NBS Working paper

5/2026

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NATIONAL BANK OF SLOVAKIA
EUROSYSTEM

www.nbs.sk

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Publisher
© National Bank of Slovakia 2026
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Electronic version
https://nbs.sk/en/publications/research-papers-working-and-occasional-papers-wp-op/

ISSN 2585-9269 (electronic version)

Central Bank Communication on Financial Stability – A Shadowed Sibling? The Tale of Central Europe*

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Abstract

Central bank communication on financial stability has been less studied than on monetary policy. Our paper aims to contribute to the growing literature in this area. Our focus is the region of Central Europe, where financial sectors are intertwined through close cross-border ownership, and about half of the countries are members of the euro area. Using large language models (LLMs) combined with country-specific contextual analysis, we study executive summaries of Financial Stability Reports (FSRs) published since the early 2000s by seven Central, Eastern, and Southeastern European (CESEE) central banks, as well as by Austria and the European Central Bank (ECB). We construct a novel financial stability sentiment index and document that central bank communication is strongly risk-focused, most notably in the case of the ECB. In addition, prior to the Global Financial Crisis, the Austrian central bank was much less concerned than other central banks in the region although Austria plays a pivotal role in the financial system in the region. Our analysis of the link between financial stability sentiment communication and macroprudential policy action highlights that many central banks actively use and communicate about borrower-based measures, while most countries activated non-zero counter-cyclical capital buffers belatedly or not at all. Finally, comparing central banks' communication on financial stability and monetary policy, we find that euro area national central banks and the ECB's FSR communicated about the rising risks of post-Covid inflation in a timely manner, ahead of the ECB's monetary policy communication.

JEL codes: C55, E58, E61, H12, D83

Keywords: Central banking, communication, macroprudential policy, financial policy, Central Europe, European Central Bank, euro area

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* The paper has benefitted from discussions at a high-level workshop organised by the Národná Banka Slovenska (NBS) and SUERF on "Macroprudential Communication" on June 5, 2025 in Bratislava. The authors are particularly indebted for comments and insights by Ádám Banai, Michael Ehrmann, Gaston Galos, Ernest Gnan, Adam Geršl, John Fell, Marek Ličák, Erlend Nier, Davide Romelli, Markus Schwaiger, and Benjamin Weigert. We are also grateful for separate comments from Pawel Gasiorowski, Meta Ahtik, Marija Drenkovska, Eugen Tereanu and an anonymous referee.

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Non-technical summary

Central bank communication has become a cornerstone of modern monetary policy, helping to anchor inflation expectations, strengthen policy transmission, and enhance institutional credibility. In contrast, communication on financial stability—despite being a core mandate of most central banks—has received far less attention in both research and practice. This paper addresses this gap by examining how central banks in Central Europe communicate systemic financial risks and how such communication relates to macroprudential policy actions.

The study focuses on seven Central, Eastern, and Southeastern European countries (Croatia, Czechia, Hungary, Poland, Romania, Slovakia, Slovenia), alongside Austria and the European Central Bank. These jurisdictions form a uniquely interconnected financial region due to cross-border banking ownership and the coexistence of euro area and non-euro area regimes. Using executive summaries of Financial Stability Reports (FSR) published since the early 2000s, the paper develops a new AI-based framework to quantify the tone and content of financial stability communication.

Methodologically, we employ large language models to classify sentences in FSR summaries into key systemic risk topics, such as household indebtedness, commercial real estate, banking resilience, sovereign risks, and global market developments, and assign sentiment scores reflecting whether communication signals rising or receding vulnerabilities. These topic-level measures are aggregated into a Financial Stability Sentiment Index, ranging from low to high concern. The approach improves upon traditional dictionary-based methods by capturing contextual nuance in financial stability language, where risk signals are often subtle and complex.

The analysis yields several important findings:

- Financial stability communication is persistently risk averse. Across countries and time periods, central banks overwhelmingly emphasize vulnerabilities. This may reflect the institutional mindset shaped by the failure to detect systemic risk build-up before the Global Financial Crisis (GFC). Another driver of this risk-aversion may be that prudential concerns can relate to both phases of the financial cycle: the build-up of systemic risks during boom and the materialization of these risks during the crisis/bust periods.
- There is a material heterogeneity in how negative the sentiment is across authorities. Unlike national central banks, the ECB's FSR sentiment remains continuously negative throughout the last two decades, with particular emphasis on global and sovereign risk factors.
- Banking resilience communication is often ambiguous. Compared with other topics, messages on bank soundness frequently balance transparency with market sensitivity, producing a relatively high share of unclear or neutral assessments.
- Home–host communication gaps existed before the GFC. CESEE central banks expressed stronger concerns than Austria's central bank in the pre-crisis boom period, despite Austria's pivotal role as home supervisor. After the crisis, Austrian communication shifted sharply toward greater vigilance and increased focus on the region.
- Macroprudential policy links are uneven. Borrower-based measures (e.g., LTV and DSTI limits) appear more actively used and communicated than countercyclical capital buffers, which were often activated belatedly or structurally rather than in response to cyclical sentiment shifts.
- Finally, the paper compares financial stability communication with monetary policy sentiment and finds that euro area authorities, including the ECB, flagged post-Covid inflation-related risks earlier in financial stability reports than in monetary policy communication. This suggests that financial stability frameworks may provide valuable early warning signals even when inflation experience is limited.

1. Introduction

Central banks' communication has been subject to increasing research and policy interest in the past decades. Policy communication is now well established as a core element of central banking. Communicating policy intentions and actions in a clear, timely and impactful way strengthens monetary policy transmission, anchors inflation expectations and potentially modifies behaviour. Overall, it improves central bank credibility, accountability and effectiveness.

Central bank communication research has primarily focused on *monetary policy* and inflation, and less so on *financial stability*[1], even though the latter is also a mandate of most central banks. This emphasis is understandable, given that most central banks' primary mandate is centred on price stability. The framework for monetary policy also appears more "suitable" for communication. Much has advanced since the late 1990s, and many central banks now use inflation-targeting frameworks in one form or another, which typically provide a quantitative inflation target against which performance can be objectively measured. Over time, monetary policy communication was in fact elevated to become an integral part of overall monetary policy. From the time of "no communication" at all, embodied by Bank of England Governor Montague Norman's often-cited view of "never explain, never excuse" in the early 20th century, central bank communication has become a cornerstone of monetary policy.

The development of central banks' communication on financial stability has, however, lagged that on monetary policy. In this sense, to date, financial stability communication appears to be a "shadowed sibling" of central bank communication.

Several reasons can explain this lag.

- Unlike monetary policy, financial stability does not have a simple, internationally agreed definition, nor a well-delineated and measurable target against which performance can be easily assessed. As a result, the formalization of central banks' objectives in financial stability policy is less straightforward than for inflation. Moreover, financial stability communication needs to balance transparency with market sensitivity considerations, and conflicts might arise between central banks' inflation and financial stability objectives, further complicating communication. In addition, the fact that financial stability is more closely linked to the financial cycle, while monetary policy is closely connected to the business cycle, can further complicate central bank communication on financial stability. Recent ECB research (Detken, et al., 2025) and its latest monetary policy strategy (ECB, 2025) stress, however, that financial sector resilience is a necessary condition to prevent conflicts between a central bank's price and financial stability objectives. Financial stability thus becomes complementary to monetary policy and helps the central bank deliver on its primary inflation objective. This should, in principle, also help ease the complexity of central bank communication.
- Communication on financial stability is intended to be preventative to the extent possible. An effective evaluation and communication of systemic risks may, by changing economic agents' behaviour, reduce these risks and improve the effectiveness of policy actions. However, it is not straightforward to formally assess the communication's effectiveness ex-post. Given its market sensitivity, preventive communication on financial stability can also be challenging if, for example, a risk warning triggers a bank run (Cukierman, 2009). More generally, the cost of communication mistakes – missing a crisis or issuing repeated false warnings of a crisis – can be very high.

[1] Moreover, the initial focus was on central bank communication in advanced economies (AEs). Interest in emerging market (EM) central bank policy communication has been gaining traction in recent years (BIS 2021), including a recent paper by several of us that compared monetary policy statements of 22 EM central banks with that of the Federal Reserve and the European Central Bank (Evdokimova, Nagy Mohácsi, Ponomarenko and Ribakova, 2023).

- The governance structure of financial stability is also often more complex than that of monetary policy. The central bank often carries full responsibility for financial stability. In some countries, however, this responsibility is shared with other agencies under various forms of committee structures.[2]
- Finally, the tools for financial stability are more numerous than standard monetary tools and are often difficult to explain. In addition, the targeted audience is multilayered: financial stability communication for market participants ("experts") tends to be far more technical than for the wider public ("non experts").

Despite these challenges, financial stability is critical for central banking and overall macroeconomic stability. In fact, financial stability was an original mandate of central banks at the time of their creation (Bordo & Siklos, 2017) and the Global Financial Crisis (GFC) of 2008/09 was a painful reminder of its importance. The aftermath of the GFC thus saw a rapid development of macroprudential policies and bank-specific (microprudential) regulation (Fell, et al., 2024).

Central banks/regulators deploy both micro- and macroprudential policies in order to increase the resilience of financial institutions and the financial system. Microprudential policy (supervision), aims to ensure that individual financial institutions are sufficiently resilient to withstand adverse economic and financial shocks. The key tools of microprudential supervision are capital and liquidity requirements. Macroprudential policy, in turn, aims to ensure the resilience of the entire financial system. Previous crises have shown that systemic risks can build up in a financial system, even if all or most individual financial institutions still look resilient. The two policy areas should thus be seen as complementary. Macroprudential policy uses a large number of different tools. Some resemble traditional microprudential tools, e.g. capital and liquidity requirements; others target borrowers' behaviour, e.g. loan-to-value (LTV) and debt service-to-income (DSTI) limits (Eller, et al., 2020).

In general, macroprudential tightening occurs during periods of excessive credit growth and risk taking, i.e., during the boom phase of the financial cycle. During such periods, policy tightening aims to address the build-up of systemic risks. During downturns or when risks materialize, macroprudential policy usually becomes accommodative. Macroprudential communication during such periods can be especially challenging, as it needs to balance the accommodative stance with risk materialization concerns.

Despite the lag vis-à-vis communication on monetary policy, central banks increasingly appreciate the importance of financial stability communication. As we discuss below, the BIS and the IMF drew early attention to it after the GFC, and several larger central banks started to develop their communication on financial stability as the new macroprudential regulatory frameworks evolved, and many central banks gained sole or lead roles for their country's financial stability.

The aim of our paper is to contribute to the understanding of financial stability communication and provide a set of specific policy recommendations.

Our approach's added value comes from several sources. First, we combine artificial intelligence (AI) text-based analysis (specifically ChatGPT 4o-mini and variants) with country-specific context analysis. Using AI tools allows us to do a more contextual analysis compared to the more traditionally used dictionary-based methods, such as in the seminal paper by (Correa, et al., 2021). In our view, the dictionary-based method needs an ex-ante assumption about the sentiment of the words used, but this might be tricky or ex ante not possible in the case of financial stability. For this reason, AI-based tools can provide a better contextual analysis. That said, we have also prepared, as a robustness test, a dictionary-based method in our paper (see Appendix B).

[2] In the sample of countries in our study, Austria and Poland have shared mandates for macroprudential policy with other agencies, while in all the other countries the central bank has a sole macroprudential mandate. In the case of the ECB, the SSM regulation (Article 5) assigns a macroprudential responsibility that is shared with national macroprudential authorities.

Second, we strive to provide significant country-specific contexts. We believe that the complex and often country-specific nature of financial stability risk assessment and macroprudential policy requires in-depth country knowledge. Therefore, we keep our country sample limited to a region whose financial sectors are closely intertwined. Specifically, we investigate the communication of eight central bank/financial stability authorities in Central Europe - Austria, Croatia, Czechia, Hungary, Poland, Romania, Slovakia, Slovenia - as well as the ECB. These countries' financial sectors are closely linked through ownership and lending relationships developed after the fall of the Berlin Wall in 1989.

Third, given our regional focus, we gain a glimpse into the communication record challenges of home (Austria) and host supervisors in the region, as well as national authorities and the ECB in the case of four euro area member countries (Austria, Croatia, Slovakia and Slovenia).

Our analytical approach encompasses four pillars:

(i) a sentiment analysis, i.e., building a text-based sentiment index to assess the subject and tone of central bank communication on financial stability risks;
(ii) a sentiment-based assessment of communication consistency between home and host regulators in the region of our investigation, Central, Eastern, and Southeastern Europe (CESEE);
(iii) an assessment of the correlation between communication on financial stability risks and macroprudential policy action; and
(iv) comparison between central bank communication on monetary policy and financial stability. In this we combine our results with our earlier work on monetary policy communication (Evdokimova, et al., 2023).

The rest of our paper is structured as follows. Section 2 reviews the existing literature; Sections 3 and 4 present our data set and methodology; Section 5 contains our main findings with AI-based sentiment analysis and preliminary impact assessment; and Section 6 concludes with summary and tentative lessons.

2. Literature Review

Communication on financial stability, and in general macroprudential policy, started to gain attention after the GFC. Early, policy-oriented literature shaped by the Bank for International Settlements (BIS) and the International Monetary Fund (IMF) focused on the institutional setup and the possible way to design the institutional arrangements for financial stability, including communication (Erlend, et al., 2011). Even post-GFC, however, there is high uncertainty about the state of the financial system and the effects and effectiveness of macroprudential policy. This carries two risks: acting too late (inaction bias); and choosing the wrong instrument(s) (Buch, et al., 2018). The paper argues that both risks can be mitigated if macroprudential policy is embedded in a structured policy process that defines policy objectives for macroprudential policies; chooses intermediate objectives; and links instruments to these indicators through ex ante evaluation studies. Furthermore, the effectiveness of macroprudential measures is also affected by the institutional setup. The message is clearer and more impactful when the central bank is solely in charge; or, under a multi-agency committee structure, when the central bank is in the lead. Conversely, committee-based communication, particularly when followed by individual committee member statements, tends to dilute the message (Ehrmann, 2025), (Gelos, 2025).

There are several challenges discussed in the literature that authorities face in the field of financial stability communication. First, the lack of an agreed definition of financial stability, against which the goal of macroprudential policy can be assessed. Second, the lack of a clear analytical framework for macroprudential policies. While significant progress has been made in this area, the analytical framework arguably still lags that for monetary policy. Third, the lower level of policy awareness and, related to this, sometimes outright misconceptions of financial stability risks by the public, which can give rise to political economy-type problems when policy action is needed (BIS, 2016). Specifically, the BIS argued that economic agents usually perceive financial stability risks to be low at times of credit or asset price booms – when in fact such risks typically build

up. Authorities can therefore have a tough time arguing for much needed macroprudential tightening during booms. On top of these challenges, there is a sort of time inconsistency with macroprudential measures, given that benefits arrive over the longer term, while costs can be immediate. Communication must deal with this in several ways. First, by focusing on early preventative action, rather than on – often not too effective – "early warning" methods. Second, by using specific household, audience-friendly language such as "protecting savings" or "take out insurance against risks" (Nier, 2025).

Despite being a challenge, macroprudential authorities should pay attention to the way they communicate, as there is already evidence of its impact on markets (Born, et al., 2011). The authors analyse the effectiveness of three major forms of central bank communication - Financial Stability Reports (FSRs), speeches, and interviews - on stock market returns. Building on a dataset of over 1000 releases of FSRs and speeches by 37 central banks in the period 1997-2009, they find that FSRs have a significant and potentially long-lasting effect on financial sector stock market returns. Specifically, FSR releases move equity markets by more than 1% during the subsequent month. Another important finding is that FSRs also reduce noise, as market volatility tends to decline in response to FSRs. These effects are particularly strong if the FSR has an optimistic assessment of the risks to financial stability. In contrast, speeches and interviews had little effect on market returns before the GFC but had a substantial effect during the crisis. In periods of crisis or financial stress, central bank communication has larger and more persistent effects on risk premia (Ehrmann & Talmi, 2020). Moreover, during a crisis, market reactions are more sensitive to communication on macroprudential policy than to monetary policy. There is even some evidence of monetary policy reacting to financial instability, that can be revealed via financial stability communication (Wischnewsky, et al., 2019).

As a natural consequence of the importance of the macroprudential policy communication, there are already quantitative studies available measuring the sentiment of such communication. One of the early methodologies is based on a dictionary-based sentiment index relying on predefined lists of positive and negative words in the FSRs (Correa, et al., 2021). With this dictionary, financial stability sentiment (FSS) indexes are constructed for 30 countries between 2005 and 2017. The main findings are as follows: (i) central banks' financial stability communications are mostly driven by developments in the banking sector; (ii) deterioration in the FSS is typically followed by monetary policy easing, i.e., monetary policy reacts to financial sector stress by reducing interest rates. Also, an increase in interest rates leads to a subsequent deterioration in the FSS, followed by worsening financial market indicators (iii). This implies that central banks can forewarn about increasing fragility in the system; and (iv) the sentiment in central bank communications is a useful predictor of banking crises—a one percentage point increase in FSS is followed by a twenty-nine-percentage point increase in the probability of crises (mainly driven by the GFC period in the sample).

The most comprehensive analysis of general central bank communication to date is a recent IMF Working paper, looking at the communication of 169 central banks over a long time period and along multiple dimensions: subjects; audiences; monetary regimes and country-level of development (Silva, et al., 2025). Instead of the more "traditional" dictionary method, the paper uses large language models (LLMs, ChatGPT and similar tools) for textual analysis. An innovative feature is the distinction between backward-looking and forward-looking communication, the latter forming more directly expectations. The paper finds, among others, that emerging markets (EMs) use more backward-looking analyses and advanced economies (AEs) more forward-looking ones.

A comprehensive overview of the macroprudential development in CESEE countries is provided by (Eller, et al., 2020). The authors develop an intensity-adjusted index of macroprudential policies in the 11 CESEE countries that have already joined the EU. They find that some countries implemented macroprudential policy tools even before the GFC, while others only became more active in its aftermath. In updates of the paper, the authors look at the use of macroprudential policies during the Covid pandemic (Eller, et al., 2021) and the high-inflation period starting in 2022 (Barmeier, et al., 2025). For a comprehensive overview of the macroprudential tools activated in the countries we focus on, we refer to these papers.

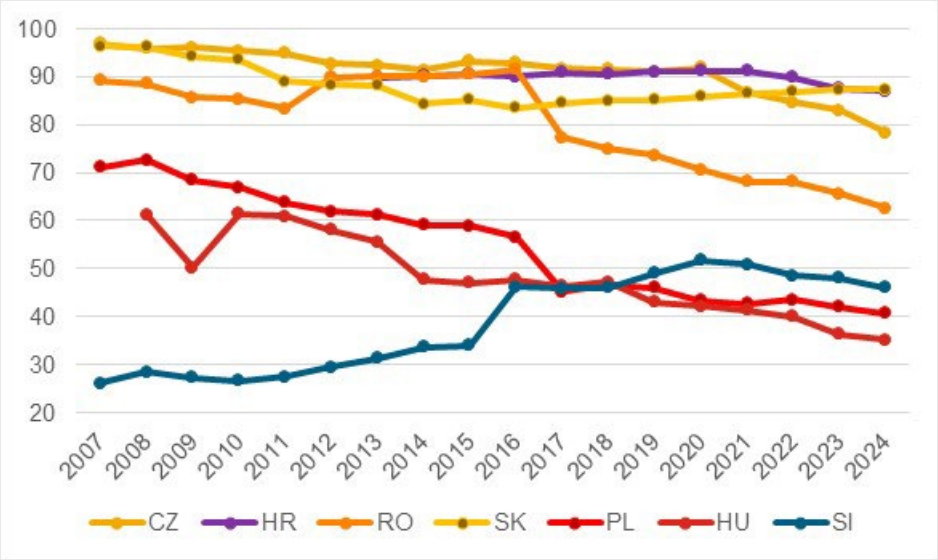
While there are papers similar in terms of the methodology used, our paper contributes to the literature in several ways. First, we focus on selected CESEE countries together with Austria and the ECB. This allows us

to compare the macroprudential communication of several countries in a home-host relationship, as many of the banks located in CESEE countries are subsidiaries or branches of Austrian banks. Furthermore, the ECB as a supervisor of significant banks adds an additional layer of complexity to the micro- and macroprudential supervisory setup in these countries. Second, by focusing on selected countries, we can provide a detailed discussion of the validity of the results by following the development of the financial stability sentiment index through different time periods including the GFC, the COVID, and the post-COVID inflationary period. We focus not only on the overall financial stability sentiment, but also on the most important sub-topics covered by the FSRs and their relationship with the macroprudential policy tools activated by the authorities covered. Finally, we combine AI text-based analysis with country-specific context analysis. Using AI tools allows us to do a more contextual analysis compared to the more traditionally used dictionary-based methods.

3. Data

We examine the FSRs of seven CESEE countries (Croatia, Czechia, Hungary, Poland, Romania, Slovakia and Slovenia), as well as Austria and the ECB.

Chart 1 Share of foreign owned banking assets
(in percent)



Source: ECB Consolidated Banking Statistics

While our country sample is relatively small, it provides a unique perspective by focusing on countries that face similar financial stability issues and synchronized policy cycles. Specifically, the CESEE region is characterized by a substantial presence of foreign-owned banks, with ownership being concentrated in the euro area and especially Austria (Chart 1). In fact, the subsidiaries of Austrian banks' account for a significant part of the aggregated balance sheet of the Austrian banking system, and Austria is the lead home supervisor for many banks in the CESEE region. That said, the GFC triggered a policy change in some CESEE countries, such as Hungary and Poland, which gradually reduced the share of foreign bank ownership to around 40 percent today. Elsewhere, foreign ownership remained or became dominant.

Regarding the ECB, prior to 2014 it did not have a formal financial stability and macroprudential policy mandate. This changed with the creation of the Single Supervisory Mechanism (SSM) in 2014. Since that date, the ECB/SSM has been the lead supervisor for the euro area's significant banking institutions, including many of our CESEE countries, and shares specific macroprudential responsibilities with the relevant national

macroprudential authorities[3]. As our sample includes the ECB and four euro area central banks, we can also examine some aspects of communication within the euro area.

Table 1 provides an overview of our sample, including the time coverage for each country. The dataset is quite rich and starts before the GFC. We collected the published statements in English, and not in the native language of the central banks. We have between 23 and 47 reports for countries in our sample, depending on the frequency of the FSR publications.

Table 1 Overview of the FSRs included in the sample

Country	Start of the sample	FSR frequency	Number of FSRs in the sample
ECB	December 2004	Semi-annual	43
Austria*	April 2001	Semi-annual	47
Croatia**	July 2005	Semi-annual till 2016, annual starting from 2017	29
Czechia	December 2004	Annual till 2017, semi-annual starting from 2018	26
Hungary	December 2003	Semi-annual	45
Poland***	August 2003	Semi-annual	41
Romania	May 2006	Annual till 2015, semi-annual starting from 2016	26
Slovakia	May 2004	Annual until 2008****, semi-annual starting from 2009	31
Slovenia	September 2004	Annual until 2015, semi-annual starting from 2016	31

Notes: * Until November 18, both summer and winter editions of FSRs contained management summary, that were used for the analysis. Starting from 2019, the winter version is divided into Recent developments and Macroprudential policy update + Special topics. In the absence of summaries, the Recent developments section (excluding content of boxes) was used as a proxy for summary.
** Croatia's dataset includes the Introduction of the FSR precursor publication in the period 2005-7.
*** The first FSR for Poland was published in August 2003 and covered the period of June 2001 – December 2002. This FSR is included in the analysis, but each FSR is labelled with the date of its publication, not the period that it covers.
**** Mid-year FSR publication became available in Slovak already in 2005, but we use only official English FSR versions.

Our study focuses exclusively on the English versions of FSR executive summaries. While the structure and length of FSRs vary across countries, the executive summaries generally follow a consistent format and thematic focus. By concentrating on executive summaries, we aim to enhance the cross-country comparability of our results, although we acknowledge that cultural differences in communication may play a role in how risk-sensitive information is presented. In our sample, we have 319 documents and 27,100 sentences to analyse over a period of about two decades on average.

Two countries in our sample, Austria and Poland, have a system of shared responsibility for financial stability with a committee-based governance structure. We investigated the case of Austria in detail, where the central bank, the OeNB, shares responsibility with the Financial Market Authority (FMA). The central bank is, however, the lead communicator on financial stability issues, whereas communication by other agencies is much more limited. In Poland, too, the central bank is the leading party in the financial stability area. Hence, we include only communication by the Austrian and Polish central banks in our sample.

[3] See the ECB Macroprudential Policy Strategy.

4. Methodology

To assess the quality of communication via FSRs we look at the content structure and sentiment of their executive summaries. Instead of the traditional dictionary-based method used (Correa, et al., 2021), our analysis relies on ChatGPT API platform primarily using the model “4o-mini.” We conduct a robustness test of our results using other models and the traditional dictionary-based approach. (see Appendix B).

The main empirical analysis consists of 5 steps:

1. Executive summaries are split into separate sentences, and a topic is assigned to each sentence, using a ChatGPT prompt. The text of the prompt is provided in Appendix A. We identify the following six typical FSR topics for classification:
   - Global economic or market developments,
   - Household indebtedness and residential real estate market,
   - Banking sector resilience,
   - Commercial real estate,
   - Sovereign and geopolitical risks,
   - Domestic economic developments.
   - Sentences that do not belong to either of these categories are aggregated in the category "Other". We discuss the content of the sentences from this category in Section 5 on our main findings.

2. We filter sentences corresponding to each topic and evaluate the sentiment of each sentence[4]. We classify sentences as neutral (sentiment score = 0), expressing strong financial stability concerns, i.e., an actual/expected deterioration in financial stability (sentiment score = 1), or weaker/limited financial stability concerns, i.e., an actual improvement in financial stability (sentiment score = -1). This sentiment analysis is performed using ChatGPT, guided by topic-specific prompts (see Appendix A). To improve accuracy, ChatGPT also receives the preceding sentence as context. Given that financial stability is a complex subject and the structure of the FSR sentences is often sophisticated, we enhance prompt precision by including definitions of what constitutes an improvement or deterioration in financial stability. Some sentences may convey an ambiguous sentiment—for example, a rise in real estate prices could be positive if aligned with economic fundamentals or negative if indicating market overheating. Regulators often clarify their interpretation of indicator dynamics within the text; when such explicit assessments are absent, we classify the sentiment as unclear. Our prompts were refined through multiple iterations, during which we manually reviewed up to 10% of ChatGPT’s initial outputs to identify recurring misclassifications. We addressed these by updating the prompts with clearer instructions targeting problematic cases.[5]

3. Once all sentences have been assessed, we calculate for each FSR the sum of the scores assigned to sentences within each topic. A high (low) score indicates that sentences expressing greater (less) financial stability concern dominate. Scores near zero may indicate either a predominantly neutral

[4] Another option would be to assess the sentiment of the whole executive summaries or respective paragraphs. While modern Large Language Models can evaluate larger context windows, there are several reasons we opted for assessing the sentiment sentence by sentence. First, the sentences in macroprudential/financial stability communication are quite complex and convoluted. It is very common to see a single sentence containing an argument and, also a counterargument. Identifying the sentiment of the whole paragraph in such a communication is very complex. Second, manual validation is more straightforward if only single sentences are evaluated; thus, we have more control over the output. Nevertheless, as we analyse the sentiment of the sentences also in the context of the preceding sentence, we capture to some extent the broader context in the executive summaries.

[5] Any remaining errors would primarily arise in sentences with highly technical details or conveying multiple complex messages.

sentiment, a balance between positive and negative sentiments, or the absence of the topic in the FSR content.

4. The score for each topic is then normalized by the total number of sentences in the FSR executive summary. This step ensures that scores are comparable across countries, accounting for the length of the report, i.e., preventing systematically higher (lower) scores in countries with longer (shorter) reports.

5. The normalized scores for each topic are summed up to obtain an overall financial stability sentiment index. Due to normalization, this index ranges from -1 (reflecting low/modest financial stability concerns) to +1 (indicating strong financial stability concerns).

Box 1 Dictionary-based vs LLM-based approach

Dictionary-based sentiment analysis relies on predefined lists of positive and negative words. This makes tone assessment relatively rigid, as classification hinges on words that are unambiguously assigned to either category. Moreover, sentences that do not contain any dictionary words are effectively excluded from the analysis, even if they convey a clear sentiment.

LLM-based sentiment analysis is more nuanced. It interprets content within its context and can therefore capture subtler messages, without automatically excluding any sentences. However, LLM outputs are harder to control: if prompt instructions are not sufficiently precise, the results become more variable and prone to error.

While the quality of dictionary-based analysis depends critically on the completeness and suitability of the underlying word lists, LLM-based results are primarily driven by the design and wording of the prompt. Given that financial stability communication is complex and multi-dimensional, we consider a flexible LLM-based approach better suited to our analysis, and our core results are based on this methodology.

Nonetheless, we also measure financial stability sentiment using the dictionaries compiled by (Correa, et al., 2021). Both approaches deliver consistent signals about turning points in regulators' sentiment and identify similar periods of heightened and subdued financial stability concerns (see Appendix B for country-specific results). For seven out of nine countries, the correlation between the two metrics exceeds 50%.

As an additional robustness check, we employ alternative LLMs (GPT o3-mini, GPT o3, Claude Sonnet 3.7, and Claude Sonnet 4). The results are consistent across models and are more closely aligned with our GPT-based estimates than with the dictionary-based measures.

5. Findings

5.1. Central bank sentiment by topic

We start our analysis by looking at the general tone of financial stability communication – the "overall message", so to speak, on the strength of financial stability concerns – over the entire period under investigation (Chart 2) as well as during a number of sub-periods (Chart 3).

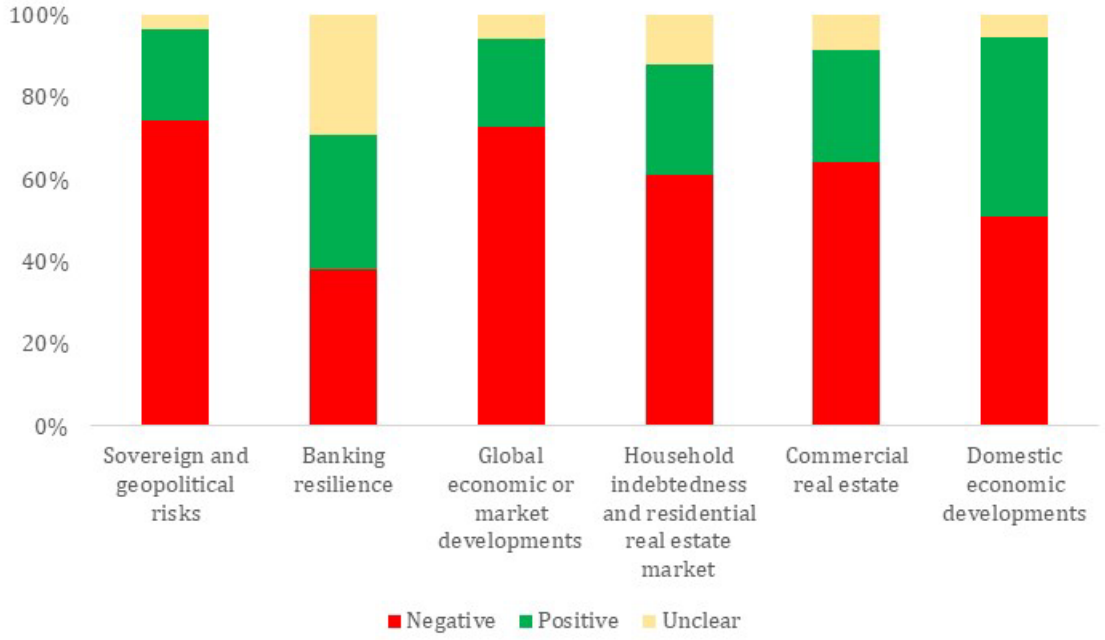
To do so we consider five sub-periods:

1. **The pre-GFC period prior to 2008** was generally characterized by insufficient policy attention to the build-up of systemic risks in the banking sectors in the US and across the world. The period witnessed financial innovation and deregulation, welcome in their own right but leading, in the absence of regulatory oversight, to excessive credit growth in many countries, including the CESEE region. It was also a period of strong cross-border lending growth without effective coordination of home and host supervisory work.

2. **The GFC in 2008-09 and the subsequent euro area sovereign debt crisis of 2011-14** saw the materialization of the accumulated systemic risks. Recession and disinflationary pressures followed for several years, and many countries, including in the CESEE region, needed IMF/EU macro-financial adjustment programs. During this period, regulators rushed to enhance their analytical frameworks for systemic risks and to deploy more and better micro- and macroprudential tools.
3. **The pre-pandemic period of 2015-19** was characterized by relative calm. Economic activity and lending recovered strongly in most CESEE countries, while regulators and supervisors continued to enhance their toolkit and – in many countries for the first time – implemented macroprudential tools as a reaction to the build-up of systemic risks related to household indebtedness and real estate prices.
4. **The acute phase of the Covid pandemic of 2020-21** saw an initial sharp downturn in economic activity and financial market valuation, to which policy responded with an unprecedented and coordinated relaxation of fiscal, monetary, and macroprudential policies.
5. **The high inflation period of 2022-24**, triggered by the rebound from post-pandemic-related macroeconomic support policies and aggravated by energy price hikes associated with Russia's war against Ukraine, led to an eventual substantial tightening of monetary policy with increases in policy and lending rates.

As outlined earlier, the nature and source of financial stability concerns reflected in the FSRs may be different in different periods. During the GFC, the euro area sovereign debt crisis, or the Covid pandemic, the main concern was the materialization of the risks that had accumulated in the financial system beforehand. The GFC and the sovereign debt crisis were followed by the introduction of a far-reaching strong macroprudential framework in the EU, yet the pre-pandemic period was mixed in terms of policy, with weak economic growth coupled with some build-up of systemic risks related to household credit growth. As a result, several jurisdictions tightened macroprudential policies in this subperiod. During the Covid period, most macroprudential authorities eased their policies as part of the concerted loosening of the overall policy mix (fiscal, monetary, and macroprudential policies).

Chart 2 Central bank financial stability sentiment by topic for the full period

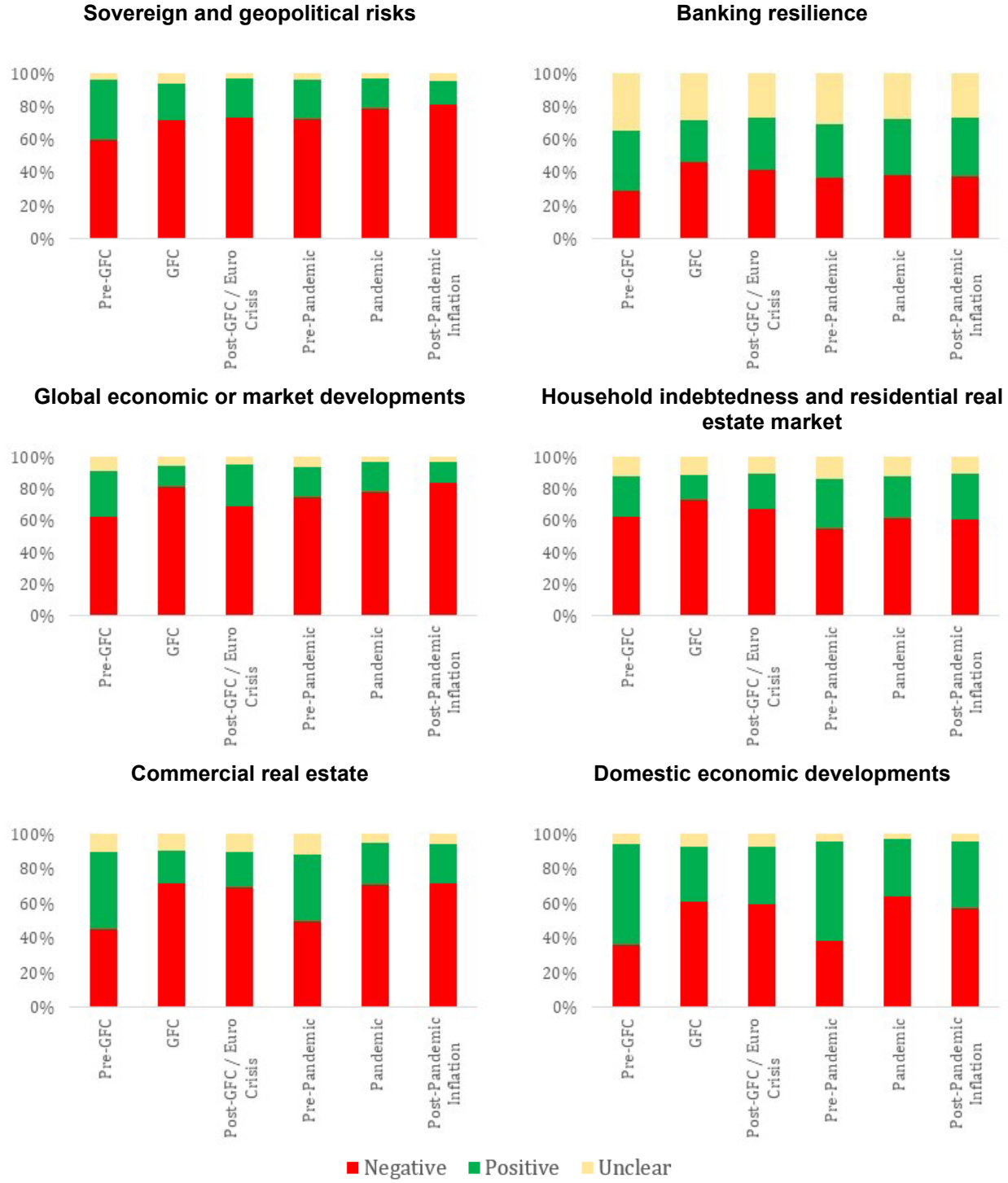


Source: authors' own calculation.
Note: Negative = strong concerns, Positive = low concerns, Unclear = ambiguous/unclear message.

Looking first at the overall period 2004-2024, a striking feature is that central bank communication on financial stability tended to signal strong concerns across all selected financial stability topics except for 'banking resilience' (Chart 2).

Net sentiment across topics and sub-periods largely corroborates this impression (Chart 3). In fact, given the considerable changes in macro-financial developments over the last 20-plus years, the stability in the sentiment across the various sub-periods is rather surprising and suggests that central bank communication on financial stability is strongly risk-averse.

Chart 3 Evolution of financial stability sentiment over time across topic components



Source: authors' own calculation.
Note: Negative = strong concerns, Positive = low concerns, Unclear = ambiguous/unclear message.

The strength of risk aversion appears to be by design, reflecting the key purpose of Financial Stability Reports, which is to assess and communicate on risks and vulnerabilities in the financial system. Given that many central banks did not signal the build-up of systemic risks in the run-up to the GFC in 2008-9, they subsequently doubled down on their efforts to detect systemic financial risks and recommend policies to mitigate them. This

is consistent with FSR communication strongly leaning towards highlighting risks rather than not emphasizing them enough (NBS and SUERF, 2025).

Across time, banking resilience appears to be an exception to this dominance of strong concerns. In fact, sentiment on the banking sector has been split roughly evenly between “negative”, “positive”, and “ambiguous” (unclear) messages over the whole period. Ex post this seems surprising, though it may be related to the delicate balance that central banks need to draw between transparency and market sensitivity considerations. Being very strongly concerned about banking resilience may turn out to be a self-fulfilling prophecy, which should obviously be avoided. Moreover, improvements in banking regulation and supervision and the rise of macroprudential policy arguably helped to make the banking system more resilient after the GFC. Nevertheless, this is an area central banks may wish to investigate when considering policy effectiveness.

Chart 4 shows the decomposition of central banks’ financial stability sentiment by topics across the entire period of our sample. Financial stability sentiment is dominated by the banking resilience topic in most countries in our sample, particularly in the wake of the GFC. This is fully understandable, given that financial sectors in the CESEE region and Europe as a whole are still dominated by banks, and that distinct systemic risks from the banking sector were behind the GFC both globally and in Europe.

That said, our analysis suggests a growing emphasis on household indebtedness in the FSR executive summaries across all countries in our sample, though somewhat less so for the ECB in relative terms. This could be linked to household indebtedness being at times a relatively stronger concern in some individual countries in our sample than in the euro area as a whole. In addition, it should be recalled that the activation and implementation of borrower-based macroprudential measures are in the remit of national authorities in the euro area.

Commercial real estate (CRE) has reappeared on central banks’ radar screens in the last five years or so, in line with that market segment’s struggle with the consequences of the Covid pandemic period. The recent intensification of communication regarding this market segment can also be influenced by recent improvements in CRE data availability, although data availability and quality still often lag behind other asset classes. Moreover, some countries in our sample lack liquid CRE markets.

The ECB’s FSR executive summary pays significant attention to global economic and sovereign factors, much more than national central banks. This seems consistent with the ECB FSR focusing on the euro area as a whole, by a wide margin the largest economic area in our sample. Sovereign risks were very much on national central banks’ radar screens during the euro area sovereign debt crisis and the Covid pandemic. More recently, however, domestic economic developments are less discussed, except in Croatia and Romania.

Finally, a relatively significant proportion of sentences is labelled as “other”. This category is highly generic and contains issues relating to the FSR’s structure, the role of macroprudential authorities, definitions of financial stability, and methodological explanations underlying the analysis.[6]

[6] Additionally, some more specific topics are also grouped here, which periodically emerge on the radar screen of regulators but do not (yet) form the core content of the FSRs. Examples include non-bank financial intermediation (15% of sentences in the “other” category, with the ECB particularly monitoring it), demographics and pension system (8.5%), climate change (3%), monetary policy (3%), payments system (2%), cyber security (1%), and digital currencies (less than 1%). The focus on climate change and cyber security increased from 2018, with Romania’s FSRs featuring the highest number of references to these two topics.

Chart 4 FSR executive summaries topic decomposition by country and ECB

(in percent)

Source: authors' own calculation.

5.2. Sentiment analysis by country/authority

This section looks at the evolution of financial stability sentiment by country, starting with the CESEE countries in our sample, followed by Austria, as the home country for an important part of the banking system in the region, and by the ECB, which takes a pan-euro area view in its assessment without generally singling out developments in individual countries.

5.2.1. Czechia

Chart 5 Czechia: Communication sentiment on financial stability

Source: authors' own calculation.
Note: vertical axes show the communication sentiment index values. Higher levels of the index correspond to more concerns about financial stability.

- Czechia's central bank has continuously communicated elevated net concerns about financial stability since the GFC (Chart 5). This reflects the specific mandate of the Czech National Bank (CNB), as well as other central banks, to stay alert, including with possible "worst-case" scenarios. As elsewhere in the region, the authorities had been caught off-guard by the GFC and subsequently mandated the central bank to be very alert to systemic risks (NBS and SUERF, 2025).
- The main concern has been about household indebtedness, and not banking sector resilience, where the authorities may have taken comfort in the fact that foreign bank subsidiaries operating in their jurisdiction have been generally well capitalized, liquid, and profitable. The central bank occasionally signalled concerns over geopolitical and sovereign risks.

- Warnings about household indebtedness spiked up during the post-Covid inflation period, when net concerns were almost as high as during the GFC. These concerns seem to have declined somewhat in recent years.
- Instead, the CNB recently increased its stated concerns about sovereign risk and, as a new factor, risks from commercial real estate.

5.2.2. Croatia

Chart 6 Croatia: Communication sentiment on financial stability

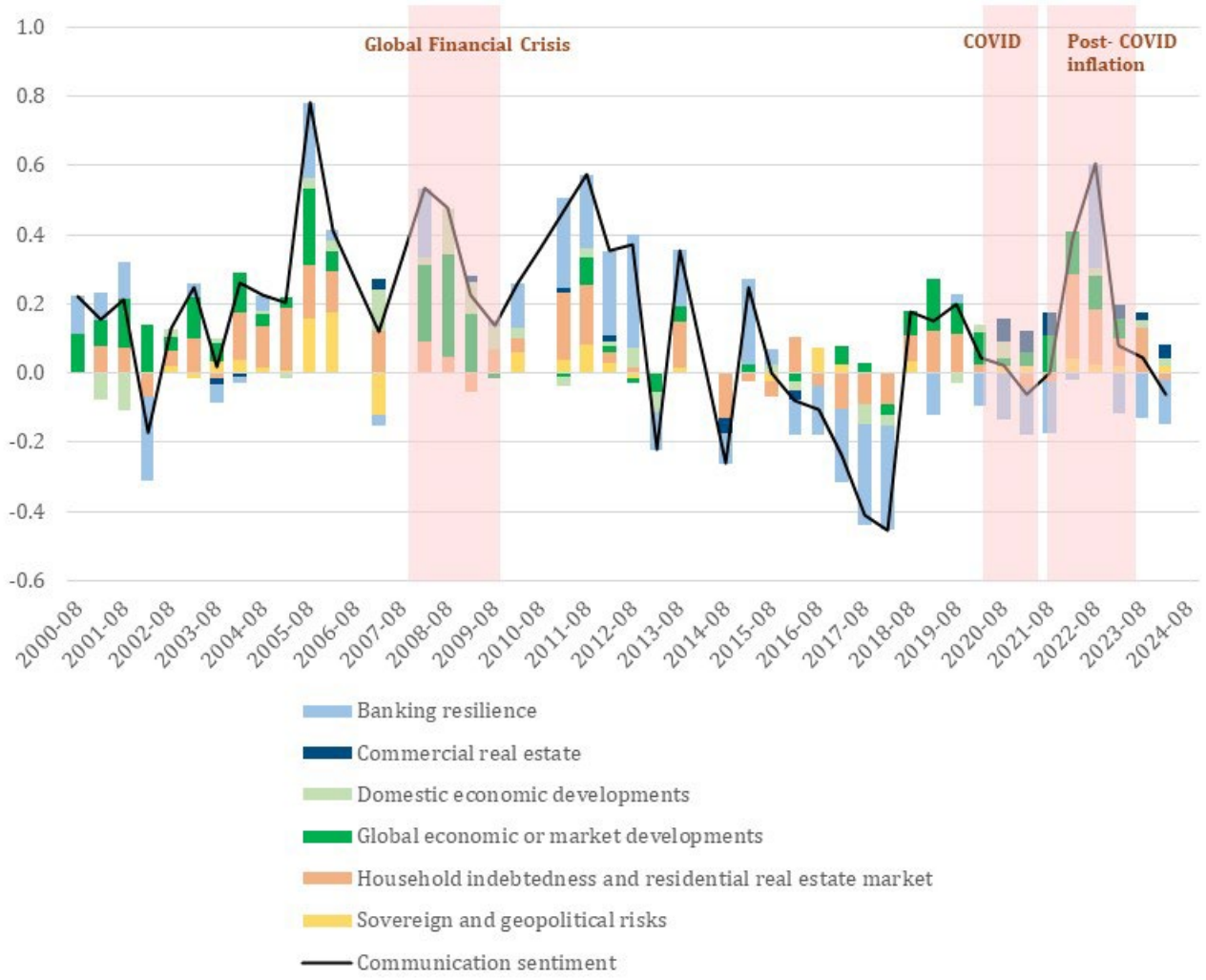
Source: authors' own calculation.
Note: vertical axes show the communication sentiment index values. Higher levels of the index correspond to more concerns about financial stability.

- Croatia did not have formal FSRs prior to the GFC (Chart 6). Instead, we included its precursor publication ('Macroprudential Analysis') from 2005 in our sample. The Croatian National Bank (HNB) was among the most active central bank regulators to take measures against excessive credit growth, particularly in foreign currency, and used a range of capital and liquidity measures to deal with FX loans already before the GFC (Eller, et al., 2020). Our communication sentiment analysis sometimes highlights these risks but not always.
- During the GFC, the main communicated concerns were global economic developments and market risks, while, in contrast to other central banks in the region, the HNB appears to have had a more relaxed view on bank resilience during most of the period. Again, this may reflect a positive assessment of the fact that most Croatian banks are owned by euro area-based parent banks.

- Sovereign risks became the key concern for the HNB shortly after the GFC and during the euro area sovereign debt crisis. The authorities clearly communicated the long-term objective of euro area membership, and the key role of fiscal parameters in the convergence process may have played a role in emphasising these risks.
- Sentiment analysis suggests a relatively low level of concern about financial stability in the run-up to and during the Covid crisis. Financial stability concerns rose, however, somewhat in the post-pandemic period, driven by household indebtedness concerns and geopolitical risks. Croatia joined the euro area/ECB in 2023.

5.2.3. Hungary

Chart 7 Hungary: Communication sentiment on financial stability



Source: authors' own calculation.
Note: vertical axes show the communication sentiment index values. Higher levels of the index correspond to more concerns about financial stability.

- Our analysis suggests that prior to the GFC, the Hungarian Central Bank (MNB) communicated concerns about financial stability from 2004, driven by a rapid rise in household indebtedness, primarily in foreign currency by unhedged borrowers, as well as global developments and sovereign risks

(Chart 7). However, as we show later in Section 5 on impact, the authorities only issued recommendations to deal with this growing problem.[7]

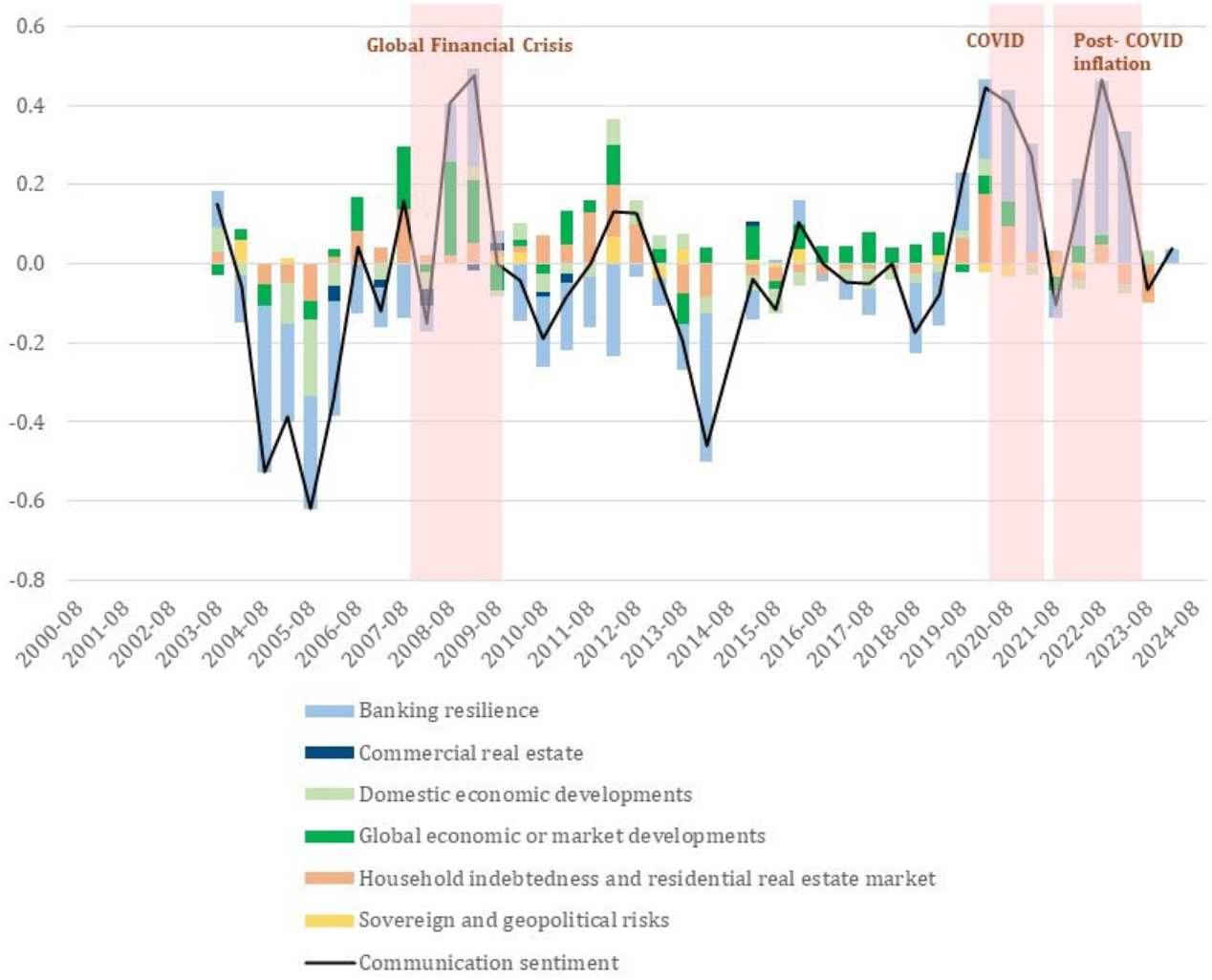
- During the GFC, communication clearly focused on concerns regarding banking sector resilience and geopolitical risks, but these subsided as the crisis was averted, with the help of an IMF-EU macroeconomic adjustment program and supported by the Vienna Initiative[8], which coordinated supervisory oversight and cross-border flows.
- After the GFC, the Hungarian authorities introduced an extensive set of macroprudential regulations with the aim of achieving a "bullet-proof" financial sector (NBS and SUERF, 2025).
- During the euro area sovereign debt crisis in 2011-2014, key euro area-based parent banks started serious deleveraging, including in their CESEE subsidiaries (and several banks withdrew altogether from the region, though not the Austrian-owned banks). Reflecting this, the MNB communicated a high level of financial stability concerns. The tone of the communication relaxed from 2014 onwards, as the crisis subsided, the European financial stability infrastructure was strengthened, and the post-GFC macroprudential measures started to bear fruit.
- In 2013, the central bank took over the responsibility for financial stability from the hitherto independent regulator. With banking sector systemic risks declining and the government taking over several banks, central bank communication about financial stability risks became more positive through 2018.
- After an initial strong increase in financial stability concerns at the beginning of the Covid pandemic, the ensuing coordinated macro policy response, including a relaxation of macroprudential tools, was reflected in a relaxation of the communication tone.
- High post-Covid inflation and spillovers from Russia's war on Ukraine, including energy price hikes and supply uncertainties, raised concerns again about banking sector stability. Hungary experienced the highest post-Covid inflation in Europe, and MNB's communication became, until 2023/24, comparable to that during the GFC and the euro area crisis.
- It is noteworthy that the Hungarian central bank has used more informal communication platforms with regard to market participants, such as regular background discussions, to explain the views of the MNB and the logic behind the steps taken. While less formal, these proved to be quite effective, particularly around stressed periods/issues of material concerns to the regulator (NBS and SUERF, 2025). This points to the effective use of "moral suasion" and communication as a preventive measure.

[7] There were several reasons for this, reflecting the nascent nature of macroprudential regulations at that time. The central bank MNB and the Supervisory Authority PSZAF had no legal tools at that time to introduce such a regulation. (Basel II had been just introduced in 2008, which meant that the first Pillar 2 discussion with banks was held only in 2008.) In early 2008, MNB and PSZÁF published a recommendation that highlighted the risks of FX lending. Another reason might have been misplaced confidence across much of CESEE in home-host supervisory arrangements and associated Memorandum of Understanding (MOUs) that proliferated in the EU before the GFC - but then proved useless during the crisis.

[8] See (EIB, 2019).

5.2.4. Poland

Chart 8 Poland: Communication sentiment on financial stability



Source: authors' own calculation.
Note: vertical axes show the communication sentiment index values. Higher levels of the index correspond to more concerns about financial stability.

- Poland has shown more variability in its sentiment on financial stability communication than most countries in our sample (Chart 8). Our analysis shows periods of relatively positive financial stability communication both before and after the GFC.
- The positive communicated sentiment before the GFC appeared to be mainly driven by a positive assessment of bank resilience. Just prior to the GFC, concerns grew regarding household indebtedness, but the overall sentiment indicator remained neutral.
- Financial stability sentiment turned sharply negative during the GFC, driven by risks in the banking sector and the global environment. As Poland managed the fallout from the GFC well–it was the only country in the region that avoided a recession and major banking sector stress–the communicated sentiment quickly relaxed again on the back of increasing comfort in banking sector resilience.[9]
- Communication subsequently remained first neutral and then turned net positive even during the euro area sovereign debt crisis.

[9] In the aftermath of the GFC, Poland purchased some major banks from foreign owners, whose share dropped from about 70 percent before the GFC to around 40 percent today (similarly to Hungary).

- Net concerns about financial stability resurfaced and spiked during the Covid and post-Covid inflation periods, including the impact of Russia's war on Ukraine, driven by concerns over banking sector resilience and, to some extent, household indebtedness. More recently, the communicated net sentiment returned to neutral, similar to several other countries in our sample.

5.2.5. Romania

Chart 9 Romania: Communication sentiment on financial stability

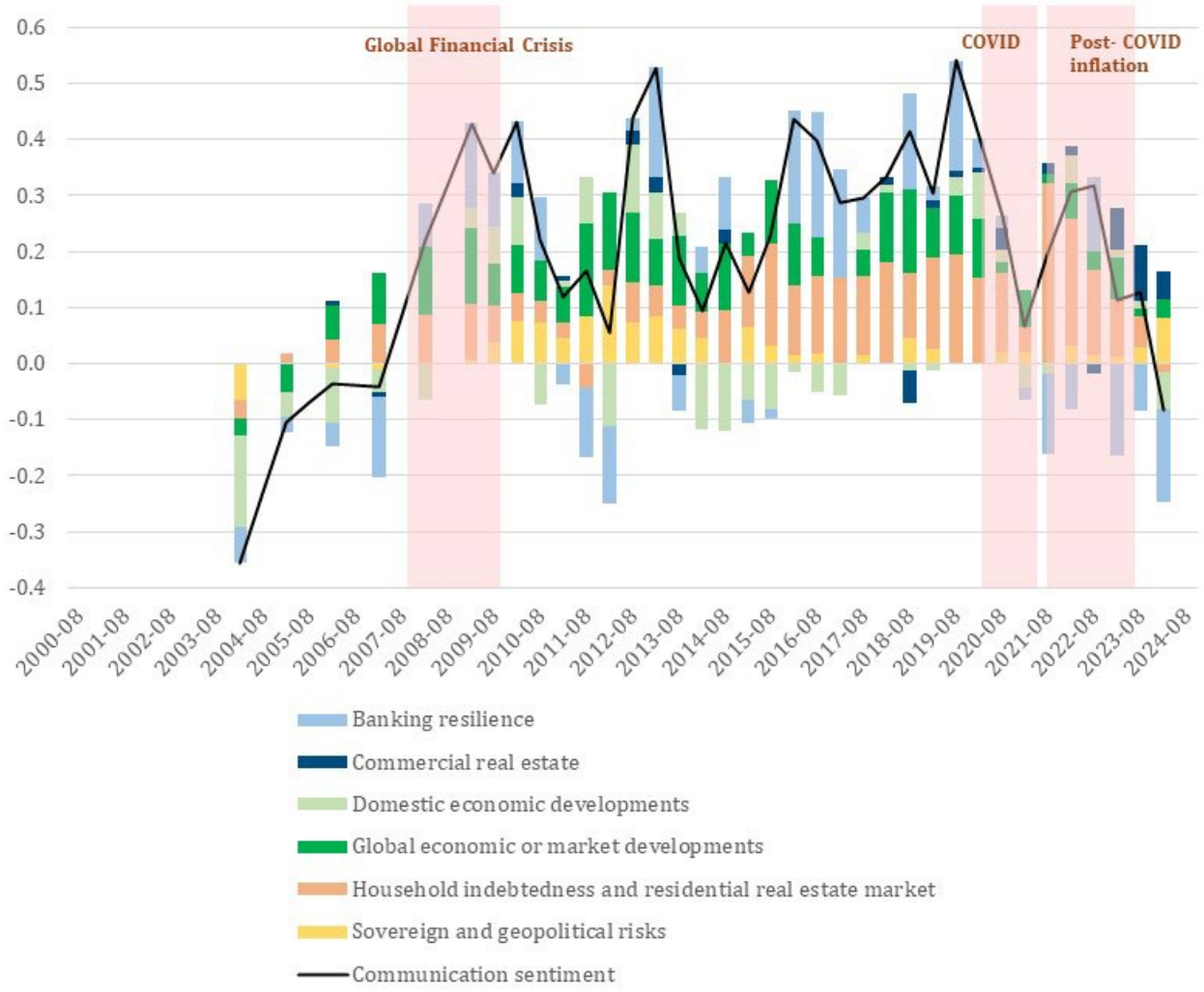
Source: authors' own calculation.
Note: vertical axes show the communication sentiment index values. Higher levels of the index correspond to more concerns about financial stability.

- Romania, like Hungary, communicated some concerns over financial stability in the run-up to the GFC. These concerns led to a rapid worsening of financial stability sentiment, which spiked as the GFC hit the Romanian banking sector hard (Chart 9). As the crisis subsided, aided by an IMF-EU macroeconomic adjustment program and the Vienna Initiative, the communication about financial stability risks was relaxed.
- After the euro area sovereign debt crisis was over by the mid-2010s, communication by the Romanian Central Bank (BNR) on financial stability risks again began to express more severe concerns. At the same time, BNR started to publish FSRs on a biannual basis. Key concerns during this period included global developments and market risks, as well as some concerns regarding household indebtedness.

- During and after the Covid period, BNR continued to communicate elevated financial stability concerns, focusing on sovereign risks; given Romania's protracted high fiscal deficits, household indebtedness, and global economics and market developments.

5.2.6. Slovakia

Chart 10 Slovakia: Communication sentiment on financial stability



Source: authors' own calculation.
Note: vertical axes show the communication sentiment index values. Higher levels of the index correspond to more concerns about financial stability.

- Slovakia's overall approach to central bank communication on financial stability appears to be similar to that of Czechia and the ECB (it has been a member of the euro area since 2009), in that it focuses on risks and maintains risk awareness across various intended audiences. Except for the pre-GFC period, the central bank's net sentiment on financial stability risks remained consistently negative (Chart 10).
- During the GFC and its immediate aftermath, concerns were driven by household indebtedness, bank resilience, and geopolitical risks. Sovereign risks appeared on the central bank's radar screen as Slovakia entered the euro area.
- Net concerns persisted through the euro area sovereign debt crisis and in fact increased afterwards, driven by concerns over household indebtedness and bank resilience in Slovakia. These concerns persisted in the run-up to the pandemic but became less pronounced during the period of coordinated policy relaxation in 2020-21, similarly to most countries in our sample.

- Net concerns rose again from 2022 in the wake of the inflation spike and Russia's war on Ukraine, and during the most recent period, the overall communicated sentiment became "neutral", reflecting offsetting views: positive on bank resilience but negative on sovereign risks (as the fiscal deficit persisted) and commercial real estate.

5.2.7. Slovenia

Chart 11 Slovenia: Communication sentiment on financial stability

Source: authors' own calculation.
Note: vertical axes show the communication sentiment index values. Higher levels of the index correspond to more concerns about financial stability.

- Slovenia already communicated concerns over financial stability prior to the GFC, mainly driven by bank resilience, household indebtedness, and domestic economic developments (Chart 11).
- Communicated financial stability concerns by the Slovenian central bank (BS) reached their peak during the euro area sovereign debt crisis, which had a rather strong impact on Slovenia and its banking system. Concerns quickly eased after the crisis subsided at the euro area level and restructuring measures were taken to address vulnerabilities in the domestic financial sector.
- The Covid period and the post-Covid inflation surge saw an increase in net financial stability concerns, but our sentiment analysis suggests that BS' concerns were not nearly as high as during the euro area crisis a decade earlier. This could be influenced by the fact that inflation in Slovenia, with a peak of below 9 percent in 2022, was much more moderate than in other CESEE countries in our sample.

- Slovenia is also unique in that BS's financial stability sentiment turned quickly and significantly positive from 2023 onwards. Based on our analysis, this improvement was primarily driven by the assessment of risks related to banking resilience.

5.2.8. Austria

Austria has a unique position in Central Europe's banking landscape, being the home supervisor of Austrian banks, whose subsidiaries play an important part in most countries in the region. Our analysis therefore focuses not only on the domestic financial stability communication of Austrian authorities, but also on the consistency of financial stability messages across the region.

Chart 12 Austria: Communication sentiment on financial stability

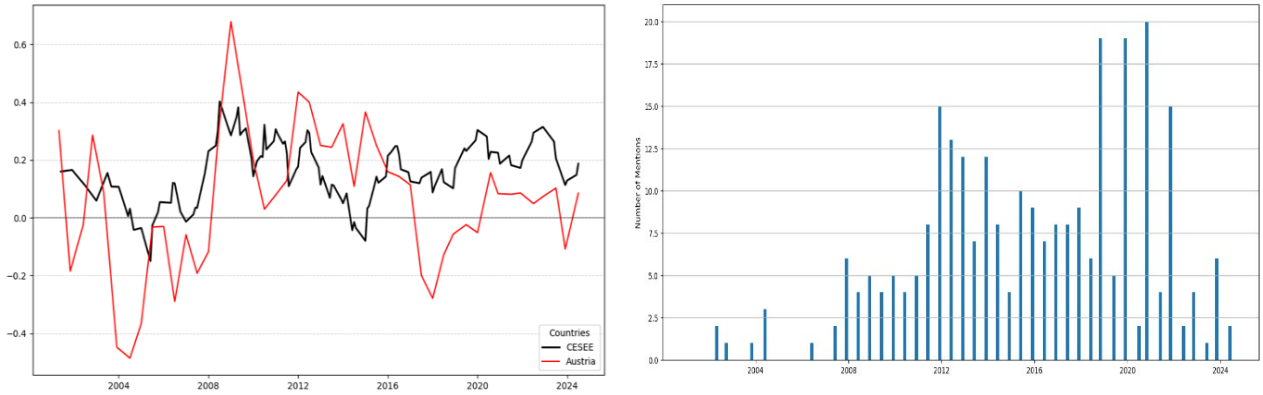
Source: authors' own calculation.
Note: vertical axes show the communication sentiment index values. Higher levels of the index correspond to more concerns about financial stability.

- The Austrian central bank (OeNB) started to publish FRSs from 2001 and hence has the longest time period and the largest number of observations in our sample (Chart 12). Having traditionally close trade and financial ties with the CESEE region, Austrian banks and businesses accelerated their engagement in the region in the run-up to 2004, when most CESEE countries were admitted to the European Union.
- The OeNB's communicated sentiment on financial stability at this time was strongly positive, owing to its confidence in banking sector resilience and positive geopolitical trends through much of the run-up to the GFC.

- During the GFC, which hit Austria and the CESEE region strongly, communication on financial stability risks quickly became very negative on the back of reversed sentiments on bank resilience and global markets. In fact, there was considerable uncertainty at the time about how the large exposure of Austrian banks in the region would affect the parent banks themselves.
- Following a short period of broadly neutral communication about financial stability in the aftermath of the GFC, net concerns emerged again during the euro area sovereign debt crisis, although Austria and the CESEE region were less affected by this crisis than by the GFC. Financial sentiment turned positive again in the second half of the 2010s, likely also reflecting enhancements in the European supervisory architecture and practice after the launch of the SSM.
- The Covid period saw a short and rather limited pickup in communicated concerns over financial stability. Financial stability sentiment during the post-Covid inflation period following Russia's attack on Ukraine remained also broadly balanced. During this most recent period, concerns over household indebtedness were offset by confidence in banking sector resilience in dealing with the shocks.

Chart 13 Comparison of Austria and CESEE central banks financial stability sentiment

Austria vs. CESEE | **OeNB communication: Frequency of reference to CESEE region**



Source: authors' own calculation.
Note: higher levels of the index correspond to more concerns about financial stability.

Looking at the consistency of financial stability sentiment across the region, we compare the communication on financial stability sentiment between the OeNB and the CESEE central banks in our sample (Chart 13, left panel)[10]. There is a striking difference in the communicated financial stability sentiment during the period before the GFC, where the OeNB was rather benign in its communication about financial stability risks, while CESEE central banks (except in Poland) flagged concerns more prominently.[11]

During the GFC, all central banks, including the OeNB, communicated severe concerns, and in fact, the Austrian central bank flagged them the most strongly. During the euro area sovereign debt crisis, the OeNB remained on average more concerned about financial stability than the CESEE central banks, but with the crisis subsiding, the SSM being established, and new macroprudential regulations kicking in, the Austrian central bank became less concerned, while its CESEE counterparts communicated more elevated risks.

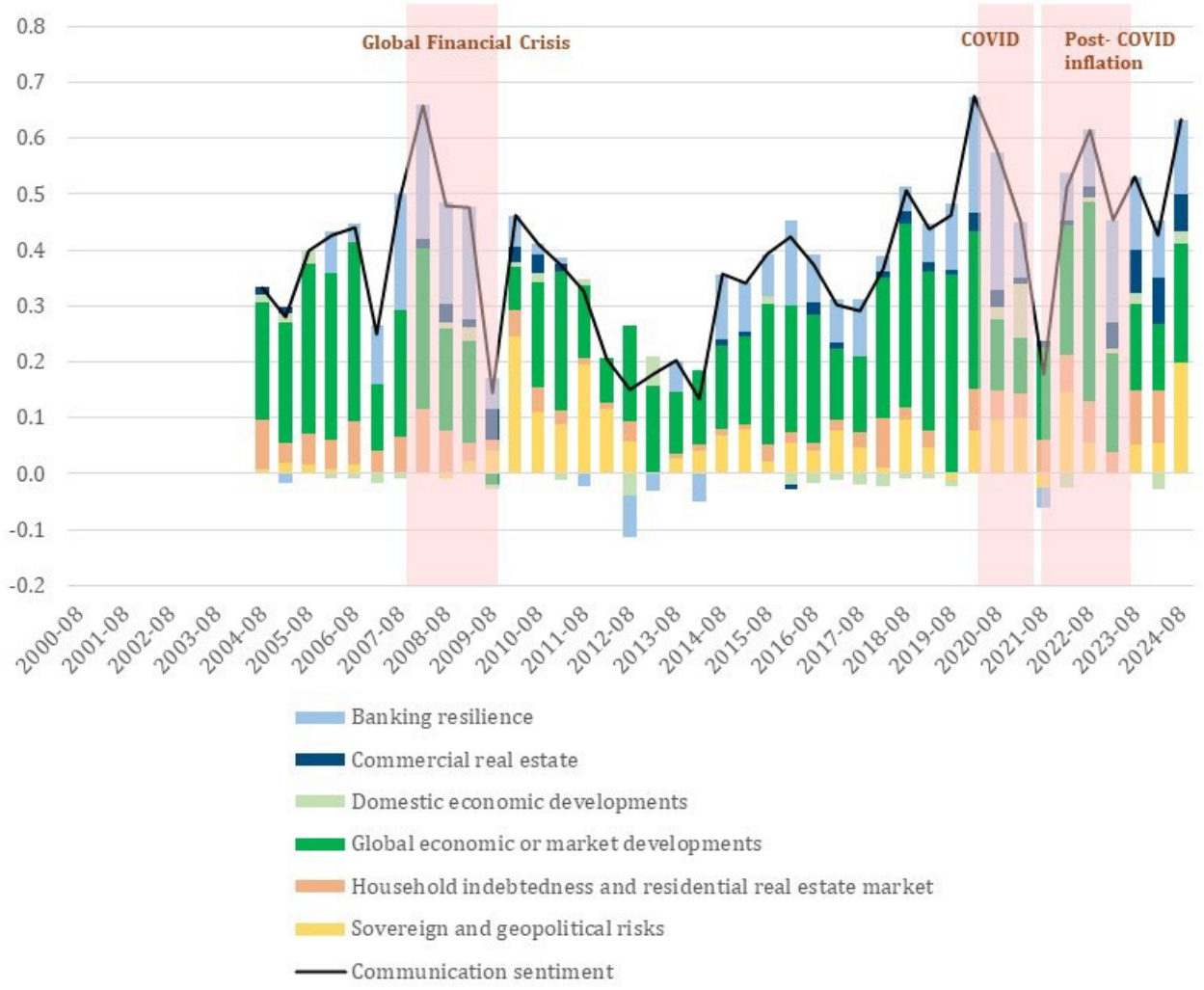
It can also be seen that the OeNB, the main Austrian authority in charge of financial stability, paid much more attention in its communication to developments in the CESEE countries after the GFC. The number of references in its FSRs to the CESEE region increased rapidly with the onset of the GFC and was particularly high during the Covid and the post-Covid high-inflation period (Chart 13, right panel).

[10] The CESEE financial stability index is calculated as a simple average of the separate CESEE countries indexes.
[11] Rating differences between Austrian banks and their subsidiaries in the CESEE region may have added to the divergent supervisory views. Parent bank ratings were typically higher than those of the subsidiaries, reflecting a host of factors including the sovereign country rating and portfolio strength in which the subsidiaries operate.

5.2.9. The European Central Bank

The ECB recently celebrated the 20th anniversary of the publication of its Financial Stability Report, and the accompanying publication provides a rich analysis of the historic evolution, key issues, and achievements of the institution in this area (ECB, 2024). Our paper focuses on some notable aspects compared with the CESEE region and Austria.

Chart 14 ECB: Communication sentiment on financial stability



Source: authors' own calculation.
Note: vertical axes show the communication sentiment index values. Higher levels of the index correspond to more concerns about financial stability.

- Compared with the national central banks in our sample, the financial stability sentiment analysis suggests that the ECB has the strongest risk aversion. Throughout the whole period of its existence, the ECB's FSR remained strongly concerned about financial stability and was never out of the "net negative" sentiment range, based on both the overall index as well as its individual components (Chart 14).
- That said, the ECB communicated its financial stability concerns most strongly around the GFC, the Covid pandemic, and the subsequent high-inflation period, sparked by Russia's war against Ukraine, post-pandemic supply disruptions, and a strong rebound in demand. In this regard, our results are consistent with the ECB's finding that their communication had some early warning properties (Fell, et al., 2024).
- Unlike in national central banks' communication, the main driver of the ECB's financial stability sentiment index is the global economic and market developments component. Moreover, there are at

times strong contributions of the sovereign and geopolitical risk component. This is understandable, given the ECB's mandate for regional oversight and its complementarity to national authorities.

- Up until the Covid pandemic, bank resilience contributed relatively less to the ECB's communication on financial stability sentiment compared to most of the countries in the sample, even after the ECB was charged with the supervision of the largest and most systemic euro area banks from late 2014. This is surprising. An explanation could be that there may be an implicit complementarity between financial stability communication by the ECB and by national authorities. Also, the ECB's macroprudential powers are limited to "topping up" certain tools (Fell, et al., 2024).

5.3. Financial stability communication vs. policy actions

Next, we consider the relationship between the sentiment of central banks' communication on financial stability and the countries' macroprudential policy actions. This is important in order to assess whether central banks' communication in this area has some leading properties for concrete policy action.

Analysing the link between financial stability communication and policy action is, however, complicated for two main reasons. First, as we discussed earlier, in the area of financial stability, central banks and supervisory authorities need to be aware of the risk that negative sentiment in communication can move markets excessively. In a worst-case scenario, it may even trigger a panic. At the same time, unduly benign communication may lull market participants into a false sense of security and contribute to a policy inaction bias. This is becoming an ever more important concern in today's digitalised world, as the 2023 US mid-size bank crisis clearly showed.

Second, an important tenet of macroprudential policy is that appropriate communication or non-binding measures can help modify agents' behaviour and eliminate the need to implement binding macroprudential measures. Under this scenario, successful communication may be sufficient to defuse financial stability risks without taking binding measures. From an analytical perspective, however, it is hard to measure success in the absence of the counterfactual (the so-called "success of non-occurrence"). There is an increasing literature on this, but here we only note this aspect.[12] Third, in some countries, like in Poland, the central bank does not have the power to initiate policy action. Hence, a one-to-one transmission of FSR communication about financial stability risks into policy action may not be direct.

With these caveats in mind, we look below at the link between financial stability sentiment and selected macroprudential measures taken in our sample countries. First, the Countercyclical Capital Buffer (CCyB) and second, borrower-based macroprudential measures (BBMs). The latter is a group of measures including Loan-to-Value (LTV), Debt Service-to-Income (DSTI), Debt-to-Income (DTI) and maturity limits.[13,14]

Given that macroprudential policy is still a relatively new policy area and that not all countries in our sample – and beyond – have used such measures actively since the beginning of our observation period, the number of instances in which macroprudential policy measures were implemented is too limited to conduct an econometric analysis assessing the strength of the link between our financial stability sentiment index and

[12] This is a complex impact question that encompasses many fields. In short, success in avoiding bad outcomes can be measured relative to plausible counter-factuals, where showing that the absence of something is linked to the policy intervention (see Angrist et al 2009).

[13] These borrower-based measure are only a subset of all types of macroprudential measures considered in the database compiled for (Eller, et al., 2020), (Eller, et al., 2021) and (Barmeier, et al., 2025). We opt for this subset as these measures are the most commonly used and comparable across countries since the legislative implementation of the macroprudential framework in the EU after the GFC.

[14] For the period since 2014, the main data source for (Eller, et al., 2021) is the ESRB Macroprudential Measures Database. The authors use mainly national data for earlier observations. The ESRB Database covers the macroprudential decisions of all EU macroprudential authorities and is regularly updated.

macroprudential policy decisions. It is possible, however, to draw some high-level conclusions based on a visual review of the overlap between the sentiment series and the policy action.

It should also be noted that the communication aspect represents only one component of the macroprudential policy process, which in itself is complex. The activation and recalibration of macroprudential instruments builds on a financial stability risk assessment, which includes both a quantitative analysis using a large set of indicators as well as expert judgement. As previously noted, the institutional setup also plays a role in policy implementation.[15]

5.3.1. Countercyclical capital buffer

First, we look at authorities' use of the CCyB.[16] This buffer, like other capital-based macroprudential measures, is primarily intended to strengthen bank resilience. We would thus assume that the evolution of the 'banking resilience' subindex of our overall financial stability sentiment index is most closely correlated with a potential CCyB change.[17] We also look at the 'household indebtedness and residential real estate' subindex, as these factors are the main drivers of the financial cycle in the countries in our sample (Chart 15).

From a policy perspective, we can observe differences in the way countries used this tool during our observation period. Slovakia and the Czech Republic used the CCyB actively during this period. Romania, Hungary, Slovenia, and Croatia kept their CCyB rates at zero through much of the observation period but moved to non-zero rates more recently. Austria and Poland[18] did not pursue an active CCyB policy throughout this period.

Looking first at the link between the communicated financial stability concerns and CCyB activation in the Czech Republic and Slovakia, our communication sentiment analysis suggests that positive CCyB rates were more directly correlated with household indebtedness and residential real estate developments than with banking resilience. For Croatia, Slovenia, Hungary, and Romania, there is no clear link with either of the two sub-indices. The activation of the CCyB towards the end of the observation period could instead be related to the fact that these and many other countries were unable to release the CCyB and other capital-based macroprudential instruments in a countercyclical fashion at the beginning of the pandemic as there was no releasable buffer activated. In other words, activating the CCyB after the acute phase of the pandemic may have been motivated by a desire to create policy space rather than to tackle negative developments in financial stability sentiment at this particular point in time (Detken, 2023; Detken, 2025). This is in line with the observation that all these countries except the Czech Republic retained the CCyB and increased it at the end of the observation period, whereas the financial stability sentiment sub-indices often declined.

[15] See (Lo Duca, et al., 2023)

[16] The CCyB index is constructed based on the decision of the home authorities. It means that it is not the bank-specific CCyB containing the weighted averages of all exposures but the country-specific CCyB, in percentages as of the decision date.

[17] While we are aware that the implementation of macroprudential policies like CCyB or BBMs is almost always communicated in some published form, these reports are not harmonized across countries and thus hard to compare. Therefore, as in the whole paper, we focus on the most harmonized communication tool, the FSR, and check to what extent the justification can be found in these reports.

[18] See NBP decision on CCBy https://nbp.pl/en/financial-system/macroprudential-supervision/countercyclical-buffer/buffer-rate/

Chart 15 Financial stability communication and CCyB-related policy

Source: authors' own calculation.

Note: green vertical line indicates the institutionalization of macroprudential policy in the EU in terms of the entry into force of the CRR/CRD IV. Non-zero CCyB rates in percentages are shown on the right-hand axes. Index values are shown on the left-hand axes.

In the case of Hungary, the central bank explicitly related the activation of the CCyB at the end of the period to the implementation of a so-called "positive neutral CCyB" framework. This is more a structural change and not related to cyclical changes in the financial sector or the real economy at the time of the activation. The national experience in the EU with positive neutral frameworks indicates a calibration range of the CCyB between 0.5% and 2% during calm periods to create macroprudential policy space during downturns.[19]

Poland and Austria display often large swings in financial stability sentiment communication, but authorities in these countries decided either that the situation was not severe enough to activate the CCyB or that other macroprudential instruments or other policy areas were more suitable to address the situation.

5.3.1. Borrower-based measures

The second set of macroprudential policy tools we consider are borrower-based measures (BBMs)[20], which are implemented with the aim of reducing the riskiness of retail loans and limiting or reduce systemic risks stemming from household indebtedness and developments in residential real estate markets. Given this purpose, it appears natural to assess how the implementation of BBMs correlates with the communication subindex related to household indebtedness and residential real estate (Chart 16).

In contrast to the CCyB, some BBMs have been implemented by all countries in our sample, except Croatia.[21] There are a number of possible reasons for this. First, research has found that BBMs are powerful tools of macroprudential policy when it comes to reducing mortgage lending growth and ensuring that PDs and LGDs for household loans, in particular real estate loans, remain acceptable from a financial stability perspective. This is particularly important in the CESEE region, where home ownership is extremely high and investments in residential real estate are often the dominant form of investment by households. Moreover, many regulators in the region missed, for one reason or another, the risks arising from the exceptionally fast credit growth that was part of the EU accession-induced convergence play in the region from the early 2000s to the GFC. Finally, BBM limits such as maximum LTV or DSTI ratios are deemed structurally necessary through the cycle by some authorities (we refer to the discussion in, e.g., (Detken, et al., 2023))[22]. This view has recently gained increasing traction among macroprudential policymakers.

We can again see some differences in the way BBMs are implemented across countries. The Czech Republic, Slovakia, Slovenia, and Romania have gradually built up BBMs during our observation period. So did Austria, which, however, started later than the other three countries. The pattern in Hungary and Poland is different. Both countries implemented measures in 2013 but made few or no changes in the level of BBMs thereafter.[23]

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[19] For more information about the positive neutral CCyB framework see, for example, Behn et al (2023) and ECB/ESRB (2025).

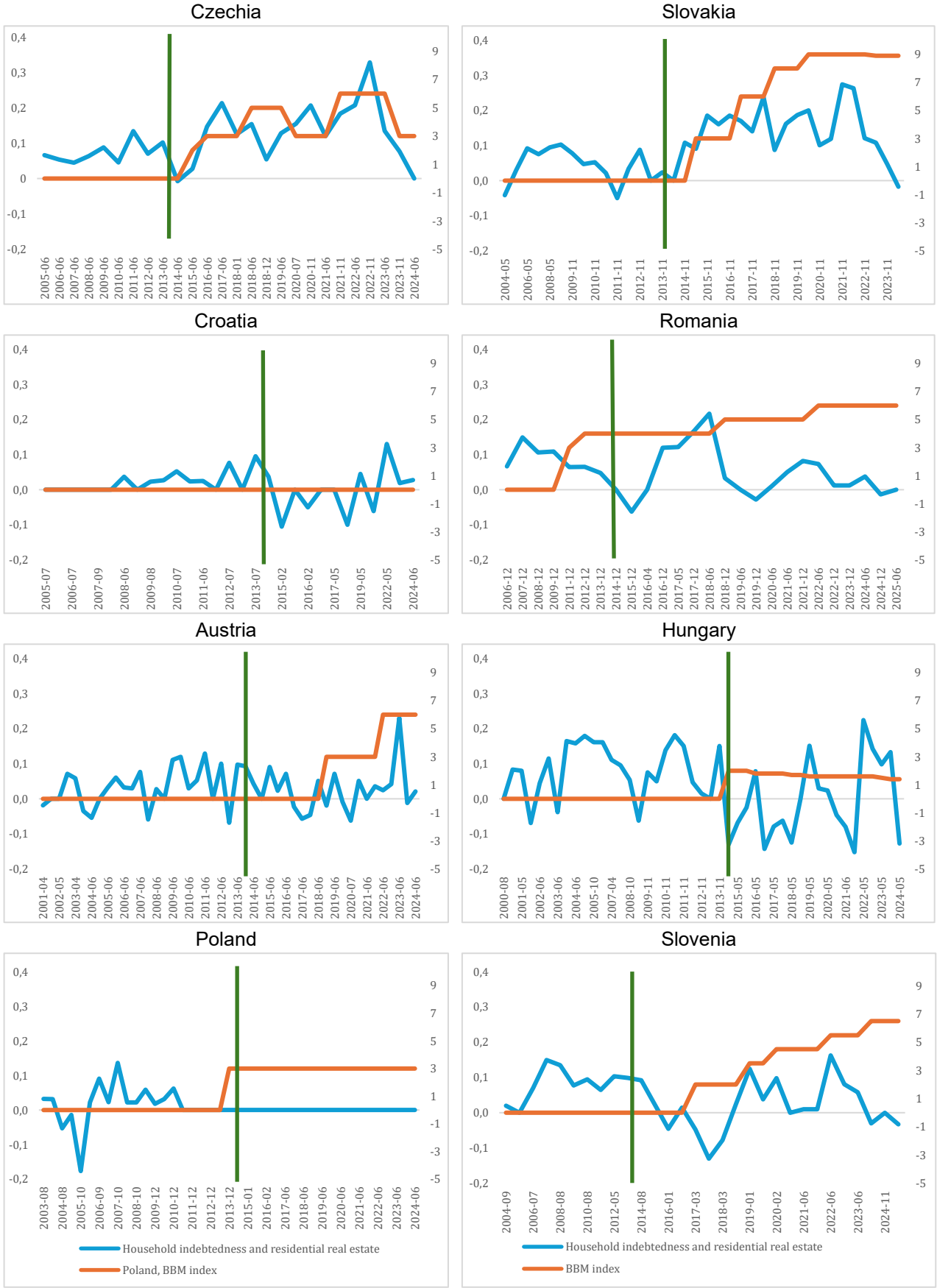
[20] The BBM index is constructed from the ESRB Macroprudential Measures Database, taking into account the date of the decision. Decisions about LTV, DTI, DSTI and maturity limits are considered. The index in only partially intensity adjusted. 1 is associated with tightening, -1 with easing of a given measure. Then, the associated numbers are accumulated across instruments and time. E.g., if there is an LTV tightening in two consecutive periods and a DTI tightening in one of these periods, the final value of the index is 3. In case there are just partial adjustments of the limit (e.g. a broadening of the measure from mortgages to consumer loans as well), the associated value is +/- 0.5 and if there is only a minor adjustment (e.g. of the exemptions coverage), the associated value is +/- 0.1. While this definition is not statistically/econometrically justified, it is satisfactory for the graphical analysis in this part.

[21] Note however that Croatia implemented LTV, DSTI and maturity limits in 2025 (these are not specifically analysed in this paper).

[22] See also the work of https://www.ecb.europa.eu/press/financial-stability-publications/macroprudential-bulletin/html/ecb.mpbu202506_02.en.html (Durante, et al., 2025).

[23] Note that Poland introduced "soft" LTV limits (ie., limits could be exceeded with documentation that risks are being mitigated) in 2011 (Bierut, et al., 2015).

Chart 16 Macroprudential communication and BBMs



Source: authors' own calculation.

Note: green vertical line indicates the institutionalization of macroprudential policy in the EU in terms of the entry into force of the CRR/CRD IV. BBM index values are shown on the right-hand axes. Communication index values are shown on the left-hand axes.

The link between the implementation of BBMs and the communicated sentiment regarding financial stability risks arising from 'household indebtedness and residential real estate' differs strongly across countries. In the Czech Republic and Slovakia there appears to be a clear link between the buildup of household indebtedness and residential real estate risks and the activation of BBMs. This has, however, changed during the last couple of years, when FSR communication in these countries indicates a decrease in these risks. In the case of Slovakia, this decrease was not followed by BBMs easing, reflecting a more structural, through-the-cycle view on BBMs. In contrast, the Czech Republic reacted with the deactivation of DTI and DSTI measures, favouring a more cyclical setting of these measures. By contrast, there appears to be a less clear overall link in Romania and Slovenia. While in general, the FSRs of these countries contain concerns about household indebtedness and the real estate markets, these are more cyclical and not always fully aligned with the policy decisions. In Austria, we see a 'front-loading' of BBM implementation before the sentiment in the OeNB FSR deteriorates sharply in 2023. In these countries, we also don't see a scaling back of BBMs, even if the communication on the commensurate risks suggests that there is an improvement, possibly reflecting the increasing evidence of their effectiveness (Durante, et al., 2025).

In Hungary, there are large swings in financial stability sentiment on indebtedness and real estate developments but, as mentioned above, BBMs are not adjusted after a 'one-off implementation' in 2013 as a response to the negative impact of the GFC. In Poland, however, the FSR does not suggest any changes in sentiment about these risks.

5.4. Financial stability sentiment vs. monetary policy sentiment

Central bank communication today covers both monetary policy and financial stability. In this section, we compare communication trends in these two areas and, to the extent possible, assess the relationship and consistency between them.

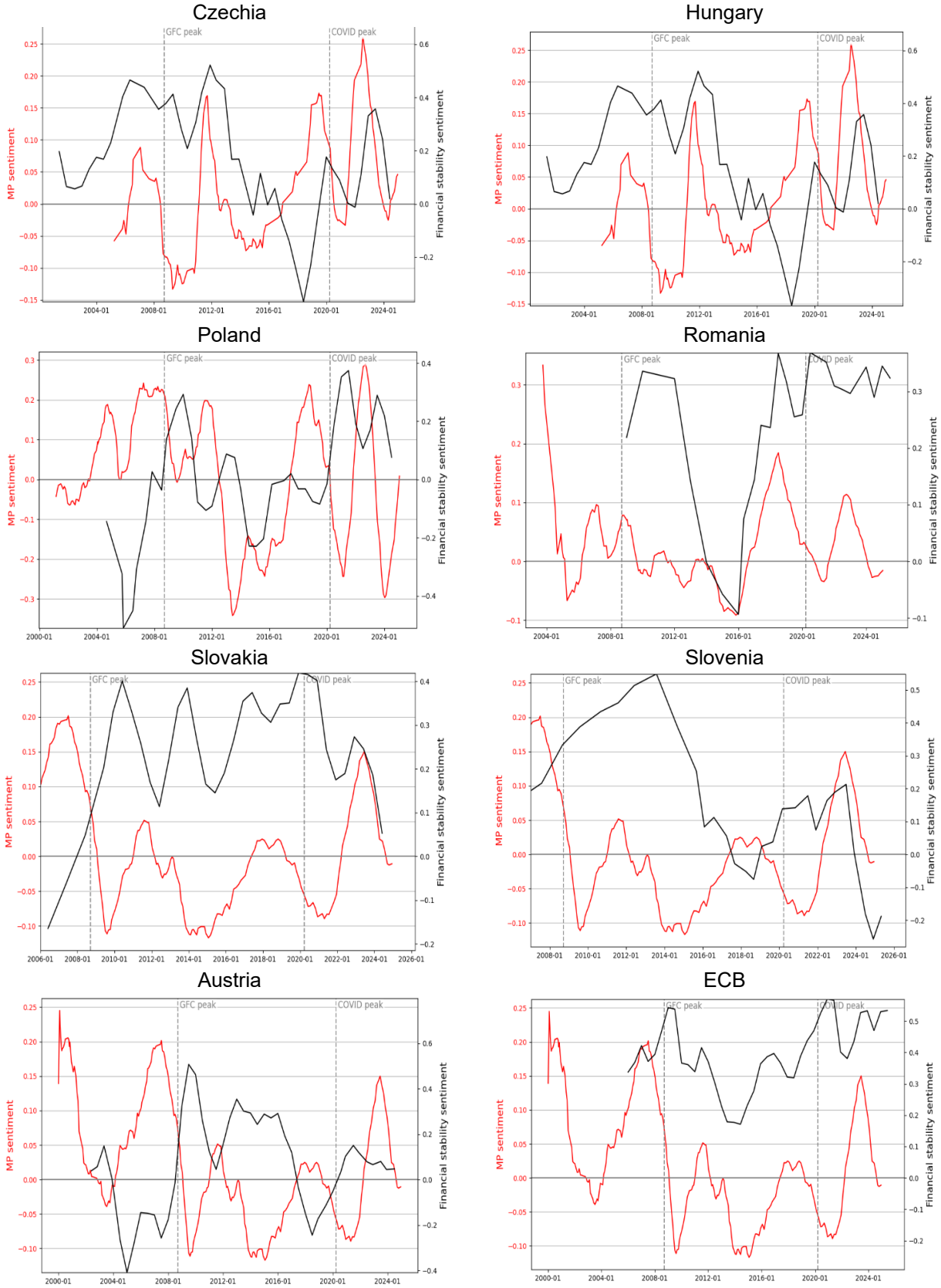
As we noted earlier, research has well established that these policies relate to two different, though naturally linked, cycles: monetary policy to the business cycle and macroprudential policy to the (usually longer) financial cycle (Constancio, 2014).

There can also be trade-offs and spillovers between these two policies. Recent research (Fell, et al., 2024) and the recently reviewed strategy of the ECB (ECB, 2025) suggest that financial stability can be seen as a precondition for an effective implementation of monetary policy. One can also say that the two policies are co-dependent on each other's effective functioning. Financial stability stress can undermine the transmission channel for monetary policy; the impact of monetary policy tightening or loosening can be better absorbed by a more resilient financial sector; and the lender-of-last resort tool of the central bank can help avert systemic stress. Moreover, reserve requirements on commercial banks, forcing them to keep a part of their deposits at the central bank, can also influence banks' profitability and financial resilience, particularly via remuneration policy, as we have seen during the post-pandemic inflation period (De Grauwe & Ji, 2023).

Our objective here is to assess the communication challenges that can arise from these two distinct but deeply intertwined policy areas. As the midsize bank crisis in the US during the Spring of 2023 reminded, treating the two areas in isolation can quickly lead to heightened systemic stress.

The first observation is immediately clear from our analysis above: central banks have a built-in risk aversion in the area of financial stability (Chart 17). Monetary policy communication changes more frequently between being 'hawkish' due to inflationary concerns and being more 'dovish' due to low inflation or even the risk of deflation. Financial stability communication stayed more concerned during the whole period, either due to risks building up or due to the potential materialization of risks. This 'risk aversion' seems to have strengthened after the GFC experience.

Chart 17 Financial stability versus monetary policy sentiment



Source: authors' own calculation.
Note: Higher value indicates more hawkishness (for monetary policy, red line) or more concerns about financial stability (for macroprudential policy, black line). The two vertical lines represent the GFC peak and the COVID peak, respectively.
Monetary policy (MP) sentiment analysis is taken from our earlier paper on the subject (Evdokimova et al, 2023). As we do not have Romania and Croatia in that analysis, these countries are not included in this section.

Second, the period between the GFC and the Covid pandemic was unique. It was characterized by the build-up, or material strengthening where it had already existed, of the macroprudential framework and toolkit. At the same time, there were increasing concerns by several central banks about the systemic risk build-up, particularly with regard to household indebtedness, particularly later in that period.

Third, during the period of highly accommodative monetary policy between the GFC and the Covid pandemic, financial stability concerns were expressed by several central banks, particularly from 2014-15 (Slovakia, Romania, as well as the ECB). This was due to the risk that loose monetary policy would result in credit booms and excessive asset price increases, particularly real estate asset prices.

Fourth, the handling of the acute post-Covid inflation period, including the energy price and supply crisis in 2022-23, was the first real test for the evolving post-GFC macroprudential system.

Looking in more detail at individual countries and country groups, we observe the following:

- In **Czechia**, the central bank signalled inflation pressures early in monetary policy communication, which in turn appears to have been appropriately reflected in an increase in the (already elevated) financial stability concerns. We see a similar reaction in **Hungary** and **Poland**, where the communicated post-Covid inflation concerns were followed by increased concerns about financial stability.
- Euro area members **Austria, Slovenia,** and **Slovakia** (and from 2023, **Croatia**), have their own sovereign financial stability sentiment communication, but also a common **ECB** sentiment on financial stability, as well as the common ECB communication on monetary policy.

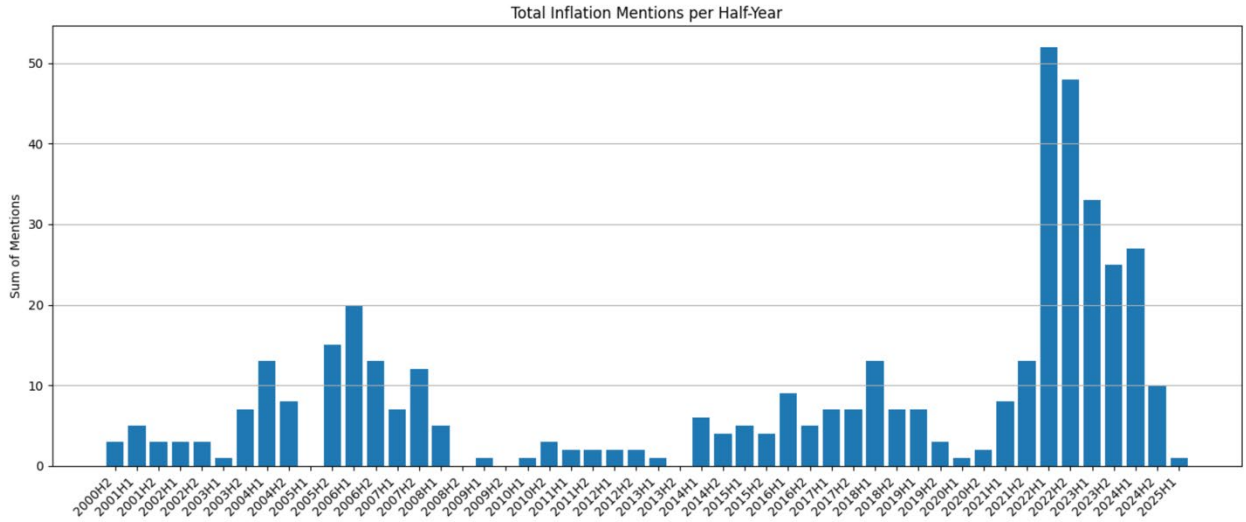
  For these countries, we observe *diverging financial stability and monetary policy sentiment communication*.

  As we have shown in our earlier paper (Evdokimova, et al., 2023), the ECB (along with the Federal Reserve and other advanced country central banks) reacted to, and communicated monetary policy concerns over the post-Covid inflation pressures with a full-year lag relative to the emergence of such pressures, and in contrast to what most emerging markets did, including the CESEE countries with independent monetary policy in our sample. Slovakia and Austria were covered by the ECB's belated *monetary policy* communication.

  In their *national financial stability communication*, however, **Austria** and **Slovenia** raised concerns for financial stability, and Slovakia maintained its high financial policy risk awareness. National financial stability views in these countries thus appear to have reacted swiftly to the range of risks prevalent at the time. Starting in 2021 and in particular in 2022, this included references to the financial stability risks posed by inflation.

  Moreover, the sentiment of the **ECB**'s own communication on financial stability risks deteriorated sharply as supply and demand pressures escalated, well ahead of its communicated monetary policy sentiment. It appears that from 2021, the ECB and Eurosystem central banks communicated their rising *financial stability concerns* in a more timely manner than their concerns about *inflation* (Chart 18). Specifically, the FSRs started referring to inflation risks in the autumn 2021 publication, and then dramatically increased this reference in the spring 2022 publication, ahead of the ECB's first interest rate increase on July 22, 2022. The ECB's monetary policy communication had started to pay attention to inflation risks before that day, but other policies in the opposite direction, such as QE and forward guidance, kept the overall monetary policy communication sentiment in dovish territory.

Chart 18 ECB FSR, number of mentions of "inflation" per publication



Source: ECB FSRs, authors' own calculation.

Further investigation is needed to understand what explains the at-times apparently non-aligned communication results in the areas of financial stability and monetary policy. Part of the story is surely that monetary policy communication is more narrowly focused on inflation, whereas financial stability communication is by definition broader and more focused on 'tail events'.

That said, other factors may have played a role too. It is reasonable to assume that the experience of the global financial crisis still loomed large in the minds of staff and policymakers, both at the national authorities and at the ECB. By contrast, advanced country central bankers no longer had a collective, real-life experience of high inflation. Moreover, the sophisticated models used by central banks at the time to inform monetary policy decisions often relied on datasets where stress episodes were largely absent. All these factors taken together may explain why Eurosystem institutions seem to have flagged financial stability concerns more expeditiously than concerns about monetary policy amid rising inflation.

Forward guidance

We also note that forward guidance as a strict, unconditional communication tool has never been used in macroprudential policy communication, in contrast to monetary policy.[24] By nature, and design, macroprudential policy is risk-focused. It means that even at times of relaxation in the communication sentiment, views are more guarded and "conditioned", perhaps in line with our earlier observation that macroprudential policy is typically "state-dependent", as discussed in Sections 5.1 and 5.2.

In this regard, macroprudential policy may have shown the way for monetary policy. Following its post-Covid failure, monetary policy backtracked on strict, unconditional forward guidance. For example, the 2025 ECB strategic review acknowledged the shortcomings of its earlier approach to forward guidance, specifically inflexibility and overcommitment, and, while keeping it in its toolkit, now puts emphasis on its more conditional nature. The US Federal Reserve's Framework Review of 2025 and the Bank of England (as early as 2021) and others also signalled a move away from "hard forward guidance" towards forward-looking signalling with forecasts based on data.

[24] Forward guidance on macropru could have entailed promise of not changing/tightening policies for a pre-determined, long period of time.

6. Summary and tentative lessons

Central banks have made major progress in creating a new financial stability framework since the Global Financial Crisis of 2008-9. Initially lagging behind the already well-established inflation-targeting framework of monetary policy, the set of macroprudential regulations and tools has undergone a fast catch-up process. Communication on financial stability has also developed substantially but has remained much less studied than communication on monetary policy. It is in this sense that we call the field of financial stability communication a "shadowed sibling" of central banks.

While recognising that communication on financial stability is inherently more complex and sometimes very difficult for both technical and political economy reasons, we share the common post-GFC belief that successful financial stability communication is critical for policymakers to contain systemic risks and avert future crises.

The ambition of this paper is to contribute to the emerging research on central bank communication on financial stability with the help of artificial intelligence tools and powerful large language models. We start with a selected group of Central, Eastern, and Southeastern European countries and Austria. Their financial sectors are closely linked through ownership and lending channels. We also include the ECB in our sample, which became the supervisor of larger systemic banks in the euro area in late 2014, receiving also a shared macroprudential policy mandate.

Our main findings are as follows:

- Communication about financial stability is risk averse. This is invariably by design, in response to the failure of to limit the build-up of systemic risks prior to the GFC. Another driver of this risk-aversion may be that prudential concerns can relate to both phases of the financial cycle: the build-up of systemic risks during booms and the materialization of these risks during the crisis/bust periods.
- In our sample, the ECB appears to be the most risk-focused central bank, never stopping voicing its "net" financial stability concerns during the past two decades. Most CESEE central banks have also been rather vocal about financial stability risks, particularly after the GFC. They are, however, more varied in the extent to which they voice concerns.
- Continuously communicating high levels of concern carries risks of its own. It is called the "crying wolf" syndrome, which may lead markets and the public to discount the strength of financial stability concerns precisely at the time when such risks are truly building up. We do not find clear evidence of this, though. The GFC's shadows still loom large and have been reinforced by subsequent shocks such as the pandemic, the post-Covid inflation shock, or the US mid-size bank crisis in the spring of 2023. And, after all, financial systems in Europe have managed a series of shocks since the GFC without a major crisis.
- The sentiment analysis suggests that the ECB placed less emphasis on bank resilience up until the Covid pandemic, in comparison with other central banks in our sample, even after taking charge of the supervision of the largest, systemically important banks from late 2014. This may be surprising and possibly linked to the nature of its shared macroprudential policy mandate, where the ECB and national supervisory authorities share complementary responsibilities. It will be important to investigate further if markets and households across Europe fully appreciate this complementarity and whether communication coordination among the various national authorities and the ECB is sufficient in this regard.
- Bank resilience is a central topic for national central banks in our sample. Yet we have found a surprisingly large share of "ambiguous" messages in national banks' statements - neither negative nor positive. This may be due to several factors, including efforts to strike a balance between risk

transparency and market sensitivity. At the same time, unclear messages can give rise to confusion and create credibility issues.[25]

- Prior to the GFC, financial stability sentiment in CESEE countries tended to be different from that of Austria, the home supervisor of many banks in that region. Communication by CESEE central banks appeared generally more concerned about banks than that by the OeNB. This changed dramatically after the GFC, when the Austrian central bank paid much more attention to the CESEE region in its policy communication.
- A visual analysis of the link between the financial stability sentiment index, mainly its component related to household indebtedness and residential real estate markets, and the activation of macroprudential policy tools indicates an association mainly in countries most exposed to the build-up of these risks before the Covid pandemic. Central bank communication around these types of measures considered (CCyB and BBMs) varies and appears to be very context/country specific.
- We also compare communication sentiment on monetary policy and financial stability of central banks in our sample. Setting aside the fact that the two policies relate to two types of economic cycles, we find that the reaction to post-Covid macroeconomic pressures has been timelier in financial stability communication (and underlying policy) than in monetary policy in the Eurosystem. The ECB and national central banks in the euro area communicated an increase in financial stability risks in a timely manner in the midst of rising risks, including those from post-Covid inflationary pressures, while communication on monetary policy reacted with a lag. This finding needs further investigation. We suspect that the experience of the global financial crisis still loomed large on financial stability staff and policymakers, much more so than the experience with the last high-inflation period. Meanwhile, central banks outside the euro area showed no inconsistency in their monetary policy and financial stability communication.
- Communication on financial stability appears to have avoided the equivalent of “forward guidance,” communication that deliberately pre-committed policy for a longer time period, thus effectively disconnecting policy from data. Of course, financial stability communication is broader and, overall, more risk-focused, yet it is noteworthy that macroprudential policy and communication have stayed flexible and data-driven all the time. The two communication styles may have recently become closer as monetary policy has moved away from the “hard” form of forward guidance towards more conditional use of forward-looking signals.

Overall, central bank communication on financial stability has come a long way since the Global Financial Crisis and, despite being central banks’ “overshadowed sibling”, it has proven credible to the markets and the public in the aftermath of the GFC, and it may even have performed better than monetary policy communication in the euro area in the post-Covid inflation period.

Our paper naturally does not cover all aspects of central bank communication on financial stability. An important missing dimension is the role of *prevention*. This is the favoured approach of macroprudential policy, in which communication should play a lead role. The optimal policy outcome is when, first, policymakers issue a warning, and then, behaviours adjust, and the anticipated negative event does not take place or is materially mitigated. However, observing and assessing such “*success of non-occurrence*” is by definition very hard. We intend to look into this area in our next phase of research.

[25] We note that central banks sometimes use other fora to send clearer messages to market participants, such as informal meetings with banks, as we mentioned earlier. By definition, we cannot test the impact of such approach.

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Appendix A Prompts for Chat GPT

1. Prompt used for assigning a topic to each sentence of FSR executive summary

   "*You are a Financial Stability Expert focusing on macroprudential policies. In this role you assess systemic financial stability risks and provide specialized insights and guidance on maintaining financial stability through a range of regulatory measures. You are able to interpret central bank communication in Financial Stability Reports with clarity and precision. You will get sentences from financial stability reports for Poland. Please assign a topic to each sentence selecting the topic from the following list:* ***"Global economic or market developments", "Household indebtedness and residential real estate market", "Banking resilience", "Commercial real estate", "Sovereign and geopolitical risks", "Domestic economic developments", "Other".*** *Use category "Household indebtedness and residential real estate market" when the focus of the sentence is household financing. Sovereign risk is determined by the public finance situation and creditworthiness of the government. "Global economic or market developments" category refers to dynamics of world economy or international financial, commodity or exchange rate markets. To qualify for category "Commercial real estate" the sentence should explicitly refer to commercial use of property. The category "Banking resilience" is broad and should include sentences describing banking sector developments, risks, bank lending trends (if not included in the category about households and commercial real estate), balance sheet. Identify only one core topic for each sentence and assign it. Please answer with the topic using the following model "Topic: ...". Use category "Other" sparingly. Here is the text:*"

2. Prompts for assessing the sentiment of sentences

   a. within "Global economic or market developments" topic

      "You are a Financial Stability Expert focusing on macroprudential policies. In this role you assess systemic financial stability risks and provide specialized insights and guidance on maintaining financial stability through a range of regulatory measures. You are able to interpret central bank communication in Financial Stability Reports with clarity and precision. Please analyse the provided sentences. ***Assess the sentiment communicated regarding global economic and market developments.*** *Does it convey concerns of the regulator or market participants regarding the situation on the global financial markets or in the world economy/main partners (negative sentiment)? Or does it provide an optimistic description of the market developments and economic conditions (positive sentiment) as viewed by the regulator or investors? Sentences implying overvaluation of assets should be treated as negative. Sentences highlighting accumulation of risk or increased probability of risks materializing should be treated as negative. When a sentence mentions stimulating policy measures without which the economy is ailing, treat this sentence as "negative" since the need for the measures implies economic challenges and weaknesses. When a sentence is generic we treat it as "unclear" sentiment. Use "unclear" sparingly. Answer "Negative", "Positive" or "Unclear" and provide your reasoning. Here is the text:"*

   b. within "Household indebtedness and residential real estate market" topic

      "You are a Financial Stability Expert focusing on macroprudential policies. In this role you assess systemic financial stability risks and provide specialized insights and guidance on maintaining financial stability through a range of regulatory measures. You are able to interpret central bank communication in Financial Stability Reports with clarity and precision. Please analyse the provided sentences. ***Assess the sentiment communicated regarding household indebtedness/residential real estate.*** *Does the sentence describe deteriorating conditions (for example, increased household indebtedness, difficulty with debt servicing, bubbles on the residential real estate market)? Or is the sentence optimistic as it reflects*

receding risks of household indebtedness or improving conditions on residential real estate market or more sustainable mortgage market conditions. When sentences about property price developments do not give sufficient context as to whether the market is overheated or recovering (for example, Transaction prices of housing in the Czech Republic grew at the fastest pace in the entire EU for most of 2017.), classify the sentiment as unclear. Answer "Negative", "Positive" or "Unclear" and provide your reasoning. Here is the text:"

c. within "Banking resilience" topic

"You are a Financial Stability Expert focusing on macroprudential policies. In this role you assess systemic financial stability risks and provide specialized insights and guidance on maintaining financial stability through a range of regulatory measures. You are able to interpret central bank communication in Financial Stability Reports with clarity and precision. ***Assess the sentiment communicated regarding banking sector resilience.*** *Does the sentence refer to increasing risks to banking sector resilience: related to the asset quality, credit risk, non-performing loans, lending activity, results of stress-tests (negative sentiment)? Or is the sentence optimistic illustrating improving banking sector resilience (positive sentiment). Answer "Negative", "Positive" or "Unclear" and provide your reasoning."*

d. within "Commercial Real Estate" topic

"You are a Financial Stability Expert focusing on macroprudential policies. In this role you assess systemic financial stability risks and provide specialized insights and guidance on maintaining financial stability through a range of regulatory measures. You are able to interpret central bank communication in Financial Stability Reports with clarity and precision. Please analyse the provided sentences. ***Assess the sentiment communicated regarding commercial real estate.*** *Does the sentence describe increasing risks: emerging commercial real estate market bubbles, strained market conditions, unfavourable trends in vacancy rates (negative sentiment)? Or is the sentiment of the sentence positive reflecting balanced market conditions, smooth market functioning, absence of imbalance between supply and demand (positive sentiment). Start your answer with "sentiment: negative", "sentiment: positive" or "sentiment: unclear". Provide your reasoning. Here is the text:"*

e. within "Sovereign and geopolitical risks" topic

"You are a Financial Stability Expert focusing on macroprudential policies. In this role you assess systemic financial stability risks and provide specialized insights and guidance on maintaining financial stability through a range of regulatory measures. You are able to interpret central bank communication in Financial Stability Reports with clarity and precision. ***Assess the sentiment communicated regarding sovereign and geopolitical risks.*** *Are these risks increasing and getting more acute: i.e. country risk premiums are increasing, investors are getting less confident in the fiscal sustainability of the country, government bond yields are rising in line with higher requested returns (negative sentiment)? Or is the sentence positive and conveying the opposite messages regarding sovereign risks (positive sentiment). Answer "Negative", "Positive" or "Unclear" and provide your reasoning. Here is the text:"*

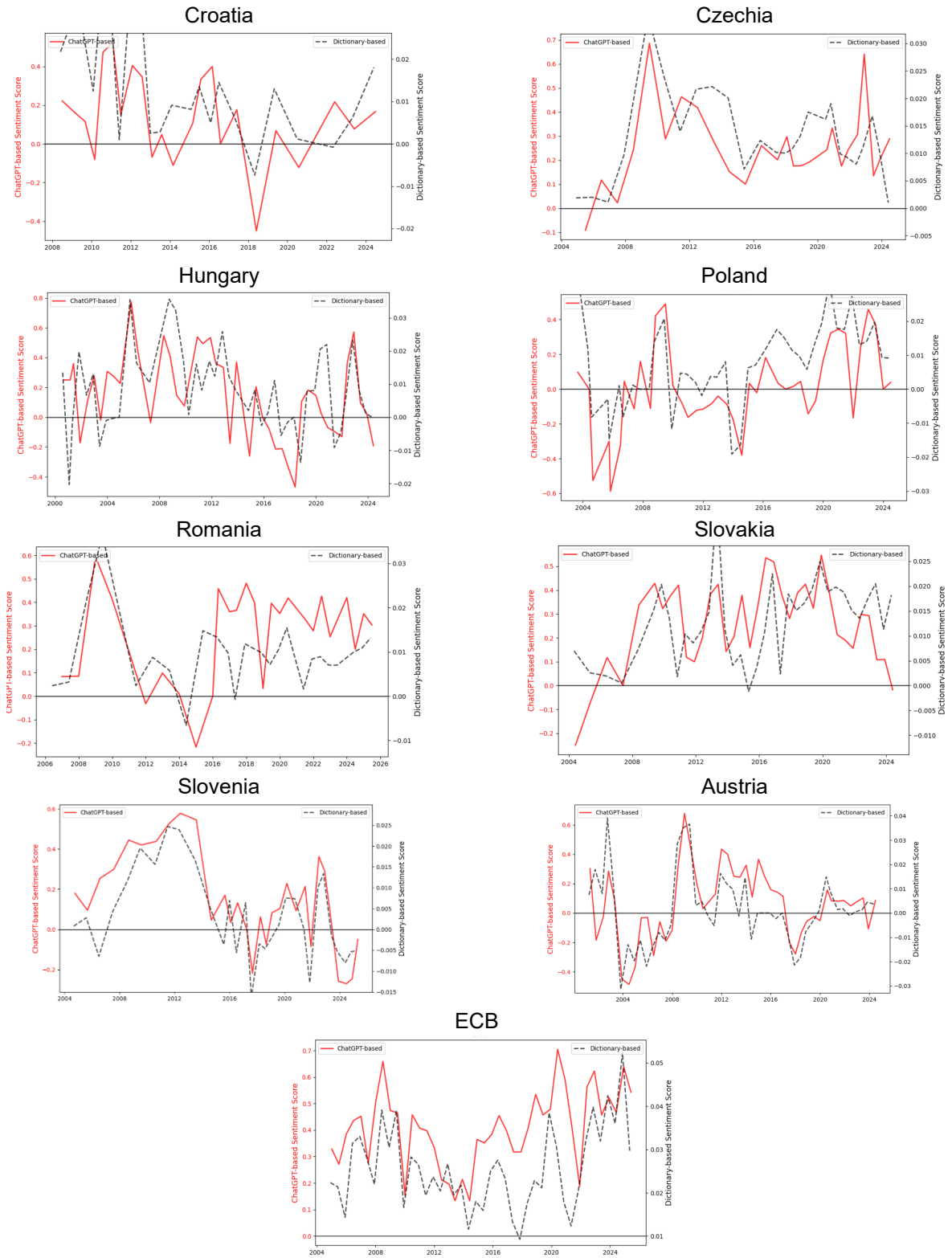
f. within "Domestic economic developments" topic

"You are a Financial Stability Expert focusing on macroprudential policies. In this role you assess systemic financial stability risks and provide specialized insights and guidance on maintaining financial stability through a range of regulatory measures. You are able to interpret central bank communication in Financial Stability Reports with clarity and precision. Please analyse the provided sentences. ***Assess the sentiment communicated regarding domestic economic conditions.*** *Does the sentence describe increasing risks: slowing growth, difficulties in the labour market, inflation pressures? Or is the sentiment of the*

sentence positive reflecting balanced economic conditions, steady stage of the business cycle, closeness of economy to external and internal balance. Evaluate the sentence in full, do not break it into excessively small parts. Start your answer with "sentiment: negative", "sentiment: positive" or "sentiment: unclear". Provide your reasoning. Here is the text:"

Appendix B Robustness check

Chart 19 executive summaries sentiment based on different methods



Source: authors' own calculation.
Note: Higher value indicates more concerns about financial stability.

As a first robustness test of our findings, we compare financial stability sentiment estimated using ChatGPT using the methodology described in section 4 with the sentiment estimated using a dictionary-based approach. The latter is in line with the methodology proposed in the seminal paper by Correa et al. (2021). The authors

compile dictionaries of 96 positive and 295 negative words using FSR texts. To create the dictionaries, the authors classify 1484 words that potentially convey sentiment into positive, negative or neutral. The classification of each word is based on 25 randomly chosen sentences that are reviewed by two independent readers.

Chart 19 shows relatively strong co-movement of the dictionary-based and ChatGPT-based financial stability sentiment indices. The correlation ranges between 38% for Slovakia and 77% for Austria. For 6 out of 8 countries correlation is above 50%. The differences in the results may stem from a more nuanced interpretation of sentences when ChatGPT is used compared to a single possible classification based on the dictionaries. Additionally, sentences not containing words from the dictionaries are de facto excluded from the analysis in the dictionary-based approach. However, some of them may convey a certain sentiment that is captured by ChatGPT-based method. What's more, most prompts in our analysis explain what we treat as positive and negative sentiment per topic. For example, when analyzing the sentiment with regard to global economic and financial developments, we specified that "sentences mentioning stimulating policy measures without which the economy is ailing, should be treated as "negative" since the need for the measures implies economic challenges and weaknesses." The interpretation might have been different in Correa et al. (2021) when they classified words into negative and positive.

Despite the differences in the output produced by two methodologies, they give consistent signals about the turning points in regulators' sentiment and identify similar periods of high (metrics above zero) and low (metrics below zero) concerns about financial stability.