-consolidated data, in € billion)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Life insurance technical result</td>
<td>−3.7</td>
<td>0.7</td>
<td>0.8</td>
<td>−0.7</td>
<td>1.2</td>
<td>0.7</td>
<td>0.7</td>
<td>0.2</td>
<td>1.1</td>
<td>1.4</td>
<td>1.3</td>
</tr>
<tr>
<td>Result of insurance activities</td>
<td>−0.3</td>
<td>−8.0</td>
<td>−7.1</td>
<td>−4.8</td>
<td>−8.3</td>
<td>−8.2</td>
<td>−9.3</td>
<td>−8.3</td>
<td>−7.3</td>
<td>−6.1</td>
<td>−2.4</td>
</tr>
<tr>
<td>Excluding adjustments for class 23</td>
<td>−4.1</td>
<td>−6.0</td>
<td>−5.9</td>
<td>−5.4</td>
<td>−6.5</td>
<td>−6.9</td>
<td>−7.3</td>
<td>−7.8</td>
<td>−6.5</td>
<td>−5.0</td>
<td>−4.8</td>
</tr>
<tr>
<td>Net investment income</td>
<td>−3.4</td>
<td>8.7</td>
<td>7.8</td>
<td>4.1</td>
<td>9.5</td>
<td>8.9</td>
<td>10.0</td>
<td>8.5</td>
<td>8.4</td>
<td>7.5</td>
<td>3.7</td>
</tr>
<tr>
<td>Excluding adjustments for class 23</td>
<td>0.4</td>
<td>6.7</td>
<td>6.7</td>
<td>4.7</td>
<td>7.7</td>
<td>7.6</td>
<td>8.0</td>
<td>8.0</td>
<td>7.6</td>
<td>6.4</td>
<td>6.1</td>
</tr>
<tr>
<td>Non-life insurance technical result</td>
<td>0.2</td>
<td>0.7</td>
<td>0.7</td>
<td>0.9</td>
<td>1.0</td>
<td>1.2</td>
<td>1.5</td>
<td>1.6</td>
<td>1.4</td>
<td>1.6</td>
<td>1.7</td>
</tr>
<tr>
<td>Result of insurance activities</td>
<td>0.0</td>
<td>−0.4</td>
<td>−0.4</td>
<td>0.1</td>
<td>−0.1</td>
<td>−0.1</td>
<td>0.2</td>
<td>0.3</td>
<td>0.1</td>
<td>0.4</td>
<td>0.6</td>
</tr>
<tr>
<td>Net investment income</td>
<td>0.2</td>
<td>1.1</td>
<td>1.2</td>
<td>0.8</td>
<td>1.1</td>
<td>1.2</td>
<td>1.3</td>
<td>1.3</td>
<td>1.3</td>
<td>1.2</td>
<td>1.1</td>
</tr>
<tr>
<td>Non-technical result</td>
<td>−0.4</td>
<td>−0.5</td>
<td>−0.1</td>
<td>−1.1</td>
<td>0.1</td>
<td>−0.4</td>
<td>−0.8</td>
<td>−0.6</td>
<td>−1.1</td>
<td>−0.7</td>
<td>0.2</td>
</tr>
<tr>
<td>Net investment income</td>
<td>0.3</td>
<td>−0.7</td>
<td>0.2</td>
<td>−0.9</td>
<td>0.9</td>
<td>0.3</td>
<td>0.4</td>
<td>0.3</td>
<td>−0.2</td>
<td>0.4</td>
<td>1.0</td>
</tr>
<tr>
<td>Other results</td>
<td>−0.7</td>
<td>0.2</td>
<td>−0.3</td>
<td>−0.2</td>
<td>−0.7</td>
<td>−0.7</td>
<td>−1.2</td>
<td>−0.9</td>
<td>−0.9</td>
<td>−1.1</td>
<td>−0.8</td>
</tr>
<tr>
<td>Net result for the financial year</td>
<td>−3.9</td>
<td>0.9</td>
<td>1.4</td>
<td>−0.9</td>
<td>2.4</td>
<td>1.4</td>
<td>1.4</td>
<td>1.2</td>
<td>1.3</td>
<td>2.3</td>
<td>3.2</td>
</tr>
</tbody>
</table>

Source: NBB.
1 The non-technical result includes investment income not attributed to life and non-life insurance activities, exceptional results and taxes.

Chart I2
Breakdown of non-life insurance premium income
(non-consolidated end-of-period data, in % of total)

Source: NBB.
### Table 13

**Investment return and average guaranteed return in life insurance**

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

<table>
<thead>
<tr>
<th></th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Investment return of technical provisions covering guaranteed rate contracts (in %)</strong></td>
<td>4.51</td>
<td>4.44</td>
<td>4.80</td>
<td>5.06</td>
<td>5.13</td>
<td>4.41</td>
<td>4.06</td>
</tr>
<tr>
<td>Estimated investment return of technical provisions without net impairments, net capital gains (in %)</td>
<td>4.25</td>
<td>3.98</td>
<td>3.99</td>
<td>4.13</td>
<td>4.00</td>
<td>4.11</td>
<td>3.79</td>
</tr>
<tr>
<td><strong>Average guaranteed rate of return on existing contracts (in %)</strong></td>
<td>3.12</td>
<td>3.04</td>
<td>2.91</td>
<td>2.82</td>
<td>2.62</td>
<td>2.47</td>
<td>2.33</td>
</tr>
<tr>
<td>- group insurance</td>
<td>3.54</td>
<td>3.41</td>
<td>3.25</td>
<td>3.19</td>
<td>2.96</td>
<td>2.78</td>
<td>2.63</td>
</tr>
<tr>
<td>- individual insurance</td>
<td>2.95</td>
<td>2.88</td>
<td>2.72</td>
<td>2.64</td>
<td>2.44</td>
<td>2.30</td>
<td>2.16</td>
</tr>
<tr>
<td><strong>Yield gap</strong></td>
<td>1.39</td>
<td>1.40</td>
<td>1.89</td>
<td>2.24</td>
<td>2.51</td>
<td>1.94</td>
<td>1.73</td>
</tr>
<tr>
<td><strong>Flashing-light provision (in € billion)</strong></td>
<td>3.0</td>
<td>4.1</td>
<td>5.6</td>
<td>7.6</td>
<td>7.6</td>
<td>7.5</td>
<td>n.</td>
</tr>
<tr>
<td><strong>Flashing-light rate (in %)</strong></td>
<td>3.06</td>
<td>2.72</td>
<td>2.38</td>
<td>1.96</td>
<td>1.37</td>
<td>1.00</td>
<td>0.74</td>
</tr>
</tbody>
</table>

*Source: NBB.*

1 Preliminary figures

### Chart 14

**Main components of the balance sheet**

*(non-consolidated data for the end of 2018, in € billion)*

*Source: NBB.*
Chart I5

Composition of the covering assets per insurance activity

(Non-consolidated data, in € billion)

<table>
<thead>
<tr>
<th></th>
<th>Life class 21</th>
<th>Life class 23</th>
<th>Non-life</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dec. 2017</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dec. 2018</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: NBB.

1 Excluding reinsurance activities

Chart I6

Geographical breakdown of public sector bonds

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

Source: NBB.
Chart I7
Breakdown of corporate bonds and equity holdings by corporate subsector
(non-consolidated data for the end of 2018, in % of total)

Issuer sector and rating – corporate bonds

Issuer sector – equity and participations

Source: NBB.
Thematic Articles
Transaction-level data sets and monitoring of systemic risk: an illustration with Securities Holding Statistics

S. Ben Hadj
S. Ferrari
J. Mitchell
P. Rovira Kaltwasser

Introduction

The 2007-2008 financial crisis and the massive losses suffered by many large banks highlighted the need for authorities to better monitor systemic risks. This realisation consequently gave rise to most of the elements of today’s macroprudential policy frameworks. Many of the problems that were observed during the crisis had derived from high levels of concentration in opaque networks of interconnections between financial institutions (e.g., through derivatives) or from high levels of common exposures by many institutions to similar securities (e.g., containing US subprime mortgages). Indeed, the 2007-2008 crisis experience demonstrated that the feedback effects generated by interconnectedness and common exposures could amplify local shocks into a global financial crisis. Furthermore, the high level of uncertainty created by a lack of information concerning the extent of banks’ holdings of particular types of securities or of their exposures to other troubled financial institutions resulted in a virtually complete dry-up of market liquidity. Interestingly, the write-downs of European financial institutions due to US subprime real estate exposures in the period from Q3 2007 - Q3 2008 accounted for almost 40 % of the total 580 billion USD of financial institution write-downs during that period.¹

As a result of the crisis, macroprudential instruments and frameworks have been legislated at national and international levels. Macroprudential frameworks typically involve the monitoring of both cyclical and structural forms of systemic risk. The cyclical, or time, dimension relates to the procyclicality of the financial system, which is often reflected in periods of excessive credit and the amplification of ensuing downturns.² The structural dimension of systemic risk relates to potential shock amplification mechanisms that arise as a result of the structure of the financial system, which involves elements such as the concentration of financial institutions in critical activities, as well as the degree of interconnectedness between financial institutions or commonality of exposures on their balance sheets.³

² As had been the case with previous crises, periods of exuberant lending (primarily in real estate) in a number of countries also played a role in fuelling the 2007-2008 crisis.
³ Structural systemic risk also includes long-term features of risk factors to which the financial system is exposed, such as structural characteristics of the mortgage market or the indebtedness of the non-financial private sector.
Macroprudential instruments that are most often used in response to cyclical forms of systemic risk include the countercyclical capital buffer as well as various measures targeted to residential or commercial mortgage lending, such as limits on loan-to-value ratios. With respect to structural forms of systemic risk, the macroprudential instruments that have been most widely used to date involve measures imposed on financial institutions designated as systemically important, either at domestic or global levels. In addition, European legislation foresees the systemic risk buffer as a tool for addressing structural risks.

In terms of the analysis of systemic risk by macroprudential authorities, the monitoring of cyclical systemic risk is generally more advanced than that of structural systemic risk. This is due in large part to greater availability of data for tracking cyclical developments. Structural forms of systemic risk encompass a wide range of potential contagion channels that are challenging to model and for which assessment often requires very granular (i.e., transaction-level) data. Yet, as the crisis illustrated, it is essential that macroprudential policymakers have a view on the most prominent structural systemic vulnerabilities and, when deemed necessary, that they take corrective action to mitigate the structural risks.

Along these lines, in the years since the crisis, and as a response to the lack of information relating to interconnectedness between financial institutions, many jurisdictions have imposed regulatory requirements for transaction-level reporting by financial institutions relating to a number of important balance sheet items (e.g., derivatives, securities holdings, and securities financing/repurchase agreements). At the same time, the resulting data sets have either only become available quite recently or have not yet been created.

While the analysis of the new transaction-level data should significantly enhance the monitoring of structural systemic risk, the data sets tend to be quite large, thereby raising a number of particular challenges with respect to accessing, storing, and analysing the data. In this article, we describe five transaction-level data sets for banks in Europe, and we highlight some of the challenges involved in exploiting these data. We use the example of the European Securities Holding Statistics to illustrate the potential benefits of analysing such data for macroprudential purposes.

In Section 1 we describe the five transaction-level data sets, the motivations for the reporting requirements associated with each, the potential macroprudential questions that can be addressed with each, and the challenges associated with analysing the data. In Sections 2 and 3 we then illustrate the discussion by examining more closely the Securities Holding Statistics. Section 2 describes the Securities Holding Statistics and provides an overview of the securities held by euro area and by Belgian banks. Section 3 discusses some aspects of systemic risk monitoring that can be undertaken with the data. Section 4 concludes.

1. Transaction-level data relating to interconnections and common exposures among banks

1.1 The need for multiple sources of data

As suggested above, multiple channels of interconnectedness and common exposures exist among financial institutions. On the one hand, institutions can be directly connected through contractual relationships, as is the case for derivatives, interbank loans, repurchase (repo) agreements, and cross-institutional asset holdings: i.e., the holding by one financial institution of a security issued by another. On the other hand, there are also important indirect channels of contagion across financial institutions, for example through asset fire sales, whereby the fall in the price of a security or asset due to a “fire sale” by one or more institutions has a negative impact on other institutions that hold similar assets. Such indirect contagion effects are strongly related to common exposures among financial institutions. Whereas transaction-level data are necessary to analyse interconnectedness and the associated potential contagion risk, such data were not available until recently.
While the various sources and dimensions of interconnectedness and common exposures are likely to mutually reinforce one another, the sources of data and the methods necessary to analyse each channel are distinct. This implies that analysis of interconnections and common exposures will inevitably involve separate examination of different channels in order to construct a picture of overall systemic risk.

Access to transaction-level information can also help authorities prevent contagion that may occur in financial markets as a result of investors’ uncertainty regarding financial institutions’ exposures. Informative and timely communication on the part of authorities regarding institutions’ potential losses can help to manage market expectations in periods of stress.

Table 1 presents five examples of potentially important sources of granular supervisory reporting data relating to interconnectedness or common exposures.¹ We discuss each of these sources in the following subsections. For each data source, we discuss the motivation for the reporting requirement, the type of information that is reported, and the potential macroprudential questions that can be addressed with the data.

### Table 1

**Sources of transaction-level data**

<table>
<thead>
<tr>
<th>Type of interconnection or common exposures</th>
<th>Source of data</th>
<th>Data availability</th>
<th>Frequency of reporting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Derivatives</td>
<td>EMIR</td>
<td>Q2 2019</td>
<td>Daily</td>
</tr>
<tr>
<td>Securities holdings</td>
<td>Securities holdings statistics for banks; Solvency II for insurance firms</td>
<td>Currently available</td>
<td>Quarterly</td>
</tr>
<tr>
<td>Securities lending and repurchase agreements (repos)</td>
<td>SFTR</td>
<td>Reporting begins in Q2 2020</td>
<td>Daily</td>
</tr>
<tr>
<td>Unsecured money market</td>
<td>Target2</td>
<td>Currently available</td>
<td>Daily</td>
</tr>
<tr>
<td>Bank loans</td>
<td>AnaCredit</td>
<td>Reporting begins in Q3 2018</td>
<td>Quarterly (monthly for some variables)</td>
</tr>
</tbody>
</table>

Note: All of these data are highly confidential, they are available only to regulatory authorities.

### 1.2 Derivatives

**Rationale:** As mentioned above, prior to the 2007-2008 crisis the opacity of derivatives exposures and the associated network of interconnections between financial institutions allowed massive, unobserved concentrations of risk to build up in particular institutions (e.g., the insurance company AIG and the monoline MBIA). Once the crisis erupted, it was seen that the default of a major market participant (Lehman Brothers) could result in significant spillover effects through derivatives contracts. In addition, the lack of transparency in the over-the-counter (OTC) derivatives markets meant that it was difficult for supervisors and even banks

¹ Note that traditional supervisory reporting data, for which assets and liabilities are reported at bank-level (rather than transaction-level), can be used to provide an initial, high-level view of the nature of potential interconnections or common exposures of banks. For example, such reporting schemes allow observation of aggregates such as the total value of interest-rate derivatives on the bank’s balance sheet or the total amount of interbank deposits, without providing an idea of the identities of the counterparties, the contract maturities, or other features of transactions that would be necessary to make an accurate assessment of systemic risk. (See, also, in this FSR the article “A risk dashboard for detecting and monitoring systemic risk in Belgium.”)
to accurately gauge the impacts of deterioration of the creditworthiness of derivatives counterparties. These issues prompted a number of post-crisis modifications to the international and European financial regulatory frameworks relating to derivatives.

Reporting of information on derivatives transactions by European counterparties was made mandatory by the 2012 European Market and Infrastructure Regulation (EMIR). The preface to the regulation states:

“Over-the-counter derivatives lack transparency as they are privately negotiated contracts and any information concerning them is usually only available to the contracting parties. They create a complex web of interdependence which can make it difficult to identify the nature and level of risks involved. The financial crisis has demonstrated that such characteristics increase uncertainty in times of market stress and, accordingly, pose risks to financial stability. This Regulation lays down conditions for mitigating those risks and improving the transparency of derivative contracts.”

Type of information reported: European counterparties entering into derivatives contracts must report the details of every transaction to a trade repository. The reporting obligation includes not only information relating to the transactions – such as the identity of the counterparties, the notional amount of the contract, the price of the transaction, the maturity, etc. – but also information on central clearing and on valuation and collateralisation (initial and variation margins).

Potential questions that can be addressed with the data: What types of derivatives are used by different financial institutions and what are the main potential sources of systemic risk? What is the extent of interconnectedness of financial institutions through derivatives exposures (e.g., domestic versus foreign banks, banks and other financial institutions, including shadow banks and CCPs)? What are the potential impacts on banks’ balance sheets of interest rate shocks (e.g., due to changes in the valuation of interest rate derivatives)? What proportion of banks’ derivatives contracts are cleared through central counterparties (CCPs), and what is the concentration of exposures to particular CCPs? How much collateral is pledged by banks for derivatives contracts (via initial and variation margins) and what might be the impact on banks of unexpected, sizeable margin calls?

1.3 Securities holdings

Rationale: Reporting of securities holdings by banks (as well as banking groups, investment funds, financial vehicle corporations and custodians) was made mandatory by the 2012 ECB Regulation (EU) No 1011/2012. Reporting entities are required to report security-by-security information on their own holdings. Among the stated rationales for the reporting requirement are: “to contribute to the smooth conduct of policies pursued by the competent authorities relating to the prudential supervision of credit institutions” and to maintain “the stability of the financial system”.

The regulation further states:

“The importance of having accurate information on the exposure of economic sectors and of banking groups to specific classes of securities at a very disaggregated level became evident during the financial crisis, as risks to financial stability due to contagion mechanisms at the level of individual financial institutions, generated by specific classes of securities, could not be properly identified from aggregated data.”

2 In addition, custodians need to report security-level data on the securities held in custody for non-financial investors (e.g., households, non-financial corporations, government) and other financial investors that are not required to report their own securities holdings (e.g., insurance corporations and pension funds).
Type of information reported: The data contain the market and notional values of the reporting entities' individual security holdings, including debt securities, quoted shares, and investment fund shares/units. The data also contain a large number of additional attributes for each security including information on the issuer, such as the issuer country and NACE and ESA sector code, and information on the security, such as the residual maturity.

Potential questions that can be addressed with the data: Which types of securities are significant sources of common exposures across European banks? Are cross-border common exposures significant? Do the key vulnerabilities to banks from their securities portfolios derive mainly from their holdings of domestic securities, or are cross-border holdings also important sources of vulnerability? Could a severe shock to a particular type of security (e.g., the government debt of a given country) have a significant negative impact on one or more European banks? Are there any securities for which a severe shock might negatively affect many banks simultaneously?

1.4 Securities lending and repurchase agreements

Rationale: During the financial crisis severe dislocations occurred in markets for asset-backed commercial paper (ABCP), which had often been issued by special purpose vehicles in order to obtain short-term funding that was used to purchase complex structured finance securities containing exposures to US subprime mortgages, which themselves were heavily used as collateral in securities repurchase (repo) markets. The sudden fall in the value of the structured finance securities that occurred in 2007-2008, combined with a lack of transparency regarding the holdings of such securities by banks and other financial institutions, led not only to dislocations in ABCP markets but also to severe disruptions in interbank lending markets.

In 2013 the Financial Stability Board (FSB) published a report containing a proposed policy framework for addressing shadow banking risks in securities lending and repurchase (repo) markets. This report cites a number of potential financial stability risks associated with securities lending and repo markets, which have served in part as the motivation for a new European regulation that has been adopted to increase the transparency of securities financing transactions (SFTs).

Among the financial stability risks that the FSB cites with respect to securities lending and repo markets are the following. First, securities lending and repo transactions can lead to “bank-like” activities, which create liquidity or maturity transformation but which are subject to the risk of becoming illiquid or suffering sudden decreases in value. Such transactions can jeopardise financial stability by contributing to a build-up of excessive leverage and maturity transformation by institutions that are not subject to prudential regulation. Linked to this is the risk that financing obtained through securities lending can contribute significantly to the procyclicality of the financial system. Second, as with derivatives transactions, securities financing transactions may be subject to large, unexpected margin calls: therefore, knowledge of holdings is important for appropriate supervision. Finally, inadequate collateral valuation practices during the crisis (i.e., relating to structured finance securities containing US subprime exposures) resulted in the failure by many financial institutions to accurately recognise the declines in the market values of the securities and, hence, of the institutions themselves.

Type of information reported: The 2015 SFTR requires the reporting to trade repositories (beginning in Q2 2020) of all securities lending and repo transactions except those concluded with central banks. In addition, information on the use of SFTs by investment funds must be disclosed to investors in the regular reports and in pre-investment documents issued by the funds. Finally, minimum transparency conditions must be met when collateral is reused, such as disclosure of the risks and the obligation to acquire prior consent.

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1 For non-financial investors and financial investors that are not required to report their own securities holdings, the same information is available at the level of the holding entities' sector.
With respect to the information that must be reported for each transaction, detailed information that is similar to the EMIR reporting requirements for derivatives transactions must be provided: i.e., regarding the counterparties, the nature and the terms of the transaction, collateral (initial and variation margin), and data on reinvestment of cash and collateral.

**Potential questions that can be addressed with the data:** What is the extent of interconnectedness of financial institutions (e.g., domestic versus foreign banks, banks and other financial institutions, including shadow banks) through SFT exposures? This information should be particularly helpful with respect to the question relating to potential systemic risk posed by the shadow banking sector. How much collateral is pledged by banks for securities lending and repo contracts and what might be the impact on banks of unexpected, sizeable margin calls? Does the reuse of collateral create a potential systemic risk?

### 1.5 Interbank payments

**Rationale:** Unlike the other sources of transaction-level data described here, the collection of data on payments between financial institutions is not recent. Such data have been collected for years by the authorities overseeing financial market infrastructures, in order to monitor the functioning of payment systems. Payments data have also been the object of prudential analyses for many years, with a well-known example being the work of Furfine (1999, 2003), who used US payment data to analyse interbank connections and the risk of contagion to other banks due to the failure of a given bank. More recently, European authors have begun using TARGET2 (the acronym for Trans-European Automated Real-time Gross Settlement Express Transfer system) data to address questions of interest for macroprudential policy.

As is noted by the ECB (2014), the analysis of interbank loans represents the most relevant use of payments data for macroprudential purposes. However, as not all payments originate from bank loans, and as banks do not report directly which payments are associated with bank loans, it is necessary to use empirical techniques, such as those initially developed by Furfine, to identify the payments that correspond to bank loans.

Whereas payments data are highly confidential, the ECB recently issued a decision, which allows central banks to access TARGET2 large payment data in order to carry out the analyses necessary for prudential purposes. According to the ECB decision:

“TARGET2 transaction-level data are necessary in order to perform analyses pertaining to macroprudential oversight, financial stability, financial integration, market operations, monetary policy functions and the Single Supervisory Mechanism. The data are also necessary to share the aggregated results of these analyses. The scope of Decision ECB/2010/9 therefore needs to be extended to allow access to the data for these purposes.”

**Type of information reported:** TARGET2 data include, for each payment, items such as the settlement and effective date, value, counterparties, and purpose. The TARGET2 system is used for settling central bank operations (primarily related to monetary policy), large interbank transfers, client operations, and settlement of Ancillary Systems, all of which are euro-denominated.

**Potential questions that can be addressed with the data:** As reported in ECB (2014), a number of authors have already begun exploiting TARGET2 payments data for macroprudential purposes. Questions that have been addressed include contagion simulations based upon the transaction data, analysis of observed changes in the network of interbank loans and of variations in particular segments of the interbank loan market during crisis periods, the importance of bank size and relationships in the market for interbank loans, and the role of

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1 Decision (EU) 2017/2080 amending Decision ECB/2010/9 on access to and use of certain TARGET2 data.
2 Strictly speaking, the TARGET2 interbank payments data are not reported but are obtained from records containing all payments settled in TARGET2.
these factors in determining interbank market responses to liquidity shocks. More generally, payments data allow regular monitoring of the evolution of bank interconnections through interbank loan markets.

1.6 Bank loans

**Rationale:** The financial crisis revealed that aggregate credit statistics were not sufficient to allow authorities to develop an adequate understanding of the underlying developments, including potential divergences across differing segments of the economy, such as sectors of activity, firm size or geographical regions. Although the reporting of detailed credit information in national credit registers is not new in the EU, the information reported in these registers has varied across countries. In addition, methodological differences in the construction of certain indicators has often prevented meaningful cross-country comparisons.

As a result of these shortcomings, the 2016 ECB Regulation (EU) No 2016/867 on the collection of granular credit and credit risk data (known as the ‘AnaCredit Regulation’) aims at establishing a harmonised dataset across all Member States containing detailed information on individual bank loans in the euro area. Besides facilitating macroprudential policy and financial stability surveillance, the detailed information contained in the AnaCredit datasets will also be helpful for analysing monetary policy.

**Type of information reported:** AnaCredit will contain loan-level information on credit to firms and other legal entities extended by eurozone banks and their foreign branches. (Natural persons are not covered at this stage of the Regulation.) Most data will be reported on a quarterly basis, although some variables will be reported monthly. The information collected comprises 88 different “attributes” covering various aspects of the credit exposure: type of credit, outstanding amount, number of days past due, date of origination and contractual maturity, interest rate type and spread/margin, currency of the credit, collateral or guarantee, information on the counterparty, etc. A given credit exposure must be reported to AnaCredit if it is held by a debtor whose total outstanding exposure to a given bank exceeds 25,000 euro.

**Potential questions that can be addressed with the data:** With regard to macroprudential policy and financial stability surveillance, AnaCredit data can be used to address a number of questions related to: (i) credit risk analysis (e.g., monitoring of aggregate credit developments, exposure concentration, and creditworthiness of banks); (ii) network analysis and analysis of contagion risk via common exposures; (iii) stress test exercises; and (iv) assessment of the impact and effectiveness of macroprudential instruments. With respect to systemic risks stemming from the real estate market, AnaCredit will also be helpful for covering some of the indicators listed in the 2016 ESRB Recommendation on closing real estate data gaps.

1.7 Challenges associated with analysing transaction-level data

In this section we describe some of the challenges that authorities face when working with the datasets described earlier. A first challenge relates to the IT infrastructure needed to store and manage such datasets. All of the datasets described in the previous sections tend to be very large compared to the datasets traditionally collected and analysed by supervisors. Attempting to use the infrastructure that was developed for traditional supervisory data to collect and analyse granular-datasets could lead to serious bottlenecks.

Because the IT infrastructure needed to work with granular datasets is often not readily available in central banks or other financial regulatory institutions, relatively expensive infrastructure upgrades may be needed. Such requirements stem from the fact that IT processes such as storage, backup, recovery, and database management have to be scaled to the amount of data. If the datasets being processed expand above a
certain critical level, existing infrastructure may not be able perform the required tasks in a reasonable amount of time.

 Authorities face additional challenges relating to the techniques needed to analyse very large granular datasets, for which traditional analytical tools may not be appropriate. For instance, machine-learning and artificial-intelligence techniques may be necessary to adequately monitor the quality of reporting in very large data sets. Also, the monitoring of systemic risk may require authorities to recognise or uncover patterns that emerge from the granular data. Such tasks can be highly complex, not only due to the large quantity of information that must be processed but also due to the somewhat looser structure of granular datasets relative to traditional supervisory reporting frameworks.

 In addition to these issues, authorities may face other potential challenges relating to the assessment of systemic risk, due to the fact that each granular data set offers only a partial view of risks in the financial system. It may be necessary to combine information from differing data sets in order to construct a more holistic view. However, differences in the structure of various data sets may render this task quite difficult.

2. Securities holding statistics: data description

The SHS data have been reported at group level by the twenty-six largest euro area banking groups on a quarterly basis since Q4 2013. As of Q3 2018, the data are now reported for 104 euro area banking groups at both consolidated and entity levels; therefore data are now available for several hundred banks. As noted above, the data contain market and notional values of individual security holdings, including debt securities, quoted shares, and investment fund shares/units. The data also contain a large number of additional attributes (up to sixty-six) for each security.

Chart 1
Composition of the aggregate securities portfolio of all reporting Euro area banks (Q3 2018)

Note: The data include security holdings of non-euro area subsidiaries
Chart 1 reports the shares of different types of securities in the aggregated portfolio of all reporting banks.\(^1\) As can be seen from this chart, 86% of European banks’ securities holdings in Q3 2018 were bonds, with 20% accounted for by intragroup bond holdings and 66% corresponding to other bond holdings.

As a point of comparison, Chart 2 reports the composition of the portfolios of Belgian banking entities (i.e., Belgian banks excluding their foreign subsidiaries). In contrast to the holdings of the sample of all European reporting banks, the aggregated portfolio of Belgian banks is virtually entirely made up of bond holdings, with 39% of the portfolio accounted for by intragroup bonds and 60% by other bonds.

**Chart 2**

Composition of the aggregate securities portfolio of Belgian banks at solo level (Q3 2018)

![Chart showing the composition of the aggregated securities portfolio of Belgian banks at solo level (Q3 2018). The chart is divided into sectors such as Debt securities, Debt securities (Intragroup), Listed shares (Intragroup), Listed shares, Money market funds (MMF) shares / units (Intragroup), Money market funds (MMF) shares / units, Non-MMF investment fund shares / units, and Non-MMF investment fund shares / units (Intragroup).]

Note: Securities holdings of non-Belgian subsidiaries are excluded.

For the remainder of our analysis, we focus only on the bonds in banks’ portfolios. We also exclude intragroup bonds from the analysis.

Note that banks may hold multiple securities of a given type (e.g., multiple sovereign bonds of a given country). For the purpose of measuring the outstanding positions, we aggregate the multiple bond positions of a given type into a single value by summing the values of the underlying securities. We then define individual “holdings” on the basis of the NACE sector code and the geographical location of the issuer. Hence, each holding is defined as the aggregate of individual securities that are issued by an issuer in the same NACE sector and in the same country of issuance. We use NACE codes at the highest level of aggregation (A-S): e.g., where the sector O represents government debt. The single exception to this rule applies to the financial sector (K), which we subdivide into banks (K.64.19), funds and trusts (K.64.30) and other. For Q3 2018, this gives us 21 sectors in 129 different issuer countries. Excluding NACE sector-country combinations for which none of the reporting banking groups holds a debt security, we obtain a bipartite network of dimension 104×675.\(^2\)

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1 Euro area banks also report the securities holdings of subsidiaries located outside the euro area.

2 675 is the number of the different categories of holdings. In theory we have up to 2709 possible categories of holdings for 21 NACE sectors and 129 countries of issuance, but we exclude the combinations that we do not observe in the database.
Chart 3 provides an idea of the total values of the different categories of banks’ (non-intragroup) bond holdings present in the combined Q3 2018 portfolio of all of the reporting banks. The chart reveals that the most important securities in banks’ bond portfolios are debt securities issued by governments. Significant government exposures include the US and Japan, as well as large European countries (e.g., Italy, Spain, Germany and France). In addition to government bonds, there are also significant amounts of debt securities issued by financial institutions in the aggregated portfolio, including Spanish and Luxembourg funds and trusts, as well as banks in a number of countries.

**Chart 3**

*Shares of individual bond holdings in the aggregate area portfolio of euro area banks (Q3 2018)*

Notes: The data exclude intragroup bond holdings. EU refers to holdings of securities of supranational EU institutions.

Clearly, Chart 3 masks considerable heterogeneity across reporting banks in the holdings of specific securities. This variation is more evident in Table 2, which reports the mean proportions and standard deviations of important holdings across individual banks’ portfolios, both for the sample of euro area banks and the sample of Belgian banks. In order to facilitate comparisons between euro area and Belgian banks, only the holdings of banking entities located within the euro area are included in Table 2.

As can seen from Table 2, the relative proportions of government bonds and those of financial institutions are roughly similar for Belgian and European banks, although government bonds account for a somewhat lower proportion of Belgian banks’ holdings. As would be expected, Belgian banks hold considerably higher proportions of Belgian government debt securities than does the average euro area bank. On the other hand, the average euro area bank holds higher proportions of Italian and Spanish government bonds than do Belgian banks. Japanese government bonds also appear among the top holdings of European banks but not of Belgian banks. With respect to the holdings of financial institutions’ securities, holdings of Luxembourg and Canadian financial institutions appear to be more important for Belgian banks than for European banks, and the holdings of German financial institutions are more important of European banks than for Belgian banks.
3. Types of analysis that can be undertaken with the SHS

One question of interest with respect to banks’ securities holdings is the extent of home bias in their portfolios. For example, the higher is the concentration of domestic government bonds in banks’ portfolios, the stronger will be the national sovereign-bank nexus. Of course, as was observed during the European sovereign debt crisis in 2010-2011, high concentrations in banks’ portfolios of the sovereign debt of another country can make banks vulnerable to macroeconomic shocks in that country as well.

Table 3 reports the extent of home bias for Belgian banks, compared with that of European banks. As can be seen from this table, Belgian banks’ portfolios exhibit significantly less home bias than do the portfolios of the average European bank. This difference is due in large part to the presence in certain European countries of a large number of medium-size banks with very high home bias in their bond holdings. If we consider banks in neighbouring countries such as France and the Netherlands, which have banking system structures more similar to that of Belgium, we observe degrees of home bias that are much closer to those reported for Belgian banks. Furthermore, as the standard deviations reported in Table 3 suggest, there is considerable heterogeneity in home bias across European banks.

A second question of interest relates to the degree of risk associated with particular securities or classes of securities in banks’ bond portfolios. A natural starting point for assessing the importance of a security in a bank’s
portfolio is to compute the weight of the security in the portfolio. The greater is the security’s weight in the portfolio, the more vulnerable is the portfolio value to a shock in the value of that security. However, from a risk perspective the weight of a security in a bank’s portfolio does not provide sufficient information concerning the potential vulnerability of the bank to a negative shock in the security’s value. More appropriate metrics would seem to be the value of the security in relation to the total assets of the bank or in relation to some measure of the bank’s capital. Indeed, a capital-based measure would capture the importance of a bank’s security holdings relative to its loss absorption capacity.

The SHS data can be combined with bank balance sheet data in order to obtain size-based and capital-based measures of vulnerability associated with banks’ securities holdings. We construct size and capital-based measures of bond portfolio importance by making use of balance sheet data made available through the semi-annual EBA transparency exercise. In order to ensure a harmonised measure of size for banks, EBA requires banks to report total leverage ratio exposures rather than total assets, for which the definition is not harmonised across countries.

Table 4 reports two measures of importance: (i) an approximation of the value of the portfolio relative to the size of the balance sheet; (ii) approximation of the value of the portfolio relative to the common equity tier-1 (CET1) of the banks. As is evident from the table, although bond portfolios account for a relatively modest share of the average bank’s balance sheet (around 15%), the portfolio values amount to well above twice the value of CET1 for the average bank. This suggests that a severe shock to a major holding of a bank’s portfolio (for example, the bonds of a particular country) could result in a significant reduction in the bank’s solvency.

Interestingly, the bond portfolio of the average Belgian bank is smaller relative to the size of the bank than the bond portfolio of the average European bank. Correspondingly, the portfolio of the average Belgian bank accounts for a smaller proportion of capital than does the portfolio of the average European bank. In addition, the fact that the average Belgian bank also has a slightly higher CET1 ratio than the average European bank further contributes to the lower ratio of portfolio value to CET1 for Belgian banks.

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1 We are able to construct these measures for only the 98 euro area banking groups that provide data through the EBA transparency exercise, as compared with 104 euro area banking groups that report SHS data.

2 Total leverage ratio exposures must be calculated by banks for use as the denominator for the Basel 3 leverage ratio. Total leverage ratio exposures include certain off-balance-sheet items, in addition to items on-balance sheet. Its calculation is harmonised across banks and countries.
The risk of a bank’s bond portfolio depends not only on the importance of the portfolio or the underlying securities relative to the bank’s size or its capital but also on other factors such as the creditworthiness of the bond issuers and the sensitivity of bond values to the overall interest rate environment. The Box below describes how SHS data may be used to assess the impact of shocks to the yields of bonds in a bank’s portfolio on the bank’s solvency.

### Assessing the market risk of a bank’s bond portfolio

One of the main risks related to bond holdings is market risk. The value of the bond is equal to the present value of the future cash flows that the bond will generate for the bond holder. Such cash flows include potential coupon payments and the repayment of the face value of the bond at maturity. The interest rate used to transform future cash flows into current values is referred to as the bond yield and is equal to investors’ required rate of return. This required rate of return depends, among other things, on the level of prevailing interest rates and the riskiness of the issuer of the bond.

The market risk of a bond relates to fluctuations in a bond’s value due to changes in yields: the higher the yield, the lower is the present value of future cash flows and, therefore, the price of the bond. If interest rates rise, a bond with a given yield will become less attractive to investors. Bond holders attempting to sell the bond will have to accept a lower price for the bond in order to guarantee investors a required rate of return that is in line with the prevailing level of interest rates. Similarly, if the creditworthiness of the issuer declines, investors may demand a higher yield. As a result, the bond’s market value will decrease.

The sensitivity of a bond’s value to changes in yields depends on certain features such as the cash-flow structure (e.g., whether there are coupon payments and whether coupon rates are fixed or floating) and the residual maturity. For the simple case of a zero-coupon bond with residual maturity $T$ and yield $\delta$, the

### Box 1

**Proportions of bond portfolios relative to size and capital for European banking groups and for Belgian banks at consolidated level**

<table>
<thead>
<tr>
<th>Value of portfolio</th>
<th>EU banks Mean</th>
<th>EU banks Std.Dev</th>
<th>EU banks Weighted mean</th>
<th>Belgian banks Mean</th>
<th>Belgian banks Std.Dev</th>
<th>Belgian banks Weighted mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>As proportion of total leverage ratio exposures</td>
<td>0.15</td>
<td>0.10</td>
<td>0.12</td>
<td>0.13</td>
<td>0.09</td>
<td>0.10</td>
</tr>
<tr>
<td>As proportion of Common Equity Tier 1 (CET1)</td>
<td>2.76</td>
<td>1.87</td>
<td>2.63</td>
<td>2.37</td>
<td>1.36</td>
<td>1.86</td>
</tr>
</tbody>
</table>


Given that the data in the EBA transparency templates is available only for Q2 2018 and the bank-level SHS data only became available in Q3 2018, the ratios reported in Table 3 can only be considered as rough approximations.

The weighted mean is a weighted average using bank size (i.e., total leverage ratio exposures) as the weights.
the percentage point change in a bond’s value in response to a one-unit increase in the yield amounts to the bond’s modified duration \(\frac{-T}{1+\delta}\). While the formula for the price sensitivity of a bond will be more complicated when the bond has a more complex cash flow structure, a bond’s price sensitivity to yield changes will nevertheless be increasing in its residual maturity.

**Sensitivity of bond values to yield changes and to residual maturity**

The left-hand chart shows that the sensitivity of the value of a zero-coupon bond depends on its residual maturity. The blue line denotes the price of a zero-coupon bond with a yield of 2% (yield 2%). The bars denote the percentage change in the price of a zero-coupon bond following a 1 percentage point increase in the yield from 2% to 3% (left axis).

The right-hand chart shows the distribution of residual maturities (horizontal axis) of all debt securities held by euro area banking groups reporting in SHS-G.

The left-hand chart shows that the sensitivity of the value of a zero-coupon bond depends on its residual maturity. The blue line denotes the price of a zero-coupon bond with a yield of 2% and shows that the price of a bond is decreasing in its remaining maturity (i.e., the present value of cash flows that occur in the more distant future is lower). The red line shows the price of this zero-coupon bond after the yield has increased from 2% to 3%: the difference between the two lines reflects the loss in the bond’s value due to the 1 percentage point increase in the yield. This difference becomes larger when the residual maturity of the bond increases. Indeed, the bars in the left-hand panel of the chart indicate that the percentage loss in the bond’s value is larger when the bond has a larger residual maturity.

The SHS data are sufficiently rich to allow determination of the price sensitivity of each reported bond. The right-hand chart presents the distribution of residual maturities of debt securities held by euro area banking groups reporting in the SHS-G data set. The variation in residual maturities suggests that the sensitivity to a yield shock of a given size may differ across individual securities issued by the same counterparty.
The SHS data therefore allow assessing the impact of shocks to bond yields on the values of banks’ bond portfolios. In terms of macroprudential simulations that make use of these data, shocks to bond yields could be assumed either to be broad-based (i.e., applying to all categories of bond holdings) or applied only to a sub-set of banks’ bond holdings (e.g., the government bonds of a particular country). The mark-to-market losses following such shocks could be calculated as a proportion of the banks’ capital, in order to assess the impact of the shock on banks’ solvency positions.

**Conclusion**

This article has provided an overview of transaction-level data sets for European banks which have been put in place since the 2007-2008 financial crisis. The transaction-level reporting requirements evolved directly out of the crisis, during which it became clear that the extent of common exposures and interconnections between banks were highly opaque and the resulting risks unknown. Authorities saw the need to have access to more granular information from banks, in order to be able to monitor systemic risk more accurately.

The article discusses five granular data sets and describes the nature of information reported, as well as the macroprudential questions that can be addressed with each. The discussion also points to some of the challenges that authorities face in managing and analysing such large amounts of data.

In order to illustrate some of the potential contributions of the new data sets to macroprudential analysis, the article focuses in more detail on securities holding statistics. Some general, descriptive statistics are presented for Belgian and European banks, in order to highlight the types of information that authorities may obtain from these data and the potential analyses that can be undertaken. Going forward, such analyses should help macroprudential authorities to detect the build up of systemic risk at an earlier stage and to take measures aimed to prevent the emergence of a crisis.
References


Climate-related risks and sustainable finance
Results and conclusions from a sector survey

Jérôme Bourtembourg
Louise Dumont
Alexandre Francart
Brenda Van Tendeloo

As climate-related risks and the transition to a more sustainable economy can constitute significant financial risks, financial institutions, supervisors and regulators have all started to work on improving the measurement, management and mitigation of these risks. In order to obtain an initial understanding of the Belgian financial sector’s approach towards climate-related risks and opportunities, collect some relevant data, and increase financial institutions’ awareness about these risks, the Bank has launched a sector survey enquiring about the various climate-related risks and the degree to which institutions have already taken these into account in their risk strategies and policies. The survey has shown that the awareness of financial institutions regarding climate-related risks is still at the early stages and that there is a lack of available data within institutions to adequately assess the exposure of Belgian institutions to climate-related risks. This article therefore includes some recommendations aimed at encouraging financial institutions to improve the measurement, management and disclosure of climate-related risks, to take part in discussions with regulators and supervisors to jointly improve the data and methods to best capture and mitigate these risks, and to support the financing of more sustainable investments.

Introduction

There is now a broad consensus that climate risks and the transition to a more sustainable economy can constitute significant risks to financial stability. The first section of this article explains the various sources of climate-related risks and describes how these can constitute major financial risks by driving traditional risks such as credit risk, market risk, operational risk, liquidity risk and insurance risk. Supervisory and regulatory authorities are therefore increasingly working on improving the assessment, management and mitigation of these risks.

The data available to supervisors are currently not granular enough to enable an in-depth analysis of the magnitude of these risks for financial institutions. Based on currently available data, the second section provides an initial overview of Belgian banks’ exposures to climate-related risks.

In a first attempt to address the data and information gaps hampering an in-depth analysis, the National Bank of Belgium (NBB) has conducted a survey to assess the relevance of these risks for the Belgian financial sector and also to increase financial institutions’ awareness. The survey covers topics ranging from general strategy and governance to risks on both the assets and liabilities sides, as well as reputational and supervisory priorities. The main results of the survey are discussed in Section 3 of this article.
Financial institutions’ awareness of climate-related risks is still at the early stages and they do not currently have the necessary data to adequately assess their exposure to such risks. Against this background, the final section of this article offers some recommendations for financial institutions, encouraging them to improve data collection, risk management and disclosures on climate-related risks, and to support the transition by greening the financial system.

1. Climate-related risks as financial risks

Climate-related risks are typically divided into two categories, physical risks and transition risks, with the former referring to actual climate change while the latter refers to risks resulting from the transition to a more sustainable, low-carbon economy. Both can constitute financial risks, driving financial institutions’ traditional risks, such as credit risk and market risk.

1.1 Physical risks

Risks arising from increased damage and losses from physical phenomena associated with both climate trends (e.g. changing weather patterns, sea level rise) and events (e.g. natural disasters, extreme weather) can affect financial institutions in various ways. Physical risks are expected to mainly impact the liabilities of insurance companies, as an increase in insured losses will raise the level of insurance claims. But increased losses resulting from climate change can also impact the asset side for both banks and insurers, as climate trends and shocks could pose economic disruptions for various economic actors, impacting financial institutions’ exposures. At a macroeconomic level, losses from physical risks may affect resource availability and economic productivity across sectors, hit the profitability of firms and individual assets, pose supply chain disruptions, etc. Losses arising from physical risks, especially when uninsured, may thus have

Sources: Bank of England, NBB.
cascading impacts across the financial system. When climate-related events lead to an increase in insurance claims, affordability and insurability are expected to become a growing concern, increasing the burden on households and companies, impairing asset values, raising credit risk for lenders and reducing the value of investments held by institutions. Figure 1 illustrates the various possible channels through which losses resulting from climate-related natural disasters could affect the soundness of individual financial institutions and the stability of the financial system.

Although major financial impacts are not expected in the short term, physical impacts are not just risks for the future. They are already impacting the economy and financial system, albeit unevenly among regions and jurisdictions. Swiss Re reports that global insured losses from natural disaster events in 2017 were the highest ever recorded (Swiss Re, 2018). According to Munich Re, overall worldwide economic costs from natural disasters have exceeded the 30-year average (USD 140 billion per annum) in seven of the last ten years (Munich Re, 2019), while the number of reported loss events due to geographical, meteorological, hydrological and climate events worldwide tripled between 1980 and 2017 (Munich Re, 2018). Economic estimates suggest that the physical impact of climate change on the global economy will be substantial by the second half of the century, particularly if limited or no action is taken to reduce emissions. Because of the increased probability of potentially disruptive events including increased migration pressures, political instability and conflict in these scenarios, these economic estimates are likely to understate the magnitude of the associated risks (NGFS, 2019).

In Belgium, too, climate change is expected to influence natural ecosystems and impact various economic sectors in the long term. The Belgian National Adaptation Plan (NAP) 2017-20, published by the National Climate Commission and establishing adaptation planning at regional and federal level, refers to several publications on climate change projections. Based on a number of scenarios, these projections show the potential for significant changes in temperature levels, more extreme weather conditions, such as more frequent and heavier rainfall in winter but also more heatwaves and droughts, potentially leading to water shortages in summer and significant increases in sea levels.

While all kinds of production processes and services may be impacted due to potential water shortages, flooding, supply problems, damage to infrastructure etc., the impacts remain difficult to assess. The largest of these are expected in agriculture, coastal areas, fisheries, land planning and infrastructure, forests, biodiversity, water resources and water management, tourism and health (due to the increase in heat waves).

A study by the European Commission (Ciscar et al., 2014) shows that the Central Europe North region (Belgium, the Netherlands, Germany and Poland) would be highly affected by climate change impacts on human health and sea flood damage. Under a reference simulation (business-as-usual scenario leading to a global temperature increase of 3.5 °C compared to the pre-industrial level), the overall welfare loss due to climate change to the Central Europe North region would be around € 45 billion/year (€ 190 billion/year in all EU), almost 2 % of regional GDP. More than half of the damages would be due to the additional premature mortality (more than 1 % of regional GDP). Damages because of sea flood damage and the agriculture sector would also be significant. Damage associated with sea floods (without public adaptation) would amount to € 9 billion/year for this region. Moving to a 2 °C world would limit annual climate damages to 1.5 % of GDP.

1.2 Transition risks

Transition risks are arising from disruptions and shifts associated with the transition to a more sustainable, low-carbon economy, which may affect the value of assets or the costs of doing business for firms. As political commitments have been made with the Paris Agreement with the aim of avoiding major

\[ \text{Temperature projections are based on a study included in the Flanders Environmental Report of 2009 (VMM, 2009) and compared to a reference period 1961-1990. The projections are based on local impact scenarios, built on the global emission scenarios from the IPCC (2007).} \]
physical risks, a transition to a low-carbon, more sustainable economy is coming. In addition, market sentiment is changing rapidly in favour of more sustainable activities and products, and technological innovations are likely to provide opportunities to respond to this changing demand.

The impact on the economy of an abrupt transition could be extensive. The longer significant action is postponed, the stronger such action will have to be to achieve the targets committed to in the Paris Agreement. Transition risks may materialise especially in the event of too sudden changes in investor or consumer preferences, available technologies and policy measures.

The various channels by which transition risks may impact financial stability are illustrated in Figure 2. Abrupt policy changes, changes in investor and consumer preferences and technological breakthroughs could all cause losses for both banks and insurers, for instance through their direct exposure to carbon-intensive industries, which are expected to be the most impacted. But as energy plays a very important role in the economy, the expected transition to a low-carbon economy is likely to have significant implications across multiple sectors. There is also the risk of missed opportunities. Rising investor and consumer demand for green products holds out opportunities for additional business. However, it is difficult to know in advance what types of products and which technologies will be winners. New technologies may emerge, making others obsolete and thereby severely impacting the value of those investments. Also, green assets can incur losses when consumer or investor preferences change. In addition, as we learn more and more about new technologies and sustainability, green products may turn out to be less green than expected. People may also portray a certain product or activity to be greener than it actually is (‘greenwashing’), which may lead to losses on green assets and cause reputational risk or even litigation risk.

Figure 2
Transition risk transmission channels

Source: NBB.
There is major uncertainty about which policy measures will be taken to attain the Paris climate goals, and what type of technological innovations will be developed. At European level, regulatory and legislative provisions are being devised that will provide the framework for an energy and climate policy for the coming decades. The European Union published its medium-term strategy (2020-30) in January 2014 (European Commission, 2014) and recently, in November 2018, its long-term strategy (2050) (European Commission, 2018). Integrated national energy-climate plans (NECPs) and low-emission long-term strategies have to be drawn up by each Member State and submitted to the European Commission by the end of 2018 and 2019, respectively. Belgium submitted a draft energy-climate plan in December 2018, which sets a course for action on climate and energy in the coming years. According to this plan, Belgium will be aiming to reduce its greenhouse gas (GHG) emissions by 35% by 2030\(^1\) (compared to 2005), to increase the share of renewable energy to 18.3% (the EU target is 32%) and to increase energy efficiency (by 26% in primary energy and 12% in final energy compared to 2005; the EU target is 32.5%).

In March 2019, the European Commission published a report (European Commission, 2019a) stating that, without additional measures, Belgium is likely to miss its GHG emissions targets for both 2020 and 2030. Additional measures are particularly needed for the industry, transport and power sectors, as well as for buildings. Belgium’s NECP refers to both transport (23%) and buildings (15% residential, 5% commercial) as main contributors of GHG emissions. For the transport sector, Belgium’s NECP mentions an ambitious modal revolution in passenger transport, with potential measures such as a toll for private cars and a greening of the vehicle fleet. Its housing stock has grown by 12% since 1995 and includes a high proportion of old buildings, with natural gas as the main source of heating. Although the GHG emissions of commercial buildings are much lower than those of residential buildings, emissions from the former have been on the rise (a 37% increase between 1990 and 2016), whereas emissions from the latter fell over the same period (−17%). The Belgian regions are therefore planning large-scale renovations of their buildings, stricter standards for renovations, and subsidies for better building insulation.

\(^1\) For sectors not included in the EU Emissions Trading System (EU ETS).

### Chart 1

**Sectors’ contributions to GHG emissions in Belgium (2016)**

![Chart](image)

Source: Belgium’s integrated national energy and climate plan (NECP).
Policies and measures that are defined well in advance and over a long-term horizon ensure predictability and reduce uncertainty, thereby fostering an orderly and gradual transition process. While it is clear that additional measures will have to be taken, it is currently unknown what these will be. In addition, amendments over time to the strategies aimed at meeting the identified targets could lead to policy variability. Most likely though, sectors that are emitting the most GHG will be targeted first. The contributions of the main sectors to total GHG emissions in 2016, as published in Belgium’s NECP, are presented in Chart 1. Policies aiming at incentivising a reduction in carbon emissions and at ensuring a better pricing in of externalities could include, among other measures, carbon or flight taxes, minimum energy performance requirements for buildings and (company) cars, etc.

1.3 Climate-related risks as driver for traditional risks

Climate-related risks do not have to be regarded as separate risk categories, but are instead driving traditional risks, such as credit risk, market risk, operational risk, liquidity risk and insurance risk. With regard to credit risk, for example, large-scale droughts or flooding (physical risks) could increase the risk of failure in the agricultural sector, and the value of buildings serving as collateral could decline as a result of a stricter policy on energy performance standards (transition risks) – as in the Netherlands, where commercial buildings must meet a minimum energy standard from 2023 onwards, and in the UK, where properties with an energy performance certificate (EPC) rating in the lowest two categories (F and G) may not be let as new leases or renewals. Farmers suffering from droughts or flooding might become unable to repay loans. Homeowners renting out property who do not improve the energy efficiency of these homes and hence can no longer let them may be more likely to default on their buy-to-let mortgages, while the value of properties not meeting new standards may be impaired, decreasing the value of a bank’s collateral. With regard to market risk, new technologies or greenwashing could cause sudden repricing or revaluation of assets, market bubbles or stranded assets. Climate events may cause physical damage to an institution’s infrastructure, increasing operational risk, and may also lead to higher claims for insurers – or may even make certain risks uninsurable. And finally, liquidity risk may also be impacted, as assets impacted by climate-related events or the transition may become less liquid, whereas, on the funding side, investors and depositors that are becoming more sustainability-oriented could require that their bank becomes so as well.

1.4 Assessing climate-related risks

There is broad consensus that scenario analyses and stress tests are the best way to capture climate-related risks, because such risks are distinctively far-reaching in breadth and magnitude, foreseeable, dependent on short-term actions and currently irreversible, as indicated in the first comprehensive report of the Network for Greening the Financial System (NGFS, 2019). This report also highlights that, as climate change will affect all agents in the economy (households, business, governments), across all sectors and geographies, these risks will likely be correlated and non-linear, with impacts potentially being larger than those from other structural changes. While the exact outcome and timing are uncertain, there is a high degree of certainty that some combination of physical and transition risks will materialise in the future. The magnitude and nature of these future impacts will, at least in part, be determined by actions taken today.

Collaboration between financial institutions, supervisors, regulatory authorities and climate experts is of the utmost importance, as it is no straightforward task to put these analyses into practice, decide which policy measures and technological innovations to focus on, etc. In addition, economic forecasts and studies focusing on scenario analyses concentrate on economic indicators such as energy prices, employment, economic growth, etc. These have to be translated into impacts on financial exposures. Various regulators, supervisors and central banks are currently putting their heads together to work on methods that can best capture and mitigate climate-related risks, as illustrated by the various initiatives included in Box 1. The Bank is actively cooperating in all these international activities, working groups and networks.
Climate-related risks and sustainable finance

Since the financial sector plays a crucial role in funding the transition to a low-carbon economy, in March 2018 the European Commission launched a sustainable finance action plan to ensure that the financial system supports the EU’s objectives for climate and sustainable development. The Commission is currently working on the implementation of this plan, in collaboration with various technical experts, and this has already resulted in regulatory initiatives regarding taxonomy, disclosure and benchmarks.

The various European Supervisory Authorities (ESAs) have been mandated to contribute to the implementation of the EU action plan. In addition, the ECB is currently analysing how to assess and address climate change-related risk in banks, how climate change-related risks can impact financial stability, how to take climate change into account in its investments in own funds and pension funds and finally how climate change can potentially impact the factors that are important to monetary policy (Lautenschläger, 2019). Also, the ESRB and its member institutions continue to work on the financial stability aspects of climate change (Draghi, 2019).

Through the Network for Greening the Financial System (NGFS) and the Sustainable Insurance Forum (SIF), supervisory authorities of various countries are cooperating to exchange information and discuss the prudential approach to climate-related risks and to promote sustainable finance. As the number of NGFS members has grown from eight at the end of 2017 to more than 35 in April 2019, central banks and supervisors across the world clearly acknowledge that climate-related risks are financial risks that have to be measured and managed accordingly.

Some national supervisors have already made good progress with regard to the assessment of climate-related risks, especially De Nederlandsche Bank (DNB), Banque de France and the Bank of England, frontrunners on climate change and sustainability, and founding members of the NGFS. After some preliminary analyses of climate-related risks in the Dutch financial sector (DNB, 2017), DNB has already performed a top-down stress test on transition risk (DNB, 2018). Building on its reviews of the insurance sector (Bank of England, 2015) and banking sector (Bank of England, 2018) regarding climate-related risks, the Bank of England has published a supervisory statement (Bank of England 2019) including some supervisory expectations with regard to climate-related risks for financial institutions.

2. Belgian financial sector’s exposure to climate-related risks

Belgian financial institutions are likely to be impacted by climate-related risks, whether in the short, medium or long term. This section gives a first view of the vulnerabilities of the Belgian banks and insurance companies to such risks. However, given the limited availability and granularity of data and uncertainties around the extent of the risks, estimates must be interpreted with care.

Physical risks

In Belgium, physical risks related to climate change are expected to mainly impact insurance companies, as insurers’ liabilities are directly exposed to these risks through their property- and

BOX 1

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2019 • Climate-related risks and sustainable finance 113
vehicle-related business. Since 2007, fire and property insurance in Belgium has had to cover damages due to flooding, storms, earthquakes, sewer overflows and landslides, and comprehensive vehicle insurance now protects the policyholder’s vehicle in the event of severe storms, flooding, hailstones, etc. The year 2018 was, for instance, particularly tough for Belgian non-life insurers, seeing claims related to severe storms and flooding reach €250 million, up from €75 million in 2017. However, insurers have managed to keep their combined ratio – i.e. the sum of claims and expenses over premiums – below the 100 % level for 2018, thanks to sound underwriting risk management and well-designed reinsurance programmes.

Physical risk can also affect the assets side of Belgian financial institutions’ balance sheets. Both banks and insurance companies hold investment or loan portfolios in areas of the world that could be severely affected by climate change, even in the short term, but the amounts at stake appear to be very limited. Following the methodology defined in the Bank’s Financial Stability Report 2018 (NBB, 2018), assets located in vulnerable to very vulnerable countries at the end of 2018 would only account for 0.3 % and 0.2 % of banks’ and insurance companies’ assets respectively. Exposures to moderately vulnerable countries were estimated at 9 % (banks) and 8 % (insurance companies), and mainly consisted of exposures to the Netherlands.

Transition risks

In addition to physical risks, banks and insurance companies are also exposed to a deterioration in their asset quality due to transition risks, with more substantial amounts at stake. To approximate these types of risk, Chart 2 provides a sectoral breakdown of Belgian banks’ corporate loans portfolios and insurance companies’ investments in corporate bonds, equity instruments and loans, based on the vulnerability

**Chart 2**

**Breakdown of Belgian banks’ and insurance companies’ exposures to transition risk by sector**

*(non-consolidated data, at the end of 2018)*

<table>
<thead>
<tr>
<th>Industry</th>
<th>Banks</th>
<th>Insurance companies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less greenhouse gas intensive sectors</td>
<td>68%</td>
<td>77%</td>
</tr>
<tr>
<td>Agriculture and food industry</td>
<td>6%</td>
<td>10%</td>
</tr>
<tr>
<td>Construction</td>
<td>6%</td>
<td>4%</td>
</tr>
<tr>
<td>Transport</td>
<td>4%</td>
<td>3%</td>
</tr>
<tr>
<td>Energy and fossil fuels</td>
<td>4%</td>
<td>1%</td>
</tr>
<tr>
<td>Manufacturing and heavy industry</td>
<td>1%</td>
<td>5%</td>
</tr>
</tbody>
</table>

Source: NBB.
of sectors to a possibly abrupt transition to a more sustainable economy. Vulnerable sectors are defined here as a function of their GHG emissions, both in relative terms (to a sector's value added) or in absolute terms.¹

At the end of 2018, about 32% of the banks’ corporate loans portfolio and 24% of the insurance companies’ corporate bonds, equities and loans portfolio had counterparties in the sectors defined as vulnerable. In absolute amounts, these exposures amounted to € 81 billion for banks and € 22 billion for insurance companies, compared with € 77 billion and € 24 billion respectively at end-2017. These figures nevertheless need to be interpreted with care due to the data’s lack of granularity. While the breakdown provided in Chart 2 is based on firms’ emission intensity aggregated at sector level, there can be important discrepancies in the ecological footprints of firms belonging to the same sector. This caveat is particularly relevant for the agricultural, transport and energy production sectors. Moreover, this methodology only takes first-round impacts into account, while other sectors and/or general macroeconomic conditions could be hit by downturns in the emission-intensive sectors.

In the same vein, Chart 2 only looks at banks’ and insurers’ corporate exposures, while other assets, such as mortgages, could also suffer losses in the event of a sudden transition to a more sustainable economy. Households or businesses residing in energy-intensive dwellings could see their heating costs increase, with fluctuations in energy prices or the implementation of policies, impacting their ability to repay mortgage debt, while stricter regulations on the energy performance of buildings could severely impact the value of buildings used as collateral for these loans. Although data regarding the energy efficiency of this collateral are currently scarce (see Section 3.2), regional sources agree that the share of energy-efficient buildings in the Belgian residential real estate market is currently very low, standing at around 20% (depending on the definition).² Scores achieved by office and public buildings in Brussels were better, however, with respectively 73% and 53% of buildings sold between 2011 and 2016 having an energy performance rating between A and C (on a scale up to G).

### 3. Results of the survey

In order to close the identified data and information gaps, in 2018 the Bank launched a survey directed towards seven credit institutions and eight insurance companies in Belgium. The goal was to get an initial understanding of the Belgian financial sector’s approach to climate-related risks and opportunities, and to collect some relevant data if these were available within the institutions.

The survey showed that, while financial institutions are generally aware of the existing risks and willing to adapt to the impending changes, they are currently not very advanced when it comes to the quantification and integration of these risks in their risk management. In the same vein, several institutions indicate that they are keen to contribute to a transition towards a more sustainable economy, but the proportion of so-called green assets in financial institutions’ portfolios remains negligible. Financial institutions underline the importance of access to and being able to provide good information, and consider this should be a priority for regulators and supervisors going forward.

The survey covers topics ranging from general strategy and governance (Section 3.1) to risks on the assets (3.2) and liabilities (3.3) sides, as well as reputational risks (3.4), green finance (3.5) and supervisory priorities (3.6).

¹ Note that the two methodologies usually come up with the same identified sectors (based on data from the Federal Planning Bureau). These sectors also broadly coincide with those mentioned in Belgium’s NECP and those identified by the EC technical expert group on sustainable finance for Europe.

3.1 General strategy

All the institutions surveyed are taking into consideration climate-related risks within their organisation, but to varying extents. The majority of Belgian financial institutions are measuring and monitoring information on climate-related risks, but only 14% of banks and 25% of insurers are actively incorporating these risks in their risk management, financing and investment decisions.

Most financial institutions have a governance structure in place through which board members and senior management are informed of climate-related risks. Improvements to these processes are foreseen in the short term. Internal reporting of environmental, social and governance (ESG) risks has been introduced or is planned in the majority of institutions. The surveyed institutions are using external inputs to build their skills and capacities with respect to climate-related risks.

The majority of financial institutions have already implemented changes to their strategy/investment policy in response to current and potential future climate change impacts. As presented in Chart 3, eight out of fifteen institutions have implemented substantive changes to their business strategy in response to current and potential future climate change impacts and six are planning to do so in the next three years. Most institutions mentioned that they have implemented – or plan to introduce in the next three years – policies with respect to the consideration of environmental issues and climate-related risks in their own investment/credit policies and in their investment management activities for clients. Examples of such changes were primarily refinements to their investment policies to further include ESG considerations into investment decision processes, drawing up ethical investment codes, and the development of sustainable financial products for their clients. Strategies consisting of divesting from the coal sector and the oil-sands sector were

Chart 3

Institutions' implemented changes to business strategy, own investment or investment for clients as a response to climate-related risks

(labels indicate the number of institutions)

Source: NBB survey on climate-related risks.
often mentioned. Many institutions mentioned initiatives or principles they are following to achieve the ESG consideration they have included in their investment policies such as the BEAMA sustainability criteria, the UN PRIs, the UN Global Compact, the 2°C Investing Initiative (2°ii), the Equator Principles, the Science Based Targets initiative (SBTi), and the BREEAM certification.

To reflect their amended strategy in response to risks related to climate change and energy transition, the main drivers for capital reallocation identified by financial institutions are the development of policies and regulations stimulating the transition towards a lower-carbon economy, the development of new technologies and the changes in consumer preferences towards green products. Surveyed institutions identified these three developments as opportunities for their business, while the change in climate trends and events are mainly identified as a threat, as further detailed in Chart 4.

Surveyed institutions indicate they are disclosing information on environmental matters as part of their non-financial reporting. This is the consequence of the Belgian Law of 3 September 2017 implementing Directive 2014/95/EU on the disclosure of non-financial and diversity information, which states that large public-interest entities must disclose information on matters such as environmental issues.

### Chart 4

**Institutions' views on opportunities and threats related to climate change**

(results for all companies)

Source: NBB survey on climate-related risks.

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1 As developed by the Belgian Asset Managers Association (Febelfin); see [https://www.beama.be/](https://www.beama.be/).
2 UN Principles for Responsible Investment, principles on ESG risk approach, engagement, impact reporting and performance measurements; see [https://www.unpri.org/](https://www.unpri.org/).
3 The UN Global Compact (UNGC) provides principles on human rights, labour rights, environment and corruption; see [https://www.unglobalcompact.org/](https://www.unglobalcompact.org/).
4 See [https://2degrees-investing.org/](https://2degrees-investing.org/).
5 The Equator Principles comprise a risk management framework, adopted by financial institutions, for determining, assessing and managing the environmental and social risks of projects and are primarily intended to provide a minimum standard for due diligence and monitoring to support responsible risk decision-making; see [https://equator-principles.com/](https://equator-principles.com/).
6 The Science Based Targets initiative (SBTi) sets long-term climate goals for operations and proprietary investments in line with the Paris Climate Agreement's target of limiting global warming to well below 2°C; see [https://sciencebasedtargets.org/](https://sciencebasedtargets.org/).
7 For real estate investment; see [https://www.breeam.com/](https://www.breeam.com/).
in their annual report (applicable as of the 2017 financial year). Moreover, almost all institutions were aware of the recommendations and supplemental guidance of the FSB Task Force on Climate-Related Financial Disclosures (TCFD), and all banks and most insurers participating in the survey planned on implementing these TCFD recommendations. In addition, ten financial institutions indicated they were disclosing or planning to disclose information regarding environmental issues or climate-related risks by other means (e.g. sustainability reporting in line with the Global Reporting Initiative; reporting prepared in cooperation with external partners or other dedicated reporting at group level). However, the type of disclosures varies quite widely. While some institutions provide some information about the carbon footprint of some of their exposures, quantitative information remains scarce, and most information is of a qualitative nature.

3.2 Financial assets risks

Belgian financial institutions are aware of the potential impact that physical risks could have on their financial assets but consider this as limited. The majority of surveyed institutions’ counterparties are indeed mainly located in Western Europe, where, according to the same institutions, physical risks are unlikely to materialise in the short to medium term. However, several institutions have started exploring these risks and some rely on external providers for acquiring specific data. In the quantitative template provided by the Bank, only three institutions out of the fifteen were able to give an overview of their exposure to physical risks.

Financial institutions consider transition risks more relevant for their financial assets than physical risks. Seven out of the fifteen institutions expect transition risks to have a major impact on their financial assets’ valuation in the medium to long term (five participants still need to investigate the potential impacts). Furthermore, they assume that potential losses would be higher for exposures in European countries, as impactful policy measures are more likely to be taken in these countries. In this regard, several institutions have started monitoring these risks and decreased their exposure towards emission-intensive sectors such as the coal industry, and some have even carried out scenario analyses. Nevertheless, the majority of institutions have not

![Chart 5](chart.png)

**Institutions’ real estate management in light of climate-related risks**

<table>
<thead>
<tr>
<th>Does your institution take climate-related risks into account when managing real estate exposures (including collateral for mortgage loans)?</th>
<th>Does your institution gather information regarding energy performance certificates of commercial and residential real estate (financed or own investment)?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Insurers</strong></td>
<td><strong>Banks</strong></td>
</tr>
<tr>
<td>Yes</td>
<td>2</td>
</tr>
<tr>
<td>No</td>
<td>6</td>
</tr>
</tbody>
</table>

Source: NBB survey on climate-related risks.
yet quantified these risks in the absence of a proper taxonomy, and they have consequently not integrated them in their quantitative risk management. For instance, while almost all institutions provided the Bank with a broad overview of their sectoral exposures, few were able to provide a more granular breakdown for energy production exposures (fossil fuel-related, nuclear-related or renewable-related).

Physical and transition risks for real estate exposures (including via collateral exposures) are considered by most financial institutions, but often on a non-systematic basis. Physical risk, for instance, is looked into when assessing the value of buildings according to potential flood risk. Regarding transition risks, which are mainly quantified by the energy-intensity of the buildings, several institutions have indicated they were clearly orienting their loan/real estate portfolio towards highly energy-efficient buildings. For banks, energy certificates are in most cases taken into account on a mainly case-by-case basis during the due diligence process. Hence, Chart 5 shows that only one bank out of the seven surveyed indicated that it was systematically collecting the energy certificates of financed buildings. Two banks indicated that they would do so in 2019. Insurance companies seem to be more advanced in this field, probably because they are mainly active on the commercial real estate markets in Belgium, for which up-to-date energy certificates are more often available.

To explain their limited progress on the quantification of the risks discussed above, financial institutions often point to several gaps and barriers. In this respect, almost all institutions agree on the lack of available data for both types of risk (Chart 6). For transition risks, more specifically, data scarcity mainly refers to the fact that it is currently hard to quantify risks associated with investment due to the lack of a common taxonomy (e.g. to distinguish between ‘green’ and ‘brown’ assets) and the absence of common disclosure requirements for both financial and non-financial companies that would ensure the availability of comparable data. The limited availability of granular climate scenarios also hinders a proper quantification of climate-related risks, with physical risk scenarios remaining at country level and transition risk scenarios often only considering broad sectoral levels. Consequently, most financial institutions advocate for an accurate taxonomy and strengthened disclosure requirements (also see Section 3.6 on supervisory expectations).

Chart 6
Gaps and barriers identified by institutions for assessing and managing climate-related risks
(results for all companies, labels indicate the number of companies)

Source: NBB survey on climate-related risks.
3.3 Insurance risk

Floods, windstorms, hail and drought are identified as the most impactful climate events for Belgian insurers. The key transition risk factors they foresee as potentially most impactful on their underwriting markets are changes in consumers’ preferences, and reputational factors. Belgian insurers also identified changing weather patterns, temperature rise and sea level rise among the most impactful climate trends for their underwriting markets. Surveyed insurers operating outside Belgium mentioned geographical differences in the physical risk factors between the markets in which they operate. The three panels of Chart 7 provide more details on insurers’ answers on key physical and transition risk factors in their markets.

Chart 7
Main physical and transition risks factors according to Belgian insurers
(in % of total respondents)

<table>
<thead>
<tr>
<th>Key physical risk factors considered most impactful</th>
<th>Key physical risk factors considered most impactful</th>
<th>Key transition risk factors considered most impactful</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climate trends</td>
<td>Climate events</td>
<td>Changes in consumers’ preferences</td>
</tr>
<tr>
<td>Changing weather patterns</td>
<td>Flood</td>
<td>63</td>
</tr>
<tr>
<td>Temperature rise</td>
<td>Windstorms</td>
<td>63</td>
</tr>
<tr>
<td>Sea level rise</td>
<td>Hail</td>
<td>63</td>
</tr>
<tr>
<td>Higher CO₂ concentrations</td>
<td>Drought</td>
<td>63</td>
</tr>
<tr>
<td>Higher global emissions (other than CO₂)</td>
<td>Freeze, snowfalls, avalanches</td>
<td>63</td>
</tr>
<tr>
<td>Displacement – Climate immigration</td>
<td>Heat waves</td>
<td>63</td>
</tr>
<tr>
<td>Trends on biodiversity</td>
<td>Earthquakes</td>
<td>63</td>
</tr>
<tr>
<td></td>
<td>Wildfire</td>
<td>63</td>
</tr>
<tr>
<td></td>
<td>Subsidence, landslides</td>
<td>63</td>
</tr>
</tbody>
</table>

Source: NBB survey on climate-related risks.

Insurers use catastrophe models to assess the likelihood and potential impact of physical and transition risks on their underwriting liabilities. Six out of the eight surveyed insurers mentioned that they use catastrophe models in their underwriting businesses. Catastrophe models are mainly from external parties. Insurers indicated that while these models cover the evolution of the frequency and severity of extreme events, climate change is not explicitly considered.

Higher insurance premiums are expected in future years due to climate change. Six of the surveyed insurers are incorporating physical or transition-related climate change risks into the pricing decisions for their insurance products. Three indicated that a significant share of their contracts will be subject to higher risk premiums in future years due to physical climate impacts; two said that further analyses were necessary. Insurers mentioned property insurance in particular as the most affected line of business. Some insurers consider that some risks may become uninsurable over the medium and long term, for example because of the rise in reinsurance premiums.

Belgian insurers are seeking to reduce, mitigate or transfer climate-related risks. A majority of them indicated that they are likely to increase risk mitigation related to climate change in the future. Reinsurance is the main way they are mitigating climate-related risks, with some insurers also mentioning that stricter underwriting policies will be used to reduce such risks.
Claims related to extreme weather events in Belgium have been very volatile in the last 18 years. Belgian insurers are collecting data on claims related to natural catastrophes, including major weather-related events. The data they provided point to higher numbers of claims related to such events, as shown in Chart 8. It must however be mentioned that the increase since the years preceding 2007 is mainly attributable to a change in Belgian law in 2007, which means that fire and property insurance in Belgium has since then had to cover damages due to flooding, storms, earthquakes, sewer overflows or landslides. Despite this, the data highlight the significant impact that extreme weather events can have on insurers’ profitability.

Chart 8
Reported claim amounts related to extreme weather events in Belgium (figures in euro million)

Source: NBB survey on climate-related risks.
1 Given the restricted sample size up to 2007, totals have been extrapolated in order to make them comparable with the right-hand part of the chart.

3.4 Reputational risk

Belgian financial institutions differ in their take on potential reputational risks – related, for instance, to greenwashing or the financing of polluting activities or sectors. Half of surveyed banks consider reputational risk as a major risk while the majority of surveyed insurance companies see it as minor. As well as the investment/asset management channel, banks also finance the real economy directly (mostly through credit) to a larger extent than do insurance companies. As a consequence, banks appear to be more vulnerable to reputational risk. Steps taken to set ex-ante limits on reputational risks are diverse in nature and include the use of ESG ratings and sectoral policies, as well as transparency in communications.
3.5 Green finance

All financial institutions indicate that they are clearly orienting themselves towards green assets or are planning to do so. Those assets are indeed mainly seen as offering opportunities that outweigh risks, even if some institutions indicate that opportunities and risks are balanced. On the opportunities side, the potential profits associated with green assets are often mentioned. On the risks side, some institutions state that green assets could offer a less interesting risk/return profile than other assets or are often less liquid. The lack of track record for such assets can also come into play when assessing risks.

Yet in practice, green assets still represent a very low share of banks’ and insurance companies’ total assets. Where data were available, this proportion was often lower than 1% of total assets. This can nevertheless partly be explained by the fact that no overall and coherent definition of green assets currently exists. Institutions hence need to rely on external green labels that are not homogeneous, develop their own internal definition or work with no definition at all while waiting for a common taxonomy at the international level.

3.6 Expectations on supervisory actions

Surveyed institutions indicated that quality and availability of information about sustainable finance and climate-related risks should be key priorities for supervisors and regulators and that adjusted capital requirements should receive lower priority. Surveyed institutions were asked what they consider the main regulatory and supervisory priorities in the light of the various initiatives undertaken, both to promote green and sustainable finance and to ensure financial stability during the transition period. A majority of both banks and insurance companies underlined the importance of solid information. This requires, amongst other things, developing taxonomies for both sustainable finance and climate-related risks, developing international standards and labels for green products, and strengthening disclosure for both financial and non-financial sectors.
The availability of good and granular data appears to be a necessary first step before considering data-demanding initiatives such as potential downward adjustments to capital requirements for green exposures or upward requirements for brown exposures (so-called ‘green supporting’ and ‘brown penalising’ factors).

Chart 10
**Institutions’ priorities on regulatory and supervisory actions**

<table>
<thead>
<tr>
<th>Priority Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lowest priority</td>
<td>Incorporating sustainable finance in Pillar 1 prudential requirements by establishing a “green supporting factor”</td>
</tr>
<tr>
<td>Low priority</td>
<td>Incorporating sustainable finance and climate-related risks in Pillar 1 prudential requirements by establishing a “brown penalising factor”</td>
</tr>
<tr>
<td>Intermediate priority</td>
<td>Incorporating climate-related risks in Pillar 2 capital requirements</td>
</tr>
<tr>
<td>High priority</td>
<td>Clarifying institutional investors’ and asset managers’ responsibilities (transparency on climate-related exposures)</td>
</tr>
<tr>
<td>Highest priority</td>
<td>Strengthening disclosure of ecological footprint and sustainability for both financial and non-financial corporations</td>
</tr>
<tr>
<td>Highest priority</td>
<td>Developing international standards and labels for green financial products</td>
</tr>
<tr>
<td>Highest priority</td>
<td>Developing a taxonomy regarding sustainable finance and climate-related risks</td>
</tr>
</tbody>
</table>

Source: NBB survey on climate-related risks.
Note: The Chart only depicts a selection of cited priorities.

Besides, most financial institutions see merits in clarifying institutional investors’ and asset managers’ responsibilities, including transparency vis-à-vis end investors regarding climate-related aspects of exposures of proposed investments. In this sense, it is evident that even though not all financial institutions assess reputational risk as being major (see above), they support the development of a clear framework related to their responsibilities. In this connection, the initiatives taken at the level of the European Commission seem to be moving in the right direction. ESAs have also a role to play in this regard.

4. **Recommendations for financial institutions**

The survey demonstrated that financial institutions’ awareness of climate-related risks is still at the early stage and that there is a lack of available data to adequately assess the exposure of Belgian institutions to climate-related risks. The absence of a common taxonomy and disclosure framework obviously hampers the identification of climate-related risks and of truly sustainable investments. But even in the absence of such a taxonomy and disclosure framework, financial institutions can increase their efforts to capture their exposures to climate-related risks and contribute to mitigating these risks in a number of ways.
- **Broaden the horizon and include more long-term thinking in strategies.** Although the impacts of climate change are already felt today, climate models usually project major impacts to periods such as 2070-2100, which is of course way beyond the current planning horizons of financial institutions, especially banks and institutional investors. Financial institutions are therefore encouraged to take a strategic approach to managing the financial risks from climate change, taking into account both current risks and those that can plausibly arise in the future, and identifying the actions required today to mitigate current and future financial risks (Bank of England, 2019).

- **Better capture the carbon- or GHG-intensity of their exposures.** As policy measures are most likely to be targeted towards carbon-intensive sectors, it is of utmost importance that institutions have a view not only of their own carbon intensity, but also the carbon intensity of their exposures. This calls for increased granularity of the data, as emissions can vary widely within a sector. In the absence of a disclosure requirement for their clients, financial institutions can stimulate clients – especially corporate clients – to provide information regarding their carbon intensity.

- **Collect information on the energy-intensity of buildings used as collateral for loans.** As described above, buildings are a main contributor to GHG emissions and a large proportion of Belgian buildings are old, and thus likely to be very energy-intensive. It is also likely that policy measures will be directed towards improving the energy intensity of buildings. This could provide major opportunities for banks, as loans can be offered to improve the energy performance of these buildings. On the other hand, if buildings have to meet minimum energy performance standards in the future, this could severely impact the valuation of buildings not meeting these standards, and hence the collateral value for financial institutions, with potentially significant impacts on real estate markets.

- **Collect information on their exposures’ vulnerability to physical risk.** As well as data regarding the energy-intensity of buildings, location data and the probability of (for instance) flooding is also important information. Even though certain countries, including Belgium, do not appear to be very strongly impacted by physical risk in the short term, changes in weather patterns such as more extreme periods of rainfall may already cause losses in the short to medium term in specific areas prone to flooding, which vary within countries, regions and even cities or villages.

- **Include climate-related risks in risk assessment.** Financial institutions are encouraged to identify, measure, monitor, manage, and report on their exposure to climate-related risks. While these risks can be managed through their existing risk management framework, it should be recognised that the nature of financial risks from climate change requires a dedicated strategic approach. Scenario analysis and stress tests are considered to be the best ways to identify and measure climate-related risks and to assess the impact of these risks on current business strategy.

- **Disclose information on climate-related risks, in line with TCFD recommendations (TCFD, 2017), and, going forward, the upcoming guidelines on climate-related non-financial reporting.** Although there is already wide support for TCFD recommendations on climate-related financial disclosures, the TCFD status report published in September 2018 revealed that the quality of such reporting can still be improved, especially in terms of quantitative, financial implications (TCFD, 2018). The European Commission’s ongoing update of the non-binding guidelines on non-financial reporting, for which a consultation document was published in February 2019 (European Commission, 2019b), is largely based on the TCFD recommendations, as suggested by the Technical Expert Group on Sustainable Finance (TEG, 2019).

- **Take part in discussions with regulators and supervisors to jointly improve the data and methods to best capture and mitigate climate-related risks.** Assessing climate-related risks is not straightforward because of major uncertainty about the materialisation of climate change as well as policy measures, technological evolutions and evolutions in market sentiment, combined with potentially major economy-wide impacts and waterfall effects. Collaboration between financial institutions, supervisors, regulatory authorities and other stakeholders is key to improving the quality of climate-related financial information.
authorities and climate experts is therefore needed. At EU level, the Commission has set up a technical expert group, consisting of members from civil society, academia, business, the finance sector, and several EU and international public bodies, in order to help them implement the EU action plan on sustainable finance. At the Belgian level, the Belgian Taskforce on Sustainable Finance is a consultation between different Belgian authorities, with the aim to exchange information and views and determine common stances with regard to the EU’s activities on sustainable finance. In addition, the Bank will start discussions with the Belgian financial sector in order to jointly improve the data and methods to best capture and mitigate climate related risks for the Belgian financial sector in the relatively short term.

- **Support the transition by greening the financial system.** As financial stability risks are mitigated by encouraging a timely and steady transition, the financing of more sustainable investments should be supported, as this is in the best interest of financial institutions and financial stability. In addition, green finance holds out huge opportunities for financial institutions. Laging behind may thus impact profitability. However, it is important to bear in mind the potential risks that may arise if certain investment projects regarded as green turn out to be less green than initially expected (greenwashing), if certain technologies prove less promising than predicted, or if market sentiment suddenly changes.

**Conclusion**

Central banks and supervisors across the world acknowledge that climate-related risks are financial risks, which have to be measured and managed accordingly. More and more financial institutions are considering climate-related risks in this way, rather than as merely a corporate responsibility concern. While Belgian financial institutions are generally aware of the existing climate-related risks, they are currently not very advanced when it comes to the quantification and integration of such risks in their risk management. In addition, the share of green assets in their portfolios remains negligible. Nevertheless, institutions seem keen to contribute to a transition towards a more sustainable economy. Developing a common taxonomy, a disclosure framework and international standards and labels for green financial products are viewed by financial institutions as the main priorities for supervisors and regulators going forward.

Because of the current lack of availability of data and the difficulty of assessing climate-related risks, collaboration is needed between financial institutions, supervisors, regulatory authorities and climate experts to jointly improve the data and methods to best capture and mitigate climate-related risks and support the financing of more sustainable investments.

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1 Government services and agencies responsible for environment, climate, circular economy, finance, investment in developing countries etc., at federal, community and regional level, as well as representatives of the Bank and the Financial Services and Markets Authority (FSMA).
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A risk dashboard for detecting and monitoring systemic risk in Belgium

Louise Dumont
Stijn Ferrari

Introduction

Past crisis experience has shown that financial stability\(^1\) is a prerequisite to economic growth and that financial supervisors should complement the monitoring of individual institutions' financial soundness with a system-wide, macroprudential view. A decade after the outbreak of the global financial crisis, macroprudential frameworks and policies for the banking sector are in place across the globe and efforts to extend macroprudential policy to the non-bank sphere are underway.

In fulfilling their mandate of preserving financial stability, macroprudential policymakers are required to identify, monitor and mitigate systemic risks that form a threat to the stability of the financial system. This involves anticipating potential shocks to the financial sector and estimating the likelihood that they may occur, plus also identifying channels (i.e. vulnerabilities) through which these shocks may amplify and propagate through the financial system, resulting in systemic risk.

As systemic risk may stem from different parts of the financial system and risk sources and channels may evolve over time, macroprudential policymakers have to rely on a broad range of information as inputs into their assessment. At the same time, they need to develop the necessary indicators and tools with which to extract from this vast amount of data the key vulnerabilities that require further investigation and potential policy action. To this end, relevant information should be presented in a concise manner, so as to facilitate risk discussions and policy decisions, plus also internal and external communication on these risks and policy decisions.

As the macroprudential authority in Belgium, the Bank plays a key role in preserving financial stability. In particular, its mandate includes the detection, monitoring and follow-up of the emergence and build-up of systemic risks, including taking appropriate policy action when deemed necessary. In dealing with the aforementioned challenges, the Bank continues to develop its analytical frameworks and toolkit, not least in anticipation of the possible extension of macroprudential policy to the non-bank sphere.

This article describes the Bank’s new risk dashboard for detecting and monitoring cyclical and structural vulnerabilities in the Belgian financial system. The risk dashboard is a key tool for keeping track of the level and evolution of risks as signalled by a wide range of indicators. The risk signals emanating from the risk dashboard serve as "question-generators", providing a basis for a more in-depth risk assessment in the highlighted areas and for outlining appropriate possible policy responses.

\(^1\) Financial stability is a situation where the probability of discontinuity or disruption in the financial system is low or, if such disruptions should occur, where the consequences for the economy would be limited.
Section 1 provides a high-level overview of the NBB’s macroprudential risk assessment framework. In Section 2 we examine the role of indicators for monitoring systemic risk and informing policy and discuss how the wide range of available information to macroprudential policymakers can be structured and assessed through the use of heatmaps. Section 3 illustrates the working of the heatmaps that have been drawn up.

1. The Bank’s macroprudential risk assessment framework

The Bank’s macroprudential risk assessment, which is performed twice a year, combines information obtained under three pillars, comprising a top-down approach, a bottom-up approach, and an indicator- and model-based approach. This macroprudential risk assessment forms a basis for identifying areas of potential risk that require more in-depth analysis, and for deciding whether and when to activate the available macroprudential instruments. The expected or actual effects of such measures that have been taken previously are incorporated into subsequent risk analyses.

The top-down approach determines the potential risks, stemming from both national and international factors, for the sustainability and viability of Belgian banks, insurance companies and financial markets infrastructure, and the associated consequences for financial stability. It includes an assessment of the impact of general economic and financial developments on financial institutions’ profit and loss accounts, balance sheets and solvency and liquidity profile. The analyses of general economic and financial developments rely on a broad range of economic parameters such as economic growth, macroeconomic imbalances, interest rate levels, credit growth, the financial position of households and businesses, rises in house prices, etc.

The bottom-up approach is intended to highlight the main points of attention in the ongoing risk analyses performed by the various departments of the Bank that are involved in the microprudential supervision of Belgian banks, insurance companies and financial markets infrastructure. Such points of attention result from the analysis of commonalities in the developments of (sub-sets of) individual institutions or of sector-specific challenges, and may or may not be connected with changes in the macrofinancial risk parameters. Relevant information resulting from market intelligence is also part of the bottom-up approach.

The indicator- and model-based approach, which draws on a sub-set of the information used under the other pillars of the risk assessment, provides an initial identification of potential threats to the stability of the Belgian financial sector, presented in a concise manner. The basis of this approach is a new risk dashboard comprising

Chart 1

Analysis of macroprudential risks at the Bank

<table>
<thead>
<tr>
<th>Macroeconomic and financial environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantitative indicators</td>
</tr>
<tr>
<td>Microprudential supervision</td>
</tr>
<tr>
<td>Top-down approach</td>
</tr>
<tr>
<td>Indicator- and model-based approach</td>
</tr>
<tr>
<td>Bottom-up approach</td>
</tr>
<tr>
<td>Overall risk assessment</td>
</tr>
<tr>
<td>Activation of macroprudential instruments</td>
</tr>
<tr>
<td>Other forms of economic and financial policies</td>
</tr>
</tbody>
</table>

Source: NBB.
a wide range of indicators for detecting and monitoring risks to financial stability. A sub-set of the indicators in the risk dashboard is aggregated in ‘model-based’ composite indicators that reflect the Belgian financial cycle. The levels of the individual indicators of the risk dashboard and composite indicators in the model-based approach are compared to threshold levels in order to determine whether the indicators signal heightened risk. The risk signals obtained from the indicator- and model-based approach serve as “question-generators”, which highlight areas in which more in-depth analysis is needed.

2. A risk dashboard for detecting and monitoring threats to financial stability

Since the end of 2018, a risk dashboard and associated heatmaps have become part of the Bank’s semi-annual risk assessment. Together with the model-based risk assessment, they form part of the Bank’s operationalisation of the ESRB (European Systemic Risk Board) Recommendation on intermediate objectives and instruments of macroprudential policy.¹ This Recommendation refers to the need a) to identify intermediate policy objectives in order to make macroprudential policy more operational, transparent and accountable; and b) to establish a sound framework for the application of macroprudential instruments, including appropriate indicators for monitoring the emergence of systemic risks and guiding policy decisions.

2.1 The role of indicators in monitoring systemic risk and setting policy

The pursuit of financial stability requires the development of a framework able to map identified systemic risks into appropriate policy responses. The operationalisation of such a framework relies on quantifications of both systemic risk and policy objectives. Macroprudential policymakers need a set of indicators and models that allows them to detect systemic risks in a timely manner so as to be able to formulate mitigating policy responses. The principle of guided discretion advocated by, for instance, the Basel Committee and the ESRB implies that policymakers will rely on quantitative tools as a starting point for their risk evaluation and complement these with additional information and expert judgement in order to arrive at a final risk assessment. In similar vein, macroprudential policy actions need to be calibrated and evaluated against quantifiable policy targets. ESRB Recommendations have been particularly helpful in establishing macroprudential frameworks in Europe.²

Although it is still being continually improved, the (further) development of the analytical toolkit for detecting and monitoring systemic risk and for calibrating macroprudential policies has taken centre stage over the last decade. In this context, risk dashboards are one of the most widely used tools in macroprudential policymakers’ risk assessment frameworks. Risk dashboards bring together quantitative indicators of systemic risk with the aim of providing an at-a-glance overview of the main vulnerabilities in the financial system. The information contained in the indicators can be presented in a variety of ways, including charts and indicator tables, which may either contain a snapshot of risks at a given point in time or present the historical evolution in time series.

Heatmaps constitute one method for summarising and visualising the information in a wide array of indicators so as to highlight financial stability risks. Heatmaps are visual tools that use specific colour coding to assign a risk level to each indicator, with the aim of highlighting areas of elevated or increasing risk and enabling a comparison of risk levels to be made across time periods. A number of institutions responsible for maintaining

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¹ Recommendation ESRB / 2013 / 1 of 4 April 2013 on intermediate objectives and instruments of macro-prudential policy.
² See for instance aforementioned Recommendation on intermediate objectives and instruments of macroprudential policy and Recommendation ESRB / 2014 / 1 of 18 June 2014 on guidance for setting countercyclical buffer rates.
financial stability have published information on the development and/or use of heatmaps. These include, inter alia, Banco de España\(^1\), Banca d’Italia\(^2\), Norges Bank\(^3\) and the Central Bank of Ireland\(^4\) in Europe, and the Office of Financial Research\(^5\) in the United States.\(^6\)

As no single data series is appropriate for gauging the build-up of risks in a complex and evolving financial system, these heatmaps generally cover a large number (ranging from about 40 to over 100) of indicators, with broadly similar coverage. Indicator categories that are common to all or most of the heatmaps include credit developments and leverage in the non-financial private sector; lending standards; real estate markets (both residential and commercial); banking sector leverage, funding and liquidity; banking sector exposures and sectoral exposure concentration; interconnectedness; and financial markets (equities and bonds) and market liquidity. As regards coverage of the financial sector, most heatmaps focus predominately on the banking sector, but coverage of the non-bank financial sector (insurance, investment and/or pension funds) differs across institutions. Other areas in which coverage tends to differ include the macroeconomic environment and the size, concentration and importance of the financial (sub-)sectors.

There are also differences in the groupings of indicators according to which the heatmaps are structured. Banca d’Italia’s heatmap groups indicators into seven risk categories: interlinkages; credit risk; macroeconomic risk; funding risk; market risk; solvency and profitability risk in the banking sector; and solvency and profitability risk in the insurance sector. Broadly similar categories are to be found in the heatmap produced by the Office of Financial Research, organised according to six risk categories (macroeconomic; market; credit; solvency and leverage; funding and liquidity; and contagion), which serves as a starting point for monitoring financial stability in the United States. Norges Bank’s heatmap consists of three broad indicator categories: risk appetite and asset valuations; non-financial sector imbalances; and financial sector vulnerabilities.

Banco de España and the Central Bank of Ireland have set up their heatmaps starting out from the ESRB’s first four intermediate macroprudential policy objectives: mitigate and prevent excessive credit growth and leverage; mitigate and prevent excessive maturity mismatch and market illiquidity; limit direct and indirect exposure concentrations; and limit the systemic impact of misaligned incentives with a view to reducing moral hazard. In the Central Bank of Ireland’s heatmap, the fourth of these intermediate objectives relates to the risk of destabilising strategies pursued by systemically important banks, whereas Banco de España has linked this objective to volatility and risks in financial markets. Banco de España supplements these categories based on intermediate objectives with two additional categories: macroeconomic imbalances and current economic and financial situation.

Various approaches have been taken regarding the method for setting the risk thresholds that determine the colour code in the heatmap. In particular, thresholds are mainly set on the basis of historical distributions (national or cross-country) of the indicators, although thresholds set by legislation or guidelines (e.g. the 2 % activation threshold for the credit/GDP gap in the context of the countercyclical capital buffer) and/or other institutions (e.g. the European Commission’s Macroeconomic Imbalances Procedure), econometric/early-warning methods and expert judgement are also used. Regarding the colour codes, levels of subdued risk are generally indicated by a range of greens, whereas different shades of yellow/orange and red signal states of heightened risk.\(^7\)

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1 See Mencía and Saurina (2016) and Banco de España’s Financial Stability Report.
6 Risk dashboards (each with their specific focus) are also used by international organisations such as the International Monetary Fund, the European Central Bank, the ESRB, the European Banking Authority and the European Securities and Markets Authority. For instance, the ESRB publishes a quarterly risk dashboard in the form of a chartpack that is structured along eight indicator sub-categories (interlinkages and composite measures of systemic risk, macro risk, credit risk, funding and liquidity, market risk, profitability and solvency, structural risk, and risk related to central counterparties).
7 For indicators for which both low and high levels may entail risk, Banco de España and Banca d’Italia use “two-tailed” thresholds and colour coding.
Aggregate risk signals are constructed at the level of the various indicator categories. This is often done in a linear way, by taking the weighted or unweighted mean of the standardised (e.g., normalised or expressed in terms of order statistics) indicators in the same category. Factors considered in determining an indicator’s weight in aggregation include, for instance, its capacity to anticipate future crises and its correlation with other indicators: the better an indicator’s predictive power and the lower its correlation with other indicators, the higher the weight that is assigned to it. Aggregate risk signals then derive from thresholds imposed on the mean indicator. While such aggregate risk signals provide a summary of the overall information in the different indicator categories, they should be interpreted with caution, as the underlying indicators may reflect risks of different type and nature, and opposite signals given by individual indicators may find themselves averaged out. For example, averaging a low risk indicator and a high risk indicator would result in a medium risk aggregate indicator.¹

Lastly, the risk dashboards and the associated heatmaps serve as a starting point for macroprudential analysis and as a means of focusing policymakers’ discussions. None of the institutions cited above tie the indicators mechanically to policy decisions. In general, risk dashboards only provide indications of potential risks and do not involve an in-depth risk assessment (e.g. analysis of the potential impact of risk materialisation). In addition, expert judgement is needed when interpreting different risk signals and interactions among risk categories. Furthermore, separate analyses and expert judgement are required in selecting and calibrating policies in response to the risks identified. Risk dashboards and heatmaps should therefore not be seen as policy-setting tools per se.

2.2 Structure and content of the Bank’s risk dashboard

The Bank’s risk dashboard contains around 150 risk indicators covering the build-up of risk in financial institutions (banking sector, insurance sector, non-bank non-insurance financial entities), the non-financial private sector (households and non-financial corporations), financial markets and the real estate market. The “build-up indicators” signal the risk areas that warrant further assessment and guide discussions on whether to activate macroprudential instruments. Such instruments are mainly intended to increase the resilience of lenders and borrowers, for instance by requiring banks to hold additional capital or liquidity buffers against systemic risk or imposing limits so as to ensure sound lending standards.

The risk dashboard also contains indicators capturing the materialisation of risks, including credit losses, liquidity and interest rate risk, and financial market indicators. The indicators typically signal two types of risk materialisation: (i) the occurrence of stress in financial markets; and (ii) the materialisation of credit and/or liquidity risks in the financial sector. These “release indicators” may trigger discussions on the need for loosening the calibration of macroprudential instruments. A release of, for instance, macroprudential capital or liquidity buffers may help banks to cover credit losses or funding outflows arising from systemic events, thereby reducing the risk of a potential breach of the (minimum) requirements and the associated corrective actions (e.g. deleveraging or a fire-sale of assets) by the banks in order to avoid such a breach.

Given the large variety of data sources used for constructing the dashboard, the time-spans covered by the different indicators vary substantially. While some indicators have a data history going back to the 1980s, others are only available for more recent periods. Breaks in the data can also appear, for instance due to changes in definitions or reporting methods. Nevertheless, continuous data series are available for the vast majority of indicators since 2008, so that all risk categories in the risk dashboard rely on at least a decade of data.

The indicators are grouped according to the ESRB’s first four intermediate objectives. The complete list of indicators for each intermediate objective can be found in the Annex to this article. The advantage of organising the risk dashboard according to intermediate objectives is that it strengthens the link between risk assessment and potential

¹ A more detailed discussion of aggregation methods and related issues may be found in, for instance, McLaughlin et al. (2018) and Venditti et al. (2018).
policy responses, as the Bank’s macroprudential policy strategy links intermediate objectives to macroprudential instruments.\textsuperscript{1} Within each intermediate objective, indicators are further categorised according to different risk dimensions, including release indicators, which provide additional structure to the risk narrative (Table 1).

Risk narratives are indeed key to the selection and organisation of variables. Firstly, they ensure that an accurate interpretation can be retrieved from signals displayed by indicators. Secondly, they enable an appropriate grouping of indicators into risk sub-categories within each intermediate objective, and ultimately a possible aggregation of risk signals at the sub-category level. Consequently, a narrative is associated with each selected indicator and can be found in the document known as the “log-book”, which lists all indicators, together with their corresponding thresholds (see Section 2.3 and Chart 2).

\textit{Mitigate and prevent excessive credit growth and leverage}

Excessive credit growth has been identified as a key driver of financial crises. Risk illusion and endogenous risk-taking in buoyant times lead to excessive credit provision, deteriorating credit standards, potential bubbles in asset markets and the build-up of leverage both within the financial system and between financial institutions and real-economy borrowers. Such developments render the financial system more vulnerable to shocks, with the unravelling of imbalances entailing credit crunch externalities.

\textsuperscript{1} See “The Belgian macroprudential policy framework in the banking sector” (www.nbb.be).

\textbf{Table 1}

\textbf{Structure of the Bank’s risk dashboard}

<table>
<thead>
<tr>
<th>Intermediate objectives (IOs)</th>
<th>IO1: Mitigate and prevent excessive credit growth and leverage</th>
<th>IO2: Mitigate and prevent excessive maturity mismatch and market liquidity</th>
<th>IO3: Limit direct and indirect exposure concentration</th>
<th>IO4: Limit the systemic impact of misaligned incentives with a view to reducing moral hazard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Categories of indicators</td>
<td>Credit cycle</td>
<td>Funding stability</td>
<td>Asset concentration</td>
<td>Importance of financial sub-sectors to the real economy</td>
</tr>
<tr>
<td></td>
<td>Leverage in the non-financial private sector</td>
<td>Asset liquidity</td>
<td>Income concentration</td>
<td>Importance of financial sub-sectors to the rest of the financial system</td>
</tr>
<tr>
<td></td>
<td>Leverage in the financial sector</td>
<td>Risk bearing capacity</td>
<td>Funding concentration</td>
<td>Search for yield</td>
</tr>
<tr>
<td></td>
<td>Financial and assets markets</td>
<td>Maturity transformation</td>
<td>Asset commonality</td>
<td></td>
</tr>
<tr>
<td></td>
<td>External imbalances</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Release</td>
<td>Release</td>
<td>Release</td>
<td>Release</td>
</tr>
<tr>
<td>Number of indicators</td>
<td>53</td>
<td>39</td>
<td>39</td>
<td>31</td>
</tr>
</tbody>
</table>

Source: NBB.
Notes: The complete list of indicators for each intermediate objective can be found in the Annex to this article.
The indicators under this first intermediate objective are intended to capture various dimensions of these risks: the credit cycle, the leverage position of the non-financial private sector; leverage in the financial sector; financial and asset (including real estate) market imbalances; and external imbalances.

**Mitigate and prevent excessive maturity mismatch and market illiquidity**

Experience shows that credit cycles coincide with increased reliance on short-term funding. Excessive liquidity transformation poses risks to financial stability through illiquidity spirals characterised by fire-sale externalities and contagion due to the dry-up of liquidity. Maturity transformation is an important determinant of liquidity transformation and, in addition, may increase sensitivity to interest rate risk.

The focus of the indicators operationalising this intermediate objective is therefore on asset liquidity, funding stability and maturity transformation in the financial sector.

**Limit direct and indirect exposure concentration**

Direct concentration risk arises from large exposures to the non-financial sector (e.g. the housing market and sovereigns), and also between financial sectors and/or financial entities. Such concentration, both on the asset and liability side, renders the financial system more sensitive to common shocks. In addition, indirect exposures arise within the system, due to the interconnectedness of financial institutions and the contagious consequences of common exposures through asset fire sales.

The indicators under the third intermediate objective comprise indicators measuring financial institutions' asset concentration, income concentration and funding concentration. In addition, the degree of commonality across financial institutions along these dimensions is also assessed. Lastly, indicators capturing the degree of intra-financial system interconnectedness are also included.

Whereas the indicators used in the risk dashboard are relatively high-level and capture the broad characteristics of the Belgian financial system, the importance of transaction-level data sets for more in-depth assessments and monitoring of structural systemic risk are discussed in the article entitled “Transaction-level data sets and monitoring of systemic risk: an illustration with Securities Holding Statistics” in this Financial Stability Report.

**Limit the systemic impact of misaligned incentives with a view to reducing moral hazard**

There are several factors that may affect financial institutions’ incentives to take excessive risk. Systemically important financial institutions may be regarded as “too big to fail” because of their importance to the real economy and/or the rest of the financial system. The presence of (perceived) ultimate public safety nets may create problems of moral hazard, leading to excessive risk-taking. In addition, financial institutions’ remuneration policies, coupled with shareholder and market pressures, may affect managers’ incentives and give rise to excessive search-for-yield behaviour.

While moral hazard/ “too big to fail” issues mainly relate to individual institutions\(^1\), it is crucial that macroprudential policymakers have a view of the extent of risk-seeking behaviour in the financial system as a whole. The risk dashboard therefore contains measures of financial sub-sectors’ importance to the real economy and to the rest of the financial system, as well as search-for-yield indicators that relate to credit standards, financial institutions’ profitability and the riskiness of their asset holdings.

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\(^1\) For the Bank’s framework on domestic systemically important banks (“other systemically important institutions” or O-SIIs), see the Annual disclosure regarding the designation of and capital surcharges on Belgian O-SIIs (www.nbb.be).
2.3 Extracting risk signals from the dashboard

As explained in Section 1, the risk dashboard is part of the Bank’s risk assessment framework, facilitating the detection and monitoring of the potential build-up of systemic risks. This means that the Bank must be able to extract risk signals from the indicators and visualise them in a way that allows the key messages to be easily communicated. Risk signals emanating from the dashboard then need to be further assessed in line with the other pillars of the risk assessment framework.

**Threshold-setting and colour coding**

In order to retrieve potential risk build-up signals from the evolution of selected indicators, two thresholds are associated with each indicator. A breach of the first threshold indicates a medium risk signal, while an indicator level exceeding the second threshold signals heightened risk. The threshold-setting process relies on various sources. Where possible, thresholds have been set on the basis of statistical early warning methodologies using pre-crisis data, bearing in mind that these methods are generally more suited to cyclical variables than for indicators monitoring structural vulnerabilities. In other cases, thresholds used at international level or specified in legislation or guidelines were preferably chosen when available (e.g. thresholds set by the European Central Bank, the ESRB and the European Commission). Lastly, when the above-mentioned sources could not be used, thresholds were set on the basis of cross-country/historical distribution of variables, or expert judgment. To keep track of this threshold-setting process,

1 While the setting of thresholds in increasing order is appropriate for indicators for which the risk level increases with the value of the indicator (e.g. loan-to-deposit ratio), this is not the case for indicators that point to risks when they approach low levels (e.g. equity to total assets). In that case, thresholds are set in decreasing order.

**Chart 2**

**Building blocks of the heatmaps**

<table>
<thead>
<tr>
<th>Credit to GDP gap – Bank, total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data source: NBB (quarterly financial accounts) and NAI (quarterly non-financial accounts)</td>
</tr>
</tbody>
</table>

**Thresholds**

**Colour code for signalling risk intensity**

1 T1 and T2 correspond respectively to the first and second threshold set for each indicator.

Source: NBB.
all indicators, together with charts detailing their historical evolution and data distribution and the justification for the chosen thresholds, are stored in a document known as a “log-book”, as shown in the left-hand panel of Chart 2.

The translation of risk build-ups into heatmaps is achieved with the help of a simple colour coding approach, ranging from dark green to red, as shown in the right-hand panel of Chart 2. As a first step, three colours were set to display the position of each indicator compared to the two associated thresholds: green indicates a value below the first threshold, orange a value between the two thresholds, and red a breach of the second threshold. In addition, in order to obtain a more dynamic view of the evolution of variables compared to thresholds, two intermediate colours were introduced: light green is used for values ranging from 90% up to 100% of the first threshold, while dark orange indicates a value between 90% and 100% of the second threshold. In this way, the colour code allows us to determine whether indicator values are close to the upper end of a risk level and thus enables a potential early detection of risks.

**Aggregation of signals**

While heatmaps offer an at-a-glance view of the overall risk levels suggested by the indicators, one of the challenges in interpreting the output is the aggregation of this information into an overall risk narrative based on the vast amount of data included in the dashboard. To facilitate this aggregation, we group the indicators within each intermediate objective into sub-categories based on their risk narrative, as shown above in Table 1.

The first step in the aggregation therefore takes place at the level of the sub-categories of indicators within the intermediate objectives. There are several possible approaches for aggregating and visualising risk signals from the individual indicators. The approach taken consists of an aggregate colour based on the simple average of colours associated with all indicators in the sub-category (each colour being translated into a numerical value ranging from 1 to 5). This allows us to make an easy interpretation of the aggregate signal, avoids introducing discretion into the aggregation process, and enables flexible threshold-setting at the level of individual indicators.

More specifically, in contrast to an approach that involves first computing a weighted or unweighted average of the indicators in each sub-category and then setting thresholds on the resulting composite indicator (as discussed in Section 2.1), linear aggregation of the indicators’ colours in a given sub-category does not require that indicators be standardised (e.g. normalised or expressed in terms of order statistics) or that individual indicators’ thresholds be set in the same way (e.g. by taking the same percentiles of the historical distribution for each indicator) in order to arrive at a consistent risk signal at the aggregate level. Moreover, while the alternative of determining an aggregate colour code that would indicate medium or strong aggregate signals for a sub-category of indicators when a number of individual indicators in the sub-category are pointing to medium and/or strong risk build-ups would solve the issue of the potential averaging-out of opposite risk signals, it would involve a high degree of discretion in determining the required number of indicators that need to signal increased risk before the aggregate indicator will emit a risk signal.

While aggregation at the level of sub-categories of indicators within an intermediate objective makes it easier to construct an overall risk narrative, further aggregation of indicators up to the level of the intermediate objectives or even across intermediate objectives may be considered. The degree to which aggregation is feasible and desirable depends on the “compatibility” of the different risk narratives: if risk sources are completely different, the value-added of aggregating them may be limited both from a risk and policy perspective. For those risk categories that can be further aggregated, several approaches may be considered, including model-based methods in the spirit of the example discussed in the Box.

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1 It should be noted that the approach of weighting indicators based on their predictive performance and/or correlation with other indicators is more suited for aggregating cyclical variables than for structural variables, which often do not display good crisis-prediction performance. Furthermore, correlations may be accounted for in two opposite directions: a lower weight may be assigned to indicators that display a higher correlation with other indicators because their information value is lower, or, on the other hand, correlated signals may be given more weight in the aggregate because risks may be endogenously reinforcing each other.
Analyses exploiting regularities before past crisis events have shown that prolonged periods of credit exuberance in combination with property price overvaluation are particularly harmful for financial stability. Research suggests that peaks in the financial cycle, which is best characterised by the co-movement of medium-term cycles in credit and property prices, are closely associated with systemic banking crises.¹

The Bank’s indicator- and model-based approach therefore contains tools in which several risk indicators are aggregated into composite indicators of the “financial cycle”. These composite indicators enable a joint assessment to be made of vulnerabilities arising from credit and property price developments and supplement the information comprised in the Bank’s risk dashboard and associated heatmaps. The model-based approach consists of two steps: (i) aggregating individual risk indicators into a composite indicator; and (ii) extracting risk signals from the composite indicator.

One approach for aggregating individual risk indicators into a composite indicator is to link them to the occurrence of past banking crisis events by means of regression analysis. Logit models are a class of non-linear models whose purpose is to distinguish pre-crisis periods from normal times (the former being indicated by ones and the latter by zeroes), based a set of relevant risk indicators. Indicators that positively affect the probability of being in a pre-crisis period receive positive weighting in the equation, whereas a negative weighting is assigned to indicators that reduce systemic risk. Due to the scarcity of past banking crises in individual countries, the methodology requires cross-country data that include a sufficient number of historical crisis events.

The Bank’s model-based approach comprises two types of composite indicators based on logit models: one set of indicators relying on purely cyclical credit and property price indicators (e.g. credit/GDP gap, credit growth, residential real estate price growth); and another set that also accounts for the longer-term dimension of credit and property price developments (e.g. credit/GDP ratio, residential real estate price-to-rent ratio or a residential real estate affordability ratio).² Whereas the former set focuses solely on short-term changes in credit and property prices, the latter reflects these changes against the background of the level of indebtedness of the non-financial private sector and measures of house price overvaluation.

When it comes to extracting risk signals from the resulting composite indicators, a statistical approach is used that compares, for a sample of 15 (European) countries³, the values of the composite indicators in historical pre-crisis periods, with the aim of obtaining a set of three thresholds that allow us to distinguish between pre-crisis and normal time periods. A composite indicator is deemed to emit a risk signal when it exceeds particular thresholds. The intensity of the risk signal depends on which threshold

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¹ See for instance Drehmann et al. (2012).
² The level of indebtedness (as captured by for instance the credit/GDP ratio) and house price overvaluation (e.g. residential real estate price-to-rent and affordability ratio) may “co-move” with the financial cycle but they tend to be slower-moving. That is to say, “cyclical” developments in these longer-term risk categories tend to exhibit longer durations than the purely cyclical variables.
³ The sample of countries used includes Austria, Belgium, Denmark, Finland, France, Germany, Greece, Luxembourg, Ireland, Italy, the Netherlands, Portugal, Spain, Sweden and the United Kingdom.
it exceeds, as indicated by a colour coding consisting of six colours ranging from green (no risk) to red (high risk). ¹

The chart below illustrates the use of the model-based approach for a single composite indicator based on a logit model that contains the difference between year-on-year growth in domestic bank lending to the non-financial private sector and year-on-year GDP growth, and the ratio of domestic bank lending to the non-financial private sector to GDP. The chart shows that risks relating to the domestic credit cycle in combination with the level of indebtedness of the non-financial private sector started building up in Belgium in the course of 2004 and continued to do so until the outbreak of the global financial crisis. In the aftermath of the crisis, credit growth dropped to more subdued levels but since 2014 the model-based indicator again indicates a gradual build-up of the credit cycle, against the background of a level of indebtedness that is higher than before the crisis.

In order to obtain robust signals from the model-based composite indicators, we do not rely on a single combination of risk indicators such as the one illustrated in the chart but estimate the models for many

¹ For more details on the signal extraction method we refer the reader to Ferrari and Pirovano (2016). The method results in three thresholds for a particular indicator, marking four different risk zones (no risk, low risk, medium risk, high risk) that can be numbered from 0 to 3. The colour coding in the Bank’s model-based approach is based on two sets of three thresholds; one set of three thresholds common to all European countries in the sample and one set of three thresholds that are specific to each country in the sample. Adding the numerical values (from 0 to 3) related to the two sets of thresholds results in six different risk zones (with numerical values from 0 to 6) linked to six colours.

Illustration of the Bank’s model-based approach

High risk

Low risk

Source: NBB.

Notes: The chart shows one out of many possible model-based credit and real estate indicator combinations. This chart is intended to serve as an illustration of the model-based approach and should not be interpreted as the Banks’ ultimate risk assessment regarding the credit cycle and the indebtedness of the non-financial private sector.
possible combinations of the credit and property price indicators, including indicators that capture lending to sub-sectors (households and non-financial corporations) of the non-financial private sector. This means that the model-based approach results in a range of composite indicators reflecting the “financial cycle” from which risk signals are obtained.

3. Heatmaps at work: an illustration based on two case studies

As described earlier in this article, heatmaps derived from the risk dashboard were developed in order to easily detect and monitor, through a system of colour coding, the build-up (or materialisation) of risks to the Belgian financial system, as part of the Bank’s six-monthly risk assessment. We illustrate their use by looking at the signals displayed in two different case studies: (i) vulnerabilities before the 2008 crisis; and (ii) the early build-up of risks in the residential real estate sector. These illustrations show that macroprudential monitoring frameworks that were set up in response to the financial crisis may enable a timely view to be obtained on the future build-up of vulnerabilities in the financial sector.

3.1 Vulnerabilities before the 2008 financial crisis

This first case study focuses on a number of indicators in the risk dashboard that, with the benefit of hindsight, capture some of the vulnerabilities that were at the heart of the global financial crisis and that also helped to amplify the problems faced by Belgian banks during the crisis.

In order to obtain a picture of the types of vulnerabilities that were building up before the financial crisis we need to combine indicators from different risk categories. Chart 3 presents a selection of indicators from the heatmaps relating to all four intermediate objectives and illustrates the multi-faceted nature of systemic risk, which only became apparent after the outbreak of the crisis. In particular, it reminds how leveraged expansion (as shown by the ratios of equity to total assets and of banks’ total assets to GDP, and banks’ total asset growth) in combination with increased risk-taking and search for yield (as suggested by the combination of low commercial margins, high profitability and an intermediate level of concentration of held-for-trading assets, and by strong equity price growth), plus reliance on potentially unstable wholesale funding (as signalled by the loan-to-deposit ratio and the market-based funding and intra-financial system deposits indicators) had made the Belgian banking sector vulnerable to the severe deleveraging forces and liquidity tensions that emerged in the global financial system in the third quarter of 2008, in particular after the failure of Lehman Brothers.

The release indicators in Chart 3 signal stress in financial markets during the 2008-2009 period, immediately following the outbreak of the financial crisis, and again in 2012, in the wake of the sovereign debt crisis. The availability of this kind of heatmap at that point in time would have suggested that if any macroprudential measures had been in place at the time, there might have been cause to consider partially or completely relaxing them (even though, as suggested by the NPL and impairment ratio, there would have been no large observed losses on domestic exposures). A relaxation of macroprudential measures, to the extent that any such measures had been implemented prior to the crisis, could have given Belgian banks some extra breathing space to deal with losses and/or liquidity shocks stemming from the crisis.
This first case study suggests that, while the risk dashboard does not enable a complete risk assessment of the Belgian financial sector, the signals emitted by the heatmaps could provide a useful starting point for further in-depth analysis of the risks under the other pillars of the risk assessment framework. In particular, the availability of the aforementioned indicators in the current heatmaps helps the Bank to spot any future build-up of vulnerabilities similar to those preceding the 2008 financial crisis so as to bolster the banking sector's resilience when deemed necessary.

Chart 3
Heatmaps signalling vulnerabilities before the 2008 financial crisis

3.2 Early build-up of risks in the residential real estate sector

With regard to the second case study, indicators from the heatmaps associated with intermediate objectives 1 and 3 reveal the early build-up of vulnerabilities in real estate markets, which eventually triggered macroprudential action by the Bank after it had been designated as the macroprudential authority in Belgium.

Medium-to-strong signals can be identified in the indicators related to the household credit cycle and property markets from 2003-2004 onwards. As regards the credit cycle, strong growth can be observed in lending to households, especially mortgage loans. In combination with continuously loose lending standards, as indicated by the share of new mortgage loans with a loan-to-value (LTV) ratio above 90 % or a debt-service-to-income (DSTI) ratio higher than 40 %, the prolonged period of intense household credit dynamics contributed to a continuous rise in the leverage position of the household sector. The household indebtedness indicators (HH debt to GDP and HH debt service ratio) suggest increasing vulnerability in this area from 2013 onwards.

The strong growth in household borrowings also fostered a rise in house prices, the most intense signals being emitted in the years 2004-2007. While house price growth reverted to more subdued levels after the crisis,
A risk dashboard for detecting and monitoring systemic risk in Belgium

142  NBB Financial Stability Report

Chart 4
Heatmaps signalling build-up of risks in the residential real estate sector

Source: NBB.
Note: The chart shows a selection of indicators from the different heatmaps and does not include the aggregate risk signals for the different sub-categories. The complete list of indicators for each intermediate objective can be found in the Annex to this article.

no real price correction took place in the residential property market. Following the sustained rise in house prices, the housing affordability ratio has indicated a strong vulnerability relating to potential overvaluation in house prices since 2005-2006.

Given that Belgian banks reoriented towards their core markets and businesses in the aftermath of the 2008 financial crisis, domestic mortgage lending represents an important element of their balance sheets. Searching for yield in a low-interest-rate environment by producing large volumes of relatively low-margin mortgage loans, Belgian banks have seen the proportion of domestic mortgage loans in their total assets increase further, rendering them more vulnerable to potential shocks in the housing market. This is suggested by the transition of the ratio of domestic mortgage loans to total assets from green to orange in Chart 4, which signals an intermediate level of risk in this regard since 2009.

The signals emitted by the indicators relating to real estate, household borrowing and lending standards in the period beginning in the early 2000s reflect the early build-up of vulnerabilities with respect to the housing market and household indebtedness which the Bank’s current macroprudential policies are designed to mitigate.

Conclusion

The Bank’s new risk dashboard for identifying, detecting and monitoring cyclical and structural vulnerabilities in the Belgian financial system allows to keep track of the level and evolution of risks as signalled by a wide range of indicators. The risk signals emitted by the risk dashboard form the basis for a more in-depth risk assessment and for structured risk and policy discussions. Although the tools included in the Bank’s indicator- and model-based approach are currently – at least until sufficient experience with them has been gained – being used as internal risk monitoring tools, they are nevertheless also helping to shape the Bank’s public messaging regarding risks and policy actions.

It should be noted that the indicator- and model-based approach is still a work in progress and that efforts to further improve the macroprudential risk assessment framework are ongoing. One of the challenges in operating this framework is to determine the need for, and the best way of extracting, more aggregated risk signals from the various sub-categories of indicators in the risk dashboard and from the range of estimated models. Experience with the heatmaps and model-based tools may over time also indicate the need to make some
adjustments to the framework, both in terms of indicator coverage and the methods and thresholds used for signal extraction. In this regard, we must remain aware of the continual changes taking place in the financial system and alert to the emergence of new potential sources of systemic risk.
References


### Annex: List of indicators included in the risk dashboard

#### IO1: Mitigate and prevent excessive credit growth and leverage

Excessive credit growth has been identified as a key driver of financial crises. Risk illusion and endogenous risk-taking in buoyant times lead to excessive credit provision, deteriorating credit standards, potential bubbles in asset markets and the build-up of leverage both within the financial system and between financial institutions and real-economy borrowers. Such developments render the financial system more vulnerable to shocks, with the unravelling of imbalances entailing credit crunch externalities.

<table>
<thead>
<tr>
<th>A. Credit cycle</th>
<th>B. Leverage in the NFPS</th>
<th>C. Leverage in the financial sector</th>
<th>D. Financial and asset markets</th>
<th>E. External imbalances</th>
<th>Release</th>
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</thead>
<tbody>
<tr>
<td>Credit to GDP gap</td>
<td>Debt to GDP</td>
<td>CET 1 capital ratio</td>
<td>Equity price growth</td>
<td>Current account balance to GDP ratio</td>
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</tr>
<tr>
<td>Broad, total</td>
<td>Total</td>
<td>Equity to total assets ratio</td>
<td>BEL 20</td>
<td>NPL ratio</td>
<td></td>
</tr>
<tr>
<td>Broad, HH</td>
<td>HH</td>
<td>Loan to deposit ratio</td>
<td>Eurostoxx 50</td>
<td>Impairment ratio</td>
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<tr>
<td>Broad, NFC</td>
<td>NFC</td>
<td>AuM to NAV</td>
<td>Eurostoxx 50</td>
<td>Euribor OIS spread</td>
<td></td>
</tr>
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<td>fixed income funds</td>
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<td>Bank loan growth (minus GDP growth)</td>
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</tr>
<tr>
<td>Total</td>
<td>Total</td>
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<td></td>
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<td>HH</td>
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<td>HH mortgages</td>
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<tr>
<td>Insurance y-o-y loan growth</td>
<td>HH debt service ratio</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Coverage ratio</td>
<td>HH</td>
<td>HH interest payment burden</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>NFC</td>
<td></td>
<td></td>
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<tr>
<td>Insurance leverage ratio</td>
<td>Proportion of new mortgage loans with LTV &gt; 90%</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Proportion of new mortgage loans with DSTI &gt; 40%</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Total financial assets to equity ratio</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>CRE price growth</td>
<td>Patronage ratio</td>
<td></td>
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</tbody>
</table>

Source: NBB.
Experience shows that credit cycles coincide with increased reliance on short-term funding. Excessive liquidity transformation poses risks to financial stability through illiquidity spirals characterised by fire-sale externalities and contagion due to the dry-up of liquidity. The focus of this intermediate objective is therefore on the market liquidity of assets and the stability of funding. Maturity transformation is an important determinant of liquidity transformation and, in addition, may increase sensitivity to interest rate risk.

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Loan to deposit ratio</td>
<td>Asset encumbrance ratio</td>
<td>Net stable funding ratio</td>
<td>Sensitivity to interest rate shocks</td>
<td>Euribor OIS spread</td>
</tr>
<tr>
<td>Insurance liquid assets to liquid liabilities</td>
<td>Illiquid assets plus liquid liabilities to AuM ratio</td>
<td>Stable funding to total assets</td>
<td>Insurance duration gap</td>
<td>CISS index</td>
</tr>
<tr>
<td></td>
<td>money market funds</td>
<td>Liquid assets to total assets</td>
<td>Long term assets minus long term funding to AuM ratio</td>
<td>Share of central bank funding</td>
</tr>
<tr>
<td></td>
<td>fixed income funds</td>
<td></td>
<td>all investment funds</td>
<td>Net interest margin – y-o-y difference</td>
</tr>
<tr>
<td></td>
<td>mixed funds</td>
<td>Liquidity coverage ratio</td>
<td>money market funds</td>
<td>Insurance surrender ratio</td>
</tr>
<tr>
<td></td>
<td>other non-equity funds</td>
<td></td>
<td>fixed income funds</td>
<td>Amihud ratio on EURO STOXX 50 index</td>
</tr>
<tr>
<td></td>
<td>Illiquid assets plus liquid liabilities to total financial assets ratio</td>
<td>Long term assets minus long term funding to total financial assets ratio</td>
<td>mixed funds</td>
<td>VSTOXX implied market volatility</td>
</tr>
<tr>
<td></td>
<td>finance companies</td>
<td></td>
<td>other non-equity funds</td>
<td></td>
</tr>
<tr>
<td></td>
<td>structured financial vehicles</td>
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<tr>
<td>Liquid assets to total assets</td>
<td>Banks</td>
<td>Euribor OIS spread</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Insurance companies</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: NBB.
IO3: Limit direct and indirect exposure concentrations

Direct concentration risk arises from large exposures to the non-financial sector (e.g. the housing market and sovereigns) and also between financial sectors and/or financial entities. Such concentration, both on the asset and liability side, renders the financial system more sensitive to common shocks. In addition, indirect exposures arise within the system, due to the interconnectedness of financial institutions and the contagious consequences of common exposures through asset fire sales.

<table>
<thead>
<tr>
<th>A. Asset concentration</th>
<th>B. Income concentration</th>
<th>C. Funding concentration</th>
<th>D. Commonality</th>
<th>E. Interconnectedness</th>
<th>Release</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bank asset concentration (in % of total assets)</td>
<td>Components of interest income</td>
<td>Retail deposits to total liabilities ratio</td>
<td>Asset commonality</td>
<td>Intra-financial system loans to total assets ratio</td>
<td>NPL ratio</td>
</tr>
<tr>
<td>Domestic mortgage loans</td>
<td>Loans to HH</td>
<td>Mortgage loans</td>
<td>Total</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public sector bonds</td>
<td>Loans to NFC</td>
<td>Government bonds</td>
<td>Interbank</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Domestic public sector bonds</td>
<td>Domestics NFC exposures</td>
<td></td>
<td>OFIs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Domestic CRE exposures</td>
<td>Domestic exposures</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fair value of derivatives</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Insurance asset concentration (in % of total investment)</td>
<td>Proportion of income type in total income</td>
<td>Income commonality (NII over operating income)</td>
<td>Inter-financial system deposits to total liabilities ratio</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public sector bonds</td>
<td>NII</td>
<td>Total</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Domestic public sector bonds</td>
<td>Fee income</td>
<td>Interbank</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Other fixed-income securities</td>
<td></td>
<td>OFIs</td>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Proportion of assets held for trading among total assets</td>
<td>Funding commonality (retail deposits)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Fair value of derivatives in liabilities to total liabilities ratio</td>
<td></td>
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</tr>
</tbody>
</table>

Source: NBB.
A risk dashboard for detecting and monitoring systemic risk in Belgium

Systemically important institutions may be regarded as “too big to fail” because of their importance to the real economy and/or the rest of the financial system; the presence of (perceived) public safety nets may create problems of moral hazard, leading to excessive risk taking. In addition, financial institutions’ remuneration policies, coupled with shareholder and market pressures, may affect managers’ incentives and give rise to excessive search-for-yield behaviour. It is therefore crucial that macroprudential policymakers have a view of the extent of risk-seeking behaviour in the financial system as a whole.

<table>
<thead>
<tr>
<th>A. Moral hazard / too big to fail: importance to the real economy</th>
<th>B. Moral hazard / too big to fail: importance to the rest of the financial system</th>
<th>C. Search for yield</th>
<th>Release</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total assets to GDP</td>
<td>Intra-financial system loans to total assets ratio</td>
<td>Proportion of new mortgage loans with LTV &gt; 90%</td>
<td>NPL ratio</td>
</tr>
<tr>
<td>- Banks</td>
<td>- Total</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>- Insurance companies</td>
<td>- Interbank</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>- Investment funds</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Finance companies</td>
<td>- OFIs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Structured financial vehicles</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Domestic bank credit to total credit to NFPS</td>
<td>Intra-financial system deposits to total liabilities ratio</td>
<td>Proportion of new mortgage loans with DSTI &gt; 40%</td>
<td>Impairment ratio</td>
</tr>
<tr>
<td>- Total</td>
<td>- Total</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>- Interbank</td>
<td>- Interbank</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>- OFIs</td>
<td>- OFIs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total assets to bail-in-able debt</td>
<td>Fair value of derivatives in liabilities to total liabilities ratio</td>
<td></td>
<td>Euribor OIS spread</td>
</tr>
<tr>
<td>Insurers’ Belgian sovereign bond holdings in % of gross Belgian general government debt</td>
<td></td>
<td></td>
<td>CISS index</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: NBB.
Statistical annex
List of tables

Tables relating to Belgian credit institutions

1. Number of Belgian credit institutions 153
2. Key figures 154

Tables relating to Belgian insurance companies

3. Number of Belgian insurance companies 155
4. Main components of insurance companies' assets 156
5. Main components of insurance companies' liabilities 157
6. Components of the income statement of insurance companies 158
Table 1

Number of Belgian credit institutions

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
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</thead>
<tbody>
<tr>
<td>Credit institutions governed by Belgian law with Belgian majority shareholding</td>
<td>20</td>
<td>16</td>
<td>15</td>
<td>15</td>
<td>17</td>
<td>15</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>Credit institutions governed by Belgian law with foreign majority shareholding</td>
<td>27</td>
<td>26</td>
<td>24</td>
<td>22</td>
<td>20</td>
<td>19</td>
<td>19</td>
<td>18</td>
</tr>
<tr>
<td>EU Member States</td>
<td>20</td>
<td>19</td>
<td>18</td>
<td>16</td>
<td>12</td>
<td>11</td>
<td>11</td>
<td>10</td>
</tr>
<tr>
<td>Other States</td>
<td>7</td>
<td>7</td>
<td>6</td>
<td>6</td>
<td>8</td>
<td>8</td>
<td>8</td>
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</tr>
<tr>
<td>Belgian branches of foreign credit institutions</td>
<td>61</td>
<td>62</td>
<td>65</td>
<td>66</td>
<td>62</td>
<td>56</td>
<td>54</td>
<td>55</td>
</tr>
<tr>
<td>EU Member States</td>
<td>52</td>
<td>53</td>
<td>55</td>
<td>56</td>
<td>52</td>
<td>48</td>
<td>46</td>
<td>47</td>
</tr>
<tr>
<td>Other States</td>
<td>9</td>
<td>9</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>108</td>
<td>104</td>
<td>104</td>
<td>103</td>
<td>99</td>
<td>90</td>
<td>87</td>
<td>87</td>
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</tbody>
</table>

Source: NBB.
### Table 2

**Key figures**

(data on consolidated basis)

<table>
<thead>
<tr>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Large banking groups</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Balance sheet total (in billion euro)</td>
<td>967.8</td>
<td>857.1</td>
<td>774.7</td>
<td>815.6</td>
<td>802.7</td>
<td>849.7</td>
<td>839.6</td>
<td>847.0</td>
</tr>
<tr>
<td>Customers' holdings (in billion euro)</td>
<td>518.4</td>
<td>518.2</td>
<td>516.5</td>
<td>544.0</td>
<td>559.2</td>
<td>575.7</td>
<td>595.3</td>
<td>598.2</td>
</tr>
<tr>
<td>Loans and advances to customers (in billion euro)</td>
<td>441.4</td>
<td>432.8</td>
<td>444.7</td>
<td>463.1</td>
<td>476.1</td>
<td>485.9</td>
<td>506.3</td>
<td>531.4</td>
</tr>
<tr>
<td>Risk asset ratio (in %)</td>
<td>18.2</td>
<td>17.9</td>
<td>18.5</td>
<td>16.9</td>
<td>17.8</td>
<td>17.5</td>
<td>17.8</td>
<td>17.7</td>
</tr>
<tr>
<td>Net after tax results (in billion euro)</td>
<td>-0.1</td>
<td>1.2</td>
<td>2.6</td>
<td>3.9</td>
<td>5.2</td>
<td>4.8</td>
<td>5.2</td>
<td>5.3</td>
</tr>
<tr>
<td>Return on average assets (in %)</td>
<td>0.0</td>
<td>0.1</td>
<td>0.3</td>
<td>0.5</td>
<td>0.6</td>
<td>0.6</td>
<td>0.6</td>
<td>0.6</td>
</tr>
<tr>
<td>Return on average equity (in %)</td>
<td>-0.1</td>
<td>2.7</td>
<td>5.6</td>
<td>7.8</td>
<td>10.3</td>
<td>9.4</td>
<td>9.4</td>
<td>9.2</td>
</tr>
<tr>
<td>Cost-income ratio (in %)</td>
<td>65.2</td>
<td>71.5</td>
<td>60.0</td>
<td>60.9</td>
<td>58.3</td>
<td>56.5</td>
<td>56.9</td>
<td>59.9</td>
</tr>
<tr>
<td><strong>B. Total of Belgian credit institutions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Balance sheet total (in billion euro)</td>
<td>1 147.3</td>
<td>1 048.7</td>
<td>960.6</td>
<td>996.3</td>
<td>970.3</td>
<td>1 021.9</td>
<td>993.8</td>
<td>993.2</td>
</tr>
<tr>
<td>Customers' holdings (in billion euro)</td>
<td>615.2</td>
<td>620.4</td>
<td>622.1</td>
<td>659.1</td>
<td>676.0</td>
<td>686.6</td>
<td>708.5</td>
<td>717.5</td>
</tr>
<tr>
<td>Loans and advances to customers (in billion euro)</td>
<td>509.4</td>
<td>504.7</td>
<td>518.1</td>
<td>538.6</td>
<td>547.2</td>
<td>565.8</td>
<td>590.2</td>
<td>618.5</td>
</tr>
<tr>
<td>Risk asset ratio (in %)</td>
<td>18.5</td>
<td>18.2</td>
<td>18.7</td>
<td>17.6</td>
<td>18.7</td>
<td>18.8</td>
<td>19.0</td>
<td>18.8</td>
</tr>
<tr>
<td>Net after tax results (in billion euro)</td>
<td>0.4</td>
<td>1.6</td>
<td>3.3</td>
<td>4.5</td>
<td>6.1</td>
<td>5.7</td>
<td>5.9</td>
<td>5.6</td>
</tr>
<tr>
<td>Return on average assets (in %)</td>
<td>0.0</td>
<td>0.1</td>
<td>0.3</td>
<td>0.5</td>
<td>0.6</td>
<td>0.6</td>
<td>0.6</td>
<td>0.5</td>
</tr>
<tr>
<td>Return on average equity (in %)</td>
<td>0.7</td>
<td>3.0</td>
<td>5.9</td>
<td>7.7</td>
<td>10.1</td>
<td>9.1</td>
<td>8.9</td>
<td>8.0</td>
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<tr>
<td>Cost-income ratio (in %)</td>
<td>65.8</td>
<td>72.1</td>
<td>60.8</td>
<td>61.2</td>
<td>58.6</td>
<td>58.4</td>
<td>58.2</td>
<td>61.2</td>
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</table>

Source: NBB.
### Table 3

**Number of Belgian insurance companies**

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>A. By the location of their registered office</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Belgium¹</td>
<td>95</td>
<td>88</td>
<td>84</td>
<td>81</td>
<td>76</td>
<td>73</td>
<td>68</td>
<td>69</td>
</tr>
<tr>
<td>European Economic Area²</td>
<td>47</td>
<td>46</td>
<td>46</td>
<td>47</td>
<td>43</td>
<td>45</td>
<td>46</td>
<td>46</td>
</tr>
<tr>
<td>Rest of the world³</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td><strong>Total</strong></td>
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<td>134</td>
<td>130</td>
<td>128</td>
<td>119</td>
<td>118</td>
<td>114</td>
<td>115</td>
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<tr>
<td>Fee service provision⁴</td>
<td>915</td>
<td>942</td>
<td>933</td>
<td>950</td>
<td>970</td>
<td>999</td>
<td>917</td>
<td>1095</td>
</tr>
<tr>
<td><strong>B. By specialisation⁵</strong></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Life insurance</td>
<td>26</td>
<td>24</td>
<td>23</td>
<td>23</td>
<td>21</td>
<td>22</td>
<td>20</td>
<td>16</td>
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<tr>
<td>Non-life insurance</td>
<td>89</td>
<td>83</td>
<td>81</td>
<td>79</td>
<td>72</td>
<td>70</td>
<td>67</td>
<td>72</td>
</tr>
<tr>
<td>Life and non-life insurance</td>
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<td>25</td>
<td>24</td>
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<td>Reinsurance companies</td>
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<td><strong>Total</strong></td>
<td>142</td>
<td>134</td>
<td>130</td>
<td>128</td>
<td>119</td>
<td>118</td>
<td>114</td>
<td>115</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Investments</td>
<td>233.8</td>
<td>240.1</td>
<td>246.6</td>
<td>258.3</td>
<td>259.7</td>
<td>261.4</td>
<td>263.9</td>
<td>272.0</td>
</tr>
<tr>
<td>All activities with the exception of class 23</td>
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<td>218.4</td>
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<td>9.4</td>
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<td>264.5</td>
<td>270.7</td>
<td>280.9</td>
<td>286.1</td>
<td>284.9</td>
<td>284.4</td>
<td>292.7</td>
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</table>

**Source:** NBB.

1 Preliminary data. Large changes in 2018 are mainly attributable to the inclusion of new companies in the reporting scope.

2 Including shares in UCITS.
Table 5
Main components of insurance companies’ liabilities
(data on a company basis, in € billion)

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<td>13.7</td>
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<td>175.3</td>
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<td>171.9</td>
<td>169.3</td>
</tr>
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<td>23.7</td>
<td>26.2</td>
<td>28.7</td>
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<td>31.8</td>
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<td>2.9</td>
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</tr>
<tr>
<td>Total</td>
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<td>264.5</td>
<td>270.7</td>
<td>280.8</td>
<td>286.1</td>
<td>284.9</td>
<td>284.4</td>
<td>292.7</td>
</tr>
</tbody>
</table>

Source: NBB.
¹ Preliminary data. Large changes in 2018 are mainly attributable to the inclusion of new companies in the reporting scope.
Table 6
Components of the income statement of insurance companies
(data on a company basis, in € billion, unless otherwise stated)

<table>
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<tr>
<td>Net premiums written</td>
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<td>15.9</td>
<td>16.0</td>
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<td>14.4</td>
<td>14.4</td>
<td>15.0</td>
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<tr>
<td>Claims paid (–)</td>
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<td>18.3</td>
<td>18.1</td>
<td>19.7</td>
<td>18.7</td>
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<td>16.6</td>
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<td>2.9</td>
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<td>–5.7</td>
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<td>1.7</td>
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<td>–8.3</td>
<td>–8.2</td>
<td>–9.3</td>
<td>–8.3</td>
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<td>all life insurance classes excluding class 23</td>
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<td>0.7</td>
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<td>8.2</td>
<td>9.8</td>
<td>17.5</td>
<td>16.3</td>
</tr>
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Source: NBB.
1 Preliminary data.
2 Large changes in 2018 are mainly attributable to the inclusion of new companies in the reporting scope.