



# AUSTRIA

## PUBLICATION OF FINANCIAL SECTOR ASSESSMENT PROGRAM DOCUMENTATION—TECHNICAL NOTE ON MACROPRUDENTIAL POLICY FRAMEWORK AND TOOLS

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# AUSTRIA

FINANCIAL SECTOR ASSESSMENT PROGRAM

February 20, 2020

## TECHNICAL NOTE

MACROPRUDENTIAL POLICY FRAMEWORK AND TOOLS

Prepared By  
**Monetary and Capital Markets  
Department**

This Technical Note was prepared by IMF staff in the context of the Financial Sector Assessment Program in Austria. It contains technical analysis and detailed information underpinning the FSAP's findings and recommendations. Further information on the FSAP can be found at

<http://www.imf.org/external/np/fsap/fssa.aspx>

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## Glossary

AIF	Alternative Investment Funds
AIFM	Alternative Investment Fund Managers
Anacredit	Analytical Credit Database
AuM	Assets under Management
AFAC	Fiscal Advisory Council
BWG	Banking Act
CESEE	Central Europe and South Eastern Europe
CET1	Common Equity Tier 1
CRD IV	EU Capital Requirements Directive IV (2013/36/EU)
CRE	Commercial Real Estate
CRR	EU Capital Requirements Regulation (Regulation (EU) 575/2013)
DTI	Debt to Income Ratio
DSTI	Debt Service to Income Ratio
EBA	European Banking Authority
ECB	European Central Bank
ESRB	European Systemic Risk Board
EA	Euro Area
EU	European Union
FMA	Financial Markets Authority
FMABG	Financial Market Authority Act
FMSB	Financial Market Stability Board
FSAP	Financial Sector Assessment Program
GaR	Growth-at-Risk
HaR	House-Price-at-Risk
IPS	Institutional Protection Scheme
LCR	Liquidity Coverage Ratio
LGD	Loss Given Default
LSI	Less Significant Institution
LTV	Loan to Value Ratio
MoF	Ministry of Finance
NAV	Net Asset Value
NBFI	Nonbank Financial Institutions
NBG	National Bank Act
NFC	Nonfinancial Corporates
NSFR	Net Stable Funding Ratio
NIM	Net Interest Margin
OeNB	Austrian National Bank
ORSA	Own Risk and Solvency Assessment
O-SII	Other Systemically Important Institutions

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PD	Probability of Default
SCR	Solvency Capital Requirement
SRB	Systemic Risk Buffer
SREP	Supervisory Review and Evaluation Process
SSM	Single Supervisory Mechanism
UCITS	Collective Investment in Transferable Securities

## EXECUTIVE SUMMARY

### **The macroprudential policy framework has been developed and enhanced since the last FSAP.**

The Financial Market Stability Board (FMSB)—established in 2014 and tasked with strengthening cooperation in macroprudential oversight and safeguarding financial stability—plays the central role. The FMSB fulfills its mandate by discussing facts relevant to financial stability and issuing expert opinions, policy action recommendations, and warnings about financial stability risks. The Financial Market Authority (FMA), Austria's integrated financial supervisory authority, is also designated by law as the competent authority for applying macroprudential instruments and implements FMSB recommendations on a comply-or-explain basis. The Austrian National Bank (OeNB) is obliged to monitor and conduct analysis of systemic risks and to inform the FMSB on its findings. It also provides the secretariat for the FMSB.

**The FMSB has been effective in activating new macroprudential tools.** The FMSB updated the macroprudential policy strategy for Austria in 2017, and borrower-based measures for residential real estate lending were added to the macroprudential toolkit in 2018. While no hard limits have been introduced yet, in September 2018 the FMSB issued a (nonbinding) guidance on “sustainable lending in real estate financing” that included recommended limits on loan-to-value (LTV) and debt-service-to-income (DSTI) ratios, and loan tenors. A Systemic Risk Buffer (SRB) was introduced in 2016 to address structural risks stemming from common exposures to the Central Europe and South Eastern Europe (CESEE) region, and from interconnectedness in the Austrian banking system. The SRB and the Other Systemically Important Institutions (O-SII) buffer—introduced in 2016—are applied both at the consolidated and the unconsolidated levels.

**The institutional framework is appropriate for conducting macroprudential policy effectively, but it could be strengthened in some areas.** The framework contains a clear mandate, well-defined objectives, and provides sufficient powers to the FMSB. The Austrian “committee model” of macroprudential oversight has been successful in securing broad support for policy actions and encouraging cooperation and coordination across different institutions. However, the framework's *willingness to act* could be strengthened by increasing the OeNB's role in decision making. This would allow taking advantage of synergies offered by the OeNB's key role in monitoring and analyzing financial stability risks and increase the accountability of the framework in which recommendations to the FMSB by the OeNB and the FMA can be currently outvoted, without this being disclosed. The communication of the systemic risk assessment and of policy decisions in the macroprudential publications could also be improved.

**The systemic risk monitoring framework is advanced but would benefit from closing data gaps.** The process for systemic risk monitoring—structured around the FMSB meetings—is well organized and facilitates exchange of views. To assess the build-up of risks, the OeNB monitors a broad range of indicators and uses sophisticated analytical methods. However, in some areas—such as nonfinancial corporate sector vulnerabilities—analytical work could be strengthened. The OeNB and the FMA are working together to fill remaining data gaps, and these efforts should continue. Collection of commercial real estate (CRE) data and of more granular data on residential real estate

will be crucial for identifying and assessing risks from increasing common exposures to the real estate sector. The analysis of the nonfinancial corporate sector could benefit from enhanced data collection too.

**Broad-based vulnerabilities remain contained but build-up of risks in the real estate sector warrants further action.** A considerable share of new loans do not comply with the recommended limits issued in the September 2018 guidance. Given continued overvaluation pressures in the housing market and the prospect of interest rates remaining low in the Euro Area in the near to medium term, further regulatory actions might be needed to ensure that risks on households' balance sheets remain contained. For example, a combination of LTV-DSTI limits, with speed limits, would allow the FMSB to more effectively control the volume of loans with high indebtedness indicators, while allowing banks the flexibility in granting loans. Strong growth of bank lending to corporates involved in real estate-related activities—where demand for credit is supported by price over-valuation—warrants close monitoring as well.

**The framework for addressing structural vulnerabilities is sophisticated but further improvements could be considered.** The authorities use a sophisticated framework based on complementarities between O-SII and SRB to address risks from structural vulnerabilities. In this framework, the O-SII buffer is used to address risks an individual institution poses to the stability of the financial system, while the SRB buffer captures the exposure of the individual institution to the system-wide risks, including through common exposures to the CESEE region. Although the approach to calibrating the SRB is advanced, it could take the risks stemming from high profit-dependence on the CESEE region into account more explicitly. This could be done through the inclusion of the share of CESEE profits in total bank profits in the calculation of the institution-specific buffers, or through an increase in the maximum level of the SRB. A higher SRB would be an additional way to encourage banks to retain (more volatile) earnings from the CESEE exposures.

Table 1. Key Recommendations

Recommendations	Authority	Time <sup>1</sup>
<i>Institutional Framework</i>		
Increase the voting representation of the OeNB in the FMSB and make the OeNB chair the FMSB meetings.	MoF	ST
Clarify in law that the consent of the Ministry of Finance (MoF) as a precondition for the adoption of FMA regulations concerning macroprudential measures should only be required regarding the determination of whether FMA regulations comply with legal requirements.	MoF	I
Streamline macroprudential publications around risks to financial stability.	FMSB, OeNB	I
Review adequacy of resources devoted to macroprudential policy coordination at the EU level.	OeNB, FMA	I
<i>Operational Framework for Risk Monitoring and Analysis</i>		
Close remaining data gaps, including in the real estate and nonfinancial corporate sectors.	OeNB, FMA, MoF	ST
Enhance the analysis of corporate sector vulnerabilities, and the drivers of prices in the real estate sector.	OeNB	I
<i>Systemic Risks and Macroprudential Policy Stance</i>		
Monitor the effectiveness of the FMSB guidance on sustainable lending standards and prepare further regulatory actions—such as binding borrower-based limits—if the risk profile of new residential real estate lending does not improve.	FMSB	ST
In the next biannual SRB review, consider reflecting the high profit-dependence on the CESEE region in the calibration of the SRB.	OeNB, FMSB	ST

<sup>1</sup> I Immediate (within 1 year); ST Short term (within 1–2 years); MT Medium Term (within 3–5 years).



## INTRODUCTION

**1. Financial sector resilience in Austria has improved significantly since the global financial crisis, and the macroprudential policy framework has been formalized.** Austrian banks—representing over 75 percent of financial system's total assets—have doubled their capital levels since 2008, and credit quality has improved too. Several initiatives, such as the Austrian sustainability package (2012), guidance on lending in foreign currency, and active use of macroprudential measures by CESEE<sup>1</sup> regulators have contributed to a reduction in the riskiness and size of direct CESEE exposures of Austrian banks.<sup>2</sup> The macroprudential framework was formalized in 2014, with the Financial Market Stability Board (FMSB) designated as the coordinating policy body.

**2. Some structural vulnerabilities to financial stability remain and cyclical risks are on the rise.**<sup>3</sup> Banks' low efficiency and the resulting low profitability of domestic operations continues to be a key concern, especially given the fact that the CESEE region accounts for over 40 percent of Austrian banks' consolidated profits. The recent economic boom in CESEE countries has contributed to rising financial risks, especially as the profits of Austrian subsidiaries have been sustained by increasing loan volumes rather than net interest margins (NIM). Domestically, house prices have become overvalued in recent years and a high share of new mortgages are characterized by high LTV and high DSTI ratios. The overall exposure to the real estate sector has been increasing for both banks and nonbanks. The recent strong pick-up in domestic bank credit to nonfinancial corporates has also been driven by real-estate-related activities. Finally, high interconnectedness and presence of decentralized banking structures (Raiffeisen, Sparkassen, and Volksbanken) have the potential to amplify transmission of adverse shocks within the domestic financial system.

**3. This note assesses strengths and weaknesses of the macroprudential policy framework in Austria and provides policy recommendations.** The next section comments on the institutional arrangements for macroprudential policymaking. In the third section, the systemic risk monitoring framework is described and options to improve it are discussed. The fourth section assesses the level of systemic risk vulnerabilities, comments on the appropriateness of the current macroprudential policy stance and provides policy recommendations. The last section concludes.

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<sup>1</sup> Central Europe and South Eastern Europe.

<sup>2</sup> The improvement in economic conditions in the CESEE region has helped too.

<sup>3</sup> The Financial Stability Analysis, Stress Testing and Interconnectedness Technical Note provides a complementary analysis of key vulnerabilities and provides an in-depth assessment of the banking system's resilience to severe macrofinancial shocks.

## INSTITUTIONAL FRAMEWORK

**4. A strong institutional framework is essential for effective macroprudential policy.** The framework needs to generate *willingness to act*, i.e., counter biases for inaction or insufficiently timely action that could arise from difficulties in quantifying the benefits of macroprudential action, or from political pressures. It also needs to foster the *ability to act* in the face of evolving systemic risks through appropriate access to information and availability of a sufficiently broad set of macroprudential instruments. The framework needs to promote *effective cooperation* in risk assessment and mitigation between institutions with a financial stability mandate. Finally, it should establish *strong accountability* to guide the execution of macroprudential powers, and *strong communication* to create public awareness of risks and understanding of the need to take macroprudential policy actions.

**5. In Austria, macroprudential policy for the banking sector is a shared competency between the national authorities and the European Central Bank (ECB).** The Single Supervisory Mechanism (SSM) Regulation (Council Regulation (EU) No. 1024/2013) confers to the national authorities and the ECB-specific tasks relating to macroprudential instruments for the banking sector set out in the CRR and the CRD IV Directives.<sup>4</sup> The ECB can apply higher requirements for capital buffers and more stringent measures than those applied by national authorities (“topping-up power”), but cannot set lower requirements than those set nationally.<sup>5</sup> The borrower-based limits are within the exclusive remit of the national authorities, but the ECB can suggest to use their powers over these instruments without any binding mechanism.<sup>6</sup>

### A. Willingness to Act

**6. The institutional framework contains a clear mandate and well-defined objectives.** The macroprudential policy strategy—revised by the FMSB in 2017—defines macroprudential oversight as a shared responsibility of the FMSB, the FMA, and the OeNB. All three institutions have a statutory responsibility for financial stability,<sup>7</sup> defined as the state in which “*the financial system can absorb the consequences of significant exogenous or endogenous shocks (...) without any assistance*

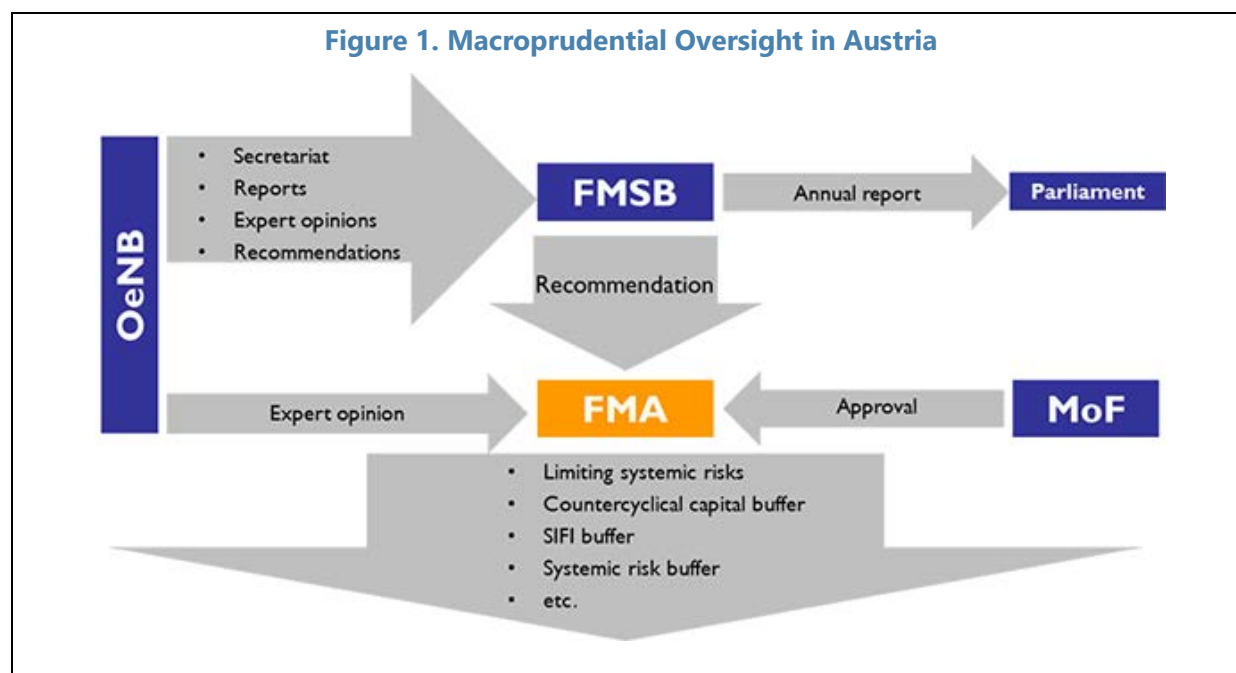
<sup>4</sup> European Union Capital Requirement Regulations No. 575/2013 and European Union Capital Requirement Directive 2013/36/EU, respectively.

<sup>5</sup> When a measure is intended to be undertaken by a national authority, the ECB should be notified within 10 working days in advance of the relevant decision, and the ECB can object to the proposed measure within 5 working days, stating its reasons for the objection in writing. Where the ECB objects, the national authority is required to consider the ECB’s reasons prior to proceeding with the decision as appropriate. Similar notification requirements apply to the ECB decision to apply higher requirements.

<sup>6</sup> The Austrian authorities inform the ECB and the European Systemic Risk Board about the exercise of those powers.

<sup>7</sup> Defined in Articles 13 and 13 lit. a of the FMABG for the FMSB, Article 13 paragraphs 2 and 9 of the FMABG for the FMA, and Articles 44 lit. c of the NBG for the OeNB.

from tax payers." To ensure that the macroprudential policy strategy is effective and efficient, it is evaluated and, if necessary, updated every two years.



**7. The Austrian "committee model" of macroprudential oversight has been effective in securing broad support for policy actions.** The FMSB is the central macroprudential decision-making body in Austria. It consists of two representatives of the Ministry of Finance (MoF) (one of whom also chairs the FMSB), two representatives of the Fiscal Advisory Council (AFAC), and one representative from the FMA and from the OeNB each. The wide representation of institutions brings a broad range of expertise to the FMSB, fosters an open discussion of trade-offs, and helps secure broader support for policy actions.

**8. The FMSB is assigned with tasks of monitoring and taking actions to mitigate risks to financial stability, based on the analysis provided by the OeNB.** FMSB's responsibilities include (i) discussing facts relevant to financial market stability; (ii) encouraging cooperation and the exchange of opinions among the participating institutions; and (iii) issuing expert opinions, recommendations, and warnings about risks to financial stability. The OeNB is obliged to conduct analysis of financial market facts relevant for identification of threats to financial stability, provide the FMSB with the findings of its analysis, and prepare preliminary recommendations to be voted by the FMSB. Importantly, when deciding on policy options, the macroprudential institutions should quantify the policy trade-offs, i.e., impact on credit availability and on economic growth.

**9. The FMSB has been active in introducing macroprudential measures, but the OeNB's weak role in decision making may entail risks to the framework's willingness to act.** The FMSB has been effective in activating new macroprudential policy tools (O-SII and SRB buffers), adding

borrower-based measures to the macroprudential toolkit (September 2017),<sup>8</sup> and has issued guidance on sustainable lending standards (September 2018). The voting arrangements in the FMSB promote the *willingness to act*: decisions on policy recommendations are made by a simple majority. However, compared to other countries with a committee model of macroprudential oversight, the MoF plays a very strong role in the decision-making process. Additionally, two out of six voting members of the FMSB (the same representation as the combined number of voting members from the OeNB and the FMA) come from the AFAC, which does not have a financial stability mandate.

## B. Ability to Act

**10. The FMSB has powers of recommendations to take policy actions and can issue risk warnings.** The FMA is the designated authority for applying macroprudential instruments and follows the FMSB's recommendations on a comply-or-explain basis. The FMA must follow the FMSB's recommendation as soon as it is practical (but within three months at the latest) or explain in writing as to why it has not done so. According to the Banking Act (BWG), the MoF's consent is necessary for the adoption of an FMA regulation concerning macroprudential measures, but the law does not specify whether MoF approval is limited to legal requirements or applies also to the substance of the FMA regulation. The OeNB is tasked with the assessment of the implementation of FMSB recommendations by the FMA.

**11. The macroprudential authorities have adequate information-collection powers.** The data-collection and data-sharing arrangements for macroprudential purposes are enshrined in various articles of national law. The OeNB is required to provide the FMA with access to both microprudential and macroprudential data on banking supervisions, and the FMA has to provide the OeNB (upon request) with all relevant data from financial institutions needed for monitoring and assessment of financial stability risks. Closing of data gaps is included as one of the intermediate objectives in the Austrian macroprudential policy strategy. When supervisory reporting data is inadequate for macroprudential policy purposes, the OeNB and the FMA can adjust the reporting requirements, and often collect additional data through topical bank surveys.

## C. Effective Coordination and Cooperation

**12. The framework encourages cooperation and coordination across different institutions.** Risk monitoring and analysis are centered around the preparations for the FMSB meetings. The preparation process is formalized and well structured. It is led by the OeNB, in close collaboration with the FMA:

- The FMSB meetings take place on a regular, quarterly frequency. The OeNB, which also acts as the FMSB Secretariat, is responsible for preparing draft assessments of key risks in the financial system, and policy recommendations that are voted by the FMSB. The FMA contributes to the

<sup>8</sup> The FMSB advised the MoF to create a legal basis for borrower-based macroprudential instruments in June 2016.

analysis of the nonbank sector. The agenda for the FMSB meetings is proposed by the Secretariat, but it can be amended by any member of the FMSB.

- About eight weeks before each FMSB meeting, the OeNB and the FMA hold a Risk Workshop, during which staff presents the latest assessment of financial stability risks and discusses special topics. Following the Risk Workshop, the presentations and draft recommendations for the FMSB meeting are approved by the Steering Committee, consisting of senior management from both the OeNB and the FMA.
- The MoF contributes to the preparations of the FMSB meetings by providing updates on relevant changes in national and EU-level regulations.

**13. Current data-sharing and cooperation arrangements between the OeNB and the FMA work well.** The framework fosters complementarities that exist between macroprudential and microprudential supervision and regulation. The FMA contributes to financial stability risk analysis by contributing to the monitoring of nonbank financial institutions (NBFIs). The OeNB and the FMA share an integrated data system, and the FMA's supervisory expertise is used when designing and managing additional datasets—such as bank surveys—for macroprudential policy purposes.

**14. Austrian authorities participate in macroprudential policy development and coordination at the EU level and are engaged in frequent dialogue with CESEE supervisors.** The OeNB and the FMA both contribute to policy coordination with the ECB and the European Systemic Risk Board (ESRB). Both institutions are also represented in different ESRB fora, including at the technical (working group) level, where analytical work is conducted, and new policies are developed. The OeNB has established a macroprudential supervisory dialogue on an ongoing basis with six CESEE countries with a large presence of Austrian banks. This involves frequent bilateral and multilateral events and visits. Cooperation with CESEE supervisors is also continued through the Vienna Initiative<sup>9</sup>: via annual meetings and working groups devoted to specific topics.

## D. Accountability and Communication

**15. The accountability arrangements seem adequate.** The FMSB is obliged to prepare an annual report on its activities and the state of financial stability to the Finance Committee of the National Council. This report is then published on the FMSB website. The macroprudential policy strategy obliges the FMSB to regularly evaluate—at least once a year—whether the intermediate macroprudential objectives have been reached and whether the measures taken have been effective.

**16. The available range of communication tools is broad, but the content of the messages could be improved.** The FMSB communicates with the public through press releases (published after each of its meetings) and annual reports. The OeNB publishes a semi-annual Financial Stability

<sup>9</sup> Vienna Initiative was established in 2009 to bolster coordination among home and host country authorities of EU-based cross-border banks active in the CESEE region and in order to avoid disorderly deleveraging. The initiative continues to this day as Vienna Initiative 2.0.

Report (FSR). The macroprudential policy strategy is evaluated every two years and is published on the FMSB website. The FMSB's press releases and annual reports currently provide a factual description of the macroprudential policy decisions and of developments in the financial sector, and references to key indicators providing a basis for FMSB decisions, as well as an assessment of the level of financial stability risks (including changes since the last FMSB meeting) are often missing. The same applies to the FSR, which does not prioritize among risks.

**17. The OeNB and the FMA's weak role in decision making could undermine the framework's accountability.** Given their weak voting representation in the FMSB, the OeNB and the FMA—two institutions in charge of financial supervision and risk monitoring—can propose a policy action to the FMSB based on their expertise and be outvoted. Given that neither the actions proposed by the OeNB and the FMA to the FMSB, nor the voting by individual FMSB members are public information, this creates a potential risk to the accountability of the framework.

## E. Recommendations

**18. The institutional framework appears appropriate for conducting macroprudential policy effectively, but it could be strengthened by increasing the voting representation of the OeNB in the FMSB.** To benefit from the OeNB's political independence and the synergies offered by its role in monitoring and analyzing financial stability risks, the FMSB could be chaired by the OeNB. In the same vein, OeNB representation should be increased from one to two voting members, with an equal decline in the total number of voting members from the MoF and the AFAC. This would also increase the accountability of the framework. Alternatively, consideration could be given to making public the policy proposals that are subject to FMSB vote, or at least reflecting in the FMSB press releases the fact that a proposal was considered and voted upon.

**19. The framework's ability to act could be strengthened by limiting the scope for the MoF's approval of regulatory actions.** The requirement of the MoF's consent as a precondition for the adoption of FMA regulations concerning macroprudential measures (Banking Act, Articles 21–23) should be dropped, or it should be clarified in law that the MoF's consent is only required when determining whether FMA regulations comply with legal provisions. This would further promote incentives to take action, as well as political independence in situations when quantifying the benefits of macroprudential policy actions is difficult.

**20. To improve clarity and consistency of communication, the macroprudential publications could be streamlined.** The FSR's role as a communication tool could be strengthened by centering it around the assessment of risks to financial stability in Austria.<sup>10</sup> Both the FSR and the FMSB's publications (press releases and annual reports) could improve their focus by prioritizing among risks and providing normative commentary on changes in key risks since the last assessment.

<sup>10</sup> Press releases are subject to the FMSB's decision making, whereas the Financial Stability Report is a document of the OeNB.

To better explain the FMSB decisions to the public, a set of core indicators could be more frequently used in the FMSB communications.

**21. Adequacy of resources devoted to macroprudential policy coordination at the EU level should be reviewed.** The EU framework of macroprudential policy has expanded considerably over the last 5–6 years, and the number of working structures contributing to policy development at the EU level has also increased. Meanwhile, the number of staff working on macroprudential policy at the OeNB and at the FMA has been stable since 2014. Therefore, it will be important to ensure that the new responsibilities related to pan-European policy coordination do not negatively affect the quality of day-to-day systemic risk monitoring and analysis.

## OPERATIONAL FRAMEWORK FOR RISK MONITORING

**22. A well-functioning macroprudential framework involves comprehensive monitoring of systemic risks and the ability to translate risk assessment into policy actions.** The effectiveness of the macroprudential policy framework depends to a large extent on how the process of monitoring and assessment of systemic risk, as well as calibration of macroprudential policy tools are operationalized in practice. Easy access to good-quality data is a prerequisite for effective risk monitoring, which in turn should be carried out through a well-defined functional process and involve analysis of a sufficiently broad range of indicators. The analysis of risks to financial stability should be supported by the use of different econometric and modelling methods. Finally, the mapping of systemic risk into policy actions should involve a thorough cost-benefit analysis and frequent ex-post evaluation.

### A. Risk Monitoring

**23. The OeNB is responsible for conducting systemic risk monitoring on a daily basis, with the FMA contributing to monitoring of NBFIs.** The operational process of risk monitoring and analysis is centered around preparations for the FMSB meetings. It is well structured and provides sufficient opportunities for the exchange of views between different institutions.

**24. The systemic risk monitoring framework is advanced in terms of indicators and analytical methods used.** To assess the build-up of risks, the OeNB monitors a broad range of indicators—many of which are derived from in-house bank surveys—and constructs summary indicators to facilitate the overall risk assessment:

- The OeNB follows the ESRB’s recommendations and analyzes variables from six risk categories to construct an aggregate measure of systemic risk.<sup>11</sup> Indicators for different borrower segments are also analyzed individually. Network model techniques are applied regularly to assess the

<sup>11</sup> The six categories include; financial markets, mispricing of risks, strength of bank balance sheets, credit and debt developments, price pressures, and external imbalances.

level of interconnectedness in the financial system and to study the scope for contagion from CESEE exposure.

- In the nonbank financial sector, systemic risk monitoring builds mostly on microprudential supervision. The OeNB prepares a quarterly update on the developments in the asset management sector (based on supervisory data), while the FMA conducts stress tests of the asset management sector. In the insurance sector, the FMA identifies systemically important insurance companies, monitors exposures to the CESEE region, and conducts stress-tests.<sup>12</sup>
- Additional in-depth analysis of topics relevant for financial stability at a given point in time is conducted on a regular basis. Usually, it is presented later in "Special Topics" and in Boxes in the FSR.

**25. The OeNB uses a range of analytical methods to assess the level of vulnerabilities and to inform the calibration of macroprudential tools.**

- Simulation and stress-testing techniques are used to assess vulnerability of borrowers and financial institutions to tail risk events and to estimate the impact of macroprudential tools.<sup>13</sup> Micro-level data is often applied for these purposes.
- Calibration of macroprudential tools is informed by a sophisticated technical analysis. For example, network methods have been used to identify banks subject to the SRB, and to map the buffer size to individual institutions. Separately, the OeNB's large-scale Austrian Quarterly Projection model<sup>14</sup> has been applied for an ex-ante cost-benefit assessment of the effects of the SRB on the economy.

## B. Data and Information

**26. Several ongoing initiatives are expected to close existing data gaps.** The recently implemented Analytical Credit Database (Anacredit) has increased granularity of corporate loan-level data collected through the credit register.<sup>15</sup> Separately, the FMA and the OeNB have introduced additional regulatory reporting on residential real estate lending standards (to be effective from 2020). The OeNB has been active in addressing the existing data gaps by implementing bank surveys on various topics, including on foreign currency lending in CESEE

<sup>12</sup> The FMA is also actively participating in the EU-level initiatives and discussions related to the development of macroprudential policy tools for the insurance sector.

<sup>13</sup> For example, sensitivity of debt servicing capacity of households to declines in house prices was presented in FSR no. 31; sensitivity of adjustable rate mortgages to interest rate increases was presented in FSR no. 32.

<sup>14</sup> Dynamic Stochastic General Equilibrium model.

<sup>15</sup> AnaCredit is an initiative of the European System of Central Banks. It is a dataset containing detailed information on individual bank loans in the euro area, harmonized across all member states.



subsidiaries and on mortgage lending standards. Significant progress has been made on data regarding bank interconnectedness and derivatives markets.

**27. However, material gaps remain in some areas.** These include CRE where little data on prices and transactions is available for systemic risk monitoring purposes. The limited granularity of the residential real estate data (lack of data for the buy-to-let and first-time-buyer markets, no data at regional level, or for mortgage *stocks* by market segment) should be at least partially addressed by the additional reporting introduced, effective 2020, and through the next phase of the Anacredit project. Data on corporate lending is not available by entity size (small and medium enterprises versus large companies), while monitoring of corporate debt issuance is done mostly at a very aggregate level.

## C. Recommendations

**28. Monitoring and analysis could be enhanced in some areas.** Due to the increasing importance of the real estate sector for the financial system, the analysis of real estate-related risks could be further deepened. For example, the suite of models applied for the assessment of real estate valuations could be enhanced. A more systematic analysis of the interlinkages between different financial sector segments through common exposures (to real estate and CESEE region) would also be desirable. Systemic risk monitoring of the nonfinancial corporate sector would benefit from the production of more disaggregated indicators as well as from a more frequent analysis of resilience to different types of shocks.

**29. The authorities should continue their efforts to address data gaps.** The OeNB and the FMA are aware of these gaps and are working together to fill them. Collection of CRE data and of granular data on residential real estate will be crucial for identifying and assessing risks from increasing common exposure to the real estate sector (see next Section for details). The analysis of the nonfinancial sector could benefit from enhanced data collection, including inter alia, on credit quality, profitability, debt characteristics (by maturity, grade, and industry), and firm characteristics.

# SYSTEMIC RISKS AND MACROPRUDENTIAL POLICY STANCE

## A. Broad-Based Vulnerabilities

**30. Private credit growth has supported cyclical expansion, although the credit-to-GDP ratio has remained broadly stable.** During 2019Q1, the year-on-year credit growth rate was 4.5 percent, while the credit-to-GDP ratio has remained broadly stable at around 140–145 percent over the last 10 years (Figure 3). The easing of underwriting standards observed in the first half of 2018 decreased in the second half of 2018 and 2019. Overall, the expected weakening of credit demand

on the back of slowing economic growth and still negative credit-to-GDP gap justify the current level of the countercyclical capital buffer (CCyB) of zero percent.<sup>16</sup>

**31. Austrian banks have improved their capital adequacy in recent years and FSAP stress tests suggest capital buffers are enough to absorb adverse macrofinancial shocks.** The aggregate capital level increased from 11.6 percent Common Equity Tier 1 (CET1) in 2013 to 15.4 percent in 2018, although it remains below the Euro Area (EA) average. The less significant institutions (LSIs), which account for 40 percent of system assets, are better capitalized than systemic institutions (SIs), with a CET1 capital ratio of 17 percent relative to 14.3 percent for SIs. The system-wide nonperforming loans (NPLs) fell from 8.6 percent in 2013 to 2.6 percent in 2018. The increase in credit quality was especially pronounced among subsidiaries in CESEE, where the NPLs declined from 14.0 percent in 2013 to 3.2 percent in 2018. System-wide liquidity indicators, such as the Liquidity Coverage Ratio (LCR, at 151 percent as of end-2018) and the Net Stable Funding Ratio (NSFR, at 132 percent as of end-2018) remain high. The results of the FSAP stress tests<sup>17</sup> suggest that banks' capital buffers are sizeable relative to potential losses under stress (although most banks would be forced to draw down their capital conservation buffers in response to severe macrofinancial shocks) and that banks hold sufficient liquidity buffers to withstand sizeable funding outflows.

## B. Household Sector Risks

**32. Household indebtedness remains broadly stable and below the EA average.** Leverage indicators—such as household indebtedness as a share of GDP—have been stable in recent years. Growth of bank lending to households has picked up in recent times—with annual growth rate of 4.2 percent in 2019Q1—but remains moderate. The share of new variable-rate household loans has been declining, although it remains high at 44 percent (as of 2019Q1), thereby exposing households to interest rate risk. Favorable economic conditions and low interest rates have been supporting households' debt-servicing capacity. Foreign currency (FX) loans have also continued to decline and currently stand at 9 percent of total outstanding loans. However, risks remain, especially since 96 percent of FX loans are denominated in Swiss francs, and more than 3/4 of FX loans are bullet loans linked to repayment vehicles.

**33. House prices have become overvalued in recent years.** House prices have grown rapidly in recent years and are overvalued by around 10–15 percent nationally, and by over 20 percent in Vienna. The historically high growth in real estate transaction volume of 13 percent in 2018 has also been indicative of an overheating in the real estate market. The FSAP's at-risk analysis shows that house prices growth in Austria is susceptible to macrofinancial shocks, and that the likelihood of a price correction has increased recently (Figure 2).

<sup>16</sup> The credit-to-GDP gap follows the BIS (Bank for International Settlements) definition. Additionally, the OeNB's aggregate indicator of systemic risk, based on variables from six risk categories (following ESRB recommendations) does not point to a broad-based build-up of vulnerabilities.

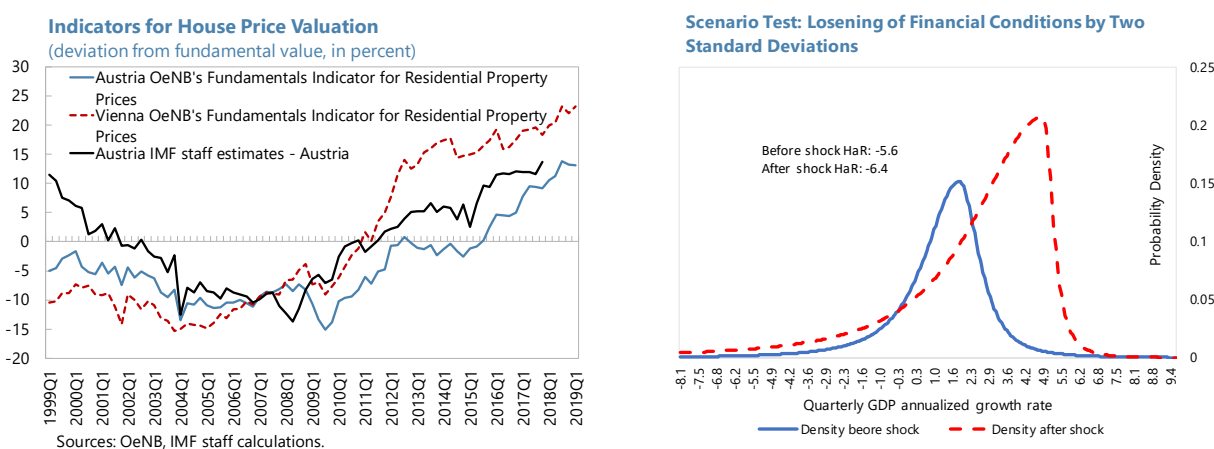
<sup>17</sup> See Financial Stability Analysis, Stress Testing, and Interconnectedness Technical Note.

**34. There are some signs that risk profile of new mortgage loans has been deteriorating recently.** Loans with an LTV of 80 percent or above accounted for nearly 38 percent of new mortgages in 2018 and over 40 percent of new loans had a DSTI of 30 percent or more. In response to the developments on the housing market, in September 2018 the FMSB issued a (nonbinding) guidance on “sustainable lending in real estate financing,” which included recommended minimum down payment (20 percent), limits on DSTI ratios (30–40 percent) and loan tenors (35 years). The analysis of bank survey data suggests that after a year since the guidance, a considerable fraction of mortgages granted after the introduction of the guidance remains above the recommended limits.

**Figure 2. House Prices in Austria: A Risk Assessment**

Staff analysis suggests a house price overvaluation of 10–15 percent in 2018...

...and shows that continued loose financial conditions increase tail risks to house price growth.



Notes: The right-hand chart shows a predicted distribution of house prices one year ahead (blue line), estimated using the Growth-at-Risk methodology by Adrian et. al (2018). The methodology employs a quantile regression estimation and uses macrofinancial data from 1990Q1 to 2018Q4 to calculate the probability of downside risks to house prices. The red line shows the same predicted distribution under a scenario of a further easing in financial conditions by two standard deviations. As a result, while the median future house price growth increases in the scenario, the tail risks to the outlook for house prices—measured by the house price decline that has a 5 percent probability of materializing (House Price at Risk, or HaR)—worsen at the same time.

**35. Real estate exposure has increased across the Austrian financial landscape.** Housing loans in total assets of Austrian banks doubled from 8 percent in 2008 to 16 percent in 2018; the Austrian insurance sector currently allocates about 8 percent of their total assets to real estate—the highest in the European Union; within the asset management industry, real estate investment funds have doubled in recent years; and a large part of new borrowing by nonfinancial corporates (NFC) has been due to loans toward construction activities.

**36. Housing market developments point to increased risks, but unique structural characteristics of the housing market are important mitigating factors.** Growth in risky mortgage loans, overvalued house prices, and an increase in cross-sectoral exposure to the real estate sector are sources of concern. At the same time, household leverage indicators remain broadly stable and credit growth is moderate. The Austrian housing market also has several built-in

buffers to soften the impact of realized risks. These buffers include a unitary market structure, low ownership ratios, and alternate arrangements for housing finance (See Box 1).

### Box 1. Structure of the Austrian Housing Market

**Austria has a unique housing market structure underpinned by a well-developed rental market.**

The structure of the Austrian housing market is rooted in post-war policies of the 1920s. Several European countries have reoriented their housing market in recent years; for example, with the application of new instruments, reduction in housing policy expenses, more targeted market-oriented subsidies, and a growing share of owner-occupied housing. However, Austria has not followed suite. Social housing and the rental component of the housing market continue to play an important role. The rental market is highly regulated, and object-related subsidies—both explicit and implicit—remain integral to the structure of the housing market.

**Both the public and private sector play an active role in the social housing market.** The public sector is engaged with the housing market at several levels (federation, state, and municipality) of government. The federation is responsible for tax revenue and legislation, including tenancy law, Limited Profit Housing Association (LPHA) law, and civil code. The nine Austrian states are responsible for housing subsidy schemes, supervision of LPHAs, regional planning, and building codes in their jurisdiction. Housing policies differ between states, since states have considerable autonomy in formulating housing policy. Municipalities also play a role by providing land or property tax abatement. Among the private sector, LPHAs, commercial developers, and private builders all play a role in the social housing market.

**Austria's housing structure has several built-in buffers to soften the impact of realized risks.**

Austria has a unitary integrated market structure, where the rent level is determined by both the private and social housing sectors. Austria has one of the highest rental ratios (second only to Germany) in Europe, with 45 percent of the population renting rather than owning homes. Within the rental market, a large proportion consists of social housing provided by a public authority (for example, a municipality) or an LPHA. Historically, Austria has also had one of the lowest shares of housing costs (in households' total consumption expenditure) among EU countries: lower than Denmark, Germany, The Netherlands, and Sweden. It has also had a high share of own equity in housing finance, which has reduced households' reliance on borrowing to purchase homes. Austrians can use several alternative arrangements for housing finance (for example, regional mortgage banks, contract savings banks, and housing construction banks) that reduce dependence on conventional banks for mortgages. These characteristics of the housing market have kept housing affordable and have helped against steep downturns in house prices witnessed in other countries during the global financial crisis.

**Austrian housing policies promote economic inclusion by design.** The Austrian housing market contrasts with most other countries in Europe and North America, which have a dual market structure, wherein the government separates competition between social and private housing providers. The Austrian housing market prevents segregation based on income levels and encourages inclusion due to several factors. First, social and private sector competition and strong tenant protection pushes down prices and allows for substitutability between the sectors, making housing affordable for low-income groups in both sectors. Second, high quality of social housing and a high-income cut-off for being eligible for social housing means that both low- and middle-income households can apply for social housing. Therefore, the social housing market not only provides housing for low-income households but also for middle-income households.

## C. Corporate Sector Risks

**37. Domestic bank lending to nonfinancial corporates (NFCs) has picked up strongly since 2017, but total NFC debt financing has fallen in 2018.** Domestic bank credit to NFCs has grown by over 7 percent on an annual basis in 2019Q1, driven primarily by the real estate-related activities. At the same time, NFC equity issuance and total debt financing (including debt issuance, borrowing from foreign banks, and other loans) declined in 2018. The decrease in total debt financing has been happening due to reduced financial needs of Austrian NFCs, which is taking place in the backdrop of uncertainty caused by trade disputes and a weaker outlook in Europe.

**38. Debt to equity ratio of the Austrian NFC sector is well above the EA average but debt servicing capacity remains strong.** Austrian corporates' debt to equity ratio has remained consistently higher—by 20 percentage points currently—than the EA average. However, the debt-to-income ratio (i.e., debt as a share of gross operating surplus) has remained consistently below the EA average, suggesting good debt-servicing capabilities of Austrian corporates. Easier debt servicing has been supported by good economic environment and low interest rates and has contributed to reduced insolvencies. However, the high share of new variable rate loans (85 percent) continues to expose the sector to interest rate risk. FX loans continue to fall and currently stand at only 2 percent of total loans, which is below the EA average.

**39. Real estate-related corporate finance continues to gain importance.** The increase in corporate loans by domestic banks since late 2017 is driven strongly by real estate-related activities, which accounted for about half of the total credit expansion: In 2018, lending to the real estate sector grew much faster (8.2 percent) than for the entire NFC sector (6.5 percent). The equity ratio of the real estate industry is significantly lower than the average equity ratio of the NFC sector, while the interest on loans to the real estate and construction industries is also higher than for the NFC sector. The share of short-term loans (maturities up to one year) in overall borrowing of NFCs has increased in recent years, while the cost of financing for SMEs has also gone up.

## D. Nonbank Financial Sector

**40. The nonbank sector is growing but remains small and non-systemic.** The nonbank financial sector is only 25 percent of the overall financial sector. Mutual funds and insurance companies account for 13 percent and 10 percent of total financial assets, respectively. Pension funds make up 2 percent of total financial assets. The structure of the Austrian financial sector is characterized by a high degree of intra-sectoral connectivity due to ownership structures, sales cooperation agreements, financial transactions, and the assumption of guarantees. Assets under Management (AuM) by corporate provision funds, managed by eight authorized management companies, have almost doubled— from EUR 6.2 billion in 2013 to EUR 11.5 billion in 2018.<sup>18</sup> The pension market managed EUR 21.4 billion by end-2018. Fund assets of real estate funds have almost

<sup>18</sup> A corporate provision fund is a company authorized to pursue severance and retirement fund activities.

doubled in the last five years, with AuM reaching EUR 8.3 billion in 2018. The sixteen authorized investment fund management companies had EUR 164.6 billion in AuM at end-2018.

**41. The Solvency II framework has several capital-based macroprudential tools for the insurance sector.** Austria has a relatively small insurance sector with AuM of EUR 132 billion. As part of the Solvency II regime, a risk-based system for calculating capital was introduced in 2016. Solvency II implementation has enhanced reporting and data available to the FMA, which analyzes exposure concentrations, interconnectedness, ORSA reports, and conducts stress tests. There are five types of capital-based macroprudential tools in the Solvency II framework: symmetric equity risk; volatility and matching adjustment; extension of the recovery period; transitional risk-free rate; and technical provisions measures. Based on the FMA's yearly analysis, the average impact of capital-based tools on Austrian insurers is small in terms of their impact on Solvency Capital Requirement (SCR) ratios. New macroprudential tools may be introduced following the Solvency II Review.<sup>19</sup>

**42. The asset management sector has grown considerably but remains small when compared to some of its peers.** The aggregate fund volume of the Austrian management sector is EUR 174 billion (accounting for only 1 percent of the EU aggregate fund volume)—which is small in comparison to European peers, such as Denmark, Germany, The Netherlands, and Sweden. The Austrian asset management sector consists of 16 Undertakings for the Collective Investment in Transferable Securities (UCITS) management companies, of which 14 are also authorized as Alternative Investment Fund Managers (AIFM). Besides 31 Asset Managers are authorized or registered as Alternative Investment Fund Managers; and 5 Managers are authorized according to the Austrian Real Estate Investment Funds Act. The overall liquidity of Alternative Investment Funds (AIFs) remains stable, while leverage has decreased on average in recent years.

**43. Austrian open real estate investment funds pose liquidity risks due to their unique structure but remain non-systemic.** Real estate fund management companies saw an increase in AuM of 12 percent in 2018, but the sector remains small, with a NAV of EUR 8.3 billion. Real estate investment funds generally pose liquidity risks due to the underlying illiquid asset, i.e., real estate. However, allowance for same-day redemptions has accentuated liquidity risks for Austrian open real estate investment funds. These funds are exposed to potentially performing large-scale maturity transformations between the short-term needs of investors and inherently long-term real estate investments. Therefore, a sudden downturn in the real estate market can prompt large investor redemption requests. If the fund does not have enough liquidity, it could freeze redemption requests or liquidate itself.<sup>20</sup> Such scenarios are prone to investor herding behavior and may lead to

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<sup>19</sup> The European Commission (EC) has asked European Insurance and Occupational Pensions Authority (EIOPA) to assess whether the existing provisions of the Solvency II framework allow for appropriate macroprudential oversight. EIOPA is also analyzing whether to integrate macroprudential measures similar to the banking framework into the Solvency II regulation.

<sup>20</sup> Parallels exist in the European Union, for example, between 2008–2010, when investors' redemptions requests to German open real estate funds exceeded funds' liquid assets, several German real estate funds suspended redemptions while others announced liquidation.

contagion. Additionally, funds buying real estate in the existing overvalued real estate market, may face significant devaluations to their portfolio if an unexpected real estate correction takes place.

## E. Exposures to CESEE

**44. The riskiness of CESEE exposures of Austrian banks has declined since the GFC.** Several initiatives since the global financial crisis—including Guiding Principles on lending in FX (2010),<sup>21</sup> the Sustainability Package (2012), and the choice of Multiple Point of Entry as the preferred resolution approach—have reduced the riskiness of CESEE exposures of Austrian subsidiaries. After the introduction of the Sustainability Package, the reliance on local funding for the purposes of lending in the CESEE region has improved considerably. The share of intragroup liquidity transfers between Austrian parent banks and the CESEE subsidiaries declined from 15 percent of subsidiaries' assets in 2011 to below 9 percent in 2018 (Figure 4). The share of FX loans in total CESEE assets of Austrian banks declined during the same period from 33 percent to 14.5 percent. The NPLs declined to 3 percent of total CESEE loans in 2018.

**45. However, the CESEE region is still a source of systemic risk, given the high contribution to total profits of Austrian banks.** The CESEE region accounted for 24 percent of total Austrian banking sector's assets in 2018, but for over 42 percent of consolidated banking net profits (Figure 4). Additionally, high market share of Austrian subsidiaries in many countries (over 20 percent in Czech Republic, Croatia, Romania, and Slovakia) makes the Austrian banking system sensitive to the economic cycle in the CESEE region. In recent years, Austrian subsidiaries' loan volumes have been increasing against decreasing net interest margins, although the latter remain considerably higher than in Austria. This is in the context of increased leverage of households, rapid credit growth, and overvaluation of the housing market in the region, especially in Czech Republic and Slovakia (see 2018 Article IV reports for Czech Republic and Slovakia).

**46. Systemic risk from CESEE exposures is addressed through the SRB.** The SRB assigned to individual institutions for CESEE-related risks is calculated based on the *total exposure*, weighted with a synthetic indicator (i) of long-term macroeconomic risks in individual CESEE countries; (ii) cross-country cyclical correlations; and (iii) the level of concentration of business activities in the region. While the calibration approach is sophisticated in including several risk-relevant dimensions of CESEE exposures, it does not capture the high profit-dependence on CESEE subsidiaries explicitly. In particular, the total exposure to the CESEE region—while affecting profits—does not capture well the high net interest margins (NIM) experienced by Austrian subsidiaries and, thus, the potential losses from a decline in the NIM.

<sup>21</sup> Guiding Principles on lending in FX refers to the commitment of Austrian banks to refrain from the riskiest forms of FX lending in CESEE.

## F. Structural Vulnerabilities

**47. Structural vulnerabilities include large exposure to the CESEE, high concentration and interconnectedness in the banking sector, and low domestic profitability** (Figure 5). The five largest banking groups account for over 80 percent of the domestic market share.<sup>22</sup> Separately, developments in the three “decentralized segments” (Raiffeisen, Sparkassen, and Volksbanken) or in Austrian foreign subsidiaries have a high potential of spreading into the domestic financial system, due to the significant equity cross-holdings by many domestic entities and their collaboration arrangements (for example, IPS in the Raiffeisen sector and cross-guarantee schemes).

**48. The authorities use a sophisticated framework based on complementarities between O-SII and SRB buffers to address risks from structural vulnerabilities.** In the framework, the O-SII buffer is used to address risks an individual institution poses to the stability of the financial system. The SRB buffer captures the exposure of the individual institution to the system-wide risks:

- The identification of institutions subject to the O-SII buffer is based on EBA guidelines, but in 2018 the buffer was extended to the unconsolidated level.<sup>23</sup> As of January 1, 2019, seven banks were subject to an O-SII buffer (ranging from 0.5 to 2 percent of RWA) at the consolidated level, and seven others also at unconsolidated level.
- The SRB buffer consists of two parts: (i) the systemic vulnerability buffer of up to 1 percent of RWA, aimed to address risks related to the institution's position in the domestic banking sector (due to interconnectedness and equity cross-holdings); and (ii) the systemic cluster risk buffer of up to 1 percent of RWA, capturing risks related to concentration of exposures in the CESEE region. The systemic cluster buffer of the SRB assigned to an individual institution is calculated based on an indicator of risk-weighted exposure to the CESEE region (that reflects long-term macroeconomic risks and cross-country correlations), and the level of concentration of business activities in CESEE countries. As of January 1, 2019, 13 banks were subject to an SRB buffer at the consolidated level, and 7 also at unconsolidated level.
- The built-in complementarities between the two buffers will become fully operational when the buffers become additive under the planned amendments to the European capital requirements framework (CRD V).

<sup>22</sup> This is when treating the Raiffeisen sector as one banking group.

<sup>23</sup> The 2018 extension of the EBA guidelines also included the introduction of four new sufficient conditions for being identified as an O-SII: i) based on a threshold approach identifying institutions whose score is particularly high in any one of the indicators used; ii) based on a high EBA score when substituting institution's share in EU deposits and EU loans with domestic equivalents; iii) based on the institution's market share of covered deposits (above 3.5 percent); and (iv) based on unconsolidated banking data.



**49. In 2015, the FMSB lowered the maximum applicable level of the SRB from the initially planned 3 percent to 2 percent.** The restructuring of Unicredit Austria<sup>24</sup> played a role in reducing the "systemic cluster" component of the SRB. The risk profiles of CESEE exposures—as measured by the OeNB methodology—also declined. The FMSB motivated its decision also by the higher SREP capital requirements imposed on Austrian banks by the ECB, but these have declined since then.

## G. Recommendations

**50. The authorities should consider taking further regulatory action in the residential real estate lending.** A considerable share of new loans does not comply with the soft limits announced in September 2018. This is in the context of continued and increasing overvaluation pressures in the housing market that increase both the collateral values and the loan size needed for a house purchase; and high likelihood of interest rates remaining low in the EA in the near to medium term, which reduce the DSTI ratios despite increasing loan sizes. With the still high share of variable rate loans in new mortgage loans, this could lead to large increases in the debt-servicing costs once interest rates normalize. Thus, the FMSB should closely monitor the effectiveness of the guidance on sustainable lending standards and prepare further regulatory actions if the risk profile of new residential real estate lending does not improve. In particular, the introduction of hard borrower-based limits could help ensure that the vulnerabilities on households' balance sheets remain contained. For example, a combination of TV-DSTI limits with speed limits<sup>25</sup> would allow the FMSB to more effectively control the volume of loans with high indebtedness indicators, while allowing banks some flexibility in granting loans to customers. The FSAP's analysis based on a semi-structural model (see Annex I) suggests that such combined limits could cut the expected losses on the new loans in a tail risk event by over a half.

**51. Strong growth of domestic bank lending to nonfinancial corporates since 2017 warrants attention.** Close monitoring of credit, overall indebtedness, and other risk indicators of the NFCs should continue, including looking at real estate and construction sector-related corporate finance—where strong demand for credit is supported by price overvaluation. Going forward, the planned introduction of sectoral macroprudential capital buffers to the European macroprudential framework (under CRR/CRD IV reform package) may help address sector-specific risks stemming from credit growth.

**52. High profit-dependence on the CESEE region could be reflected in the calibration of the SRB.** Despite some successful de-risking of exposures across the region by major Austrian banks, the CESEE region is vulnerable to financial market volatility, capital outflows, and foreign exchange (FX) swings. A slowdown in the CESEE countries would hit Austrian banks' profitability via the size of exposure (extensive margin) and the NIM (intensive margin). Additionally, the higher cyclical volatility in the CESEE region implies a larger volatility of returns. Thus, the calibration of the

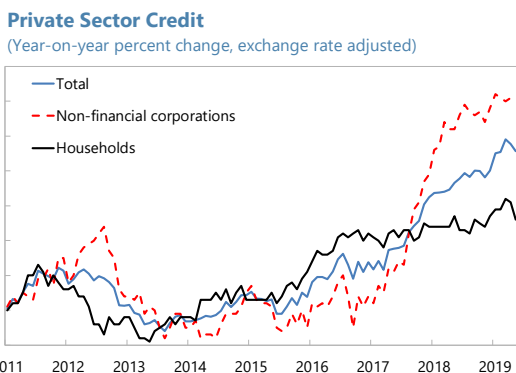
<sup>24</sup> In 2015, the Unicredit decided to consolidate its CESEE subsidiaries in Italy rather than in Austria.

<sup>25</sup> A speed limit of 10 percent means that 10 percent of new mortgage flows do not have to comply with the macroprudential limits.

SRB should take the risks stemming from high profit-dependence on the region into account. This could be done through the inclusion of the share of CESEE profits in total bank profits in the calculation of the institution-specific buffers, or through an increase in the maximum level of the SRB. A higher SRB would be an additional way to encourage banks to retain (more volatile) earnings from the CESEE exposures.

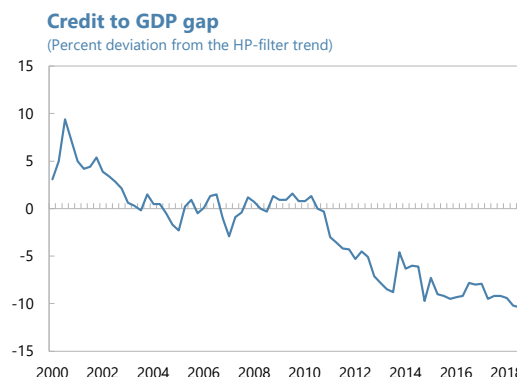
**Figure 3. Credit Developments**

*Private sector credit growth has picked-up in recent years, but remains moderate...*



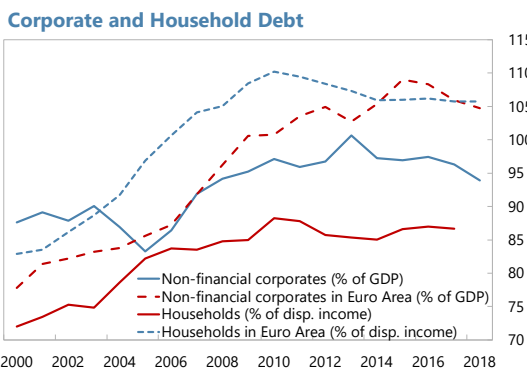
Source: ECB.

*...and the credit-to-GDP gap does not point to excessive credit growth.*



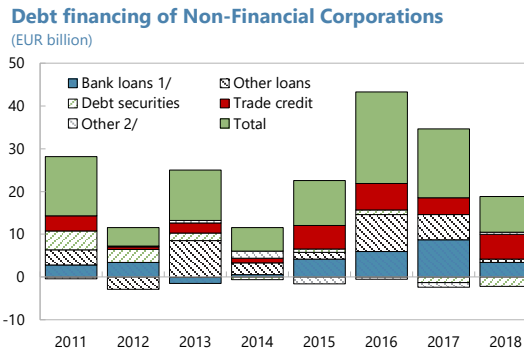
Source: Haver, Staff calculations.

*Households and corporates hold low levels of debt in international comparison.*



Source: Haver.

*Despite strong domestic bank credit growth to corporates, total debt financing of the sector declined last year.*



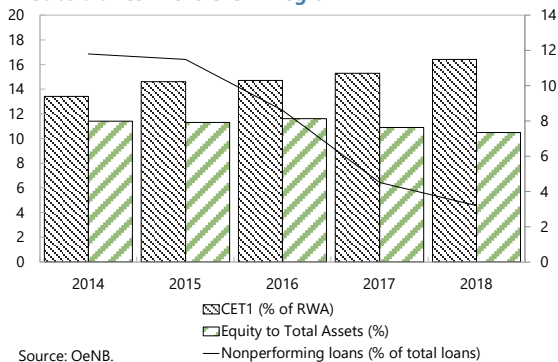
Source: OeNB

1/ Loans by domestic and foreign banks  
2/ Pension entitlements and other accounts payable

**Figure 4. Austrian Subsidiaries in CESEE: Selected Indicators**

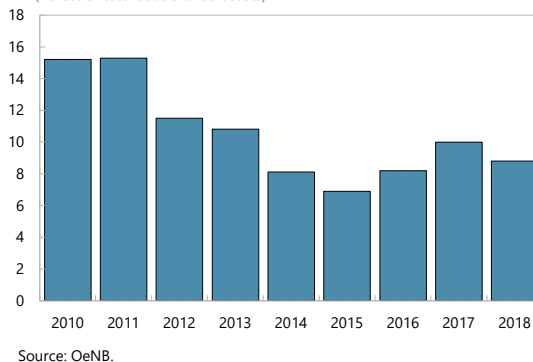
Capital adequacy of Austrian banks in the CESEE region has improved since 2014, and NPL ratios have declined.

**Capital Adequacy and Loan Quality of Austrian Banks' Subsidiaries in the CESEE Region**



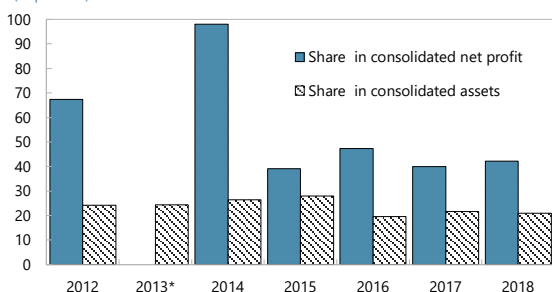
The direct exposure of Austrian banks to the region through intergroup loans has declined too.

**Intragroup Liquidity Transfers to CESEE Subsidiaries**  
(Percent of total subsidiaries' assets)



CESEE region accounts for a large share of Austrian banks' consolidated profits.

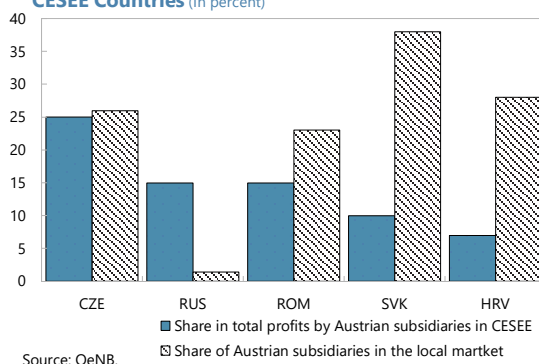
**Assets and Profits of CESEE Subsidiaries**  
(In percent)



\*In 2013 the consolidated net profit was negative (-1 percent), while the net profit of CESEE subsidiaries was 2.2 percent.

Austrian banks continue to have a considerable market share in several CESEE countries.

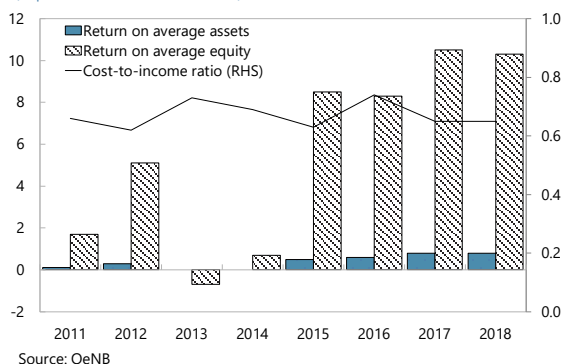
**Profits and Market Share of Austrian Banks in Selected CESEE Countries**  
(In percent)



**Figure 5. Profitability and Foreign Exposures of the Banking System**

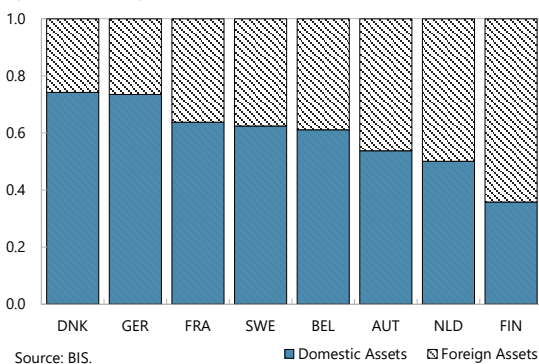
Costs as a share of banks' operating income remain high.

**Profitability of Austrian Banks**  
(In percent, on consolidated basis)



Foreign exposure is high and concentrated in the CESEE.

**Foreign Assets of Banking Systems in Selected Countries**  
(As a share of total)



## Annex I. Structural Model of Mortgage Risk for Austria

**1. We study the impact of borrower-based macroprudential tools in Austria by extending the Reserve Bank of New Zealand (2008) model.** The model simulates mortgage default rates and losses in a tail risk event. It assumes that borrowers will continue to service a loan if they can afford to pay off the scheduled interest and principal payments, even when they have negative equity. The drivers of borrowers' debt servicing capacity include changes in (i) house prices; (ii) income; (iii) unemployment rate; and (iv) mortgage interest rates. We extend the model to incorporate Austria-specific characteristics, and to allow macroprudential tools to affect the risk profile of new mortgages.

**2. To simulate mortgage losses under borrower-based macroprudential limits, we proceed in three stages:**

- *Assessment of tail risks to the macroeconomic outlook.* To calibrate the tail risk event, we use the Growth-at-Risk (GaR) and House Price-at-Risk (HaR) methodology.
- *Introduction of macroprudential tools.* We assume macroprudential policies are introduced 4 or 8 quarters before the tail risk materializes. They affect the distribution of LTV, DSTI, and DTI ratios of new mortgages granted during that period.
- *Simulation of mortgage defaults and losses.* We simulate default rates and losses on banks' mortgage portfolios in the tail risk event for different levels of macroprudential limits.

**3. The use of GaR and HaR ensures the tail risk event reflects the *current* level of systemic risk.** As calibration of macroprudential tools should be guided by the current level of risks to macrofinancial stability, we employ GaR and HaR to link the desirable tightness of macroprudential tools with cyclical position:

- Following Adrian et al. (2016) and IMF (2017), downside risks to both GDP growth and house price growth are proxied by the fifth percentile of the forecasted distributions of future GDP and house prices. The methodology employs a quantile regression estimation on macrofinancial data between 1993Q3–2018Q4 to calculate the predicted distribution one year ahead. The explanatory variables used for the house prices-at-risk analysis include: house price growth, financial conditions index, private sector credit growth, house price misalignment, and GDP growth. Explanatory variables for the growth-at-risk include lagged GDP growth and financial conditions index.
- Estimates from GaR and HaR models are used to inform the size of income and house prices decline in the tail risk event.

- The increase in the unemployment rate is estimated based on the past relationship with GDP growth, and the increase in the interest rate on housing loans in the tail risk event is calibrated based on evidence from past recessions.

**4. Borrower-based limits reduce the riskiness of new loans in the model.** To study the impact of borrower-based macroprudential tools, we simulate the portfolio of mortgages for four or eight quarters into the future, before the tail risk event is triggered. During this time, the macroprudential limits are binding and affect the LTV, DTI, and DSTIs of new flows of mortgages, while some of the outstanding loans mature. We assume that in the absence of macroprudential measures, the new mortgage flows would be similar (in terms of volume, LTV, DTI, and DSTI distributions) to the average flows observed in the last four quarters of data. The income and house prices are assumed to grow at the median values predicted from the GaR and HaR exercises, and we assume no change in the unemployment or in the mortgage interest rate in the period before the tail risk event.

**5. In the last stage, we simulate mortgage losses during the tail risk event. The model assumes that a borrower defaults on housing loan if two conditions are satisfied:**

- *The borrower is in distress:* he is unable to repay the debt on time due financial difficulties. The probability of the financial distress,  $\Pr(FS_t)$ , is a function of i) the borrower's initial DSTI, ii) the change in the debt servicing capacity,  $\Delta DSTI$  (due to changes in income and interest rate), and iii) unemployment rate  $U$  and growth in unemployment,  $\Delta U$ <sup>1</sup>

$$\Pr(FS_t) = \beta_0(DSR_{t-1}) \times D + \beta_1 \times \Delta DSR_t^\gamma + \beta_0 \times (\beta_2 U_{t-1} + \beta_3 \Delta U_t^\alpha)$$

- *The net value of collateral, after disposable costs, is less than the value of the loan:* the borrower cannot sell the collateral to service the loan. The value of collateral is proxied by the house price  $\widetilde{HP}_t$  net of fees to be paid when selling the house,  $C$ . The net present value of the loan,  $NPV$ , depends on the outstanding value of the loan  $L_t$ , the interest rate,  $r_t$ , and the remaining maturity of the loan  $T - t$ .

$$\widetilde{HP}_t - C < NPV(L_t, r_t, T, t)$$

**6. Conditional on defaulting, a bank's loss on a mortgage is driven by the discounted sale price of the house.** The loss-given default (LGD) is calculated assuming that the sale occurs at time  $t+s$  (where  $s$  denotes the time to sell the collateral, calibrated at 1.75 years) and that the sale proceeds net of transaction costs,  $\delta$ , are discounted at a rate reflecting the risk premium of the foreclosed asset ( $r^f + spread$ ):

<sup>1</sup> Parameters  $\beta_0, \beta_1, \beta_2, \beta_3$  are calibrated as in RBNZ (2008), parameter  $D$  is calibrated to match the Austria-specific average probability of default of a mortgage during normal times.

$$LGD_t = NPV(L_t) + C - (1 - \delta) \times \frac{\bar{HP}_t}{(1+r^f+spread)^S}$$

**7. The default rate and LGD for the banking system-wide mortgage portfolio are generated through simulations.** Using information on system-wide distribution of LTVs, DSTIs, and DTIs, we simulate probabilities of default (PDs) and LGDs for each LTV-vintage bucket of mortgages and calculate system-wide PDs and LGDs as weighted averages of bucket-specific values. For a given bucket of mortgages, the model generates 10,000 draws of individual house prices (from a normal distribution with the mean equal to the fifth percentile estimate from the HaR model). For each of these house prices, the model determines whether a borrower defaults and computes the LGD. We simulate each bucket 2,000 times and take the averages across iterations to compute the bucket-specific PDs and LGDs.

**8. We study several alternative calibrations of borrower-based limits.** The model is flexible in allowing several alternative calibrations of borrower-based macroprudential limits. In particular, we consider a range of (i) LTV limits; (ii) DSTI limits; (iii) a combination of LTV-DSTI limits; and (iv) a combination of LTV-DSTI-DTI limits. We also distinguish between hard limits and speed limits, where, in the latter case, a pre-defined share of loans is allowed not to comply with the regulatory limit. For each choice of the macroprudential tools, we compare the losses on the mortgage portfolio generated in the tail risk event with the losses observed in the absence of any limits. The results suggest that reasonable calibrations of combined LTV-DSTI or LTV-DSTI-DTI limits with speed limits could cut the expected losses on the new loans in a tail risk event by over a half.

**9. The model can incorporate several Austria-specific characteristics of the housing market, but caveats apply.** The model distinguishes between fixed and floating-rate loans when considering the impact of interest rate increases on debt servicing capacity in the tail risk event. The LTV and DSTI values for different mortgage vintages are updated to reflect changes in house prices, real income, and loan repayments since the mortgage origination. At the same time, the model has some important limitations. In particular, the calibration of macroprudential tools should incorporate a broader cost-benefit analysis, that would capture the impact of the new limits on bank credit and house prices. These considerations remain beyond the scope of the model developed here.

## References

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