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Contents

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Studies

Are Phillips curves in CESEE still alive and well behaved?

Florian Huber, Josef Schreiner[1]

This paper estimates Phillips curve relationships using nonparametric vector autoregressions for four Central, Eastern and Southeastern European (CESEE) economies. The novel feature of our model, which builds on Bayesian additive regression trees, is that it allows for unveiling possible asymmetries with respect to the size and sign of structural shocks. We simulate how unexpected movements in the unemployment rate impact inflation measures across the countries under consideration. We provide evidence that the reactions of inflation to labor market shocks are highly asymmetric: Small shocks trigger no statistically significant response of inflation whereas larger shocks induce strong, significant and persistent reactions for all countries in our sample. When focusing on differences between positive and negative unemployment shocks, we find that benign shocks lead to stronger price reactions than adverse movements in unemployment rates. These results all highlight substantial nonlinearities in the dynamic relationship between unemployment rates and inflation rates.

Inflation is currently the most pressing topic on economic policymakers' agendas in Central, Eastern and Southeastern Europe (CESEE) and, in fact, around the globe. Among the most frequently cited reasons for accelerating inflation are the rebound of demand following COVID-19-related lockdowns, combined with emerging demand-supply mismatches, the strengthening of households' net financial wealth during the pandemic, adverse weather conditions (e.g. droughts) in some parts of the world and, more recently, the economic consequences of Russia's war against Ukraine (and primarily its impact on energy and food prices). Policymakers in CESEE have acted proactively and decisively to tame surging inflation by raising monetary policy rates to historic levels. As of early 2023, they have been successful in putting a break on ever-increasing headline inflation rates, helped by a rebalancing of European energy demand and the associated decrease of energy prices. Core inflation rates, however, kept on rising unabatedly. At the same time, CESEE labor markets are in full swing, as the COVID-19 pandemic has not left any lasting scars: Once the pandemic-related restrictions were lifted, the region's labor markets quickly returned to practically full employment amid tight labor supply, occasional skill mismatches and accelerating wage growth.

The question arises of how much (if any) of the 2021–2022 price surge in CESEE can be attributed to labor market tightness. This question is usually addressed through the lens of the Phillips curve, a concept that generally postulates a negative relationship between measures of economic slack (in our case, the unemployment rate) and inflation rates, meaning that tighter labor markets cause inflation rates to rise. In CESEE, however, there has been a visible disconnect

between labor market and price developments for at least the past decade. While this has caused quite some confusion among economists analyzing the CESEE region, it fits well into empirical evidence gathered for many advanced economies that found a flattening of the Phillips curve since the mid-1990s (see e.g. Kuttner and Robinson, 2010; IMF, 2013).

The motivation of this paper is, therefore, to examine the Phillips curve in a sample of CESEE countries and to see whether it is still alive and well behaved. This broader topic has drawn considerable attention in economic literature over the past years (see e.g. Stock and Watson, 2019; Del Negro et al., 2020). Present literature deals with this question by looking at parametric econometric models that take a strong stance on the nature of any nonlinearities the Phillips curve might exhibit. To circumvent introducing strong prior assumptions on the functional relationship between prices and real economic activity, we use the nonparametric multivariate time series model originally developed in Huber and Rossini (2022) and Huber et al. (2023). This model uses Bayesian additive regression trees (BART, see Chipman et al., 2010) to handle structural breaks, changing trends and any form of nonlinearities in the conditional mean.

Empirically, we are interested in how shocks to the unemployment rate impact inflation as measured by the Harmonised Index of Consumer Prices (HICP). The flexibility of our model allows us to focus on whether shocks to the unemployment rate trigger a nonproportional reaction of inflation or whether positive shocks trigger different inflation reactions than negative shocks. By decomposing core inflation into a cyclical and a noncyclical component, we can then assess whether labor market shocks have the potential to shift trend inflation or whether variations in core inflation are purely driven by the reaction of the transitory component.

This paper is structured as follows: Section 1 describes the data and shows some descriptive statistics. Section 2 introduces the econometric framework we employ, briefly discusses the prior setup and outlines our estimation strategy. Section 3 presents our empirical results, including the impulse response of different measures of inflation to unemployment shocks. Section 4 discusses the results. Finally, section 5 puts the results into context and applies them to rationalize some stylized facts of CESEE's recent inflation history; it elaborates on some policy implications and further research questions and concludes the paper.

1 Data description

In our analysis, we concentrate on the link between unemployment rates and HICP inflation in four CESEE EU member states that conduct an independent monetary policy: Czechia, Hungary, Poland and Romania. We collected quarterly data over the period from Q1 00 to Q2 22. The dataset includes the following series: annual percentage changes in HICP inflation, core inflation (defined as overall HICP inflation excluding energy and unprocessed food), cyclical and noncyclical items within core inflation, real GDP (seasonally and working day adjusted), the nominal compensation per employee (whole economy, seasonally and working day adjusted) and nominal unit labor costs (whole economy, per person, seasonally and working day adjusted) as well as the unemployment rate (EU Labor Force Survey methodology), the respective policy rate, the three-month money market rate and ten-year government bond yields in percent.

The distinction between cyclical and noncyclical core inflation follows the methodology used in Lian and Freitag (2022). In particular, core inflation items (on the two-digit level of the HICP classification or – in areas that include energy – on the three-digit level) are split into cyclical and noncyclical components based on their average correlation with a simple HP-filtered output gap. Cyclical components include rentals for housing; maintenance and repair of dwellings; furnishings, household equipment and routine household maintenance; health; transport services; recreation and culture; restaurants and hotels; and processed food including alcohol and tobacco. Noncyclical components include clothing and footwear; water supply and miscellaneous services relating to the dwelling; purchase of vehicles; communications; education; and miscellaneous goods and services. Individual cyclical and noncyclical components are aggregated using their country-specific item weights in the consumption basket.

Chart 1 shows the unemployment rate and annual changes in HICP inflation in the four CESEE countries in our sample. In the period under review, price developments in CESEE were characterized by a broad-based disinflation trend that lasted approximately up to 2005, reflecting economic stabilization after the early years of transition, increased competition (especially at the international level), a monetary policy shift away from exchange rate stabilization toward inflation targeting in many countries and – later on – a stronger reform momentum in the run-up to EU accession. Unemployment rates trended up moderately but basically did not move too much over the first five years in our time series. As always, there is some variation across countries. Disinflation, for example, was especially pronounced in Romania, as the country had experienced a period of very high price growth after its currency reform and the elimination of most price controls in the late 1990s.

In the boom years following the 2004 EU enlargement round, prices trended up again, reflecting buoyant (partly credit-fueled) domestic demand and record-high GDP growth as well as tightening labor markets amid continuing emigration. Consequently, the unemployment rates also declined in all countries in our sample except Hungary, where pronounced macroeconomic imbalances and high fiscal deficits weighed on growth and the labor market.

The crisis of 2008 and the subsequent years put an end to this phase and sent prices on a downward trend. This trend – temporarily interrupted between 2011 and 2013, when oil prices climbed to above USD 100 per barrel – culminated in a period of deflation around 2015 and 2016. Up until the pandemic and the recent price boost, inflation rates only increased very moderately, hovering between 2% and 4%. This is even more striking as the four CESEE countries under review experienced a period of swift economic expansion between 2014 and 2019 after economic imbalances and crisis legacies from 2008 were finally cleaned up. In this boom period, unemployment rates embarked on a remarkable downward path (from the elevated levels they had reached during the Great Recession) and reached historically low levels on the eve of the pandemic. Even the disruptions caused by the COVID-19-related lockdowns did not persistently alleviate labor market tightness. Unemployment rates only increased moderately in 2020 and early 2021 and then quickly returned to their pre-pandemic levels.
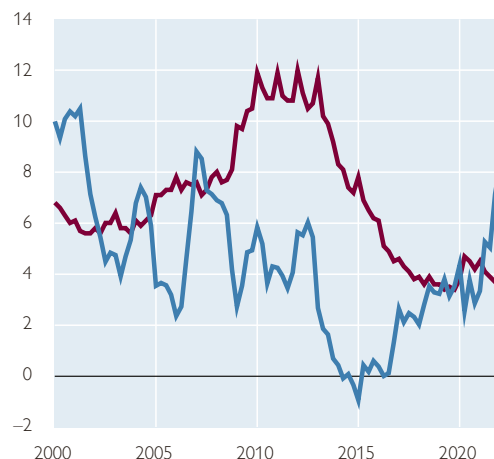
Chart 1

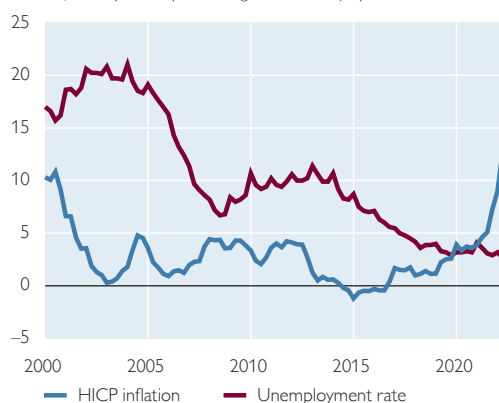**Development of HICP inflation and unemployment rates**

Czechia

HICP inflation: year-on-year change in %; unemployment rate: %
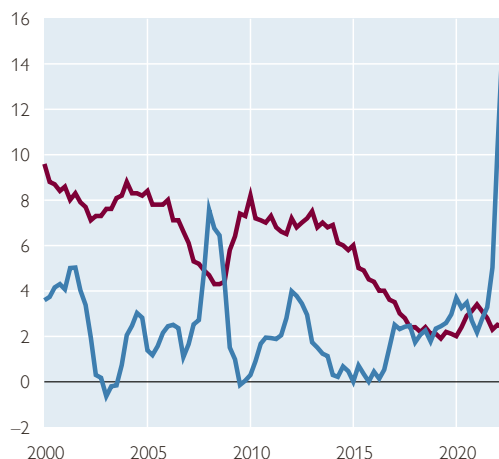
Hungary

HICP inflation: year-on-year change in %; unemployment rate: %

Poland

HICP inflation: year-on-year change in %; unemployment rate: %

Romania

HICP inflation: year-on-year change in %; unemployment rate: %

— HICP inflation   — Unemployment rate
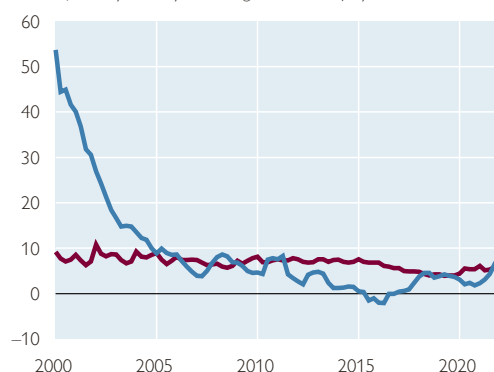
Source: Eurostat.

It is already clear from the remarks above that unemployment and price trends in the countries under review disconnected at least for certain periods. Chart 2 shows the correlation between HICP inflation and the unemployment rate both over the entire observation period and for a moving window of 20 quarters. Over the whole period, correlation coefficients range from −0.25 in Czechia to 0.43 in Romania.

For different time frames, correlations show some distinct patterns across countries: large and negative correlation coefficients in the years surrounding the economic downturn after the financial crisis, large and positive correlation coefficients for the deflationary period around 2015, and large and negative correlation coefficients for the boom years preceding the pandemic. At the most recent end of our sample, correlations weakened notably again.

Chart 3 shows the development of core inflation and its cyclical and noncyclical components. Core inflation very much mimics the dynamics of headline inflation throughout the sample and over the entire observation period. However, it was

Chart 2

Correlation between HICP inflation and unemployment rates

Czechia

Coefficient of correlation
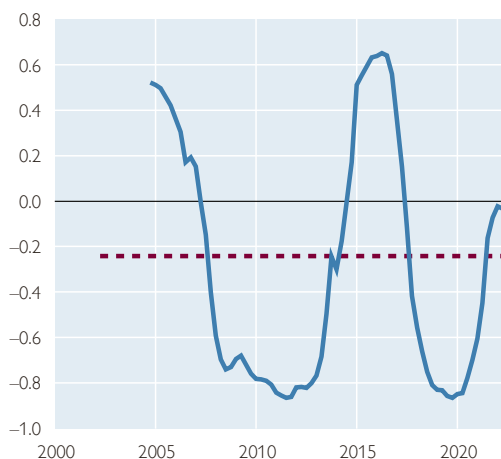
Hungary

Coefficient of correlation
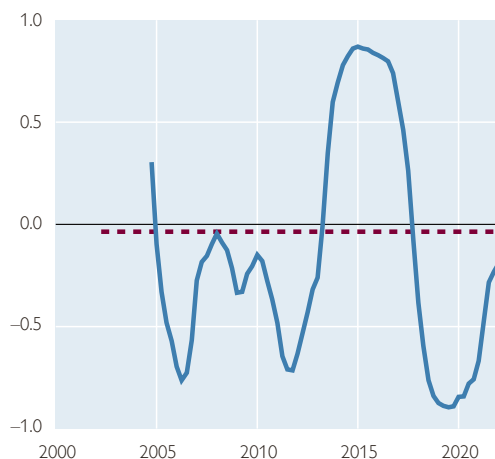
Poland

Coefficient of correlation
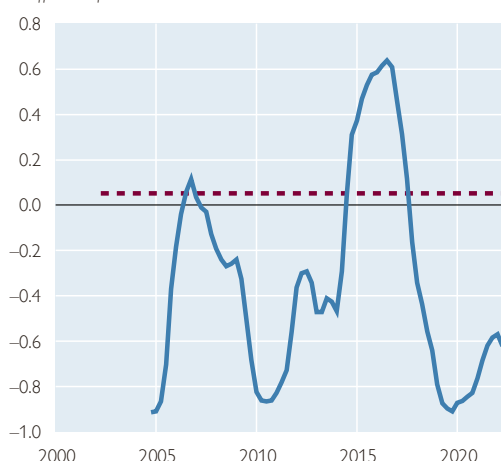
Romania

Coefficient of correlation
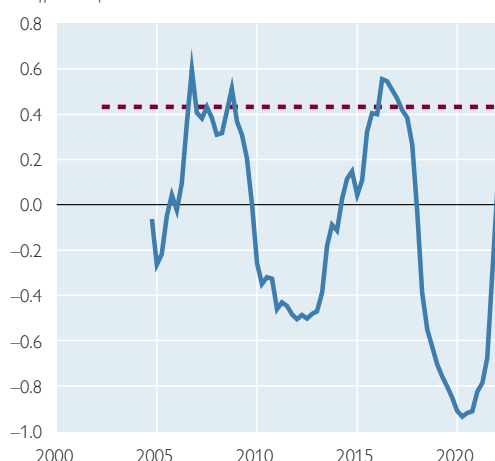
— 20-quarter moving correlation   ▪▪▪ Correlation over entire period

Source: Authors' calculations.

generally lower than headline inflation except for the disinflationary (or deflationary) period between 2013 and 2017 and a brief period during the COVID-19 pandemic.

Furthermore, it is clearly visible that cyclical core inflation generally outpaced noncyclical core inflation across all four countries, sometimes by a large margin. The only exceptions to this pattern are once again the disinflationary (or deflationary) period around 2015 and – at least in Poland and Czechia – the years of the COVID-19 pandemic. This suggests that structural price trends generally had a disinflationary effect in CESEE, very much echoing the discussions on secular stagnation that made headlines throughout much of the 2010s.

Chart 3

Development of core inflation and its cyclical and noncyclical components

Czechia

Year-on-year change in %
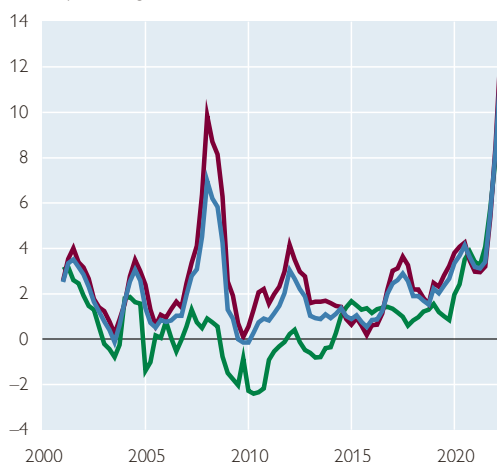
Hungary

Year-on-year change in %
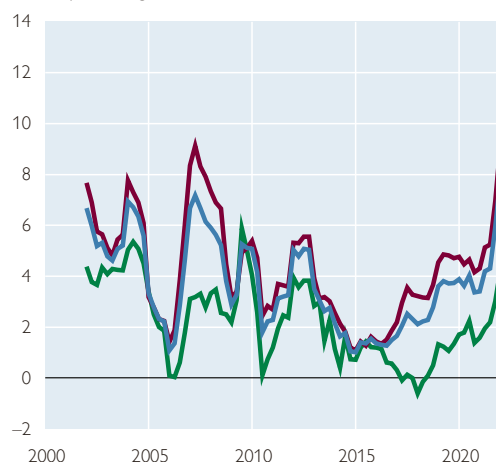
Poland

Year-on-year change in %
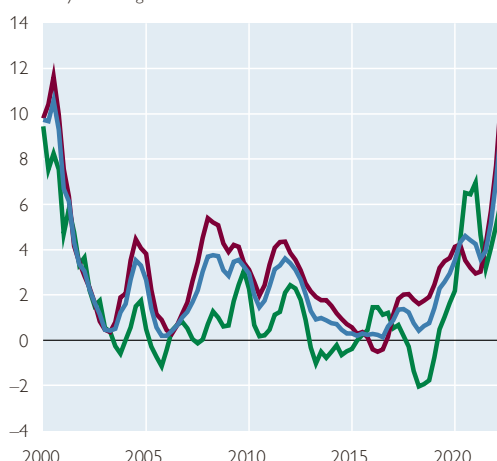
Romania

Year-on-year change in %
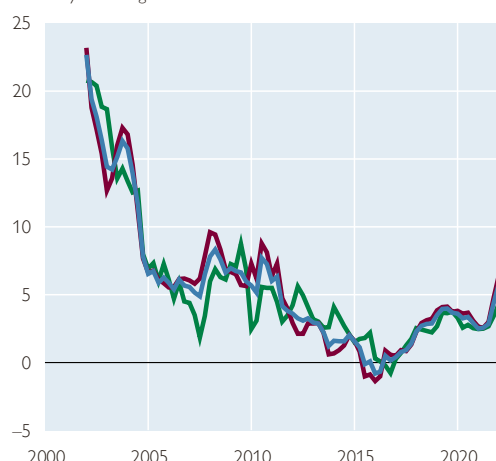
Core inflation — Cyclical core inflation — Noncyclical core inflation

Source: Eurostat, authors' calculations.

2 Econometric framework

Our flexible econometric model combines BART with vector autoregressions (VARs) along the lines of the BART-VAR developed in Huber and Rossini (2022) and Huber et al. (2023). Linear models such as standard VARs are not capable of producing asymmetries in impulse responses with respect to the size or the sign of a structural shock of interest. If the researcher is interested in these forms of asymmetries, nonlinear multivariate time series models such as regime-switching VARs (see Sims and Zha, 2006; Huber and Fischer, 2018), time-varying parameter VARs (see Primiceri, 2005; Koop et al. 2009; Korobilis, 2013) or smooth transition models (see Hauzenberger et al. 2021) are possible approaches to an analysis. However, all these models take a strong prior stance on how nonlinearities are captured, and their assumptions might be inconsistent with the data. In this paper,

our approach is nonparametric and does not rely on specific assumptions of the relationship between the vector of endogenous variables y_t, which is $M \times 1$ dimensional, and $x_t = (y'_{t-1}, \ldots, y'_{t-p})'$, which stores the lags of the endogenous variables. The model is given by

$$(1) \qquad\qquad y_t = F(x_t) + \varepsilon_t, \quad \varepsilon_t \sim N(0, \Sigma)$$

where F denotes an unknown function that takes x_t as input and returns $F(x_t) = (f_1(x_t), \ldots, f_M(x_t))'$ as output. The equation-specific functions $f_j(x_t)$ ($j = 1, \ldots, M$) allow for different functional relations across the elements in y_t. Finally, we let ε_t denote a Gaussian shock term with error covariance matrix Σ. The matrix Σ can be made time varying but, given the recent forecasting evidence in Clark et al. (2022), we leave this possibility aside and focus on the homoscedastic case for reasons of simplicity.

The unknown equation-specific functions f_j are approximated using BART. The BART approximation of f_j is:

$$(2) \qquad\qquad f_j \approx \sum_{s=1}^{S} g(X | \mu_s, T_s),$$

where we let $X = (x_1, \ldots, x_T)'$ denote a $T \times Mp$ full data matrix of regressors and each function g is a tree function that depends on the tree structure T_s and terminal node parameters μ_s. The intuition behind the tree functions is as follows. The tree structure is made of a sequence of decision rules of the form $\{x_t < c\}$ or $\{x_t \geq c\}$ and thus decomposes the input space into several disjoint subsets. These forms of decision rules are applied iteratively and, after testing all these splitting rules, we reach a terminal node. Each terminal node is associated with a terminal node parameter μ_s. The terminal node parameter is then the predicted value of the corresponding regression.

It is worth illustrating this concept by means of a simple example that sets $S=M=1$. Suppose that $x_t=t$ and t runs from 1 to T. Let $c=30$ and the number of terminal nodes be equal to 2. In this trivial case the tree simply splits the sample in two: The first part includes all observations from the beginning of the sample up to 29, whereas the second part includes observations 30 to T. For each of these samples, we then simply estimate the mean over the samples. These means are then the terminal node parameters. The corresponding predictions are then given by:

$$E(y_t) = \begin{cases} \mu_1 \ if \ \ t < 30 \\ \mu_2 \ if \ \ t \geq 30 \end{cases}.$$

Since this specification is very simple (it models through a single structural break), the question arises whether it would pay off to allow for more complex tree structures. Chipman et al. (2010) discuss this possibility but argue for a model that uses very simple tree functions and – instead of taking one single tree – sum over many simple trees. This is what we do in equation (2). Instead of just using a single tree that implies a single structural break, it would be possible to use many (i.e., S) trees. In such a case, the joint model will be able to fit more complex patterns in the data while minimizing the risk of overfitting.

We carry out model estimations precisely along the lines suggested in Huber and Rossini (2022). Our approach is Bayesian and we use the benchmark priors proposed in Chipman et al. (2010). Posterior simulation is carried out using an equation-by-equation algorithm that simulates the terminal node parameters, tree structures and error covariances using a Metropolis-within-Gibbs sampler. Further information can be found in Huber and Rossini (2022) or Clark et al. (2022).

3 Empirical results

This section discusses the impulse responses of the unemployment rate and different price measures to shocks to the unemployment rate. We focus on an unemployment shock defined along the lines of Del Negro et al. (2020). This implies that we rank unemployment first and then consider a Cholesky decomposition of the error covariance matrix Σ. Notice that this approach leaves open the question of whether changes in the unemployment rate are driven by demand- or supply-side shocks. One way to address this question would be to use identified shock measures. As we are interested in estimating nonlinear Phillips curves and high-frequency instruments are not readily available for the CESEE countries, we leave this possibility aside.

We consider three different shocks to the unemployment rate: a one-standard deviation (weak), a five-standard deviation (medium) and a ten-standard deviation (strong) shock.

Chart 4 shows the impulse responses of the unemployment rate, illustrating the magnitude and the evolution of the respective shock. In all four countries under review, a weak shock leads to an immediate increase of the unemployment rate by 0.4 to 0.5 percentage points.[2] The shock fades out rather quickly and becomes statistically insignificant after 5 to 7 quarters.

A medium shock leads to an immediate increase of the unemployment rate by 1.8 percentage points in Czechia, 2.1 percentage points in Hungary and 2.5 percentage points in Poland and Romania. The unemployment rate returns to its initial level quickly at first, and then gradually. The shock ceases to be statistically significant after 9 quarters in Romania, after 10 quarters in Poland and after 12 quarters in Hungary. In Czechia, the shock delivers significant increases in the unemployment rate even after 20 quarters.

A strong shock raises the unemployment rate by 3.7 percentage points in Czechia, 4.2 percentage points in Hungary, 5 percentage points in Poland and 5.1 percentage points in Romania. Again, the unemployment rate returns to its initial level quickly at first, and then gradually. The shock fades out after 10 quarters in Romania, after 12 quarters in Hungary and after 13 quarters in Poland. In Czechia, the shock is still statistically significant after 20 quarters and thus more long lived.

Chart 5 depicts the reaction of the unemployment rate to a strong positive and a strong negative shock. The impulse responses are largely symmetrical for Hungary and Romania, except for the first few quarters when negative shocks fade out somewhat more quickly than positive shocks. More variation can be observed in Czechia and Poland. In both countries, negative shocks impact the unemployment rate more strongly than positive shocks do. The difference between the two shocks

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[2] *The figures for the responses of selected variables to a shock in the unemployment rate reported in this section refer to the median estimates. The confidence intervals are depicted in the respective charts.*

Chart 4

Unemployment rate: impulse responses to different positive unemployment shocks

Czechia
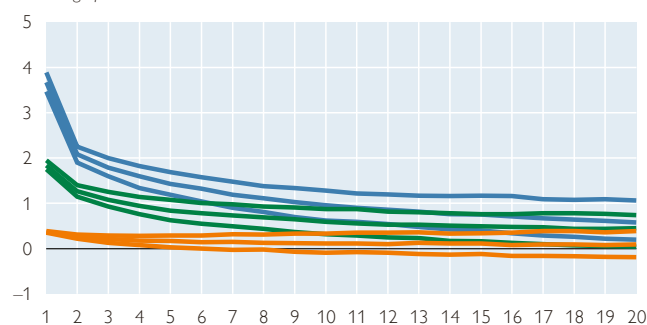
Percentage points

Hungary
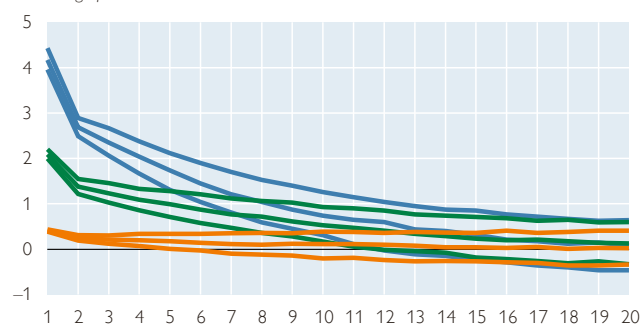
Percentage points

Poland

Percentage points

Romania

Percentage points

Source: Authors' calculations.

Note: Median, 16th and 84th credible intervals of the posterior distribution of the dynamic responses to a strong (blue line), medium (green line) and weak (orange line) unemplomyent shock.

reaches a maximum of about 0.4 percentage points after 4 and 5 quarters, respectively, and – in the case of Czechia – continues to be observed even after 20 quarters.

Chart 5

Unemployment rate: impulse responses to strong positive and strong negative unemployment shock

Czechia

Percentage points

Hungary
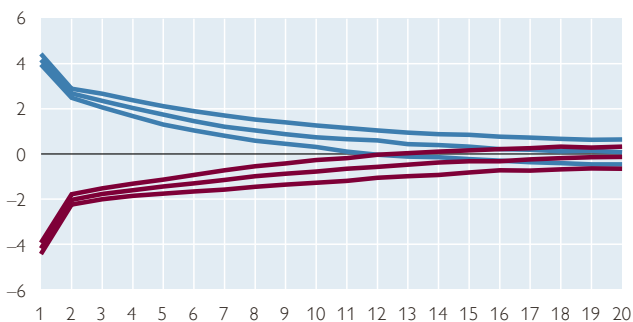
Percentage points

Poland

Percentage points

Romania

Percentage points

Source: Authors' calculations.

Note: Median, 16th and 84th credible intervals of the posterior distribution of the dynamic responses to a strong positive (blue line) and a strong negative (red line) unemplomyent shock.

Next, our focus is on how HICP inflation responds to unexpected movements in the unemployment rate. This exercise sheds light on whether inflation dynamically reacts to movements in the unemployment rate and whether these movements are consistent with economic theory.

The price reactions to shocks of different sizes are shown in chart 6. The most important information from this chart is that it takes quite a substantial shock to the unemployment rate to trigger a significant reaction in HICP inflation. Small shocks do not translate into any significant price reactions. While medium-sized shocks reduce inflation across the countries under review, responses are very moderate in some cases and tend to fade out in most cases. A medium-sized shock reduces inflation by a maximum of 1.2 percentage points in Czechia (after 17 quarters), 0.7 percentage points in Hungary (after 6 quarters), 0.6 percentage points in Poland (after 10 quarters) and 0.9 percentage points in Romania (after 7 quarters). Only in Czechia, the response remains significant after 20 quarters. In Hungary, the shock becomes insignificant after 17 quarters, in Poland after 13 quarters and in Romania after 16 quarters.

Only strong shocks substantially reduce inflation and produce significant reactions even after 20 quarters. The largest effects can be observed in Czechia and Romania, where the shock reduces inflation by a maximum of 1.6 percentage points after 15

Chart 6

HICP inflation: impulse responses to different positive unemployment shocks
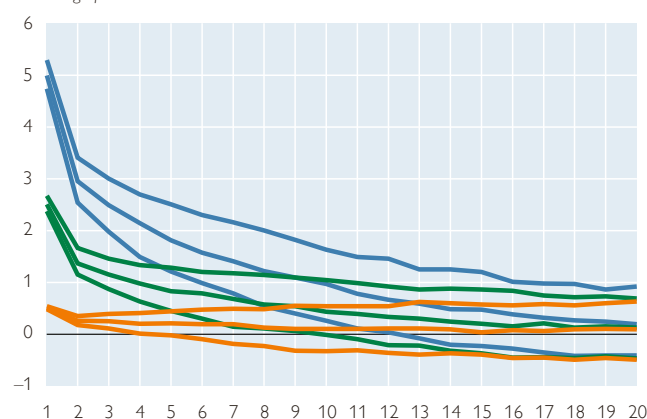
Czechia
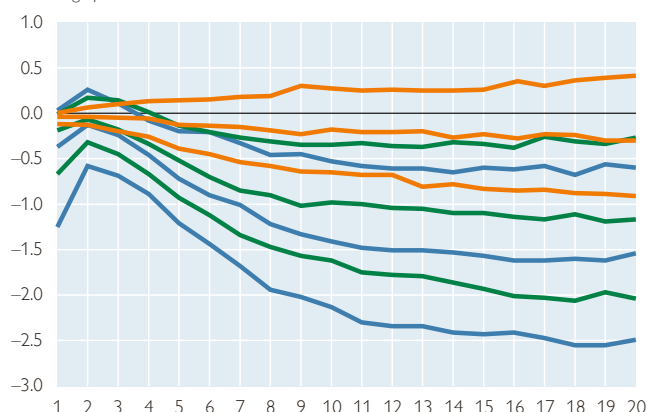
Percentage points

Hungary
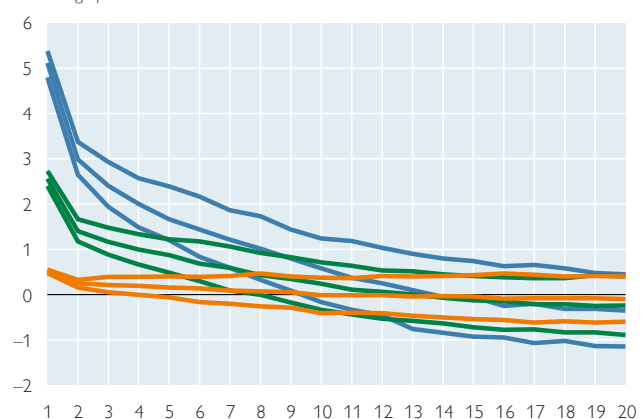
Percentage points

Poland

Percentage points

Romania
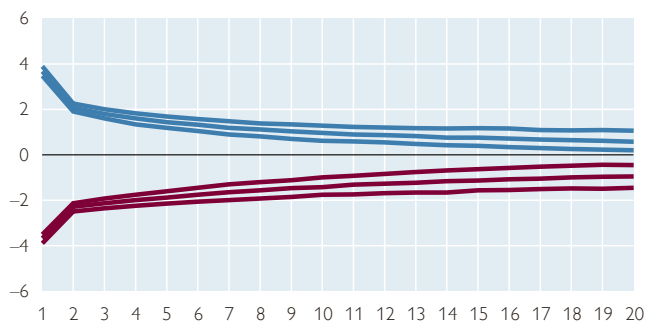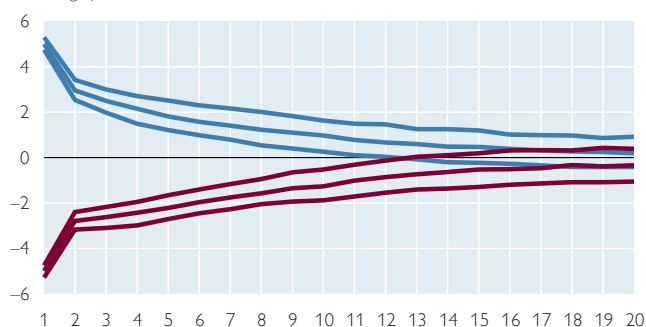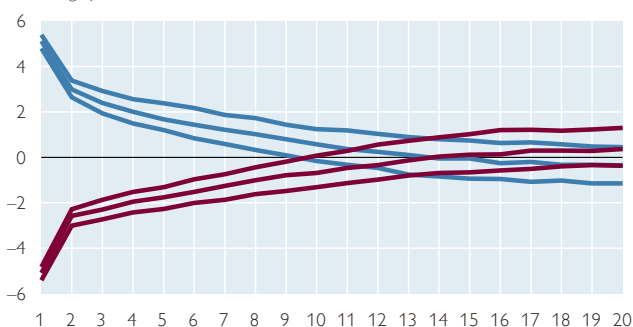
Percentage points

Source: Authors' calculations.

Note: Median, 16th and 84th credible intervals of the posterior distribution of the dynamic responses to a strong (blue line), medium (green line) and weak (orange line) unemploymyent shock.

and 8 quarters, respectively. The impact is somewhat weaker in Hungary and Poland but remains substantial at a maximum of 1.2 and 1.1 percentage points, respectively, after 7 quarters.

Chart 7 shows the impulse responses of HICP inflation to a strong positive and a strong negative shock. Only for Hungary we find responses that are symmetrical, indicating that positive and negative shocks impact prices to a similar extent. For the other countries, responses differ somewhat. In Czechia, a positive unemployment shock has a much weaker impact on HICP inflation than a negative shock. This means that an increase in the unemployment rate reduces inflation by a lesser margin than a decrease in the unemployment rate drives inflation up. This difference reaches a maximum of 1.1 percentage points after 12 quarters and remains substantial even after 20 quarters. The picture is similar for Poland, although the differences are not quite as pronounced and reach a maximum of only 0.4 percentage points after 5 quarters. In Romania, a negative shock produces a stronger response up until 10 quarters; after that, a positive shock tends to impact on inflation somewhat more strongly.

Chart 7

HICP inflation: impulse responses to strong positive and strong negative unemployment shock

Czechia

Percentage points

Hungary
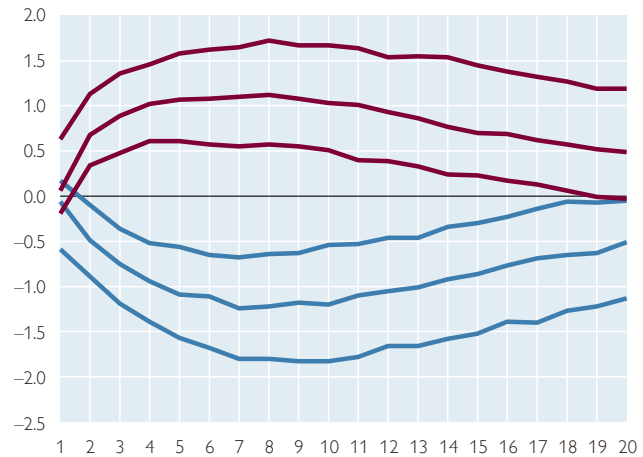
Percentage points

Poland

Percentage points

Romania

Percentage points

Source: Authors' calculations.

Note: Median, 16th and 84th credible intervals of the posterior distribution of the dynamic responses to a strong positive (blue line) and a strong negative (red line) unemplomyent shock.

Chart 8 shows the impulse responses of core inflation (HICP inflation excluding energy and unprocessed food) to different positive shocks. As is the case with headline inflation, only medium and strong shocks result in statistically significant changes to core inflation. A medium-sized shock reduces core inflation by a maximum of 0.9 percentage points in Czechia (after 12 quarters), 0.5 percentage points in Hungary (after 6 quarters), 0.4 percentage points in Poland (after 6 quarters) and 0.6 percentage points in Romania (after 6 quarters). Only in Czechia, the response remains significant after 20 quarters. In Hungary, the shock becomes insignificant after 17 quarters, in Poland after 12 quarters and in Romania after 16 quarters.

A strong shock to the unemployment rate reduces core inflation by a maximum of 1.3 percentage points in Czechia (after 12 quarters), 0.9 percentage points in Hungary (after 8 quarters), 0.8 percentage points in Poland (after 8 quarters) and 1.1 percentage points in Romania (after 8 quarters). The effects of the shock remain statistically significant after 20 quarters. With that, shocks to core inflation produce effects that are comparable to the effects of shocks to headline inflation in
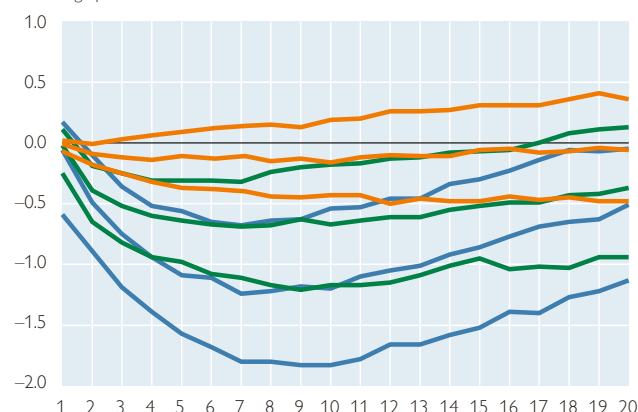
Chart 8

Core inflation: impulse responses to different positive unemployment shocks
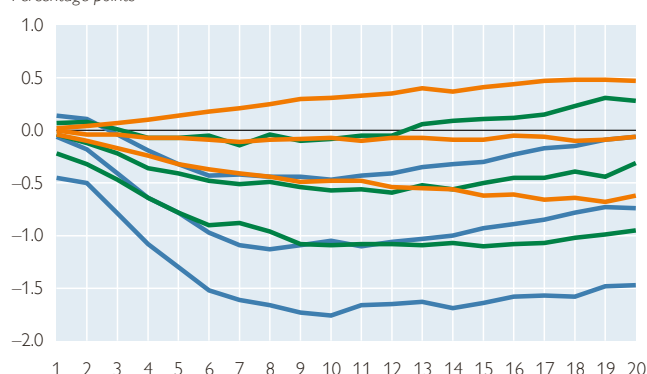
Czechia

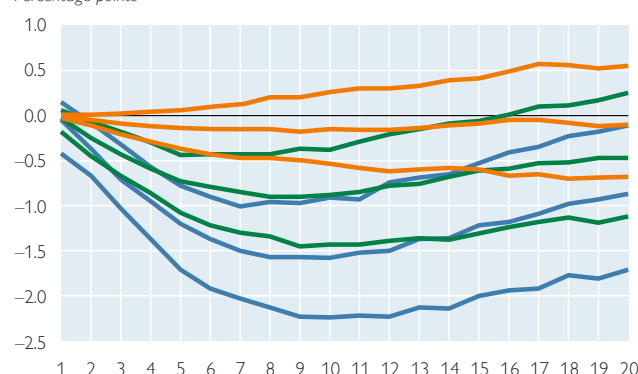*Percentage points*

Hungary

Percentage points

Poland

Percentage points

Romania
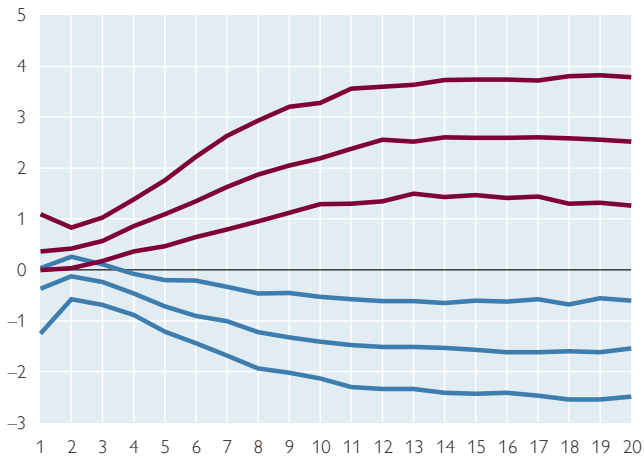
Percentage points
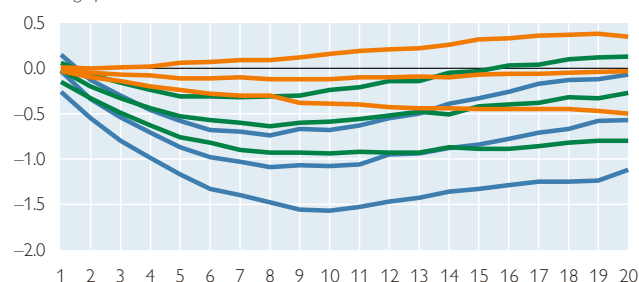
Source: Authors' calculations.

Note: Median, 16th and 84th credible intervals of the posterior distribution of the dynamic responses to a strong (blue line), medium (green line) and weak (orange line) unemplomyent shock.

terms of timing and persistence; their quantitative effects are generally lower, however.

We now turn to the question of whether there are any asymmetries with respect to the sign of the shock to core inflation. Chart 7 shows the impulse responses of core inflation to strong positive and negative shocks to the unemployment rate. As is the case with headline inflation, impulse responses are largely symmetrical for Hungary (even though the negative shock impacts somewhat more strongly on core inflation over the first 3 quarters). In Czechia, core inflation responds more strongly to negative shocks than to positive shocks throughout the observation period, with the difference reaching a maximum of 0.8 percentage points (after 14 quarters). The same is true for Poland, but the difference in the two responses only climbs to 0.2 percentage points (after 5 quarters). In Romania, the impact of the negative shock outpaces the impact of the positive shock up until the 10th quarter, after which the two shocks become largely indistinguishable.

Chart 9

Core inflation: impulse responses to strong positive and strong negative unemployment shock
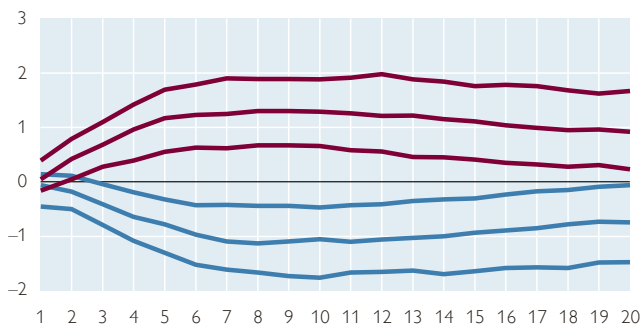
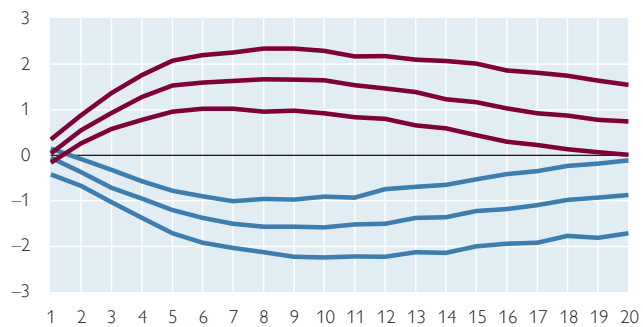**Czechia**
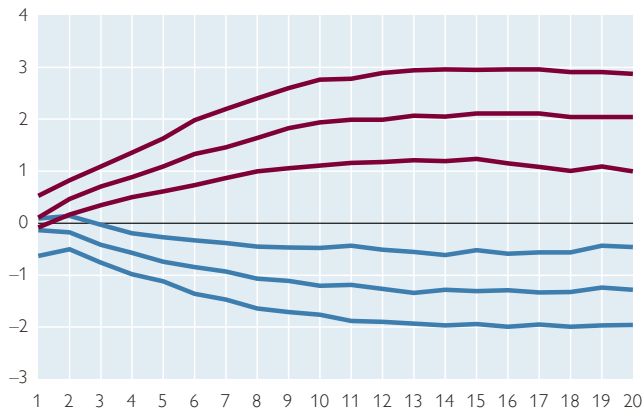
Percentage points

Hungary
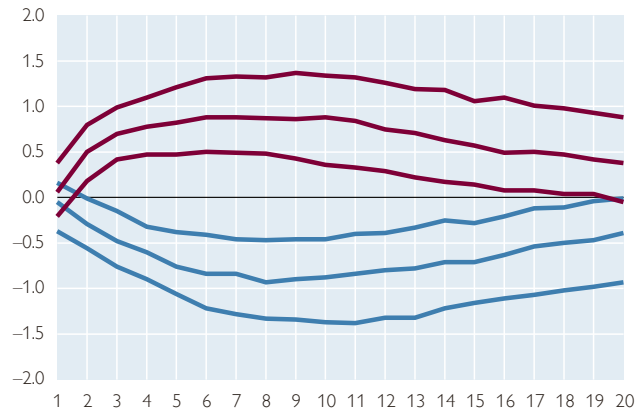
Percentage points

Poland

Percentage points

Romania

Percentage points

Source: Authors' calculations.

Note: Median, 16th and 84th credible intervals of the posterior distribution of the dynamic responses to a strong positive (blue line) and a strong negative (red line) unemplomyent shock.

To improve our intuition of what drives dynamics in core inflation, we decompose core inflation into a cyclical and a noncyclical component. Chart 10 depicts the reaction of cyclical core inflation to different unemployment shocks. Again, it takes at least a medium-sized shock to produce statistically significant results.

A medium-sized shock reduces cyclical core inflation by a maximum of 0.9 percentage points in Czechia (after 12 quarters), 0.6 percentage points in Hungary (after 5 quarters), 0.5 percentage points in Poland (after 9 quarters) and 0.9 percentage points in Romania (after 11 quarters). The effects remain significant even after 20 quarters in Czechia, but fade away after 15 quarters in Hungary, after 11 quarters in Poland and after 15 quarters in Romania.

Large shocks reduce cyclical core inflation by a maximum of 1.3 percentage points in Czechia (after 12 quarters), 1.1 percentage point in Hungary (after 9 quarters), 0.9 percentage points in Poland (after 8 quarters) and 1.4 percentage points in Romania (after 11 quarters). The effects remain statistically significant even after 20 quarters in all countries under observation.
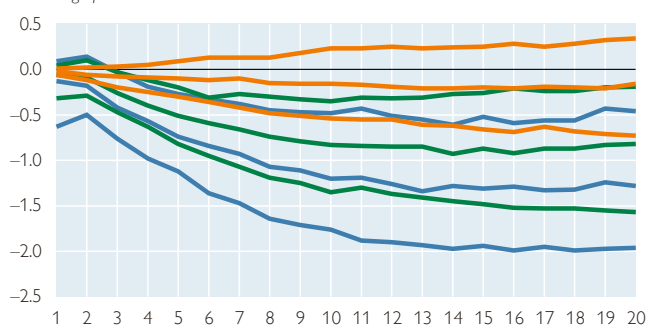
Chart 10

Cyclical core inflation: impulse responses to different positive unemployment shocks
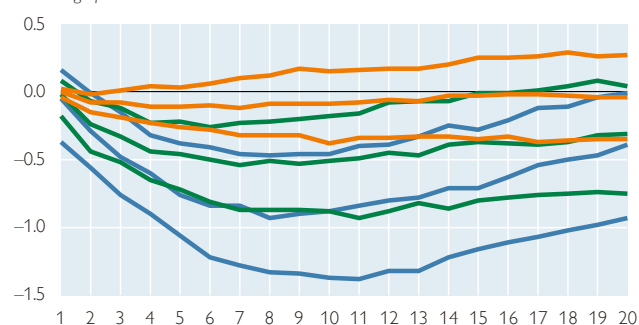
Czechia
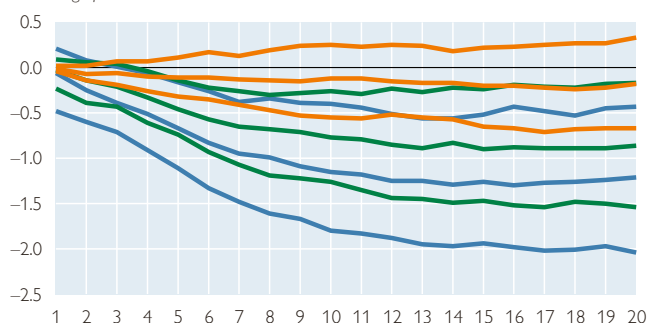
Percentage points

Hungary
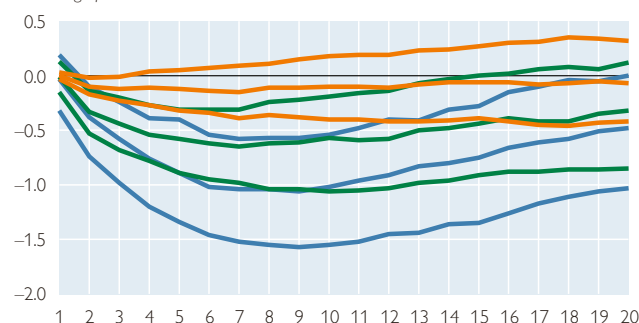
Percentage points

Poland
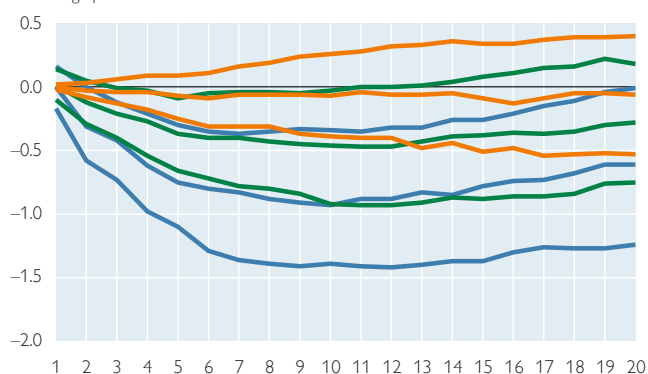
Percentage points

Romania

Percentage points
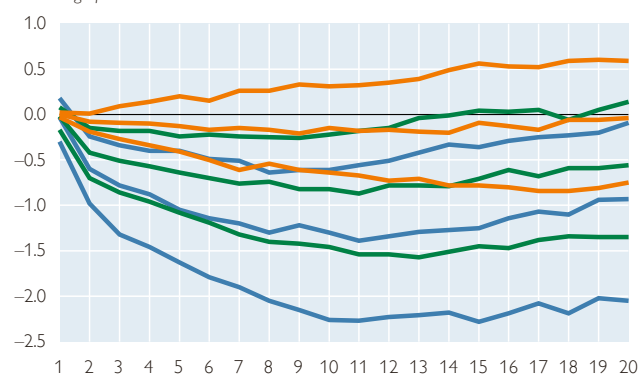
Source: Authors' calculations.

Note: Median, 16th and 84th credible intervals of the posterior distribution of the dynamic responses to a strong (blue line), medium (green line) and weak (orange line) unemplomyent shock.

Chart 11 shows the response of cyclical core inflation to strong negative and strong positive shocks to the unemployment rate. The responses are largely symmetrical for Hungary and Romania, even though in Hungary, the negative shock impacts somewhat more strongly on cyclical core inflation over the first 5 quarters. In Czechia, cyclical core inflation responds more strongly to negative shocks than to positive shocks throughout the observation period, with the difference reaching a maximum of 0.8 percentage points (after 10 quarters). The same is true for Poland, but the difference in the two responses only climbs to 0.3 percentage points (after 6 quarters).

Chart 11

Cyclical core inflation: impulse responses to strong positive and strong negative unemployment shock

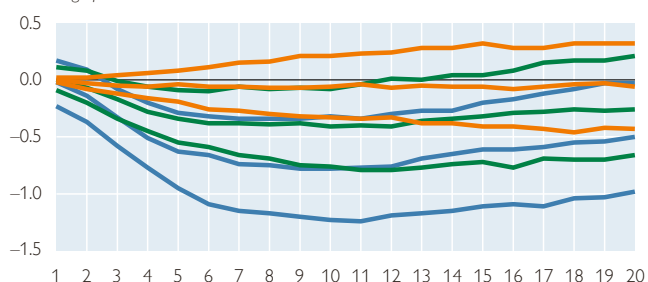**Czechia**
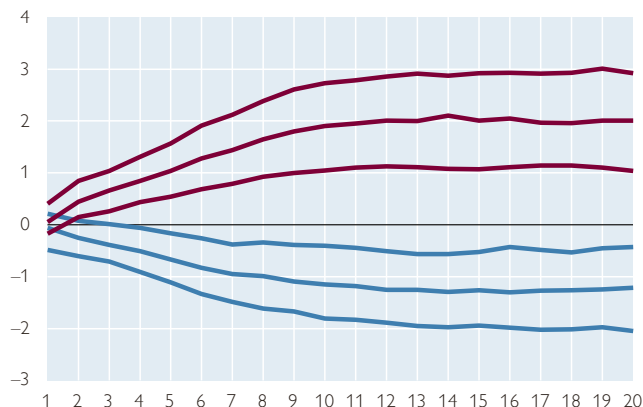
*Percentage points*

Hungary
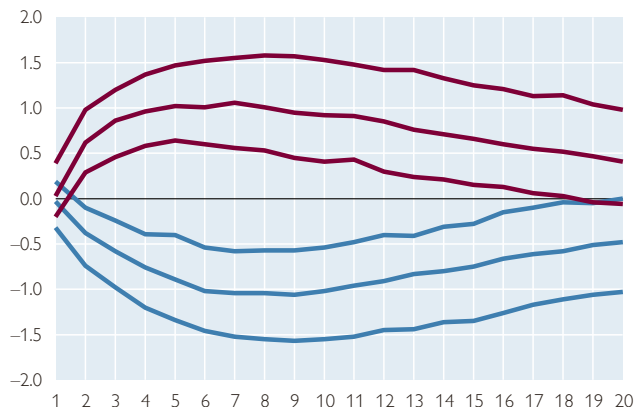
Percentage points

Poland
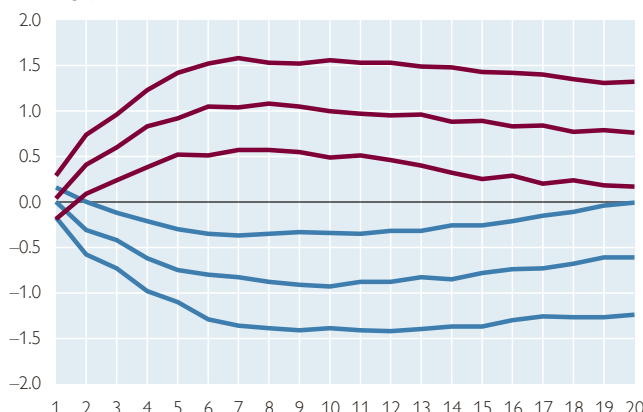
Percentage points

Romania

Percentage points
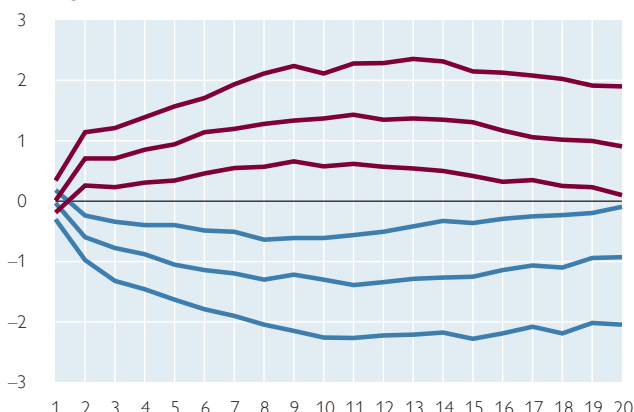
Source: Authors' calculations.

Note: Median, 16th and 84th credible intervals of the posterior distribution of the dynamic responses to a strong positive (blue line) and a strong negative (red line) unemplomyent shock.

Chart 12 shows the reaction of the noncyclical part of core inflation to shocks to the unemployment rate. Two things stand out: First, only large shocks significantly reduce noncyclical core inflation for an extended time span. Second, even with strong shocks it takes quite some time to produce a significant negative effect on noncyclical core inflation (between 4 quarters in Czechia and 7 quarters in Romania).

Strong shocks reduce noncyclical core inflation by a maximum of 1.2 percentage points in Czechia (after 11 quarters), 0.5 percentage points in Hungary (after 9 quarters), 0.5 percentage points in Poland (after 7 quarters) and 0.9 percentage points in Romania (after 13 quarters). The effects of the shock remain statistically significant even after 20 quarters in all countries but Poland, where the effect fades after 16 quarters.

Chart 13 shows the responses of noncyclical core inflation to strong negative and positive shocks to the unemployment rate. We observe largely symmetrical effects in Hungary and Romania. In Czechia, noncyclical core inflation responds

Chart 12

Noncyclical core inflation: impulse responses to different positive unemployment shocks

Czechia
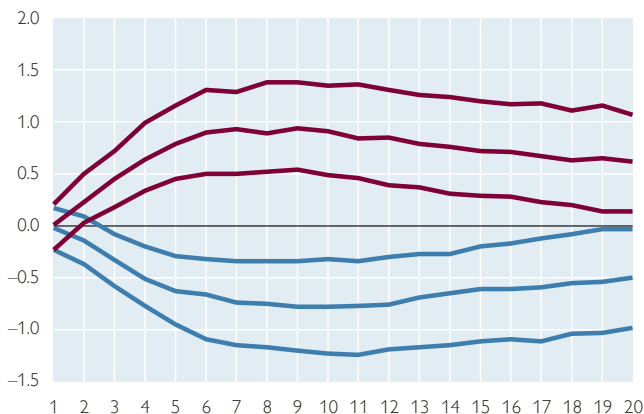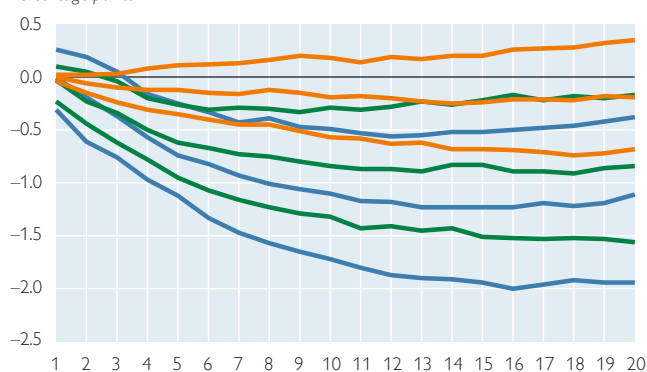
Percentage points

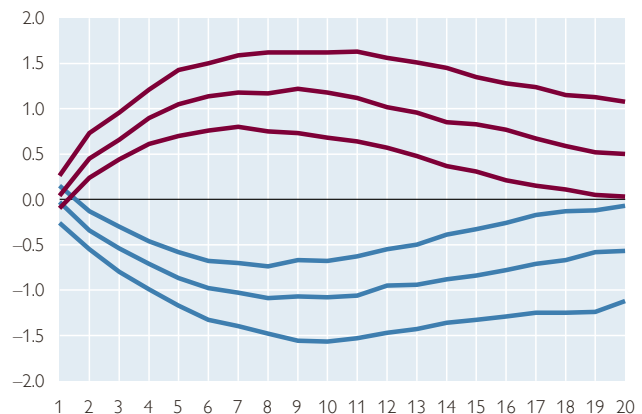**Hungary**
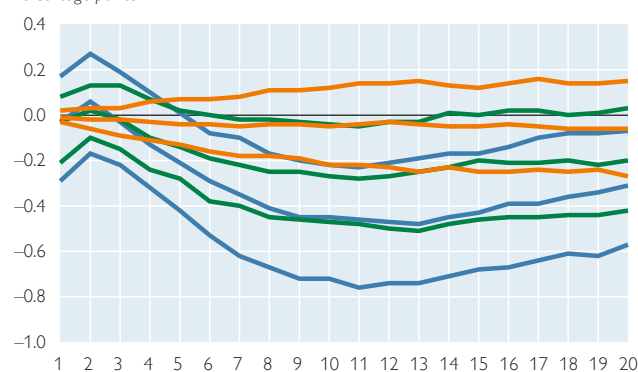
Percentage points

Poland
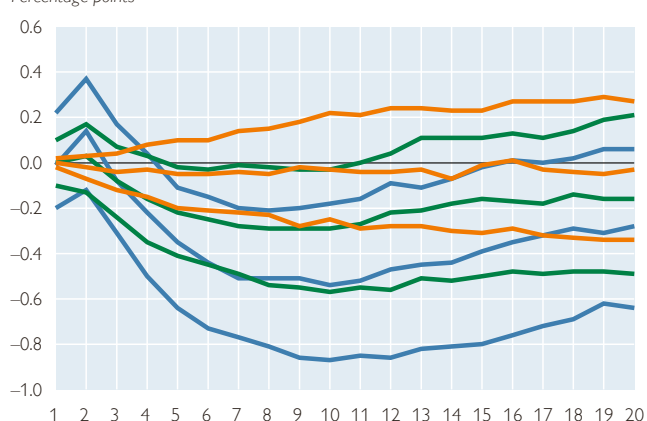
Percentage points

Romania

Percentage points
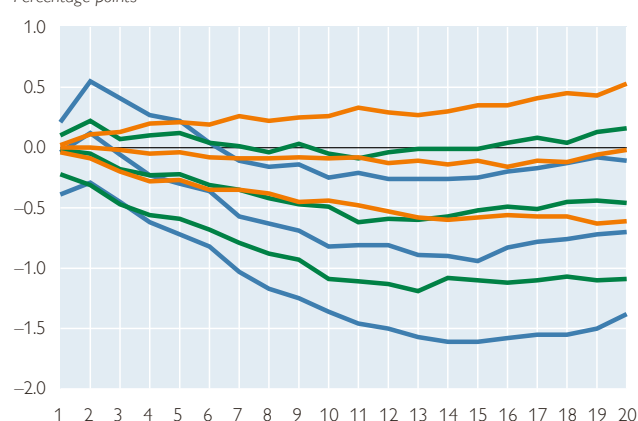
Source: Authors' calculations.

Note: Median, 16th and 84th credible intervals of the posterior distribution of the dynamic responses to a strong (blue line), medium (green line) and weak (orange line) unemplomyent shock.

more strongly to negative shocks than to positive shocks throughout the observation period, with the difference reaching a maximum of 0.7 percentage points (after 12 quarters). The same is true for Poland, but the difference in the two responses only climbs to 0.3 percentage points and reaches its maximum already after 2 quarters. After 10 quarters, the two responses are largely indistinguishable.

Chart 13

Noncyclical core inflation: impulse responses to strong positive and strong negative unemployment shock

Czechia
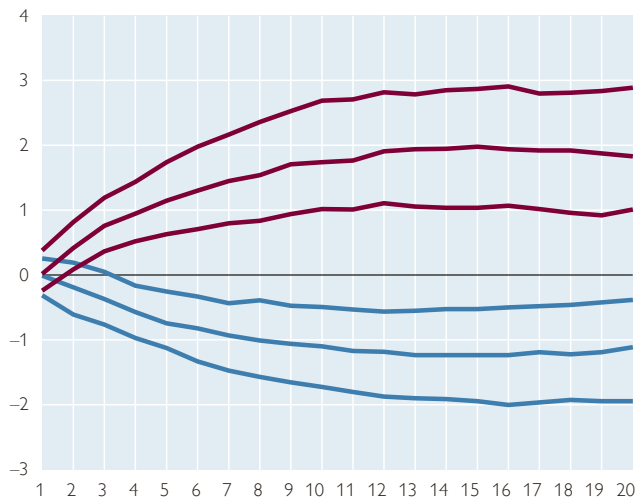
Percentage points

Hungary
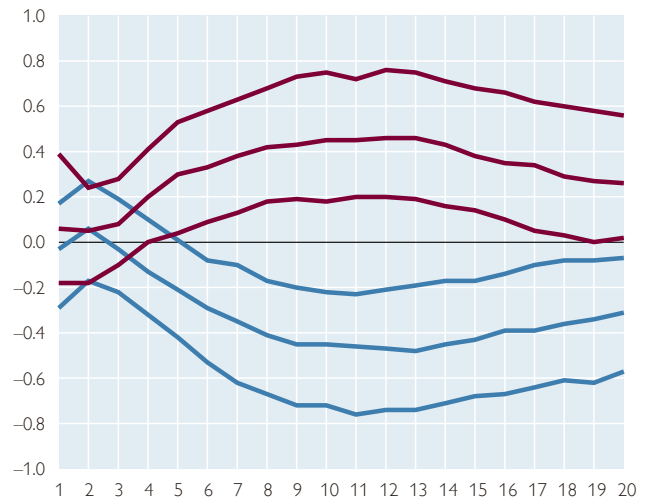
Percentage points

Poland
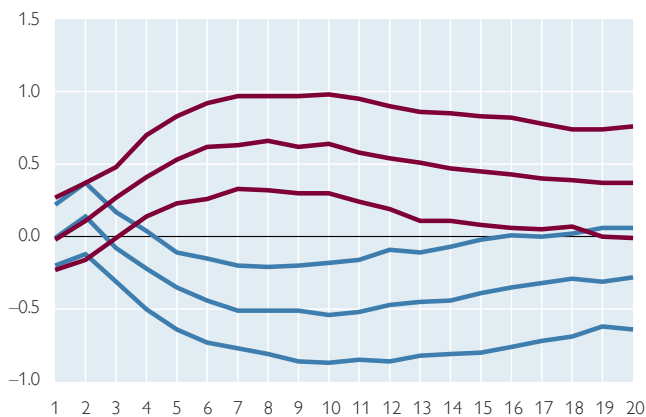
Percentage points

Romania

Percentage points
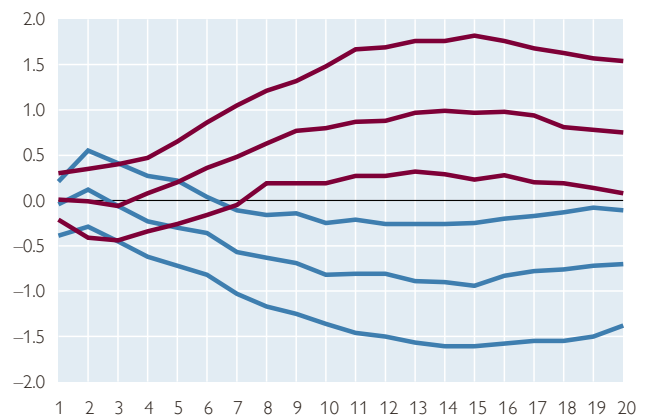
Source: Authors' calculations.

Note: Median, 16th and 84th credible intervals of the posterior distribution of the dynamic responses to a strong positive (blue line) and a strong negative (red line) unemplomyent shock.

4 Discussion of results

Our paper aims to find out whether the Phillips curve is still alive and well behaved in CESEE. Our results for a sample of four CESEE countries suggest the following: The Phillips curve is still alive, but it may be somewhat sleepy. It takes quite a push to wake it up. Only a strong shock to the unemployment rate induces a significant, broad and lasting effect on price growth in the countries in our sample. Our results point toward substantial nonlinearities in the relationship between real economic activity and inflation.

We find that an increase in the unemployment rate by a magnitude of ten standard deviations lowers headline HICP inflation by a maximum of 1.1 to 1.6 percentage points, depending on the individual country. The impact is some-

what weaker for core inflation, where a strong shock induces a decline by a maximum of between 0.8 and 1.3 percentage points. Within core inflation, cyclical components react much more strongly than noncyclical components (0.9 to 1.4 percentage points vs. 0.5 to 1.2 percentage points). Usually, the maximum impact is reached after about 10 quarters and weakens again toward the end of the observation period. Across individual countries, the strongest effects can be observed for Czechia, followed by Romania and – with quite some margin – Hungary and Poland.

Compared with the reactions to strong shocks, those to medium-sized shocks (five standard deviations) are roughly half as strong and usually lose statistical significance after some time at least in Hungary, Poland and Romania. In Czechia, even medium shocks produce significant results for 20 quarters and beyond and impact somewhat more strongly on inflation than in the other CESEE countries.

The fact that only strong shocks induce substantial, broad and lasting reactions constitutes one important nonlinearity in the Phillips curves of the countries under review. Another important nonlinearity can be found in the way inflation reacts to shocks with different signs. At least in the case of Czechia and Poland, inflation reacts much more strongly to negative shocks than to positive shocks. This means that a reduction in the unemployment rate drives up inflation to a stronger extent than an increase in the unemployment rate lowers it. This finding is robust across different inflation measures. The situation is somewhat more heterogeneous in Romania. Here, negative shocks tend to produce stronger results than positive shocks. The differences, however, are less pronounced, they are often restricted to certain time periods and they are found predominantly for the broader aggregates of headline and core inflation. Only in Hungary, impulse response functions are largely symmetrical for both positive and negative shocks.

5 Conclusions

Our estimations show that the Phillips curve is alive and well in CESEE. However, it displays some nonlinearities that are vital in understanding the impact of labor market developments on inflation over the past ten years. It takes a substantial shock to the unemployment rate to trigger a notable and sustained move in the inflation rate. Furthermore, it takes around two and a half years until such a shock reaches its maximum impact. This should introduce quite some inertia in the Phillips curve relationship in cases where the unemployment rate changes steadily but only slowly. Exactly such a setting was observed in the years preceding the pandemic, when gradual improvements in the unemployment rate stretched out over many years and did not initiate a strong increase in inflation.

Nevertheless, some inflationary pressure was probably accumulated. This pressure finally started to contribute to price rises after post-pandemic and war-related disruptions led to a regime change from a low inflation to a high inflation environment. In such a situation, price changes in individual subsegments increasingly affect other subsegments and a limited change in relative prices tends to translate into a stronger generalized inflation momentum (see BIS, 2022). Transitioning back from such a high inflation regime can be very costly once it becomes entrenched. Our research suggests that – at least in some CESEE countries – this transition could be made even more costly by the fact that inflation reacts more weakly to a loosening than to a tightening of the labor market. Against this back-

drop, classic macroeconomic demand management, including demand management by means of monetary policy, would be called upon to act particularly strongly and decisively to keep inflation in check.

On top of that, it remains unclear how strongly economic policy could contribute to labor market loosening in the CESEE countries under consideration. In CESEE, several factors keep labor markets tight even when macroeconomic demand conditions are weakening: (1) The production factor labor is particularly heavily utilized; (2) labor supply is adversely affected by demographic headwinds such as population aging, skill mismatches, emigration and – in some countries – cross-border commuting for work; and (3) catching-up related positive growth differentials vis-à-vis Western Europe and a structural shift of the economy toward labor-intensive services keep labor demand high. CESEE labor markets have therefore operated (almost) at full capacity for much of the past decade and labor shortages have become chronic. While there are some possible remedies for this situation – e.g. automation – labor markets will probably remain tight at least over the medium term, thereby limiting the functioning of the Phillips curve relationship. Against this backdrop, future research might explicitly address the functioning of the Phillips curve in an environment of structurally tight labor markets and put a spotlight on special nonlinearities related to unemployment rates that are near the "zero lower bound."

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Dedollarization efforts in Russia's foreign trade against the backdrop of Russia's war in Ukraine and intensifying Western sanctions (2013–2023)

Stephan Barisitz, Tatiana Evdokimova[1]

Dedollarization trends in Russia's foreign trade have accelerated profoundly since Russia invaded Ukraine in 2022. Efforts to dedollarize date back to 2014, when Russia's annexation of Crimea triggered the first sanctions. In the following eight years, the US dollar share in Russia's foreign trade with its main trading partners dropped, albeit to varying degrees. Opportunities to dedollarize were smaller for Russian exports than for imports as Russian exports are dominated by commodities, which are historically mostly traded in hard currencies. Prior to 2022, the euro was deemed a relatively secure alternative to the US dollar and often replaced it as dedollarization unfolded. This strategy, however, limited genuine risk diversification once the United States and the European Union massively tightened their sanctions against Russia in 2022 in a synchronized way. Heightened difficulties and risks in processing US dollar and euro payments prompted a rapid shift to national currencies in Russia's foreign trade. As of spring 2023, about 60% of Russia's foreign trade was settled in Russian ruble and renminbi-yuan, compared to an average of around 20% in early 2022. Numerous initiatives regarding settlements in Turkish lira, United Arab Emirates dirham and Indian rupee were announced in 2022 and continue to be pursued in 2023, but financial infrastructure limitations have so far prevented any major breakthrough. These shortcomings may gradually be tackled though, creating opportunities for further invoicing currency diversification. Still, we do not consider these rapid shifts in Russia's foreign trade invoicing a major threat to the predominance of the US dollar and the euro in global trade. On a regional level, however, a degree of currency fragmentation appears possible or likely.

Ever since Russia's annexation of Crimea and the Western sanctions imposed on Russia from 2014, the authorities in Moscow have pursued a dedollarization policy, which gained strong momentum after Russia invaded Ukraine in February 2022 and the United States and the European Union put in place unprecedented punitive economic and financial measures against Russia. This study will focus on *dedollarization in Russia's foreign trade,* leaving aside the numerous domestic and foreign non-trade related aspects of this multifaceted phenomenon that would go far beyond the scope of this paper. Our key contribution to the rapidly growing literature on invoicing patterns is a timely investigation of Russian foreign trade dedollarization efforts amid the swiftly changing sanctions environment. Prior to February 2022,

changes in Russia's invoicing patterns had some similarity to globally observed trends that were consistent with the dominant currency paradigm discussed in Gopinath and Itskhoki (2021). Since the start of the war against Ukraine, Russia's invoicing choices have seemed to be more affected by sanctions risks than by standard invoicing determinants.

This paper is structured as follows: Section 1 briefly defines foreign trade dedollarization, including its drivers and potential challenges. Section 2 gives an overview of Russia's foreign trade geography and product structure. In section 3, we describe dedollarization trends of the last decade, focusing on several subperiods and the role of sanctions. Section 4 lists some key impediments to further dedollarization. Section 5 wraps up, providing an outlook and conclusions.

1 Dedollarization of Russian foreign trade: definition, reasons and challenges

In a general sense, we adhere to the view of Kokenyne, Ley and Veyrune (2010, p. 3) that a successful dedollarization policy makes the local currency more attractive to residents than foreign currencies. For the purpose of this study, we use *dedollarization* in the wider sense of the Russian term "devalyutizatsia" to mean the *transition to settling trade with nonsanctioning countries in their national currencies,* thus avoiding the use not only of the US dollar, but also of other sanctioning (Western) countries' reserve currencies, e.g. the euro, the pound sterling or the Japanese yen.[2]

Reasons for dedollarization include boosting the importance of the domestic currency and thus also enlarging national economic policy room for maneuver. Using national currencies for foreign trade payments can avoid having to take recourse to widely used reserve currencies, like the US dollar or the euro. It can thus prevent a drawdown or depletion of foreign reserves, which may be needed for debt servicing. At least theoretically, it can even cut transaction costs as it requires only one exchange between two respective national currencies as opposed to first converting national currency A into the reserve currency used and then converting the latter into national currency B. This notwithstanding, the attractiveness of a currency for foreign trade payments is also influenced by domestic monetary stability, i.e. primarily by the question whether a country has a track record of low inflation or not (Nabiullina, 2022).

For Russia, the most important reason for dedollarization is to reduce its exposure to possible Western sanctions connected to the use of the US dollar or the euro. Since most large Russian banks were excluded from the international Swift system of financial messaging in March 2022, US dollar transactions have become very difficult, complicated or risky for Russian banks, euro transactions have become more difficult as well, and most correspondent accounts with Western banks have been closed. The Russian authorities therefore consider the US dollar and the euro "toxic" currencies that are to be avoided as much as possible. But Western sanctions also provide companies from nonsanctioning countries wishing to trade with Russia with an incentive to steer clear of the US dollar or the euro to cut potential costs and risks of being sanctioned themselves (see section 3.2.1).

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[2] *We choose this approach because existing sanctions that have already been expanded may easily be further extended to restricting the use of sanctioning countries' currencies.*

Challenges to dedollarization comprise relatively low liquidity and the lack of full convertibility of many national currencies. The tightening of Western sanctions led to a significant decline in Russian ruble liquidity on the foreign currency market (trading volumes dropped by around one-half), while – following the implementation of capital controls by the Bank of Russia in February and March 2022 – the ruble was no longer fully convertible. Taken together, these factors limited the ability to use the ruble as a substitute to reserve currencies. Trade between countries using national currencies should be relatively balanced because in case of large disequilibria it may be more difficult for a country recording a bilateral surplus to efficiently use earned proceeds than in a situation where proceeds denominated in widely used reserve currencies can be spent almost globally. Finding the appropriate exchange rate between currencies of limited liquidity may also be a challenge. Moreover, it takes time to set up alternative payment infrastructures (e.g. systems of correspondent accounts, messaging networks, infrastructures for foreign currency transactions, modern technologies).

2 Point of departure: some stylized facts on Russia's trade geography, product structure and dollarization in 2013

In recent decades, the EU was Russia's key trading partner, accounting for around 45% of Russia's exports and more than a third of Russia's imports, but its market share was declining gradually (charts 1 and 2). Russia's cooperation with China was scaling up rapidly between 2010 and 2021: China's share in Russian exports and imports increased from 5% to 14% and from 17% to 25%, respectively. At the same time, the US share in Russia's exports and imports remained below 3.5% and 2%, respectively, implying a considerable mismatch between the geography of trade and the use of invoicing currencies (chart 3). A similar pattern is also observed globally, as documented by Boz et al. (2020).

Chart 1

Russia's exports to its main trading partners
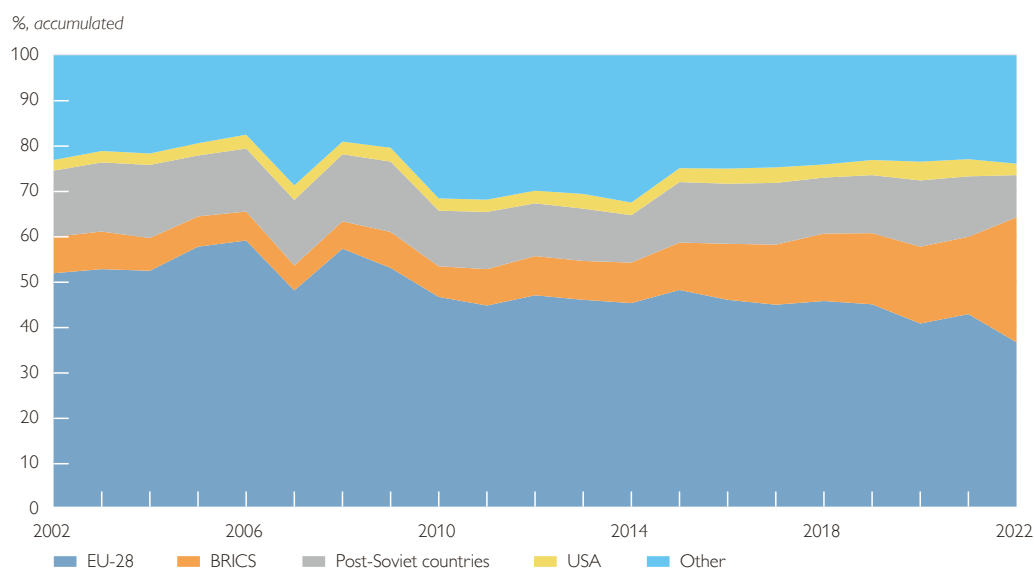
%, accumulated

Source: Trade Map, Bank of Russia.

Note: Estimates for 2022 are based on mirror data and may not be fully comparable. Post-Soviet countries excluding the Baltic countries.

Chart 2

Russia's imports from its main trading partners

%, accumulated

EU-28   BRICS   Post-Soviet countries   USA   Other

Source: Trade Map, Bank of Russia.

Note: Estimates for 2022 are based on mirror data and may not be fully comparable. Post-Soviet countries excluding the Baltic countries.
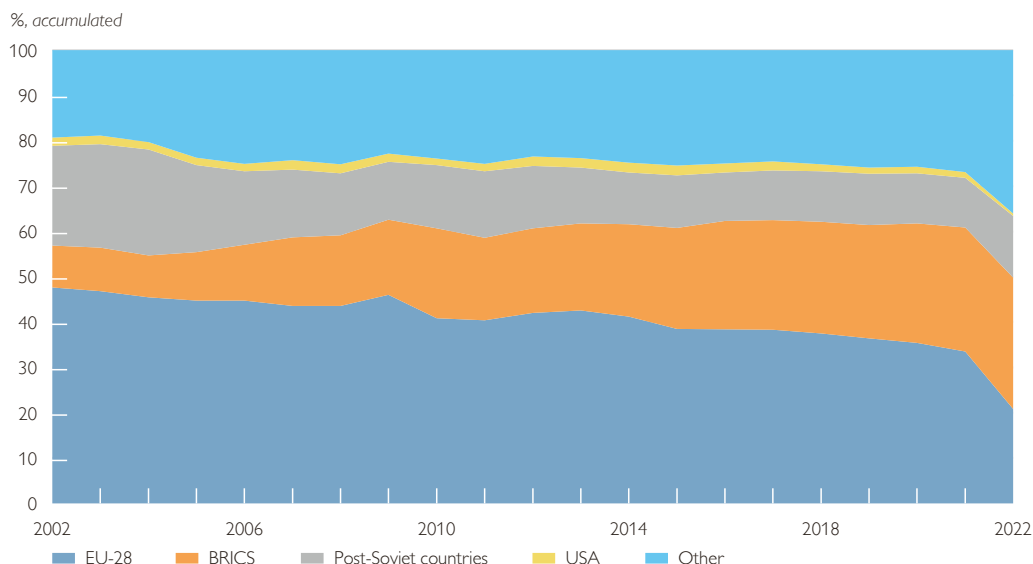
The currency mismatch was particularly visible in export payments, where US dollar predominance was linked to the high share of commodities in Russia's exports (up to two-thirds of export receipts came from exporting hydrocarbons and another 10% from metals). The product structure of imports was much more diversified, with the dominant category of machinery and equipment (45% on average) being largely supplied by EU companies and settled in euro (chart 4).

Chart 3

Russian exports: regions vs. invoicing currencies (2013)

Currency share in export invoicing, %

Export share per country, %

Source: Trade Map, Bank of Russia.
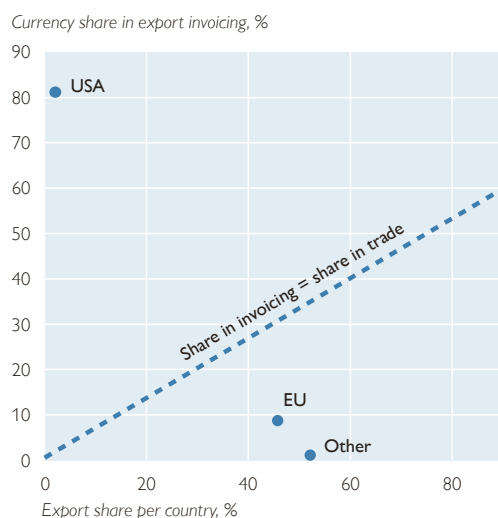
Chart 4

Russian imports: regions vs. invoicing currencies (2013)

Currency share in import invoicing, %

Import share per country, %

Source: Trade Map, Bank of Russia.
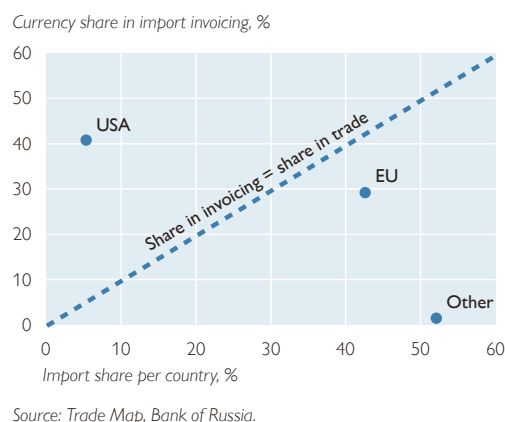
3 Dedollarization pushes and strategies

3.1 Was there an attempt to dedollarize prior to the annexation of Crimea and the initial sanctions?

Prior to the global financial crisis of 2008 and 2009 and the first round of sanctions against Russia in 2014, dedollarization was not very high on the agenda of Russian policymakers. In the absence of sanctions, exporters and importers were favoring reserve currencies (notably the US dollar and the euro) as the means of payment in line with the dominant currency paradigm discussed in Gopinath and Itskhoki (2021). Operations in these currencies helped keep transaction costs to a minimum thanks to highly liquid foreign exchange markets, the better pricing of trade finance instruments, a very wide network of correspondent accounts and the availability of hedging products.

At the same time, the Russian government pursued the medium-term goal to enhance the role of the Russian ruble in trade with Eastern European countries, the Caucasus countries and Central Asia and to increase the importance of Moscow as a regional financial center. Economic integration within the Eurasian Economic Community (Belarus, Kazakhstan, Kyrgyzstan, Russia and Tajikistan) strengthened the position of the ruble. However, these efforts were mostly focused on regional trade with no strategic target of reducing reliance on reserve currencies in trading with other partner countries.

3.2 Dedollarization strategy between 2013 and 2022

3.2.1 Reliance on the US dollar

With the introduction of sanctions in 2014, the risks associated with the use of the US dollar increased. This was also the moment when Russia's efforts to reduce reliance on the US dollar in foreign trade became clearly visible. The trend accelerated in the period from 2018 to 2019, following a new wave of US sanctions including the adoption of the Countering America's Adversaries Through Sanctions Act (CAATSA) in August 2017, restrictions on RUSAL, the world's second largest aluminum producer, in April 2018 and initial sanctions on Russian sovereign debt in August 2018. These new rounds of sanctions confirmed the trend toward a further tightening of US restrictions which could potentially target any private, publicly traded company.

The CAATSA marked the start of secondary sanctions related to transactions with Russian companies on the Specially Designated Nationals and Blocked Persons (SDN) list. Unlike primary sanctions, which introduce restrictions for US individuals and entities in dealing with SDN-listed foreign entities, secondary sanctions target non-US persons and entities that engage in activities with SDN-listed entities. Secondary sanctions (such as denial of export licenses or loans from US financial institutions, or potential inclusion in the SDN list) are thus of an extraterritorial nature. In fact, they represent the threat to foreign entities of being isolated from the US financial market. In many cases, the risk of becoming subject to secondary sanctions triggered overcompliance and multiple precautionary checks by banks and thus caused substantial delays in the execution of transactions with Russian entities.

In this environment, the euro was viewed as a relatively safe haven, i.a. because EU sanctions did not include secondary sanction clauses and hence did not create risks for non-EU entities. Even though the trends observed between 2013 and 2021 can be labeled as dedollarization, Russia's reliance on Western currencies remained, in fact, very high. A switch toward the euro, which might have seemed a more secure alternative to the US dollar, proved to provide little genuine diversification in foreign trade invoicing. A swift transition toward the use of national currencies was complicated as the corresponding payment infrastructure was lacking.

The Bank of Russia started publishing statistics on the currency composition of settlements for Russian trade in goods and services in 2013. Between 2013 and 2021, the share of the US dollar in payments for total Russian exports dropped from 81% to 54% (chart 5). Many Russian commodity exporters switched from the US dollar to the euro in that period. In 2019, Rosneft, the largest Russian oil company, and Novatek, Russia's largest producer of liquified natural gas (LNG), announced their complete transition to invoicing in euro (Reuters, 2019; Vedomosti, 2019).

This downward trend in US dollar use was observed in Russia's trade with most of its key trading partners but was particularly pronounced in trade with the BRICS[3], where the US dollar share declined from 95% in 2013 to 36% in 2021. A very similar trend was observed in China and India, Russia's two key trading partners among the BRICS. Given that hydrocarbons account for around 60% of Russian exports to the BRICS countries (chart 7), the decline of the US dollar

Chart 5

Share of USD in payments for Russian exports by region
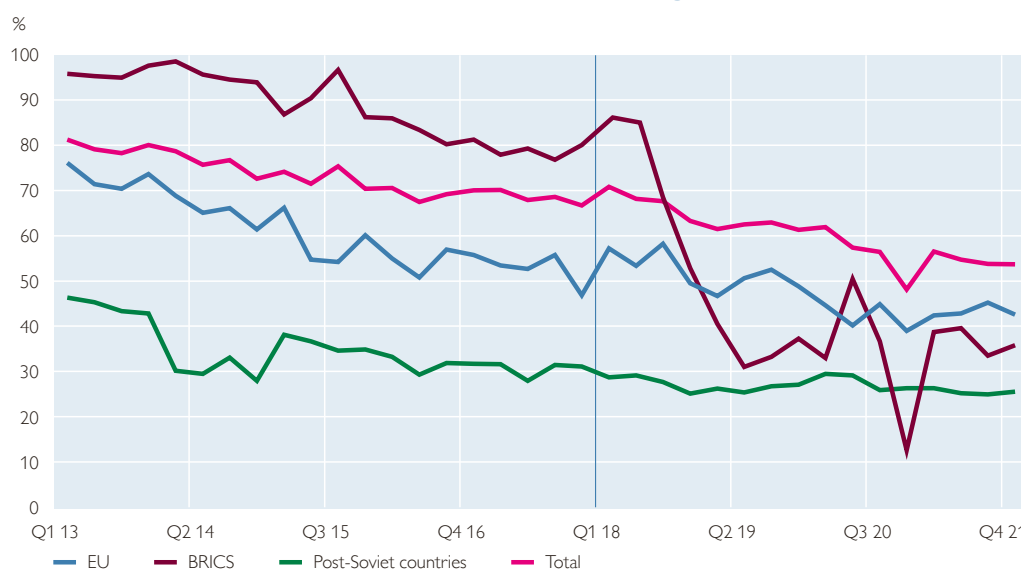
Source: Bank of Russia.
Note: Post-Soviet countries excluding the Baltic countries.

[3] BRICS is the acronym for a group of five leading emerging economies: Brazil, Russia, India, China and South Africa. In 2014, the BRICS established the New Development Bank (NDB), a multilateral emerging market development bank. As of end-May 2023, Bangladesh, Egypt and the United Arab Emirates joined the NDB, and Saudi Arabia is negotiating to become an NDB member (Leahy, 2023).

Chart 6

Share of USD in payments for Russian imports by region

%
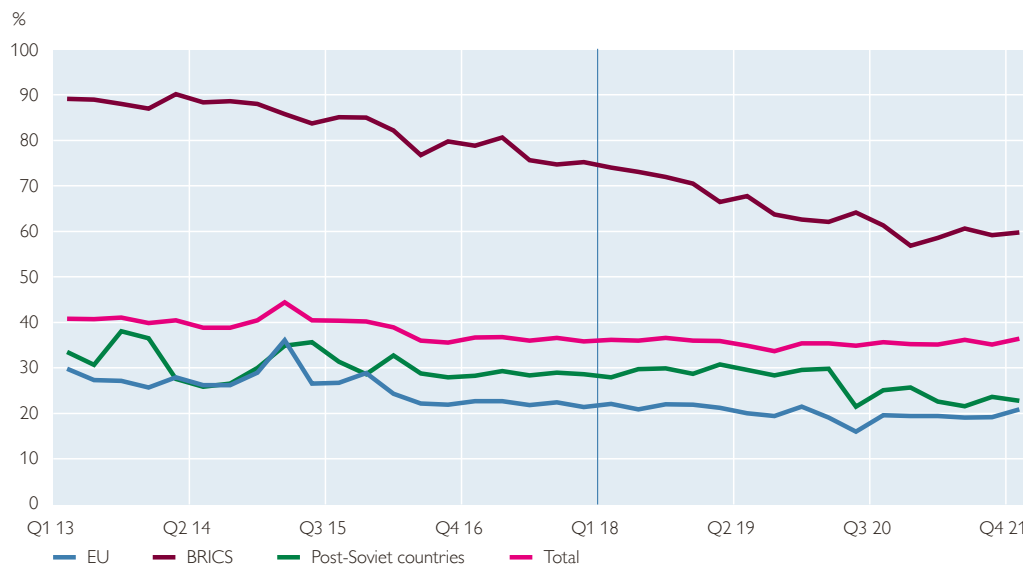
Source: Bank of Russia.
Note: Post-Soviet countries excluding the Baltic countries.

share in this segment to around 30% from 2019 to 2021 suggests that a substantial part of oil and gas exports to the BRICS switched to alternative currencies, notably the euro. The dedollarization of Russian exports to China proceeded very quickly in 2018 and 2019 and was likely reinforced by trade tensions between the USA and China that intensified in the same period. The quick pace of dedollarization is also likely to be linked to a high concentration of Russian exports: Russia's top 200 exporters generate more than 80% of export revenue.[4]

Russia's trade with *Europe* was also gradually dedollarized, with the euro being used as a natural substitute. By 2020, the share of the US dollar in the EU's trade with Russia (42.2% for imports from Russia and 18.5% for exports to Russia) was already lower than in the EU's total external trade (49% and 28% respectively), according to Eurostat. Russian goals to reduce reliance on the US dollar went hand in hand with European efforts to strengthen the international role of the euro.

The *post-Soviet countries,* historically, were the countries that relied least on the US dollar in paying for Russian exports, but even they managed to further reduce the US dollar share in these payments from 46% to 25%.

Dedollarization trends in Russian *import* payments were much more benign: Here, the share of the US dollar declined from 40% to 36% (chart 6). The inherently higher dollarization of Russian exports is linked to the high share of commodities in Russian exports (chart 7). Like with the currency composition of export payments, the most significant changes occurred in trade with the BRICS: Here, the share of the US dollar decreased from 90% to 60%.

It is hard to establish a robust link between the product composition of Russian trade and the propensity to invoice in certain currencies. Unfortunately, more

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[4] *Calculations based on the rating of the top 200 Russian exporters by the Russian Analytical Center Expert.*

Chart 7

Product structure of Russian exports (2021)
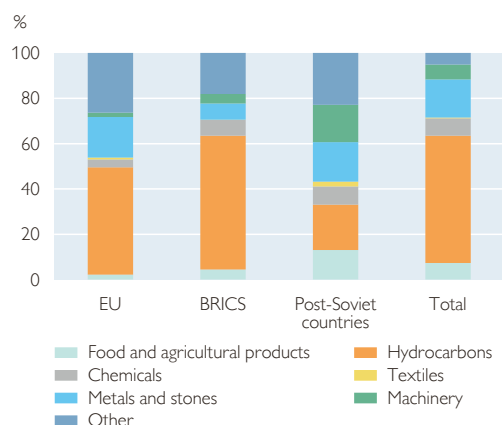
%

Source: Trade Map, Rosstat.

Note: Post-Soviet countries excluding the Baltic countries.

Chart 8

Product structure of Russian imports (2021)

%
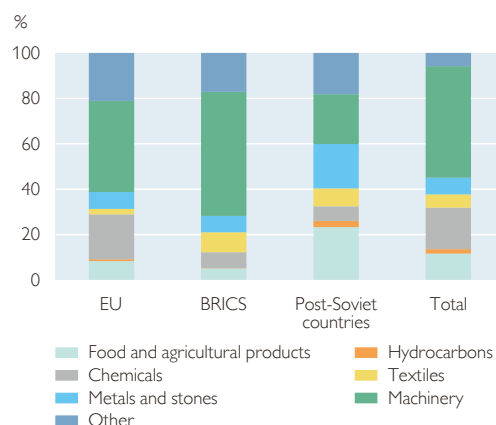
Source: Trade Map, Rosstat.

Note: Post-Soviet countries excluding the Baltic countries.

granular data on the currency structure of trade by types of goods are not available. Evidence from French customs data presented in Berthou (2022) suggests that the propensity to invoice in US dollar clearly declined in trade in dual-use goods given secondary sanctions risks for non-US firms.

3.2.2 Reliance on the US dollar and the euro

Russia's progress in reducing reliance on major reserve currencies in general was much weaker than in reducing reliance on the US dollar alone. From 2014 to 2021, the joint share of the US dollar and the euro continued at around 80% and 65% in Russian export (chart 9) and import (chart 10) settlements, respectively. The Western sanctions do not seem to have triggered a decisive substitution of Western currencies with alternative invoicing currencies. As with dedollarization in its narrow sense, the most noticeable progress was accomplished in Russia's trade with the BRICS countries.

Over the period from 2013 to 2021, the importance of the US dollar decreased for most of Russia's trading partners. However, the currencies that served as a substitute for the US dollar were different across regions (charts 11 and 12). Trade with Europe became increasingly settled in euro. In the case of the BRICS, the pattern was different for export and import payments. Declining reliance on the US dollar was almost fully counterbalanced by an increased reliance on the euro for Russian exports and by reliance on the BRICS countries' national currencies for Russian imports. Notably, Chinese companies tended to offer more beneficial terms for contracts settled in renminbi-yuan. The post-Soviet countries were the only region where dedollarization was happening in favor of the Russian ruble.

Chart 9

Combined share of EUR and USD in payments for Russian exports

%

— EU   — BRICS   — Post-Soviet countries   — Total
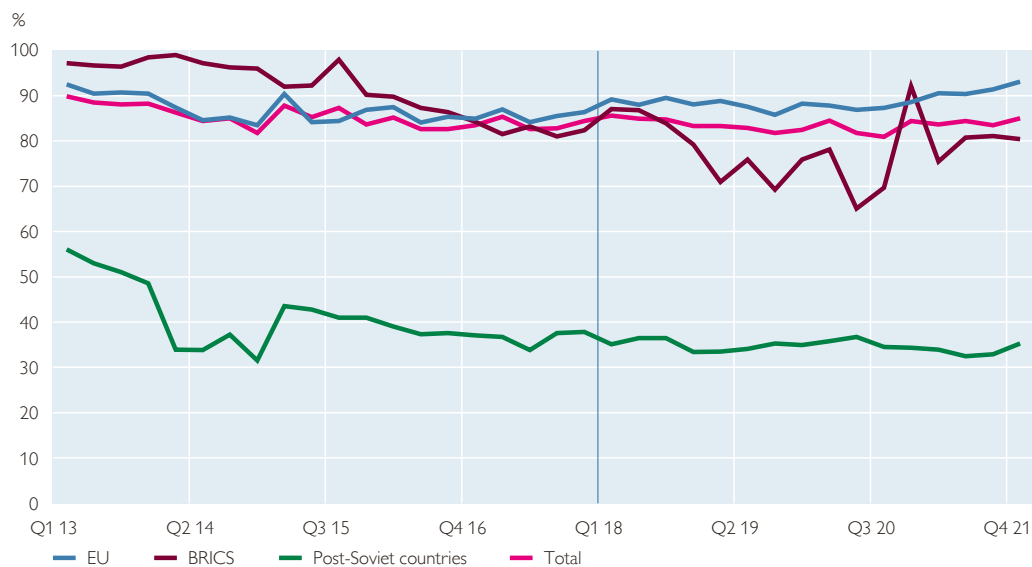
Source: Bank of Russia.

Note: Post-Soviet countries excluding the Baltic countries.

Chart 10

Combined share of EUR and USD in payments for Russian imports

%

— EU   — BRICS   — Post-Soviet countries   — Total
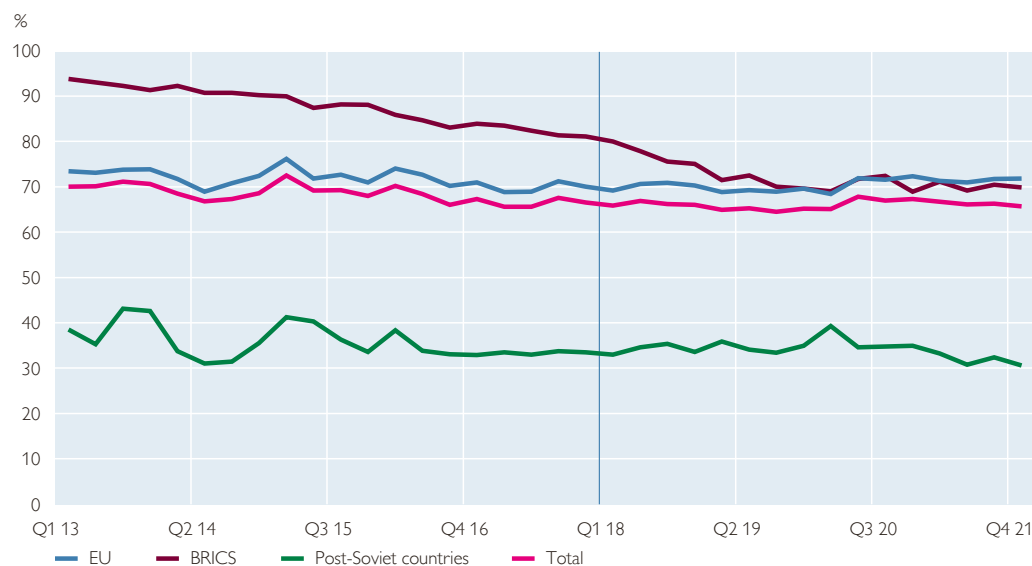
Source: Bank of Russia.

Note: Post-Soviet countries excluding the Baltic countries.

Chart 11

Change in the currency composition of payments for Russian exports between Q1 13 and Q4 21

Percentage points

Europe Post-Soviet countries BRICS
■ USD ■ EUR ■ RUB ■ Other
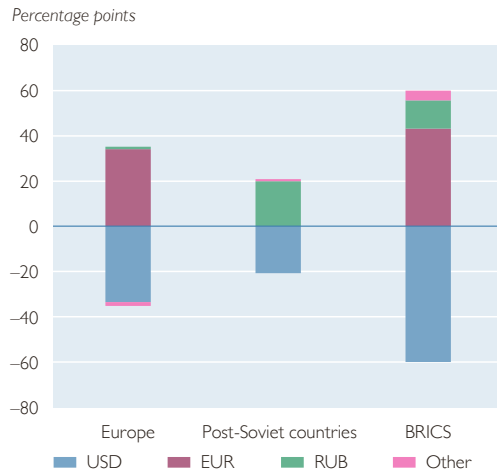
Source: Bank of Russia.

Note: Post-Soviet countries excluding the Baltic countries.

Chart 12

Change in the currency composition of payments for Russian imports between Q1 13 and Q4 21

Percentage points

Europe Post-Soviet countries BRICS
■ USD ■ EUR ■ RUB ■ Other
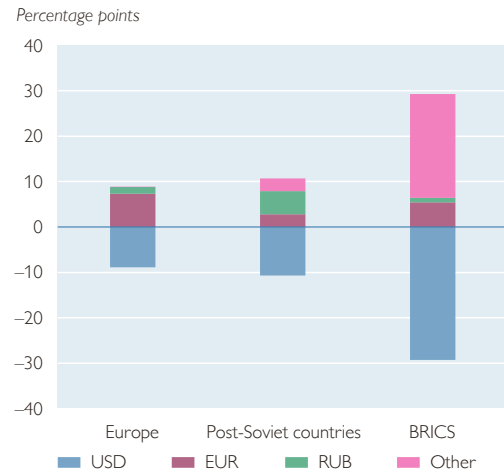
Source: Bank of Russia.

Note: Post-Soviet countries excluding the Baltic countries.

Despite this seemingly slow progress in currency diversification, Russia was still in the forefront of this trend in global terms. According to the International Monetary Fund's (IMF) database on the currency composition of international trade payments, by 2019, only a few emerging market economies (Thailand, Uruguay and Saudi Arabia) had a lower combined share of the US dollar and euro in their import (chart 14) or export (chart 13) payments than Russia.

These dedollarization trends of the previous decade were accompanied by significant efforts to develop foreign exchange markets in national currencies. Specifically, the Moscow Exchange launched spot operations in renminbi-yuan at the end of 2010 and introduced a futures market in renminbi-yuan in 2015. In 2018, it started Turkish lira-Russian ruble trading. Moreover, the Kazakhstan tenge and the Belarusian ruble have been quoted on the Russian exchange market since 1998.

Chart 13

Combined share of EUR and USD in countries' export payments[1]

%

Argentina Azerbaijan Paraguay Egypt Chile Brazil Indonesia India Ukraine Saudi Arabia Türkiye Uruguay South Korea Malaysia Russia Thailand
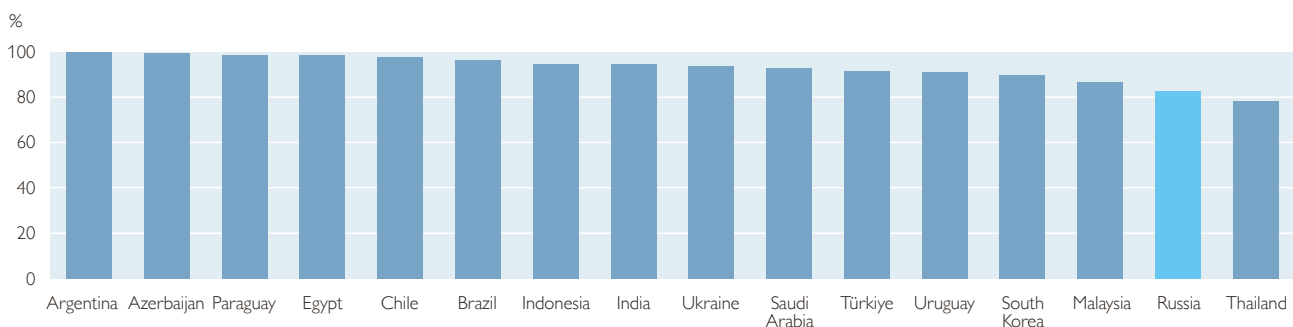
Source: Boz et al. (2020).

[1] *2019 or latest data available.*

Chart 14

Combined share of EUR and USD in countries' import payments[1]

%

Paraguay, India, Ukraine, Peru, Argentina, Egypt, Türkiye, Azerbaijan, Brazil, Indonesia, Chile, South Korea, Malaysia, Thailand, Russia, Uruguay, Saudi Arabia
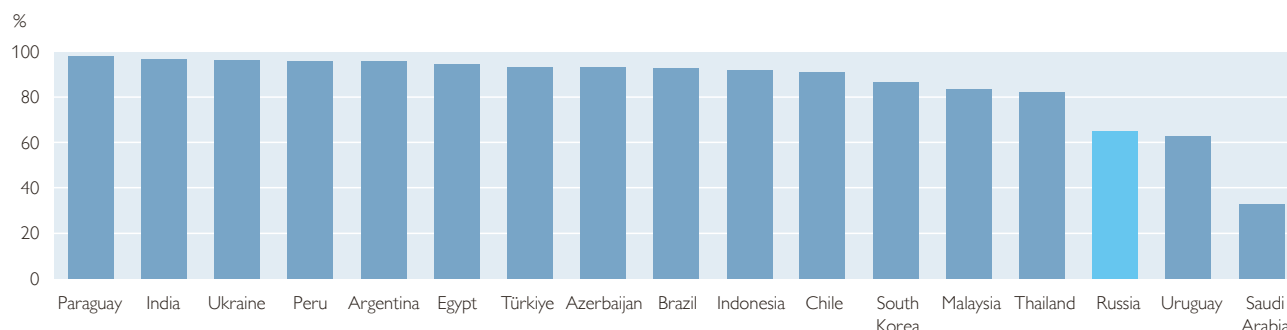
Source: Boz et al. (2020).

[1] 2019 or latest data available.

Overall, the dedollarization trends observed during the period 2013–2021 had some similarities to global patterns reported in the empirical literature. The euro's share in Russian-European trade invoicing became relatively well aligned with that share in trade in which at least one euro area country is involved – a pattern that was also observed globally by Boz et al. (2020). The stable combined share of the US dollar and the euro in the currency composition of Russian trade is also in line with the stylized fact documented by Boz et al. (2020) regarding the increasing global concentration of invoicing in US dollar and euro over time despite the declining share of world exports to the USA and the euro area. Amiti et al. (2022) provide empirical evidence on firm-level decision-making about currency choices in external trade. The high degree of synchronization in the transition of Russian exporters to euro invoicing from 2016 to 2018 is in line with their finding regarding the influence of competitors' decisions on firms' currency choices. A more stable currency composition of import invoicing compared to export invoicing is also consistent with the stylized fact that the choice of invoicing currency is a less active firm-level decision for imports than for exports since suppliers tend to be more powerful in their choice of currency. The conclusions drawn in Amiti et al. (2022) that firm-specific characteristics, in particular firms' import intensity and size, affect the choice of invoicing currency more than industry-related factors imply that highly granular firm-level data are required to uncover the key determinants of the trends described above. Such microdata are unfortunately not available for Russia yet.

3.3 Developments since the invasion of Ukraine and the adoption of major Western financial sanctions

The situation changed abruptly with the start of the war in Ukraine in 2022. Additional financial sanctions, especially the successive ban of major Russian banks from Swift, considerably complicated the processing of US dollar and euro cross-border payments. Given the highly coordinated nature of the sanctions, transactions in euro became subject to similar operational risks as transactions in

US dollar.[5] These developments have progressively narrowed Russia's opportunities to carry out transactions with foreign counterparties in Western currencies and triggered a true reorientation toward alternative invoicing currencies.

According to the Bank of Russia, the share of *export payments* executed in euro and US dollar dropped from 87% in January 2022 to 33% in May 2023 (see chart 15).[6] The combined market share of the US dollar and the euro was overtaken by the share of the Russian ruble and the renminbi-yuan, whose shares in payments increased from 12% to 39% and from 0.5% to 25%, respectively, in the period from January 2022 to May 2023 (Bank of Russia, 2023c, p. 4—5).[7] Thus, the combined share of the Russian ruble, renminbi-yuan and other nonreserve currencies, e.g. the United Arab Emirates (UAE) dirham, has recently reached two-thirds of all Russian export payments. Apart from a redirection of trade flows from Europe to Asia, this also reflected practices of switching settlement currencies in existing contracts (Wheatley and Smith, 2022). Moreover, Russia's demand in spring 2022 that "unfriendly" European sanctioning countries pay for Russian gas in Russian ruble certainly had an impact, although it is difficult to quantify given the quick decline of pipeline gas deliveries to the EU.

Regarding *import payments*, dynamics do not differ much, as chart 16 shows. For a decade, the joint share of the US dollar and the euro remained quite stable

Chart 15

Russian exports broken down by settlement currencies (2022–2023)

USD billion
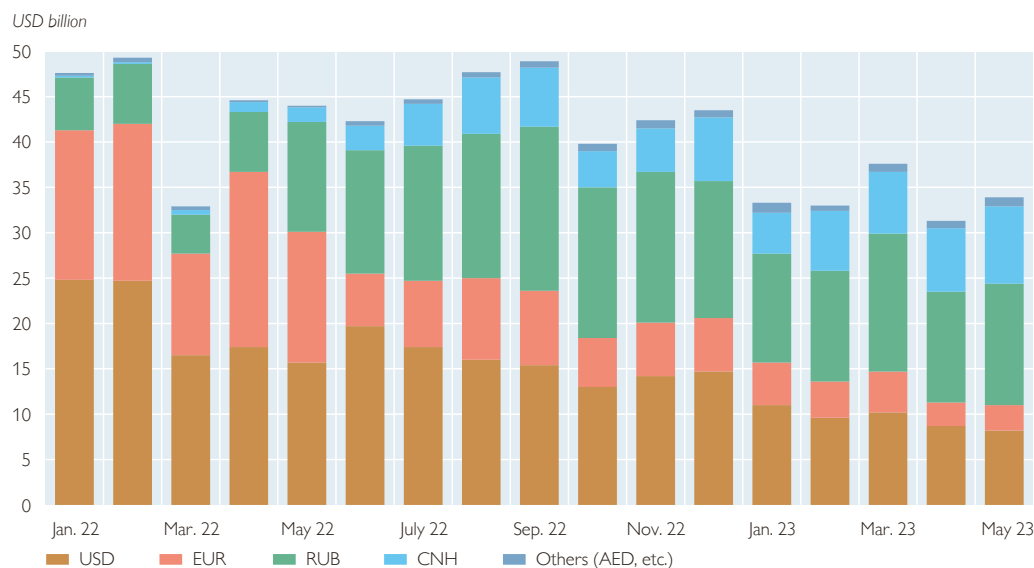
Source: Bank of Russia (2023a, p. 4—5; 2023c, p. 4—5).
Note: AED = UAE dirham; CNH = renminbi-yuan.

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[5] *Yet a number of medium-sized or smaller Russian banks remain connected to Swift (for the time being), and a tendency has developed to redirect the settling of payments to as yet nonsanctioned banks, e.g. in trade with India (see below).*

[6] *Note that total Russian exports (measured in USD) in the first five months of 2023 declined by 22.5% against the corresponding period of the previous year, largely due to the EU embargo on oil and oil products and the G7 price cap for Russian oil that had entered into force in late 2022 and early 2023.*

[7] *The share of other currencies remained marginal and rose from less than 1% to below 3%.*

Chart 16

Russian imports broken down by settlement currencies (2022–2023)

USD billion

USD   EUR   RUB   CNH   Others (AED, etc.)
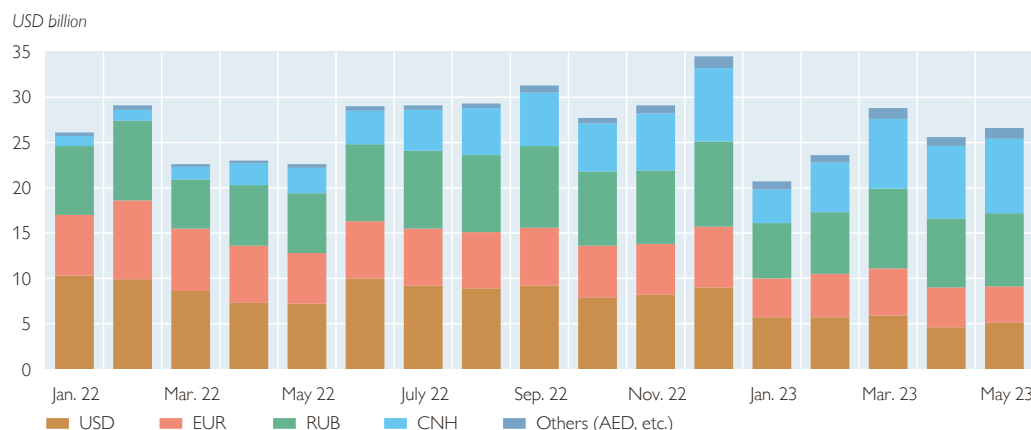
Source: Bank of Russia (2023a, p. 4–5; 2023c, p. 4–5).

Note: AED = UAE dirham; CNH = renminbi-yuan.

between 60% and 70%, but it dropped to 34% by May 2023. The combined share of the Russian ruble and the renminbi-yuan rose from 34% in January 2022 to 61% in May 2023. While the share of the ruble remained largely stable at 29% to 30%, that of the renminbi-yuan went up sharply from 4% to 31%. Here, too, the combined share of the ruble, renminbi-yuan and other nonreserve currencies has lately almost reached two-thirds of Russia's total import settlements. That said, notwithstanding multiple announcements regarding the use of other nonreserve currencies (apart from ruble and renminbi-yuan) as a means of payment in foreign trade with Russia, the so far only moderate rise from 2% to 4% from 2022 to early 2023 does not indicate any "takeoff" yet (Bank of Russia, 2023c, p. 4—5). Summing up, in late 2022 and early 2023 – apart from the Russian ruble – the renminbi-yuan was by far the most-used alternative currency to the US dollar and the euro in both Russia's exports and imports.

3.3.1 Russia's experience and plans for further dedollarization in 2022 and 2023

Overall trade

Given increasing sanction risks for Russian banks and other economic agents using the US dollar or the euro, the Eurasian Economic Union (EAEU) followed a request by its largest member, Russia, and officially decided, in March 2022, to move step by step to full mutual payments in national currencies. In September 2022, the Samarkand Declaration, which was published after the Shanghai Cooperation Organization[8] heads of state had met in Samarkand, Uzbekistan, approved a roadmap for gradually increasing the share of national currencies in mutual trade payments between member countries (see table 1). In November 2022, Russian Deputy Foreign Minister Alexander Pankin pointed to negotiations

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[8] *The Shanghai Cooperation Organization (SCO) is a Eurasian intergovernmental organization founded in Shanghai in 2001. The SCO aims at strengthening regional security and economic cooperation and development. Its members are China, India, Iran, Kazakhstan, Kyrgyzstan, Pakistan, Russia, Tajikistan and Uzbekistan. Iran joined the SCO in early July 2023, Belarus is expected to become a member next year (Ivanova, 2023).*

between Russia and a number of (undisclosed) G20 countries that proceeded during the G20 summit in Indonesia. Negotiations focused on possibilities of activating the use of national currencies in mutual trade (RIA Novosti, 2022). In 2022, a number of countries purchasing Russian gas accepted settling these purchases in ruble (Otkrytyi Zhurnal, 2022). In early July 2022, the Russian United Grain Company (Obedinennaya zernovaya kompania – OZK), the world's largest grain exporter, announced that it was switching to receiving payments in national currencies from "friendly countries" (TASS, July 6, 2022).

EAEU and CIS countries

Trade with EAEU member countries slightly grew to about 10% of Russia's total foreign trade turnover in 2022. In the preceding year, the lion's share (73.5%) of mutual trade settlements among EAEU members was already carried out in national currencies (overwhelmingly in Russian ruble); the share of the US dollar was 19%. Notwithstanding the above-mentioned official EAEU decision to move to payments in national currencies and Armenia's and Belarus' transition to paying for gas purchases from Russia in ruble (instead of US dollar) announced in spring 2022, the share of national currencies in mutual settlements only slightly increased to 75% in 2022 (Ostwirtschaftsreport, 2022; PrimePress, 2023). In the case of Russian-Belarusian trade, the respective bilateral share was reportedly above 80% and reached 85% in June 2023 (BeITA, 2022; RIA Novosti, 2023).

China

In 2022, Chinese-Russian trade soared by about one-third to over USD 190 billion (close to 22% of Russia's total foreign trade turnover) as data released by Chinese customs showed. Shipments from China to Russia came to USD 76.1 billion worth of goods (29.4% of Russia's total imports in 2022), up 12.8% since 2021, while Russian exports to China surged by 43.4% to USD 114.1 billion (19.3% of Russia's total exports). Bilateral trade expansion upheld its high tempo in the first six months of 2023: The growth rate (year on year) of Russia's imports from China accelerated to 78%, while Russian exports to China still strongly expanded by 19%. In August 2022, the Chinese ambassador to Russia, Zhang Hanhui, assured Moscow that China will continue to increase settlements in national currencies in its trade with Russia (FARS, 2022). In September, Gazprom started to sell its expanding pipeline gas deliveries (via the Sila Sibiri pipeline launched in 2019) to the China National Petroleum Corporation for ruble and renminbi-yuan, in equal proportions (replacing US dollar payments that had been predominant until then).

In late 2022, the Chinese and Russian authorities also decided to promptly switch supplies of oil, oil products and coal to settlement in national currencies. While the renminbi-yuan and the Russian ruble made up 20%–25% of Chinese-Russian trade settlements in the summer of 2022, this share is estimated to have increased to about 50% in late 2022 and early 2023 (Kommersant, 2022; Gaidaev, 2023). According to Russian president Vladimir Putin, the share of bilateral trade settled in national currencies rose further to about two-thirds in March and to 80% in June 2023 (BRICS International News, 2023). Apparently in response to the above-mentioned instructions of the authorities, as of May 2023, nearly all of China's purchases of oil, fuel oil, coal and of some metals from its northern neighbor

were paid in renminbi-yuan according to trade executives with direct knowledge of the matter (Chen, 2023).

Moreover, during 2022, the renminbi-yuan became more important for Russia's trade with a number of countries outside China and the EAEU: Some emerging markets, e.g. Brazil, are reportedly ready to pay for Russian fertilizers in renminbi-yuan to steer clear of risks connected to the use of sanctioning countries' currencies, the co-owner of the fertilizer corporation UralChem, Dimitry Mazepin, said at a meeting with President Putin in November 2022 (Interfax, November 23, 2022).

India

From a modest basis, Russian-Indian trade expanded spectacularly in 2022 and in spring 2023. This expansion has been driven by multiplying Indian purchases of cheap Russian crude oil and fertilizers, which drove up Russian exports to India from USD 9.1 billion in 2021 to over USD 37 billion in 2022 (i.e. about 6% of Russia's total exports), while Indian deliveries to Russia shrank from USD 4.4 billion to about USD 3 billion (around 1% of Russia's total imports) (Sharma, February 17, 2023). In the first quarter of 2023, Russian exports to India more than quadrupled (year on year) to USD 15.5 billion, while Russia's much smaller imports from India grew by about one-third to USD 0.95 billion; thus, the major bilateral trade imbalance has so far not been tackled. Given that oil[9] accounts for most Russian exports to, and thus trade with, India and that oil is largely paid for in US dollars, a considerable share of Russia's trade with India – at least until late 2022 – was settled in US dollar.[10] Yet, because of high sanctions-induced risks connected to using the US dollar, both the Russian and the Indian authorities have shown interest in adopting measures to avoid the US dollar in their bilateral trade and to expand payments in national currencies (Russland Aktuell, 2023).

In July 2022, in a bid to encourage wider use of the Indian rupee (which is not yet fully convertible though) as well as to reduce pressure on India's international reserves and curtail the Indian economy's dependence on the US dollar, the Reserve Bank of India, India's central bank, introduced guidelines to promote invoicing and paying the country's exports and imports in Indian rupees (table 1) (Laskar, 2022; Business Standard, 2022; Chenoy, 2023). Yet, a breakthrough toward the Indian rupee settlement scheme in Russian-Indian trade had not been reached by early July 2023. Given Russia's large bilateral export surplus, exporters are concerned about having to deal with a glut of Indian rupees which, they argue, they cannot easily spend in India. The Russian ruble/Indian rupee exchange rate has also been an area of concern. In early February 2023, Indian refiners started paying for most of their Russian oil purchased via Dubai-based traders in UAE dirham instead of US dollar, something Russia had already requested in July 2022. India's second-largest commercial bank, the publicly owned State Bank of India, has been clearing these UAE dirham settlements (Verma, 2023). In June and July 2023, however, the renminbi-yuan may have seen a breakthrough in Russian-

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[9] In 2022, Russia overtook Saudi Arabia and Iraq and became India's largest oil supplier (Loginova, 2023).

[10] According to Bank of Russia data, in late 2021 – before the oil-triggered quadrupling of Russian exports to India – the share of the US dollar in the settlement of Russian exports to India had been 37% and the share of the Russian ruble had exceeded 50%.

Indian oil trade: Indian Oil Corporation, the country's biggest buyer of Russian crude oil, became the first state refiner to pay for some purchases from Russia in renminbi-yuan. It was joined by at least two of India's three private refineries (Reuters, 2023b).

Türkiye, Iran, Pakistan and some other nonsanctioning countries

Trade turnover between Russia and Türkiye doubled year on year to USD 46.9 billion from January to September 2022 (against USD 23.3 billion in the corresponding period of 2021). This equals 7.7% of Russia's total trade turnover in the first nine months of 2022. In early November 2022, the Turkish Minister of Energy and Natural Resources, Fatih Donmez, announced that Türkiye and Russia had reached a consensus on a step-by-step movement to mutual settlements in Russian ruble and Turkish lira.[11] While more technical work needed to be concluded, Donmez added that the two countries had already started trading in national currencies, with Türkiye paying part of its gas supplies in Russian ruble (TASS, November 8, 2022).

Russia-Iran trade, though much smaller than Russia's trade with Türkiye, is also expanding. Bilateral trade turnover rose by 15% in 2022 to USD 4.6 billion (0.6% of Russia's total trade), with Russian exports exceeding imports and expanding more dynamically than the latter (Eliseeva, 2022). Yet progress in moving to national currencies may initially have been sluggish. In mid-November 2022, Iranian Vice President Mohammad Mokhber urged to drop the US dollar and expand trade in national currencies. As of end-2022, however, according to Vyacheslav Volodin, Russia's State Duma speaker, the share of the Iranian rial and the Russian ruble in mutual settlements had exceeded 60%, and as of May 2023, according to Russian Deputy Prime Minister Alexander Novak, this share had reached 80% (Tehran Times, 2023; Frontier India, 2023). Recently, Russia and Iran appear to have established direct banking links that are independent of Swift: At end-January 2023, the two countries signed an agreement to connect their national financial messaging systems that allow for financial communications and interbank transfers, namely Russia's SPFS (Systema peredachi finansovykh soobschenii, i.e. system for the transfer of financial messages) and Iran's SEPAM (Russia Briefing, December 20, 2022; Heilmann, 2023).

In April 2023, Pakistan[12] and Russia concluded a dedollarized oil delivery agreement. The first shipment arrived at the port of Karachi in May (Landrin, 2023, p. 15), and Pakistan paid for this shipment in renminbi-yuan (instead of US dollar, as had been the country's practice in oil purchases to this point). According to Pakistan's Minister of State (Ministry of Energy, Petroleum Division) Musadik Malik, Pakistan has set a target of lifting imports of Russian crude oil to one-third of its total oil imports (The Times of India – Energy World, 2023b; Shahid and Shahzad, 2023).[13]

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[11] *The Turkish and Russian heads of state had already expressed their intention to move to settling trade in their national currencies five years earlier, in 2017 (Russland Aktuell, 2022).*

[12] *With its 230 million inhabitants, Pakistan accounted for only about 0.1% of Russia's foreign trade turnover in 2021.*

[13] *Pakistan has recently been grappling with swelling current account deficits because of oil payments. Cheap Russian oil and trade in renminbi-yuan may help here to stave off a depletion of US dollar reserves.*

The central bank of Bangladesh[14] also stated in mid-November 2022 that it was looking for a new payment mechanism with Russia, given that bilateral trade may be threatened by sanctions by the USA and its allies (New Nation, 2022). In April 2023, Bangladesh agreed with Russia to settle a USD 300 million payment related to the building of a nuclear power plant near Dhaka in renminbi-yuan (Kauffmann, 2023; The Times of India – Energy World, 2023b). Other emerging markets like Egypt, Iraq and Nigeria have also expressed their interest in, or are in consultations on, switching to national currencies in their trade settlements with Russia (Vitvitsky, 2023; Baikova, 2023).

3.3.2 Some other emerging markets' trade dedollarization efforts (not directly involving Russia)

There is no doubt that attempts to move toward payments in national currencies and to reduce dependence on the US dollar go beyond Russia's efforts (Jamrisko and Carson, 2022).[15] As mentioned above, the Indian authorities are promoting the Indian rupee settlement scheme for trade with a number of neighboring countries, but this promotion is not necessarily linked to Russia. Central Asian countries plan to expand payments in national currencies not only in their trade with Russia but also in their trade with China (Trend News Agency, 2022). Most recently, China marked further progress in its quest to promote its own currency and dedollarize: In March 2023, the renminbi-yuan for the first time overtook the US dollar in China's cross-border transactions, with its share in China's total cross-border payments and receipts reaching 48% (from nearly zero in 2010), while the US dollar's share declined to 47% (from 83% in 2010), according to research by Bloomberg citing data from the Chinese State Administration of Foreign Exchange (Bloomberg News, 2023).

Over the course of 2022, Saudi Arabia increased its cooperation with China to the point of envisaging the possibility of selling a substantial share of its oil for renminbi-yuan instead of US dollar (Kodmani, 2022). At a meeting with leaders of member states of the Gulf Cooperation Council (GCC)[16] in mid-December 2022, Chinese President Xi Jinping confirmed that Beijing was ready to shift its energy purchases to payments in renminbi-yuan. A month later, China asked GCC members to make full use of the Shanghai Petroleum and Natural Gas Exchange for renminbi-yuan settlement of oil and gas trades over the next three to five years (Pozsar, 2023). In mid-March, it was reported that the Export-Import Bank of China (China Exim-Bank) had concluded a first agreement on cooperation and borrowing with the largest commercial bank of Saudi Arabia, Saudi National Bank, with the objective to secure future bilateral settlements in the two countries' national currencies (Migunov, 2023). In late March 2023, the French multienergy conglomerate TotalEnergies and China National Offshore Oil Corporation settled China's first LNG transaction in renminbi-yuan. The deal on the shipment of 65,000 tons of LNG from the United Arab Emirates was made on the Shanghai

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[14] Bangladesh accounted for 0.4% of Russia's foreign trade turnover in 2021.

[15] While US sanctions are, of course, far from being the only driving force for dedollarization efforts (see section 1), more and more countries appear to be targeted by US sanctions involving the US dollar. About 30% of all countries in the world are assessed to be subject to US, EU, Japanese or UK sanctions, as against only about 10% in the 1990s (Sharma, April 23, 2023).

[16] Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, United Arab Emirates.

Petroleum and Natural Gas Exchange (The Times of India – Energy World, 2023a; Lei, Chen and Gu, 2023).[17]

Also in late March 2023, the two BRICS members Brazil and China signed an agreement to drop the US dollar and use their national currencies (Brazilian real and renminbi-yuan) in bilateral trade and financial transactions (table 1). They further announced the creation of a clearinghouse that is to provide settlements and lending in national currencies (Silk Road Briefing, 2023; The Economist, 2023a, p. 40). Overall, the renminbi-yuan's share in global trade settlements reportedly rose from 2% in February 2022 to 4.5% in spring 2023 (The Economist, 2023b).

In late March 2023, an official meeting of Association of Southeast Asian Nations (ASEAN) finance ministers and central bank governors focused on discussions to reduce trade and financial dependence of the Southeast Asian nations on the US dollar, euro, Japanese yen and pound sterling and move to mutual settlements in national currencies through the region's Local Currency Transaction scheme (Devonshire-Ellis, 2023). In April 2023, Malaysian Prime Minister Anwar Ibrahim pointed out that it was necessary for his country to curtail its dependence on the US dollar, adding that Malaysia and China were in talks to use the Malaysian ringgit and the renminbi-yuan for trade deals (Tayeb, 2023). In early May 2023, the central bank of Indonesia signed a Memorandum of Understanding (MoU) with its South Korean counterpart to cooperate on promoting the use of their national currencies for bilateral transactions (current account and direct investment) (Reuters, 2023). In May 2023, the central bank of Indonesia launched an Indonesian credit card, a domestic card payment system for government institutions and state companies that is to replace use by these entities of Visa and Mastercard in order to reduce reliance on foreign systems and protect official transactions from possible geo-

Table 1

Overview of selected recent dedollarization policy steps in emerging markets

Month	Dedollarizaton decision or agreement
March 2022	*Eurasian Economic Union* decides to gradually move to mutual payments in national currencies
July 2022	*Reserve Bank of India* introduces guidelines to promote invoicing and payment of India's exports and imports in Indian rupees
September 2022	Samarkand Declaration of *Shanghai Cooperation Organization* approves roadmap for gradually increasing share of national currencies in mutual payments
November 2022	*Türkiye* and *Russia* agree to gradually move to mutual settlements in national currencies
December 2022	*China* and *Russia* decide to switch to settlements in national currencies in their trade in oil, oil products and coal
January 2023	*Russia* and *Iran* sign agreement to connect their national financial messaging systems (SPFS and SEPAM)
March 2023	*Export-Import Bank of China* concludes agreement with Saudi National Bank, *Saudi Arabia's* largest commercial bank, to secure future bilateral settlements in national currencies
	Brazil and *China* sign agreement to use their national currencies in bilateral trade and financial transactions
April 2023	*Pakistan* agrees to pay discounted *Russian* oil in renminbi-yuan and commits to expanding transactions
	Bangladesh agrees with *Russia* to settle USD 300 million payment for building nuclear power plant near Dhaka in renminbi-yuan
May 2023	Central bank of *Indonesia* signs agreement with *South Korean* central bank to cooperate on promoting use of national currencies in bilateral transactions
July 2023	*Reserve Bank of India* and *Central Bank of the United Arab Emirates* sign MoUs on using national currencies for cross-border transactions and on interlinking their payment and messaging systems

Source: Authors' compilation.

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[17] *So far, China has also concluded oil deals in renminbi-yuan with Iran and Venezuela, two strongly sanctioned countries (Petring, 2023, p. 37).*

political disruptions (CNBC Indonesia, 2023). In mid-July 2023, the Reserve Bank of India and the Central Bank of the United Arab Emirates exchanged MoUs on promoting the use of their national currencies for cross-border transactions and on interlinking their payment and messaging systems (Bhattacherjee, 2023).

4 Impediments for dedollarization faced by Russia

Developing a country's foreign exchange infrastructure is an important step toward promoting the use of national currencies in foreign trade payments. Previously, importers and exporters often cited poor trading infrastructure as a significant impediment to further dedollarization. The appeal of national currencies was reduced by the lack of financial instruments to facilitate hedging and trade financing in national currencies, by low liquidity and, consequently, by large trading spreads implying additional transaction costs. These constraints were further amplified by a lack of trust in national currencies and higher risks to macroeconomic stability in the countries concerned. In the case of Russia, the Bank of Russia as well as the Ministry of Finance have aimed at establishing track records of low inflation, prudent budget policies and modest public debt in the last two decades. According to the Bank of Russia, modernized national currency settlement infrastructures are currently being set up bilaterally with interested countries (Yudaeva, 2022). For this purpose, the Bank of Russia established its International Settlements Department in mid-February 2023 (Bank of Russia, 2023b).

The dedollarization of Russian exports and imports made substantial progress in 2022 and early 2023. The combined use of the US dollar and the euro dropped from an average of over three-quarters of total transactions at the beginning of 2022 to below 40% in March and April 2023. The Moscow Exchange plans to introduce new hedging instruments in 2023, in particular Turkish lira/Russian ruble, Hong Kong dollar/Russian ruble and US dollar/renminbi-yuan futures. However, their costs will likely remain high amid relatively low liquidity and high interest rates around the globe. Since 2016, the Eurasian Development Bank has also contributed to infrastructure development by performing market maker functions for trading in Kazakhstan tenge/Russian ruble to increase liquidity and limit transaction costs.

The further dedollarization of Russian exports will require the continued dedollarization of trade in commodities. In this area, some trading partners, e.g. Indian enterprises, are experimenting with invoicing in alternative currencies (Indian rupee, Russian ruble, UAE dirham and, most recently, renminbi-yuan). Moreover, some large Middle Eastern producers reportedly consider dedollarizing their oil exports at least in part. Yet, as the Indian example shows, satisfactory solutions have not yet been found everywhere, and players are proceeding prudently. High and persistent trade imbalances can certainly constitute a challenge for settlements in national currencies.

5 Conclusions and possible implications for the international role of the US dollar and the euro: Are we witnessing an erosion of unipolarity?

Doubtlessly, the sweeping Western financial sanctions taken in response to Russia's invasion of Ukraine, including restrictions on the Bank of Russia, have provided a major impetus to Russia's ongoing dedollarization policies and have accelerated dedollarization in foreign trade and other areas. This transition, even though rapid

and efficient, certainly creates additional transaction costs for Russian companies engaged in foreign trade. Also, it is interesting to note that the sanctions prompted joint efforts with foreign trading partners, both enterprises and governments, in a number of areas, aimed to structurally overcome newly imposed obstacles on bilateral trade. Of course, the discounts Russian enterprises offered, e.g. for oil, have provided additional incentives for foreign trading partners to cooperate in moving to settlements in national currencies. Apart from that, other countries have also put forward motives (not necessarily linked to Russia) of reining in pressure on their international reserves and, more generally, reducing their economies' dependence on the US dollar.

Turning to the impact these developments may have on the role of the US dollar and the euro as the world's major and second-most important currency, respectively, we find that the two currencies do not appear threatened as the dedollarization efforts described above are still in their initial stages and mostly regional in character. Backed by very large economies, deep markets, full convertibility and a highly developed financial infrastructure, the dominance of the US dollar and the euro is not likely to be challenged for the time being. Yet, on a regional level (e.g. in transactions linked to Russia's, China's or, possibly, India's or some Southeast Asian countries' trade with their neighbors), some dissemination of dedollarized trading practices, and thus a limited degree of fragmentation of the overall system, seems possible or likely. The US authorities themselves appear quite aware of the US dollar's exposure to sanctions-triggered forces that, over time, could somewhat erode its international role (Channel News Asia, 2023; Financial Times, 2023).

Moreover, in a broader context, these changes at the regional level are happening amid a trend of rising fragmentation risks in global trade. Following supply chain disruptions during the COVID-19 pandemic, many companies have put a stronger focus on the security of their supplies and on opportunities for near-shoring and reshoring. Should these developments lead to a higher regionalization of global trade, the move toward national currencies in trade invoicing could gradually increase further. At the same time, the Russian experience shows that in the absence of tough constraints on using reserve currencies, the process of transition has, at least so far, been very slow.

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Event wrap-ups

91ˢᵗ East Jour Fixe

Housing markets in Austria and CESEE: homing in on prices, affordability and financial stability

Compiled by Antje Hildebrandt with input from Elias Farnleitner, Mathias Lahnsteiner, Tomáš Slačík and Karin Wagner[1]

Housing markets in Austria and Central, Eastern and Southeastern Europe (CESEE) may be at a turning point given economic slowdown, high inflation, tighter financing conditions and elevated uncertainty among households and businesses. The 91ˢᵗ East Jour Fixe[2] of the Oesterreichische Nationalbank (OeNB) on June 27, 2023, brought together academics and policymakers for an exchange of views on recent house price developments and burgeoning financial stability risks linked to housing markets. The workshop also highlighted potential policy measures that might serve to address the eroding affordability of housing for many households whose budgets are already stretched by rising living and housing costs.

In her introductory remarks, *Birgit Niessner*, Director of the OeNB's Economic Analysis and Research Department, emphasized the topicality of housing market issues in view of the current uncertainty about future housing market developments. In her keynote, *Laura Valderrama*, Senior Economist at the International Monetary Fund (IMF), highlighted that – despite the recent cooldown – house prices in Austria and CESEE remain overvalued by about 15% to 20%. Thus, they are farther above equilibrium values than house prices in other parts of Europe, where overvaluation has started to go down. However, housing affordability in Austria and CESEE has not only been dented by strong house price growth, which meanwhile has outpaced the growth of households' income and rents, but also by rising mortgage rates. The latter also affect households' ability to service their debt. Potential financial stability risks emerge from the fact that three out of four mortgages in CESEE have variable rates. At the same time, the room for maneuver for CESEE households is limited, as the amount of income they spend on essential consumption is almost double that observed in other European countries. Against this background, Valderrama showed that rising lending rates and costs of living could have a significant impact on households if no policy support is provided. According to IMF simulations, in the most severe scenario the share of vulnerable households reaches 60% in CESEE while more than 50% of mortgage debt is at risk. As a result, up to nearly half of CESEE households would have to adjust their spending by 7% on average. Yet, low-income households that are disproportionately affected might need to cut their consumption by twice as much. Despite the relatively harsh impact of a potential, adverse shock on households and the fact that banks in the region are exposed to household loans to a significant degree, the average impact of such a shock on the banking system appears to be manageable. Nonetheless, according to the IMF's assessment, a house price correction by 20% could reduce bank capital by up to 200 basis points in some countries. Against this backdrop of financial stability risks, Valderrama accentuated that policy measures could ease

the impact of higher living costs and rising debt repayments and thus shield house-holds from financial distress. However, unlike previous, wide-spread practice, these measures should be well targeted. She went on to point out that shielding low- and middle-income households, i.e. the bottom income tercile in Austria and the bottom two income terciles in CESEE, could be more cost efficient. The ensuing discussion focused on the preferential treatment of green mortgages and the possible taxation of those profits that largely drive inflation.

Julia Wörz, Head of the OeNB's Central, Eastern and Southeastern Europe Section, chaired session 1, which discussed the question "Where are house prices headed?" In her introductory statement, she pointed out that house prices had moderated in most CESEE countries in the second half of 2022, following a pro-longed period of price rises. Referring also to the role loan market developments play in this context, she concluded that house prices currently seem to be at a turning point.

The first speaker in this session, *Michael Klien*, Senior Economist at the Aus-trian Institute of Economic Research (WIFO), focused on the Austrian real estate market and its driving forces. He presented webscraped house price data for Austria that make it possible to identify mismatches between real estate supply and demand. Given that the number of listed properties increased sharply in recent months, Klien concluded that housing demand has decreased considerably as inter-est rates have gone up and lending standards have tightened. He also noted that nominal listing prices have remained relatively stable, which results in a decline in real house prices. The share of new entries in the property listing data base has decreased, which might indicate that sellers follow a "wait and see" approach.

Katarzyna Rzentarzewska, Chief CEE Macro Analyst at Erste Bank in Vienna, highlighted that, due to (post-)pandemic reallocations, the average growth dynamics of CESEE house prices doubled over the last two years compared to the 2015–2020 period. However, interest rates on loans at least doubled in 2022, thus cool-ing off demand. Higher costs of credit affected demand for loans and borrowers' eligibility for mortgages, resulting in a slowdown of house price growth in the second half of 2022. In Rzentarzewska's view, the housing market correction in Czechia, Hungary and Poland was – most likely – short lived amid rising expectations of monetary easing and tight labor markets.

Adám Banai, Executive Director at Magyar Nemzeti Bank, drew attention to signs of house price overvaluation in many EU member states after years of rising house prices. Regarding Hungary, he pointed out that we have to differentiate between substantial house price dynamics in Budapest and other big cities on the one hand and more muted house price growth in smaller towns on the other hand. He does not expect a strong house price decrease, as enough money is available on the market. Banai illustrated that Hungarian house prices saw a strong adjustment of overvalu-ation compared to real economic fundamentals in the second half of 2022. At the end of his presentation, he discussed the issue of energy efficiency and heating with regard to the housing market. In this context, he noted that the relative value of gas-heated properties with high energy consumption has decreased slightly. In the ensuing discussion, a consensus seemed to be emerging among speakers that a strong correction of house prices is not to be expected – neither in CESEE nor in Austria. Other issues raised during the discussion included the role of institutional investors and differing developments in various market segments (price levels, regional heterogeneity, flats with different heating systems, etc.).

Session 2 dealt with potential financial stability risks emanating from housing markets and was chaired by *Jan Klacso*, Head of the Financial Stability Research Section at Národná banka Slovenska, who started out by reminding us that housing has become a key topic in financial stability discussions in general and for the broader public in Slovakia in particular, given the country's unusually high home-ownership rate, high number of mortgage loans and underdeveloped rental market. As long as labor market developments remain stable, however, he said he did not expect significant housing market corrections to take place in Slovakia.

Frauke Skudelny, Principal Economist at the European Central Bank (ECB), identified key vulnerabilities of European housing markets, namely house price overvaluation, household indebtedness, loose lending standards and high variable interest rate loans. Resilient factors, on the other hand, comprise savings and low unemployment rates. All these factors combined with current shocks (namely high inflation and high interest rates) could result in a higher probability of default and loss given default on banks' residential real estate loans, credit losses on mortgage loans, lower consumption and credit losses on other loans. Turning to macropru-dential policy, Skudelny showed that countries have been active in this field since end-2021, e.g. regarding the (re)building or calibration of capital buffers or the adjustment of borrower-based measures. Skudelny explained the three-year (medium-term) horizon of the European Systemic Risk Board's forward-looking assessment in a baseline scenario compared to an adverse scenario. She argued that there could be a disorderly correction of house prices followed by a materialization of risks in the adverse scenario, which is more prevalent for households with high indebtedness. In the baseline scenario, by contrast, there could be an orderly cor-rection, which could even be beneficial to financial stability. She stated that the adverse scenario was not likely but still possible. Overall, the forward-looking assessment is characterized by a high degree of uncertainty, and cross-country differences depend on present vulnerabilities and the policy measures taken to mitigate risks.

Miroslav Plašil, Director at the Czech National Bank, focused his presentation on his country, Czechia, where house prices were growing exuberantly but have moderated recently. According to Plašil, an orderly but not sizable price correction is expected to happen in 2024. He discussed the vicious feedback loop between property prices and debt financing, with risky loans being quite common in periods without borrower-based measures. In 2022, however, borrower-based measures helped contain credit risks in Czechia. Finally, he discussed current financial stabil-ity risks in the Czech housing market, which are mainly of a cyclical nature. Risks to financial stability in Czechia remain elevated but have been declining slowly since mid-2022, while new risks emanating from lending for housing purposes are muted because the provision of new housing loans is well below historical averages and risky loans are restricted by LTV-, DTI- and DSTI-limits as well as by a shift of credit provisions to high-income creditors. Following the presentation, several issues were raised, such as the right timing for changing borrower-based measures in an adverse scenario or the repricing of loans. The discussion also focused on the important role of microdata in calibrating macroprudential policies. In answering a question on household sentiment, Plašil argued that, while being very important, household sentiment was difficult to predict. In Czechia, moreover, sentiment regarding the housing market is rather short lived: Once people are convinced that they can afford to buy a house, they want to do so.

Chaired by *Nicola Brandt*, Head of the OECD Berlin Centre, the third and final session of the 91st East Jour Fixe focused on housing affordability in Austria and CESEE. The first speaker, *Karin Wagner*, Senior Principal at the OeNB's Research Section, presented the results of the latest Household Finance and Consumption Survey (HFCS) that contain information on households' consumption decisions and asset allocation. The findings suggest that Austria's relatively low homeownership rate, which is mostly attributable to the prevalence of social housing, has decreased even further, from 50.2% (2010) to 47.9% (2021). Moreover, it varies substantially across Austria's provinces. HFCS results also indicate that housing expenditure in Austria remained relatively stable over time, with variations based on mortgage obligations and income levels. Still, tenants in the lowest income quartile spend more than half their incomes (51.5%) on housing, which is worrying as this leaves less than half of their incomes for other consumption and living necessities. The results show how important it is to track affordability on a microdata level.

In the second presentation of session 3, *Andrejs Semjonovs*, Senior Economist at Latvijas Banka, discussed several key points on housing in Latvia. First, he noted a significant drop in total transaction numbers, which indicates a substantial increase in the stock of apartments and houses. However, the Latvian housing market showed some heterogeneity as transactions regarding old Soviet-era apartments, which are known for their energy inefficiency, remained stable. This suggests that new houses have become less affordable and that most people can only afford older apartments. Semjonovs argued that this pattern can also be seen in house prices: While overall price growth is moderating, different trends can be observed in different housing market segments. Prices for new dwellings continue to increase while prices for old dwellings are decreasing. This sharp deterioration in the affordability of new apartments and houses raises concerns, also regarding the country's long-term energy balance.

Jaime P. Luque, Professor of Real Estate at ESCP Business School, presented his study on housing policy interventions in Catalonia, Spain. Luque highlighted the global trend of implementing new rent control measures, such as in Berlin, France and California, which have sparked considerable debates. He emphasized that academic papers on rent control are rare, particularly those focusing on the regional level. This makes his study on Catalonia unique as it relies on comprehensive data covering all municipalities of Catalonia. Implemented in 2020, the Catalonian rent control law aimed to limit rent increases in areas specified as "tense housing markets" by prohibiting new contracts from exceeding the price agreed upon in previous contracts for properties already rented. Luque's data indicated a decrease (by about 5%) in rents during the first six months after the new law was implemented but also showed that the effect diminished after one year. Interestingly, the volume of property sales strongly increased in the observation period while the volume of rents decreased. The presumption is that some apartments that were available for rent before rent control was implemented could not be rented out profitably enough after the new law took effect and were sold instead. Overall, rent control had substantial distributive effects, with the poorer groups of the population bearing the brunt of the reform; subsequently, inequality increased. The key lesson learned from this study is that rent control measures do not effectively reduce rents; instead, they might devalue properties. This decline in property value negatively affects the long-term savings of the working class. Therefore, it would be more beneficial to

allocate resources to supporting developers rather than to implementing rent control policies. At the end of the third session, participants discussed whether future trends such as green mortgages or energy-efficient building standards will drive house prices and how rent control measures should best be designed. Speakers also highlighted that microdata are essential in discussing issues like housing market vulnerability and the affordability of housing because in-depth knowledge is the basis for implementing targeted policy measures.

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