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Monetary Policy Transmission in Euroized Countries: Evidence from Emerging Europe

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ABSTRACT: This paper studies domestic monetary policy transmission in European countries with a significant share of lending and deposits in foreign currency, referred to as 'euroized economies'. We find that the impact of domestic monetary policy shocks on both inflation and GDP diminishes with the degree of euroization across countries: the effects are twice as high in non-euroized countries compared to countries in our sample with the highest level of euroization. We further examine the exchange rate, credit and interest rate transmission channels, which are typically less effective in euroized economies. We show that domestic monetary policy has at best limited effects on the exchange rate. In addition, during the post-pandemic monetary tightening episodes, an increase in foreign-currency loans often softened the decline in overall credit growth, and rates of foreign-currency loans have followed the ECB policy rate rather than the domestic ones. By contrast, our analysis suggests that the pass-through to interest rates of domestic currency loans is similar across countries with different levels of euroization.

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* Florian Misch and Mengxue Wang are corresponding authors. The authors would like to thank Helge Berger, Jan Kees Martijn, Luis Brandao Marques, Donal McGettigan, Laura Papi, Anke Weber, Yan Chen, Shalva Mkhatrishvili, Yunhui Zhao, Thomas Kroen, Galip Kemal Ozhan, Kareem Ismail, Luisa Charry, Anh Nguyen, participants of the Monetary Policy Analytical Working Group in the European department and staff of the Bank of Albania and the National Bank of the Republic of North Macedonia for valuable comments.

WORKING PAPERS

Monetary Policy Transmission in Euroized Countries

The Experience of Emerging European Economies

Prepared by Wentong Chen, Fazurin Jamaludin, Florian Misch, Alex Pienkowski, Mengxue Wang, and Zeju Zhu[1]

[1] Florian Misch and Mengxue Wang are corresponding authors. The authors would like to thank Helge Berger, Jan Kees Martijn, Luis Brandao Marques, Donal McGettigan, Laura Papi, Anke Weber, Yan Chen, Shalva Mkhatrishvili, Yunhui Zhao, Thomas Kroen, Galip Kemal Ozhan, Kareem Ismail, Luisa Charry, Anh Nguyen, participants of the Monetary Policy Analytical Working Group in the European department and staff of the Bank of Albania and the National Bank of the Republic of North Macedonia for valuable comments.

Contents

1. Introduction

On the back of surging inflation in the post-pandemic period, there has been renewed interest in the effects of monetary policy on output and prices. In Europe, emerging market economies have generally faced higher inflation peaks than advanced economies. In Central Eastern and South-Eastern European (CESEE) countries that are not part of the euro area, part of the reason is likely related to limited effectiveness of monetary policy as households and firms often borrow or save in euro instead of in local currency (referred to as financial euroization).[1] This paper re-examines the effects of euroization on monetary policy transmission in Europe.

Euroization can impair the transmission of monetary policy transmission in at least two ways. First, the effective monetary policy stance does not only depend on domestic monetary policy, as the interest rates on euro loans and deposits are influenced by the ECB's policy (Moder, 2023). In other words, euroization directly undermines the interest, credit, cash flow, and balance sheet channels of monetary policy transmission when a significant share of loans and savings are in euro. Second, euroization is oftentimes a prime motivation to stabilize the exchange rate. This limits the role of the exchange rate as a transmission channel.

In addition to undermining monetary policy transmission, euroization can also lead to complex monetary policy trade-offs, at least indirectly. Given that euroization is often a prime motivation for foreign exchange interventions, it indirectly cements a monetary policy framework where the central bank pursues de facto inflation and exchange rate objectives, which can create trade-offs (Vargas and Sanchez, 2023). For instance, inflation shocks that have asymmetric effects on euroized economies and the euro area necessitate different monetary policy responses from inflation and exchange rate stabilization perspectives.

There are several empirical papers that examine monetary policy transmission in euroized and dollarized economies, and emerging market economies more broadly. Some papers show that a reduction in dollarization is often associated with stronger monetary policy transmission (e.g., Acosta-Ormaechea and Coble, 2011). Bordon and Weber (2010) find that de-dollarization can improve monetary policy transmission, especially when implemented concurrently with measures to strengthen the monetary policy framework, while Brandao-Marques et al. (2020) do not find significant effects of financial dollarization on the strength of monetary policy transmission. Similarly, Baliño et al. (1999) find no significant difference between dollarized and non-dollarized countries' ability to meet their inflation target despite the higher inflation volatility

[1] In this paper, we use the term 'euroization' and 'partial euroization' interchangeably. We consider a country as 'euroized' when the share of FX lending and deposits is significant. We recognize that strictly speaking, a euroized economy could refer to a country that has unilaterally adopted the euro and does not have its own currency.

in dollarized countries. Ize and Yeyati (2003) find that stronger credibility of the monetary policy framework can help reduce dollarization.

In this paper, we revisit the effects of euroization on monetary policy transmission using data from seven CESEE countries with independent monetary policy that have their own currency, that do not have a formal exchange rate peg, and that are partially euroized. We also use data from Norway and Sweden as regional comparator countries that have independent monetary policies (but no reserve currency) and minimal levels of euroization. While the deeper issue at stake is the “impossible trinity” of fixed exchange rates, free capital movement, and monetary autonomy, our goal is to quantify the impact of euroization on the effectiveness of specific monetary policy channels.

Using a mix of SVAR analysis and stylized facts, the paper offers two contributions.

First, we provide a framework for examining how levels of euroization correlate with the effectiveness of domestic monetary policies in influencing aggregate macroeconomic variables for euroized countries. In general, monetary policy shocks have a smaller impact on inflation and output in economies with higher levels of euroization compared to those with lower levels of euroization (although Albania and North Macedonia are exceptions). More concretely, the effects are twice as high in Norway and Sweden (our non-euroized benchmark countries) compared to Serbia (the country with the highest euroization level in our sample).

Second, we go beyond quantifying the aggregate macro impact and examine the exchange rate, credit and interest rate channels of monetary policy transmission separately. We show that monetary policy has at best limited effects on the exchange rate, which is unsurprising, given that euroized countries typically manage their exchange rates, although to varying degrees. We also find that substitution towards foreign-currency loans during the post-pandemic tightening period in some countries dampened the impact of domestic monetary policy tightening, by softening the decline in overall credit growth. In addition, there is little correlation between domestic policy rates and rates of foreign-currency loans. By contrast, our analysis also suggests that the policy rate pass-through to domestic currency interest rates is not weaker in countries with higher degrees of euroization.

We identify monetary policy shocks using sign restrictions, which use theoretical assumptions to establish exogeneity. Some of the other recent and widely used approaches to construct monetary policy shocks are not easily applicable to emerging market economies, including to the countries that this paper focuses on; see Checo, et al. (2024) for an excellent survey of the literature. Using a narrative approach, which uses central bank documents to identify monetary policy decisions that were not merely responding to economic conditions, is impractical because

of challenges posed by differences in central bank transparency and communication strategies.[2] Similarly, the high-frequency approach, which exploits interest rate movements within narrow windows around monetary policy announcements is often not applicable due to data limitations and insufficient financial market development in these economies. Data constraints also limit the use of alternative approaches applied by more recent papers to construct monetary policy shocks for all CESEE countries in our sample. For example, Checo et al. (2024) construct a novel set of monetary policy shocks for 18 emerging market economies using professional analysts' forecasts of policy rate decisions collected by Bloomberg. Deb et al. (2023) use a similar approach and show that monetary policy is more effective in countries with flexible exchange rate regime and credible monetary policy frameworks. Brandao-Marques et al. (2020) construct monetary policy shocks for 39 emerging market economies using Taylor rule residuals, but this approach does not suit countries with highly stabilized exchange rates that are included in our sample.

The structure of the paper is outlined as follows. Section 2 presents the data and some stylized facts of the countries in our sample. Section 3 describes the estimation methods and the identification strategy. Section 4 presents the findings. Section 5 concludes.

2. Sample and Country Characteristics

For our analysis, we focus on European economies outside the Euro Area without formal pegs or complete euroization. In particular, we include Albania, Czech Republic, Hungary, North Macedonia, Norway, Poland, Romania, Serbia, and Sweden for our analysis from 2007q1 to 2023q1 (for North Macedonia and Albania, the time series begins in 2012q2 and 2008q1, respectively). Norway and Sweden are not euroized but serve as benchmark countries (both are small open European economies with their own independent monetary policy, but their currencies are not reserve or safe heaven currencies).

Figure 1 illustrates the euroization levels across countries in our sample, quantified through two metrics: the share of foreign exchange loans to total loans and the share of foreign exchange deposits in total deposits. The Czech Republic and Poland have relatively low euroization levels according to both criteria compared to Romania, Hungary, North Macedonia, Albania, and Serbia. In general, there has been de-euroization in all the countries over the past decade, but euroization levels remain high in Serbia, Albania, and North Macedonia.

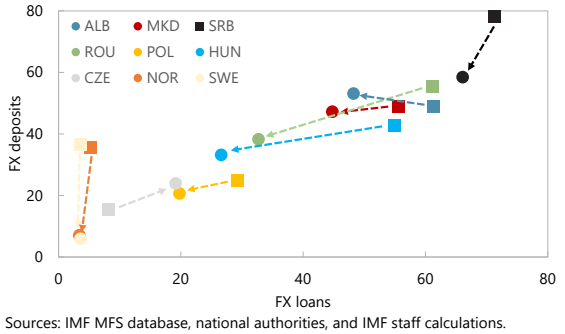
While Norway and Sweden, our two benchmark countries, are pure inflation targeters with freely floating exchange rates, the other countries differ in their exchange rate arrangements as assessed by the IMF.[3] Czech Republic and Poland—while partially euroized—are also

[3] IMF The Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER).

classified as having freely floating exchange rates. The remaining countries—which are also more heavily euroized—have floating (Albania and Hungary) or stabilized arrangements (North Macedonia, Romania and Serbia). In some countries, the exchange rate arrangements have changed over time (see Annex Table 1 for details). Figures 2 and 3 document that countries in our sample with high levels of euroization also experience relatively low exchange rate volatility, in line with the assessed exchange rate arrangements.

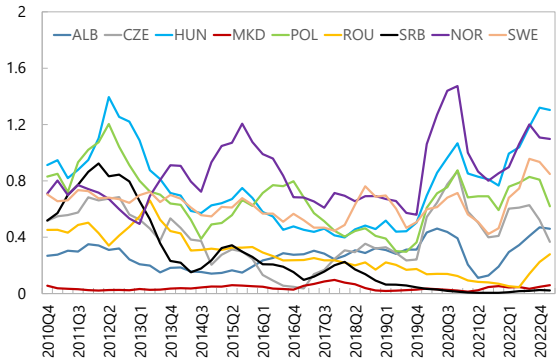
Another characteristic of the countries in the sample is their comparatively small financial sector which can also affect the effectiveness of monetary policy. As depicted in Figure 4, Sweden and Norway both have domestic credit-to-GDP ratios that exceed 100 percent. In contrast, euroized countries in our sample typically exhibit a domestic credit-to-GDP ratio of less than 40 percent. In addition, the credit-to-GDP level has not improved over the past decades for highly euroized economies.

Figure 1. Financial Euroization
(Share of total loans or deposits in FX)



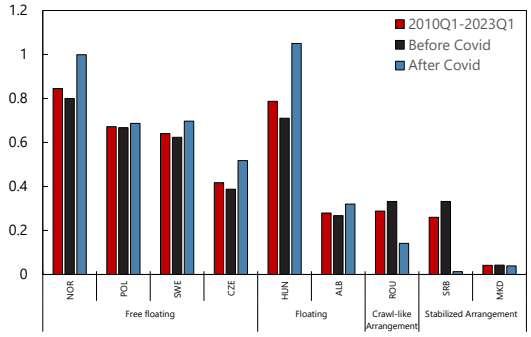
Sources: IMF MFS database, national authorities, and IMF staff calculations.
Note: ALB, MKD, SRB, ROU, and NOR show 2013Q1 vs. 2023Q1. POL, HUN, CZE, and SWE show 2012Q3 vs. 2022Q3. All reflects the latest available data. Circle means the latest available, and square means the decade ago. After a steep increase in the share of deposits in Euro, there has been de-euroization in deposits since 2019 in CZE.

Figure 2: Volatility of Exchange Rate against Euro
(Percent, 4-quarter moving average)



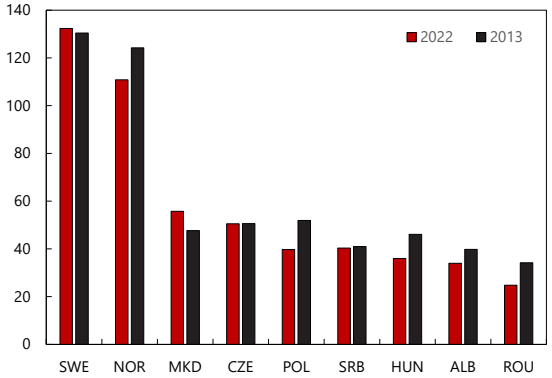
Sources: Haver Analytics and IMF staff calculations.
Note: Exchange rate volatility is calculated by taking the standard deviation over mean of the daily exchange rate against the euro.

Figure 3: Volatility of Exchange Rate against Euro
(Percent, average by period)



Sources: Haver Analytics and IMF staff calculations.
Note: Exchange rate volatility is calculated by taking the quareterly coefficient of variation of the daily exchange rate against the euro.

Figure 4: Domestic Credit to Private Sector
(Percent of GDP)



Source: World Bank World Development Indicators.

3. Estimation and Identification

Following standard literature, we use the Bayesian Estimation of the Structural Vector Autoregressive Model (Bayesian SVAR) to analyze the impact of monetary policy shocks on macro variables for each country in our sample. The joint dynamics is described by the following system of linear equations:

$$\boldsymbol{A_0 Y_t} = \sum_{j=1}^{p} \boldsymbol{A_j Y_{t-j}} + \boldsymbol{\varepsilon_t} \qquad t = 1,2, \dots \dots T \qquad (1)$$

where $\boldsymbol{\varepsilon_t}$ is a vector of exogenous structural shocks and $\boldsymbol{\varepsilon_t} \sim i.i.d.(\boldsymbol{0}, \boldsymbol{I_n})$, $\boldsymbol{A_j}$ is the matrix of parameters with $\boldsymbol{A_0}$ invertible, and p is the lag length. In the model, we include four endogenous variables $\boldsymbol{Y}_t = [y_t, p_t, r_t, e_t]$, where y_t denotes real GDP, p_t is inflation (measured by the headline HICP index), r_t is the policy rate (see Annex Table 2 for country-specific definitions), and e_t is the nominal effective exchange rates (the latter is expressed as domestic currency per euro so that an increase in e_t means domestic currency depreciation). All variables are seasonally adjusted and enter the analysis in logs (except for interest rates). Data are predominantly from Eurostat. Where Eurostat data is not available, data from Haver Analytics was used. We set the number of lags $p = 2$ based on the combined results of lag-order selection statistics, including final prediction error (FPE), Akaike's information criterion (AIC), Schwarz's Bayesian information criterion (BIC), and the Hannan and Quinn information criterion (HQIC).

To identify the structural shocks of the model, we use sign restrictions. Given that we are interested in the relevant magnitude of the impact of monetary policy shocks on macroeconomic variables across countries, sign restrictions help us restrict the relationships between variables based on established economic theory. In the baseline model, we first consider three identified shocks: demand, supply, and monetary policy shocks. Following Canova and De Nicolò (2002), Uhlig (2005), and Rubio-Ramírez, Waggoner and Zha (2010), we use the sign restrictions as shown in Table 3.

Table 3.1: Sign restrictions used for identification: the baseline model

	Demand shock	Supply shock	Monetary policy shock
GDP (y_t)	+	+	-
HICP (p_t)	+	-	-
INT (r_t)	+		+
NEER (e_t)			

A positive demand shock increases output, inflation, and the interest rate (in line with Uhlig, 2005 and 2017, and New Keynesian models). A supply shock drives output and inflation in opposite directions (Bekaert et al., 2022), while a monetary policy shock (i.e., an unexpected

increase in the interest rate) lowers both output and inflation. These restrictions are applied in the contemporary response and the first quarter response.

In a robustness check, we employ another SVAR model that includes exchange rate shocks as the fourth shock in the system. Following Conti et al. (2017), this involves imposing additional restrictions on the nominal effective exchange rate. A positive demand shock now also results in the central bank raising rates, leading to an appreciation of the exchange rate. At the same time, a contractionary monetary policy shock also results in a domestic currency appreciation. Lastly, a contractionary exchange rate shock, characterized by domestic currency depreciation, leads to increases in output, inflation, and interest rate.

Table 3.2: Sign restrictions used for identification: exchange-rate shocks identified model

	Demand shock	Supply shock	Monetary policy shock	Exchange rate shock
GDP (y_t)	+	+	-	+
HICP (p_t)	+	-	-	+
INT (r_t)	+		+	+
NEER (e_t)	-		-	+

The interpretation of results is the impact of a 100-basis point (bps) monetary policy shocks on macroeconomic variables across countries. Each country is analyzed through its own SVAR model with the same set of variables and specifications. To standardize the response of GDP, HICP, and exchange rates, we normalize these responses by the standard deviation of the identified contemporary monetary policy shocks within each country.[4]

While sign restrictions offer a flexible and theory-consistent approach to identifying structural shocks in SVAR models, the approach comes with important caveats. First, they typically yield set rather than point identification, meaning that multiple structural decompositions may be consistent with the imposed restrictions. Second, the restrictions can be weak, especially when applied to a finite IRF periods, leading to a wide range of admissible impulse responses. Third, the results can be sensitive to the choice of priors and the implementation method used to draw from the set of admissible models. Finally, as with most SVAR approaches, the method assumes structural stability over time, which may not hold in the presence of crisis such as the COVID periods.

[4] The impulse responses to a 100-bps monetary policy shock are obtained via linear scaling of SVAR-estimated responses to a one standard deviation shock. This approach assumes response linearity, which may not hold —particularly across countries— due to potential nonlinearities in macroeconomic dynamics.

4. Results

4.1 Impact on aggregate demand and prices

In this subsection, we report the effects of monetary policy shocks on prices and output by summarizing the impulse response functions across countries. Overall, we find that the magnitudes of the first-quarter responses of GDP and inflation to a 100-bps monetary policy shock are lower in countries with higher euroization levels (Figure 5). The euroization level is defined as the average share of FX loans in total loans from 2007m1 to 2023m3. We focus on responses of output and prices to monetary policy shocks over a relatively short horizon, as we find that the responses are not significant for longer time horizons, which is partly the result of sign restrictions identification.[5]

Our estimated first-quarter fall in GDP in response to a 100-bps hike in the policy rate range from around 7 percent in our benchmark countries, Norway and Sweden to 4 percent in Czech Republic, Poland, and Hungary (which have relatively low euroization levels), and 3 percent in Romania and Serbia (which have relatively high euroization levels). By contrast, both North Macedonia and Albania also show large falls in GDP despite their very high euroization levels. We discuss some potential reasons below.

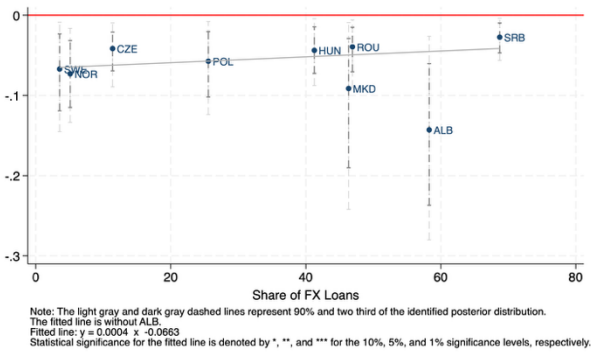
Our estimated first-quarter fall in the HICP index in response to a 100-bps hike range from 2.5 percent in Norway and Sweden to 2 percent in Czech Republic and Poland, and 1.5 percent in Hungary, Romania and Serbia, where euroization levels are higher (the response to the shock in the first period is equivalent to the quarter-on-quarter percentage change in the HICP index shock relative to period 0 which is the steady state before the shock). Again, in Albania and North Macedonia, the decline in inflation is in between Poland and Romania, despite having higher euroization levels. Country-by-country impulse response plots for each country are provided in the Appendix.

The magnitudes of the responses of GDP and the HICP index, although seems to be large, are mostly in line with the literature. Ramey (2016), in a summary of findings of past works, reported a range of the trough effect of a 100bps interest rate increase ranging between -0.7 and -5 percent both for output and prices. Conti et al. (2017) use a similar approach and find that a 100-bps monetary policy shock reduces GDP and HICP by around 2-3 percent. The large magnitudes of the response to shocks could be attributed to the size of the shock being 100-bps, given that the standard deviation of monetary shocks across countries ranges from 5-bps to 25-bps, see the IRFs in Annex III.

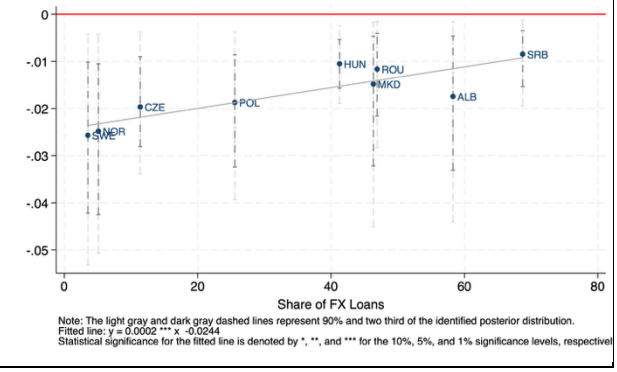
[5] Please see Annex III for the full IRFs for each country in the sample.

Figure 5: First Quarter Responses to Monetary Policy Shocks: Baseline Model

Panel A: GDP Responses



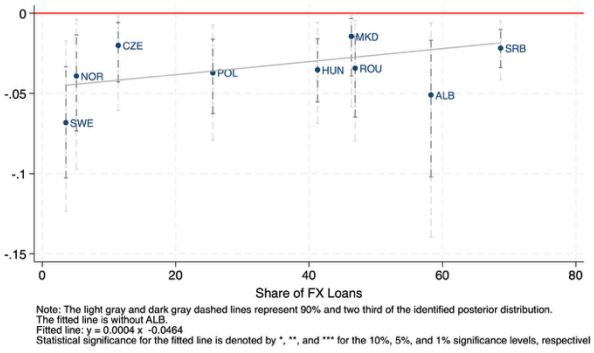
Panel B: Inflation Responses



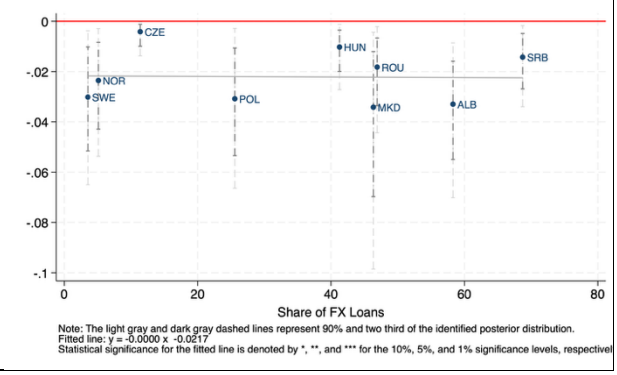
In Figure 6, we report second-quarter responses (and report responses over longer time horizons in the Appendix). Overall, the changes differ less by euroization level, and the fall in GDP is generally smaller. The fall in GDP is mostly smaller in euroized countries, including North Macedonia. With respect to the HICP index, there is no clear pattern: While Norway and Sweden are among the countries with the largest second-quarter effects, the magnitudes are similar in countries with financial euroization.

Figure 6: Second Quarter Responses to Monetary Policy Shocks: Baseline Model

Panel A: GDP Responses



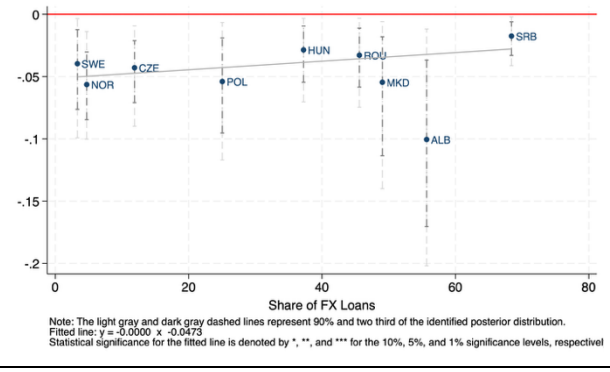
Panel B: Inflation Responses



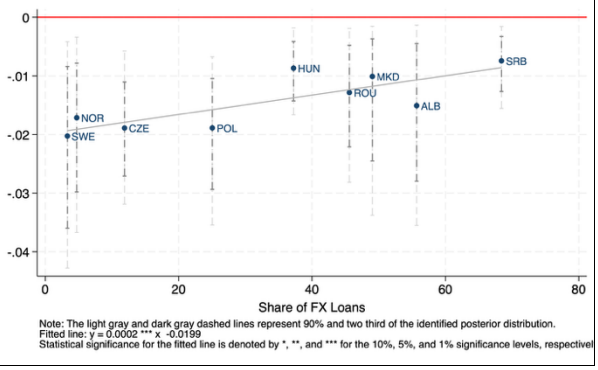
As a robustness check, we present the impulse responses of GDP and HICP using the exchange rate shock-identified model in Figure 7. In analogy to the baseline results, the first-quarter effects of monetary policy shocks on GDP and inflation are inversely correlated with the level of euroization. Again, the effect on GDP and inflation in Albania and North Macedonia are larger than their level of euroization would suggest, similar to the baseline model.

Figure 7: First Quarter Responses to Monetary Policy Shocks: Exchange Rate Shock Identified Model

Panel A: GDP Responses



Panel B: Inflation Responses

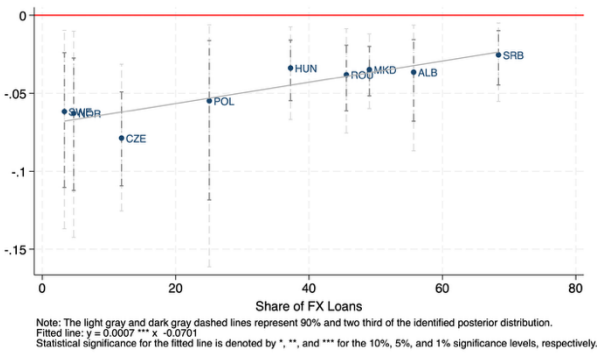


We now turn to the analysis of three transmission channels that could help explain the differentiated effects of monetary policy shocks depending on the euroization levels including the exchange rate channel, the credit channel, and the interest rate channel.

4.2 Monetary policy transmission through the exchange rate

We examine how the exchange rate responds to monetary policy shocks. Figure 8 shows the first-quarter response of the exchange rate to a monetary policy shock. The movement of the exchange rate in response to monetary policy shocks also shows a correlation with the levels of euroization, with countries that have lower euroization levels showing a larger response of the exchange rate to monetary policy shocks. This could, in part, explain our results in the previous subsection.

Figure 8: Exchange Rate First Quarter Responses to Monetary Policy Shocks



Of course, the finding that the exchange rate responds less to monetary policy shocks in more euroized economies is not the direct result of euroization. As discussed above and shown in Figures 2 and 3, euroization often prompts countries to stabilize their exchange rates to the euro.

4.3 Monetary policy transmission through the credit channel

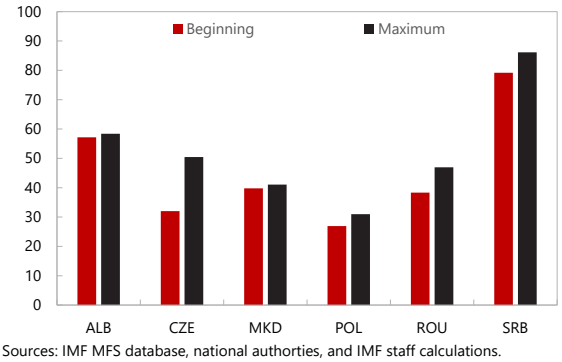
In this subsection, we examine credit growth during the post-pandemic tightening cycle. In general, monetary policy transmission in euroized economies can be impaired if firms and

households switch to FX loans during tightening episodes as the interest rate differential to other central banks widens. As a result, overall credit growth could slow less than in non-euroized economies where lending in FX is not common. This could be yet another explanation of our estimated effects of monetary policy shocks on output and prices and their differences across countries.

Stylized facts in the wake of the pandemic are consistent with this hypothesis. We focus on loans to non-financial corporations (NFCs) due to data availability and because, in some of the countries in our sample, households' access to FX loans has been somewhat restricted through macroprudential measures. After the pandemic, the euroized countries in our sample started their tightening cycle before the ECB did. Figure 9 suggests that, at least in some of the countries in our sample, the share of FX loans to total outstanding loans to NFCs increased significantly. For instance, in Czech Republic, the peak increase in the stock of NFC loans since the beginning of the monetary policy tightening in 2021 amounted to 20 percentage points.

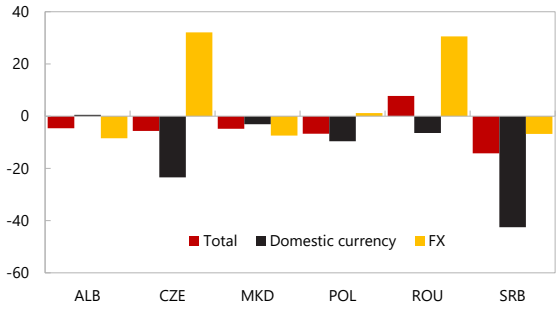
Figure 10 examines the real growth of credit to NFCs in local and foreign currency during the post-pandemic tightening cycle. In all countries except Albania and North Macedonia, NFC loans in FX grew more strongly (or declined less) than loans in domestic currency. In Romania, which is the most extreme case, the combination of strong growth of FX loans and a relatively large initial share of FX loans implied that total NFC credit grew during the post-pandemic tightening cycle, despite the contraction of NFC loans in domestic currency.

Figure 9: Loans to NFCs in FX during the Post-pandemic Tightening Cycle
(Percent of total NFC loans)



Sources: IMF MFS database, national authorties, and IMF staff calculations.
Note: The first bar in each country shows the share of NFC FX loans in the beginning of the cycle, the second shows the highest share of NFC FX loans until mid 2023.

Figure 10: Growth of NFC Loans during Post-pandemic Tightening Cycle
(Cumulative real growth in percent)



Sources: Haver Analytics, Eurostat, and IMF staff calculations.
Notes: For the purpose of this exercise, we only use data from the post-pandemic hiking cycle and truncate the data for each country in the month of the first rate hike until three months after the last hike (or the first rate cut or the end of our sample, whatever is shorter).

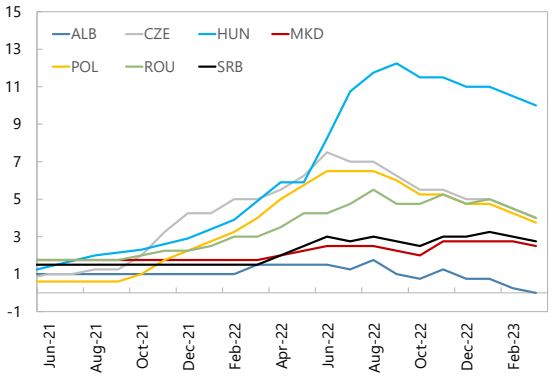
This heterogeneity across countries could be driven by variation in the differences between the domestic and ECB policy rates which in turn determine the differences between domestic and foreign currency loan rates. Figure 11 shows that the difference between the domestic and ECB policy rates in the post-pandemic period was lowest in Albania, followed by North Macedonia

and Serbia, which are also the most euroized economies (and North Macedonia and Serbia have the most stabilized exchange rates which could explain the relatively high correlation between their domestic and the ECB policy rates). Figure 12 shows that in the case of Albania and North Macedonia, this resulted also in relatively low differences between domestic and foreign currency loan rates.

4.4 Monetary policy transmission through the interest rate channel

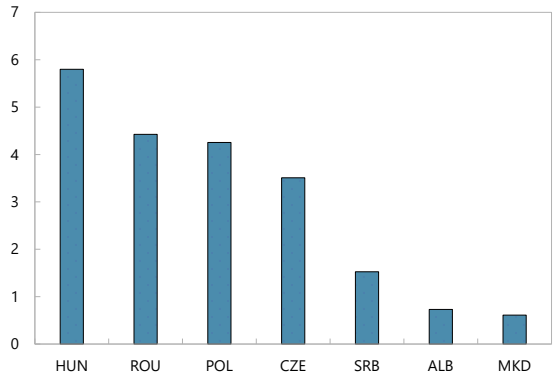
In this subsection, we examine interest rate pass-through, which measures the sensitivity of bank interest rates on loans and deposits to changes in policy rates. This is another transmission channel through which monetary policy affects financial conditions, and thereby output and prices; in other words, the extent of pass-through of monetary policy rate changes to bank interest rates therefore affects monetary policy effectiveness; see Beyer et al. (2024) for a more detailed discussion and stylized facts of policy rate pass-through.

Figure 11: Difference between the Domestic and ECB Policy Rates during the Post-pandemic Tightening Cycle *(Percent)*



Source: Haver Analytics.

Figure 12: Mean Difference between the Rates of New Domestic and Foreign Currency Loans to NFCs during the Post-Pandemic Tightening Cycle *(Percentage Points)*



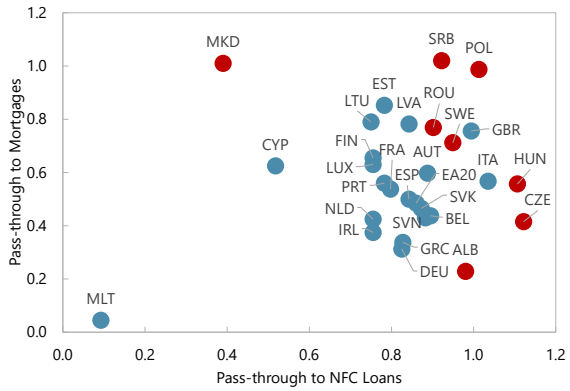
Sources: Eurostat and IMF staff calculations.

Figure 13 documents the pass-through in the post-pandemic monetary tightening episode for rates of new mortgages and loans to NFCs in domestic currencies. We compute bank interest rate betas, defined as the ratio of the cumulative increase in bank interest rates on new loans in domestic currencies to the cumulative increase in the policy rate. For the purpose of this exercise, we only use data from the post-pandemic hiking cycle and truncate the data for each country in the month of the first rate hike until three months after the last hike (or the first rate cut or the end of our sample, whichever comes first). Figure 13 shows that the pass-through is generally higher for more euroized countries in our sample, with a few exceptions. For instance, while the pass-through to mortgages is high in North Macedonia, the pass-through to interest rates on domestic currency NFC loans is low, possibly because of significant month-to-month

volatility, which could be driven by low volumes. In Albania, the pass-through to mortgage rates is low but relatively high for NFC loans.

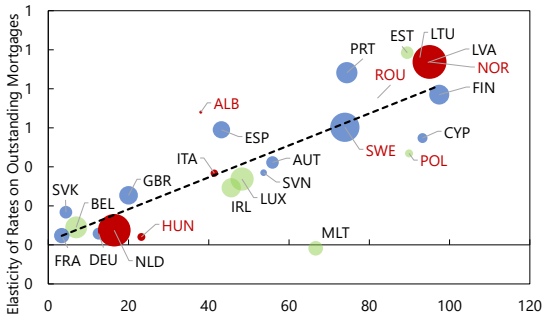
We also compute the policy rate pass-through to rates of existing mortgages in domestic currency (Figure 14). There is no clear pattern, and the pass-through is correlated with the share of flexible rate mortgages. We conclude that, unsurprisingly, euroization levels per se do not undermine pass-through to loans denominated in domestic currency (and without any currency clause or foreign currency indexing).

Figure 13: Pass-Through to New NFC Loans and Mortgages in Domestic Currency
(Countries in our sample are in red)



Sources: Eurostat and IMF staff calculations.

Figure 14: Pass-Through to Outstanding Mortgage Rates
(Bubble size shows share of HHs that have mortgages; red<10, 10<blue<30, green>30)



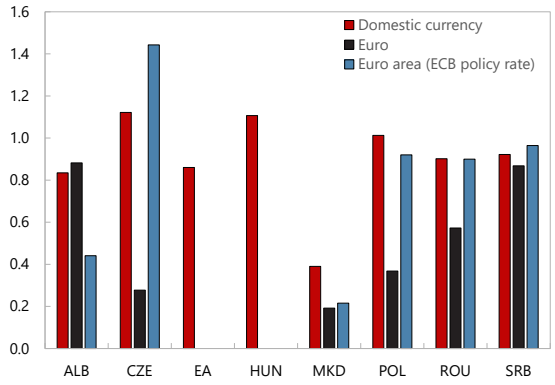
Sources: Eurostat and IMF staff calculations.
Note: Elasticity defined as the change in rates on outstanding mortgages between 2023M6 and month of first policy hike as a ratio to the change in the policy rate. The share of flexible rate mortgages is approximated by taking averages of the share of new flexible rate mortgages since 2013.

We then compare the pass-through to the rates of new NFC loans and mortgages denominated in both domestic currency and Euro, using both the domestic policy rates and the ECB rates. Figure 15 and 16 present the pass-through in euroized countries for which data are available and in the euro area as a benchmark (as FX loans are mostly in euro). Pass-through to both domestic currency NFC loans and mortgages (red bars) is generally higher in euroized countries than in the euro area using the domestic policy rate to compute pass-through (again with the exception of North Macedonia where the pass-through to NFC loans is low as discussed above). However (and perhaps unsurprisingly), the pass-through of the domestic policy rate to NFC loans and mortgages in euro (black bars) is significantly lower as these interest rates do not necessarily respond to domestic policy rate changes.[6] However, the pass-through to the rates of euro NFC loans and mortgages is similar to or above the pass-through in the euro area, if using the ECB policy rate to calculate the pass-through (blue bars).

[6] Strictly speaking, the term 'pass-through' is misleading in this context and pass-through of domestic policy rates to euro loan rates may rather reflect co-movement between domestic and ECB policy rates during a particular episode.

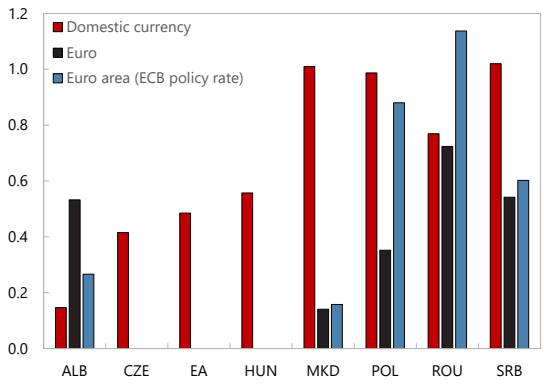
This implies that the domestic policy rate pass-through to domestic currency denominated NFC loans and mortgages, and the ECB rate pass-through to euro denominated NFC loans and mortgages are both high in euroized economies. However, the co-movement between the domestic policy rate and the rates of loans in euro is small, which plausibly drags down aggregate monetary policy transmission in euroized countries. In Albania, the co-movement between the domestic policy rate and rates of euro NFC loans and mortgages is larger than that of the ECB policy rate. In part, this could be explained by the relatively low spread between the domestic and ECB policy rates.

Figure 15: Pass-Through to NFC Loans in Domestic Currency and co-movement between the domestic rates and the rates of loans in Euro, and Pass-Through Calculated by the ECB Policy Rate



Sources: Eurostat and IMF staff calculations.

Figure 16: Pass-Through to Mortgages in Domestic Currency and co-movement between the domestic rates and the rates of loans in Euro, and Pass-Through Calculated by the ECB Policy Rate



Sources: Eurostat and IMF staff calculations.

5. Conclusions

In this paper, we revisit the effects of financial euroization on monetary transmission. First, we compare the results across countries that differ in the level of financial euroization including Norway and Sweden as benchmark countries from the same region with minimal financial euroization whose currencies have no reserve currency status. Second, we examine differences in aggregate effects on prifces and output and differences in the strength of specific transmission channels.

We broadly find that the aggregate effects on output and prices are correlated with the level of financial euroization: In Norway and Sweden, the fall in output and inflation in the first quarter is roughly twice as high as in Romania and Serbia, which both have high levels of euroization. Other countries with lower levels of financial euroization are between these extremes. These findings are generally robust to the use of another model and also apply to the second-quarter effects.

We then turn to comparing the strength of the exchange rate, credit, and interest rate channels across the countries in our sample. Given that, generally, the exchange rate in euroized countries is stabilized, the response of the exchange rate to monetary policy shocks is relatively muted, implying that monetary policy transmission through this channel is impaired. In addition, we find that the interest rate pass-through to domestic currency retail rates proves to be effective in euroized economies, while the rates of foreign currency loans mostly follow the ECB policy rate. It follows that the impact of domestic policy changes is limited and that the effective impact of monetary policy changes on bank interest rates hinges on the degree of policy synchronization with the ECB. Furthermore, this weakening of the impact of non-synchronized policy changes can be amplified by substitution effects on the credit side. Our examination of the credit channel suggests that domestic monetary policy tightening can impel a switch towards foreign currency-denominated credit in highly euroized economies, which undermines the credit channel.

While sign restrictions as identification strategy is widely used in the literature to identify monetary policy shocks, identification strategies could be improved to encompass more recent methodological innovations. However, data limitations for some countries in our sample restrict our choices. In addition, our focus is on comparing the effects across countries that have different levels of euroization, rather than the effects in absolute terms. This implies that as long as any bias in our estimation is similar across countries, the sign restrictions identification is sufficient for our purposes. Finally, the range of our estimates of the responses of GDP and inflation is broadly within the range of past estimates.

Our results imply that first and most importantly, successful efforts to reduce the level of euroization would increase the effectiveness of monetary policy. Existing papers point to feasible strategies in this regard. For instance, Vargas and Sanchez (2023) argue that while past episodes of high inflation and substantial devaluations are associated with high levels of dollarization in Central and South America, maintaining low, stable inflation is critical but not sufficient to reduce dollarization levels. To design a strategy for de-dollarization or de-euroization, respectively, it may therefore be desirable to better understand the underlying drivers of financial euroization. For several CESEE countries, the OeNB provides representative household survey data that contains rich information on financial euroization that can help guide policies to promote de-euroization; see for instance Scheiber and Wörz (2018). Geng et al. (2018) argues that deposit euroization and loan euroization require different strategies. The former can be addressed by establishing a strong track record of prudent macroeconomic policies that reduce economic agents' perception of the euro as the only reliable hedge against exchange rate and inflation risks. This requires eliminating entrenched expectations of exchange rate depreciation through maintaining sound macroeconomic policies and credible institutions (della Valle et al., 2018). Loan euroization is driven in part by interest-rate differentials; allowing more exchange rate flexibility and regulatory measures that could make FX loans less attractive (Geng et al., 2018), but could also reflect deposit euroization which can incentivize banks to extend loans in euro.

Greater exchange rate flexibility could also enhance the transmission of monetary policy by itself. Efforts towards de-euroization could, to some extent, pave the way for greater exchange rate flexibility and more effective inflation targeting, as the degree of exchange rate flexibility is closely correlated with levels of euroization due to fear of floating and financial stability considerations.

There are at least three avenues for future research. First, future research could examine in greater detail why throughout our analysis, Albania and North Macedonia are often outliers. Albania had by far the greatest synchronization with ECB policy rates in the post-pandemic tightening period. In the hypothetical case that domestic and ECB policy rates move in parallel, euroization does not impair monetary policy transmission, but monetary policy could be suboptimal as it is not tailored to domestic macroeconomic conditions. Albania also has a more flexible exchange rate regime than other countries with similar levels of euroization, and there is some evidence that a relatively high share of payments is made in euro (della Valle et al., 2018), which may play a role. In the case of North Macedonia, future research could examine whether any peculiarities of the monetary policy framework described by Cabezon and Kovachevska (2024) matter for our results.

Second, future research could examine to what extent exchange rate stabilization triggered by euroization has led to suboptimal monetary policy from an inflation-targeting perspective. As we

have shown, in the most euroized CESEE countries in our sample, the difference between the domestic and the ECB policy rates has been smallest in the post-pandemic tightening cycle, but this may have been driven – at least in part – by exchange rate objectives rather than the inflation target.

Finally, euroization levels themselves are not exogenously given and could be a function of monetary policy. For example, the effectiveness of monetary policies and monetary policy choices themselves could undermine domestic currency use in the countries' financial system. Future research could therefore examine the determinants of euroization including monetary policy in greater detail using microeconomic data or resort to structural models to understand the financial institutions' decision-making process (Ize and Yeyati, 2003).

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Annex I. Data Appendix

Annex Table 1: Exchange rate regimes as per IMF's Assessment

Country	Exchange rate regime
ALB	Floating (independently floating in 1999-2007; floating in 2008-2022)
CZE	Free floating (managed floating with no predetermined path for the exchange rate in 1999-2000; independently floating in 2001; managed floating with no pre-determined path for the exchange rate in 2002-2006; independently floating in 2007; free floating in 2008-2012; other managed arrangement in 2013; stabilized arrangement in 2014-2016; floating in 2017-2018; free floating in 2019-2022)
HUN	Floating (crawling band in 1999; pegged exchange rate within horizontal bands in 2000-2006; independently floating in 2007; floating in 2008-2022)
MKD	Stabilized arrangement (conventional pegged arrangement in 1999-2007; stabilized arrangement in 2008-2022)
NOR	Free floating (managed floating with no pre-determined path for the exchange rate in 1999-2000; independently floating in 2001-2007; free floating in 2008-2022)
POL	Free-floating (independently floating in 1999-2007; free-floating in 2008-2022)
ROU	Crawl-like arrangement (managed floating with no predetermined path for the exchange rate in 1999-2000; crawling band in 2001-2003; managed floating with no predetermined path for the exchange rate in 2004-2007; floating in 2008-2017; stabilized arrangement in 2018; crawl-like arrangement in 2019-2022)
SRB	Stabilized arrangement (managed floating with no predetermined path for the exchange rate in 2000-2004; exchange arrangement with no separate legal tender in 2005; managed floating with no predetermined path for the exchange rate in 2005-2007; floating in 2008-2015; stabilized arrangement in 2016; crawl-like arrangement in 2017; stabilized arrangement in 2018-2022)
SWE	Free floating (independently floating in 1999-2007; free floating in 2008-2022)

Source: IMF The Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER)

Annex Table 2: Policy Rates Definition

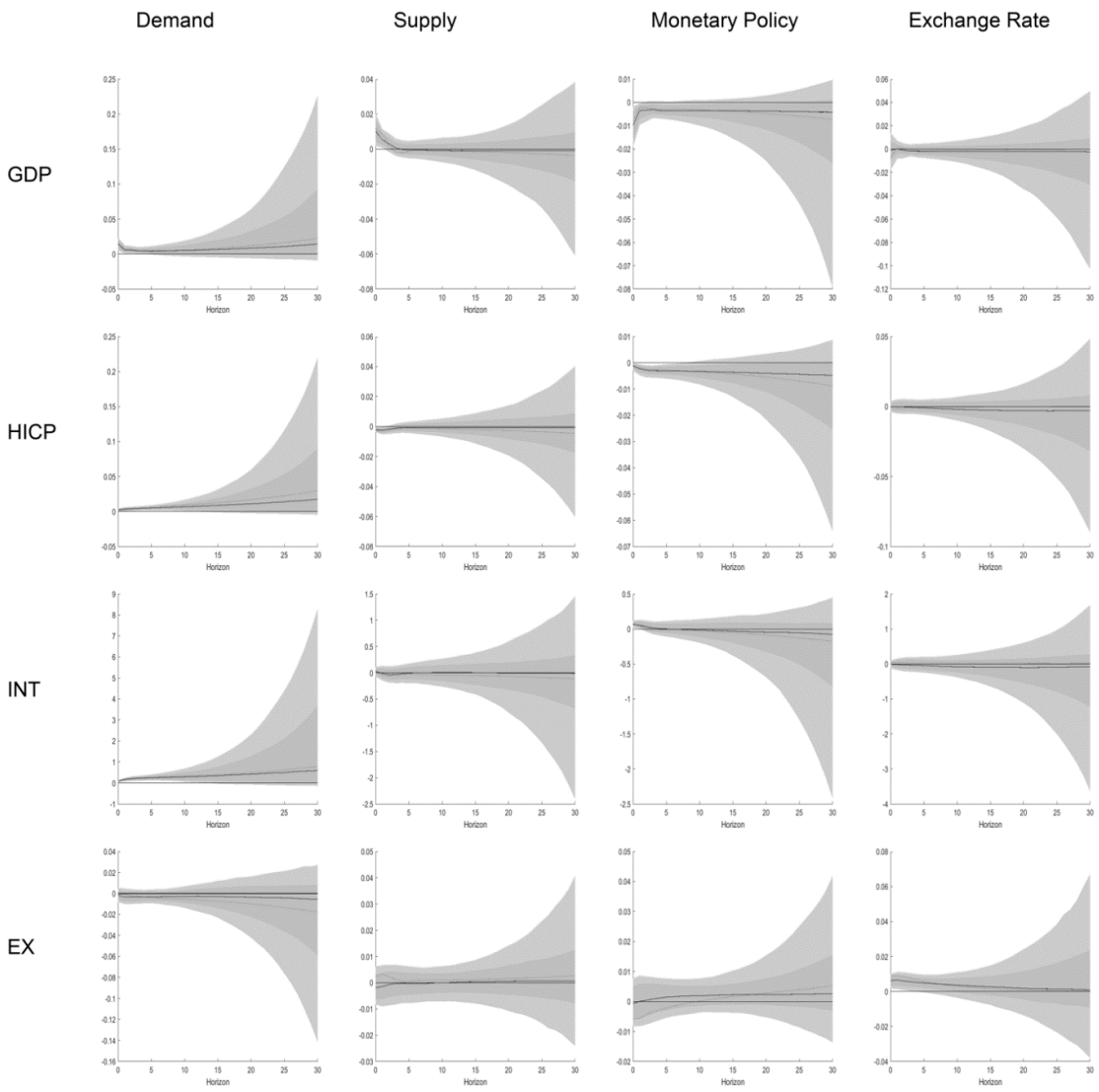
Country	Policy Rates
ALB	One-week repurchase agreement, percent, quarterly, average
CZE	repo rate, 2 week, percent per annum, quarterly
HUN	base rate, percent, quarterly, not seasonally adjusted, average
MKD	central bank bill rate, percent, quarterly, not seasonally adjusted, average (MKD has the policy rate data available only after 2012m4.)
NOR	Sight deposit rate, percent per annum, quarterly, average
POL	Narodowy Bank Polski Base Rates, reference rate, 7-day market operations, percent per annum, quarterly, average
ROU	monetary policy rate, percent, quarterly
SRB	1-week repo rate, percent per annum, quarterly, average
SWE	Policy rate, percent, quarterly, average

Annex II. Methodological Details

We use the identification algorithm and package following Breitenlechner, Geiger, and Sindermann (2019). Firstly, we estimate the reduced form VAR parameters using a Bayesian approach. Following Uhlig (1994), we estimate the reduced form using an uninformative Normal-Inverse-Wishart prior, yielding a posterior distribution characterized by a Normal-Wishart density. Furthermore, we obtain the orthogonal impulse responses by multiplying the reduced form responses with a lower triangular Cholesky factor, which is the product of the variance-covariance matrix and a random orthogonal matrix**.** We then check whether the orthogonal impulse responses satisfy the sign restrictions defined in the previous section over the contemporary and the first quarter. If yes, we save the orthogonal responses, and if not, we repeat this step to check a new draw of the random orthogonal matrix. When the maximum of the matrix transformation set in the options is reached and no qualifying matrix could fulfill the restrictions, the algorithm proceeds with another model draw with the Bayesian estimation.

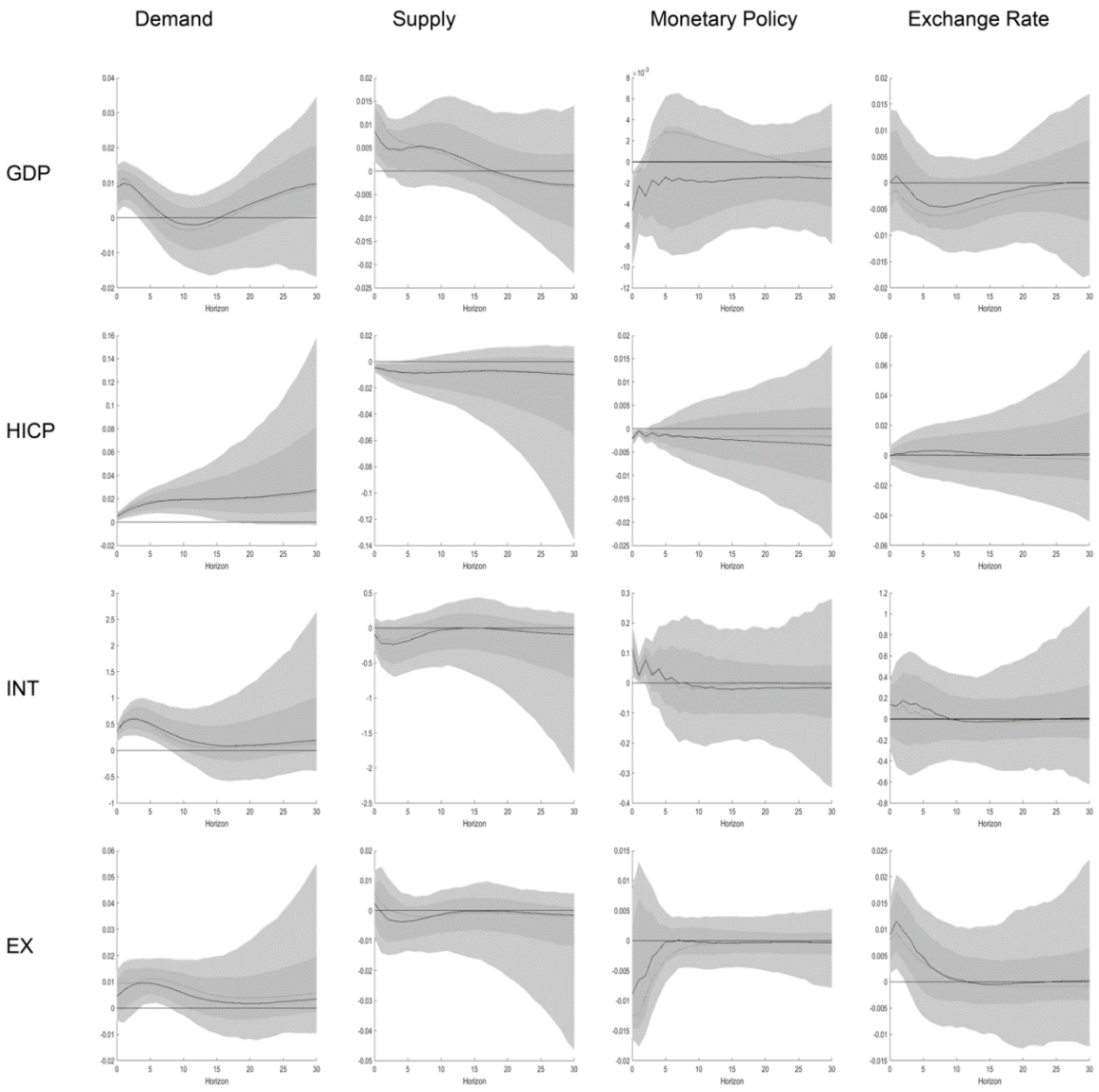
Annex III. Impulse response plots of each country: the baseline model

Albania



Notes: Each panel shows the impulse response of a row variable (GDP, inflation (HICP), interest rate (INT), or exchange rate (EX)) to a column shock (demand, supply, monetary, or exchange rate). For example, the top-left plot shows the response of GDP to a shock in demand. Solid lines indicate point-wise medians, dashed lines show the closest-to-median responses. The light and dark grey areas represent 90% and two third of the identified posterior distribution, respectively.

Czech Republic



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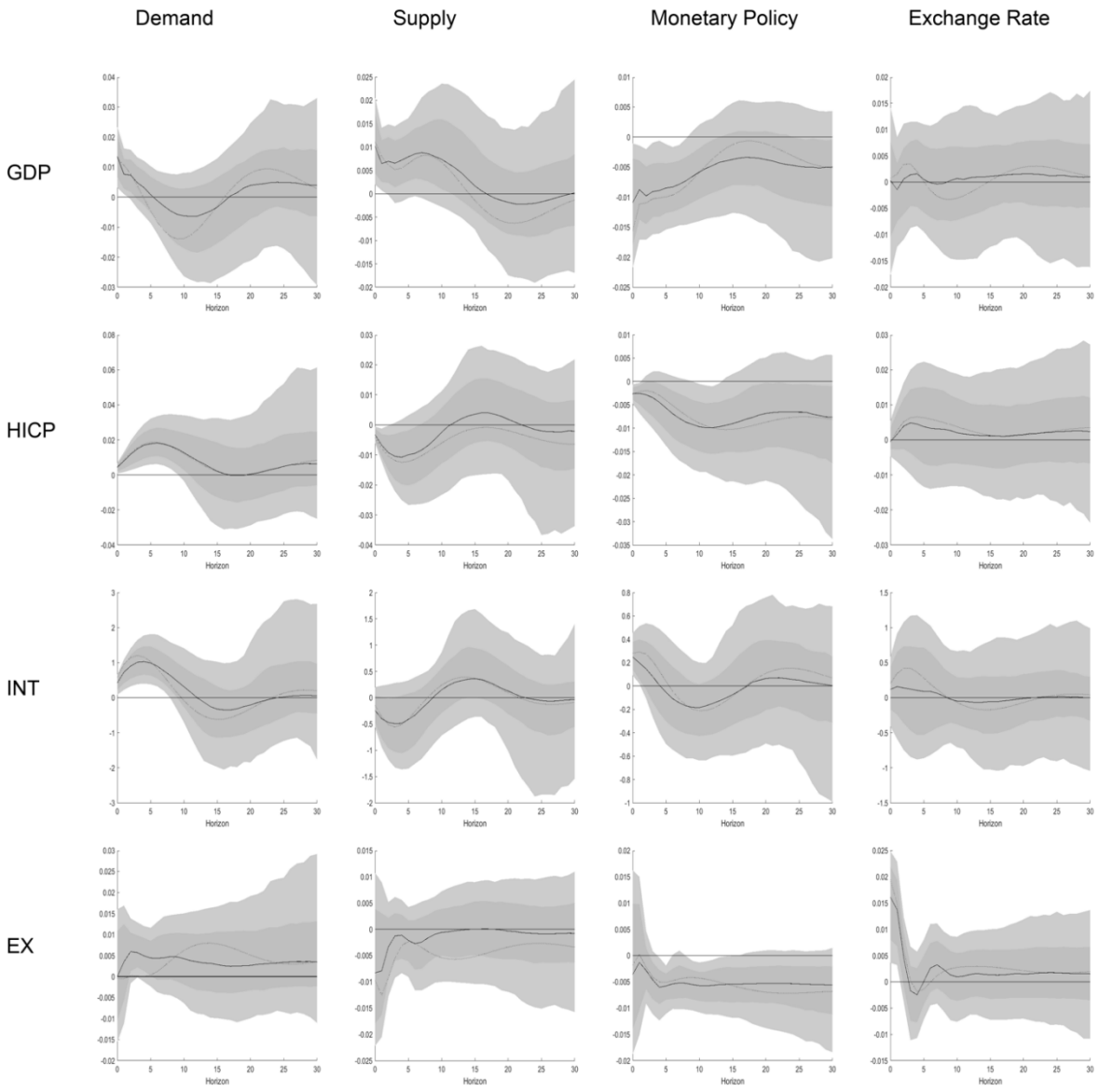
Hungary



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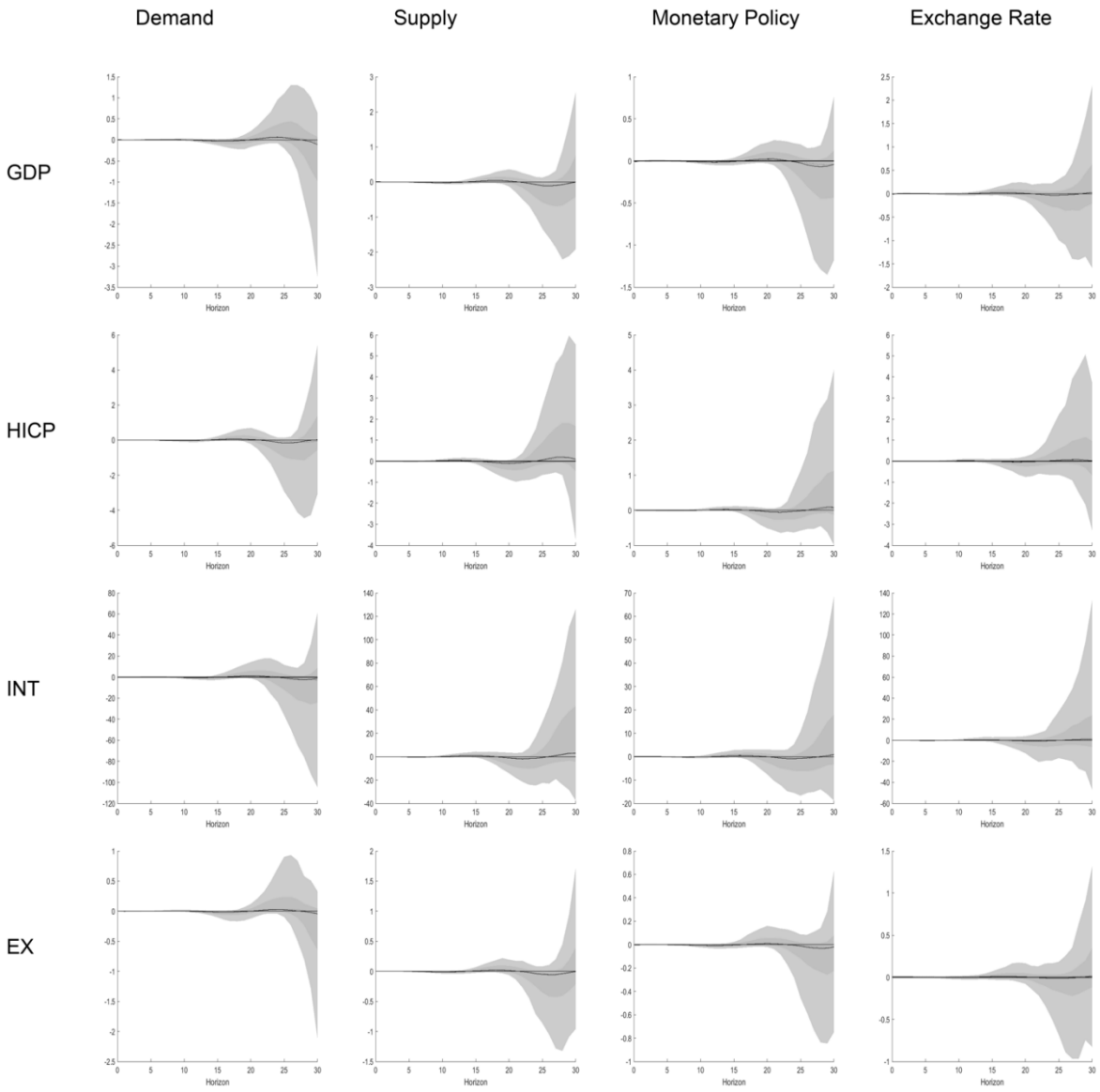
North Macedonia



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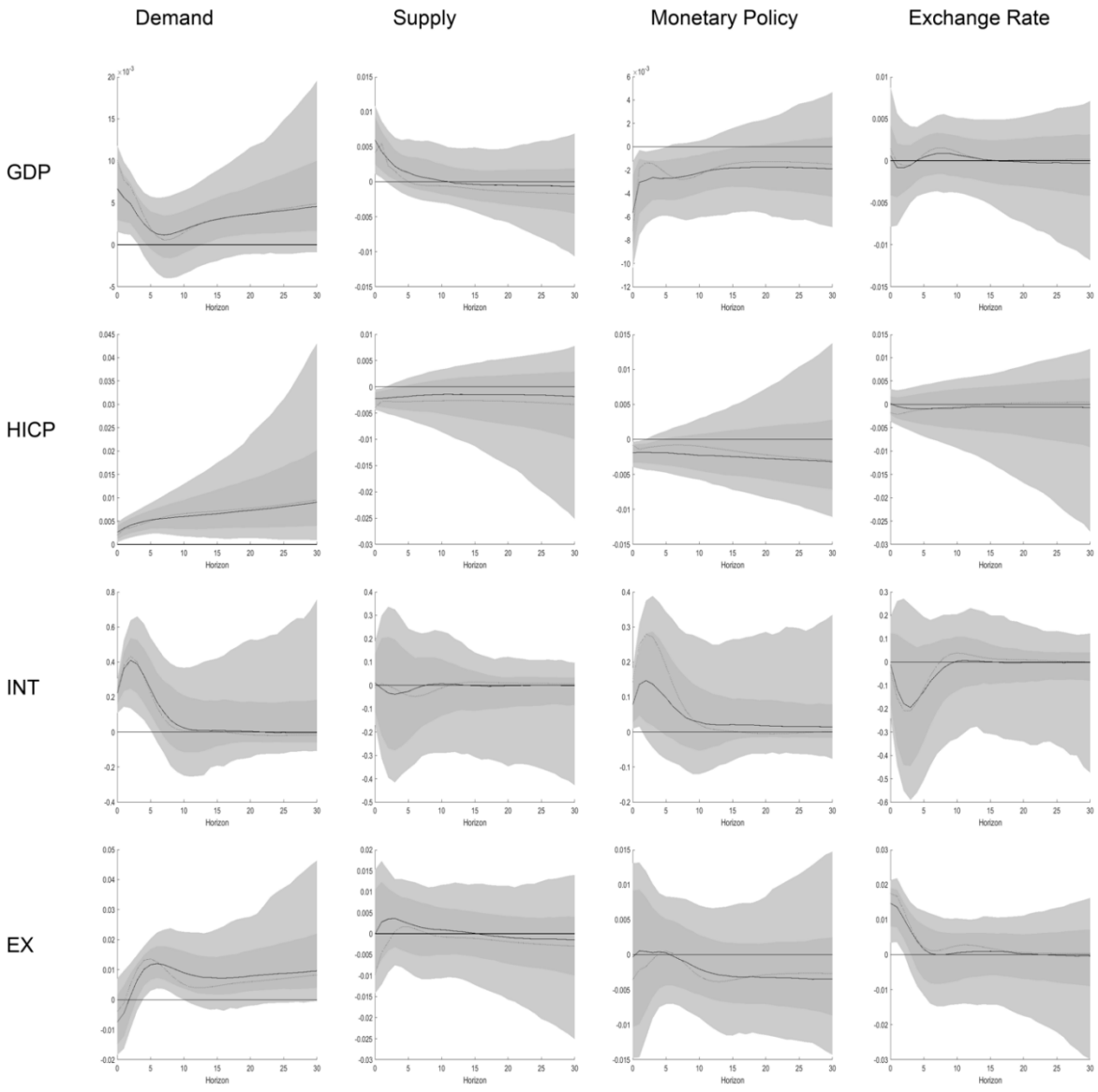
Norway



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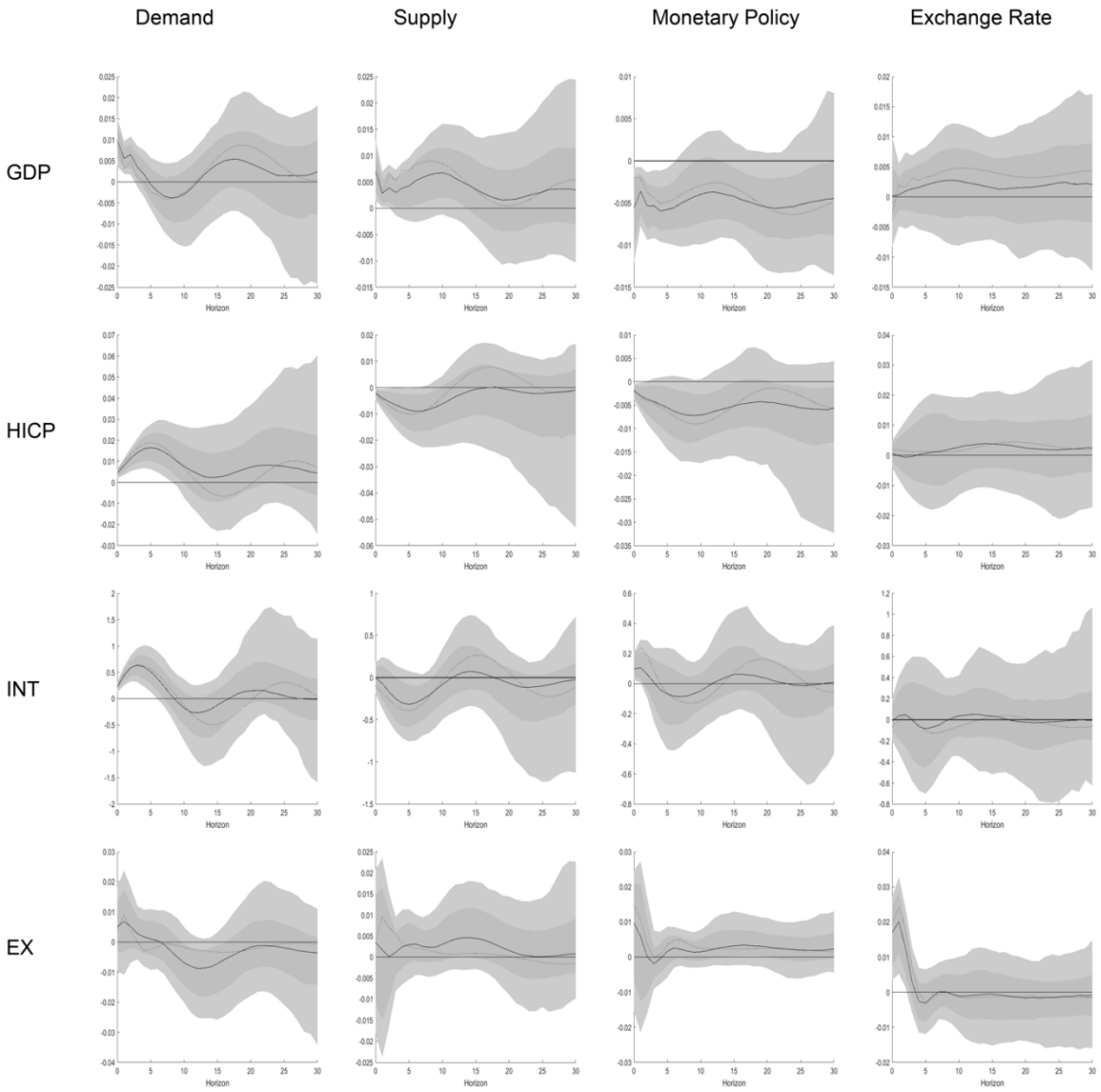
Poland



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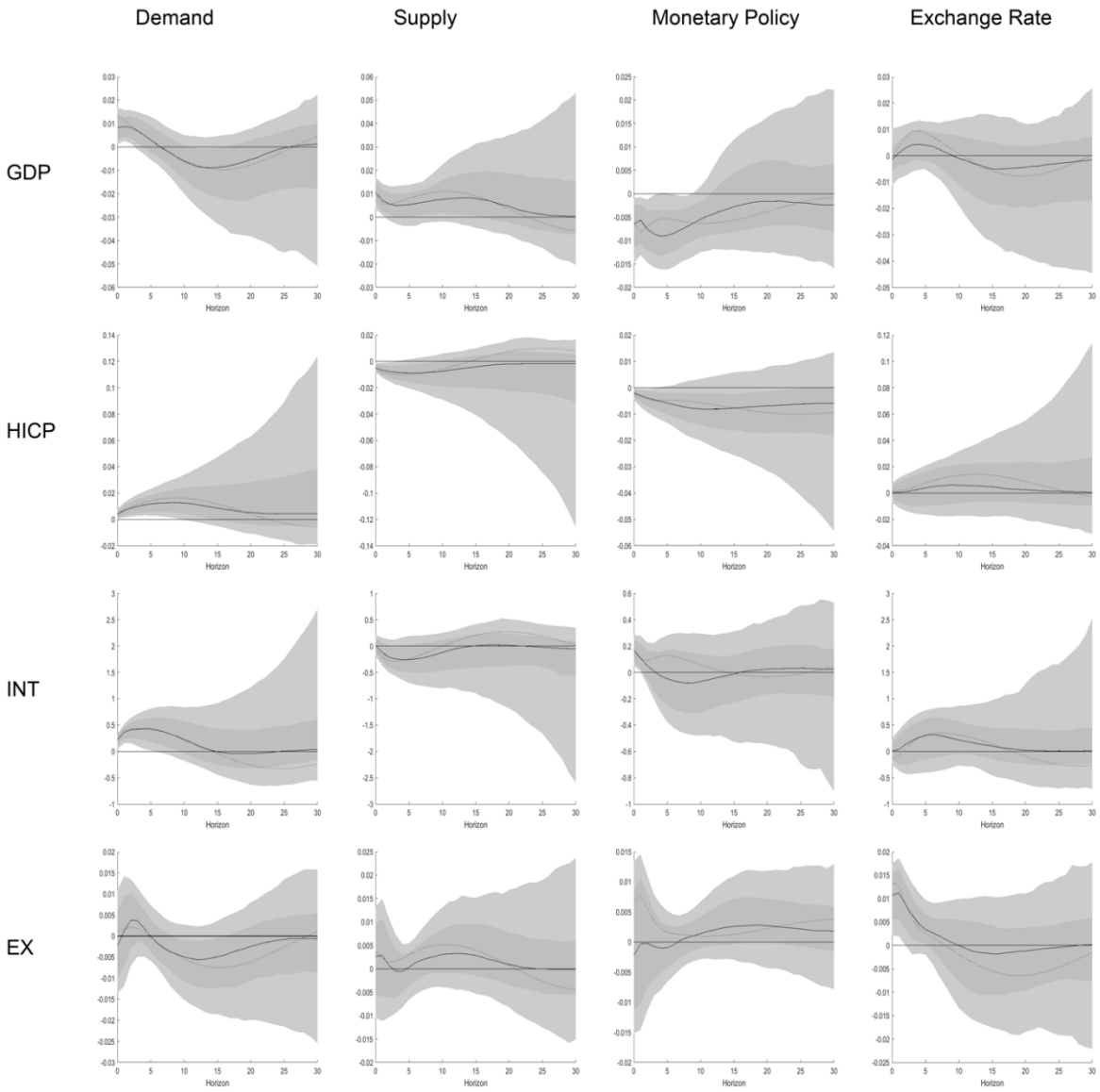
Romania



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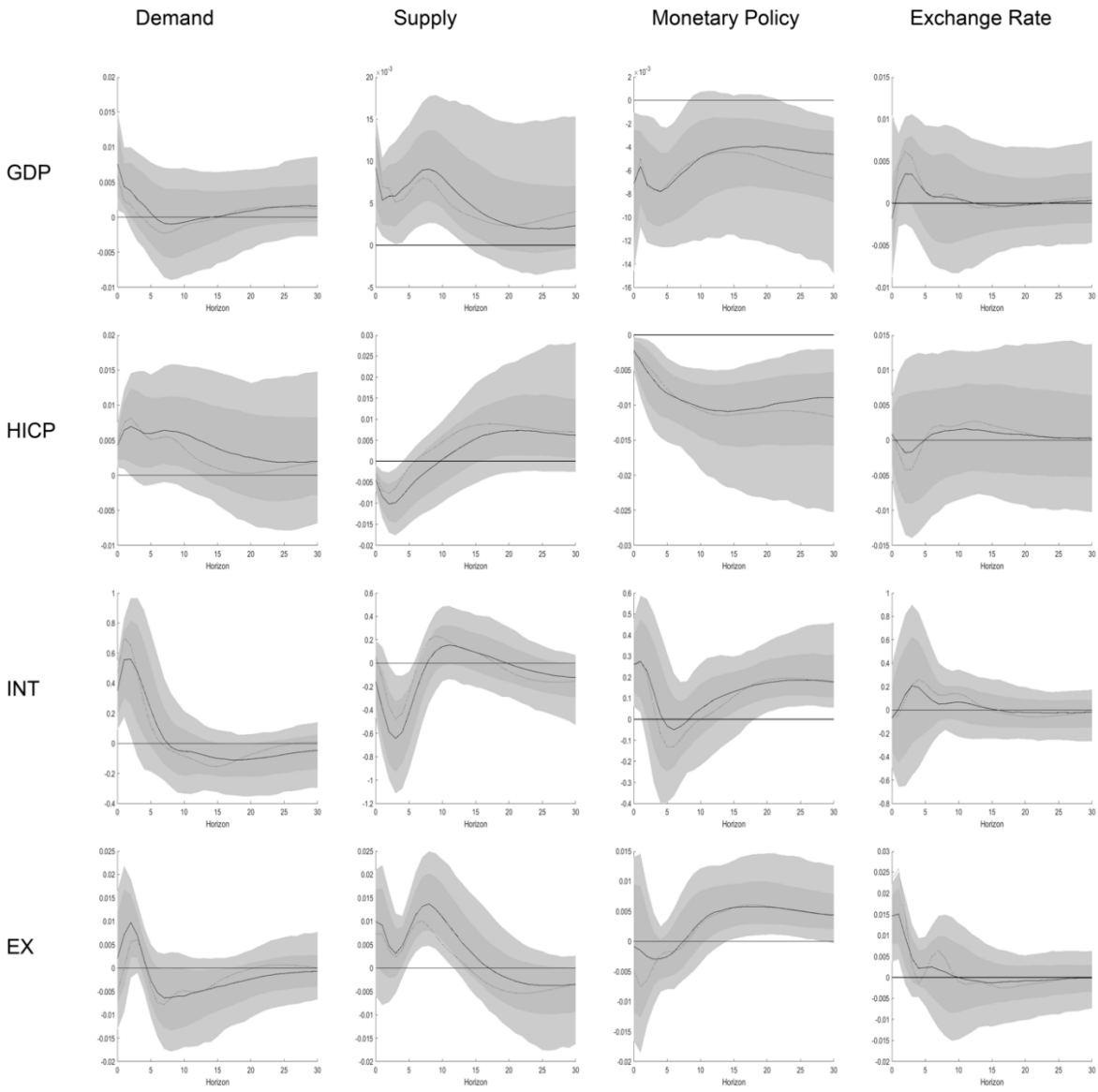
Serbia



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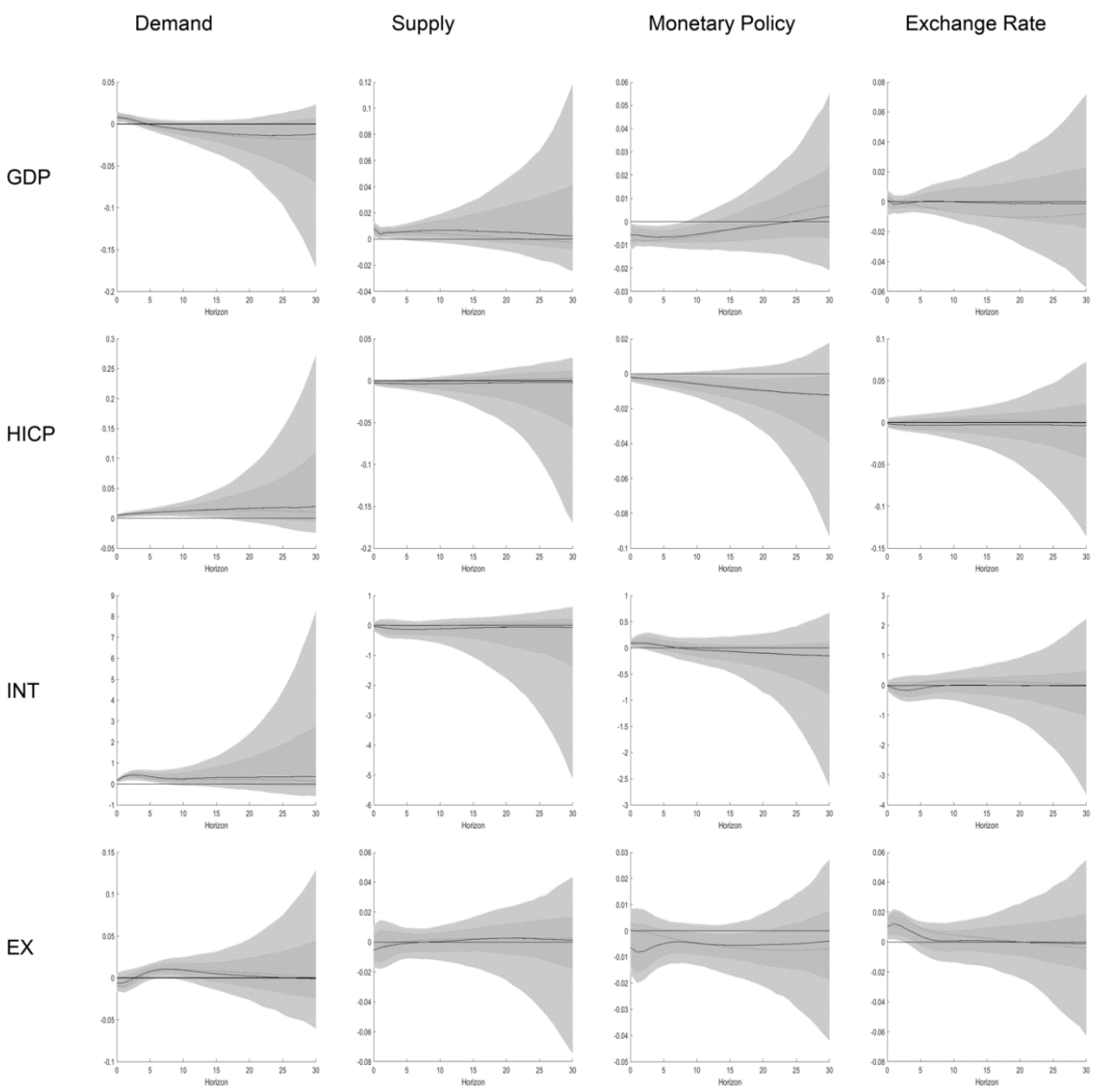
Sweden



Notes: Each panel shows the impulse response of a row variable (GDP, inflation (HICP), interest rate (INT), or exchange rate (EX)) to a column shock (demand, supply, monetary, or exchange rate). For example, the top-left plot shows the response of GDP to a shock in demand. Solid lines indicate point-wise medians, dashed lines show the closest-to-median responses. The light and dark grey areas represent 90% and two third of the identified posterior distribution, respectively.

PUBLICATIONS

Monetary Policy Transmission in Euroized Countries: Evidence from Emerging Europe
Working Paper No. WP/2026/177