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FINANCIAL SYSTEM STABILITY ASSESSMENT

March 6, 2018

This Financial System Stability Assessment paper on Belgium was prepared by a staff team of the International Monetary Fund as background documentation for the periodic consultation with Belgium. It is based on the information available at the time it was completed on November 21, 2018.

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February 21, 2018

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This report is based on the work of the Financial Sector Assessment Program (FSAP) mission that visited Belgium in November 2017. The FSAP findings were discussed with the authorities during the Article IV consultation mission in December 2017.

- The FSAP team was led by Javier Hamann and included Eija Holttinen (deputy mission chief), Atilla Arda, Caio Ferreira, Tanai Khiaonarong, Mesmin Koulet-Vickot, Dan Nyberg, Nobuyasu Sugimoto, and Laura Valderrama (MCM); Andrew Jewell (EUR); and Timo Broszeit and José Tuya (external experts). Technical support was provided by Pavel Lukyantsau and David Jutrsa (MCM), and administrative support was provided by Ilgim Sumer (MCM).
- The mission met with National Bank of Belgium (NBB) Governor Jan Smets and Vice-Governor Pierre Wunsch, Minister of Finance Johan Van Overtveldt, Financial Services and Markets Authority (FSMA) Chairman Jean-Paul Servais and other NBB, Ministry of Finance (MoF), and FSMA senior officials. Meetings were also organized with members of the High-Level Expert Group (HLEG) of the Future of the Belgian Financial Sector; senior officials of the European Central Bank (ECB), European Systemic Risk Board (ESRB), and Single Resolution Board (SRB); as well as market participants and industry associations.
- FSAPs assess the stability of the financial system as a whole and not that of individual institutions. They are intended to help countries identify key sources of systemic risk in the financial sector and implement policies to enhance its resilience to shocks and contagion. Certain categories of risk affecting financial institutions, such as operational or legal risk, or risk related to fraud, are not covered in FSAPs.
- Belgium is deemed by the IMF to have a systemically important financial sector according to [Mandatory Financial Stability Assessments Under the Financial Sector Assessment Program—Update](#) (11/18/2013), and the stability assessment under this FSAP is part of bilateral surveillance under Article IV of the IMF's Articles of Agreement.
- This report was prepared by Javier Hamann and Eija Holttinen with contributions from the FSAP team.

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Glossary

AML/CFT	Anti-Money Laundering/Countering the Financing of Terrorism
BNYM	Bank of New York Mellon
BRRD	Bank Recovery and Resolution Directive
CET1	Common Equity Tier 1
CFI	Captive financial institution
CoVaR	Conditional value at risk
CPMI	Committee on Payments and Market Infrastructures
CRD	Capital Requirements Directive
CRR	Capital Requirements Regulation
CSP	Critical Service Provider
D-SIB	Domestic Systemically Important Bank
DSTI	Debt service-to-income
DTI	Debt-to-income
EA	Euro area
EBA	European Banking Authority
ECB	European Central Bank
ELA	Emergency Liquidity Assistance
ESRB	European Systemic Risk Board
EU	European Union
FATF	Financial Action Task Force
FC	Financial Conglomerate
FICOD	Financial Conglomerate Directive
FMI	Financial Market Infrastructure
FSAP	Financial Sector Assessment Program
FSMA	Financial Services and Markets Authority
FSSA	Financial System Stability Assessment
FX	Foreign Currency
GFC	Global Financial Crisis
GDP	Gross Domestic Product
HLEG	High-Level Expert Group of the Future of the Belgian Financial Sector
HQLA	High quality liquid assets
IOSCO	International Organization of Securities Commissions
IRRBB	Interest rate risk in the banking book
LCR	Liquidity Coverage Ratio
LGD	Loss given default
LSI	Less significant institution
LTG	Long-term guarantee
MER	Mutual Evaluation Report
MoF	Ministry of Finance
ML	Money Laundering

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MREL	Minimum Requirement for Own Funds and Eligible Liabilities
NBB	National Bank of Belgium
NSFR	Net Stable Funding Ratio
NPL	Nonperforming loan
ORSA	Own Risk and Solvency Assessment
O-SII	Other Systemically Important Institution
PD	Probability of default
RAM	Risk Assessment Matrix
ROA	Return on assets
ROE	Return on equity
RRP	Recovery and resolution planning
RWA	Risk weighted assets
SI	Significant institution
SPE	Special Purpose Entity
SRB	Single Resolution Board
SREP	Supervisory Review and Evaluation Process
SRM	Single Resolution Mechanism
SSM	Single Supervisory Mechanism
STeM	Stress Testing Matrix
SWIFT	Society for Worldwide Interbank Financial Telecommunication
TD	Top-down
WEO	World Economic Outlook

EXECUTIVE SUMMARY

Belgium's financial landscape has changed significantly since the global financial crisis (GFC).

The banking system has contracted mainly because of restructuring operations in entities that received government support. Banks have adopted more traditional business models, with greater emphasis on domestic lending and deposit funding. The insurance sector has seen some consolidation and is gradually moving away from traditional insurance products towards asset management-type products. Cross-border financial linkages, while still significant, have declined and Brussels remains the home of globally significant financial market infrastructures (FMIs) and service providers.

These changes have enhanced the structural resilience of the financial system, but cyclical vulnerabilities are rising. Banks' reduced reliance on wholesale funding and smaller trading books, together with more limited interbank activities, have reduced the potential for highly disruptive market-liquidity risk spirals and contagion. However, a domestic cyclical upswing has been spurred by easy global financial conditions, and new risks are emerging. This is most evident in the real estate sector, where rapid growth in mortgage lending and declining lending standards have led to marked increases in household leverage and housing prices, with signs of moderate, overvaluation in residential properties.

The financial sector remains resilient in the face of the rising cyclical vulnerabilities, but there is a need for closely monitoring risks. Stress tests on banks and insurance companies confirm that they can absorb credit, sovereign, and market losses in the event of a severe deterioration in macro financial conditions. The risk of interbank contagion through direct exposures is low. Insurance companies are also generally resilient and the losses incurred by those that belong to banking groups do not threaten the soundness of those groups. Bank resilience reflects relatively healthy loan portfolios and limited exposure to market and liquidity risks, while insurance companies have sound solvency levels and reduced exposures to guaranteed rates. Nonetheless, there is a need to monitor carefully banks' capacity to cope with interest rate shocks, credit risk vulnerabilities in selected portfolios, and growing liquidity risk in insurance companies.

A mortgage-related macroprudential policy recently proposed by the NBB needs to be enacted promptly. Following rejection by the government of measures proposed by the National Bank of Belgium (NBB), a new measure has been identified, which should be approved promptly. Going forward, it will be necessary to revise the framework for macroprudential decision making to enhance NBB's ability to deploy cyclical macroprudential policies in a timely manner.

Financial sector supervision and crisis management arrangements have been upgraded markedly. The Single Supervisory Mechanism (SSM), responsible for over 90 percent of the Belgian banking sector assets, has made the supervision of Belgian significant institutions (SIs) more intrusive, forward looking, and effective. NBB has enhanced the supervision of less significant institutions (LSIs). Resolution planning for SIs by the Single Resolution Mechanism (SRM) and for LSIs by the NBB is progressing.

However, the transition to a full banking union must be carefully managed by national and European authorities. The implementation of complex institutional reforms at different speeds may create unintended financial stability risks. While these risks are common to all euro area (EA) member countries, some are heightened in Belgium given the local presence of large subsidiaries of EA banks. Sufficient capital and loss absorbing capacity should be kept in these subsidiaries to ensure the viability of group resolution strategies.

NBB and European authorities should continue to upgrade their supervisory and crisis management frameworks and operational capacity. Efforts to ensure prudent provisioning practices and to enhance the monitoring of banks' internal models should continue. Authorities should improve their ability to prepare for and manage a crisis by prioritizing the resolution planning for important banks and strengthening the deposit insurance system (DIS). It will also be important to address the challenges posed by complex financial conglomerates, ongoing changes in the risk profile of the insurance sector, and potential challenges arising from the low quality of some insurers' capital.

The oversight arrangement for the Belgium-based Society for Worldwide Interbank Financial Telecommunication (SWIFT) has proven effective, but is being challenged by new risks. Key among these are cybersecurity incidents in SWIFT's global user network. To strengthen the NBB's ability to exercise its role as overseer and protect Belgium's reputation as a key hub for FMIs, the authorities should consider complementing the NBB's use of moral suasion with regulatory and supervisory powers and should enhance the NBB's ability to share information with foreign authorities.

Belgium should continue efforts to enhance the effectiveness of its anti-money laundering/countering the financing of terrorism (AML/CFT) framework. The 2014 Financial Action Task Force (FATF) evaluation found a well-established regime, notwithstanding some deficiencies. Since then, steps have been taken to strengthen the framework, notably with respect to combating the financing of terrorism and AML/CFT supervision. However, efforts need to continue to fully implement the FATF's recommended actions.

Main Recommendations	
Recommendation	Timing*
Systemic risk analysis	
Enhance the risk analytical framework by: (i) incorporating bank stress testing to the toolkit for systemic risk assessment and macroprudential policy; (ii) extending the horizon of insurance stress tests; (iii) intensifying monitoring of insurers' mortgage loan portfolios and related underwriting standards; (iv) in cooperation with the FSMA, further developing the shadow banking monitoring framework; (v) enhancing the coverage and quality of commercial real estate data. (NBB)	ST
Prudential policy, supervision, and oversight	
Approve promptly the new macroprudential measure proposed by the NBB and enhance the NBB's ability to implement cyclical macroprudential tools in a timely manner. (MoF)	ST
Continue to strengthen bank supervision by: (i) ensuring the reliability and consistency of internal models and (ii) proactively assessing loan classifications to ensure prudent provisioning practices. (NBB/SSM)	C
Adjust to insurers' evolving risk profiles by: (i) seeking to address the sector's increasing liquidity risk; (ii) continuing to analyze the business growth of reinsurance operations; and (iii) engaging with the industry to gradually improve the quality of insurers' capital. (NBB)	ST
Enhance FC supervision by: (i) setting supervisory expectations for FC governance and risk management; and (ii) enhancing monitoring of intra-group transactions at FC level and the risk of regulatory arbitrage between insurance and banking sectors. (NBB/SSM)	ST
Enhance SWIFT oversight by (i) aiming at complementing the NBB's use of moral suasion in the oversight of SWIFT with additional regulatory and supervisory powers; (ii) broadening membership in the SWIFT Oversight Forum; and (iii) improving information sharing on SWIFT oversight and assurance reports.(NBB)	ST
Financial safety net and crisis management	
Ensure the feasibility of resolution strategies for banking groups with systemically important subsidiaries (SRM) and prioritize resolution planning for the two less significant institutions with the highest share of insured deposits (NBB).	MT
Strengthen the DIS by (i) publicly committing to shortening the DIS pay-out period to seven days by 2019; (ii) establishing credit lines with the MoF; and (iii) segregating the Guarantee Fund from government funds. (MoF)	ST
AML/CFT	
Ensure adequate transparency of beneficial ownership of legal persons and arrangements. (MoF)	MT
* C = continuous; I = Immediate (within one year); ST = Short Term (within 1-2 years); MT = Medium Term (within 3-5 years)	

MACROFINANCIAL BACKGROUND

A. Rising Financial Vulnerabilities

1. The economic recovery that began in 2014 is gaining strength. GDP growth is estimated to have increased to 1.7 percent in 2017 from 1.5 percent the year before (Figure 1). The recovery has been driven by solid consumption growth and business investment. Monetary policy has been supportive, together with improving labor market conditions. Fiscal consolidation accelerated in 2017 thanks to a mix of cyclical, structural, and one-off factors. Higher energy prices pushed up headline inflation in 2015–2016, but core inflation remains subdued. The output gap is closing and is expected to turn positive in 2018.

2. However, the financial cycle is running ahead of the economic cycle and vulnerabilities are rising. Bank credit growth has accelerated since 2015 driven by residential mortgages and a small positive credit gap opened in 2016. Credit is expanding in an environment of low interest rates and volatility and compressed risk premia. While this is driven largely by buoyant global financial conditions, domestic housing prices and leverage in Belgian nonfinancial sectors have risen markedly. Household debt reached 100 percent of disposable income in 2016, with mortgage debt accounting for about 90 percent of it. Corporate debt has also risen in recent years; however, while gross corporate debt is high at nearly 130 percent of GDP, nearly half of this is accounted for by intragroup debt with small residual exposures for the Belgian financial system. Public debt has remained above 100 percent of GDP since 2011.

3. Housing markets appear moderately overvalued, but sustained price increases coupled with high and rising household leverage can pose risks. Housing prices in Belgium did not experience a sharp decline during the crisis and have risen by about 20 percent since 2008. While the increase can be partially linked to demographic trends, it has exceeded the pace justified by fundamentals and the overvaluation is estimated by the NBB and the European Systemic Risk Board at around 10 percent or less. Further increases in housing prices, household leverage, and declining lending standards would be a source of systemic risk.

4. Going forward, the main threats to financial stability are abrupt corrections in asset valuations or a protracted period of low growth and interest rates. These risks are summarized in the Risk Assessment Matrix (RAM, Appendix I) and could materialize as follows:

- *A sudden increase in global risk aversion.* This would lead to higher money market rates, a steepening of the yield curve, and reductions in market liquidity, which would push down asset prices. Economic activity would likely slow down in advanced and emerging market countries. This scenario is broadly consistent with increased volatility triggered by monetary policy tightening in advanced countries.
- *A large correction in the Belgian real estate market.* The direct impact on banks, through lower collateral values, could be followed by credit losses associated with weak consumption if households were to deleverage aggressively. Depressed mortgage loan valuations would also impact banks' asset encumbrance and increase funding costs.

- *A reassessment of regional sovereign risk.* Fiscal stress in the EA could re-emerge, triggered by political uncertainty or concerns about debt sustainability. This would weaken banks' balance sheets, given relatively large exposures to EA sovereign debt, and hamper their access to wholesale funding.
- *A prolonged period of low growth and low interest rates in the EA.* This "low-for-long" scenario would depress interest margins and profits and could lead to higher credit losses. Corporate earnings could also decline and market leverage would rise, possibly leading to higher corporate defaults. Low interest rates could also lead to a significant increase in housing prices.

B. Smaller Banks and a Changing Financial Sector Landscape

5. The banking sector has shrunk and undergone significant changes in the last 10 years.

Banking system assets have shrunk from 470 percent of GDP in 2008 to 250 percent today, mainly because of the scaling back of cross-border activities of banks that underwent restructuring during the crisis and NBB regulations preventing proprietary trading activities and limiting other trading activities. Other changes include the takeover by the Belgian government of the Belgian subsidiary of Dexia Group, which became Belfius Bank, and the acquisition by the French bank BNP Paribas of a majority stake in the Belgian subsidiary of Fortis. Belgium's largest (BNP Paribas Fortis) and fourth largest (ING Belgium) banks are subsidiaries of EA banks.

6. Banks have adopted more conservative business models. Loans to the nonfinancial private sector increased from 35 percent of bank assets in 2008 to about 50 percent in 2016, while the size of their bond portfolio declined by half. During the same period, deposits rose from under 40 percent of total liabilities to 55 percent. Banks also redirected their lending activities towards the local economy. Internationally active banks are now concentrated on their core markets (Czech Republic, France, Ireland, Luxembourg, Netherlands, and Turkey), with very limited exposure outside of them. Banks hold a fifth of Belgium's public debt and this accounts for 8 percent of their total assets. Banks are gradually shifting towards digital banking platforms, which is helping rationalize networks by integrating branches and reduce costs.

7. Eight Belgian banks have been designated as domestically systemically important. In 2016, the NBB designated eight banks, accounting for more than 90 percent of total banking system assets, as other systemically important institutions (O-SIIs). The largest four (BNP Paribas Fortis, KBC Group, Belfius Bank, and ING Belgium) are subject to capital surcharges of 1.5 percent of risk-weighted assets (RWA), and the others (Euroclear Bank, the Bank of New York Mellon, AXA Bank Europe, and Argenta) to surcharges of 0.75 percent; the surcharges are being phased in gradually.

8. The insurance sector has not grown in recent years and is undergoing important changes. Total assets of the sector have been stable over 2012–16 and, at 2016 market values, represented 80 percent of GDP. The sector has seen some restructuring in response to sluggish growth and low interest rates, with 12 percent of licensed firms exiting since 2013. Several insurers have ceased to sell guaranteed products and moved from traditional to asset management-type

instruments; some insurance companies have also purchased mortgages. While these changes have reduced the sector's exposure to interest rate and market risks, they increase its exposure to liquidity risk. Further, the low quality of some insurers' capital raises concerns.

9. Belgian insurers have large holdings of domestic sovereign bonds and real estate.

Sovereign bonds account for nearly half of total assets of insurance companies and around two thirds of these are Belgian sovereign bonds. Real estate exposures are also high and come mainly in the form of mortgage loans issued in the Belgian and Dutch market. Additionally, being part of a financial conglomerate (FC), some insurers have concentrated exposures towards banks, particularly in the form of deposits within the same group.

10. The shadow banking and asset management sectors are relatively small. The assets of shadow banks, defined as entities fully or partially outside the regular banking system that perform credit intermediation, amounted to 30 percent of GDP (about one-tenth of the banking sector) at end 2016. The sector is dominated by investment funds, including money market and non-equity investment funds, and includes also leasing and factoring companies, lenders outside banking and insurance groups that provide consumer and mortgage credit, and securitization activities not retained on the balance sheets of banks. Belgian investment funds overall, including those that are not part of the shadow banking sector, had assets equivalent to 35 percent of GDP at end-2016.

11. However, shadow banks and investment funds pose some risks to financial stability. Risks from direct exposures (including within FCs or consolidated banking and insurance groups) are relatively small: only 7 percent of banks' funding comes from the shadow banks and banks' claims on the shadow banking sector are also about 7 percent of their assets. The exposure of insurance companies and pension funds is somewhat higher at about 17 percent of their total assets. However, banks may be indirectly affected by falls in asset prices and tightening liquidity in the event of fire sales by fund managers facing investor redemptions. Risks also stem from the interconnectedness between investment funds and banks that sponsor them, as banks may provide support to funds experiencing stress even in the absence of a contractual obligation.

12. Captive financial institutions (CFIs) hold sizeable assets but have virtually no direct links with the domestic financial system. CFIs (e.g., nonfinancial holding companies, corporate treasury centers) are typically established by international companies seeking to benefit from tax advantages in Belgium. Their liabilities (comprising debt and equity) amounted to 105 percent of GDP in 2016 but their transactions are mostly with other entities within the same corporate group and are not intermediated by financial firms. CFIs hold only €6 billion (about 1.5 percent of GDP) in cash and deposits at Belgian banks, and Belgian banks have less than €5 billion in claims on CFIs. Nevertheless, given the magnitude and growing size of CFI debt, continued monitoring is warranted.

13. Belgium is home to SWIFT, a critical service provider (CSP) for FMIs across the world. Many systemically important FMIs, their participants, and correspondent banks are dependent on SWIFT's core financial messaging services. At end-September 2017, 239 market infrastructures were using SWIFT. Around 11,000 institutions across 200 countries and territories are connected to SWIFT. SWIFT messaging services support domestic and international payments and facilitate the settlement of payments and securities transactions, including in central banks' monetary operations.

Belgium, as a financial center, and the NBB as the authority in charge of its oversight, face reputational risk in case of an incident (including a cybersecurity incident) impacting SWIFT's core services. NBB has recognized SWIFT as a critical infrastructure under the 2011 Law on the Protection and Security of Critical Infrastructures, which subjects SWIFT to additional requirements for security planning.

14. Recommendations by the High-Level Expert Group (HLEG) on the Future of the Belgian Financial Sector are being implemented. The HLEG, established in 2015, issued the following year a report with 10 recommendations to enhance the resilience and competitiveness of the financial sector. Working groups have been established in five areas: (i) financing the real economy; (ii) regulation and supervision; (iii) digitalization and cyber risk; (iv) growth finance; and (v) promoting Brussels as a financial center. A "B-hive" comprising banks, insurers, and the government was created to attract investment in the digitalization of the financial sector. A Financial Cybersecurity Council, with representatives from financial institutions, cybersecurity agencies, and supervisors, is developing proposals to strengthen Belgium's cyber resilience.

SYSTEMIC RISK AND RESILIENCE

15. Stress tests were conducted to assess the financial system's ability to withstand losses and continue supporting the real economy. One set of tests used macroeconomic scenarios to capture the impact of a drastic deterioration in macrofinancial conditions on the solvency of banks and insurance companies. A second batch of tests, conducted only on banks, measured the impact of hypothetical deteriorations in liquidity and asset market conditions on individual entities and on the likelihood of contagion. The technical details of the tests are described in Appendices II and III.

A. Scenario-Based Solvency Analysis

16. An adverse scenario was calibrated in coordination with the NBB. The adverse scenario, spanning five years, covered the first three risks identified in the RAM (heightened global risk aversion, correction of housing prices, and increased sovereign risk) and featured nine quarters of negative growth. The severity of this scenario is comparable to that in the 2016 EU-wide stress tests; however, the scenario envisages a more drastic correction of asset prices, largely motivated by the continuation of buoyant financial conditions in 2016–17. The fourth risk in the RAM, a low-for-long scenario, was assessed using single-factor shocks. The baseline was aligned with the October 2017 World Economic Outlook (WEO). In all cases, the projections included variables for Belgium, ten relevant foreign countries, and global financial conditions. The tests covered the six largest Belgian banks (90 percent of the system) and used ECB/SSM confidential supervisory data post-2014 and NBB supervisory data pre-2014. The tests were based on end-2016 data.

Banks

17. In the baseline, capital ratios decline slightly because of the implementation of Basel III deductions and projected balance sheet expansion. Aggregate common equity tier 1 (CET1) ratios, adjusted to exclude instruments ineligible under Basel III, range between 15.1 and 15.5 percent initially, peak at 15.6 percent in 2018, and stabilize at around 15 percent by 2021. These

levels are comfortably above the fully-loaded minima of 8½ percent for the four largest O-SIIIs and at 7¾ percent for the remaining two O-SIIIs. Total regulatory capital is projected to decline by an additional 30 basis points by 2021 due to the elimination of capital instruments no longer eligible as Tier 2 capital.

18. Banks are resilient in the adverse scenario. All banks meet minimum capital requirements and none needs to draw down its conservation buffer over the entire adverse scenario horizon (Figure 2). The average CET1 ratio falls by 370 basis points from 15.1 percent at end-2016 to a low point of 11.4 percent in 2018 before trending back to 13.2 percent by 2021. Although every bank maintains sufficiently high capital ratios, the losses experienced by them vary widely, reflecting differences in business models and risk exposures.

19. The decline in CET1 ratios is driven mainly by stressed RWAs, with credit and valuation losses largely absorbed by banks' revenues. RWAs rise by 290 bps in the first two years, driven mainly by an increase in the risk weight density of the domestic mortgage portfolio from an average of 11.5 percent in 2016 to 25.8 percent in 2019. During this period, the combined impact of credit (140 bps) and valuation (200 bps) losses is slightly larger than that of RWAs, but is largely absorbed by banks' projected revenues. By the end of the 5-year horizon, the average CET1 ratio recovers nearly half of the fall experienced through 2019, again largely reflecting the dynamics of RWAs, which have fallen by nearly half from their 2019 level. The cumulative impact of credit (300 bps) and valuation (300 bps) losses through 2021 is also absorbed, on average, by banks' revenues—some banks, however, experience losses and see their nominal levels of CET1 fall, but in all cases the resulting CET1 ratios remain above the tests' hurdles.

20. Banks are also resilient to a range of additional shocks. The banking book is robust to increases or decreases of 200 bps in interest rates, reflecting the widespread use of hedging strategies against interest rate volatility and the stability of sight and time deposits. Banks can also absorb a fall in real estate prices that triggers an increase of 25 bps in LGDs; this would lower the average CET1 ratio by 100 bps but would leave it above regulatory minima. However, banks' resilience to additional shocks to the quality of their mortgage portfolios may weaken if underwriting standards continue to deteriorate and this needs to be monitored regularly. The banking system is resilient to defaults of banks' largest three borrowers, but some banks would breach their capital conservation buffer. The potential impact of IFRS9 implementation is estimated to be limited at no more than 25bps of CET1 for most Belgian banks.

21. Banks' resilience reflects relatively healthy balance sheets and a moderately positive profit outlook. Overall, the relatively limited impact of credit losses in the adverse scenario is explained by banks past de-risking strategies, which have led to portfolios with low levels of non-performing loans (NPLs), a larger share of mortgages that, on average, feature low initial default rates, and a smaller share of riskier (consumer) loans. In addition, banks' projected net interest income is resilient in the adverse scenario and this reflects their ability to sustain margins in the face of declining rates in the past, higher reliance on deposits, and active hedging strategies. Further, the 2014-16 wave of loan refinancing triggered by the low level of interest rates lengthened the average repricing maturity of Belgian banks' home loans to around 8.5 years and this shields the banks somewhat from rollover risk and loan prepayment risk. However, banks' ability to maintain interest

rate margins in the face of changes in interest rates and their management of interest rate risk warrant continued vigilance.

Insurance Companies

22. Stress tests on insurance companies also focused on the sector's capacity to absorb the impact of macrofinancial shocks. Given the size of the Belgian insurance sector and its critical role in providing funding for the public and the financial sector, the exercise included asking the companies for their likely strategies to restore solvency and profitability in an adverse scenario analogous to the one used for the bank stress tests. This scenario encompasses a substantial increase in the yield of Belgian government bonds, negative shocks to equity and property prices, and haircuts on mortgage loans. A second scenario, designed by the NBB, and broadly aligned with the low-for-long scenario in the RAM, was used in bottom-up tests. The tests covered eight composite insurers accounting for 78 percent of the market and used regulatory measures of capital as hurdles.

23. The insurance industry can withstand the severe asset-price shocks in the adverse scenario. In the first scenario, the median solvency ratio drops from 184 to 124 percent, while in the low-for-long scenario the ratio declines to 145 percent (Figure 3). In each case, one company drops below a solvency ratio of 100 percent, but the capital needed to restore solvency is very small. In the first scenario losses are driven by higher spreads on the Belgian sovereign (which come on top of the assumed higher risk-free rates); these losses are only partially offset by lower insurance liabilities. In the low-for-long scenario, lower risk-free interest rates are the sole driver of changes in the solvency position. Sensitivity analyses show that life insurers are resilient to longevity and mortality shocks.

24. The insurance sector is unlikely to amplify market risks or tighten market liquidity. Insurance companies reported that, while they would rebalance their asset allocations after a shock to improve their solvency position, they would do so only gradually and, at least for the largest insurers, in small magnitudes. Divested assets would include equity and corporate bonds below investment grade; insurers would increase their holdings of sovereign bonds. This is in line with what was observed during the European sovereign crisis and highlights the potentially stabilizing role of insurance companies in the Belgian sovereign debt market.

25. Over the medium-term, insurers will face declining investment returns, which can pressure profitability. Insurers continue to record investment returns above guaranteed interest rates, largely on account of bonds with high coupons acquired several years ago. As these bonds mature and are replaced with lower-coupon bonds, returns are bound to fall. Companies with a high stock of guarantees on their policies are likely to experience a drain on their profitability. Insurers focused on non-life and unit-linked life business will be less affected and could sustain the current low-yield environment for a longer period.

B. Structural Resilience

26. Tests were also conducted to determine whether the financial system can absorb severe liquidity shocks and/or trigger contagion. Two complementary liquidity frameworks were used (i) a Liquidity Coverage Ratio (LCR)-based approach implemented to all banks; and (ii) an implied cash-flow test applied under six alternative scenarios for the seven major banks. Contagion analysis in the interbank market was assessed through bilateral exposures, including domestic intragroup transactions. Systemic risk and market contagion was examined using a conditional value at risk (CoVaR) approach.

Liquidity and Market Risk

27. The tests show that the banking system is resilient to a sudden withdrawal of funding. The LCR-based stress tests used more severe assumptions than prescribed by Basel and comprised an *idiosyncratic* scenario, with higher run-off rates to unsecured funding and lower inflow rates than those prescribed by Basel; a *systemic* scenario, with higher haircuts to high quality liquid assets (HQLA) and increased net cash-outflows; and a *combined* scenario which applies the most stressed assumptions from the previous scenarios. The system-wide LCR ratio was 140 percent in March 2017, the tests' starting point. The average LCR ratio falls by 40 basis points under the systemic scenario, by 46 basis points under the idiosyncratic scenario, and by 64 basis points under the combined scenario, leaving the stressed LCRs at reasonably high levels. Banks' resilience to liquidity stress is due to the high quality of their liquidity buffers and reliance on stable deposits on average, although some banks appear vulnerable to idiosyncratic shocks. The cash-flow-based tests largely confirm the results of the LCR-based tests.

28. Asset encumbrance appears to be well managed in general but is a potential risk for some banks. The average asset encumbrance ratio of Belgian banks was 12 percent in 2016, which is not high, but is significantly higher for a few large banks. Asset encumbrance is explained by large derivative books against cash collateral (in some cases related to legacy portfolios), covered bonds against mortgage loans, and repo transactions supported by general collateral. The risks posed by asset encumbrance under stress (i.e., stressed flows from margin calls) are not well captured by the LCR and, thus, the risks posed by asset encumbrance should be monitored separately.

Interconnectedness and Contagion

29. The risk of contagion and spillovers is moderate. Contagion among Belgian systemic institutions (SIs) was assessed using data on large exposures. The analysis was based on the simulation of single credit counterparty defaults to explore whether this could lead to subsequent rounds of defaults. No bank triggered consecutive defaults by other institutions. This result is largely driven by the small size of interbank exposures relative to banks' capital, and the low connectivity of the interbank network. In addition, an application of the CoVaR methodology reveals that the risk of inward and outward spillovers caused by stress in domestic or foreign peer banks is moderate. Linkages with the shadow banking sector were not formally analyzed, although banks' exposures to other entities (including those engaging in shadow banking activities) were considered.

FINANCIAL STABILITY POLICY FRAMEWORK

A. Systemic Risk Assessment and Macroprudential Policies

30. The macroprudential policy framework has been upgraded since the 2013 FSAP (Appendix IV). The NBB was made responsible for monitoring of systemic risks and taking macroprudential policy action in April 2014. Its framework for analyzing systemic risks includes the use of early-warning indicators, stress tests, and the analysis of market trends. Recently, the NBB and the Financial Services and Markets Authority (FSMA) prepared an extensive report on asset management and shadow banking. In the exercise of its macroprudential mandate the NBB must act in conjunction with the Minister of Finance or Council of Ministers, since the deployment of any macroprudential policy requires the issuance of a Royal Decree.

31. The NBB has demonstrated a strong willingness to act but recent events raise questions about its ability to do so in a timely manner. To mitigate rising risks in the residential real estate market, the NBB introduced in 2013 a 5 percent risk weight add-on for banks using internal ratings-based models (IRB banks). In 2016, the NBB introduced capital surcharges for eight O-SIs and began to assess quarterly the need for a counter-cyclical capital buffer, currently set at 0. In early 2017, the NBB proposed an additional increase in capital charges linked to the riskiness of banks' mortgages (proxied by the loan's loan-to-value ratio), but the government rejected this measure. In November 2017, NBB proposed an alternative, but broadly equivalent measure, which would scale up by a fixed factor banks' mortgage risk weights. This measure, which is important to protect financial stability, should be approved promptly.

32. The NBB's ability to act as macroprudential authority should be strengthened. The requirement for approval by the Minister of Finance or Council of Ministers in a setting where the NBB is the sole macroprudential authority creates the risk of inaction. This is a key weakness because macroprudential policy is most effective when implemented sufficiently early. To minimize this risk, the NBB should be granted the power to implement directly cyclical macroprudential policies. Accountability of the NBB's actions in this area can be addressed ex-post, via reporting to Parliament and/or public disclosure of the rationale for NBB's actions—as is being currently done—and, if warranted, through parliamentary inquiries.

33. The authorities should continue strengthening their systemic risk analytical framework. Concrete areas include (i) further strengthening the bank stress testing framework to cover all SIs and broadening the coverage interconnectedness analysis; (ii) developing multi-period horizons for insurance stress tests and using the results in the validation of companies' Own Risk and Solvency Assessment (ORSA); (iii) enhancing the coverage and quality of the commercial real estate data; and (iv) deepening understanding of the potential systemic risks posed by the shadow banking and asset management sectors. In addition, NBB should set up a monitoring framework for the analysis of risks arising from mortgage lending by insurers.

B. Prudential Supervision

34. Financial sector supervision has been upgraded markedly in recent years. Since the 2013 FSAP, new national banking and insurance laws have been issued, amendments to the EU Financial Conglomerate Directive (FICOD) have been transposed, and Solvency II has been

implemented. This has strengthened and broadened the scope of the regulatory framework. The Single Supervisory Mechanism (SSM), responsible for over 90 percent of the Belgian banking sector assets, has made the supervision of Belgian SIs more intrusive, forward looking, and effective. NBB has enhanced the supervision of LSIs.

35. Building on recent improvements in the regulatory framework and supervisory structure, the NBB and ECB should continue to develop their supervisory approach. Both authorities should continue to devote sufficient attention and apply adequate supervisory intensity to the challenges posed by systemically important Belgian subsidiaries of EA banks, complex FCs, and the evolving risk profiles of insurance companies.

Banking and Financial Conglomerate Supervision

36. Sufficient capital and adequate supervision of the systemically important subsidiaries of EA banks should be maintained during the transition to a full banking union. Staff is fully supportive of the single market and timely completion of the banking union, inclusive of a European deposit insurance scheme and a common fiscal backstop. However, during the transition to a full banking union, changes to current prudential requirements and supervisory focus should be mindful of financial stability in member states and should be implemented gradually to minimize the risk of unintended consequences. International standards require supervisors to supervise each bank on a stand-alone basis and understand its relationship with other members of the group. They also call for adequate allocation of capital within different entities of a banking group in line with the distribution of risks.

37. Efforts to enhance the monitoring of internal models for regulatory capital must continue. Belgian banks' reliance on internal models is significant. Completing the SSM's ongoing targeted reviews of internal models will contribute to reducing the risk of unwarranted variability of risk-weighted assets. Supervisors should also continue to demand greater involvement of bank boards in the oversight of the models.

38. NPLs are relatively low in Belgium, but a more proactive role by supervisors to ensure prudent provisioning standards is desirable. Loan valuation and provisioning have traditionally been driven by accounting norms in Belgium. While the recently issued ECB guidelines introduce prudential considerations for loan classification, valuation, and provisioning, additional regulatory measures to further specify supervisory expectations and improve the prudential treatment of problem assets are needed. More intrusive supervisory reviews are also recommended.

39. The related party transactions framework needs improvement. There is no EU-wide regulation of transactions with related parties and the legal definition of related party transaction in the Belgian framework is too narrow. The definition of related parties and the types of transactions covered by it should be broadened and banks should be required to establish sounder policies and processes to identify them. Supervisors should develop guidance for the evaluation of FC intragroup transactions, assess the economic purpose of intragroup transactions, and identify those aimed at circumventing regulatory requirements. Supervisory manuals should highlight, for cases where

supplementary supervision has been waived, all remaining risk transmission channels including reputational risk.

40. Special purpose entities (SPEs) should be brought within the scope of supervision.

Supervisors should have the power to develop a process for determining whether an SPE is to be fully or proportionally consolidated for regulatory purposes. The overall nature of the relationship between SPEs and the financial groups should be contemplated, going beyond traditional control and influence criteria. Stress tests and scenario analyses should consider all relevant off-balance sheet activities.

41. Supervisory expectations on FC governance and risk management should be heightened.

The SSM Supervisory Manual provides supervisors with limited insight beyond the regulatory requirements. Defining best practices and providing further guidance is critical for effective FC supervision.

Insurance Supervision

42. The NBB should continue to address the challenges arising from the insurers' evolving risk profiles.

These relate particularly to insurers' increasing liquidity risk because of their transition to asset management type products and their acquisition of mortgage loan portfolios. While insurers currently have sufficient liquid assets to meet their immediate liquidity needs, a robust regulatory framework for liquidity risk should be put in place over the medium to long term. In addition, Brexit has prompted the reallocation of reinsurance business to Belgium, and this will pose additional challenges. The NBB should seek to implement measures to address the rising liquidity risk of the insurance sector, strive to retain its highly-qualified staff, and enhance its resources as the size and complexity of the industry increases.

43. Proactive engagement with the industry to promote gradual improvements in the quality of capital is strongly recommended.

Although the industry already meets Solvency II requirements, reliance on lower quality forms of capital is a concern. This includes subordinated loans from parent banks and unrecognized gains on new insurance products with greater flexibility of surrender, which are vulnerable to redemption risk. Also, the use of the volatility adjustment may have led to an overstatement of insurers' solvency.

C. SWIFT Oversight

44. SWIFT is not a regulated payment or settlement system, but it is subject to NBB oversight as a CSP.

The practical oversight modalities are laid down in a protocol between SWIFT and the NBB. The oversight approach is based on moral suasion, with the NBB having primary oversight responsibility, supported by the G-10 central banks. The NBB also has information-sharing arrangements with the Eurosystem High-Level Group on SWIFT Oversight and the SWIFT Oversight Forum.

45. While the current approach has been effective so far, it is being challenged by evolving risks.

The effectiveness of the oversight arrangement depends crucially on SWIFT's continued willingness to cooperate. But the changing nature of risks, including cybersecurity

incidents at SWIFT's customers, calls for a reassessment of the arrangement. Lack of cooperation by SWIFT, particularly in a crisis, would leave the Belgian authorities with limited legal means to react and could pose significant reputational risks to Belgium and the NBB as the lead overseer.

46. The authorities should consider complementing the NBB's use of moral suasion with additional regulatory and supervisory powers. Enhanced legal backing for and transparency about the NBB's oversight role could help maintain trust in SWIFT in the face of increasing risks. These additional powers could be used, where necessary, to address any emerging oversight challenges, such as delays in implementing the authorities' recommendations or lack of timely incident reporting.

47. It is recommended to broaden the membership in the SWIFT Oversight Forum and sharing of SWIFT oversight and assurance reports. The Oversight Forum should be composed of countries from different regions and at different stages of economic development. More information should also be available to authorities that are not part of the core group but have a legitimate interest, given the dependency of their financial institutions and market infrastructures on SWIFT. This is particularly relevant in the case of SWIFT's self-assessment against the oversight expectations and its information security assurance reports.

FINANCIAL SAFETY NET AND CRISIS MANAGEMENT

48. While national and EU level actions have improved the Belgian financial safety net and crisis management arrangements, further steps are needed. The establishment of the SSM and SRM are important achievements at the European level. At the national level, the EU recovery and resolution framework was implemented, and the NBB Resolution Board was established. The NBB also participates in the SSM and the SRM—and the national authorities continue to exercise their national roles for deposit insurance and emergency liquidity assistance (ELA). Despite the progress achieved so far, additional measures are needed to fully operationalize the new recovery and resolution framework, strengthen depositor protection, and address some operational deficiencies.

49. The Belgian authorities are concerned about the consequences of potentially insufficient loss-absorbing capacity at the level of large subsidiaries of EA banks. They are subject to group recovery and resolution plans (RRPs) and expected to be resolved at the parent level under a single point of entry (SPE) resolution strategy. Resolution planning for SIs follows the SRB timeline, and the SRB intends to decide on internal loss absorbing capacity (or MREL, in the EU) allocation within groups and on subsidiary-level targets in 2018, possibly subject to a transitional period. The lack of sufficient subsidiary-level MREL, together with the subsidiary holding bail-inable debt issued by its parent, could jeopardize the SPE strategy. In that event, the subsidiary would need to be resolved separately, which could result in unduly large losses for its creditors and contagion to the real economy, the mitigation of which could be costly for the Belgian authorities.

50. The SRM should ensure the feasibility of resolution strategies for banking groups with systematically important subsidiaries. As stated earlier, staff supports the completion of the Banking Union, but it is also mindful of the need to protect financial stability in member states during the transition. Consistent with the FSB and EBA guidance, internal MREL targets should

support the group resolution strategy and enable the recapitalization of material subsidiaries. Meanwhile, Belgium has adopted legislation authorizing a new macroprudential tool for setting minimum funding requirements for financial stability purposes.

51. The Guarantee Fund for Financial Services should be strengthened. The fund administers both the Belgian DIS and the national resolution fund, both of which are notional funds. Fees collected from the industry are transferred to the government. In return, the Guarantee Fund can draw on the Federal Treasury up to the accumulated amounts. To ensure consistency with international standards and ready access to the funds, especially in times of fiscal duress, the funds should be segregated from government funds. The DIS should also have standing credit lines with the Ministry of Finance. To increase depositor confidence, the current DIS pay-out period should be shortened to seven days in 2019 instead of 2024.

52. The NBB should enhance its ability to undertake effective resolution of LSIs. The NBB should prioritize resolution planning for the two LSIs holding the highest share of insured deposits. At present, the insured deposits in these two LSIs exceed the DIS funds. The NBB should also ensure a smooth and decisive transition from early intervention to resolution for LSIs, with ample time for resolution preparation. A protocol should detail the cooperation and information sharing between the NBB supervisory and resolution staff.

53. Further actions are needed to operationalize the financial safety net and crisis management arrangements. Currently, the ex-ante judicial review of all NBB's decisions on transfer of assets and liabilities takes at least seven business days. This delay should be eliminated or shortened. In a system-wide crisis, the NBB Resolution Board could serve as a platform for cooperation, while member agencies would autonomously exercise their powers. A committee of the Resolution Board should be mandated to more proactively oversee the national financial crisis preparedness, including organizing regular financial crisis simulation exercises.

FINANCIAL INTEGRITY

54. Belgium's 2014 AML/CFT evaluation found a well-established regime, notwithstanding some deficiencies. Overall, the regime produced relatively good results. Some adjustments were nevertheless necessary, notably with respect to the authorities' understanding of money laundering and terrorist financing (ML/TF) risks and their AML/CFT strategy, the implementation of preventive measures by some sectors, AML/CFT supervision, and the transparency of legal entities.

55. The legal framework has since been strengthened. The new AML/CFT law transposing the EU 4th AML Directive came into force in October 2017. It strengthens the preventive measures and sets the basis for a registry of beneficial owners of legal entities and arrangements (expected to become operational in mid-2018). The authorities updated the assessment of Belgium's ML/TF risks, and took measures to enable swifter implementation of TF-related targeted financial sanctions and the domestic designation of terrorists.

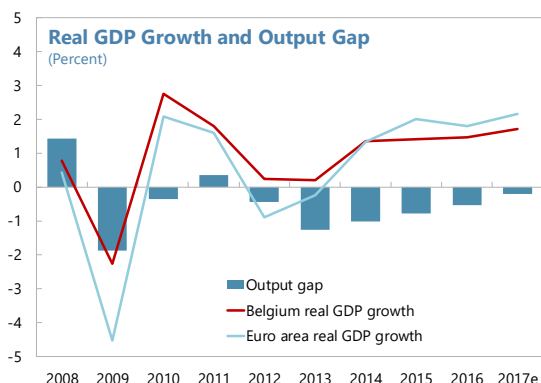
56. Institutional changes were also made. The NBB increased and centralized its AML/CFT resources and started developing a risk-based approach to supervision, collecting more granular information from supervised entities, and refining its analysis. Other AML/CFT supervisors increased their outreach to reporting entities and provided access to tools facilitating customer due diligence, which led to a significant increase in suspicious transactions reporting.

57. The authorities should continue to strengthen the effectiveness of the AML/CFT regime. They should communicate the results of the updated risk assessments to reporting entities and ensure that the new risk-based supervision framework is implemented in an effective way. Notwithstanding ongoing EU level discussions, the authorities should ensure adequate transparency of beneficial ownership of legal persons and arrangements.

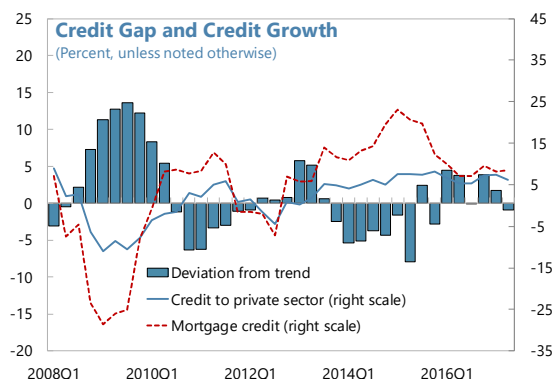
Figure 1. Belgium: Macroeconomic Developments 2008–2017

A moderate economic recovery is proceeding alongside a dynamic financial cyclical upswing.

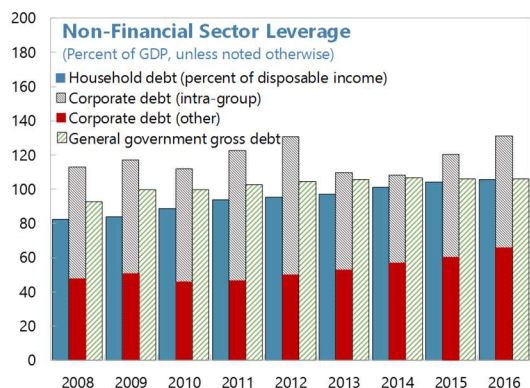
The economic recovery begun in 2014 has been modest;



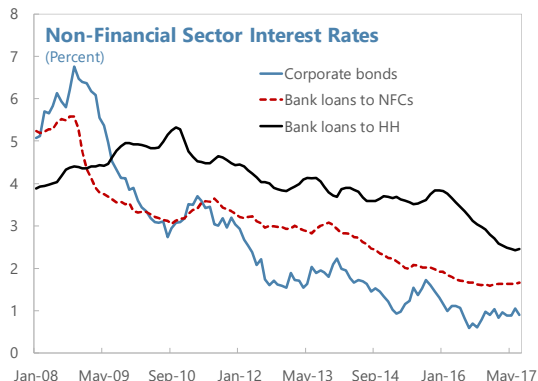
and the financial cycle has gathered strength since 2016.



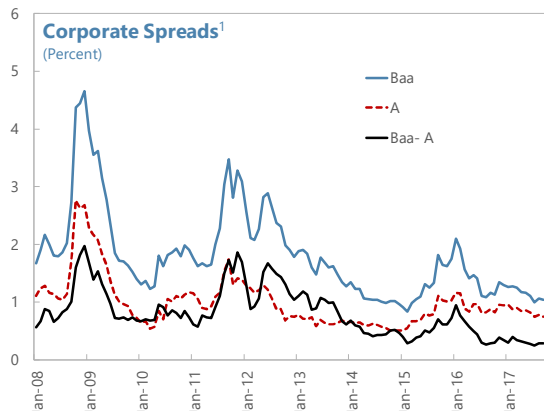
Leverage has risen steadily among households and picked up steam in the last two years among corporates.



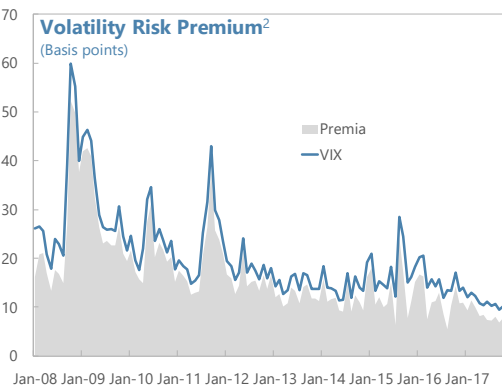
The financial cycle has been fueled by low and declining interest rates...



...compressed credit risk premia...



...and low volatility risk premia.



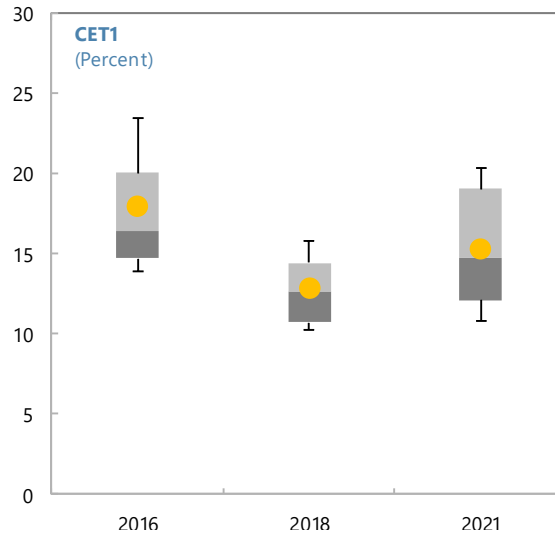
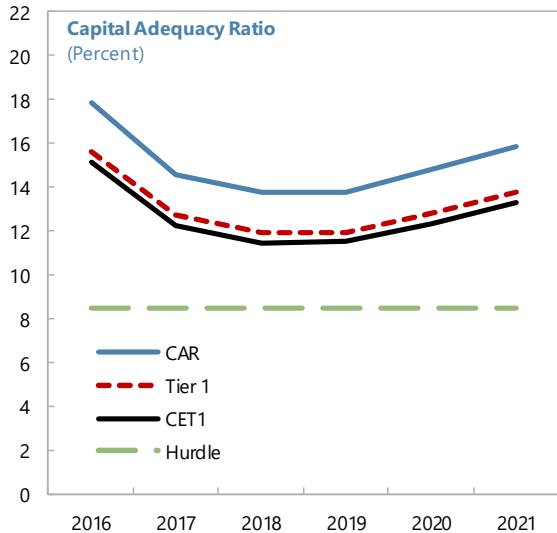
Sources: National Bank of Belgium; Bloomberg L.P.; Haver Analytics; Eurostat; Thomson Reuters; Barclays Capital Research; and IMF staff calculations.

1/ Euro area corporate bonds (5-year maturity) over AAA government bond yield.

2/ Difference between the VIX and a measure of realized volatility for the BEL20 index (classical estimator).

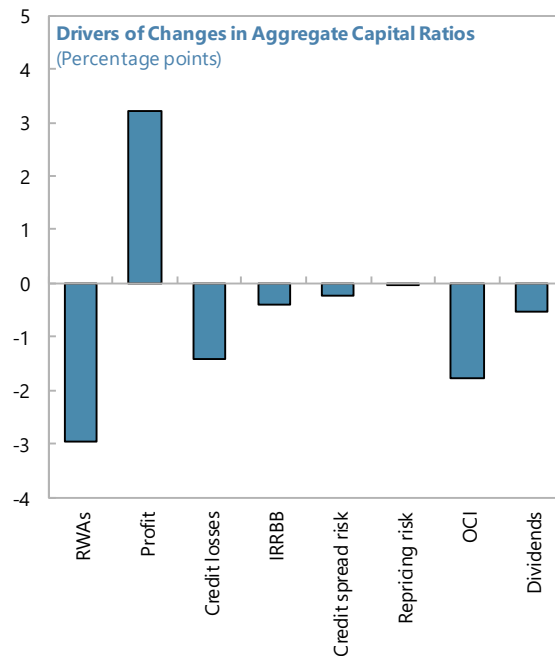
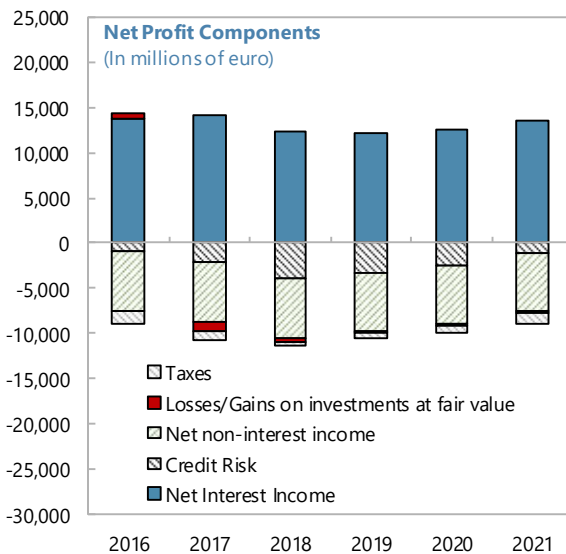
Figure 2. Belgium: Results of the FSAP Solvency Stress Test ^{1/}

Under the adverse scenario, all banks would still meet minimum requirements but there is a large dispersion of impact across banks. Risk-based bank CET1 ratios decline by 370bps at the low point of stress to 11.4 percent...
with a wide dispersion in impact across banks.



Profit and loss impact is driven by the compression in net interest income and an increase in loan loss rates.

The fall in aggregate capital ratios in 2018 is mainly driven by stressed RWAs, credit losses, and portfolio valuation losses.



Sources: IMF Staff Estimates.

Note: Capital impact is shown relative to the starting point. OCI includes movements in accumulated "other comprehensive income" mainly from unrealized gains and losses in the available for sale portfolio. Profit (RHS bottom chart) includes Net profit (LHS bottom chart) and excludes risk losses with P&L impact (i.e., loss provisions, interest rate risk, credit spread risk, repricing risk in the trading book and investments at fair value, commodity risk, and other market risk). OCI and Dividends affect regulatory capital but do not impact P&L.

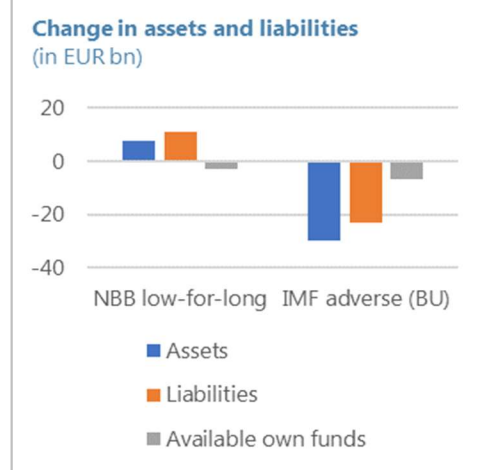
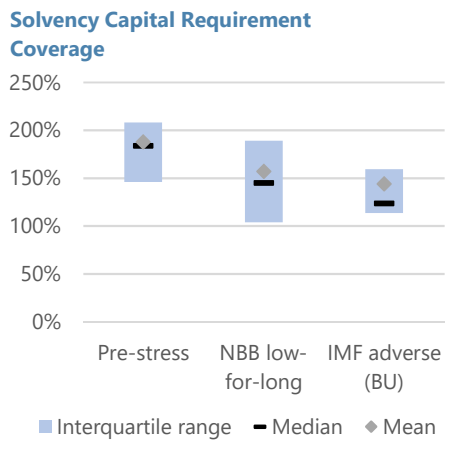
^{1/} The sample of banks included the six major Belgian banks. Boxplots include the mean (yellow dot), the 25th and 75th percentiles (grey box, with the change of shade indicating the median), and the 10th and 90th percentiles (whiskers). The dashed line indicates the minimum capital regulatory ratio.

Figure 3. Belgium: Insurance Solvency Stress Tests

The Belgian insurance sector is well capitalized and able to withstand severe shocks to financial markets.

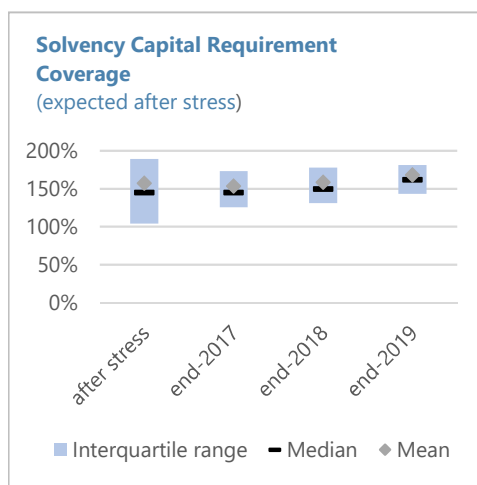
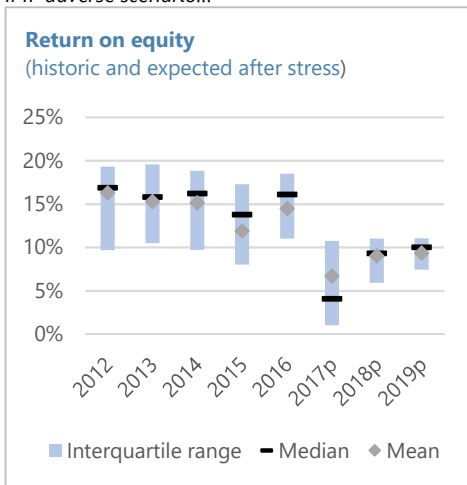
Solvency ratios decline markedly in the adverse scenarios, but generally remain above 100.

The scenarios impact gross assets and liabilities in opposite directions, but reduce available own funds.



On aggregate, the sector remains profitable after stress in the IMF adverse scenario...

... and solvency ratios recover slowly.



Source: IMF staff calculations based on company submissions.

Note: Return on equity projections after stress are only available for six companies out of the sample of eight.

Table 1. Belgium: Selected Economic Indicators

	Projections							
	2016	2017	2018	2019	2020	2021	2022	2023
	(Percent change, unless otherwise indicated)							
Real economy								
Real GDP	1.5	1.7	1.9	1.7	1.5	1.5	1.5	1.5
Domestic demand	2.1	1.4	1.8	1.7	1.5	1.5	1.5	1.5
Private consumption	1.7	1.1	1.4	1.6	1.6	1.6	1.6	1.6
Public consumption	0.5	0.7	0.7	0.6	0.6	0.7	0.6	0.6
Gross fixed investment	3.6	1.1	3.7	3.2	2.1	2.1	2.2	2.2
Stockbuilding 1/	0.2	0.4	0.0	0.0	0.0	0.0	0.0	0.0
Foreign balance 1/	-0.6	0.3	0.1	0.0	0.0	0.0	0.0	0.0
Exports, goods and services	7.5	4.5	4.7	4.0	3.8	3.4	2.9	3.1
Imports, goods and services	8.4	4.3	4.6	4.1	3.9	3.4	2.9	3.1
Household saving ratio	11.2	11.6	12.3	12.3	12.5	12.5	12.5	12.5
Potential output growth	1.2	1.4	1.2	1.4	1.6	1.6	1.6	1.6
Potential output growth per working age person	1.1	1.1	1.1	1.4	1.6	1.6	1.6	1.6
Output gap (in percent)	-0.5	-0.2	0.4	0.7	0.6	0.5	0.3	0.2
Employment								
Unemployment rate (in percent)	7.9	7.3	7.0	6.8	6.7	6.7	6.6	6.6
Employment growth	1.2	1.2	1.1	0.9	0.7	0.6	0.6	0.6
Prices								
Consumer prices	1.8	2.2	1.6	1.8	1.8	1.9	1.9	2.0
GDP deflator	1.6	1.8	1.6	1.7	1.6	1.6	1.6	1.7
	(Percent of GDP; unless otherwise indicated)							
Public finance								
Revenue	50.7	51.1	50.4	50.1	49.9	49.9	49.9	49.9
Expenditure	53.2	52.3	51.7	51.4	51.1	51.1	51.1	51.1
General government balance	-2.5	-1.2	-1.3	-1.3	-1.3	-1.2	-1.2	-1.2
Structural balance	-2.2	-1.1	-1.5	-1.7	-1.5	-1.4	-1.4	-1.3
Structural primary balance	0.7	1.4	0.8	0.5	0.6	0.5	0.5	0.5
Primary balance	0.4	1.4	1.0	0.8	0.8	0.7	0.7	0.6
General government debt	105.7	103.3	101.1	99.1	97.4	95.7	94.0	93.0
Balance of payments								
Goods and services balance	1.3	1.0	1.1	1.0	1.1	1.2	1.0	1.1
Current account	0.1	0.1	0.3	0.2	0.5	0.6	0.4	0.5
Exchange rates								
Euro per U.S. dollar, period average 2/	0.9	0.9	...	...	...	...	...	...
NEER, ULC-styled (2005=100) 2/	98.9	101.2	...	...	...	...	...	...
REER, ULC-based (2005=100) 2/	99.0	105.5	...	...	...	...	...	...
Memorandum items								
Gross national savings (in percent of GDP)	24.0	23.9	24.5	24.8	25.1	25.3	25.4	25.6
Gross national investment (in percent of GDP)	23.9	23.8	24.1	24.5	24.6	24.8	25.0	25.1
Nominal GDP (in billions of euros)	423.0	438.2	453.6	468.9	483.4	498.6	514.2	530.9
Population (in millions)	11.3	11.4	11.4	11.5	11.5	11.6	11.7	11.7
Sources: Haver Analytics, Belgian authorities, and IMF staff projections.								
1/ Contribution to GDP growth.								
2/ As of November 2017.								

Table 2. Belgium: Structure of the Financial System 2007–16
(In percent unless otherwise indicated)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Banking sector										
Number of credit institutions	110	107	104	107	108	104	104	103	99	90
Domestic	52	51	48	48	47	42	39	37	37	34
Branches of foreign banks	58	56	56	59	61	62	65	66	62	56
Total assets (in billions of euros) ¹	1,578	1,422	1,191	1,151	1,147	1,049	961	996	970	1022
<i>of which</i> Four largest banks	1,489	1,324	1,092	1,003	968	857	775	816	803	850
<i>of which</i> claims on Belgian residents	449	503	483	478	500	527	488	476	478	507
Insurance sector										
Number of insurance companies	156	151	147	145	142	134	130	128	119	118
Life	30	30	29	28	26	24	23	23	21	22
Mixed	23	22	23	24	25	25	25	25	24	24
Non-life	103	99	94	91	89	83	80	78	72	70
Reinsurance			1	2	2	2	2	2	2	2
Total assets (in billions of euros) ²	220	224	234	249	257	265	271	281	286	327
Net premiums written (in billions of euros) ²										
Life	22	21	19	19	18	21	16	16	15	12
Non-life	9	10	9	10	10	11	11	12	13	15
Other financial intermediaries										
Stockbroking firms										
Number	26	23	23	23	22	20	20	20	20	20
Income (in billions of euros)	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.1
Total assets (in billions of euros)	3.1	2.7	2.3	2.4	2.0	2.2	2.3	3.2	2.1	2.4
Portfolio management companies										
Number	23	26	24	24	20	21	19	19	19	19
Income (in billions of euros)	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0
Assets under management (in billions of euros)	49	25	49	62	3	4	3	4	5.2	6.3
Management companies of undertakings for collective investment										
Number	7	7	7	7	7	7	7	7	7	8
Income (in billions of euros)	1.4	1.2	0.5	0.9	0.8	0.8	1.0	1.1	1.3	0.6
Assets under management (in billions of euros)	252	193	189	194	178	178	175	201	217.6	221.6
Undertakings for collective investment distributed in Belgium										
Number of investment companies	410	432	425	460	484	509	521	578	638	619
Belgian law	179	171	149	148	142	144	130	128	130	143
Foreign law	231	261	276	312	342	365	391	450	508	476
Assets under management	188	128	135	139	115	118	132	164	204	n.a.
Pension funds										
Number	277	270	263	251	245	237	201	196	200	199
Total assets (in billions of euros)	15	13	14	16	16	19	20	23.4	24.7	n.a.

Sources: National Bank of Belgium, Belgian Asset Managers Association, and Financial Services and Markets Authority.

¹ On consolidated basis.

² On company basis. Figure for insurance total assets in 2016 at market value.

Table 3. Belgium: Financial Soundness Indicators for the Banking Sector, 2009–16¹

	2009	2010	2011	2012	2013	2014	2015	2016
Earnings and profitability								
Return on assets	-0.1	0.5	0.0	0.1	0.3	0.5	0.6	0.6
Return on equity	-2.7	10.7	0.7	3.0	5.9	7.7	10.1	9.1
Net interest income to total income	79.1	68.3	71.2	71.6	62.6	70.2	67.7	66.0
Interest margin	0.8	1.2	1.2	1.3	1.2	1.6	1.8	1.8
Average yield on assets	2.8	2.8	2.9	2.9	2.6	2.7	2.6	2.6
Average cost of funding	2.0	1.6	1.7	1.7	1.4	1.1	0.8	0.6
Noninterest income to gross income	20.9	31.7	28.8	28.4	37.4	29.8	32.3	34.0
<i>Of which:</i> Net fee and commission income	30.1	25.6	26.8	28.3	27.7	25.8	26.7	25.1
(Un)realized capital gains booked in P&L	-14.5	-0.2	-3.9	0.2	6.0	-0.3	5.3	6.7
Cost/income ratio	77.7	66.0	67.3	73.4	62.4	61.2	58.6	58.4
Structure assets								
Total assets (in percent of GDP)	349.2	323.2	310.2	278.7	251.0	249.0	236.5	266.1
<i>Of which</i> (in percent of total assets):								
Loans to credit institutions	13.1	17.0	15.2	12.4	12.3	9.1	8.5	7.5
Debt securities	22.3	20.1	18.5	18.4	18.9	19.6	18.0	16.4
Equity instruments	0.8	0.5	0.4	0.6	0.4	0.6	0.7	0.4
Derivatives	11.3	11.6	14.6	11.5	6.8	8.4	6.4	5.8
Loans to customers	45.0	44.0	44.4	48.1	53.9	54.1	56.4	55.4
<i>Of which:</i> Belgian residents (in percent of loans)	59.0	64.0	69.7	72.0	69.4	69.2	69.2	71.0
Other EMU residents (in percent of loans)	19.0	19.0	16.9	15.0	15.7	16.2	16.1	15.1
Rest of the world (in percent of loans)	22.0	17.0	13.4	13.0	14.9	14.5	14.7	13.9
Mortgage loans (in billions euros) ²	158.0	178.5	183.9	188.3	190.8	202.4	216.1	229.7
Consumer loans (in billions euros) ²	17.0	23.7	23.2	24.0	26.9	17.2	19.7	24.8
Term loans (in percent of loans)	44.0	42.3	40.0	39.3	40.8	n.a.	n.a.	n.a.
Reverse repo operations (in percent of loans)	7.3	7.3	4.2	3.3	3.1	2.3	2.5	2.8
Funding and liquidity (in percent of total assets)								
Debts to credit institutions	14.1	15.4	11.2	11.0	10.7	9.1	8.5	10.3
Bank bonds and other debt securities ³	12.6	10.9	8.8	10.6	10.1	9.3	9.1	9.3
Customer deposits	46.8	46.0	46.5	49.3	54.7	58.5	61.0	58.4
<i>Of which:</i> Sight deposits ⁴	13.2	13.7	12.6	15.1	18.1	24.2	28.4	26.4
Saving deposits ⁵	13.7	16.2	16.0	18.9	21.0	19.9	20.8	25.6
Term deposits ⁴	8.9	8.5	9.6	9.2	9.6	8.9	8.1	6.2
Retail deposits ⁵	23.8	26.1	26.5	30.6	34.8	33.5	35.1	35.6
Repo's	7.1	5.0	5.2	2.3	2.7	2.3	1.7	0.2
Liquid assets ⁶	31.5	32.5	34.3	36.4	36.8	32.8	32.2	32.5
Asset quality								
Sectoral distribution of loans (in percent of total assets)								
Credit institutions	13.1	17.0	15.2	12.4	12.3	9.1	8.5	6.1
Corporate (until 2013) / Non financial corporations (as of 2014)	20.5	17.2	16.4	16.3	18.5	20.6	22.0	21.4
Retail (until 2013) / Households (as of 2014)	19.9	22.1	22.9	26.3	29.4	25.5	27.4	27.5
Central governments (until 2013) / General government (as of 2014)	1.2	1.0	0.8	0.8	1.0	4.4	4.3	4.1
Non-credit institutions (until 2013) / Other financial corporations (as of 2014)	3.4	3.8	4.3	4.7	5.0	3.5	2.7	2.4
Non-performing loans (NPL) as percent of gross loans ⁶	2.7	2.8	3.2	3.2	3.1	2.7	2.6	2.4
Provisions and write-offs as percent of NPL ⁶	51.0	53.0	49.4	53.0	54.1	57.1	54.3	55.7
Capital adequacy								
Regulatory capital to risk-weighted assets	17.3	19.3	18.5	18.1	18.7	17.3	18.7	18.8
Regulatory Tier 1 capital to risk-weighted assets	13.2	15.5	15.1	15.8	16.4	15.1	16.0	16.2
Capital to assets	4.5	5.0	4.6	5.8	6.4	6.6	6.5	7.1
NPL net of provisions as percent of Tier 1 capital ⁶	13.8	12.2	14.2	13.4	12.3	12.0	12.9	10.7
Net open position in foreign exchange to capital	4.7	3.3	1.4	2.1	2.1	3.4	2.6	2.1

Sources: National Bank of Belgium.

¹ Consolidated data. Data are based on the IAS/IFRS reporting scheme.² Only loans to households as of 2014³ Excluding saving certificates as of 2014⁴ Deposits booked at amortized cost only.⁵ Only household deposits as of 2014⁶ Unconsolidated data.

Table 4. Belgium: Financial Soundness Indicators for the Insurance Sector, 2012–17
(In percent, unless otherwise stated)

	2012	2013	2014	2015	2016	H1 2017
Insurance sector						
Capital adequacy						
Shareholder equity and reserves / total assets	5.2	5.1	5.3	4.9	4.8	...
Solvency coverage ratio (Solvency I)	196.7	207.4	221.3	213.1	...	...
Solvency coverage ratio (Solvency II, SCR) 1/	...	...	...	183.7	175.8	189.4
Profitability						
Growth in gross written premiums - life business	12.8	-22.9	-0.1	-5.8	-4.5	...
Growth in gross written premiums - non-life business	8.0	2.6	16.3	1.5	0.5	...
Loss ratio (net paid claims / net premiums) - non-life business	64.6	64.3	63.3	61.7	64.6	...
Expense ratio (net expenses / net premiums) - non-life business	30.0	30.5	30.8	30.3	31.5	...
Combined ratio (loss ratio plus expense ratio) - non-life business	94.5	94.8	94.1	92.1	96.1	...
Return on equity 2/	20.6	11.2	9.7	8.5	14.3	...
Return to gross premiums	7.2	4.7	4.2	3.7	4.3	...
Asset quality						
Stocks / total assets 3/	3.7	4.4	4.5	4.6	4.9	4.9
Bonds / total assets 3/	62.7	59.6	58.0	55.6	62.7	61.8
Domestic government bonds / total assets 3/	25.7	25.7	23.5	22.4	23.7	...
Fixed income assets below investment grade / fixed income assets	...	...	...	...	1.0	0.9
Investment yield 2/	4.1	3.9	4.1	4.0	3.8	...
Average guaranteed interest rate - life business	3.1	3.0	2.9	2.8	2.7	...
Liquidity						
Liquid assets (bonds, listed stocks, deposits) / total assets	71.8	70.3	69.1	67.3	67.0	66.0
Lapse rate (based on technical provisions) - life business	4.3	4.1	3.8	4.9	5.0	...
Reinsurance and actuarial issues						
Risk retention ratio (net premium / gross premium)	92.9	91.6	90.0	89.7	88.5	...
Net technical reserves / average of net claims paid in last three years	310.4	309.6	319.0	312.8	309.0	...
Net technical reserves / average of net premium received in last three years	2.0	2.0	2.0	1.9	1.9	...
Management soundness						
Gross premiums / number of employees (thousands of EUR)	1,597	1,375	1,499	1,494	1,500	...
Total assets / number of employees (thousands of EUR)	12,458	12,649	13,342	13,858	13,990	...

Source: NBB

1/ Data for 2015 based on Solvency II "Day 1" reporting as of 01/01/2016.

2/ Only for composite insurers.

3/ Book values until 2015, afterwards market values.

Appendix I. Risk Assessment Matrix (RAM)

Source of risk	Overall Level of Concern	
	Likelihood of severe realization in 1–3 years	Expected impact on financial stability
Sudden increase in global risk aversion.	<p>Low</p> <ul style="list-style-type: none"> Repricing in global fixed income markets triggered by an abrupt decompression of asset risk premia amplified by low secondary market liquidity, interacted with the reemergence of financial stress in the euro area. Over the past few years, there has been a gradual reduction in market depth of some bond markets, with short-lived episodes of significant market corrections. 	<p>Medium</p> <ul style="list-style-type: none"> This would lead to a sizeable pick-up in money market rates, a steepening of the yield curve, reductions in market liquidity, and broad-based financial market dislocation, leading to mounting losses in fair value instruments and pushing up funding costs. Belgian banks' ability to issue debt securities in wholesale markets would be hampered by market disruptions exacerbating liquidity risk.
A large correction in the Belgian real estate market.	<p>Low</p> <ul style="list-style-type: none"> After picking up strongly in 2015, housing price increases slowed down in Belgium in 2016. Overvaluation estimates have stabilized at around 8 percent. Although Belgian commercial property prices have been less buoyant than in other European countries, exposures to the construction and real estate sector have grown dynamically over the last decade with 10 percent of the loans granted to Belgian regulated real estate investment companies (REITS). 	<p>High</p> <ul style="list-style-type: none"> A fall in real estate prices, would lead to higher impairment charges affecting primarily highly leveraged households given the relatively high share of risky mortgage loans in Belgium. Thus, a broader deterioration in credit risk would materialize. Insurers hold sizable mortgage loan portfolios compared to EU peers, amounting to almost 10 percent of assets. The extension of the macroprudential measure to add a 5pp risk weight add-on for real estate mortgages by IRB banks has increased Belgian banks' capacity to absorb losses.
Reassessment of regional sovereign risk.	<p>Low</p> <ul style="list-style-type: none"> Financial stress in the euro area could re-emerge triggered by political uncertainty, faltering reforms, or confidence shocks over debt sustainability concerns. 	<p>High</p> <ul style="list-style-type: none"> Re-emerging sovereign debt sustainability concerns would push down securities' market valuation, weaken banks' and insurers' balance sheets and worsen banks' funding costs. Albeit the size of the sovereign bond portfolio has remained broadly stable, its relative importance in the fixed income securities portfolio of banks has increased to about 75 percent in 2016, while insurers hold nearly 60 percent of their assets in sovereign bonds.
A prolonged period of low growth and low interest rates in the EA	<p>Medium</p> <ul style="list-style-type: none"> This could be driven inter alia, by a retreat from cross-border integration, and ripple effects from Brexit. Low nominal growth would impact Belgium through falls in export demand, financial linkages, 	<p>Medium</p> <ul style="list-style-type: none"> Low credit growth and low lending rates would adversely affect bank earnings through a compression of net interest income. Borrowers' creditworthiness would also be affected, leading to greater than expected defaults, write-offs, and loan impairment charges. The adverse effect on net income could be amplified by

Source of risk	Overall Level of Concern	
	Likelihood of severe realization in 1–3 years	Expected impact on financial stability
	and confidence effects.	<p>large currency fluctuations in geographies material to large Belgian internationally active banks.</p> <ul style="list-style-type: none"> • While insurers have partially shifted away from guaranteed life business and improved their ALM, low yields still weigh heavy on profitability.

A Banking Sector: Solvency Test			
Domain		Framework	
		TD by NBB	TD by FSAP Team
1. Institutional perimeter	Institutions included	Six major banks: Argenta, AXA Bank Belgium, Belfius Banque, BNP Paribas Fortis, ING Belgium, and KBC Group. The criteria used to determine the institutional perimeter include: firms' balance sheet, firms' share in the domestic market, and firms' role in the Belgian payment system. The stress tests were conducted at the highest level of consolidation in Belgium, including the insurance arm for KBC Group and Belfius, the consolidation of banking associates, and foreign subsidiaries. The NBB analysis covered the same sample at a solo level, excluding foreign subsidiaries.	
	Market share	About 90 percent of total banking sector assets.	
	Data	Effective date: December 2016. Data: Supervisory data. Scope of consolidation: Projection of consolidated ratios based on solo estimates.	Effective date: December 2016. Data: Supervisory data, including NBB's pre-2014 reports and ECB post-2014 ITS templates. Supervisory data was complemented with public sources including: bank Pillar 3 disclosures, Bloomberg, Dealogic, Haver Analytics, Moody's KMV, Fitch, International Financial Statistics (IFS), IMF Global Assumptions (GAS), and IMF WEO. Scope of consolidation: Consolidated group basis. Treatment of insurance activities: Insurance-generated dividends and commissions are recognized in financial conglomerates' income statement. Bank P&L projections incorporate the results of the insurance stress test through the impact of the upstreaming of dividends and fees and commissions on net income.
	Stress testing process	The NBB conducted its own TD macroprudential stress test based on the WEO forecast (baseline) and IMF's Global Macrofinancial Model with shocks to residential and commercial real estate prices estimated outside the framework (adverse). NBB used its own satellite models for credit risk projections and P&L impact.	The FSAP team conducted its own TD macroprudential stress test based on the WEO forecast (baseline) and IMF's Global Macrofinancial Model with shocks to residential and commercial real estate prices estimated outside the framework (adverse). For IRB exposures, a separate credit risk model was calibrated for five Basel asset classes, core industry sectors, and eleven material geographies for internationally active banks including Belgium, Bulgaria, Czech Republic, France, Hungary, Ireland, Luxembourg, Netherlands, Slovakia, Switzerland and Turkey.

A Banking Sector: Solvency Test			
Domain		Framework	
		TD by NBB	TD by FSAP Team
			<p>For STA exposures, stressed NPL ratios, stressed coverage ratios, and a stressed transition matrix for performing exposures is projected.</p> <p>For market risk, stress to all sovereign issuers to which Belgian banks are exposed is modeled. A corporate benchmark index is modeled separately.</p> <p>The TD stress test included an assessment of the impact from a 'low-for-long' environment and a sensitivity test of the mortgage portfolio.</p>
2. Channels of risk propagation	Methodology	<p>Risks in the Belgium portfolio were projected using a variety of models (based on borrowers' stressed financials), and macro models (based on stressed projections for key macroeconomic and financial variables).</p> <p>The NBB modeled the impact of a sharp rise in wholesale and retail funding costs, and how the increase in funding costs is passed on to customers drawing on econometric work.</p>	<p>A comprehensive battery of econometric and structural models was specifically developed and calibrated for the 2018 Belgium FSAP.</p> <p>For credit risk, over 55 credit risk models and around 500 econometric specifications were estimated for PDs based on bank-specific regressions, panel regressions, and dynamic equations.</p> <p>Net trading income on equity positions, debt instruments, and trading derivatives was projected using a Bayesian VAR approach at the bank level.</p> <p>Bank funding costs were linked to euribor benchmark rates and bank spreads separately for deposits and outstanding debt instruments based on past behavior of yields at issuance under stressed conditions. Funding costs were estimated using a Bayesian VAR approach at the bank level and by instrument (i.e., deposits, debt instruments).</p> <p>Lending rates were linked to OLO benchmark rates for mortgages, bank commercial spreads over stressed funding costs, and macrofinancial conditions.</p> <p>Mark-to-market losses from full revaluation of sovereign securities were projected for twenty-three issuers and a BAA corporate index, excluding shocks to portfolio hedges for interest rate risk.</p>
3. Tail shocks	Scenario analysis	<p>The adverse scenario is calibrated using the IMF's Global Macrofinancial Model and auxiliary models to estimate stressed paths for residential and commercial real estate prices.</p> <p>The calibration of the scenario follows a layer-of-shocks approach characterized by the simultaneous realization of exogenous shocks and the endogenous structural response of the economy, which amplifies the initial macrofinancial impact of shocks. The narrative of the scenario features the re-emergence of financial stress and sovereign default risk in the euro area economies (money market spreads rise by 125 bps and 10y Belgium government bond yields increase by 150 bps),</p>	

A Banking Sector: Solvency Test		
Domain	Framework	
	TD by NBB	TD by FSAP Team
	<p>the effect of a tightening of global financial conditions (long-term yields raise by an average of 100bps and equity prices fall by 20 percent in the EA, Japan, the UK and the U.S.), and an autonomous domestic demand-driven contraction in Belgium triggered by sovereign risk concerns and large property market corrections (private investment and private consumption drop by 12 percent and 3 percent, respectively; real residential property prices and commercial real estate prices fall by 20 percent peak-to-trough).</p> <p>To capture stress in material geographies for Belgian internationally active banks, the scenario includes a regional layer of shocks from de-globalization initiatives affecting particularly Germany and Central and Eastern European Economies material for Belgian internationally active banks.</p> <p>This scenario constitutes a 3.1 standard deviation move in two-year cumulative real GDP growth rate by 2019, calculated over 1990–2016.</p> <p>Belgium output falls 8.1 percent below baseline by 2019, while consumption price inflation falls 3.5 percentage points below baseline by 2020, and the unemployment rate rises 2.2 percentage points above by 2019. Within the euro area, the output loss is concentrated in high spread economies, which experience a fall of 9.1 percent below baseline, versus 7.2 percent in low spread economies at the low point in 2019. Despite fiscal consolidation, the government debt ratio rises 17.9 percentage points above baseline in Belgium by 2021, given lower nominal output and higher debt service costs.</p> <p>The scenario includes an additional idiosyncratic and system-wide funding risk shock triggered by dislocation of money markets and linked to banks' spreads over benchmark under stress.</p>	
	Sensitivity analysis	<p>Shocks to Belgium residential house prices impacting stressed LGDs.</p> <p>Shocks to the euro swap curve.</p> <p>Shocks to FX rates.</p> <p>Low-for-long environment.</p> <p>Shocks to concentration risk to single obligors.</p> <p>Interest sensitivity gap of the ALM book under a range of market scenarios.</p> <p>IRRBB excluding derivatives from the repricing gap schedule.</p>
4. Risks and buffers	Positions/risk factors assessed	<p><u>Credit risk</u> Estimated according to the national implementation of the CRD IV framework. Positions include retail exposures, corporate exposures, sovereign/public sector exposures, and exposures to financial institutions. Covered bonds and securitization exposures are included. Off-balance sheet exposures using baseline and stressed Credit Conversion Factors (CCFs) are included.</p> <p><u>Sovereign risk</u> Mark-to-market valuation of securities (from shocks to interest rates and credit spreads) in trading book and AFS/FVO linked to macro scenario. All sovereign issuers relevant for Belgian banks were included, namely Austria, Belgium, Bulgaria, Canada, Czech Rep., Germany, Spain, Finland, France, Hungary, Iceland, Ireland, Italy, Japan, Latvia, Lithuania, Luxembourg, Netherlands, Portugal, Slovak Rep, Slovenia, Singapore, and United States.</p>

A Banking Sector: Solvency Test			
Domain		Framework	
		TD by NBB	TD by FSAP Team
		<p><u>Market risk other than sovereign risk</u> Market stress from shocks to changes in interest rates, exchange rates, credit spreads, commodities, and equity prices.</p> <p><u>Profits</u> For Belgian financial conglomerates, stressed revenues from insurance activities under the stress test of the insurance sector are projected. Net trading income from equity positions, debt instruments, and trading derivatives. Income from loans and non-loan activities. Interest income declines for the amount of lost income from defaulted loans. Interest income from non-defaulting loans is estimated according to satellite models. Interest expenses increase due to rising funding costs linked to the macroeconomic scenario with empirically estimated pass-through, and add-on funding stress from a market event with no pass-through to lending rates. Net fee and commission income and other income evolve with macroeconomic conditions and banks' balance sheets. No change in business models (no rebalancing of portfolio). Business models and balance sheets evolve over the stress horizon according to the scenario.</p> <p><u>Regulatory impact</u> The effects of the phase-out of no-longer-eligible additional Tier 1 and Tier 2 capital are included. No conversion of additional Tier 1 capital is assumed during the stress horizon.</p>	
	Behavioral adjustments	<p><u>Dynamic balance sheets</u> Credit supply effects are disallowed to calibrate credit risk projections. Balance sheets evolve with key macroeconomic aggregates adjusting for credit demand effects. EAD under stress from off-balance sheet exposures increases about 5–10 percent on average, reflecting higher use of undrawn credit and liquidity facilities. As a conservative assumption, all facilities are assumed to be contractually irrevocable ("committed") to extend funds in the future. Maturing assets are replaced by exposures of the same type and risk. Dividends are linked to banks' net profits. Under positive profits, the dividend payout floor is set at 30 percent. Otherwise, no dividend payout is assumed. The effective tax rate evolves with the macro scenario. Losses are recognized in the same year that a shock hits. If banks' capital ratio falls below regulatory minimum during the stress test horizon, no prompt corrective action is assumed.</p>	
5. Regulatory and market-based standards and parameters	Calibration of risk parameters	Credit risk projections are based on loan loss provision ratios and non-performing exposures.	<p><u>Parameter definition</u> Point-in-time (PiT) PDs and LGDs for expected losses (P&L impact) and stressed regulatory PDs and LGDs on non-defaulted exposures for regulatory capital requirements (RWAs). Estimated non-defaulted PDs by Basel asset class and material geography.</p>

A Banking Sector: Solvency Test			
Domain		Framework	
		TD by NBB	TD by FSAP Team
			<p>Non-defaulted LGDs calculated post-credit risk mitigation by Basel asset class based on ECB's generator engine (scenario analysis), and add-on adjustments for mortgages (sensitivity analysis).</p> <p><u>Parameter calibration</u></p> <p>For IRB exposures, shifts to PDs are informed by shocks to credit risk losses based on Moody's EDFs rates (non-mortgage portfolios), and credit registry data (mortgage portfolio). PDs and LGDs evolve with the macroeconomic and financial variables of the scenario.</p> <p>For STA exposures, inflows into NPL categories are based on bank-specific and regression estimates based on supervisory data merging pre-2014 NBB supervisory reporting and post-2014 ECB ITS templates, including risk migration for performing exposures, and stressed coverage ratios.</p>
	Regulatory standards	<p>Capital definition according to Belgium implementation of CRD IV rulebook, including CET1, Tier 1, and total CAR. Capital components that are no longer eligible for additional Tier 1 and Tier 2 capital components follow CRR's transitional path.</p> <p>CET1/Tier 1/CAR ratio hurdle rate at 6.0/7.5/9.5 percent of RWAs for regulatory minimum capital of the Big-4 Belgian banks (including the O-SII fully implemented capital surcharge), and at 5.25/6.75/8.75 percent of RWAs for regulatory minimum capital of the other two O-SII Belgian banks with an additional 2.5 percent hurdle rate for the capital buffer breach. Leverage ratio (3 percent hurdle rate met with Tier 1 capital) using the Belgian implementation of CRD IV.</p>	
6. Reporting format for results	Output presentation	<p>Evolution of CET1, Tier 1, CAR, and leverage ratio, for the aggregate banking system.</p> <p>Contribution of key drivers to aggregate net profits and aggregate CET1 capital ratios.</p> <p>Number of banks and share of total assets below hurdle rates.</p> <p>Capital shortfall in terms of nominal GDP.</p>	

Liquidity Stress Testing Matrix		
Domain		Conducted with NBB
1. Institutional perimeter	Institutions	All Belgian banking institutions for the LCR-based test including seven SIs, two significant subsidiaries of EU SIs, ten core LSIs, ten other LSIs, and four subsidiaries of EU SIs with presence in Belgium. Dexia is excluded as a run-off vehicle. All eight Belgian SIs for the cash-flow based test.
	Market share	Between 95 and 100 percent of banking sector total assets.
	Data and base date	Based on granular supervisory data. The contractual based tests are based on end-2016 data. The LCR test is based on supervisory data as of June 30, 2017. The cash-flow liquidity stress tests are based June 30, 2017 except for the two significant subsidiaries of EU STs based on end-2016 data.
2. Channels of risk propagation	Methodology	Basel III measures of liquidity risk—the LCR conducted on four calibrated scenarios. Two implied cash flow tests under six alternative scenarios. Evolution and drivers of asset encumbrance ratio.
3. Risks and buffers	Risks	Funding risk, rollover risk, market liquidity risk, and liquidity risk related to systemic events, idiosyncratic risks, and margin requirements related to cash collateral for derivative positions, and government bonds for repo operations.
	Buffers	HQLA securities assessed at market values net of haircut on a security-by-security basis.
	Data and base date	Based on granular supervisory data. The contractual based tests are based on end-2016 data. The LCR test is based on supervisory data as of June 30, 2017. The cash-flow liquidity stress tests are based June 30, 2017 except for the two significant subsidiaries of EU STs based on end-2016 data.
4. Tail shocks	Size of the shock	<u>Four separate scenarios for LCR-based tests:</u> <ul style="list-style-type: none"> • LCR Scenario under standard assumptions calibrated by BCBS. • A systemic stress scenario which applies lower market values and higher haircuts to HQLA assets and impact some net outflows (higher drawings on liquidity lines; reduced inflows from financial counterparts). • An idiosyncratic stress scenario which applies higher run-off rates to unsecured funding (with 10 percent run-off rates for stable deposits), and lower inflow rates.

Liquidity Stress Testing Matrix		
Domain		Conducted with NBB
		<ul style="list-style-type: none"> A combined stress scenario of systemic and idiosyncratic risks which takes the most stressed haircuts/run-off rates from the previous scenarios. An LCR "Belgium wholesale stress" scenario. This scenario replicates the liquidity stress observed during the global financial crisis. It is characterized by: (i) a freeze of wholesale funding on the interbank market, secured funding market via repo and covered bonds, and the commercial paper market (with a run-off rate for operational deposits of 75 percent and for not-fully covered corporate deposits of 100 percent), and (ii) liquidity risk from sizeable margin calls related to secured funding, derivatives and foreign currency funding due to market liquidity shocks, derivative assignments, and unwinds and disruptions in the FX swap market (with rollover of secured funding backed by other than Level 1 and Level 2A assets of up to 0 percent). <p><u>Six separate scenarios for Implied cash-flow based tests.</u> They simulate a range of stress factors over eighteen maturity buckets ranging from one-day through twelve months (cumulative):</p> <ul style="list-style-type: none"> S0: baseline. S1: Contractual: excludes modeling adjustments to non-maturity assets and liabilities. S2: Macroeconomic: includes lower inflows from debt issuance and monies due; incorporate higher haircuts on banks' counterbalancing capacity. S3: Idiosyncratic: higher run-off rates to liabilities, including 10 percent run-off rates for stable deposits and 30 percent for other deposits. S4: Idiosyncratic (no inflows): excludes most contractual inflows except for central banks and derivative receivables. S5: Combined scenario including S2 and S3 assumptions.
5. Regulatory standards	Regulatory standards	Counterbalancing capacity above net cash outflows under stress scenario. CRD IV full implementation for the LCR ratio at 100 percent.
6. Reporting format for results	Output presentation	Changes in average liquidity position and counterbalancing capacity for each scenario. Distribution of banks' liquidity position for each scenario. Number of banks with counterbalancing capacity below net cash outflows. Banks' post-shock net liquidity position. Liquidity shortfall in terms of banking system total liabilities.

Domain		Assumptions	
		Bottom-Up by Insurance Undertakings	Top-Down by IMF
INSURANCE SECTOR: SOLVENCY RISK			
1. Institutional perimeter	Institutions included	<ul style="list-style-type: none"> • 8 composite insurers. 	<ul style="list-style-type: none"> • 8 composite insurers.
	Market share	<ul style="list-style-type: none"> • 78 percent of total balance sheet assets. 	<ul style="list-style-type: none"> • 78 percent of total balance sheet assets.
	Data	<ul style="list-style-type: none"> • Regulatory reporting. 	<ul style="list-style-type: none"> • Regulatory reporting.
	Reference date	<ul style="list-style-type: none"> • December 31, 2016. 	<ul style="list-style-type: none"> • December 31, 2016.
2. Channels of risk propagation	Methodology	<ul style="list-style-type: none"> • Investment assets: market value changes after price shocks, affecting the solvency position. • Sensitivity analysis: effect on available capital and solvency position. 	<ul style="list-style-type: none"> • Investment assets: market value changes after price shocks, affecting the solvency position.
	Time horizon	<ul style="list-style-type: none"> • Instantaneous shock. • 3-year projection (only in the baseline and the adverse scenario). 	<ul style="list-style-type: none"> • Instantaneous shock.
3. Tail shocks	Scenario analysis	<ul style="list-style-type: none"> • Adverse scenario: interest rates +50 bps (EUR, parallel shift up to a maturity of 20 years); sovereign bond spread +147 bps (Belgium), +50 bps for other low-yield euro area countries, +200 bps for high-yield euro area countries; stock prices -16.2 percent (advanced economies), -25 percent (emerging and developing economies); property prices -20 percent (Belgium), -15 percent (other countries); corporate bond spreads between +50 bps (AAA) and +300 bps (BB and lower), 5.7 percent depreciation of EUR against USD. • NBB “low-for-long” scenario: interest rate term structure (up to 20 years) at minimum of the last 2 years minus 15 bps, beyond 20 years extrapolation towards an ultimate forward rate of 2.0 percent (instead of 4.2 percent as prescribed by Solvency II). 	<ul style="list-style-type: none"> • Adverse scenario: interest rates +50 bps (EUR, parallel shift up to a maturity of 20 years); sovereign bond spread +147 bps (Belgium), +50 bps for other low-yield euro area countries, +200 bps for high-yield euro area countries; stock prices -16.2 percent (advanced economies), -25 percent (emerging and developing economies); property prices -20 percent (Belgium), -15 percent (other countries); corporate bond spreads between +50 bps (AAA) and +300 bps (BB and lower); 2 percent haircut on mortgage loan portfolio; 5.7 percent depreciation of EUR against USD.
	Sensitivity analysis	<ul style="list-style-type: none"> • Longevity shock: permanent 20 percent decline in mortality rates. • Mortality shock: permanent 15 percent increase in mortality rates. • Pandemic event: temporary 35 percent increase in disability/morbidity rates, temporary 10 percent increase in mortality rates. • Catastrophic events: (i) Windstorm Lothar (December 1999); (ii) Windstorm Xynthia (February/March 2010). 	<ul style="list-style-type: none"> • Variations of the interest rate term structure. • Default of largest financial counterparty.

Domain		Assumptions	
		Bottom-Up by Insurance Undertakings	Top-Down by IMF
4. Risks and buffers	Risks/factors assessed	<ul style="list-style-type: none"> • Market risks: interest rates, share prices, property prices, FX rates, credit spreads. • Credit risks: default in mortgage loans. • Underwriting risks: longevity, mortality, pandemic event, catastrophic events. • Summation of risks, no diversification effects. 	<ul style="list-style-type: none"> • Market risks: interest rates, share prices, property prices, FX rates, credit spreads. • Credit risks: default in mortgage loans; default of largest financial counterparty. • Summation of risks, no diversification effects.
	Buffers	<ul style="list-style-type: none"> • Product-specific. 	<ul style="list-style-type: none"> • None.
	Behavioral adjustments	<ul style="list-style-type: none"> • Management actions limited to non-discretionary rules in place at the reference date. 	<ul style="list-style-type: none"> • None.
5. Regulatory standards and parameters	Regulatory/accounting standards	<ul style="list-style-type: none"> • Solvency II. • National GAAP. 	<ul style="list-style-type: none"> • Solvency II. • National GAAP.
6. Reporting format for results	Output presentation	<ul style="list-style-type: none"> • Impact on solvency ratios (including and excluding the effect of long-term guarantee measures). • Impact on net income. • Contribution of individual shocks. • Dispersion measures of solvency ratios and net income. 	<ul style="list-style-type: none"> • Impact on solvency ratios (including and excluding the effect of long-term guarantee measures). • Impact on net income. • Contribution of individual shocks. • Dispersion measures of solvency ratios and net income.

Appendix IV. Implementation of 2013 FSAP Recommendations

Policy Action	Implementation Status
Overall financial stability oversight	
Formalize procedures and improve information exchange between the NBB and FSMA.	Implemented. Cooperation arrangements between NBB and FSMA have been formalized.
Make stress testing a routine tool within the macrofinancial policy and surveillance framework.	Implemented. Results of a supervisory solvency stress test on Belgian LSIs will be used as input for setting Pillar 2 Guidance (P2G) of LSIs in the Supervisory Review and Evaluation Process (SREP) from 2017 onwards. In the insurance sector, passing the low-for-long scenario of the annual stress test is a precondition for receiving an exemption from building up additional interest-rate risk reserves.
Enhance further stress testing of insurers using a market consistent valuation framework.	Implemented. Stress tests are generally based on the Solvency II valuation of assets and liabilities, but also use scenarios with a substantially lower ultimate forward rate, thereby eliminating the most important deviation from market-consistent liability valuation in Solvency II.
Complete the ongoing business model reviews for both banks and insurance companies, and develop a strategy for both sectors over the medium term.	Implemented. Reviews of banks' business models have been completed and are an integral part of the supervisory approach. Insurance supervisors have identified unsustainable business lines of life insurers and have actively engaged with insurers to change business models.
Develop an explicit conglomerates supervision framework and ensure consistent application of governance requirements across financial conglomerates.	Partially implemented. The new BL provides an appropriate legal framework for FC supervision but supervisory procedures need to be further developed.
Designate the NBB as the macroprudential authority, ensuring a regular dialogue with FSMA and MoF on macroprudential and financial stability matters.	Implemented. The NBB has been assigned by the law of April 25, 2014, as the designated macroprudential authority. A general MOU regarding the collaboration between the NBB and the FSMA was concluded on March 14, 2013. Any macroprudential measure of the NBB requires a Royal Decree signed by the Minister of Finance (in case of Art. 458 measures deliberated in the Council of Ministers) for implementation.
Banking regulation and supervision	
Review supervisory processes and calibrate intensity and resource allocation based on institutions' risk profiles, particularly for smaller institutions.	Implemented. The establishment of the SSM revamped supervisory processes and resources allocation. SIs are supervised directly by the ECB following a harmonized and risk-based approach. LSIs are supervised by the NBB (under the ECB oversight), which considers the institutions' risk profile to determine the appropriate level of engagement.

Policy Action	Implementation Status
Embed engagement with bank and insurance boards in the supervisory process in a systematic way.	Implemented. The supervisory process for banks includes quarterly meetings with members of the board. Solvency II, especially the implementation of its Own Risk and Solvency Assessment (ORSA), enabled the supervisors to engage with the insurance company boards more frequently and proactively.
Empower the NBB to pre-approve a major acquisition by a credit institution.	Implemented. The new BL (Article 77) requires prior authorization of major acquisitions by the supervisory authorities.
Maintain current liquidity regulatory regime until the Basel III Liquidity Coverage Ratio (LCR) is fully adopted and phased in at the European level.	Implemented. LCR has been implemented by the CRR.
Insurance regulation and supervision	
Formulate a baseline prudential supervisory program for insurers and risk-based conduct-of-business supervision of insurers and intermediaries.	Implemented. Supervisory tools have been developed for line supervisors to derive the financial positions of baseline scenarios and compare them with those of peers easily.
Align findings of insurance stress testing with contingency planning in the context of the recovery and resolution framework.	Partially implemented. Recovery and resolution plans have not been fully developed.
Implement elements of Solvency II, including an ORSA regime.	Implemented. Solvency II, including ORSA requirements, has been implemented.
Empower the NBB to take immediate recovery measures notwithstanding an appeal by an insurer.	Implemented. The NBB Organic Act has been amended to enable the NBB to take immediate recovery measures for an insurer notwithstanding an appeal by the insurer.
Securities markets supervision	
Establish an Emerging Risk Committee at the FSMA and formalize framework for detecting and monitoring emerging risks.	Implemented. The FSMA established an Internal Committee for External Risks in 2015, with the role to assist in detecting, identifying and monitoring emerging risks, trends, and vulnerabilities and to guide in responding to market developments.
Crisis management and resolution framework	
Formalize domestic coordination arrangements for the financial safety net participants via a crisis management MOU and the establishment of a cross-institutional coordination group.	Partially implemented. The Resolution College with relevant membership has been established. However, it is not mandated to ensure regular intra- and inter-agency financial crisis simulation exercises, and crisis preparedness more generally.

Policy Action	Implementation Status
Request recovery and resolution plans (RRPs) for all domestic systemically important firms.	Partially implemented. This is mandated in Articles 111 and 228 of the Banking Law. However, RRP are not required for insurers and their establishment is still at an early stage.
Grant NBB an explicit mandate as the resolution authority.	Implemented. This is laid down in Article 12ter of the NBB Organic Act.
Improve the bank resolution toolkit by reducing ex ante procedural requirements, extending the framework to all banks and enhancing powers for special inspectors.	Partially implemented. Article 296 and further of the Banking Law continue to require an ex ante judicial review of key resolution decisions, which could take several days. The resolution framework now applies to all credit institutions. The powers of the special commissioner are available and divided between the 'special inspector,' 'provisional managers,' 'provisional administrators,' and more generally the NBB.
Revamp the deposit guarantee scheme, establish ex ante fund and depositor preference.	Partially implemented. Depositor preference has been established and protocols are in place to draw on the Federal Treasury for payouts. However, deposit insurance funds are not segregated from the general government revenue.