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TECHNICAL NOTE ON MACROPRUDENTIAL POLICY FRAMEWORK AND TOOLS

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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 mission in the Slovak Republic. 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

BBMs	Borrower-based measures
BCBS	Basel Committee on Banking Supervision
BIS	Bank for International Settlements
CBI	Central Bank of Ireland
CRD	Capital Requirements Directive
CRR	Capital Requirements Regulation
CCyB	Countercyclical Capital Buffer
DSTI	Debt-service-to-income
DTI	Debt-to-income
DTV	Debt-to-value
EA	Euro Area
EBA	European Banking Authority
ECB	European Central Bank
ESRB	European Systemic Risk Board
EU	European Union
FSB	Financial Stability Board
FSD	Financial Stability Department
FSR	Financial Stability Report
GFC	Great Financial Crisis
HP	Hodrick–Prescott
IMF	International Monetary Fund
LCR	Liquidity coverage ratio
LGD	Loss given default
LSTI	Loan-service-to-income
LTV	Loan-to-value
MoF	Ministry of Finance
NBS	Národná banka Slovenska
NFC	Non-financial company
NPL	Non-performing loans
NSFR	Net stable funding ratio
O-SII	Other systemically important institutions
pnCCyB	Positive neutral Countercyclical Capital Buffer
RoA	Return on assets
RoE	Return on equity
RWA	Risk-weighted assets
RRE	Residential real estate
PD	Probability of default
SSM	Single Supervisory Mechanism
SyRB	Systemic Risk Buffer

EXECUTIVE SUMMARY[1]

Since the 2007 FSAP update, the Národná banka Slovenska (NBS) has made significant progress in implementing and advancing the macroprudential policy framework. In response to a build-up of mortgage risks and imbalances in the residential real estate market, the NBS, as the designated macroprudential authority, issued a non-binding recommendation in 2014 on loan-to-value (LTV), debt-service-to-income (DSTI), and maturity limits. These recommendations became binding in early 2017 and have been progressively tightened, including by adding a debt-to-income (DTI) limit to the regulatory toolkit. Borrower-based measures (BBMs) have been complemented by the activation of a counter cyclical capital buffer (CCyB) in 2017, supplementing existing capital conservation buffer (CCoB) and other systemically important institutions (O-SII) buffers. Authorities have also established a credit register to collect individual borrower data for households. As a member of the euro area, Slovakia collaborates extensively with European regulators on macroprudential policymaking.

The institutional framework for macroprudential policy in Slovakia aligns broadly with the IMF guidance for effective macroprudential policymaking. The NBS Board (the Bank Board) holds the authority to issue, amend, or revoke all macroprudential policy instruments as specified under the law. The Ministry of Finance (MoF) can suggest changes during the required public consultation process for BBMs, but it does not have formal authority in shaping macroprudential policy. The effectiveness and appropriateness of macroprudential measures are routinely evaluated through both NBS and European-level assessment processes. Additionally, accountability is reinforced through transparent communication.

The willingness to act could be further enhanced by adopting and publishing a macroprudential strategy and incorporating external advisors into the policy-making process. The Bank Board has adopted clear and comprehensive macroprudential intermediate objectives. To bolster their legitimacy and importance, these objectives should be integrated into a broader macroprudential strategy that encompasses communication, the available toolkit, and the mapping of risks to instruments. The macroprudential decision-making process is currently effective, with the Financial Stability Department (FSD) conducting analyses to inform the Macroprudential Committee's meetings and the Board's decisions. However, this process could be further improved by expanding the Committee's membership to include external advisors. To maintain the NBS's independence while ensuring a diversity of perspectives, these advisors could be drawn from academia or subject-matter experts.

While extensive information-collection powers are established in law, they should be broadened to include loan-level data and information from unregulated financial institutions.

[1] This technical note was prepared by Julia Otten (Monetary and Capital Markets Department, IMF) with administrative support from Vanessa Guerrero and David Ramirez. The review was conducted during the period of September 11–24, 2024, and considers the legal and regulatory framework in place and the practices employed at the time. The mission team would like to thank the NBS, MoF, ECB, and representatives from the private sector for their excellent cooperation and fruitful discussions.

The NBS has the authority to gather information from other public entities and those under its supervision, granting it access to a wide array of macroeconomic and financial data. However, specific legislation empowering the NBS to access household loan data is currently lacking, which is essential for calibrating BBMs. Presently, access to retail loan data from banks is requested on ad-hoc basis, making the process inconsistent and cumbersome. Progress has been made towards establishing ongoing access to household loan-level data from banks. On the other hand, data from non-bank financial institutions (NBFIs) remain unaddressed. Furthermore, it would be advantageous to proactively expand information-collection powers to include supervisory data from unregulated institutions to capture any emerging risks.

Operational capacity is generally high but could be improved at the margins by closing data gaps in the residential real estate (RRE) and commercial real estate (CRE) sectors and by developing a macrofinancial model. First, the staff of the FSD should be increased to reduce turnover risk and ensure that it can effectively continue its responsibilities, including expanding into new domains that will influence future policymaking. Second, the NBS should persist in its efforts to address data gaps in the RRE and CRE sectors, particularly by obtaining high-quality data from the land register, as well as further enhancing the monitoring frameworks. Third, the NBS should perform regular ex-post evaluation of BBMs, including the use of a model with a macrofinancial feedback channel.

While the current CCyB rate of 1.5 percent is adequate for protecting against legacy risks in the REE market, adopting a positive-neutral CCyB (pnCCyB) framework would further safeguard the availability of releasable capital in the future. By keeping CCyB relatively high to protect against entrenched risks that are mainly present in the RRE sector, even as the financial cycle bottoms out, Slovakia's CCyB rates have effectively aligned with a pnCCyB framework. Formally adopting a pnCCyB would safeguard the availability of releasable capital at any stage of the cycle, including in the event of shocks unrelated to the financial cycle, to which Slovakia is particularly prone as a small open economy without an independent monetary policy. This approach would also enhance the predictability of CCyB decisions by formally basing the activation stage on indicators such as bank profits and voluntary buffers. Moreover, maintaining a positive CCyB during stable periods would provide the NBS additional time to evaluate any potential buildup of vulnerabilities, allowing for a more gradual adjustment of buffers if higher levels are deemed necessary. While there remains an open question regarding the possibility to set a positive rate for the CCyB when cyclical systemic risks are not elevated under Slovak National Law, ongoing discussions at the European level may lead to clearer guidance from European regulators on the pnCCyB, thereby supporting any necessary legal actions.

The BBM package is comprehensive and has played a crucial role in mitigating household credit risk, yet the co-financing of mortgages creates a non-negligible loophole. The Slovak BBM package is comprehensive and includes LTV, DTI, DSTI, and maturity limits, which bind at different phases of the financial cycle, and have contributed to containing risk in households' balance sheets. However, the possibility to co-finance a mortgage with a consumer loan undermines LTV regulation. While total debt remains subject to DTI and DSTI limits and the consumer loan is

subject to a tighter maturity limit, the uptake is still non-negligible at 15 percent. To ensure the effectiveness of LTV regulation, this practice should be abolished.

The recent availability of real estate transaction data provides an opportunity to revise the macroprudential framework with a greater emphasis on mitigating the procyclicality of credit and house price growth, while keeping the principle focus on the structural built-up of resilience. Several factors contribute to the strong correlation between credit and house price growth in Slovakia. The flexibility of mortgage refinancing, combined with intensified competition from mortgage brokers, has led to a surge in refinancing activities and top-ups during periods of low interest rates. Additionally, the perception of RRE as a prime investment asset drives some individuals to purchase and hold apartments. The NBS should leverage the newly accessible transaction data from the land register to refine the speed limits within the BBM package, focusing on First-time buyers (FTB), Second-time buyers (STB), Investor, and Top-up categories. Implementing tighter macroprudential limits for investors and top-ups, in particular, can be expected to reduce the procyclicality of credit and house price growth. Such a realignment is also likely to provide a better alternative to the current design of the DTI, by targeting more closely the systemic risk contributions of different borrower groups.

The NBS should be prepared to activate the systemic risk buffer (SyRB) if risks in the CRE sector become systemic and should maintain close oversight of real estate funds. Although the CRE sector has developed more favorably than expected, it remains sensitive to interest rates and risk of lower demand particularly the office segment. The NBS should remain vigilant and be ready to activate the SyRB if risks accumulate. While real estate funds currently represent a small share of the financial system, the NBS should continue to monitor this sector closely. If risks become systemic, it should stand ready to enact additional measures such as leverage limits and aligning redemption limits with asset liquidity, avoiding a procyclical tightening.

Table 1. Slovak Republic: Key Recommendations on Macroprudential Policy

Recommendations		Agency	Time[1]
A. Institutional Framework			
1.	Publish a macroprudential strategy document including objectives, communication, risk monitoring framework, and available toolkit.	NBS	I
2.	Open the Macroprudential Committee to external advisory members (e.g., academia and experts) to strengthen diversity of perspectives.	NBS	NT
3.	Expand information collection powers to cover loan-level data from both banks and non-banks and data from unregulated entities.	Government and NBS	MT
B. Operational Capacity			
4.	Increase staffing of the FSD to limit turnover risk and to ensure that it can continue to fulfill its responsibilities.	NBS	I
5.	Continue to work on closing data gaps in the RRE and CRE sectors and on improving monitoring frameworks.	NBS	I
6.	Incorporate a macrofinancial perspective into BBM analysis and implement a regular ex-post evaluation process.	NBS	NT
C. Systemic Risk and Macroprudential Policy			
7.	Maintain the availability of releasable capital in normal times by adopting a pnCCyB framework.	Government and NBS	MT
8.	Refine the borrower-based measures and remove the possibility to circumvent LTV limits with consumer loans.	NBS	MT
9.	Stand ready to deploy the SyRB in case risks in the CRE sector become systemic.	NBS	MT

[1] I = Immediate (within one year); NT = Near Term (within 1 to 3 years); MT=Medium Term (within 3 to 5 years).

INTRODUCTION

1. In Slovakia, responsibilities for financial stability and macroprudential policy are shared between European and national institutions. The Single Supervisory Mechanism (SSM) regulates banking supervision for all Euro Area (EA) countries as well as for countries that decide to join the European Union (EU) Banking Union.[2] It delineates the division of labor between European and national supervisory authorities, as outlined in the Capital Requirements Directive (CRD)[3] and the Capital Requirements Regulation (CRR)[4], both established in 2013 with the aim of achieving harmonization across different jurisdictions. The CRD mainly provides guidelines on setting capital buffers, while the CRR empowers national authorities to impose additional provisions to address systemic risks ("national flexibility measures").[5] The implementation of these policies primarily falls to national authorities but is subject to notification and coordination with the European Central Bank (ECB), which possesses "top-up power".[6] Furthermore, the European Systemic Risk Board (ESRB) is tasked with macroprudential oversight at the European level, holding the authority to issue warnings and recommendations, the latter of which triggers a "comply or explain" mechanism for national authorities. Finally, there is a class of macroprudential tools outside of the CRD/CRR, for which national authorities bear sole responsibility, including borrower-based measures (BBMs).

2. In alignment with evolving EU regulations, the Slovak macroprudential framework has undergone significant changes since the 2007 FSAP Update. The financial stability mandate was delegated to the NBS in 2006,[7] and was broadened to include general macroprudential powers in 2013.[8] The authority to set capital buffers was conferred to the NBS in 2014, in accordance with European CRD and CRR regulations as well as the ESRB's recommendation to develop coherent national macroprudential strategies.[9] Amid growing concerns about risks in the housing market,

[2] An assessment of the SSM framework is not subject of this TN, but part of the Euro Area FSAP (see respective TN).

[3] See https://eur-lex.europa.eu/eli/dir/2013/36/2022-01-01.

[4] See http://data.europa.eu/eli/reg/2013/575/2023-01-01.

[5] See European Systemic Risk Board, 2014. Additional measures can include the level of own funds, large exposure limits, public disclosure requirements, the level of the capital conservation buffer (CCoB), liquidity requirements, risk weights for the residential and commercial property sectors, and measures for intra-financial sector exposures.

[6] Based on Article 5 of the SSM Regulation, the ECB can apply tighter measures if deemed necessary. See http://data.europa.eu/eli/reg/2013/1024/oj.

[7] Amendment No. 519/2005 Z. z. to the Act No. 566/1992 on NBS, Article 2(3), adopted on October 27, 2005, and effective on January 1, 2006.

[8] Amendment No. 132/2013 Z. z. to the Act No. 747/2004 on Financial Market Supervision, Articles 1(2) and 1(3b), adopted on May 15, 2013, and was effective on June 13, 2013.

[9] Macroprudential powers for capital buffers are delegated to the NBS by the amendment No. 213/2014 Z. z. to the Act No. 483/2001 on banks, Articles 33a to 33g, that was adopted on July 3, 2014, and was effective on August 1, 2014. Macroprudential powers for other capital-based measures, liquidity, large exposures, and reciprocity are delegated to the NBS by the amendment No. 213/2014 Z. z. to the Act No. 483/2001 on banks, Article 33m, that was adopted on July 3, 2014, and was effective on August 1, 2014. See ESRB (2014) for the ESRB recommendation.

the NBS issued a recommendation on BBMs in 2014, formally extending its macroprudential mandate to include BBMs for both mortgages and consumer loans in 2016.[10]

3. This technical note assesses Slovakia's macroprudential framework and its effectiveness in addressing any emerging vulnerabilities. It evaluates (i) the institutional framework (Section II), (ii) the operational capacity (Section III), and (iii) the adequacy of the current macroprudential settings (Section IV). The evaluation is carried out in accordance with IMF guidance, as detailed in the Staff Guidance Note (IMF, 2014a), its background note (IMF 2014b), and additional IMF policy documents.

INSTITUTIONAL FRAMEWORK

4. A robust institutional framework is essential for effective macroprudential policymaking. The framework's strength can be assessed based on three principles (IMF, 2014a). First, the framework should promote the willingness to act, i.e., to promote timely action against any buildup of systemic risk and counter the inaction bias inherent in macroprudential policymaking. To this end, the dedicated macroprudential authority should have a clear mandate and accountability framework, along with appropriate communication channels. Second, the ability to act embodies the capacity of the macroprudential authority to implement measures aimed at mitigating systemic risks, underpinned by a strong legal framework, access to relevant data, a comprehensive toolkit, and operational independence. Third, the framework must facilitate effective coordination among domestic and international agencies to identify and mitigate systemic risks. This coordination is crucial for conducting thorough risk assessments, ensuring consistency in policy implementation, and addressing cross-border risks. The following assessment evaluates the Slovak macroprudential framework based on these principles.

A. Willingness to Act

5. The macroprudential framework should be designed to counter inaction bias. Policymakers may hesitate to implement macroprudential measures due to concerns about short-term costs or pressures from political and industry stakeholders. It is essential to design the macroprudential framework in a way that encourages a proactive stance, enabling authorities to make difficult decisions and safeguard financial stability over the long term (IMF, 2014a). Key design elements include a clear mandate, strong involvement of the central bank, a well-defined objective, as well as transparency and accountability mechanisms (IMF, BIS, and FSB, 2016).

6. The NBS holds a clear mandate for financial stability and general macroprudential policy, sharing responsibility for capital tools with the ECB. The NBS's financial stability

[10] BBMs for mortgages are covered under the Act No. 90/2016 on housing loans, Article 8(16), that was adopted on December 9, 2015, and was effective on March 21, 2016. BBMs for consumer loans are covered by the amendment No. 299/2016 to the Act No. 129/2010 on consumer loans, Article 7(41), that was adopted on October 12, 2016, and was effective on January 1, 2017.

mandate and general macroprudential powers are enshrined in law,[11] complemented by specific laws assigning powers for setting capital-based measures,[12] BBMs, as well as regulations related to liquidity, large exposures, and reciprocity.[13] The NBS is the only Slovak institution with such powers but powers to set capital buffers are shared with the ECB, as outlined in paragraph 1. While modifications to BBMs on housing loans necessitate consultations with the MoF[14], the MoF has no formal powers to decide on the substance of the proposed measure.

7. The NBS has clear objectives for macroprudential policy setting but should aim to publish these as part of a comprehensive macroprudential strategy. The Bank Board has adopted macroprudential intermediate objectives, which are available on the NBS website.[15] They include *mitigating and preventing of excessive credit growth*; *limiting direct and indirect concentration risk; mitigating and preventing market illiquidity and excessive maturity mismatches in bank balance sheets; limiting the systemic impact of misaligned incentives, with a view to reducing moral hazard; and strengthening the resilience of the financial market infrastructure.* The formulation aligns with the ESRB recommendation (ESRB/2013/1) on intermediate objectives and instruments of macroprudential policy. The objectives are clear and comprehensive, effectively addressing risks across both temporal and structural dimensions. To enhance their legitimacy and impact, these objectives should be published as part of a broader macroprudential strategy, which should also encompass areas such as communication, available tools, and the mapping of risks to instruments.

8. Within the NBS, there is a well-established macroprudential decision-making process that could, however, benefit from the inclusion of external advisors. The Financial Stability Department (FSD) is tasked with providing analysis and making recommendations related to financial stability and macroprudential policy, typically initiating the process for adjusting existing measures or introducing new ones.[16] Building on this analysis, the Macroprudential Committee, composed of NBS senior staff, including members from other policy areas, offers high-level advice to the Bank Board while also considering other perspectives from microprudential supervision, monetary policy, and consumer protection. The Bank Board has the power to adopt and modify macroprudential measures as outlined in the law.[17] Decisions are made through simple majority

[11] This general mandate and the ultimate objectives are defined as "*contribut[ing] to the stability of the financial system as a whole and to the secure and sound functioning of the financial market, with the aim of ensuring financial market credibility, the protection of financial consumers and other financial market customers, and compliance with competition rules*" (Amendment No. 519/2005 Z. z. to the Act No. 566/1992 on NBS, Article 2(3)).

[12] For example, the CCoB is explicitly set by law, as adopted by the National Parliament (Act No. 483/2001 on banks, Article 33b(1)).

[13] See paragraph 2 for references to these laws.

[14] According to the Act No. 90/2016 on housing loans, Article 8(16).

[15] The October 2014 Commentary on Macroprudential Policy and a background document provide further details on the rationale behind selecting these specific intermediate objectives.

[16] The CCyB is assessed quarterly and the O-SII weights and SyRB annually. Changes to the CCyB are published in the NBS's Official Journal and on its website. There is no regular schedule for assessing the calibration of BBMs.

[17] The Macroprudential Committee convenes at least bi-annually but holds additional meetings when proposing changes to the macroprudential toolkit to the Bank Board, which meets twice a month.

voting,[18] although there is generally a pursuit of consensus.[19] To strengthen the diversity of perspectives, it would be beneficial to open the Macroprudential Policy Committee to external advisors, such as those from academia or subject-matter experts.

9. Effectiveness and appropriateness of macroprudential policy are regularly evaluated through NBS and ESRB/ECB evaluation processes. The NBS employs several means to determine whether the current macroprudential policy package aligns with its established objectives. The FSD continuously seeks feedback from internal stakeholders (Macroprudential Committee, Consumer Protection Department, Supervisory Department, and Research Department), government agencies (mainly MoF), through market intelligence (banks, non-bank lenders, mortgage brokers), and from the media.[20] In addition to gathering this feedback, the FSD conducts impact analyses and stress testing to assess the appropriateness of the current macroprudential settings. Twice a year, the NBS presents the latest financial stability trends to Parliament. At the European level, the ESRB regularly reports on systemic risks at both the union-wide and national levels, providing valuable additional analysis to the NBS. ESRB warnings serve to publicly notify the NBS of arising risks, fostering timely action. When risks are assessed as particularly high, the ESRB issues a warning or a recommendation, the latter compelling the NBS to either implement the suggested policies or to explain, thereby increasing the pressure on the NBS to act.[21] Furthermore, the ECB's top-up power regarding capital measures incentivizes the NBS to adhere to union-wide guidance promptly.[22]

10. Accountability is further reinforced through a variety of communication channels. While macroprudential policy yields long-term benefits, it can sometimes impose short-term costs—particularly for individual borrowers (IMF, 2013). Therefore, the NBS recognizes that open and data-driven communication is essential. The NBS allocates significant resources to convey the advantages of macroprudential policies, especially during their initial implementation, to foster acceptance among stakeholders and facilitate the legislative process. The NBS employs multiple channels to inform the public about its past and forthcoming actions in alignment with its stated objectives. The primary communication tools are official NBS reports, including the Financial Stability Report (FSR) and the Macroprudential Commentary, which summarize recent developments in financial stability risks and macroprudential policy. These reports feature detailed analyses of emerging risks and cost-benefit evaluations of any proposed changes to the macroprudential framework, with supplementary background material available on the NBS

[18] In event of a tie, the Governor's vote carries double weight.

[19] The Bank Board typically does not engage in microprudential regulation, which is the responsibility of the respective Director. If consensus cannot be reached between the Director and staff, the Bank Board may be called upon to make a decision, although the situation is rare in practice.

[20] When the NBS plans to modify an existing measure or introduce a new measure, it typically consults with stakeholders beforehand, unless there is a risk of frontloading. In the case of BBMs, the consultation process is mandatory; see paragraph 6 for more details.

[21] For example, the build-up of risks in the housing sector in 2020 and 2021 led to an ESRB warning being issued for Slovakia (ESRB/2021/16).

[22] To date, the ECB has not exercised its top-up powers for Slovakia or any other country.

website.[23] The release of the FSR is accompanied by a press conference, and key messages are disseminated through social media. As mandated by law, the FSR is submitted to the Government and Parliament for discussion in the Parliamentary Committee and plenary sessions, attended by the NBS Governor or members of the NBS management. The NBS also engages in regular outreach with journalists and market participants. To enhance engagement, the NBS employs tiered communication strategies, utilizing straightforward language and clear messages aimed at a general audience.

B. Ability to Act

11. The macroprudential framework should grant the designated macroprudential authority sufficient powers to act. To ensure timely and effective action, the willingness to act should be backed by the necessary powers to act. These powers include (IMF, 2011): *information collection powers* to assess evolving risks; *rulemaking and calibration powers* to be able to react to changing risks, and *designation powers* to ensure that macroprudential policies impact all relevant institutions. Each of these powers can vary in strength (IMF, 2013). 'Hard' powers provide direct control to the macroprudential authority, allowing for prompt and decisive action. 'Semi-hard' powers enable the policymaker to issue formal recommendations, often accompanied by a 'comply or explain' mechanism. 'Soft' powers limit the policymaker to merely expressing an opinion.

12. The NBS has wide designation powers. The regulatory perimeter of the NBS is wide and includes banks and non-banks.[24] An example of a non-supervised activity is peer-to-peer lending, but its activities and assets are currently limited. The regulatory perimeter is also deep, as it includes small institutions. The NBS has the authority to expand this perimeter as necessary to incorporate emerging sectors. Additionally, the NBS designates O-SII buffers at least once a year. This process involves imposing buffers on institutions previously deemed non-systemically important and removing buffers from those that have diminished in significance over time.

13. Information-collection powers are enshrined in the law and are far-reaching but should be extended to include loan-level data and data from unregulated financial institutions. The NBS has the power to collect information from other public entities[25] and from entities under NBS supervision.[26] In particular, the NBS can request data from domestic and foreign banks operating in Slovakia for its registry on loans to non-financial companies (NFCs).[27] However, there is currently no specific legal framework for data collection for the retail loan registry, which the NBS uses to calibrate BBMs. Although household loan data are covered under the law granting

[23] The background material includes data as well as Analytical Notes. The 'Financial Stability Hub' on the NBS website also offers further information on macroprudential measures, legislation, and data.

[24] Sectors and entities under NBS supervision include the banking sector, payment services, and electronic money; non-bank creditors; insurance companies; pension funds; collective investment funds; securities/investment companies; the central securities depository; the Bratislava Stock Exchange; foreign exchange offices, and crypto assets.

[25] See Act No 566/1992 on NBS, Article 34a.

[26] See Act No. 747/2004 on Financial Market Supervision, Articles 35(1).

[27] See Act No. 483/2001 on Banks, Articles 38(1), 42(2), 93a(4).

general information-collection powers,[28] current access is ad-hoc and the process is time-consuming.[29] Progress has been made on legislating continued access to household loan-level data from banks, with talks with the MoF and the Office for Personal Data Protection having concluded, pending Parliament approval. To ensure ongoing access and avoid potential delays in policymaking, the right to access this data should be legislated promptly. Loans from non-banks are not currently included in the household loan registry, and efforts to legislate access to household loan data have not addressed this gap. While non-banks do not offer mortgages and represent a small share of the consumer loan market (around 10 percent), it is still important to include loan-level data for consumer loans issued by non-banks in the credit register to identify vulnerabilities in this sector. Additionally, the NBS lacks the authority to collect supervisory data from unregulated financial institutions. Although this segment currently constitutes a minor part of the financial sector, it would be prudent to enhance information-collection powers preemptively to capture any emerging risks.

14. The NBS possesses hard powers to calibrate and implement a broad range of macroprudential measures as outlined in the law, subject to the ECB's top-up powers for capital buffers. The process to change capital buffers is straightforward: the draft proposal is prepared by the FSD and discussed by the Macroprudential Committee. Following this, the Bank Board makes a preliminary decision, which is then formally consulted with the ECB, allowing the ECB to exercise its top-up powers. Ultimately, the final proposal is approved by the Bank Board and published in the official NBS Journal. The process for modifying BBMs or introducing new measures is more involved. After the FSD prepares a draft proposal and it is discussed by the Macroprudential Committee, the proposal undergoes several rounds of consultation with stakeholders, including the MoF.[30] If the NBS intends to adjust the calibration of an instrument for which it lacks authority or to introduce measures not currently covered by existing law, it must seek a change in National Law, which requires approval from Parliament. In the interim, the NBS holds soft powers to issue public recommendations aimed at raising awareness and preparedness among market participants.[31]

C. Effective Cooperation and Coordination

15. Domestic inter-agency cooperation is naturally limited due to NBS's broad mandate but effective. As the NBS is the only domestic institution with a macroprudential mandate, the necessity for cooperation and coordination with other domestic agencies is somewhat restricted. Beyond the previously mentioned consultation processes, the NBS has established long-term agreements for information sharing with several government entities, including the Statistical

[28] See Act No. 747/2004 on Financial Market Supervision.

[29] For each quarterly wave, access must be requested in a letter signed by the Executive Director.

[30] The law does not mandate consultation on changes to BBMs related to consumer loans; however, in practice, any forthcoming changes are still discussed with the MoF.

[31] For instance, the NBS issued a recommendation concerning capital and profit distributions by banks during the COVID-19 pandemic (Recommendation 1/2021).

Office, the Social Insurance Agency, the Financial Administration, the Cadastre Authority, and the Central Office of Labour, Social Affairs, and Family.

16. The NBS extensively collaborates with European regulators and regularly shares supervisory data with the ECB and ESRB. In addition to the evaluation processes (¶9), the NBS consults with representatives from both the ECB and ESRB regarding any significant planned changes to the macroprudential toolkit.[32] Staff from the FSD regularly meet with the ESRB to discuss specific issues, including developments in the RRE and CRE sectors. The ECB produces a semi-annual Macroprudential Report with a country-level risk assessment and targeted soft recommendations. This internal document is prepared by ECB staff, considering the views of national representatives,[33] and is discussed at the highest levels. The NBS also regularly participates in working groups led by the ECB.[34] The NBS submits data on significant institutions (SIs), which the ECB directly oversees, and adhere to information sharing mandated by ESRB Recommendation ESRB/2019/18 by banks headquartered in another Member State or a third country. In its most recent compliance report of this recommendation, the NBS has been assessed as having "sufficiently explained inaction".[35]

17. The NBS adheres to the European reciprocity framework. In accordance with Basel III, the CRD mandates reciprocity of a Countercyclical Capital Buffer (CCyB) of up to 2.5 percent. The CRR further stipulates that credit institutions with relevant exposures in countries with higher real estate risk (RRE) weights or a higher average loss given default (LGD) apply these tighter standards. Reciprocity of other measures is voluntary but strongly encouraged by the 2015 ESRB reciprocity framework (ESRB/2015/2). The activating country submits its request to the ESRB, which then decides whether to recommend the activation of the measure (or an equivalent one) for all other banking union members. The ESRB also conducts regular assessments of compliance. In this context, Slovakia was found to be fully compliant in the most recent compliance report from September 2023.[36] For instance, the NBS fully reciprocated the Estonian SyRB.

18. The NBS cooperates with other international organizations and regional bodies on macroprudential policies. This collaboration includes analytical studies, such as a partnership with the IMF focused on credit growth and macroprudential measures in Slovakia (IMF, 2018) as well as a joint project with the ECB and IMF examining the effectiveness of BBMs in Slovakia (Jurča et al., 2020). At the regional level, the NBS maintains regular exchanges with the Czech National Bank and

[32] If the proposed change pertains to capital buffers, consultation is mandatory. For BBMs, discussing planned changes is voluntary, but any changes must be communicated to European regulators upon adoption.

[33] For the report on Slovakia, the head of the FSD will present the NBS's views.

[34] Recent examples include workstreams on a positive-neutral Countercyclical Capital Buffer (pnCCyB) and on sectoral buffers.

[35] See compliance report, pages 17 and 18, for country-level results. Sufficiently explained inaction refers to a situation where "[n]o actions were taken but the addressee provided sufficient justification".

[36] The publicly available version of the compliance report does not contain country-level results, which are only covered in the restricted version.

organizes an Annual Financial Stability Seminar series in collaboration with neighboring countries and the ECB.

D. Recommendations

19. Recommendation 1: Publish a macroprudential strategy document including objectives, communication, risk monitoring framework, and available toolkit.

20. Recommendation 2: Open the Macroprudential Committee to external advisory members (e.g., academia and experts) to strengthen diversity of perspectives.

21. Recommendation 3: Expand information collection powers to cover loan-level data from both banks and non-banks and data from unregulated entities.

OPERATIONAL CAPACITY

22. The capacity to effectively assess systemic risk is crucial for making timely and appropriate adjustments to macroprudential policy. To achieve this, it is essential to have a comprehensive set of monitored indicators, a diverse array of models, and streamlined policy-making processes in place. This section evaluates the NBS's operational capacity based on these criteria.

A. Resources

23. The FSD has a wide range of responsibilities with limited resources. The FSD is tasked with all aspects related to financial stability and macroprudential policy. In terms of systemic risk monitoring, this includes updating surveillance data and maintaining monitoring frameworks, which encompass stress-testing models for various types of risks and sectors. In the realm of macroprudential policy, the FSD is responsible for initiating and calibrating macroprudential measures, implementing necessary legislative changes, and evaluating their effectiveness. Additionally, it manages both internal and external communication. With only 12 permanent staff members, the FSD's resources are stretched thin, limiting its ability to advance emerging areas. To mitigate turnover risk and ensure the FSD can continue to fulfill its responsibilities—including expanding into areas that will influence future policymaking—an increase in staffing is essential.

B. Data Availability and Gaps

24. The NBS's has extensive access to macroeconomic and financial data. The Statistical Office of the Slovak Republic produces macroeconomic data in line with the European Statistical System. Additionally, the NBS has secured access to data through bilateral contracts with various domestic institutions. It receives social security data from the Social Insurance Agency, tax data from the Financial Administration, real estate market data from the Cadastre Authority, and data on social benefits and unemployment from the Central Office of Labour, Social Affairs and Family.

25. The NBS maintains datasets containing detailed information on the household, NFC, and NBFIs sectors. The NBS collects data on bilateral exposures for banks, investment funds, pension funds, and insurance companies. It also maintains the following datasets:

- *Household loans*: At the formal request of the NBS, banks report their complete outstanding portfolio of retail loans on a quarterly basis ('loan tapes').[37] This dataset includes information at the time of loan origination (e.g., type of loan - mortgage/consumer credit/overdraft, LTV, DTI, DSTI, maturity, granted amount, interest rate, interest-rate fixation, installment) as well as data at the time of reporting (e.g., outstanding amount, interest rate, installment, current financial assets, credit risk, provisions, probability of default). It also contains details about the underlying property (e.g., collateral value, type, characteristics, region). The loan tapes include borrower characteristics such as age, gender, education, income, and source of income, as well as a borrower ID that enables the NBS to merge information on different loans at the household level. New categories can be easily added if emerging risks are identified.[38]

- *NFC loans*: The NBS operates an NFC credit register that has been collecting monthly data for over 20 years. This register aligns with the ECB Regulation on AnaCredit, an EU-wide dataset that provides detailed information on bank loans.[39] It encompasses all loans granted by Slovak banks to non-bank legal entities, regardless of loan size and type. The register captures terms and conditions of exposures, including variable vs. fixed rates, interest rate composition and margin, currency, original amount, maturity, most recent outstanding balance, and debt service amounts. It also includes details on the underlying collateral through a firm identifier, which can be linked with data from the firm register and firms' financial statements.

- *NBFI assets:* The NBS has developed a monthly asset-by-asset database that includes information on NBFI portfolios ('SQLite').[40] This database contains data on various asset classes, such as debt securities, equities (including shares of investment funds and ETFs), bank accounts, and derivatives. It also features a wide range of market indicators, including interest rates, equity indices, foreign exchange rates, and credit spreads.

26. A variety of survey datasets complements the analysis of macro and micro data. The NBS has access to several survey datasets collected by various domestic and international institutions. To gain further insights into developments in the household sector, the NBS employs the Household Financial Consumption Survey, which provides detailed information on debt, assets, and income. It also utilizes the Survey of Income and Living Conditions and the Classification of Individual Consumption According to Purpose, all collected by the Statistical Office. On the banking side, the NBS conducts the Bank Lending Survey, which offers qualitative insights into changes in

[37] Loan-level data collection began in 2018. All relevant banks comply with the reporting requirements, achieving 99 percent market coverage. Currently, access to this data is ad-hoc, and discussions are ongoing to automate the process, as described in ¶12.

[38] Recent examples include data on mortgage moratoria, green loans, and buildings' energy certificates.

[39] See http://data.europa.eu/eli/reg/2016/867/oj.

[40] NBFIs included are insurance companies, collective investment funds, pension funds and supplementary pension funds.

credit standards and loan demand. Additionally, the Survey on the Access to Finance of Enterprises, maintained by the ECB, provides comprehensive data on the financial conditions of firms. The NBS is also capable of conducting its own ad-hoc surveys.[41]

27. The NBS is working on closing data gaps, but some gaps persist, particularly in the RRE and CRE sectors. Until recently, the NBS lacked access to data regarding whether borrowers were purchasing for the first time, for a second or subsequent time; it only had data on the share of top-up financing/equity withdrawal. The NBS has collaborated with the Cadastre Authority to produce this data and has recently obtained the first wave but is still subject to further checks . Also, data on purchases for investment purposes ('buy-to-let', BTL) are not included. Securing high-quality data on different borrower classes, including for BTL, will be crucial to assess the contribution of individual mortgages to the buildup of systemic risk (see also Recommendation 8). In the CRE sector, in line with ESRB guidance,[42] the credit register has been expanded to include the project classification, an under-construction flag,[43] and the type of real estate used as the collateral. To monitor demand in the CRE sector, the NBS has begun collecting data on vacancy rates, rental yields, rental price per square meter, as well as the volume and number of transactions. The financial health of CRE firms is tracked using their profits and interest coverage ratios. Additionally, the NBS conducts targeted on-site and off-site reviews of real estate funds. Despite these efforts, some data gaps remain. The NBS should continue to enhance the credit registry by expanding cross-border coverage. While constructing a national CRE price index may be challenging due to low transaction volumes and the heterogeneity of projects, the NBS should explore potential solutions.

C. Risk Modeling and Analysis

28. The NBS assesses broad-based vulnerabilities based on a range of indicators with a particular focus on bank portfolios. To determine the position in the financial cycle, the NBS regularly monitors the level of banks' available releasable capital and constructs a composite "cyclogram" indicator (see Table 2 and Box 1 for further details on its methodology). As the Slovak financial system is predominantly bank-centered, the NBS employs the following bank-focused indicators as leading indicators of financial stress, which are also used to assess the need for a relaxation of the CCyB:[44]

- absolute change in non-performing loans (NPL) / risk-weighted assets (RWA);
- annualized net provisioning / RWA; and
- domestic government bonds spreads.

[41] A recent example is a survey designed to monitor households' ability to continue making loan repayments following the expiration of loan moratoria due to Covid-19.

[42] ESRB Recommendation ESRB/2016/14, amended by Recommendation ESRB/2019/3.

[43] The 'under-construction' flag also includes permits.

[44] The NBS does not utilize early warning models based on market indicators, such as equity prices or spreads, as they are deemed irrelevant in the Slovak context.

These indicators have been found to be more useful in Slovakia than market stress indicators in predicting financial stress (Rychtárik and NBS, 2018).

Table 2. Slovak Republic: Key Indicators

Type of risk	Indicators	Notes
Broad-based	*Financial cycle indicator:* "cyclogram" indicator, composed of: • Aggregate: credit-to-GDP gap, output gap, unemployment rate, economic sentiment index • Households: Lending to households, debt service, indebtedness • Corporates: Lending to enterprises, debt-to-revenue ratio, debt-to-revenues, gap, default rates • Banks: NPL volume dynamics • Housing: RRE price dynamics, housing affordability index	All major components are benchmarked against their historical distributions
	Indicators of stress: • Available releasable capital in banks (above P1, P2R, CBR and MREL requirements)	
Household sector	Exceedance of limits of BBMs and share of loans granted close to limits: • LTV limit • DSTI limit • DTI limit • Maturity limit	Thresholds set by regulation
	Indicators of HH indebtedness: • Credit growth • Growth of household-debt-to-income ratio	Credit growth compared to other countries and economic fundamentals
	Real estate prices (by segments)	Thresholds for various metrics indicated by the RRE dashboard
Corporate sector	Indicators of indebtedness: • Credit growth by firm size/economic segments • Credit risk (NPLs, bankruptcies, loans at risk)	
	Indicators of financial situation of firms: • Profitability • Liquidity • Leverage • Lending conditions	Alert in case of a significant deterioration
	Indicators of the CRE market: • Vacancies • Financing • Lending conditions	
Liquidity/funding	Liquidity Coverage Ratio	Legislative threshold of 100%
	Net Stable Funding Ratio	Legislative threshold of 100%
	Loan-to-Deposit Ratio	Benchmarked against history and other EU countries

Source: NBS.

Box 1. Slovak Republic: Indicators of the Financial Cycle

This box outlines the challenges in identifying the financial cycle in Slovakia and proposes potential solutions. The Basel III framework provides guidance on the activation and calibration of the CCyB, mainly based on the credit-to-GDP gap (BIS, 2010), commonly referred to as the "Basel gap".[1] However, this guidance explicitly states that credit-to-GDP measures should not be applied mechanically and must be supplemented by expert judgment. Additionally, the Basel gap can encounter measurement issues, particularly in transition countries (Wezel, 2019). Here, time series data often obscure the effects of structural changes, and financial cycles tend to be shorter than those observed in advanced economies.[2] In Slovakia, the credit and GDP time series reflect these challenges. First, significant structural changes occurred in the Slovak economy prior to 2004, making it difficult to identify meaningful trends before that year. Second, as a small open economy, Slovakia's GDP is relatively volatile, resulting in estimates of the credit-to-GDP gap being influenced more by fluctuations in GDP than by credit dynamics. Consequently, the Basel gap has proven to be unhelpful in identifying the financial cycle in Slovakia (see also Figure 2).[3]

The NBS calculates a domestic-credit-to-GDP-trend gap (referred to as the "domestic gap" hereafter) to address some of these issues.[4] First, this approach focuses exclusively on household and NFC credit, which helps extend the time series by excluding data that was heavily distorted by structural changes in previous years. Second, it incorporates the GDP trend in the denominator to mitigate volatility associated with fluctuating GDP figures (Rychtárik and NBS, 2014).[5] The NBS domestic gap series falls well within the range of IMF staff estimates for the domestic gap (see Figure 2) and appears to effectively characterize the financial cycle. It captures the deleveraging that occurred during the Euro Crisis, the subsequent rapid increase in credit growth, and the recent significant deleveraging that followed the rise in interest rates. However, while acknowledging that the domestic gap has satisfactorily captured the financial cycle in Slovakia so far, the NBS considers this indicator unreliable when used in isolation, as it depends on filtering techniques that are prone to an end-point problem, resulting in an overestimation of the trend following prolonged periods of expansionary credit (see NBS April 2019 Macroprudential Commentary).

In light of these concerns, the NBS has developed the cyclogram indicator. This composite indicator comprises 14 variables that capture various aspects of the real economy, credit and housing markets, indebtedness, debt service ratios, and credit risk losses (see also Figure 2). Each variable is assessed against its historical distribution and assigned a score between 1 and 9. The composite indicator is calculated as the unweighted average of these 14 scores. The dynamics of the cyclogram have largely mirrored those of the domestic gap but have shown a more moderate decline since mid-2022. This trend likely reflects a greater focus on the macroeconomy, alongside persistently high debt levels and low default rates.

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[1] The guidance indicates that the buffer should be set between 0 and 2.5 percent of risk-weighted assets (RWA) based on how much the credit-to-GDP measure exceeds its long-term trend. Specific thresholds are suggested based on empirical evidence from a wide range of countries: if the credit-to-GDP gap is below 2 percent, a zero buffer should be implemented; if the gap exceeds 10 percent, the maximum buffer of 2.5 percent should be applied, with linearly increasing buffers for values in between. While these thresholds appear optimal for the average country, the guidance clarifies that they are not prescriptive and should be tailored to country-specific characteristics.

[2] The Basel methodology decomposes the credit-to-GDP ratio into a long-run trend and a cyclical component using a statistical filter. It recommends a one-sided Hodrick–Prescott (HP) filter with a lambda of 400,000, based on the assumption that the financial cycle is four times as long as the business cycle. For transition countries, this level of smoothing is typically excessive, as their financial cycles are shorter and time series data are often limited, making it challenging for the filter to distinguish between cyclical developments and structural trends (Wezel, 2019). Recently, this issue has also affected many advanced economies, particularly in European countries following the Euro Area crisis, as the method tends to estimate negative gaps for extended periods after a sharp credit contraction, failing to recognize the new trend (Galán, 2019).

Box 1. Slovak Republic: Indicators of the Financial Cycle (Concluded)

[3] Many countries have not adhered strictly to Basel gap estimates when setting their buffers, as these estimates would imply zero buffers, while national authorities acknowledge the necessity of building up buffers (Galán, 2019). Rather than formally basing their buffer decisions on alternative indicators, most countries have maintained the Basel gap's primary role while exercising judgment in buffer settings.

[4] The domestic-credit-to-GDP trend is computed as the sum of private non-financial sector debt originated by domestic banks (including retail loans and loans to NFCs) divided by the nominal GDP trend, applying a one-sided HP filter with a lambda of 15,000 to annual nominal GDP data (calculated as the moving sum of four quarters).

[5] Reflecting financial deepening and other structural developments typical in transition countries, the domestic-credit-to-GDP ratio has consistently increased until 2022. Due to the statistical properties of the filter, this development will favor overly positive gaps, with trend growth lagging behind actual growth.

29. The NBS regularly monitors sector-specific indicators to identify pockets of vulnerabilities in various sectors. In the household sector, the NBS analyzes credit dynamics and developments in residential real estate, which are crucial for identifying potential feedback loops between rising house prices and increased leverage (IMF, 2014a). These core indicators are complemented by the share of loans that are at or near various regulatory limits. In the corporate sector, the NBS tracks firms' indebtedness and overall financial health. Given the significant role of the CRE sector, the NBS also monitors vacancy rates and other indicators of financial health of CRE firms. Lastly, to evaluate liquidity and funding risks, the NBS ensures compliance with the Liquidity Coverage Ratio (LCR) and Net Stable Funding Ratio (NSFR) thresholds, while also monitoring the loan-to-deposit ratio.

30. CCyB rates are based on the composite "cyclogram" indicator, but the NBS often exercises discretion in setting them. Due to problems with the standard credit gap, as discussed in Box 1, the NBS uses the cyclogram indicator to guide CCyB rates. The calibration of the mapping from cyclogram to CCyB rate is based on historical losses observed during the Great Financial Crisis (GFC). It is estimated that the Slovak banking sector would require an additional capital buffer of 2.5 percent of risk exposures to cover losses comparable to those experienced between 2008 and 2010 (Rychtárik and NBS, 2018). This figure is taken to be the maximum buffer rate to be applied when the cyclogram indicates that systemic risk is at historically peak levels. Every quarter, the NBS publishes an update of the buffer guide containing an updated version of the cyclogram and implied buffer rates. Depending on the risk environment, the NBS employs additional models to monitor the build-up of systemic risk.[45] While the cyclogram is seen as an indicator of the speed at which risk builds up, it does not necessarily reflect a consistently high level of vulnerability; thus, the NBS incorporates expert judgment when determining CCyB rates. To evaluate any potential macroeconomic impacts of raising the CCyB, the proposed additional capital buffer is compared against the existing capital headroom on a bank-by-bank basis.[46]

[45] For example, it uses domestic network analysis if relevant, but contagion risk is low. They also have implemented a Value-at-Risk model and use it when relevant (see, e.g., Chart 24 in FSR May 2018).

[46] This comparison takes into account both current capital headroom and projected future headroom based on planned dividend distributions and expected profits. Any planned changes are also reviewed with senior managers of major banks. For ex post evaluations, a bank-lending survey allows respondents to indicate any changes in lending standards.

31. For stress-testing purposes and to calibrate the SyRB, the NBS employs a well-integrated suite of quantitative models. Stress tests are conducted at least annually. The NBS employs a variety of stress-testing models across different sectors, all based on common assumptions, to create a comprehensive overview of the banking sector's resilience. The FSD develops baseline and stressed scenarios that serve as the foundation for sector-specific models. Household credit risk is assessed using an integrated dynamic household balance sheet model (see the paragraph below for further details), leveraging the loan-level dataset. Corporate credit risk estimation is carried out through Monte Carlo simulations of individual firms' cash flows.[47] A new module has been developed to monitor exposures to the CRE sector for both banks and non-banks, integrating firms' financial statements with project characteristics.[48] The results from these various modules, along with simulations of other components of banks' balance sheets, contribute to the overall assessment. The FSR typically details the proportion of at-risk households and non-NFCs, along with corresponding NPLs, but could provide clearer insights into the assumptions underlying the overall results regarding capital and profitability.[49] In 2023, the NBS also conducted a stress test focused on climate-change-related risks, utilizing scenarios developed by the Network for Greening the Financial System (Kalman et al., 2023).[50] Additionally, the NBS regularly performs stress tests on non-core segments of the financial system. Specifically, the insurance, collective investment, and pension sectors are evaluated for resilience against market risks, including equity, foreign exchange, and interest rate risks, using the SQLite database. The NBS also conducts an annual interconnectedness analysis of the financial system that includes NBFIs. Stress testing of climate-related risks has thus far been conducted on an ad-hoc basis, but efforts are underway to integrate it into regular stress-testing protocols.

32. The household-sector model is a valuable tool for calibrating BBMs, but it lacks a feedback loop between borrowers, banks, and the real economy. This semi-structural model (see Jurča et al., 2020) integrates micro-simulations of employment status, income, and expenses with macro data simulations under adverse scenarios ('micro-macro model'). This approach enables the simulation of individual household balance sheets and the estimation of loans at risk, along with probabilities of default and loss given default during adverse conditions. The framework can be utilized to conduct a cost-benefit analysis of proposed changes to the BBM toolkit, where improvements in risk parameters represent the benefits, while any reduction in overall credit constitutes the costs. The model is also occasionally employed for back-testing, assessing the effectiveness of past changes (see, e.g., Cesnak et al., 2021). While this model is a valuable tool in assessing detailed pockets of vulnerabilities in the mortgage portfolio, it does not incorporate a

[47] There are plans to develop a model to assess the risk of individual enterprises, which could serve similar purposes as the household micro model for stress testing and for analyzing the composition of loan flows. This model would fundamentally evaluate firms' probability of default based on their financial circumstances.

[48] See FSR 5/2024, Table 3, for a first application of this module.

[49] E.g., the FSR 5/2024 on pages 24 and 30 presents the share of households and NFC at risk and corresponding NPLs but is silent on assumptions on the probability given default (PD) and LGD that are used jointly with the loans-at-risk models to project losses.

[50] In 2021, the NBS conducted an initial assessment of financial stability risk by assessing the exposure of banks' portfolios to climate-sensitive NFC loans. (See NBS (2021) for working paper in Slovak and FSR May 2021, section 2.5, for a summary of its findings in English.)

macrofinancial perspective. The FSD should work on integrating a feedback loop between borrowers, banks, and the real economy in its stress-testing framework, potentially by complementing the micro-macro model by a more macrofinancial model. Additionally, the NBS should implement a regular ex-post evaluation process to ensure that no legacy measures remain unnecessarily restrictive.[51]

33. O-SIIs are identified in accordance with harmonized European regulation. Annually, the NBS updates the list of O-SIIs and determines capital buffers for each institution. This update follows a two-step procedure outlined by EBA guidelines (EBA, 2013). In the first step, the O-SII score is calculated using the standardized EBA methodology, which applies uniform indicators and weights across all EBA-supervised countries. In the second step, the NBS has the discretion to add institutions to the list using its own methodology, tailored to the specificities of the Slovak banking system. The decision regarding the capital buffers imposed on these O-SIIs is informed by the national methodology score, which also considers the minimum capital buffers set by the ECB.

34. The NBS regularly updates a variety of indicators to assess emerging risks in the housing market, but a coherent narrative is lacking. The NBS's RRE Dashboard includes a range of useful indicators, most of which are updated quarterly.[52] The NBS identifies the following two indicators as core metrics for assessing overvaluation risks in the RRE sector:

- *Housing Affordability Index:* This index measures the ratio of the average monthly mortgage payment to the average net disposable income.[53] It is available for various regions and age groups.
- *Fundamental Price:* This metric is based on demand-side determinants. The NBS estimates the price implied by factors such as disposable income and debt burden and compares it to the prevailing market price.[54]

Additionally, the "buy-to-rent" indicator, which represents the ratio of average rental costs to average mortgage payments, is considered specifically for the capital region, as the rental market is quite small in other areas of the country. The Dashboard also features three additional indicators: the composite index, a borrowing capacity indicator, and house price decomposition. While the RRE Dashboard represents a positive step toward a comprehensive monitoring framework, the NBS should focus on providing a clearer narrative. Currently, it is unclear which indicators the NBS considers most informative and how these influence its assessment of the housing market. Distinguishing between indicators that measure the speed of vulnerability buildup (such as the composite index) and those that assess the level of accumulated vulnerabilities (like the gap to the fundamental price, the gap to the price implied by the borrowing capacity indicator, and indirectly,

[51] For example, the Central Bank of Ireland (CBI) conducted annual reviews of its mortgage measures prior to engaging in a broader macroprudential framework review during 2021-22.

[52] See Cesnak et al. (2024) for the methodology paper underlying the dashboard.

[53] Net disposable income is defined as the amount remaining after accounting for minimum expenses in Slovakia.

[54] The RRE price index is derived from the prices of apartments on the secondary market. Primary-market sales are excluded due to their limited relevance outside Bratislava, where prices are analyzed separately. House prices are also not included because of their high heterogeneity.

affordability measures) would be beneficial. Moreover, the fundamental price model could be enhanced by incorporating supply-side factors, such as the number of completed flats and construction permits granted.

35. The NBS engages in regular dialogue with market participants to gauge broader sentiment. The NBS frequently meets with senior managers from major banks to gather their insights on trends, risks, and business strategies within the lending market. These discussions also cover expectations regarding asset quality, profitability, and liquidity.[55] Banks are required to report their business and capital plans to the NBS on a regular basis. Additionally, the NBS holds ad-hoc meetings with professionals from the RRE and CRE markets to obtain updates on price movements and qualitative information, including market sentiment and valuation practices.

D. Recommendations

36. Recommendation 4. Increase staffing of the FSD to limit turnover risk and to ensure that it can continue to fulfill its responsibilities.

37. Recommendation 5: Continue to work on closing data gaps in the RRE and CRE sectors and on improving monitoring frameworks.

38. Recommendation 6. Incorporate a macrofinancial perspective into BBM analysis and implement a regular ex-post evaluation process.

SYSTEMIC RISK AND MACROPRUDENTIAL POLICY

39. The macroprudential toolkit in Slovakia has been extended and tightened substantially over the last decade. After observing a build-up of mortgage risks and imbalances in the RRE market, the NBS issued a non-binding recommendation in 2014 on LTV, DSTI, and maturity limits (Figure 1). Starting in 2017, these recommendations became binding and have been tightened over time, including by adding a DTI limit to the toolkit. Currently, the DSTI limit stands at 60 percent, with a 5-percent exception for new loans with a DSTI ratio between 60 and 70 percent, and the LTV limit at 80 percent, with a 20-percent exception for the share of loans with an LTV ratio between 80 and 90 percent (Table 3). The DTI limit is set to gradually decrease from 8 for borrowers aged 40 and under to 3 for those aged 60 and over, with a 5-percent exception.[56] There is an additional 5-percent exception for young borrowers (up to 35 years, with an income limit). These BBMs have been complemented by the activation of a CCyB in 2017, supplementing existing CCoB and O-SII buffers. The CCyB was gradually increased to 1.5 percent in 2019, before being lowered to 1 percent in 2020 during the COVID-19 pandemic and raised back to 1.5 percent in August 2023.

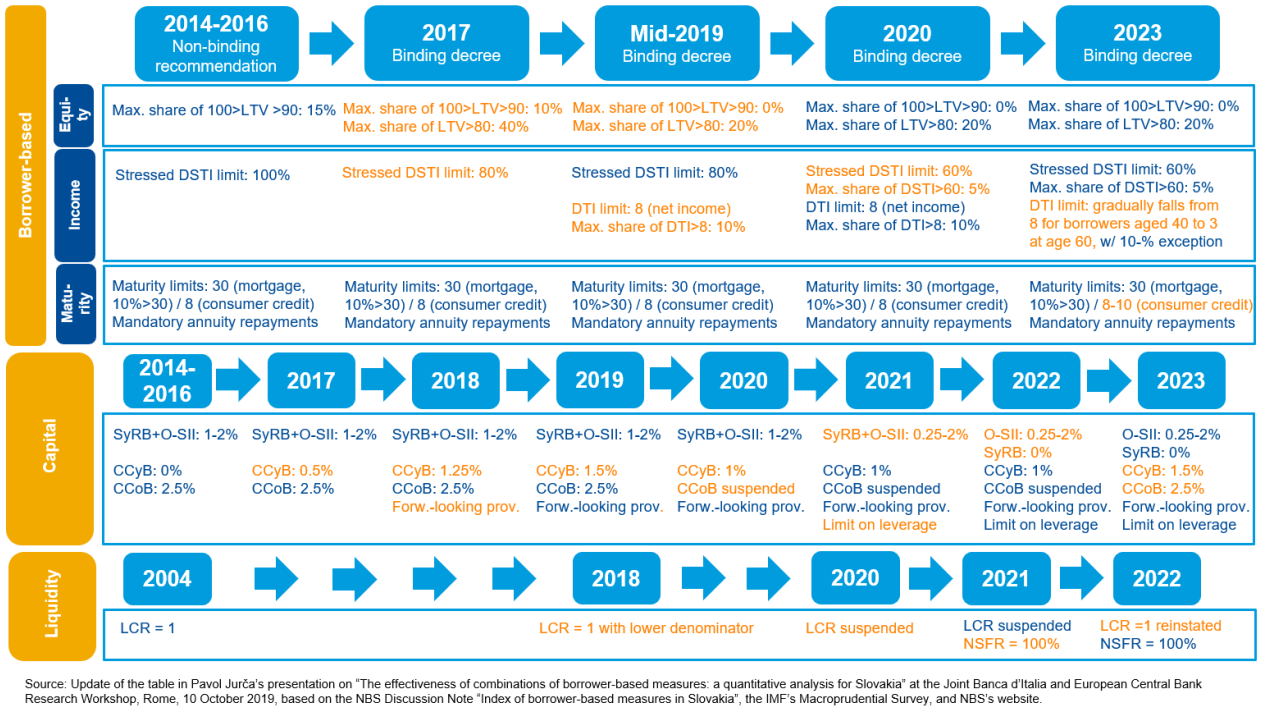
40. This section assesses the macroprudential stance in Slovakia based on prevailing vulnerabilities. Systemic risks are identified based on indicators outlined in the IMF Staff Guidance Note on Macroprudential Policy (IMF 2014a, IMF 2014b) as well as any vulnerabilities detected in

[55] The timing of the meeting is aligned with the drafting phase of the FSR.

[56] These DTI limits refer to loans with maturities extending into retirement, which is the case for most loans. For all other loans, the DTI limit remains 8.

the FSAP's stress testing exercise (see Technical Note on Stress Testing). Against this backdrop, the note assesses the appropriateness of the current macroprudential measures in each domain and provides recommendations to enhance the macroprudential stance.

Figure 1. Slovak Republic: Evolution of Macroprudential Policies in the Slovak Banking Sector



Source: Update of the table in Pavol Jurča's presentation on "The effectiveness of combinations of borrower-based measures: a quantitative analysis for Slovakia" at the Joint Banca d'Italia and European Central Bank Research Workshop, Rome, 10 October 2019, based on the NBS Discussion Note "Index of borrower-based measures in Slovakia", the IMF's Macroprudential Survey, and NBS's website.

Source: Update of the table in Pavol Jurča's presentation on "The effectiveness of combinations of borrower-based measures: a quantitative analysis for Slovakia" at the Joint Banca d'Italia and European Central Bank Research Workshop, Rome, 10 October 2019, based on the NBS Discussion Note "Index of borrower-based measures in Slovakia", iMaPP, and the NBS's website.

Table 3. Slovak Republic: Current Macroprudential Settings

Broad-Based Tools Applied to the Banking Sector	
Countercyclical capital buffer	Effective August 1, 2023, the CCyB was increased to 1.5%.
Capital conservation buffer	After a temporary suspension relating to the COVID-19 pandemic, a CCoB of 2.5% was re-introduced on January 1, 2023, with exemptions for small and medium-sized firms.
Limit on leverage ratio	A limit on the leverage ratio of 3% was introduced on June 28, 2021.
Forward-looking loan loss provisioning requirement	Effective January 1, 2018, IFRS 9 was implemented, which introduced a forward-looking approach to loan loss provisions.
Household Sector Tools	
Cap on loan-to-value ratio	Effective July 1, 2018, an LTV cap of 80% on all housing loans collateralized by residential property was implemented, with 20% of new housing loan production may be provided with LTV between 80% and 90%.
Cap on debt-to-income ratio	Effective January 1, 2023, for those loans with maturity exceeding into retirement, the DTI limit is set to gradually fall from 8 times for borrowers aged 40 and under to 3 at age 60 and over, with an exemption for 5% of loans, plus an additional 5% of loans for young borrowers (with additional conditions).

Table 3. Slovak Republic: Current Macroprudential Settings (Concluded)	
Cap on debt-service-to-income ratio	Effective January 1, 2020, a DSTI cap of 60% on all housing and consumer loans was implemented. The maximum share of new loans with DSTI ratio between 60% and 70% is 5%, with some exceptions.
Limit on amortization periods	Effective January 1, 2017, caps on loan maturities were set as follows: 30 years for mortgages, 8 for consumer loans, with some exceptions.
Restrictions on unsecured loans	DSTI limit, DTI ratio limit, and limit on amortization periods apply also to (unsecured) consumer loans.
Liquidity Tools Applied to the Banking Sector	
Liquidity Coverage Ratio	After a temporary suspension relating to the COVID-19 pandemic, an LCR of above 100% was re-introduced on January 1, 2022.
Net Stable Funding Ratio	Effective June 28, 2021, banks must maintain a net stable funding ratio of above 100%.
Tools to Address Systemic Liquidity Risk and Fire Sale Risk in the Nonbank Sector	
Asset management industry	Effective July 1, 2011, at least 10% of the value of assets in a public special real-estate fund established as an open-ended fund must consist of liquid assets. Standard funds' assets may only be invested in liquid financial assets.
Central counterparty clearing	Effective January 2, 2020, the EMIR 2.2 is in effect.
Tools to Address Risks from Systemically Important Institutions and Interconnectedness within the Financial System	
Capital surcharges for systemically important institutions	Effective January 1, 2023, O-SII buffer rates are set as follows: O-SII buffer rates: (1) Československá obchodná banka, a.s., – 1.25%, (2) 365.bank, a.s., – 0.25%, (3) Slovenská sporiteľňa, a.s., – 2%, (4) Tatra banka, a.s., – 1.5%, (5) Všeobecná úverová banka, a.s., – 1.75%. (6) Prima banka Slovensko, a.s., – 0.25%. The capital buffers for O-SIIs remain at the same value for the year 2024. Effective January 1, 2023, a G-SII must maintain a leverage ratio buffer equal to 50% of the risk-weighted G-SII buffer rate.
Source: iMaPP and NBS.	

A. Broad-based Vulnerabilities and Tools

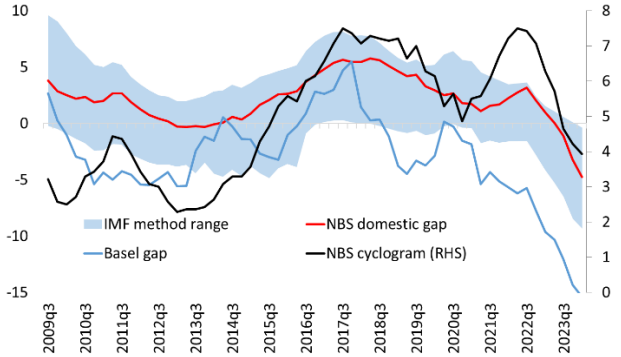
41. After some cooling, the financial cycle is likely to turn in the near term reflecting the peaking of interest rates. Most credit gap estimates remain negative and are trending downward (Figure 2), and the domestic credit-to-GDP ratio has consistently declined since mid-2022. However, the rate of decline in the NBS's composite cyclogram indicator has recently slowed, indicating a potential turning point in the financial cycle. This outlook is further supported by the stabilization of housing loan growth over the past year, alongside house prices no longer decreasing. The ongoing decline in private-sector credit growth has recently been driven primarily by a pronounced demand-driven decrease in growth in the NFC sector. With the ECB having started its easing cycle, financial conditions have already begun to loosen. Notably, mortgage rates have yet to decrease, possibly due to their correlation with government bond yields, which have risen recently due to widening spreads.

Figure 2. Slovak Republic: Broad Credit Conditions

Credit gap estimates point to continued cooling of the financial cycle…

Total Credit Gap Estimates

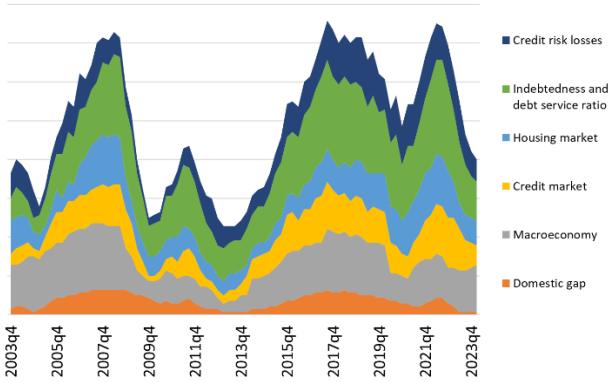
Percent, Indicator



Source: NBS and IMF staff computations.

But the NBS's composite cyclogram indicator suggests that the cycle may be bottoming out…

Cyclogram Components

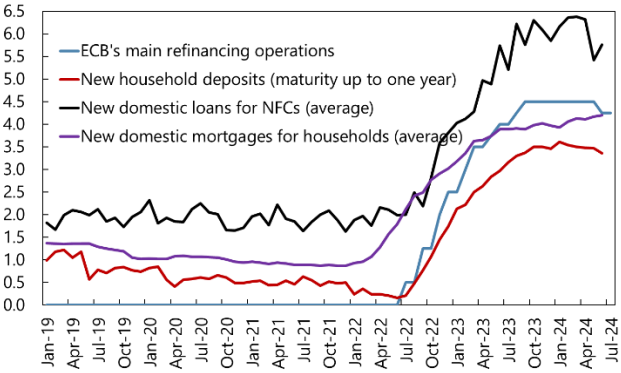


Source: NBS.

With the ECB having decreased their policy rate in June 2024 for the first time, market rates can be expected to start falling soon…

Interest Rate

(Percent)

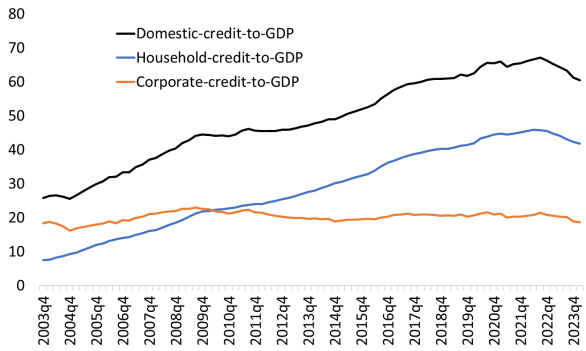


Source: NBS.

… and the domestic-credit-to-GDP ratio has been falling.

Credit-to-GDP Ratio

(Percent)

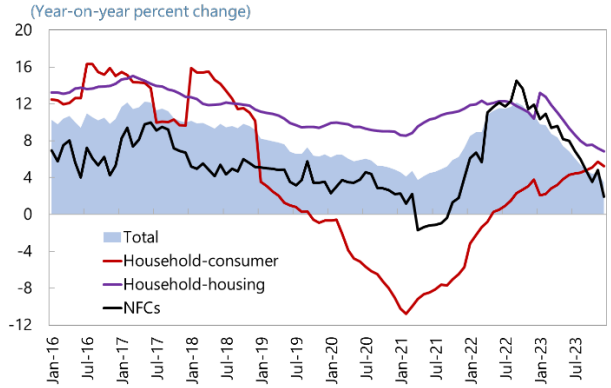


Source: NBS.

…and the decrease in private sector growth has been recently driven by declining NFC credit growth, while household credit growth has stabilized.

Private Sector Credit Growth

(Year-on-year percent change)

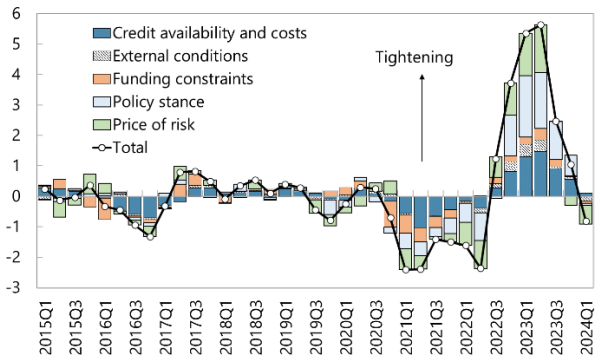


Sources: Haver Analytics and IMF staff calculations.

…and financial conditions have already become more accommodative.

Financial Condition Changes

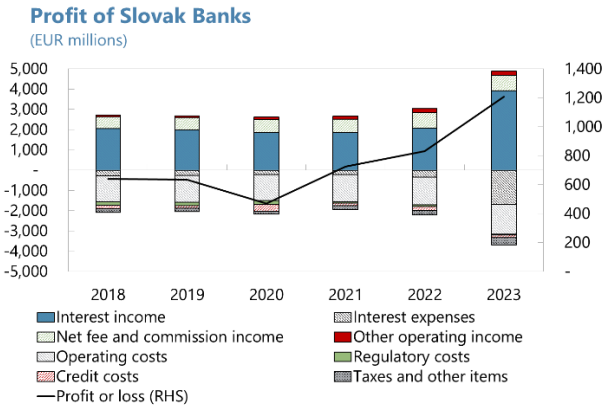
(Contribution to quarter-over-quarter first difference of the unscaled FCI)



Sources: Borraccia, G. et al. (2023)

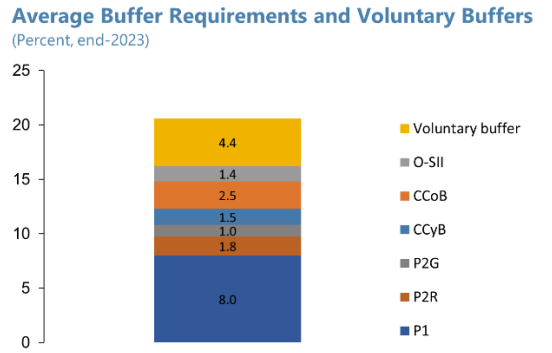
Figure 3. Slovak Republic: Bank Profitability and Resilience

Profits of Slovak banks have reached record highs in 2023…



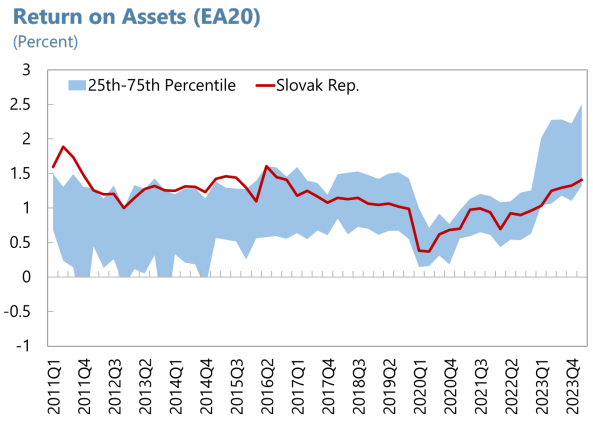
Source: NBS.

…and voluntary buffers are high.



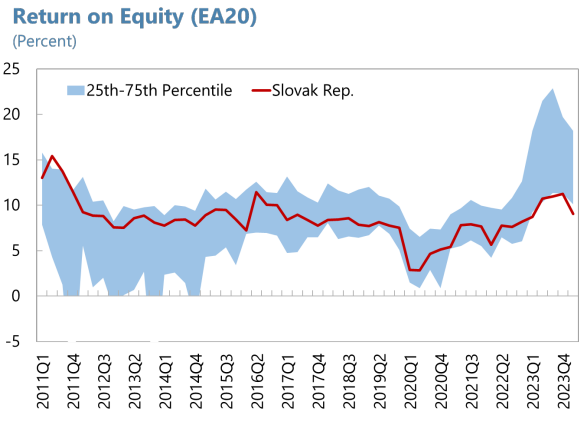
Source: NBS and IMF staff calculations.
Note: The chart displays average values weighted by the capital adequacy ratio (CAR). P2G = Pillar 2 Guidance, P2R = Pillar 2, P1 = Pillar 1.

Still, RoA and…



Source: IMF FSI.

…RoE remain at the lower end of EA countries.



Source: IMF FSI

42. Bank profits and voluntary buffers reached record highs in 2023; however, the bank levy is expected to moderately reduce profits in 2024. With higher interest rates, banks achieved record profits driven by substantial net interest income (Figure 3). By the end of 2023, the aggregate total capital ratio rose to 20.5 percent of risk-weighted assets (RWA), with voluntary buffers accounting for 4.4 percent of RWA. Nevertheless, the Return on Assets (RoA) and Return on Equity (RoE) remained at approximately the 25th percentile compared to peers in the euro area. Looking ahead, the bank levy introduced in January 2024 will likely dampen both profits and voluntary buffers in the banking sector.[57] The maintenance of levy, albeit at a low rate, could weigh on profits and buffers, coupled with falling interest rates.[58] While the specifics of the recently announced financial transaction tax are still unclear, it is likely to increase banks' operational costs.

[57] The bank levy currently stands 30 percent of pre-tax profits; however, it is scheduled to be steadily decreased to 4.356 percent by 2028. Profits have moderated by 6.6 percent in the first eight months of 2024 compared to the same period in 2023.

[58] See Article IV recommendation to phase out the bank levy as planned. The ECB's legal opinion on the bank levy from February 14, 2024, also warns of the levy's potential negative effects on the resilience of the banking sector.

In such a scenario, competitiveness of Slovak banks compared to their peers might decrease or capital may be redirected to more profitable jurisdictions, potentially eroding capital buffers over time.[59]

43. Capital buffers were implemented between 2014 and 2016 to align with new EU regulations.

- *CCyB*: Introduced on November 1, 2014,[60] the CCyB rate was initially set at 0 percent. It was subsequently increased up to 1.5 percent by August 1, 2019 (Figure 1). In June 2019, the NBS announced an increase of the CCyB rate to 2 percent, effective August 2020; however, this decision was reversed on April 28, 2020, in response to the COVID-19 pandemic. Instead, the rate was reduced to 1 percent, effective August 1, 2020. Following the economic recovery, the rate was raised back to 1.5 percent, effective August 1, 2023.
- *CCoB*: The NBS introduced a CCoB of 2.5 percent of banks' total risk exposure effective October 1, 2014,[61] with exemptions for small and medium-sized investment firms.[62] The CCoB requirement was suspended during the pandemic but was reinstated on January 1, 2023.[63]
- *SyRB*: The SyRB was introduced alongside O-SII buffers, effective January 1, 2016. The initial rationale for implementing the SyRB was to require O-SIIs to maintain higher capital buffers than the maximum O-SII buffer, which was set at 2 percent at that time, but with a potentially stricter cap for subsidiaries of foreign banks.[64] An update to EU regulation (CRD V) mandated that the SyRB could only be utilized to protect against specific types of exposure, leading to its reduction to zero, effective January 1, 2022.[65] To maintain the combined buffer requirement (O-SII and SyRB) at the same level, the maximum O-SII buffer requirement was increased to 3 percent.
- *Additional tools:* Other broad-based tools include a leverage ratio limit of 3 percent, with a temporary exclusion of central bank exposures during the pandemic, and a forward-looking loan loss provisioning requirement.

44. The current CCyB rate of 1.5 percent aims to balance a cooling financial cycle with ongoing elevated legacy risks. The CCyB is the only tool with an explicitly cyclical objective, while other broad-based measures remain constant, aside from the temporary suspension during the pandemic and adjustments to O-SII requirements. Slovakia has been among the few countries that maintained a releasable capital buffer without fully releasing it at the onset of the pandemic

[59] This view is supported by the ECB's legal opinion on the Slovak financial transaction tax from 8 Nov 2024.

[60] https://nbs.sk/_img/documents/_legislativa/_fullwordingsother/en_rozhodnutie%20nbs%2012-2014.pdf. The CCyB applies to all banks that have exposure to households or enterprises in the Slovak Republic, i.e., domestic banks, foreign bank branches, or foreign banks operating cross-border.

[61] The CCoB was 1.5 percent of total risk exposure between August 1, 2014, and September 30, 2014.

[62] https://www.esrb.europa.eu/pub/pdf/other/150429_ESRB-notification.pdf?f89860ad452c81ea2335d38cc5a6cb78.

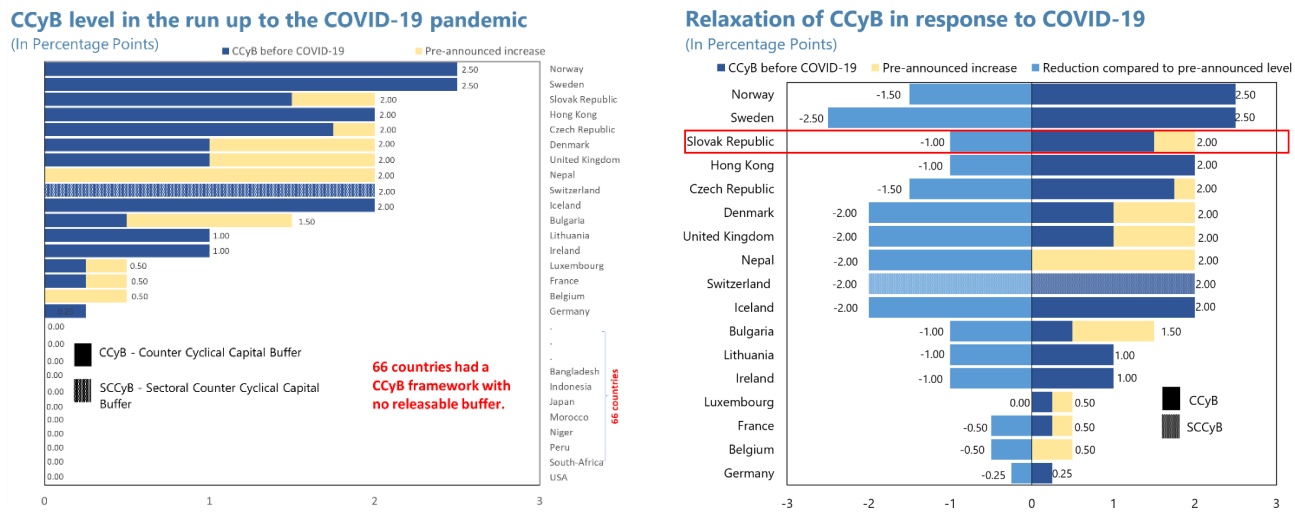
[63] On March 12, 2020, the ECB allowed SIs to temporarily operate below capital levels as defined by the CCoB. On March 12, the NBS granted the same temporary exception to LSIs.

[64] See the NBS's May 2015 FSR.

[65] See Commentary on this decision.

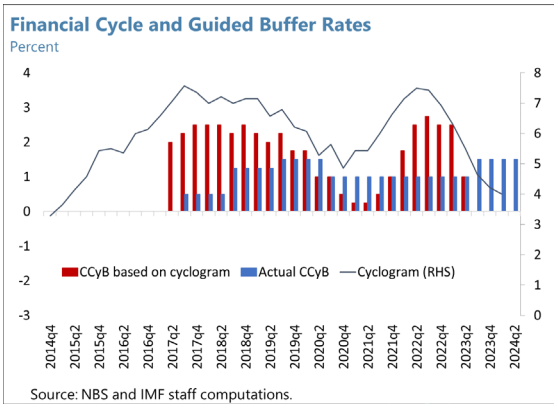
(Figure 4). The rationale was to preserve a buffer for when potential losses would emerge; however, those losses never materialized, largely due to effective fiscal and monetary policies and government initiatives such as payment holidays.[66] Following the recovery from the pandemic, the NBS raised the CCyB rate back to 1.5 percent, with the cyclogram indicating a potential increase to 2.5 percent. After the financial cycle cooled, the NBS opted to maintain the rate at 1.5 percent, even as the cyclogram suggested a zero rate. This decision was influenced by several factors, including legacy risks—particularly concerning households—stemming from the prolonged boom in the RRE sector, lingering risks from the pandemic, and the implications of sharply rising inflation and interest rates.[67] With banks experiencing increased margins, the NBS concluded that there was sufficient capacity to build additional releasable buffers to mitigate these risks. This approach aligns with the guidance from the ESRB and other policy institutions, such as the Basel Committee on Banking Supervision (BCBS), which continue to advocate for building up buffers as long as banks' profits remain robust and credit supply is ample.

Figure 4. Slovak Republic: Releasable Buffers Before and During the COVID-19 Pandemic



Source: Miettinen and Nier (forthcoming).

45. The NBS's CCyB has recently appeared akin to a positive-neutral CCyB (pnCCyB), although it remains formally distinct. Several countries have recently transitioned to a pnCCyB (Miettinen and Nier, forthcoming). The purpose of a pnCCyB is to increase the CCyB rate to its neutral level as soon as bank profits and voluntary buffers have recovered, thereby preventing procyclical reductions in credit supply. One of the key motivations for adopting a pnCCyB is the challenge of assessing the credit cycle



Source: NBS and IMF staff computations.

[66] See July 2020 Commentary on Macroprudential Policy.

[67] See June 2022 Commentary on Macroprudential Policy.

in real time, particularly during the early stages of the financial cycle, as credit gaps exhibit known limitations. These shortcomings can sometimes lead to releasable buffers not being built up in time.[68] A pnCCyB also provides protection against shocks unrelated to the financial cycle, such as a pandemic. Increases beyond the neutral level are still guided by traditional financial cycle indicators, which are expected to yield more definitive insights at later stages of the cycle. By deciding to maintain the CCyB at 1.5 percent during a period when financial cycle indicators suggest a slowdown, while bank profits and voluntary buffers remain high, the NBS has adopted an approach akin to that of a pnCCyB.[69] This has led to a divergence between guided and actual rates recently (see figure).[70]

46. Formally adopting a pnCCyB would safeguard releasable buffers going forward and reduce the risk of delayed action. This is particularly pertinent for Slovakia, which is prone to shocks not related to the financial cycle as a small open economy without an independent monetary policy. Maintaining a positive CCyB during stable periods would provide the NBS with more time to evaluate any buildup of vulnerabilities, facilitating a more gradual adjustment of buffers if higher levels are deemed necessary. While under the NBS's current discretionary approach, this early activation has also been also achieved, the advantage of the pnCCyB framework is the formalization and automatization of the activation. Importantly, a formal pnCCyB would enhance the predictability of the NBS's actions and minimize the risk of delayed action or inaction in the future. Following key issues should be taken into consideration in making the formal conversion:

- *Legal underpinnings*. The relevant legislation for CCyB (Section 33g of the Act No 483/2001 on banks) references cyclical risk, and a change in the law may be necessary to adopt the pnCCyB.[71] Ongoing discussions at the European level are focused on formalizing a more supportive stance on the pnCCyB. If European regulators reach a consensus, it could bolster the case for any necessary changes to national law.
- *Communication.* The methodological shift needs to be communicated well to market participants. While the indicators guiding the decision to increase/release around the positive neutral level would remain unchanged, a consistent methodology is likely to enhance the transparency of the buffer-setting process by better aligning actual rates with guided rates.

[68] Releasing capital buffers generates additional "headroom" on top of other requirements, reducing the need to cut lending (BCBS, 2022, BCBS, 2021). The evidence on the effectiveness of release is consistent across countries (see, e.g. evidence on the Euro Area (Couaillier et al., 2022), the UK (Mathur et al., 2023), HKSAR (Wong et al., 2022), EU countries (Dursun-de Neef et al., 2023, Bedayo and Galan, 2024).

[69] Under a traditional CCyB framework, the CCyB rate would gradually be decreased if cyclical risks recede, even if there has not been a realization of risks (see, e.g., IMF 2014, para. 25).

[70] The decision to increase the CCyB to 1.5 occurred when the cyclogram implied a rate of 2.5 percent. There is an inherent lag between the decision and the implementation of CCyB changes, resulting in guided rates generally leading actual rates, with this lag typically being one year in Slovakia.

[71] In practice, altering the buffer guide may not be necessary: the activation stage can be informed by an ad-hoc assessment of financial sector health, while any subsequent increases can still be guided by the established buffer guide. Alternatively, as demonstrated in Spain, the cyclogram indicator could be expanded to incorporate additional variables reflecting the financial situation of banks.

- *Adoption cost*. Since the NBS already maintains a positive CCyB of 1.5 percent, the cost associated with formally adopting a pnCCyB would be limited (see Box 2 for possible calibration approaches). If the NBS chooses to set the pnCCyB higher, the phase-in must be carefully timed to avoid disrupting credit supply. It should be implemented when banks are profitable and possess voluntary buffers (as is currently the case with Slovak banks), as costs are typically low in such conditions.[72]

Box 2. Options for Calibrating a pnCCyB[1]

In general, the pnCCyB should ensure that a meaningful buffer is available for release during periods of financial stress. If the neutral buffer is set too low, it is unlikely to influence banks' behavior or prevent credit rationing in times of stress. Most countries that have adopted a pnCCyB have established it within the range of 1 to 2 percent.

There are several approaches to calibrating the neutral buffer. One method involves using historical accumulated losses as a reference point. In this case, the pnCCyB level is typically linked to a percentage of peak losses, serving as a foundation for further increases if risks accumulate. For instance, the Dutch Central Bank opted for a pnCCyB that covers half of the peak accumulated losses since the GFC (De Nederlandsche Bank, 2022). Other methods utilize forward-looking stress tests for calibration:

- Stress tests can identify the losses that the pnCCyB needs to cover by calculating the difference between overall losses and any existing non-releasable buffers (such as O-SII, CCoB, and SyRB in Slovakia), minus the capital headroom that banks typically wish to maintain even during financial stress.[2] Stress testing under severe scenarios can provide an upper bound for reasonable pnCCyB levels, while using a milder, more typical recession scenario will yield a calibration that falls more centrally within the range of reasonable levels.
- The aforementioned approach, however, has limitations, as stress testing models often fail to capture the negative feedback loop between credit supply, the real economy, and the health of the banking sector that macroprudential policy aims to disrupt. Integrating this feedback effect into stress-testing models is expected to enhance calibration by accounting for second-round effects that macroprudential buffers are likely to mitigate, alongside standard first-round effects (see, e.g., Catalan and Hoffmaister, 2022).

Ultimately, the calibration will necessitate a decision on the types and magnitudes of shocks that authorities wish to insure against, which will also be influenced by other macroprudential regulations, such as BBMs.

[1] See also Miettinen and Nier 2024 (forthcoming).
[2] See, e.g., EBA (2024).

B. Household Vulnerabilities and Tools

47. Credit growth to the household sector has slowed during 2022-2023 but has recently stabilized. Since the 2007 FSAP Update, the share of mortgage portfolios in total loans has steadily increased, reaching 59 percent in May 2024. While mortgage growth slowed during 2022-2023 due to rising interest rates and decreasing real wages, which resulted in a negative household credit gap, it has recently stabilized at around 3 percent (Figure 5). Consumer loan growth mirrored these dynamics, picking up with increasing inflation as households took on loans to finance more expensive durable goods. Interest rates for most household loans are fixed for up to 5 years, but some loans originated or refinanced before interest rates increased have longer fixation periods, locking in lower rates for a longer duration.

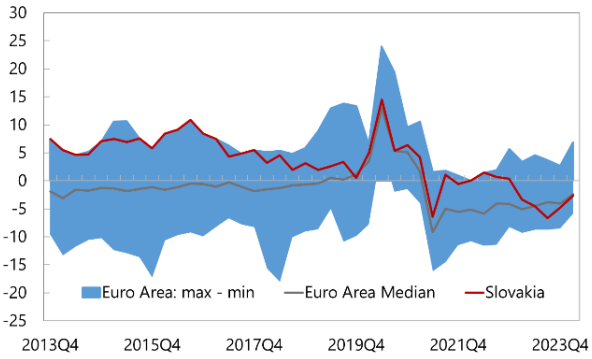
[72] See, e.g., Bedayo and Galan (2024), Behn et al. (2024) for empirical evidence on Europe and Lang and Menno (2023) for the theoretical foundation.

Figure 5. Slovak Republic: Aggregate Credit to the Household Sector

Slovakia had one of the highest growth rates in household credit and indebtedness before the pandemic, but higher interest rates have curbed credit demand.

Growth of Household-Credit-to-GDP

(Percent, yoy)

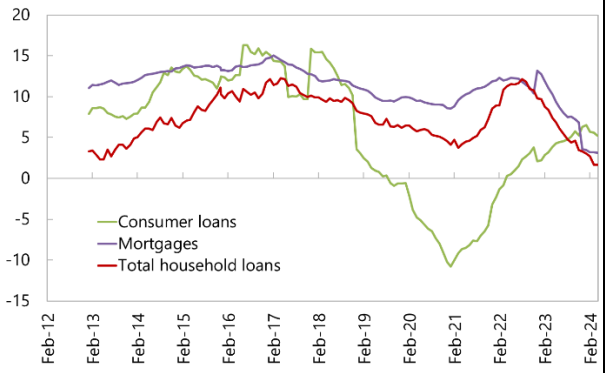


Source: Haver Analytics, IMF staff calculations.

Mortgage growth has come down with the increase in interest rates, while consumer loan growth has picked up in the face of inflation, but dynamics seem to begin to reverse recently.

Household Loans Growth

(Percent, y-o-y)

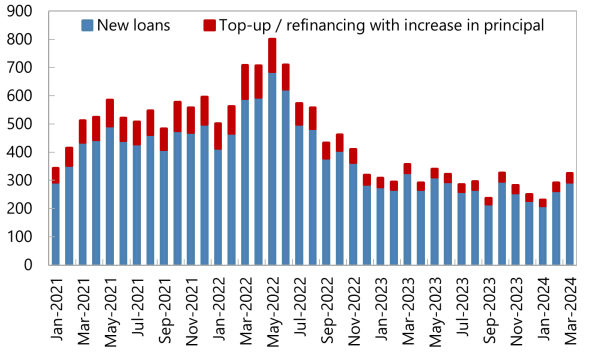


Source: NBS.

Both new mortgage and top-up/refinancing loans have stabilized recently …

New Mortgage Loans

(EUR Millions)

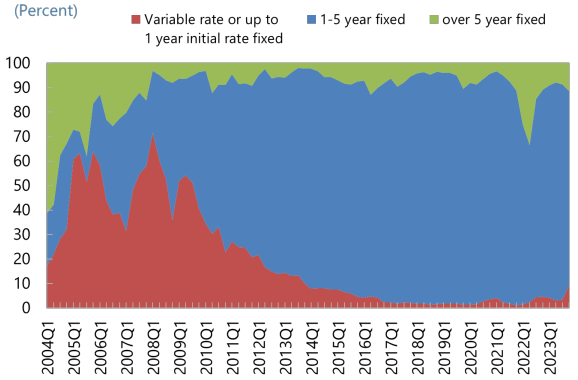


Source: NBS.

…while most loans have interest rates that are fixed for up to 5 years, but some borrowers have managed to lock in low rates for longer before interest rates have gone up.

Share of New Household Loans by Interest Rate Fixation

(Percent)

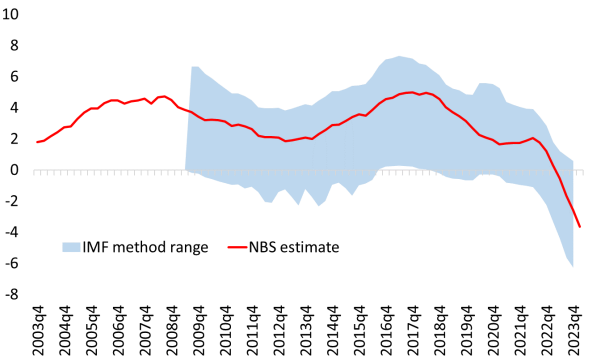


Source: NBS.

Since the early 2000s, credit to the household sector has continuously risen, partly attributable to financial deepening.

Household Credit Gap Estimates

Percent

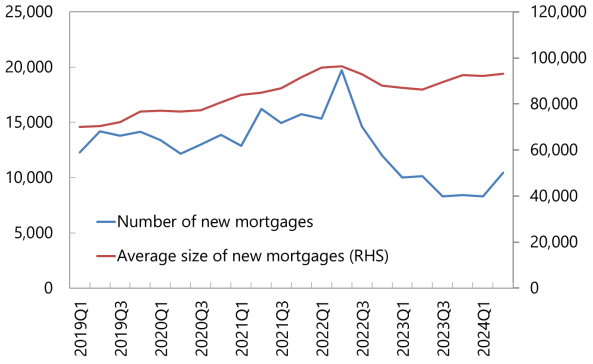


Source: NBS and IMF staff computations.

Still, some of the credit growth appears to have been excessive, with borrowers taking out increasingly larger loans.

New Mortgages

(Amount, Euros)



Source: NBS.

48. Slovakia's strong growth in credit to the household sector has occasionally been excessive. Since the early 2000s, credit to the household sector has continuously risen, primarily driven by increased mortgage demand. With Slovakia joining the EU in 2004 and adopting the Euro in 2009, this growth can be partly attributed to desirable financial deepening, which has enabled broader access to housing loans. However, until recently, estimates of the household credit gap have consistently been positive since reporting began in 2004 (Figure 5).[73] It appears that some of the credit growth has been excessive, with borrowers taking out increasingly larger loans. Credit growth appeared to be excessive leading up to the Euro adoption and following the recovery from the Euro Crisis during 2014-2016. The significant surge in new mortgages prior to the rate hike in mid-2022 was partly fueled by borrowers anticipating the increase, which also intensified demand for refinancing ahead of the rate change.

49. Bank lending is heavily concentrated in the RRE sector, yet the mortgage portfolio appears resilient. Banks' exposure to the RRE sector is relatively high in Slovakia compared to other EA countries. The existing mortgage portfolio is characterized by moderate LTV and loan-service-to-income (LSTI) ratios, but it includes a significant share of loans with relatively high loan-to-income (LTI) values.[74] Thus far, there are no indications of increased losses, as retail NPLs remain low.[75] Stress tests indicate that the banking sector continues to be solvent and liquid, even in the event of an adverse shock (see Technical Note on Stress Testing). With the ECB beginning to lower interest rates, the risk associated with the fact that only about 26 percent of mortgage rates have been reset to higher levels has been alleviated. In the longer term, lower interest rates are likely to stimulate mortgage growth, potentially reigniting house price increases and re-emerging related vulnerabilities.

50. The RRE market corrected by 10 percent but has remained stable since mid-2023. Residential property prices have more than doubled since 2007, with the house price index steadily rising until mid-2022 (Figure 6), driven by strong fundamentals and low interest rates. When rates increased, the market corrected by about 10 percent but has remained relatively stable since mid-2023.[76] Alongside house prices, real house prices and price-to-rent and price-to-income ratios have also declined. While the price-to-rent ratio has stabilized, the real house price and price-to-income ratios have recently begun to recover. Despite this, house prices and sustainability indicators remain at historically high levels, contributing to deteriorating housing affordability. Since the GFC, housing supply has been increasing to meet the demand that surged during the era of ultra-low interest rates; however, house construction has stagnated in recent times.

51. Despite the recent correction in housing prices, properties still appear overvalued, and risks of further declines remain. Several factors contribute to a pronounced procyclicality

[73] This methodology might have even underestimated gaps, given shortcomings discussed in Section 2.

[74] For the existing portfolio, the NBS lacks data on DSTI and DTI ratios.

[75] Government schemes are available to partially compensate for increase in the installment due to refixation to a higher interest rate, but uptake has reportedly been low.

[76] While the increase in interest rates appears to be the primary driver of the correction, the war in Ukraine and the subsequent spike in energy prices also played a significant role.

between credit and house price growth in Slovakia. The significant flexibility in mortgage refinancing, coupled with heightened competition from mortgage brokers, has led to increased refinancing activity and top-ups during periods of low interest rates. [77] Furthermore, the perception of RRE as the prime investment asset encourages some individuals to purchase and hold apartments. Results from various methods indicate that overvaluation persists, even following the housing market correction (Box 3).[78] In its In-Depth Review 2024 of Slovakia, the European Commission also concludes that there remains overvaluation in the market. Indicators on the NBS's RRE Dashboard suggest that while there has been no further buildup of vulnerabilities post-correction (according to the composite index), residual overvaluation is still implied by the borrowing capacity indicator, the fundamental price, and the affordability index. An RRE price-at-risk analysis (Box 3) further indicates significant downside risk to RRE prices. Simultaneously, there is unprecedented uncertainty regarding future RRE price growth, suggesting a notable likelihood of positive—and potentially excessive—price increases moving forward. While the NBS has communicated that house price growth exceeded fundamentals during the pandemic, it would be beneficial to provide more regular updates on this sector, given its critical relevance for financial stability and its significant procyclicality with credit growth.

52. The NBS has implemented a suite of BBMs to address rising household indebtedness and emerging vulnerabilities in the real estate sector. In response to increasing imbalances in the household credit market observed in the early 2010s, the NBS issued a set of recommendations in 2014 aimed at limiting risky lending practices, including Loan-to-Value (LTV) and maturity limits (summary of recommendations). In 2016, these recommendations were made binding and were tightened in subsequent decrees, including by the addition of DTI and DSTI limits.[79] BBMs in Slovakia are not viewed as cyclical tools; rather, they serve a structural purpose. As discussed in Section 2, the calibration of BBMs and speed limits, including the age-differentiated DTI, is informed by the NBS's micro-macro model, based on loan-level data. This approach allows for precise targeting of vulnerabilities identified within the mortgage portfolio.

- *LTV limit:* Currently, the LTV limit is set at 80 percent, with an exception permitting 20 percent of loans to have an LTV of up to 90 percent.[80]
- *(Stressed) DSTI limit:* The limit for the (stressed) DSTI is 60 percent, with an exception allowing 5 percent of loans to have a (stressed) DSTI of up to 70 percent. The calculation of the DSTI limit in Slovakia has two key distinctions compared to the standard DSTI. First, the subsistence level is deducted from income.[81] Second, the DSTI is determined as the maximum of the DSTI based

[77] Mortgage rates were among the lowest in Europe leading up to the interest rate hike; however, they are now the fourth highest in the euro area. Mortgage brokers receive compensation from banks, earning a relatively high commission fee.

[78] Prior to the market correction, on December 2, 2021, the ESRB issued a warning on medium-term vulnerabilities in the residential real estate sector of Slovakia (ESRB/2021/16).

[79] See NBS Discussion Note (2022) "Index of borrower-based measures in Slovakia" for an assessment of the degree of tightness over time of the combined set of measures.

[80] See summary of the decree with the most recent changes to the LTV.

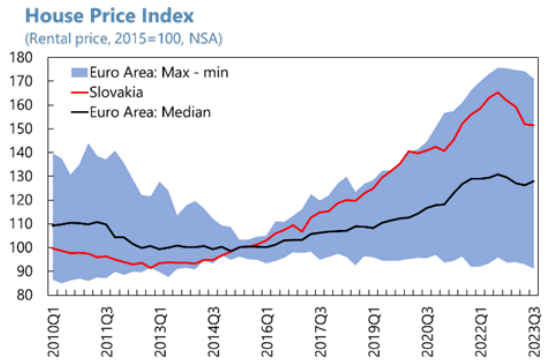
[81] The subsistence minimum set by the Act 601/2003 on the subsistence minimum. See website of the Ministry of Labour, Social Affairs and Family for current subsistence levels.

on the actual rate and maturity, and the DSTI based on a stressed rate (the actual rate plus 2 percentage points, capped at 6 percent) and the maximum maturity (see also the left panel of Figure 10).[82] This methodology ensures that the stressed rate applies primarily during low interest rate periods, as using a stress rate in high-rate environments may impose overly stringent requirements.

- *DTI limit:* Since its introduction in 2018, the DTI limit has been set at 8, but as of 2023, it has become age-dependent, varying from 3 to 8, for a subset of loans with maturities exceeding into retirement.[83]
- *Maturity limit:* For housing loans, the maturity limit is currently set at 30 years, with a 10 percent exception. For consumer loans, the maturity limit is 8 years, except for loans designated for energy-saving renovations, which have a maturity limit of 10 years.

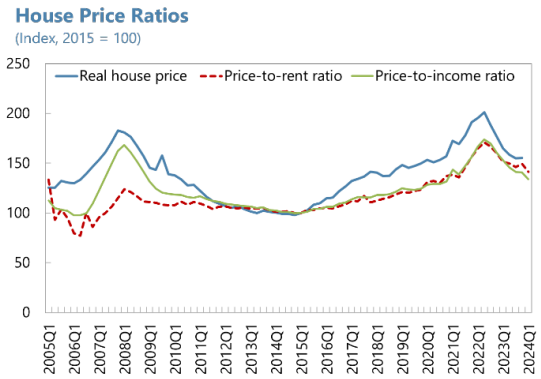
Figure 6. Slovak Republic: Developments in the RRE Sector

House prices have been increasing since the early 2010s but underwent a 10-percent correction starting in mid-2022. Recently, prices have started to pick back up.



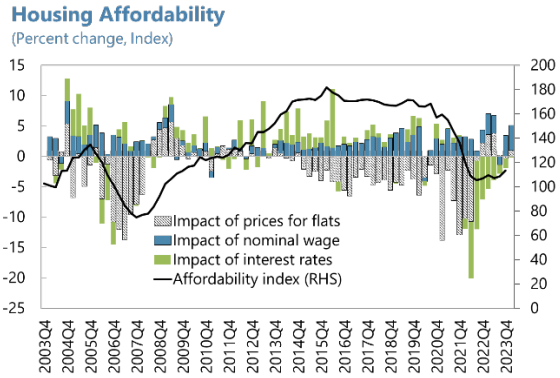
Sources: Eurostat and IMF staff calculations.
Note: Excludes Greece.

Sustainability indicators having come down as well but have stabilized recently (real house price and price-to-income ratio) or have picked back up (price-to-rent ratio).



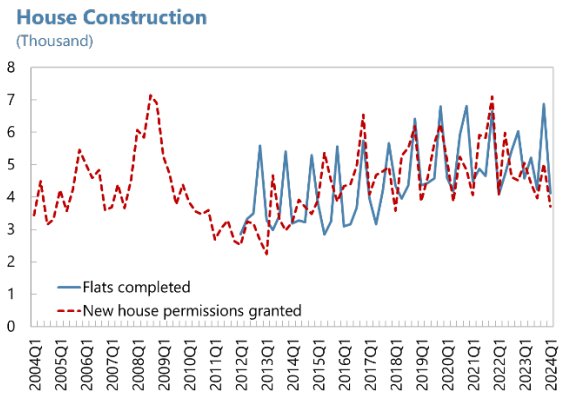
Source: NBS

Affordability has decreased since 2019, first as a result of high house prices, then as a consequence of higher interest rates.



Source: NBS RRE Dashboard.
Note: A higher value indicated improved affordability.

Housing construction has been increasing to keep up with demand but has recently stagnated due to high interest rates.



Source: NBS

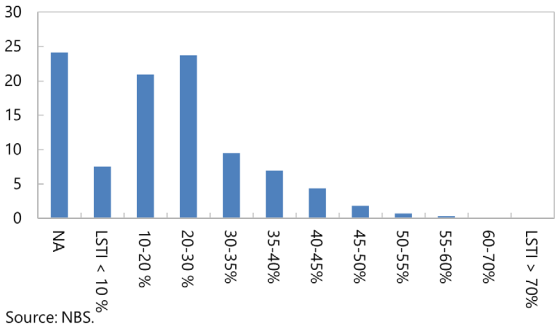
[82] In algebraic terms: $\text{DSTI} = \max\{\text{DSTI}(\min(i + 2\%, 6\%), 30 \text{ years}), \text{DSTI}(i, m)\}$, where i is the interest rate and m is maturity in years.

[83] See the NBS website for the exact calibration.

Figure 7. Slovak Republic: Resilience of Mortgage Portfolios and Banks' Exposure

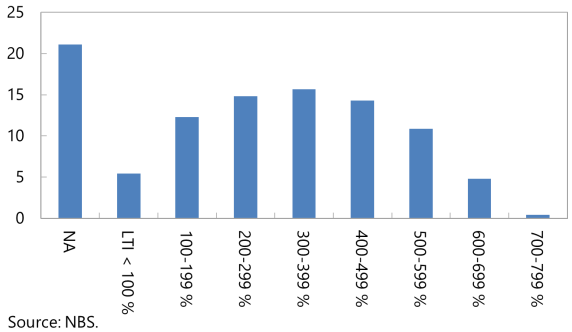
A 2024Q1 snapshot of the mortgage portfolio shows that the existing mortgages are concentrated at relatively low values of LSTI and LTV ratios. However, there is a significant share of mortgages with relatively high LTI ratios, and almost half of the existing portfolio has a maturity of more than 26 years.

LSTI Distribution of Mortgage Portfolio
(Percent)



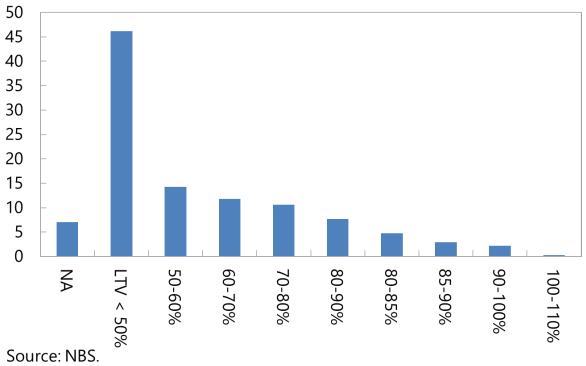
Source: NBS.
Note: DSTI data are not available for the outstanding mortgage portfolio. Note: Data refer to 2024Q1.

LTI Distribution of Mortgage Portfolio
(Percent)



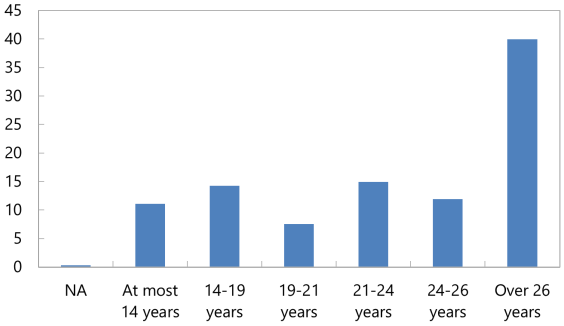
Source: NBS.
Note: DTI data are not available for the outstanding mortgage portfolio. Data refer to 2024Q1.

LTV Distribution of Mortgage Portfolio
(Percent)



Source: NBS.
Note: Data refer to 2024Q1.

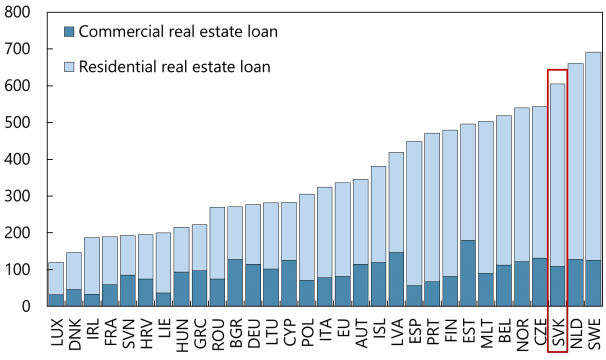
Maturity Distribution of Mortgage Portfolio
(Percent)



Source: NBS.
Note: Data refer to 2024Q1.

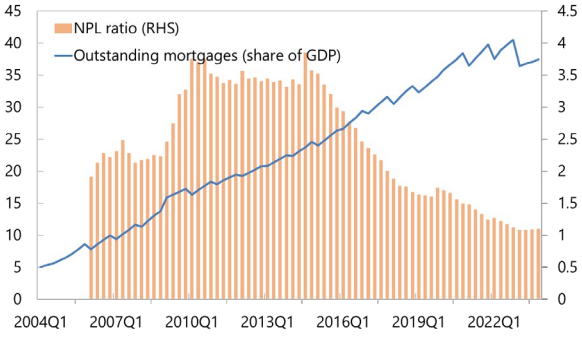
Banks' exposure to the RRE sector is high compared to other Euro area countries but NPLs remain low.

Bank Credit Exposure to Real Estate
(Percent of Tier 1 Capital, 2023Q4)



Sources: European Banking Authority and IMF staff calculations.

Outstanding Mortages and NPL ratio
(Percent)



Source: NBS.

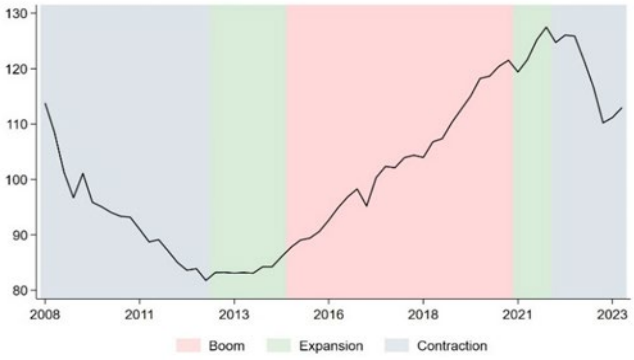
Box 3. Slovak Republic: Analyzing House Price RRE Overvaluation and Price-at-Risk

This box presents three analyses assessing past and current levels of overvaluation in the Slovak RRE sector: (i) cross-country analysis of housing boom-bust cycle, (ii) statistical measures of overvaluation, and (iii) house price-at-risk analysis.

In a cross-country comparison, Albuquerque et al. (forthcoming) divide housing cycles into contraction, (non-bubble) expansions, and (bubble) boom periods. They find that Slovakia has experienced overheating between 2014 and 2021.

To determine whether this overheating has resulted in an overvalued housing market and whether such overvaluation may have persisted after the 2022-2023 RRE correction, we compute a variety of overvaluation measures using different statistical filters (Hodrick-Prescott, Hamilton, and Christiano and Fitzgerald) and various indicators (price-to-income, real house prices, and price-to-rent). These purely statistical measures indicate significant overvaluation following the prolonged boom, with the average of these measures peaking at nearly 40 percent in mid-2022. While overvaluation has sharply decreased with the RRE correction, statistical overvaluation measures seem to have bottomed out at around 10 percent. Additionally, we employ two non-statistical measures to enhance these findings. First, we calculate the gap between the average house price implied by the DSTI regulation, considering average income, interest rates, and a 20-year maturity. Second, we evaluate the gap between the actual house price and the price predicted by the BBM model, as described in Box 4. Both of these measures suggest even greater overvaluation, at 21 percent and 35 percent, respectively.

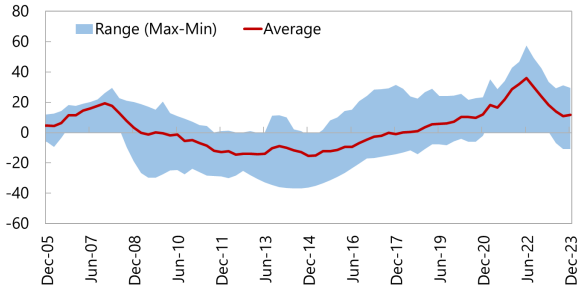
Housing Booms



Source: Albuquerque et al. (forthcoming).

Statistical Overvaluation

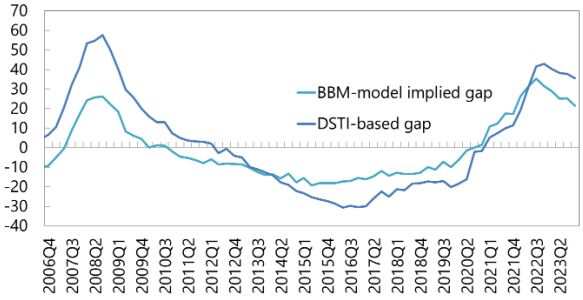
(Percent)



Source: NBS and IMF staff estimates.
Notes: The range is based on three filters (HP, Hamilton, and Christiano and Fitzgerald), applied to three indicators each (price-to-income, real house prices, and price-to-rent).

Other Overvaluation Measures

(Percent)



Source: NBS and IMF staff estimates.
Notes: The BBM-model implied gap is based on the model laid out in Box 4. The DSTI-based gap is the gap relative to the price that would be implied by the regulatory DSTI limit.

The RRE-price-at-risk analysis was conducted to quantify the downside risks associated with RRE prices, exploring the non-linear relationships between RRE prices and key determinants through quantile regressions. Downside risks are represented by the fitted values of lower percentiles (e.g., the 10th percentile), which are derived by applying a skewed T-distribution to the predicted values from the quantile regressions over a specified time horizon (e.g., four quarters ahead). The empirical analysis covers the period from Q1 2006 to Q1 2024.

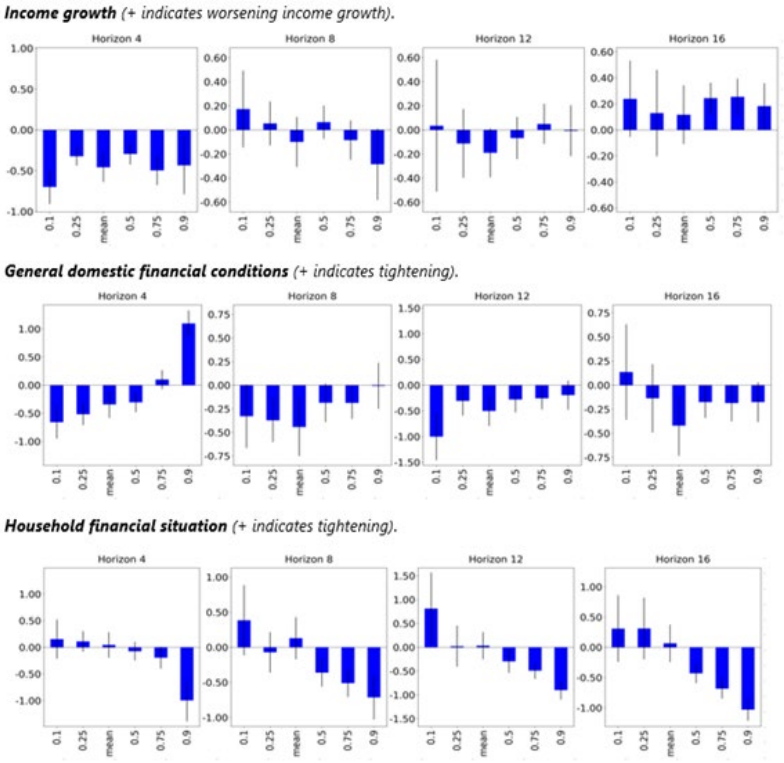
Box 3. Slovak Republic: Analyzing House Price RRE Overvaluation and Price-at-Risk (Concluded)[1]

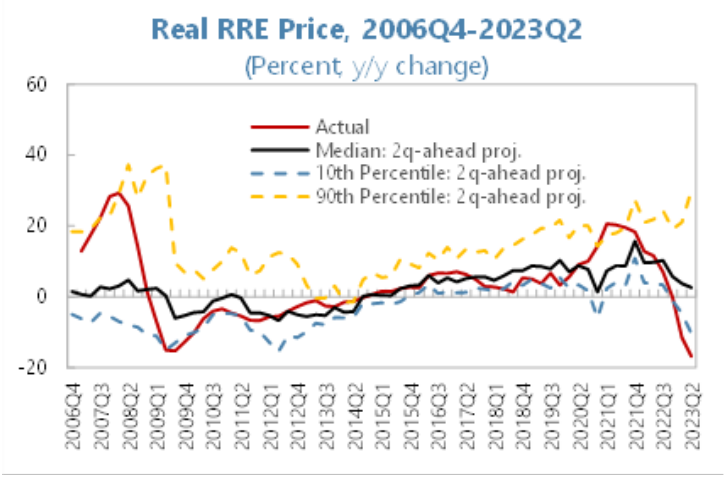
In the short term, the growth of RRE prices exhibits a negative correlation with declining household income. Stricter financial conditions increase risks to house prices, suppressing the lower end of the price distribution while elevating the 90th percentile. However, these effects generally become uniformly negative over longer durations. Tighter household finances constrain price growth at the higher end of the distribution but do not seem to have any statistically significant impact on the lower end.

The in-sample fit indicates that the current model specification performs reasonably well during stable periods. However, during significant fluctuations in housing prices—particularly around 2008 and 2023—the model's estimated RRE-price-at-risk seems to underestimate the severity of the situation. Out-of-sample analyses identify downside risks but do not fully capture the extent of the severity.

The results suggest that house prices could decline by 12.9 percent in Q1 2025, with a likelihood of 10 percent. The primary drivers of these downside risks are persistently tight financial conditions. However, a notable level of uncertainty remains, as evidenced by the widening gap between the fitted 10th and 90th percentiles, indicating a significant probability that prices may rebound.

Drivers of RRE risk in Slovakia





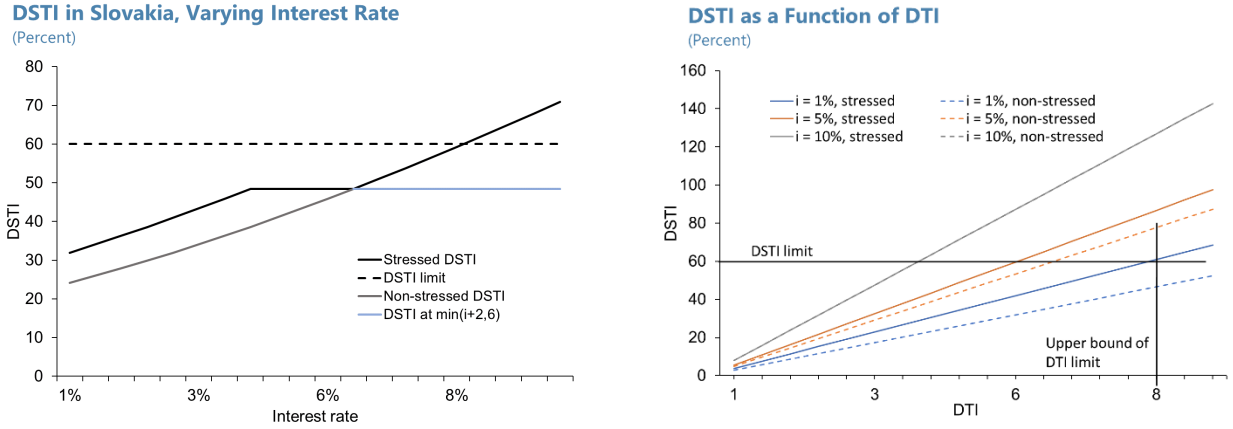
Sources: NBS, Statistical Office of the Slovak Republic, Haver Analytics, Financial Sector Analytical Data, ECB, Bloomberg, and IMF staff estimates.
Notes: Downside risks to house prices are characterized by the fitted values of the lower percentiles by fitting a skewed T-distribution to the predicted values of the quantile regressions over pre-specified time horizon. Underlying variables have been categorized into three groups, which are represented by their first principal component. Data used in this analysis cover 2006Q1 to 2024Q1. The forecasting horizon is 4 quarters.

[1] This box was prepared together with Wei Shi (Monetary and Capital Markets Department, IMF). It also benefitted from research assistance of Mohamad Nassar.

53. Different BBMs complement each other by becoming binding at various stages of the financial cycle. When interest rates are low, mortgage payments—and consequently DSTI ratios—tend to decrease, making the DSTI limit less effective. In such a scenario, the DTI limit is generally more likely to be binding (Figure 8). However, for older borrowers, the DTI limit may still pose restrictions in low-interest-rate environments due to the more stringent DTI thresholds applied to those nearing retirement. Similarly, the LTV limit is often more binding during periods of low interest rates, which can lead to rising house prices, so the required down payment for new borrowers increases. This situation may compel potential new borrowers to delay their purchases until they have saved enough for a larger down payment. The LTV limit acts as a critical check on the feedback loop between credit growth and house prices.

54. The introduction and tightening of BBMs have contributed to decreasing risk in households' balance sheets (Figure 9). Recently, the median DTI has decreased, and the distribution has narrowed significantly. The DSTI limit, which has been tightened several times, has led to reductions in both the median DSTI and the upper percentiles. As interest payments have risen, the median DSTI and the 75th percentile have increased since 2022, with the 90th percentile reaching the 60-percent DSTI limit. The LTV limit and its distribution have remained relatively unchanged over the past six years, with the median LTV hovering around 70 and the 75th percentile at 80, which serves as the binding limit for approximately 80 percent of loans. Finally, the maturities of most loans have gradually approached the 30-year limit, particularly in response to rising interest rates, as borrowers aim to mitigate increases in debt service costs.[84]

Figure 8. Slovak Republic: Relationship between DTI and DSTI



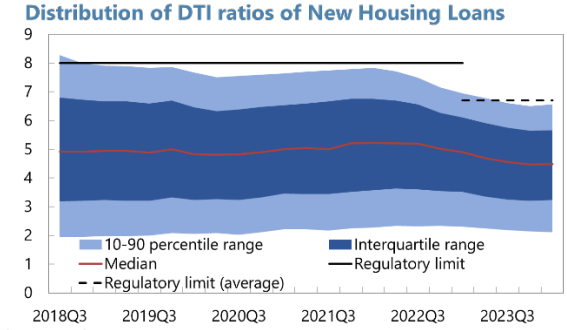
Sources: NBS and IMF staff calculations.
Notes: The chart displays the upper bound of the age-dependent DTI limit, which ranges from 3 to 8. 5 percent of loans may have a DSTI over 60. Underlying calculations assume median values for the principal (92,417 Euros), maturity (30 years), monthly net income (1722 Euros), and subsistence level for a household of 2 adults and 1 child (579 Euros).
$\text{DSTI} = \max\{\text{DSTI}(\min(\text{i} + 2\%,\ 6\%), 30\ \text{years}),\ \text{DSTI}(\text{i}, \text{m})\}$, where i is the interest rate and m is maturity in years.

[84] The assessment that the Slovak BBM package has contributed to limiting household credit risk is shared by Jurča et al. (2020) and IMF (2021).

Figure 9. Slovak Republic: Household Balance Sheet Indicators

The DTI distribution has been stable between 2018 and 2022, with the then-regulatory limit of 8 not binding for the 90th percentile. Recently, the median has decreased, and the distribution has become narrower.

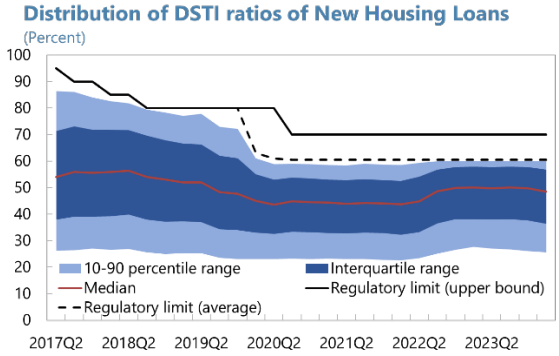
Distribution of DTI ratios of New Housing Loans



Source: NBS.
Note: Prior to January 1, 2023 the regulatory DTI was 8 with a 10-percent exception. It is not possible to compute the average limit because there was no formal upper bound. Since then, the DTI limit ranges between 3 and 8, depending on age. The average refers to the population-weighted average.

The DSTI limit has continuously decreased since 2016, pushing down the median and narrowing the distribution. Since interest rates have increased starting mid-2022, the median DSTI has increased and the 90th percentile is close to the average regulatory limit, suggesting the limit has become binding for more loans.

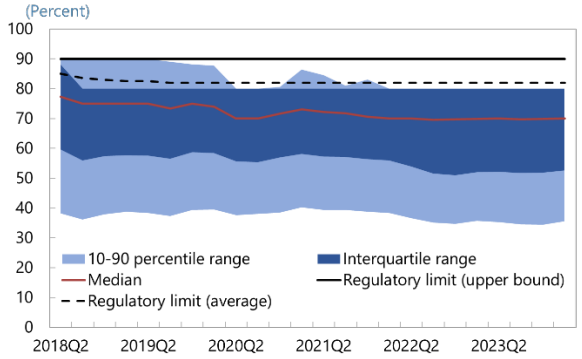
Distribution of DSTI ratios of New Housing Loans



Source: NBS.
Note: The regulatory limit refers to the stressed DSTI. The average regulatory limit refers to the average weighted by "speed limits".

The LTV distribution has remained relatively constant, with the median hovering around 70, and the 75th being constant at 80, which is the effective limit for the largest share of loans. More recently, also the 90th percentile has been equal to 80.

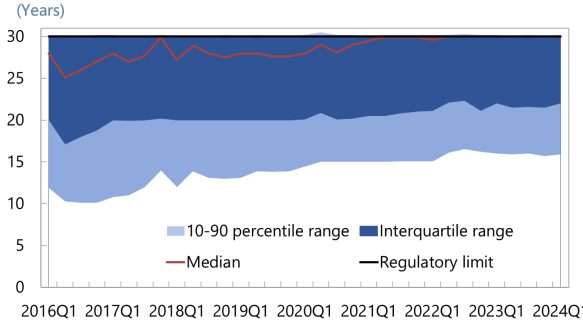
Distribution of LTV ratios of New Housing Loans



Source: NBS.
Note: The average regulatory limit refers to the average weighted by "speed limits".

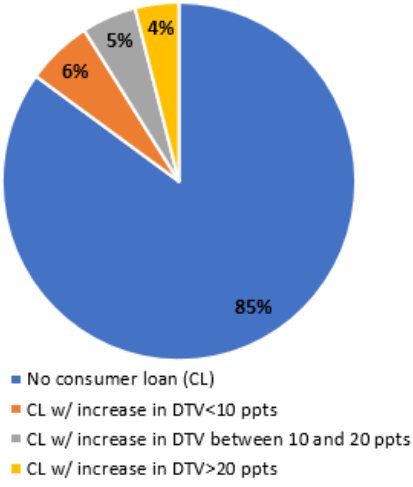
Maturities have moved closer to the 30-year limit over time, especially in the face of rising interest rates to limit the increase in debt service costs.

Distribution of Maturities of New Housing Loans



Source: NBS.
Note: 10 percent of new mortgage loans can have maturities longer than 30 years. It is not possible to compute the average limit because there is no formal upper bound.

55. The option to co-finance a mortgage with a consumer loan represents a notable leakage in the package. BBM regulation is product-based, meaning that BBM limits apply to loans from both banks and NBFIs, effectively preventing leakage to the NBFI sector. This regulation also extends to refinancing practices. A potential leakage was mitigated by tightening the DTI requirement, which prevents the topping up of mortgages by extending their maturity. However, a remaining loophole exists that allows financing the down payment with a consumer loan, circumventing the LTV regulation. The total debt remains subject to DTI and DSTI limits and the consumer loan is subject to an 8-year maturity limit, which effectively restricts the uptake of this co-financing option.[85] Nonetheless, NBS data indicates that in Q4 2023, 15 percent of mortgages close to the LTV limit (greater than 78 percent) were co-financed by a consumer loan, with 9 percent of these loans experiencing debt-to-value (DTV) increases of more than 10 percentage points (see figure). As previously discussed, an effective LTV limit is crucial for mitigating the procyclicality between house prices and credit during boom periods. To address the leakage that could lead to frontloading credit demand, such practices should be prohibited. Effective enforcement of this measure will rely on the ability to obtain loan-level data from NBFIs (Recommendation 3).



Source: NBS.
Notes: The chart shows 2023Q4 data on the share of loans close to the LTV limit (LTV>78%), which had no co-financing with a CL, and the shares of those that had co-financing and resulting increases in DTV.

56. While the general tightening of the previous blanket DTI limit seems appropriate, differentiating the DTI by age appears suboptimal from a macroprudential perspective. During the period of ultra-low interest rates, many borrowers topped up their mortgages, keeping monthly payments effectively constant but risking higher future payments when interest rates could rise again. Therefore, the general tightening of the DTI limit appears to have been appropriate. The age-differentiation of DTI aimed to address the significant share of mortgages held by elderly borrowers with high DTI ratios who may struggle to finance their mortgage payments during retirement. However, this concern should already be addressed by regulations requiring banks to ensure that a loan can be repaid solely with income, including after income declines in retirement, based on the European Mortgage Credit Directive. From a macroprudential perspective, the risk to lenders is alleviated unless the value of the house falls below the outstanding debt. It appears that such cases are rare, as older borrowers tend to pledge more collateral and maintain lower LTV values (see figure). Therefore, the DTI differentiation by age is likely suboptimal in capturing contributions to systemic risk posed by borrowers. Given that currently exemptions are

Age group (Current age)	Originating LTV ratios	
	<70	<80
20-30	34.5%	84.5%
30-40	39.7%	86.9%
40-50	49.3%	92.8%
50-60	61.7%	93.4%
60-70	69.7%	90.4%

[85] Additionally, interest rates on consumer loans are higher than on mortgages.

not fully used by banks, the DTI does not appear to restrict access to credit, including not for elderly borrowers, however that may change in the future.

57. The new availability of transaction data presents an opportunity to revise the package with a stronger focus on mitigating the procyclicality of credit and house price growth, while keeping the principle focus on the structural built-up of resilience. Although limiting house price growth is not a primary objective of Slovak macroprudential policy, high house price growth can pose systemic risks, particularly given historically strong procyclicality with credit growth in Slovakia. While BBMs are generally recognized as structural policies, a sufficiently stringent BBM package can still be expected to help mitigate risks connected to procyclicality. Indeed, results from a structural model indicate that the current Slovak BBM package has contributed to dampening both house price and credit growth (Box 4). However, considering the legacy risks in the household sector and the substantial risk of a resurgence in credit and house price growth with lower mortgage rates, the NBS should utilize the newly available transaction data from the land register to refine the speed limits of the BBM package along first-time buyers (FTBs), second-time buyers (STBs), investors, and top-up categories.[86] Implementing tighter macroprudential limits for investors and top-ups, in particular, has been shown to reduce the procyclicality of credit and house price growth (Box 4).[87] Such alignment would take into account consistent cross-country evidence regarding the contributions of various borrower segments to systemic risk, rather than relying solely on Slovak microdata.

58. Supply-side inefficiencies have somewhat contributed to the overheating of the housing market and should be addressed. While a considerable portion of house price growth has been driven by catch-up growth and demand-side factors, sluggish supply has also played a role.[88] Construction activity has lagged demand, with inefficiencies in the permitting process particularly pronounced in larger cities, compounded by a worsening shortage of skilled labor. An additional factor is the low taxation of RRE in Slovakia. The official rental market remains underdeveloped, lacking government support, although a notable informal rental market exists. Overly restrictive rental regulations hinder the expansion of the formal market. Simplifying land use policies and building permit processes would improve the responsiveness of supply. Additionally, reforming rental regulations to balance the rights of owners and tenants would offer a viable alternative to taking on a mortgage, alleviating pressure on the housing market.

[86] Differentiating macroprudential limits across these categories has become increasingly common. For example, Finland, Hungary, Iceland, and Luxembourg have higher LTV limits for FTBs, while Belgium, Cyprus, Ireland, Latvia, and Romania impose stricter LTV limits for BTL.

[87] FTBs have demonstrated a high likelihood of repaying loans (see Kelley et al. (2015), Guiliana (2019), Nier et al. (2019), and Lazarov and Hinterschweiger (2018) and contribute minimally to credit booms. STBs still maintain adequate repayment capacity but are likely to contribute more to procyclicality. Investor or buy-to-let (BTL) mortgages are riskier and have been shown to drive credit and housing cycles (Lazarov and Hinterschweiger, 2018). Finally, equity withdrawals and mortgage top-ups exhibit strongly procyclical behavior without generating additional housing value.

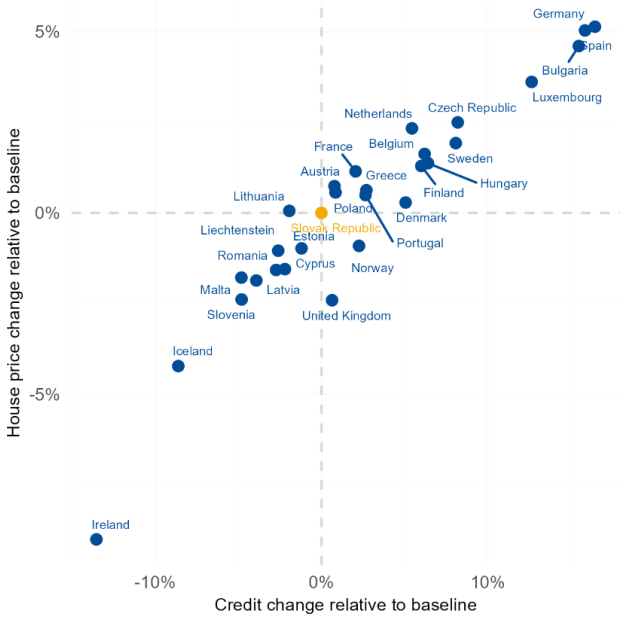
[88] For a comprehensive report on supply-side issues and policy recommendations, see OECD (2024).

Box 4. Slovak Republic: Effects of BBMs on Credit and House Price Growth[1]

This box evaluates the impact of various BBM parameterization alternatives on mortgage credit and house prices. The analysis is based on a structural micro-funded framework that models optimal mortgage choices under three macroprudential limits: LTV, DSTI/DTI, and maturity (Karmelavičius and Otten, forthcoming). Although households have diverse preferences, they all face the same fundamental decisions: how much to save for a down payment, the price of the house to purchase, and how much and for how long to borrow, all while adhering to budgetary and macroprudential constraints aligned with Slovakia's BBM regulation. The model simulates thousands of borrowers whose preferences are calibrated so that the resulting distributions of LTV, DTI, DSTI, and maturity reflect the empirically observed data (Figure 9). We utilize the estimated model to conduct a counterfactual analysis over the period from Q3 2021 to Q4 2023, assessing the effects of various BBM designs and parameterizations on borrower behavior, credit uptake, and housing demand.

First, we simulate a counterfactual scenario without any BBMs in place. This enables us to quantify the reduction in credit flow and house prices attributable to the current BBM package. Assuming that banks maintain internal limits on risk-taking that prevent them from significantly expanding credit supply in the absence of BBMs, the impact of the current BBM package on curbing credit and house prices is relatively modest, at 7.7 percent and 1.9 percent, respectively. While we can reasonably expect that banks will uphold sound lending standards to manage their risk exposure, competition may encourage risk-taking behavior over time. Consequently, the reported estimates should be viewed as a lower bound on the cooling effect of the Slovak BBM package on credit and house prices.

Second, we utilize the model to compare the stringency of the Slovak BBM package with regulations in other European countries. Such comparisons are not straightforward, as BBMs differ in design across countries. In Slovakia, there are speed limits (i.e., exemptions for a certain percentage of loans) that are unrelated to borrower characteristics, along with an age-dependent DTI. In contrast, other countries feature various designs where speed limits often depend on borrower categories (FTBs, STBs, BTL, top-up). By accounting for these different designs,[2] the scatterplot illustrates the impact of other countries' BBM packages, if applied in Slovakia, on credit and house price growth, relative to the baseline established by the current BBM package. Overall, the Slovak BBM regulation positions itself in the middle range regarding the stringency of BBM packages, as indicated by its effect on credit and house price growth.



Finally, we utilize the model to evaluate the impact of several streamlined alternative packages that reflect the design discussions outlined in the main text. Specifically, we estimate the effects of different parameterization options, where exemptions are eliminated and LTV limits are differentiated by borrower segment, including FTBs, STBs, investors/BTL properties, and those seeking equity withdrawal or topping up an existing mortgage.

The table presents various options in ascending order based on their tightening impact. In comparison to the current BBM regulation, Option 1 removes exemptions for the DSTI limit of 60 percent, sets the maturity limit to 30 years, features an age-independent DTI of 8, and assumes that FTBs have an LTV limit of 90 percent, while other borrowers are subject to an 80 percent limit. This option represents a package of similar average stringency to the current regulation but is streamlined and differentiates LTV limits by borrower type.

Box 4. Slovak Republic: Effects of BBMs on Credit and House Price Growth (Concluded)

Relative to Option 1, Option 2 introduces a tighter LTV for investors/BTL and equity withdrawal/top-ups, aiming to mitigate the procyclicality typically associated with these categories, which modestly reduces credit and house price growth. Option 3 imposes an even stricter LTV for equity withdrawal/top-ups, as this behavior can be highly procyclical, leading to a slightly larger reduction in credit and house price growth. While Options 1-3 maintain a relatively high LTV of 90 percent for FTBs, the subsequent options consider tightening this limit and adjusting other thresholds. Simply lowering the LTV for FTBs to 85 percent does not significantly impact housing credit or prices, as only a small proportion of lending falls within the 85 to 90 percent LTV range. However, if the DTI is also tightened to 6—closer to the current average—this results in an additional reduction in house prices and credit growth. The findings indicate that a streamlined regulatory framework, free of exceptions for income-based measures and the maturity limit, combined with LTV differentiation by segment, can have a significant effect on curbing credit and house price growth while aiming to reduce procyclicality and enhance the resilience of certain borrower types.

		----------> Tightening ---------->							
		Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Segment
Regulation	LTV, %	90	90	90	85	80	80	80	FTBs
		80	80	80	80	80	80	75	STBs
		80	70	70	70	70	70	70	Investors
		80	70	50	50	50	50	50	Top-ups
	DSTI, %	60	60	60	60	60	55	55	All
	Maturity, y.	30	30	30	30	30	30	30	All
	DTI	8	8	8	8	8	6	6	All
Impact	Mortgage flow, %	1	-4	-6	-6	-8	-12	-15	
	House prices, %	1	-2	-3	-3	-3	-5	-7	

[1] This box was prepared together with Jaunius Karmelavičius (Monetary and Markets Department, IMF).

[2] The comparison takes into consideration variations in speed limits and distinguishes between a standard DSTI ratio and a stressed DSTI ratio. Additionally, it seeks to address definitional differences in DSTI, albeit with some limitations.

C. Corporate Vulnerabilities and Macroprudential Settings

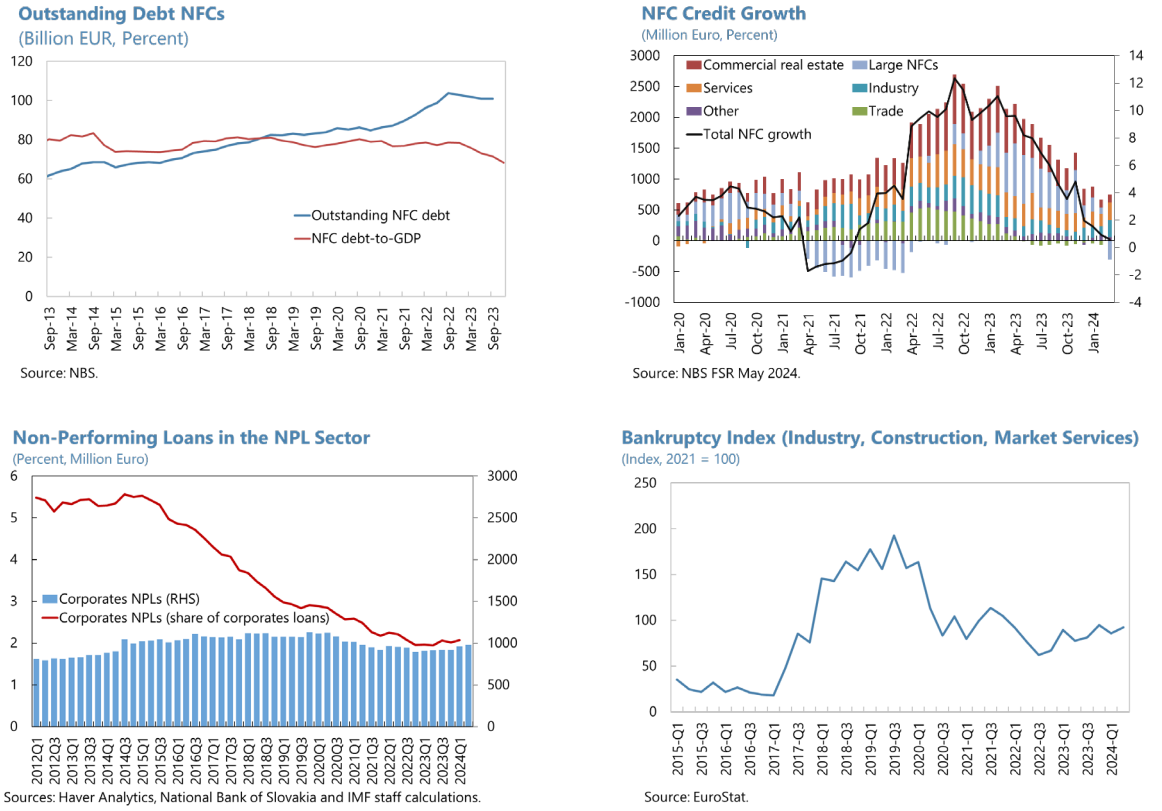
59. Non-financial corporate debt increased during 2022-23 but has since stabilized. Outstanding NFC debt has been on an upward trajectory for the past decade; however, the NFC debt-to-GDP ratio has remained relatively stable, even as credit growth surged following the pandemic. A significant portion of this growth was driven by increased credit to the CRE sector. Growth has tapered off with the rise in interest rates, approaching nearly zero at the beginning of 2024. NPL and bankruptcy rates have remained low and relatively stable, despite the reduction of some COVID-era policy support. The sector's resilience has been validated by stress tests (see Technical Note on Stress Testing).

60. Banks maintain substantial exposure to the CRE sector, which has shown relative stability despite rate hikes. Banks, investment funds, and households are directly and indirectly exposed to the CRE sector, which is highly leveraged and sensitive to interest rate increases, potentially exacerbating an economic downturn. Banks' loans to the CRE sector represent about 8 percent of total loan portfolios and make up 90 percent of all CRE-related loans, with investment funds providing the rest.[89] CRE firms' profits have recovered in 2022, limiting the increase in NPLs

[89] Households are indirectly exposed to CRE through their exposures to real estate investment funds that not only provide loans but also equity financing. In 2023, the real estate investment funds relied up to 87 percent on the retail investor base and were exposed up to 76 percent to CRE via equity shares and debt exposures.

during 2023, with most recent NPL rates decreasing and approaching pre-pandemic levels (Figure 10).[90] Both the industrial and retail sectors have shown recovery post-pandemic. The industrial sector, primarily composed of warehouses for large online retailers and firms in the automotive supply chain, has generally benefited from European "near-shoring." Although there are downside risks associated with declining demand for European-manufactured combustion-engine vehicles, Slovak suppliers are pivoting towards electric vehicles, including partnerships with non-European manufacturers. In the retail sector, retail parks gained popularity during the pandemic, while large shopping malls have exhibited a robust recovery following the easing of pandemic-related restrictions.

Figure 10. Slovak Republic: NFC Debt and Credit Quality



61. Due to structurally lower demand, the office sector poses a particular risk that requires close monitoring. The vacancy rate in this segment has risen to 14 percent, with interest expenses now accounting for 20–30 percent of rental income for most firms (Figure 11).[91] Higher interest rates have raised the required yield for investors, resulting in a recent increase in average yields after a

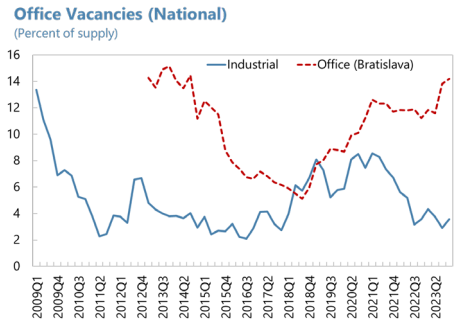
[90] According to NBS's stress tests of the sector, there would need to be a small sectoral SyRB to cover all losses under an adverse scenario (between 0 and 0.1 percent of total RWA). The NBS has decided against activating the SyRB because CRE risk weights are relatively high in the sector (around 85 percent) and the sector has recently developed more favorably than expected.

[91] Historically, vacancy rates in the office sector have often exceeded 10 percent, primarily due to robust construction activity. However, market participants have indicated that this construction has recently stalled, leading to expectations of a declining vacancy rate in the near future.

period of decline. However, the shift towards more flexible work arrangements and improved construction efficiencies is likely to lead to a structural decrease in demand within the sector. Moreover, coupled with the potential for prolonged higher interest rates, this could result in declining property values and heightened risks associated with loans in this sector, where exposure to office-sector assets is currently at 20 percent.

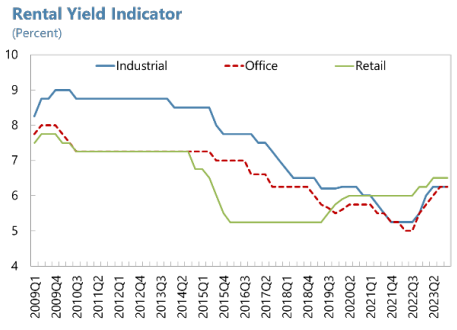
Figure 11. Slovak Republic: Developments in the CRE Sector

Vacancies have been increasing in the office sector, with other sectors having stabilized.



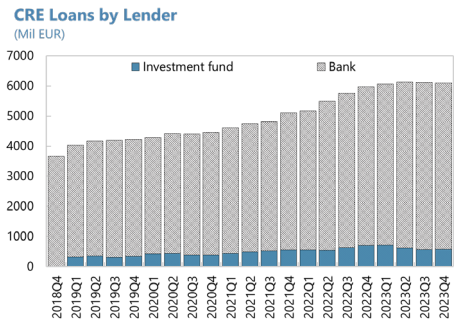
Source: NBS

Rental yield indicators have picked up recently, after having decreased for most sectors during the pandemic.



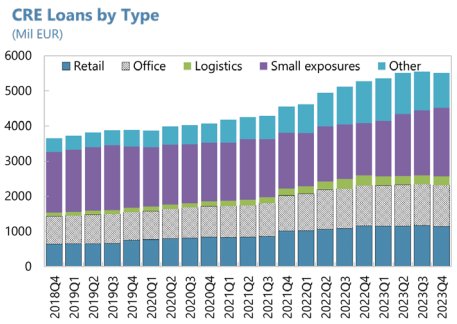
Source: NBS

The CRE loan stock has been constant since beginning of 2023, with banks holding about 90 percent of all CRE loans...



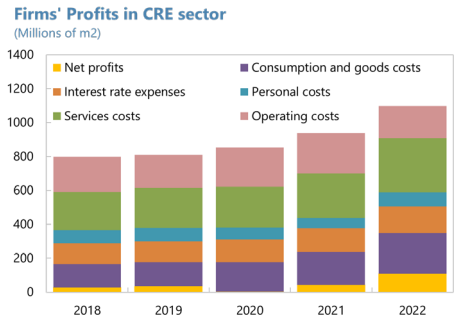
Source: NBS

...and the exposure to the office sector having been constant at around 20 percent since the beginning of 2022.



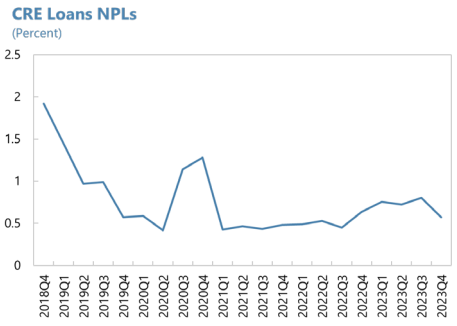
Source: NBS

CRE firms' profits have recovered in 2022, enabling them so far to stem higher interest rate costs.



Source: NBS

...with NPLs remaining relatively low.



Source: NBS

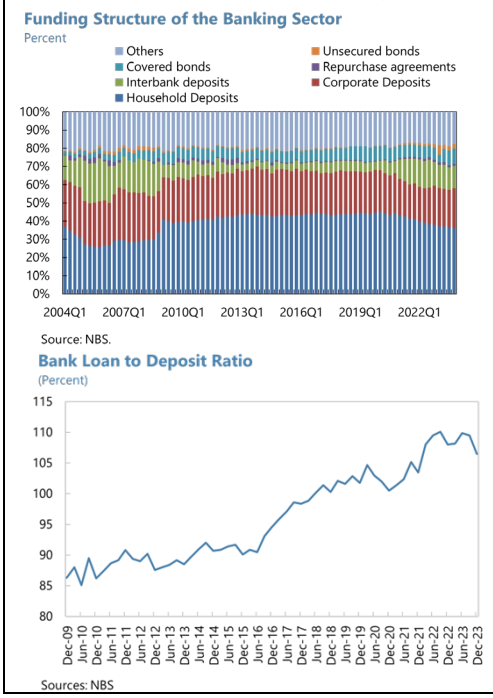
62. There are no instruments specifically targeted to the NFC sector, but the NBS should stand ready to deploy the SyRB if risks in the CRE sector become more systemic. Currently, risks from the NFC sector, and the CRE sector in particular, are not addressed by any specific tools but rather covered by general capital buffers. The NBS should stand ready to implement a SyRB to mitigate these risks, if risks in the CRE sector begin to accumulate, and discuss the advantages and disadvantages of a preemptive activation. Imposing a targeted buffer preemptively could reduce

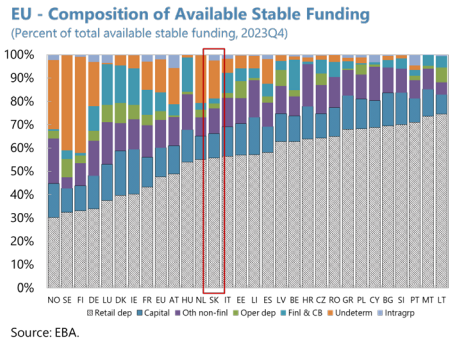
incentives to accumulate more CRE exposures. On the other hand, given that the sector is already under pressure, additional requirements could lead to procyclical effects. Therefore, if the situation in the CRE sector stabilizes and lending picks up, an early activation of a SyRB could be considered.

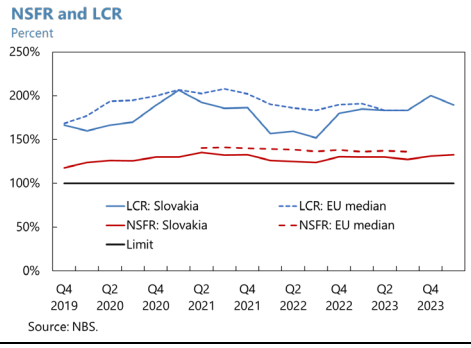
D. Bank Funding and Liquidity Vulnerabilities and Macroprudential Settings

63. Funding for Slovak banks continues to be primarily reliant on deposits from the non-financial sector. Household deposits remain the largest source of funding for Slovak banks, although their share of overall funding has declined from 44 percent at the end of 2020 to 36 percent currently (Figure 12), mainly due to targeted longer-term refinancing operations. Despite this reduction, retail deposits still constitute approximately half of the available stable funding, which aligns closely with the EU average. The decrease in household deposit share has been counterbalanced by an increase in interbank deposits, which now represent 12 percent of total funding, while other funding sources have maintained relatively stable proportions. Overall, the reliance on market-based funding remains minimal.

Figure 12. Slovak Republic: Bank Funding





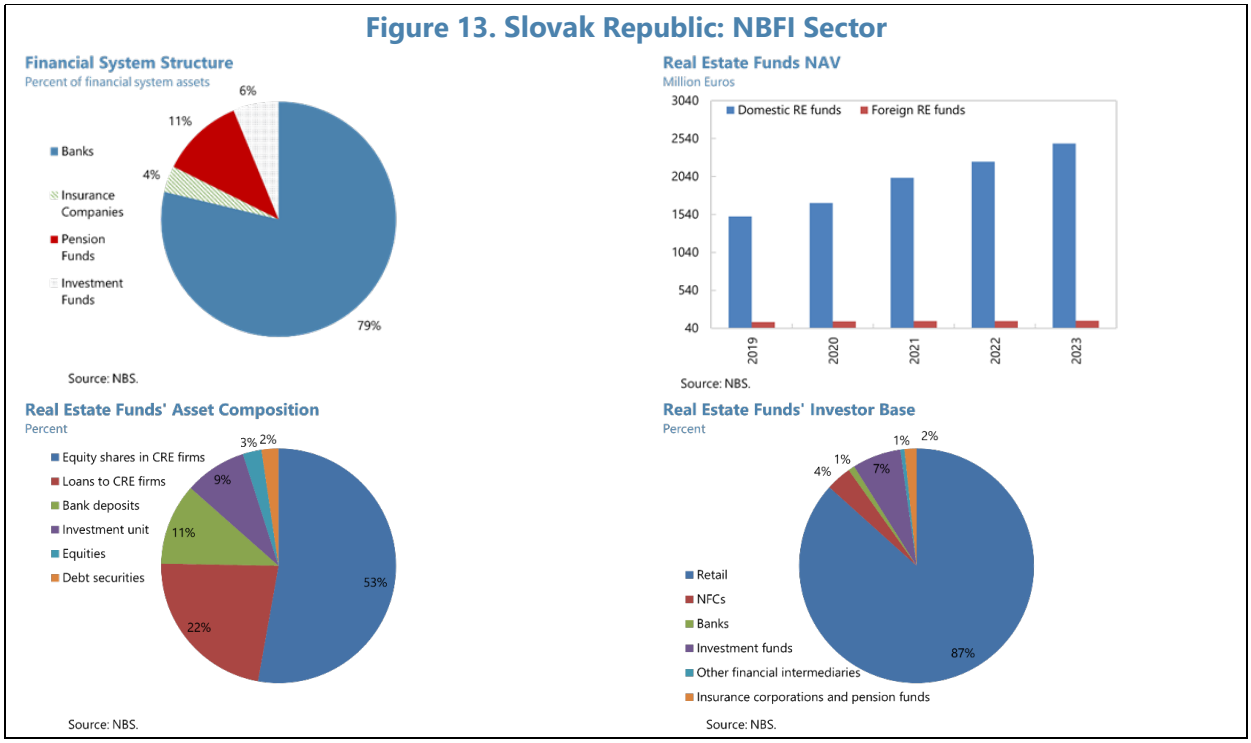


64. The Slovak banking sector maintains adequate aggregate liquidity and stable funding. Over the past 15 years, loan growth has consistently outpaced deposit growth, leading to a loan-to-deposit ratio that reached 110 percent in mid-2023. However, this ratio has since improved due to an increase in household deposits and lower credit growth. Slovak banks continue to enjoy substantial liquidity buffers, as confirmed by liquidity stress tests (see Technical Note on Stress Testing). The Net Stable Funding Ratio (NSFR) stands at 132 percent, while the Liquidity Coverage Ratio (LCR) is at 189 percent, both significantly exceeding regulatory limits and aligning with EU median values.

E. Vulnerabilities in the NBFI Sector and Tools

65. Slovakia's NBFI sector remains relatively small but is expected to keep growing. Currently accounting for approximately 21 percent of total financial system assets, the NBFI sector has remained relatively stable over the past two decades, though its composition has evolved. The share of insurance companies has decreased to 4 percent by the end of 2023, down from 9 percent in 2006, while the share of pension funds has risen to 11 percent from 3 percent (Figure 13). Once virtually non-existent in 2006, investment funds now constitute 6 percent of the sector. Approximately a quarter of the total assets in investment funds are held by real estate funds, which are primarily domestically owned.[92] These real estate funds mainly invest in the CRE through equity shares and loans. The ratio of their retail investor base to household deposits in banks is around 5 percent, indicating that these funds currently play a limited role. However, there is potential for these funds to amplify any CRE-related shocks, especially as their size is expected to continue increasing.

Figure 13. Slovak Republic: NBFI Sector



66. The existing liquidity requirements for asset management funds are broadly appropriate but the NBS should continue to closely monitor the sector and tighten regulation if risks accumulate. Currently, there is regulation requiring at least 10% of the value of assets in a public special real-estate fund to consist of liquid assets. The NBS also conducts an annual assessment of leverage according to Article 25 of European Alternative Investment Fund Directive (AIFMD). Following its transposition into Slovak law, the NBS has the power to enact additional

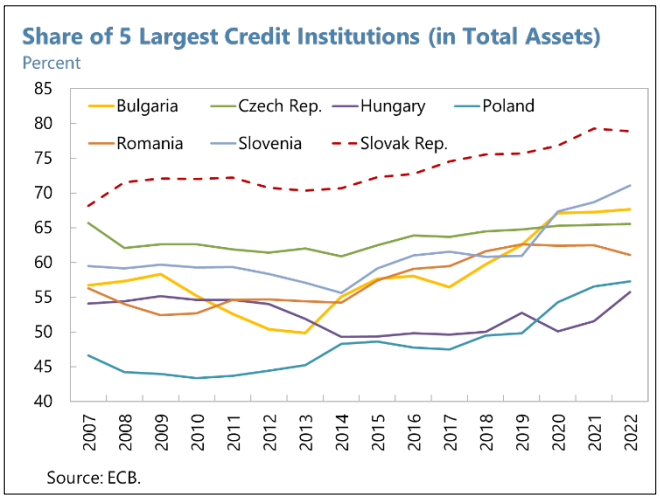
[92] Market participants have indicated that yields in the Slovak CRE sector are not competitive on an international scale. This lack of competitiveness is a key factor contributing to the predominance of domestically owned funds. There is a limited number of foreign-owned funds that operate cross-border in Slovakia and neighboring countries, most of these are under Czech ownership and regulated by the Czech National Bank.

measures such as leverage limits and aligning redemption limits with asset liquidity, if risks in the sector build up. The NBS should remain vigilant in monitoring this sector and be prepared to ready to tighten measures before risks become systemic.

F. Vulnerabilities in Structural Dimensions and Tools

67. The Slovak banking system, which constitutes the largest part of the financial system, is highly concentrated but the level of interconnectedness is moderate. The Slovak financial system continues to be strongly bank-centered, with more than 80 percent of financial sector assets. The five largest banks hold nearly 80 percent of those assets, which makes it the most concentrated banking in the region. Still, the level of interconnectedness within the banking sector and between the banking sector and the NBFI sector remains moderate, somewhat limiting the risk inherent in high concentration.

68. The NBS implements O-SII buffer rates to strengthen the resilience of the banking sector. For 2024, the NBS has identified six systemically important banks that are subject to capital surcharges. The O-SII buffer requirement can be as high as 3% of the institution's total risk exposure and currently ranges between 0.25% and 2% (see Table 3 for the current O-SII and buffer requirements). As of January 1, 2025, the list will be reduced by one bank that is no longer considered systemically significant.



G. Recommendations

69. Recommendation 7. Maintain the availability of releasable capital in normal times by adopting a pnCCyB framework.

70. Recommendation 8. Refine the borrower-based measures and remove the possibility to circumvent LTV limits with consumer loans.

71. Recommendation 9. Stand ready to deploy the SyRB in case risks in the CRE sector become systemic.

References

Albuquerque, B., Cerutti, E., Kido, Y., Varghese, R. (forthcoming). "Not all Housing Cycles are Created Equal: Booms and Busts".

BCBS (2021). "Early lessons from the COVID-19 pandemic on the Basel reforms", Bank for International Settlements, July.

BCBS (2022). "Newsletter on positive cycle-neutral countercyclical capital buffer rates", Bank for International Settlements, October.

Bedayo, M., and Galán, J. (2024). "The impact of the Countercyclical Capital Buffer on credit: Evidence from its accumulation and release before and during COVID-19". *Documentos de Trabajo/Banco de España, 2411*.

Behn, M., Forletta, M., and Reghezza, A. (2024). "Buying insurance at low economic cost–the effects of bank capital buffer increases since the pandemic".

BIS (2010). "Guidance for national authorities operating the countercyclical capital buffer".

Catalan, M., and Hoffmaister, A. W. (2022). "When banks punch back: Macrofinancial feedback loops in stress tests". *Journal of International Money and Finance, 124, 102572*.

Cesnak, M., Klacso, J., Kupkovič, P., Moravčík, A., Rychtárik, Š., and Vrbovský, R. (2024). "Assessing Residential Real Estate prices in Slovakia: Possible Approaches and Indices". *NBS Occasional Paper 1/2024*.

Cesnak, M., Klacso, J., and Vasil, R. (2021). "Analysis of the Impact of Borrower-Based Measures", *NBS Occasional Paper 3/2021*.

Couaillier, C., Reghezza, A., d'Acri, C. R., and Scopelliti, A. (2022). "How to release capital requirements during a pandemic? Evidence from euro area banks".

De Nederlandsche Bank (2022). "Analytical framework for setting the Countercyclical Capital Buffer in the Netherlands", February.

Dursun-de Neef, H. Ö., Schandlbauer, A., and Wittig, C. (2023). "Countercyclical capital buffers and credit supply: evidence from the COVID-19 crisis." *Journal of Banking and Finance, 154, 106930*.

EBA (2024). "Stacking Orders and Capital Buffers – Reflections on Management Buffer Practices in the EU", July 14, 2024.

ESRB (2014). "Flagship Report on Macro-prudential Policy in the Banking Sector".

ESRB (2022). "Review of the EU Macroprudential Framework for the Banking Sector March 2022, Response to the call for advice".

Galán, J. (2019). "Measuring Credit-To-GDP Gaps. The Hodrick-Prescott Filter Revisited". *Banco de Espana Occasional Paper No. 1906.*

Giuliana, R. (2019). "Have First-Time Buyers continued to default less?" *(No. 14/FS/19). Central Bank of Ireland.*

IMF (2011). "Macroprudential Policy: An Organizing Framework," *IMF Policy Papers, Vol. 2011(18).*

——— (2013). "Key Aspects of Macroprudential Policy," June.

——— (2014a). "Staff Guidance Note on Macroprudential Policy," December.

——— (2014b). "Staff Guidance Note on Macroprudential Policy: Detailed Guidance on Instruments," December.

IMF, FSB, BIS (2016). "Elements of Effective Macroprudential Policies. Lessons from International Experience". 31 August 2016.

IMF (2018). "Slovak Republic: Selected Issues".

IMF (2021). "Slovak Republic: Selected Issues".

Jurča, P., Klacso, J., Tereanu, E., Forletta, M., and Gross, M. (2020). "The effectiveness of borrower-based macroprudential measures: a quantitative analysis for Slovakia." *IMF Working Paper 20/134.*

Kalman, J., Klacso, J., Vasil, R., Zeman, J. (2023). "What's the Cost of "Saving the Planet" for Banks? Assessing the Indirect Impact of Climate Transition Risks on Slovak Banks' Loan Portfolios". *NBS Working Paper 7/2023.*

Karmelavičius, J., and Otten, J. (forthcoming). "Mortgage Choice under Macroprudential Borrower-Based Measures".

Kelly, R., O'Malley, T., and O'Toole, C. (2015). "Designing macro-prudential policy in mortgage lending: do first time buyers default less?" *Central Bank and Financial Services Authority of Ireland, Research Technical Paper 02/RT/15.*

Lang, J. H., and Menno, D. (2023). "The state-dependent impact of changes in bank capital requirements."

Lazarov, V. S., and Hinterschweiger, M. (2018). "Determinants of distress in the UK owner-occupier and buy-to-let mortgage markets."

Mathur, A., Naylor, M., and Rajan, A. (2023). "Creditable capital: macroprudential regulation and bank lending in stress". *BoE Staff Working Paper (No. 1011)*.

NBS (2019). April Macroprudential Commentary.

Nier, E., Popa, R., Shamloo, M., and Voinea, L. (2019). "Debt service and default: calibrating macroprudential policy using micro data."

OECD (2024). "OECD Economic Surveys: Slovak Republic". March.

Rychtárik, Š., and NBS (2014). "Analytical background for the counter-cyclical capital buffer decisions in Slovakia," *Biatec 22.4: 10-15*.

Rychtárik, Š., and NBS (2018). "Follow-up on CCyB in Slovakia: build-up, calibration and release." *Biatec 26.3: 20-24.*

Wezel, T. (2019). "Conceptual issues in calibrating the Basel III countercyclical capital buffer".

Wong, E., Ho, K., Wong, A., and Lo, V. P. H. (2022). "Effects of COVID-19 support measures on bank lending: Lessons from the release of countercyclical capital buffer and loan guarantee schemes in Hong Kong." Pacific Economic Review.