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Who's afraid of euro area monetary tightening? CESEE shouldn't

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Who's afraid of euro area monetary tightening? CESEE shouldn't

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Abstract

After a first phasing out of the ECB's net asset purchases at end-2018, the question of how a future tightening of the ECB's monetary policy may affect countries located in the vicinity of the euro area has gained prominence, but has been left largely unanswered so far. Our paper aims to close this gap for the CESEE region by employing shock-specific conditional forecasts, a methodology that has been little exploited in this context. Besides demonstrating the usefulness of our framework, we obtain three key findings characterising the spillovers of ECB monetary policy to CESEE economies: first, a euro area monetary tightening does trigger sizeable spillovers to the CESEE region. Second, we show that in the context of a demand shock-induced monetary tightening, which is more realistic than the usual approach taken in the literature, CESEE countries' output and prices actually respond *positively*. Third, spillovers on output and prices in CESEE countries are heterogeneous, and depend on the trajectory of euro area tightening.

JEL-Classification: C11, C32, E52, F42

Keywords: Monetary policy, international shock transmission, BVAR, EU integration

Non-technical summary

In this paper we investigate the international effects of a potential tightening of ECB monetary policy. More specifically, we are interested in the implications of a rise in the ECB's key policy rate for economic growth and inflation in eight countries in central, eastern and south-eastern Europe (namely Bulgaria, Croatia, Czech Republic, Hungary, North Macedonia, Poland, Romania and Serbia). With the first phasing out of the ECB's net purchases of several types of assets in end-2018, the question emerged how a future monetary policy tightening of the ECB could affect countries that are located close-by and strongly interconnected with the euro area through international trade and financial flows. However, while the international implications of the ECB's monetary policy measures undertaken during and in the aftermath of the global financial crisis have received some attention in the literature, the consequences of a potential reversal have not been investigated much so far.

Our paper aims to close this gap by employing conditional forecasts, which indicate what potential future ECB monetary policy could imply for economic developments in other countries. Based on quarterly data from 2003 to 2018, we simulate three potential paths of the ECB's key policy rate going forward until end-2023. Those three potential paths consist of the following: 1) The ECB's key policy rate stays at its current level of zero percent until end-2023, 2) the ECB's key policy rate increases slowly going forward to around 0.7 percent until end-2023 and 3) the ECB's key policy rate rises faster to around 2.2 percent until end-2023. This approach of formulating and investigating the economic implications of concrete scenarios extends the typical methodology used in the literature.

Moreover, the literature on the domestic and international effects of monetary policy usually assumes that monetary policy is independent of economic developments. While this can be a useful exercise, we adopt a more realistic approach in this paper. More specifically, we regard monetary policy decisions as reactions to economic developments, which is the way monetary policy usually works in practice. Still, we also provide results of the former approach in order to be able to compare the different outcomes.

Our results indicate that ECB monetary policy strongly influences economic trajectories in central, eastern and south-eastern Europe. However, contrary to the standard findings in the literature, we show that an increase in the ECB's key policy rate does not necessarily accompany negative economic consequences in the countries of central, eastern and south-eastern Europe. Instead, the implications of ECB monetary policy on those countries depend on the way how monetary policy is assumed to work. If monetary policy decisions are based on economic developments, the ECB would raise its key policy

rate only when warranted by the underlying economic conditions in the euro area. As the countries in central, eastern and south-eastern Europe are closely interlinked with the euro area, they would very likely benefit from the benign economic developments in the euro area that entail a rise in the ECB key policy rate. Our results show that the positive implications of a benign economic environment in the euro area would outweigh the negative consequences of a rise in the ECB's key policy rate for almost all countries in central, eastern and south-eastern Europe. Thus, we conclude that a potential tightening of ECB monetary policy could actually imply positive international effects. However, if monetary policy is assumed to act independent of economic developments instead, economic consequences for the respective countries would be mostly negative.

1 Introduction

Since 2008, the ECB has engaged in a degree of monetary accommodation on an unprecedented scale to fulfil its mandate of price stability, and to cushion the adverse repercussions of the global financial crisis on the euro area economy. On the operational side, it has not only employed its standard monetary policy toolkit when lowering its key policy rates to historically low levels, but also introduced a range of non-standard monetary policy measures, such as large-scale asset purchases or (targeted) long-term refinancing operations.

In the context of the first phasing out of the ECB's net purchases under the asset purchase programme at the end of 2018, the question of how a future tightening of the ECB's monetary policy may affect countries located in the vicinity of the euro area has gained prominence. In the literature, this question has been left largely unanswered so far: to our knowledge, the potential repercussions on central, eastern and south-eastern European economies (CESEE) from a scaling back of monetary accommodation in the euro area have not received much attention.[1] This stands in contrast to the United States, where policy normalisation by the Federal Reserve has progressed further and has therefore spawned a growing body of research investigating the implications of tighter monetary conditions for emerging economies.[2] Against this background, our paper complements the various studies investigating spillovers from the policy measures that were taken by the ECB since 2008 (see e.g. Babecká Kucharčuková et al., 2016; Bluwstein and Canova, 2016; Ciarlone and Colabella, 2016; Horvath and Voslarova, 2017; Potjagailo, 2017; Hajek and Horvath, 2018; Feldkircher et al., 2019; Moder, 2019) by putting the emphasis on a potential tightening of monetary conditions in the euro area and its possible consequences for output and consumer price developments in CESEE

Focusing on the CESEE region, more specifically on six EU members (Bulgaria, Croatia, the Czech Republic, Hungary, Poland and Romania) and two prospective EU members (North Macedonia and Serbia), in this paper appears especially worthwhile for two reasons. First, CESEE countries are characterised by a high degree of trade integration and strong financial linkages with the euro area, including a notable degree of (unofficial) euroisation in most cases. As a result, they are likely to be more profoundly affected by a normalisation of ECB monetary policy than economies that are less interlinked with the euro area. Second, the variety of ways CESEE countries are connected with the

[1] An exception is Colabella (2019) who analyses the impact of a shock to the euro area shadow interest rate on output in - among others - CESEE by employing a GVAR framework. Cova et al. (2019) use a New Keynsian model to also simulate the effects of an unwinding of the Eurosystem's Asset Purchase Programme and the normalisation of US monetary policy on the euro area, the United States, China, Japan and a residual region, thereby not allowing the drawing of any particular conclusions about CESEE.

[2] See for example Dahlhaus and Vasishtha (2014), Feldkircher et al. (2015), Caceres et al. (2016), Hernández (2017), Meinusch (2017), Pérez Forero (2017) or Koepke (2018).

euro area implies a number of potential transmission channels through which a reduction of monetary accommodation by the ECB may affect growth and inflation in the region. Moreover, the direction of the impact could, a priori, cut both ways, opening a rich field for the investigation of spillovers. As an illustration, tighter ECB monetary policy may have only limited negative effects on CESEE countries if it occurs in a context of an economic upswing in the euro area, benefitting exports originating from the region and attracting foreign capital to create the productive capacity to meet higher demand. However, it is equally conceivable that investment will remain concentrated in the euro area if its outlook improves, thereby lessening capital inflows to CESEE countries. In turn, this may dampen output and inflation, at a time when external funding in euro, on which the private and public sector in the region frequently rely, is also increasing in cost, likely slowing economic activity further. Among the various factors that determine the strength and direction of the spillovers from tighter ECB monetary policy to the CESEE region, exchange rate regimes and the degree of euroisation of the domestic economy may play a particularly important role. For instance, stabilised exchange rates against the euro in combination with its widespread domestic use may compel some CESEE central banks to tighten in unison with the ECB, even if not warranted by economic conditions, to prevent a depreciation of their currency which may jeopardise macroeconomic and financial stability. In contrast, a more flexible exchange rate framework could allow a central bank to accommodate some currency depreciation, notably if facilitated by limited levels of euroisation, thereby achieving relatively better economic outcomes yet potentially at the price of higher inflation.

Our contribution to the literature on international spillovers of euro area monetary policy is twofold: First, we go beyond the usual approach taken in the literature – using impulse response functions of monetary policy shocks – by performing a scenario analysis based on shock-specific conditional forecasts. The advantages of this method have recently been explicated by Antolín-Díaz et al. (2019), who stress that scenario analysis should ideally be performed on the basis of economically meaningful structural shocks. In applied research, shock-specific conditional forecasts were employed by Feldkircher et al. (2015) to investigate how global GDP and inflation will be affected by different paths of US monetary policy normalisation. Similarly, Baumann et al. (2019) use a structural counterfactual analysis based on conditional forecasts to discern the contributions of monetary and fiscal policy shocks to GDP growth in the period since the global financial crisis in a set of advanced and emerging economies. To the best of our knowledge, we are the first to apply the methodology to analyse spillovers from euro area monetary policy to CESEE. Different from an analysis solely based on impulse response functions, we are able to investigate a variety of trajectories euro area monetary policy may take in the context of alternative structural shocks and study the direction and magnitude

of spillovers to CESEE over time. Specifically, we compare the economic implications for CESEE based on three scenarios: (1) Unconditional model forecasts form our baseline case where, absent any conditions, all variables converge to their steady states, implying a gradual tightening of euro area monetary policy. (2) Another scenario assumes continued accommodation until the end of our forecasting horizon in 2023, implying looser monetary conditions than in the unconditional forecast. (3) We condition our forecast on the path policy rates took during the last monetary tightening cycle before the global financial crisis, implying a faster monetary tightening compared to the unconditional forecast. Based on this setup, we can analyse the impact on CESEE from a euro area monetary policy path that is looser or tighter than the unconditional forecast derived from the model.

Our second contribution to the literature consists of our modelling of the shocks underpinning the shock-specific conditional forecasts. With a few exceptions (see e.g. Pérez Forero, 2017, for spillovers from US monetary policy to Latin American economies), the literature assesses spillovers of changes to monetary policy that are orthogonal to economic conditions, i.e. pure monetary policy shocks. In practice, however, monetary policy is not acting this way. Rather, central banks are adjusting their monetary policy stance as a response to (projected) economic developments. Therefore, our main focus is on demand shock-driven monetary policy changes (tightening or loosening) instead of 'pure' monetary policy shocks. Still, we also provide results of the latter as a means of comparison.

The main result of this paper is that a normalisation of euro area monetary policy does not preordain negative implications for CESEE. In fact, our results show that positive spillovers to CESEE from a benign euro area economic environment more than offset the negative effect of tighter monetary conditions. More specifically, after five years the level of output in CESEE could be between 1.6% and 7.5% higher if euro area demand necessitates a fast, as opposed to a more gradual, tightening of monetary policy. In the same scenario, differences in the level of consumer prices range from 7.2% to 16.3%. Conversely, if economic developments in the euro area require monetary policy to stay more accommodative than in our baseline case, this implies that GDP and consumer prices in CESEE follow much more muted trajectories. By contrast, in the case of a series of monetary policy shocks where the central bank changes its stance irrespective of the prevailing economic environment, which is the standard assumption used in the literature, our results show that GDP and inflation in CESEE are adversely affected, in line with outcomes commonly found in the literature.

The remainder of the paper is structured as follows: We describe our methodology in Section 2 and discuss our results in Section 3. Lastly, we discuss the conclusions of our findings and highlight some avenues for further research.

2 Methodology

2.1 Model and data

Our modelling framework consists of separate bilateral structural Bayesian VARs. Each model includes the euro area and one CESEE country, and takes the following form:

$$\sum_{s=0}^{p} \begin{bmatrix} A_{11}(s) & A_{12}(s) \\ A_{21}(s) & A_{22}(s) \end{bmatrix} \begin{bmatrix} y_1(t-s) \\ y_2(t-s) \end{bmatrix} + \begin{bmatrix} c_{11} \\ c_{21} \end{bmatrix} = \begin{bmatrix} \varepsilon_1(t) \\ \varepsilon_2(t) \end{bmatrix}$$

$y_2(t)$ denotes a vector of macroeconomic variables for each CESEE country, comprising GDP and consumer prices, and $y_1(t)$ represents a vector of euro area variables, including GDP, consumer prices and the interest rate on the ECB's main refinancing operations (MRO). In order to account for the non-standard monetary policy measures introduced since the global financial crisis, and the switch to a fixed-rate tender with full allotment in October 2008, we include the Eurosystem balance sheet. Furthermore, $y_1(t)$ comprises the Composite Indicator of Systemic Stress (CISS; see Holló et. al, 2012) to control for changes to the Eurosystem balance sheet triggered by financial stress in the euro area.[3]

Following Cushman and Zha (1997), we use block exogeneity by setting $A_{21}(s) = 0$ for each s, implying that current and past developments of GDP growth and inflation in CESEE have no impact on euro area variables. In view of the countries in our sample, this assumption is plausible and is frequently used in the literature to model spillovers from large to small economies (see e.g. Canova, 2005; Maćkowiak, 2007; Benkovskis et al., 2011). Moreover, it further reduces the number of parameters to be estimated.

All variables enter our models at quarterly frequency and in annual growth rates, with the exception of the MRO and the CISS, which enter in levels. Reflecting our quarterly time series, we choose $p = 4$ in line with the literature to avoid overfitting our data. Our sample starts in 2003Q1[4], to account for a full monetary policy cycle, and ends in 2018Q4. While moving further back in time would yield benefits in terms of estimation accuracy, it would at the same time narrow our sample of CESEE countries. The comparatively short time series we are therefore left to work with leads to a parsimonious selection of variables to be included into our models. It also motivates our choice of a Bayesian setup

[3] For a discussion how to incorporate non-standard monetary policy into a structural VAR framework, see for example Moder (2019).
[4] Unfortunately, we are therefore not able to include Albania (GDP data available since 2008Q1), Bosnia and Herzegovina (GDP available since 2008Q1) and Montenegro (GDP data available since 2010Q1).

that allows disciplining the estimation of our parameters by imposing additional prior restrictions. The conditional forecasts start after the end of the estimation sample in 2019Q1 and are estimated until 2023Q4.

We opt for an independent Normal-Wishart prior and obtain the scale matrix S0 from individual AR regressions. Concerning the hyperparameters, the autoregressive coefficient is set at 0.8 with the remaining hyperparameters specifying the prior chosen according to Dieppe et al. (2016). The posterior is derived by Gibbs sampling, with a total number of 10,000 iterations and a burn-in sample of 2,000 iterations. The unconditional forecasts, impulse response functions and conditional forecasts are derived as described in the technical guide accompanying the BEAR toolbox used for the estimations (see Dieppe et al., 2016).

2.2 Identification and empirical approach

For the (partial) shock identification, we use sign restrictions following the methodology proposed by Arias et al. (2014) in order to identify two shocks (Table 1). In both cases, we model a monetary tightening via the ECB's standard monetary instrument, the MRO rate, leaving the Eurosystem balance sheet to fluctuate endogenously within our model, thereby acting as a control variable capturing non-standard monetary policy measures such as purchases of euro area sovereign bonds or additional long-term refinancing operations. We prefer this approach to modelling euro area monetary policy normalisation through shadow rates, even though it may constrain the generality of our findings since the MRO rate has remained at the zero lower bound during a substantial part of our sample. Shadow rates include both standard as well as non-standard monetary policy measures, and using shadow rates as a measure of monetary policy thus does not allow disentangling between the two. In our case, focusing on the MRO rate as a measure of standard monetary policy adequately reflects the sequencing of monetary policy normalisation that had been communicated by the ECB at the time. Specifically, the ECB expressed an explicit commitment to reinvest the principal payments from its asset purchase programmes until well after it will begin raising policy rates, thereby not shrinking the Eurosystem balance sheet for an extended period of time.[5] Modelling this path of monetary policy normalisation through a shadow rate instead of using the MRO rate in combination with the Eurosystem balance sheet would not be straightforward and the results would be more difficult to interpret. Similar to the Eurosystem balance sheet, we treat the CISS, our measure of systemic stress in

[5] In its decision taken on 12 September 2019, the Governing Council reiterated that "Reinvestments of the principal payments from maturing securities purchased under the APP will continue, in full, for an extended period of time past the date when the Governing Council starts raising the key ECB interest rates, …".

the euro area financial system, as an endogenous variable to account for the possible impact of financial tensions on the other variables in our model.

The first shock is identified as a demand shock-induced monetary tightening. An increase in GDP growth and inflation in the euro area trigger a monetary policy response in the form of a higher MRO rate. Due to the forward-looking nature of monetary policy, the tightening takes place in the same quarter as the demand shock. The monetary policy shock raises the MRO rate on impact and in the first two quarters. The persistence of the monetary policy-shock identification is needed in order to generate shocks strong enough to push the unconditional forecast to the path imposed in the shock-specific conditional forecasts (see below). For the impact of the monetary policy shock, we impose declines in euro area GDP growth and inflation one period after the rise in the MRO rate in order to account for some lag with which changes in monetary conditions affect the economy.

Our strategy to gauge potential spillovers from euro area monetary policy tightening to CESEE has rarely been employed in the literature to date. Instead of solely relying on impulse response functions to assess the propagation of shocks, we base our analysis on shock-specific counterfactual scenarios. The conditional forecasts employ the structural shocks defined in Table 1 to arrive at a path for the MRO rate that deviates from its unconditional model forecast. Specifically, we consider two scenarios (Chart 1): in the first case (scenario 1), we assume that structural shocks will leave the MRO rate unchanged at its present level of 0% over our forecast period from 2019 to 2023 (green line), and thus below the unconditional model forecast (light blue line), which projects a gradual increase to somewhat below 1% by 2023. In the second case (scenario 2), structural shocks move the MRO rate along a trajectory that is modelled on the tightening cycle that started in 2005 and ended with the collapse of Lehman Brothers in September 2008 (red line). Thus, scenario 2 imposes an increase of the MRO rate that is steeper and reaches a higher level than implied by the unconditional model forecast.

Depending on the structural shock that is employed to achieve these paths for the MRO rate, outcomes for the other variables incorporated into our model will obviously vary. Under the premise of a demand shock as defined in Table 1, for instance, only a series of positive shocks to euro area GDP growth and inflation will put the MRO rate above the unconditional model forecast and thereby onto the trajectory specified by our second scenario. Under the monetary policy shock, by contrast, the same trajectory for the MRO rate can only be achieved by a series of negative shocks to euro area GDP growth and inflation.

To sum up, our analysis follows a three-step empirical setup. First, we derive unconditional forecasts for all model variables over our forecast horizon, thereby letting them converge towards their steady

states which serve as our baseline. Second, we take one of our model variables, the MRO rate, and impose two paths (scenario 1 and scenario 2) that deviate from its unconditional model forecast while presuming that each path is attained by either demand or monetary policy shocks affecting the euro area. Third, we forecast all remaining variables under these four conditions (two different paths for the MRO rate and two different shocks) and compare the results to the unconditional forecasts.

3 Results

3.1 Euro area

We start by employing our empirical approach outlined above to the euro area, before discussing spillovers to GDP growth and inflation in CESEE in Section 3.2. The h-period ahead unconditional forecast $y_1(t+h)$ based on our estimates of $A_{11}(s)$ and c_{11} with $h = 1, \dots, 20$ shows the trajectories with which the euro area variables return to their steady states over the period 2019-2023 (Chart 2). Specifically, the MRO rate shows a gradual increase to 0.7% by the end of 2023. At the same time, the Eurosystem balance sheet converges towards a growth rate of somewhat above 10%, roughly in line with the expansion seen before the global financial crisis.[6] Taken together, the unconditional forecast thereby implies some reduction in monetary accommodation over time, consistent with decelerating GDP growth and inflation. Lastly, financial stress as measured by the CISS registers a mild pick-up but stays low overall. In sum, the results obtained for the euro area from the unconditional model forecast appear to be a plausible benchmark against which to evaluate our scenarios.

Next, we discuss the impulse response functions that are needed for the shock-specific conditional forecasts. Following a demand shock-driven monetary tightening (Chart 3, left panels), the median posterior increase in the MRO rate (red line) is relatively persistent with the 68% credibility interval (black lines) remaining above zero for four years (16 quarters), as the rise in the annual rate of inflation fades only slowly, in contrast to GDP that rebounds faster from the initial shock. With the initial response to the demand shock-driven monetary tightening pointing towards a reduction of financial stress, the median posterior of the CISS enters positive territory after seven quarters but size of the response can be regarded as negligible. Interestingly, the Eurosystem balance sheet shows little reaction to the demand shock, leaving the MRO rate to accommodate its impact. Turning to the 'pure' monetary policy shock (Chart 3, right panels), the hike in the MRO rate is relatively persistent. While

[6] Between 2000 and 2007 the Eurosystem balance sheet grew at an average annual rate of around 7%, compared to the about 10% rate in our unconditional forecast and the nearly 15% seen over the period 2008 to 2018.

the associated contraction of GDP lasts around three quarters, it takes longer until the disinflationary impact phases out completely, in line with economic theory. Neither the CISS indicator nor the annual growth rate of the Eurosystem balance sheet indicate a strong response to the monetary policy shock.

Moving from unconditional to conditional forecasting, we are conditioning our forecasts on the two paths for the MRO rate as illustrated in Chart 1, each of which will be attained either through a series of euro area demand or monetary policy shocks as defined in Table 1 and discussed in the previous paragraph. Thus, our approach yields four different outcomes, namely continued accommodation (scenario 1) prompted either by a series of continuous demand or monetary policy shocks, and faster tightening (scenario 2), again prompted by either a series of demand or monetary policy shocks. The series of structural demand and monetary policy shocks needed to obtain the conditioned paths for the MRO rate under the two respective scenarios are depicted in Chart 4. As the path of the MRO rate in the scenario of a faster tightening deviates more from the unconditional MRO path than the scenario of continued accommodation (Chart 1), the implied structural shocks needed to push the MRO rate to the faster tightening scenario are larger than the implied structural shocks needed for the continued accommodation scenario.

Finally, our conditional forecasts indicate that continued accommodation elicited by demand shocks (Chart 5, left panels, green lines), i.e. an economic environment that warrants continuous accommodation of the MRO rate at zero percent, puts the conditional forecast trajectory of euro area variables in close vicinity of the unconditional forecasts that serve as our baseline (blue lines). In particular, the median posteriors of the level of the CISS and the annual growth in the Eurosystem balance sheet in scenario 1 are nearly identical to the baseline. GDP growth and inflation are somewhat lower, however, as, in the context of a demand shock, more modest increases in economic activity and the price level than in the baseline are required to fix the MRO at the path implied by scenario 1.

By contrast, the conditional forecasts of all euro area variables in the demand shock-driven scenario 2 (Chart 5, left panels, red lines) are deviating much more from the unconditional path. In scenario 2, the economic environment warrants a fast monetary tightening which manifests in a steep rise of the MRO. Seen through the prism of a demand shock, the ECB will sustain such a trajectory for the MRO only in an environment of elevated inflation, and our results confirm this notion: the median posterior of our conditional forecast for inflation rises to above 3% by 2020 on the back of an expansion that drives GDP growth to nearly 4%. Subsequently, though, economic activity moderates rapidly as tighter monetary conditions take their toll, bringing GDP growth below our baseline from mid-2021 onwards whereas inflation decelerates to 2.6% at the end of our conditional forecasting horizon. The

Eurosystem balance sheet initially supports the ECB's less accommodative stance with its annual growth falling below the baseline but rapidly rebounds and, after a brief period of overshooting, converges towards the baseline by 2023. Finally, financial stress declines at first, aided by favourable economic conditions, before it permanently settles at a higher level than in the baseline against a mix of slower growth, elevated inflation and tighter monetary policy.

Compared to demand shock-driven monetary policy, the results differ radically when the underlying shocks of the conditional forecasts are modelled as 'pure' monetary policy shocks, substantiating our view that it is important to ascertain the rationale for a tightening of monetary policy before assessing spillovers to countries outside the euro area. Indeed, if the ECB were to tighten irrespective of prevailing economic conditions – and by more than implied by our baseline –, the outcome would be unambiguously negative (Chart 5, right panels, red lines). Growth and inflation would drop substantially below the baseline and remain at negative levels until the end of our conditional forecast horizon. Likewise, financial stress would significantly intensify. Conversely, continued accommodation in scenario 1 would provide some boost to GDP growth and inflation compared to the unconditional forecast, as well as further reduce financial stress (Chart 5, right panels, green lines).

To summarise our results, we translate the growth rates for GDP and inflation depicted in Chart 5 for the baseline and each of the two scenarios into levels, before computing cumulative percentage deviations compared to the baseline for each shock/scenario-combination up to the end of our conditional forecast horizon in 2023 (Chart 6). The following features stand out: first, it greatly matters whether the path set for the MRO rate in each scenario is arrived at by a series of demand or monetary policy shocks. The direction of the impact on the level of euro area GDP and prices switch signs, depending on the two types of shocks we consider, i.e. whether we assume that monetary policy responds to economic conditions, or we model monetary policy as orthogonal to economic developments. For instance, if scenario 1 of continued accommodation is attained by a series of demand shock-driven monetary expansion, the level of euro area GDP and prices are a respective 0.5% and 2% below the baseline by 2023 (Chart 6, upper left panel). Conversely, a monetary policy shock-driven expansion (upper right panel) would increase euro area GDP and prices by 1.4% and 2.5%, respectively, compared to the baseline after five years. The difference is even more striking in our scenario 2 of faster tightening (Chart 6, lower panels).

Second, the absolute magnitude of the impact on euro area GDP and inflation is larger in the series of monetary policy shocks as compared to demand shock-driven tightening. The effect is particularly strong in a more vigorous monetary tightening than implied by the baseline, which leads to a decrease of euro area GDP and inflation of more than 3% and 6%, respectively, compared to the baseline by

2023 (Chart 6, lower right panel). The more muted response of GDP and inflation in conditional forecasts with demand shock-driven monetary policy can be explained by the two opposing forces at work: as a series of demand shocks drive economic conditions into one direction, monetary policy reacts countercyclically in order to contain the economic expansion or contraction. On the contrary, in our conditional forecasts driven by a series of monetary shocks, only one force is at work.

Third, the effects of both types of shocks on the level of euro area GDP and prices prove relatively persistent over time across our scenarios, at least over the horizon of our conditional forecast. Only the impact on GDP reverses its course in the context of our demand shock-driven scenarios 1 and 2. This shows that monetary policy is working properly in containing the negative/positive demand shocks, at least for output growth but less so for inflation (Chart 6, left panels, blue bars). Keeping these results for the euro area in mind, we are now turning to the main focus of our paper, the spillovers of our two euro area monetary policy scenarios to CESEE economies.

3.2 CESEE countries

3.2.1 Unconditional forecasts

In line with the approach taken for the transmission of monetary policy within the euro area, we employ the unconditional forecast of GDP growth and inflation in each CESEE country as a benchmark against which we assess the size and trajectory of spillovers originating from the euro area. Unconditional forecasts are uniquely suitable for this purpose as they are, by definition, free from the influence of shocks occurring in the euro area. At the same time, due to the strong integration of the CESEE region with the euro area, they still depend to some extent on euro area economic developments. Indeed, Chart 7 shows that the unconditional forecasts of GDP growth and inflation in most CESEE economies take a shape similar to the unconditional forecasts of the euro area. With the exception of North Macedonia and Poland, all countries exhibit some acceleration of GDP growth in the near term which is slowly fading by 2023 (Chart 7, left panels). For inflation (right panels), the picture is somewhat more mixed. Initially, like in the euro area, inflation in all CESEE countries bar North Macedonia and Serbia decelerates, but then price pressures rebound modestly, different from the flattening out seen in the euro area.[7]

[7] For Serbia, we interpret the strong acceleration of inflation in the unconditional forecast as a mean reversion of the model to the high inflation rates observed in the past.

3.2.2 Spillovers of a euro area demand shock

In what follows we will mainly focus on spillovers originating from a monetary policy reaction to a euro area demand shock, since we have discussed in Section 2 that a central bank is mainly interested in adapting its monetary policy in reaction to (anticipated) economic conditions and less in administering a genuine monetary policy shock that can have wide-ranging consequences for output and inflation, as demonstrated by our analysis of the euro area in Section 3.1. For the sake of completeness, however, we will also briefly present the propagation of a euro area monetary policy shock to CESEE economies in Section 3.2.3.

Ex-ante the overall impact of a demand shock-driven euro area monetary tightening on CESEE countries is not clear-cut. On the one hand, GDP growth in CESEE countries could pick up as higher activity in the euro area may first stimulate exports and then the wider economy by fostering additional investment and encouraging private consumption on the back of improved employment prospects. In combination with increasing prices for euro area imports, a tighter labour market and emerging capacity constraints may then lift inflation over time. On the other hand, a booming euro area economy offering attractive returns on investment and buoyant consumer demand may direct capital (flows) away from CESEE countries in the near-term, followed by a rise in ECB policy rates that prompt a cooling of euro area activity and thus a dampening effect on CESEE countries' GDP growth and inflation. The outcome prevailing among these alternatives is likely to be at least in part a function of each country's integration into cross-border supply chains with the euro area, the degree with which capital flows to CESEE economies will respond to rising interest rates and expanding investment opportunities in the euro area, as well as the reaction required from domestic policy makers to cope with a changing external environment.[8]

Impulse response functions show a relatively clear impact of a euro area demand shock-driven monetary tightening on GDP growth and inflation in CESEE economies (Chart 8). Impulse responses are in general developing in the same direction as in the euro area, and are relatively homogenous across countries. Particularly inflation (Chart 8, right panels) reacts rather strongly to a euro area demand shock with the 68% credibility intervals around the median posteriors settling above zero between three (Bulgaria, Croatia, Czech Republic) and eight (Hungary, Serbia) quarters after euro area inflation, providing a clear indication of the transmission of euro area price developments to the region, although with some delay. The reaction of GDP growth is less persistent (Chart 8, left panels).

[8] For instance, in CESEE economies with a stabilised exchange rate against the euro, central banks may need to adjust their monetary policy stance and/or intervene in foreign exchange markets to maintain their exchange rate regime. Likewise, governments relying on international debt markets for their funding may be confronted with more limited fiscal space if euro area financial conditions tighten.

Even though the mass of posteriors shifts noticeably above zero in most countries, it continues to encompass zero in all cases but Bulgaria and the Czech Republic, potentially as a result of the effects of the demand shock on GDP growth in the euro area dissipating fairly quickly. Taken together, this may indicate that higher prices of imports are an important transmission channel from euro area to CESEE inflation, an interpretation also supported by the large share of trade between the CESEE and the euro area that is invoiced in euro (ECB, 2019).

Our shock-specific conditional forecasts along the two trajectories we postulate for the MRO rate over the period 2019-2023, suggest that the repercussions on GDP growth and inflation for CESEE countries are by and large the same as for the euro area (Chart 9). Economic conditions in the euro area that would justify keeping the MRO rate at 0% until 2023 (scenario 1) imply CESEE inflation rates dropping below their baseline levels of the unconditional forecast, with the gap widening over time (Chart 9, right panels, green lines). Likewise, GDP growth (left panels) shifts somewhat below the baseline and stays put. Only in Croatia and Hungary the monetary stimulus shifts GDP growth above the unconditional forecast seen towards the end of the forecast horizon. In our scenario 2, where a benign euro area economic environment warrants a steeper rise in the MRO rate compared to the baseline (scenario 2), inflation in CESEE countries accelerates sharply in all countries (right panels, red lines). In line with the dynamics observed for the euro area, the rise in inflation proves to be persistent in most countries.

For GDP growth, the picture is slightly more mixed. Whereas its shape closely resembles the path taken in the euro area, the end points reached in 2023 differ across CESEE countries when set against the baseline. In particular, GDP growth in half of the countries (Croatia, Czech Republic, Hungary and Romania) falls below the baseline, and sometimes substantially so, as we move along the conditional forecasting horizon, an outcome comparable to the euro area. Thus, in those countries the negative effects of the monetary tightening outweighs the positive effects of the demand shock. On the contrary, in Bulgaria and Serbia GDP growth remains above the baseline along the entire horizon, while economic activity in North Macedonia and Poland displays responds much less to the euro area shocks than other CESEE countries.

In sum, our conditional forecasts extend the conclusions drawn from our analysis of the impulse response functions above. Specifically, the impact of our two scenarios compared to the baseline is larger and more homogeneous for CESEE countries' prices than for GDP when accumulated over the five years of our conditional forecast horizon (Chart 10). If ECB monetary policy stays accommodative as warranted by economic conditions, prices in CESEE economies are between 4.0% (Hungary) and 5.1% (Bulgaria) below, and GDP between 0.3% (Hungary) and 2.9% (Czech Republic)

below their levels in the baseline scenario (Chart 10, top panels). Similarly, results for our scenario 2 (bottom panels) are of the opposite sign, but of a larger magnitude, reflecting the more forceful demand shocks required to move the MRO rate along its steeper-than-baseline path and keep it unchanged thereafter. Moreover, the effect on price levels proves persistent in both scenarios, with divergences from baseline gradually increasing over time. By contrast, differences between GDP and baseline levels (start to) dissipate after widening at first in some CESEE countries, such as Hungary, Croatia or, in the second scenario only, the Czech Republic and Romania. This may indeed suggest that, at least in some economies, prices are determined by external factors to a non-negligible extent, relegating inflationary pressures that originate domestically to second place.

Importantly, our results indicate that the removal of monetary accommodation in the euro area does not necessarily entail negative consequence for the CESEE region. To the contrary, if a tightening of the ECB's monetary policy occurs against a background of an improving euro area economy, CESEE countries appear to profit in the form of higher growth rates. Still, the substantial – and persistent – spillovers to inflation may call for determined policy action in inflation-targeting countries to safeguard price stability and international competitiveness, thereby potentially offsetting some of the benefits of the favourable repercussions on growth.

3.2.3 Spillovers of a euro area monetary policy shock

To highlight how crucial the assumptions behind a monetary policy tightening in the euro area are for the direction and size of spillovers to CESEE GDP growth and inflation, we repeat the exercise undertaken in Section 3.2.2 for the case of a 'pure' monetary policy shock.[9] As already demonstrated for the euro area in Section 3.1, such a shock has negative consequences for output and inflation if the MRO rate increases more steeply and to a higher level than in the baseline. By contrast, continued accommodation keeping the MRO rate below the baseline along our conditional forecasting horizon has positive effects. What would it imply for the CESEE region? Chart 11 shows that, akin to the demand shock, the level of GDP and prices in most CESEE economies after a monetary policy shock take a direction similar to the euro area.[10] Specifically, in our first (second) scenario, GDP levels lie

[9] As a monetary policy shock is not the main focus of our analysis, we do not include charts illustrating impulse response functions and conditional forecasts of GDP growth and inflation for each country in our paper but, for the sake of brevity, rely on Chart 10 to highlight key findings. Most individual country results are of the expected sign and shape and are available from the authors upon request.

[10] A notable exception is North Macedonia where the level of GDP – counterintuitively – develops in the opposite direction from the euro area and other CESEE countries. These results need to be interpreted with caution as the high volatility of North Macedonia's GDP growth series (Chart 7, left panel, fifth chart from the top) distorts the ability of our estimation framework to adequately capture the dynamics of the variables entering our model, thereby also discounting the validity of our conditional forecasts. Inflation in Serbia (Chart 7, right panel, bottom chart) is a similar case. While price levels in Serbia move in the same direction as in the euro area, the magnitude of the impact of the monetary policy shock appears unreasonably large.

above (below) their baseline levels at the end of 2023, yet not in all countries (Chart 11, left panels). In Bulgaria, Croatia and Poland GDP does not deviate much from the baseline after the five year period in both scenarios. To some extent, this mirrors developments after a euro area demand shock which also propagates heterogeneously across the CESEE region (Chart 10), although the (absolute) magnitude of the estimated deviations from baseline is larger for a monetary policy shock, corresponding to our findings for the euro area. At the same time, changes in the level of GDP over time in individual CESEE economies do not simply emulate fluctuations in euro area GDP across different shocks and scenarios. For example, Croatian GDP reacts comparatively strongly to a euro area demand shock in both of our scenarios but does not do so in the case of a euro area monetary policy shock. Likewise, Bulgarian GDP is among the most affected by a euro area demand shock but is much less so than the Czech Republic, Hungary, Romania and Serbia in the event of a euro area monetary policy shock. Taken together, this suggests that additional to spillovers transmitted via variations in euro area output, other factors, such as exchange rate regimes, the degree of euroisation or the mode of corporate and government funding, may exert a reinforcing or countervailing impact. Turning to prices, Bulgaria, Croatia and the Czech Republic seem only relatively mildly affected by a euro area monetary policy shock in both scenarios (Chart 11, right panels), contrasting with the situation after a euro area demand shock where the gaps between the baseline and the conditional forecast of price levels widen rather homogeneously across countries by 2023 (Chart 10, right panels). Like for GDP, this might again be an indication that prices in the CESEE region are not only influenced by euro area inflation and the state of the domestic economy but that other drivers may also play a role.

4 Conclusions

In the wake of the global financial crisis, the world has witnessed a degree of monetary accommodation in advanced economies on an unprecedented scale, accompanied by the deployment of instruments that had not previously formed part of the toolkit of central banks. How such policies may have affected economic and financial conditions in third countries has found widespread attention in academia. More recently, some advanced economy central banks, among them the ECB, have contemplated and/or implemented steps to normalise monetary policy, raising the question of whether the tide of spillovers to countries outside their jurisdictions will turn and what the implications of such a turn for the affected economies and policymakers will be.

In this context, our work on the possible spillovers of a monetary policy tightening by the ECB to CESEE economies is demonstrating several key features that may contribute to this debate. First, changing policy rates in the euro area do trigger spillovers to the CESEE region, which are potentially sizeable, depending on the direction and the speed of the adjustment. Second, the economic environment in which monetary policy alters its stance matters to a great deal. If the ECB raises its policy rate as a reaction to an improving economic outlook and mounting inflationary pressures, CESEE countries record, by and large, higher GDP growth and inflation, notwithstanding the tighter monetary and financial conditions in the euro area. By contrast, should the ECB administer a rate increase irrespective of whether the economic backdrop is conducive to such a step, the implications for the CESEE region are negative. Additionally, our results indicate that prices and output in CESEE economies do not respond homogenously to developments in the euro area. Rather, notable cross-country differences emerge, conditional on the type of economic shock and scenario in place, thereby pointing towards additional factors at play that are not captured by our relatively simple models. Apart from these findings, our analysis also shows that employing a conditional forecasting framework can offer useful insights that go beyond an approach that solely relies on the evaluation of impulse response functions.

This paper opens some avenues for further research. As stressed by our results, spillovers of the same shock-scenario combination to individual CESEE countries can vary widely, calling for a closer analysis of the channels of transmission, either by augmenting the model's complexity or by employing a different kind of models. In addition, our analysis does not address the potential reaction of policy makers in the countries affected by spillovers from the monetary policy decisions taken by the ECB. Accounting for such responses, possibly by conditioning the path of domestic policy variables, would further enrich the results and may also yield policy recommendations for ways to cushion adverse impacts of negative – or make best use of positive – spillovers originating from the euro area.

Tables

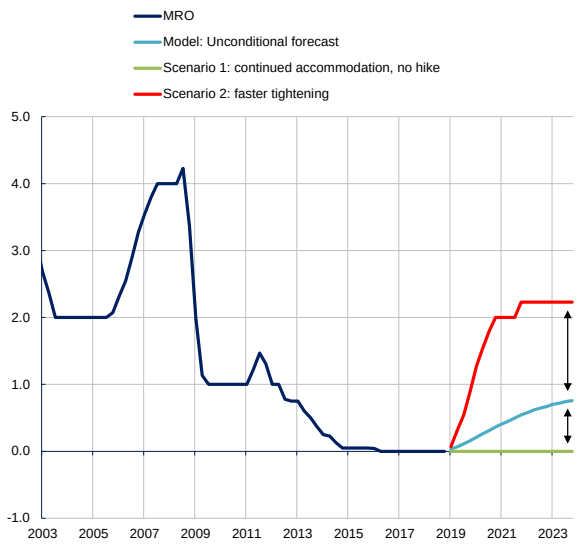
Table 1: Shock identification

	Demand shock-driven monetary policy response	Monetary policy shock
ECB balance sheet	?	?
MRO rate	+	+
	(0-0)	(0-2)
CISS	?	?
Euro area GDP	+	–
	(0-0)	(1-1)
Euro area consumer prices	+	–
	(0-0)	(1-1)
CESEE GDP	?	?
CESEE consumer prices	?	?

Note: figures in brackets indicate the quarters in which the restrictions are binding with (0-0) implying a restriction on impact only. "?" denotes that no zero or sign restriction is imposed on the respective variable.

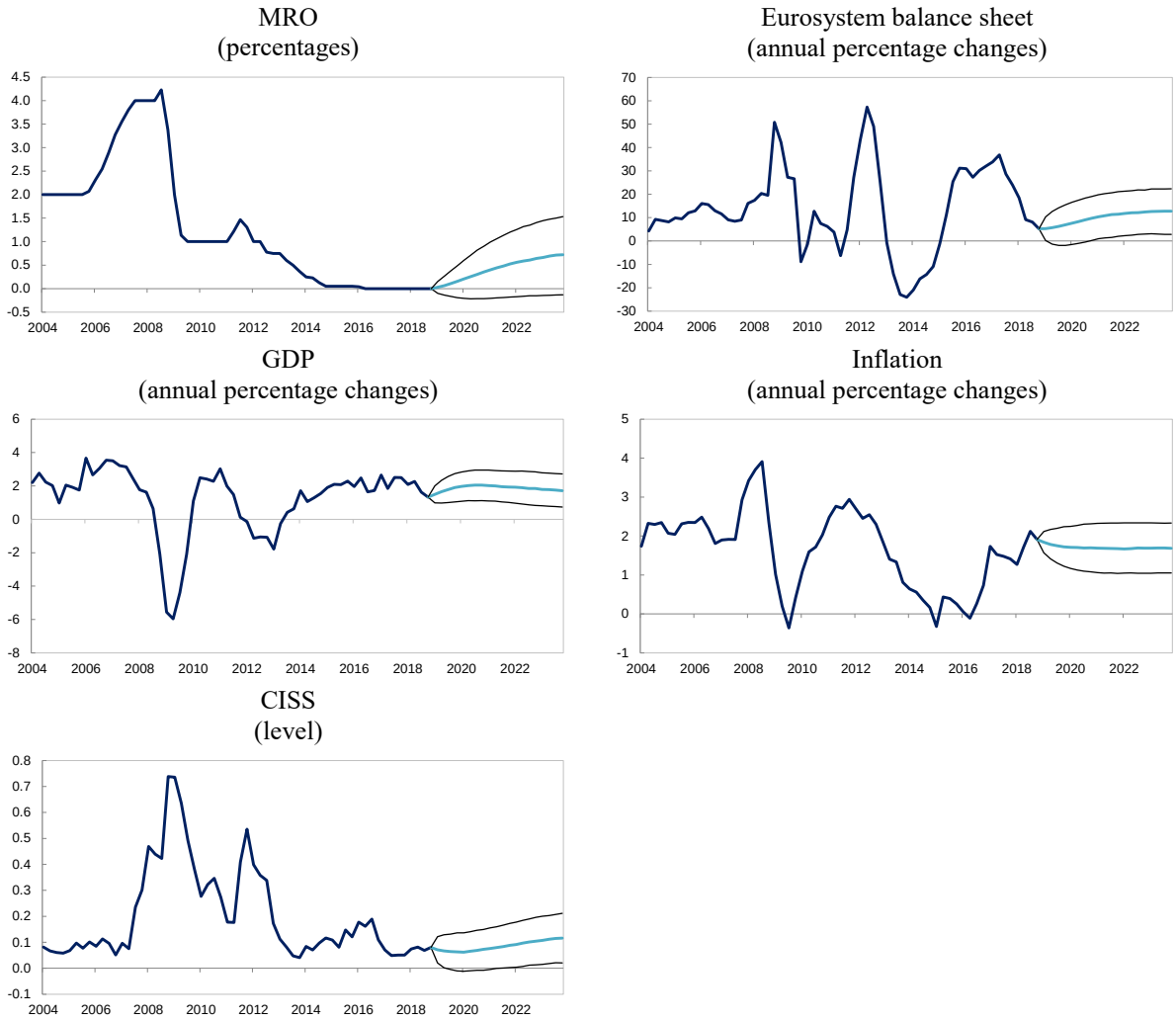
Figures

Chart 1: Unconditional MRO rate forecast and scenarios



Sources: ECB and authors' calculations.

Chart 2: Euro area variables, unconditional forecasts



Sources: ECB, Eurostat and authors' calculations.

Chart 3: Euro area variables, impulse response functions

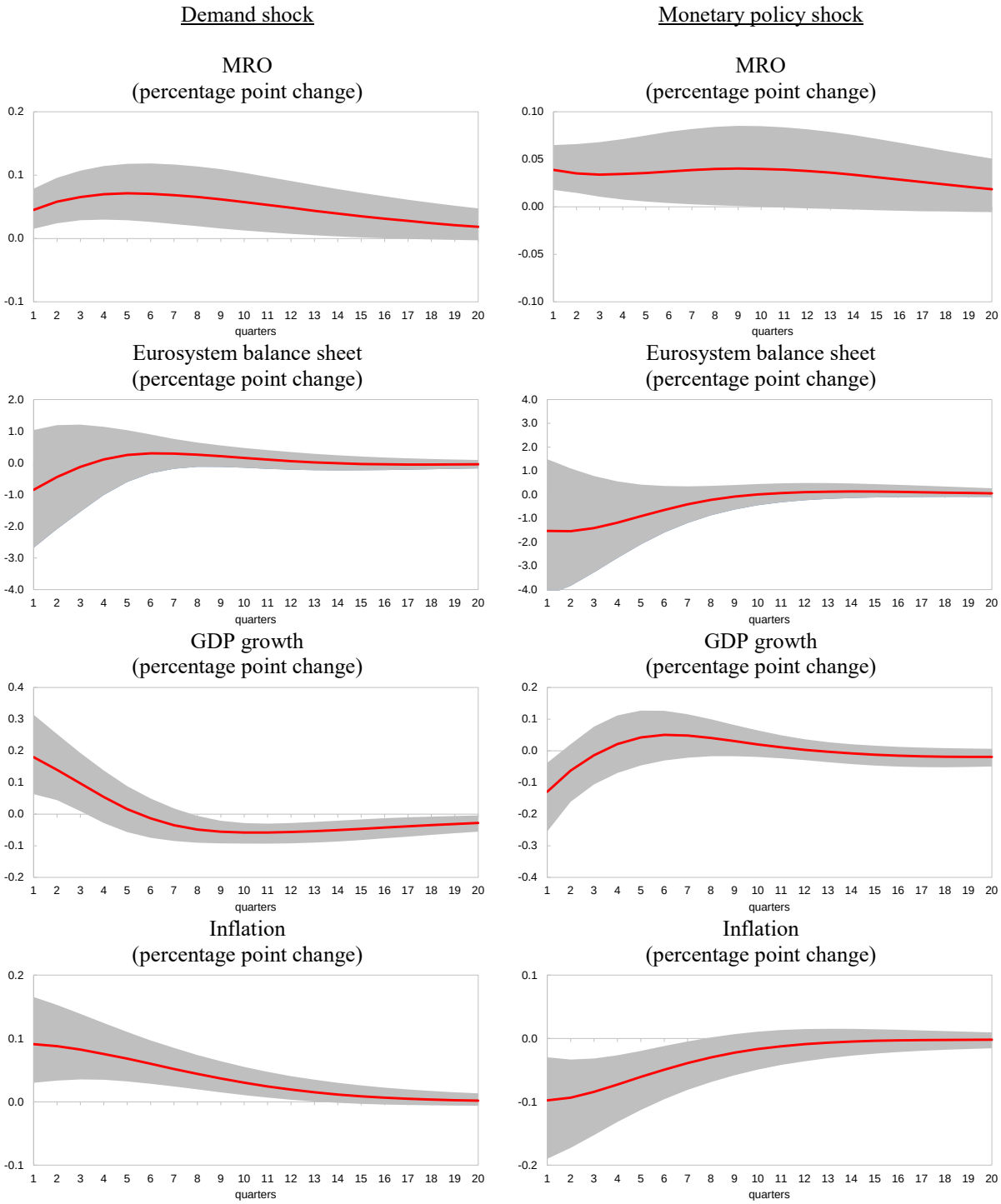
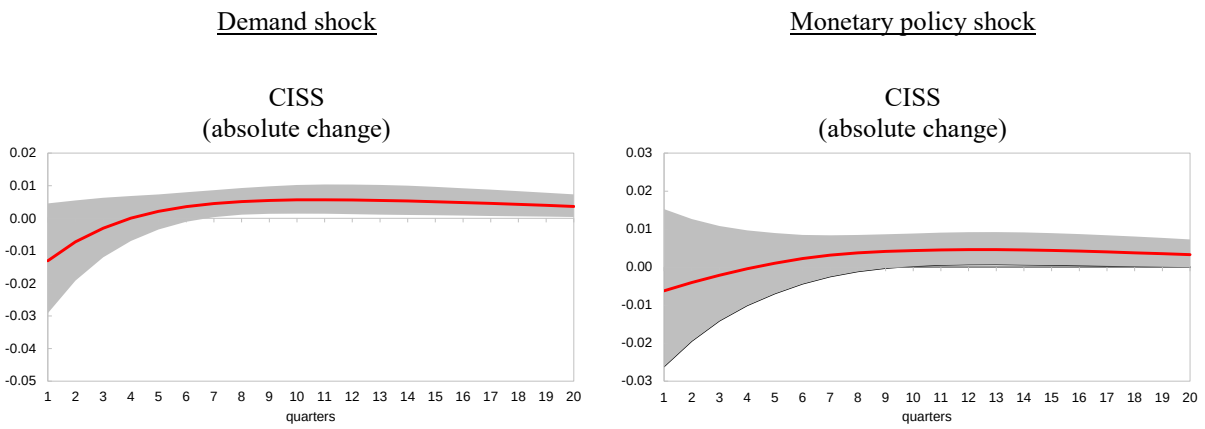
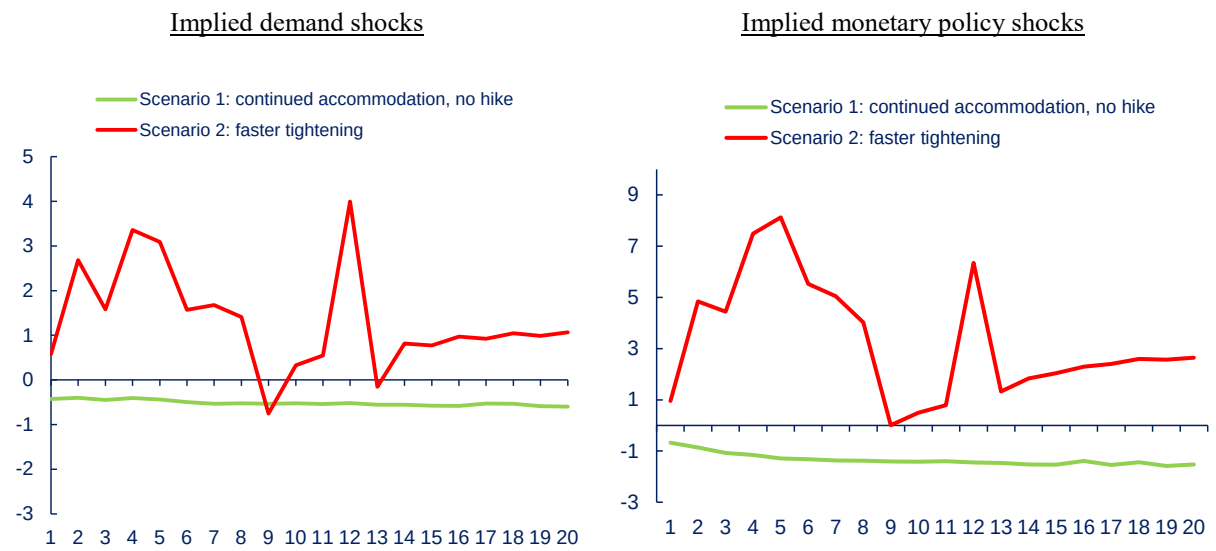


Chart 3 cont.: Euro area variables, impulse response functions



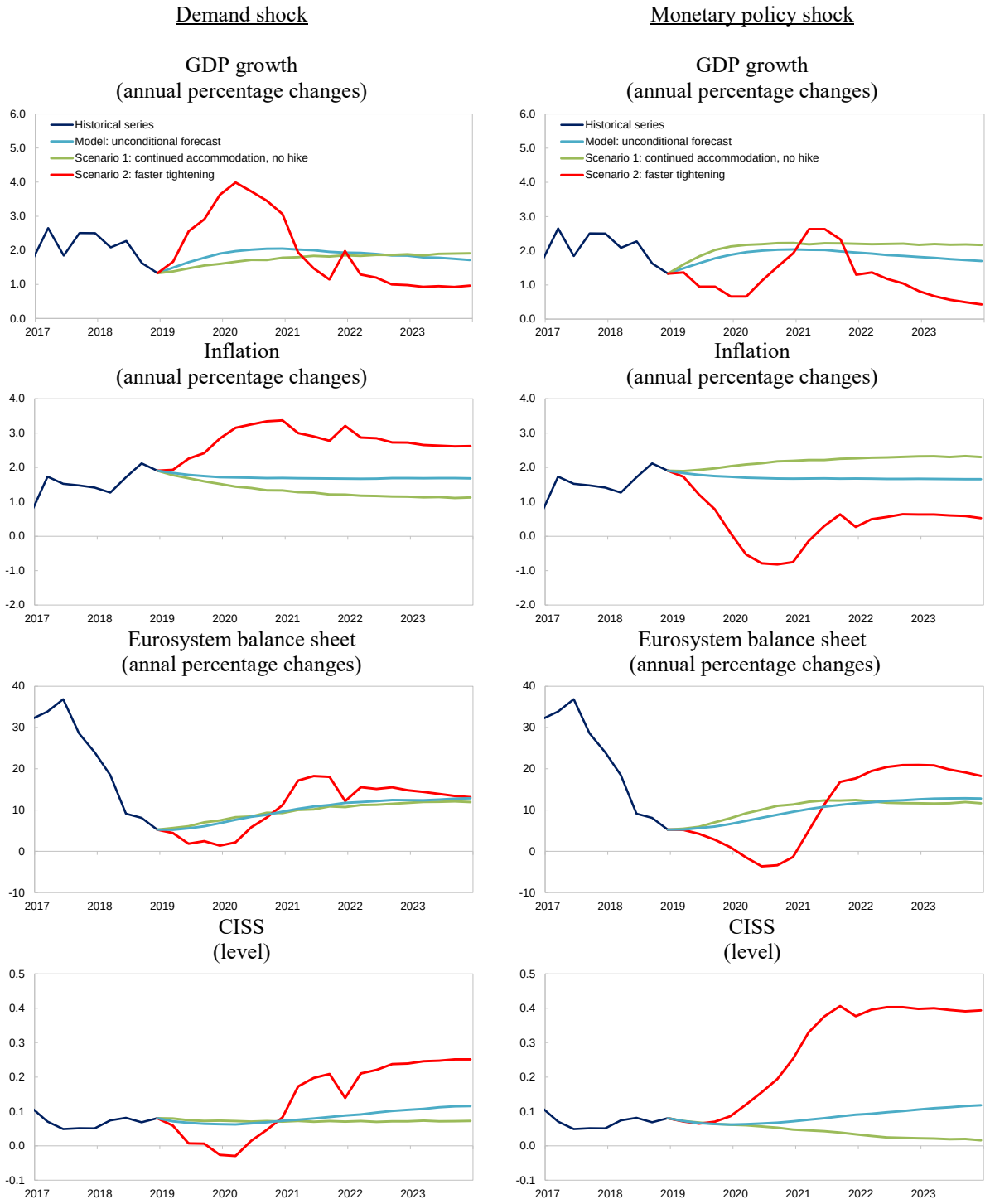
Source: Authors' calculations.

Chart 4: Implied structural shocks for conditional forecasts



Sources: Authors' calculations.

Chart 5: Euro area variables, median posteriors of conditional forecasts

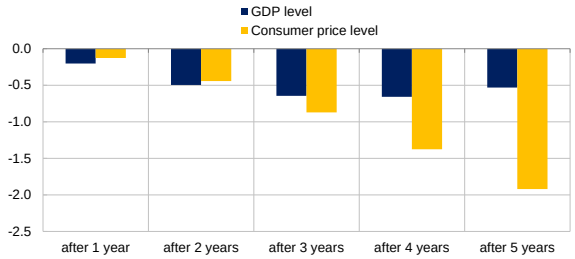


Sources: ECB, Eurostat and authors' calculations.

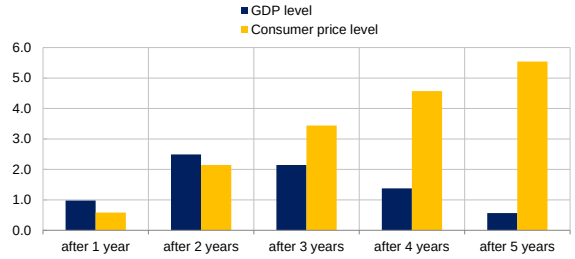
Chart 6: Euro area GDP and consumer prices: deviation from baseline levels under different scenarios and shocks, median posteriors of conditional forecasts

Demand shock

Scenario 1 - continued accommodation
(cumulative percentage difference from baseline level)

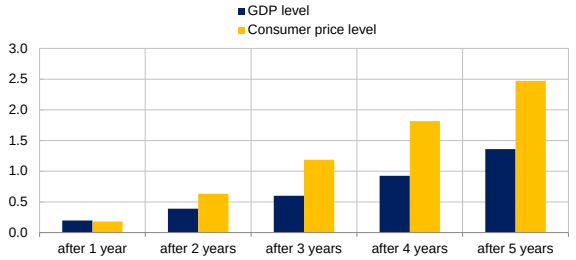


Scenario 2 - faster tightening
(cumulative percentage difference from baseline level)

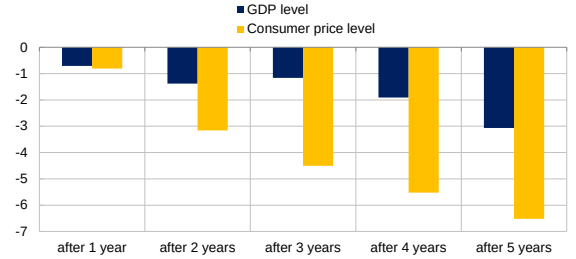


Monetary policy shock

Scenario 1 - continued accommodation
(cumulative percentage difference from baseline level)



Scenario 2 - faster tightening
(cumulative percentage difference from baseline level)



Source: Authors' calculations.

Chart 7: CESEE variables, unconditional forecasts

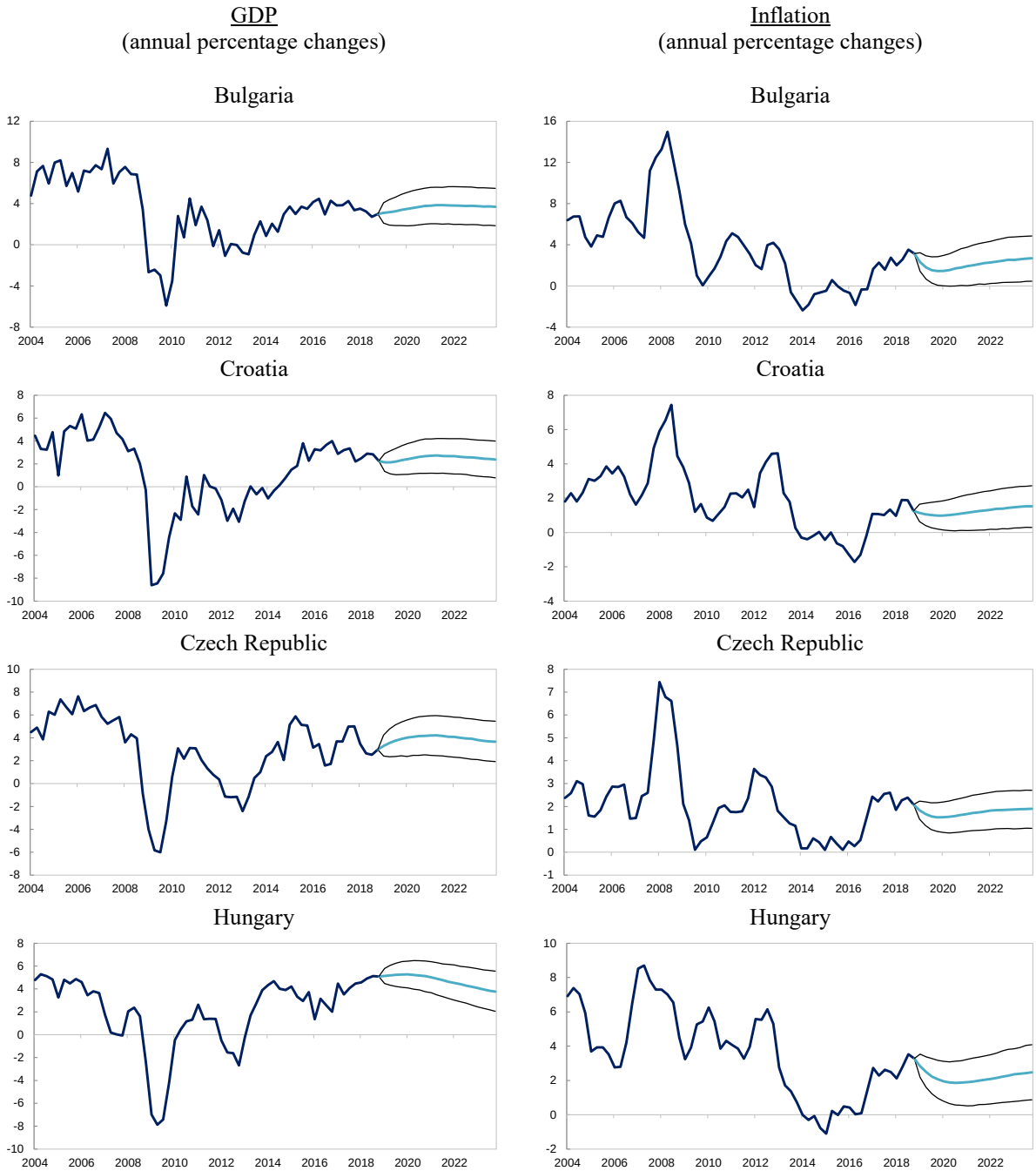
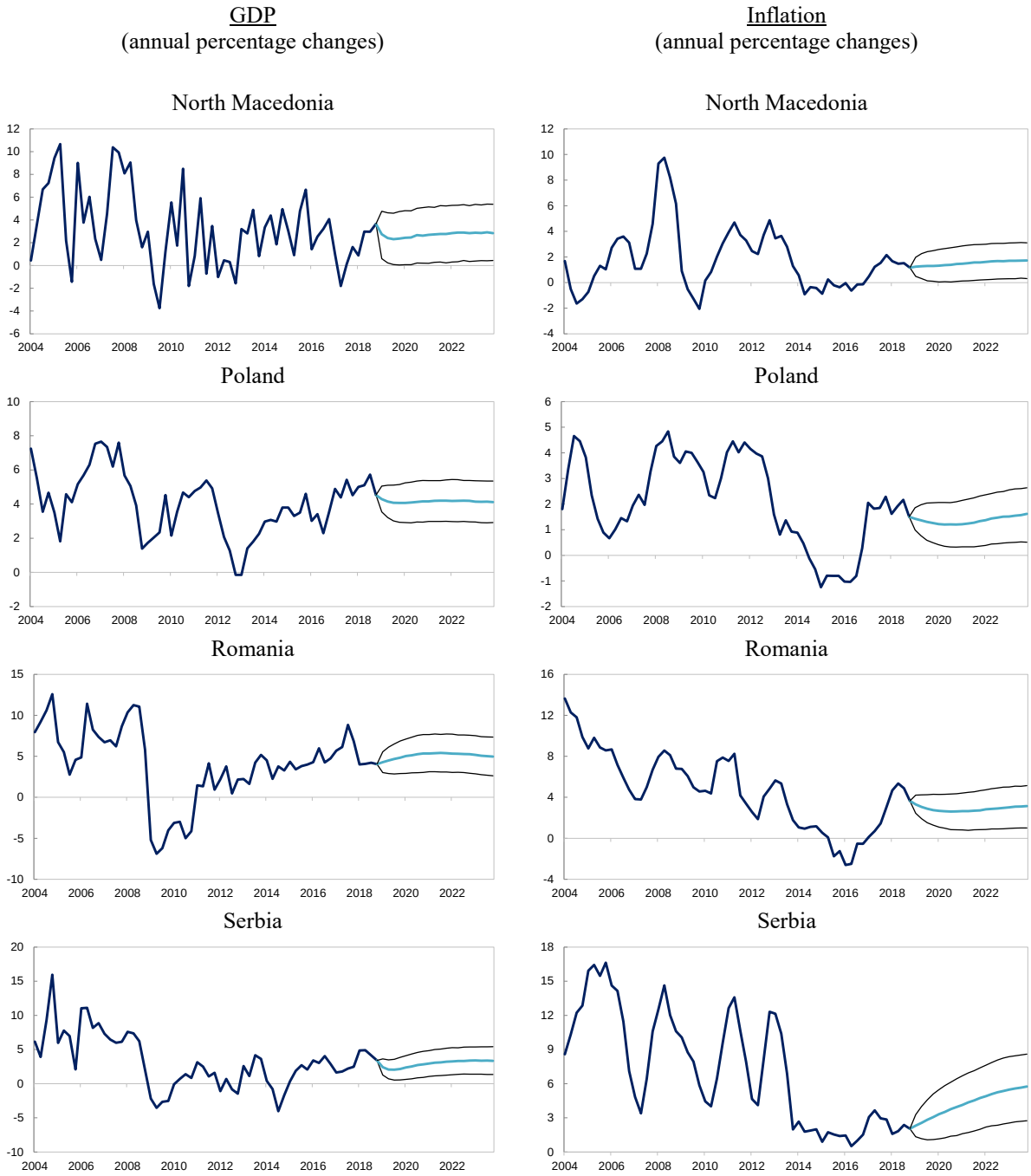


Chart 7 cont.: CESEE variables, unconditional forecasts



Sources: Haver and authors' calculations.

Chart 8: CESEE variables, impulse response functions to a euro area demand shock

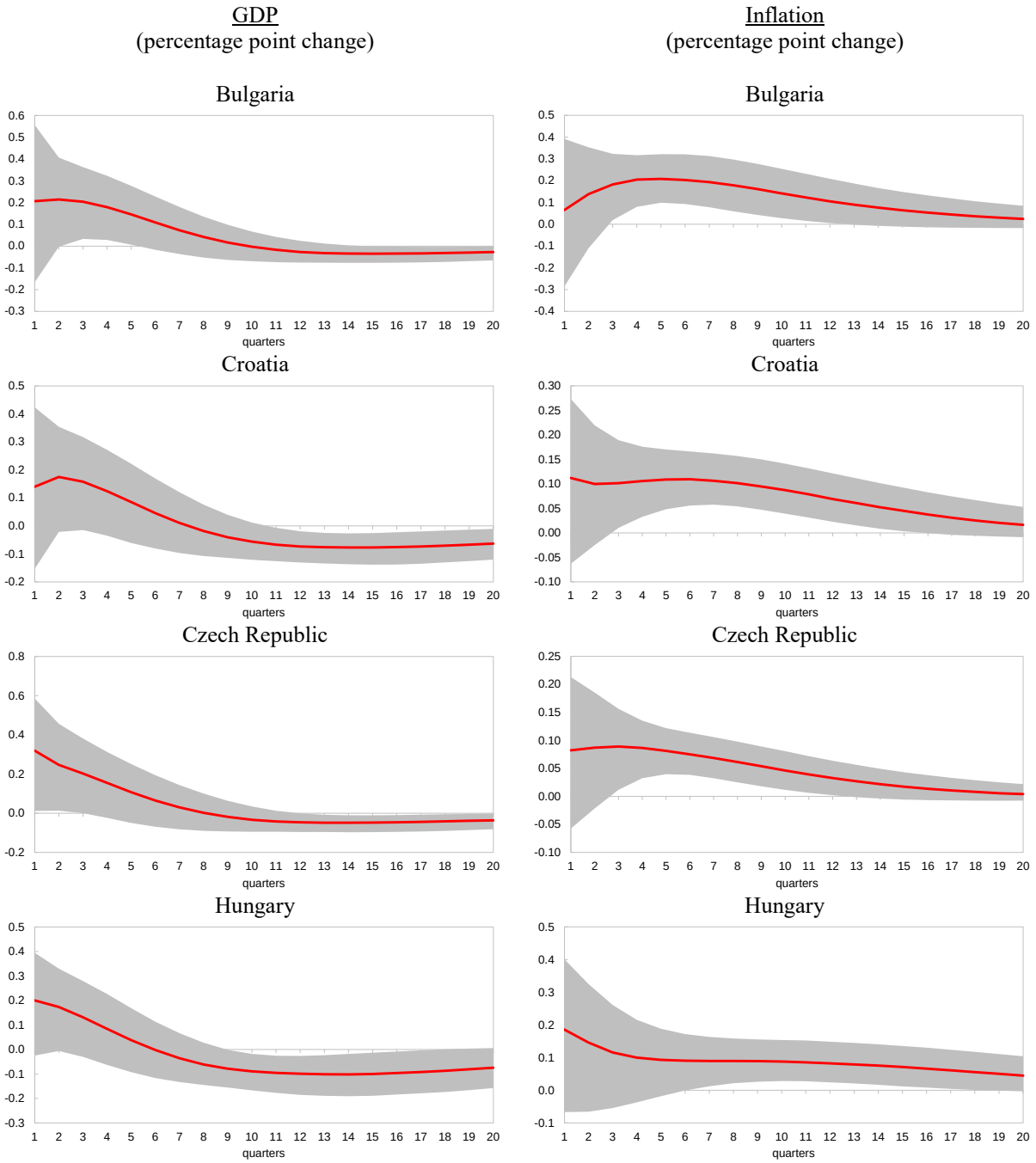
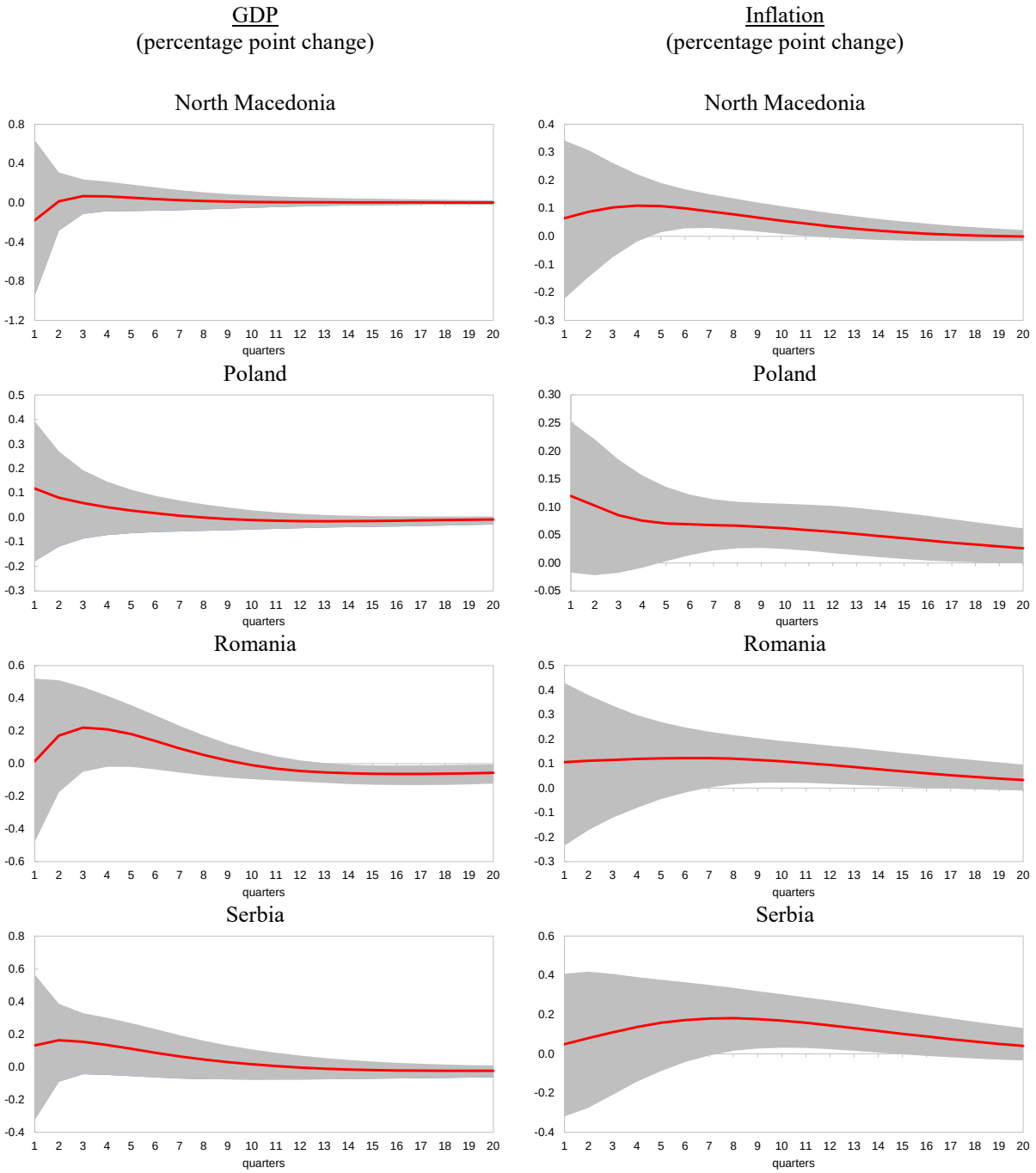


Chart 8 cont.: CESEE variables, impulse response functions to a euro area demand shock



Sources: Authors' calculations.

Chart 9: CESEE variables, median posteriors of conditional forecasts based on demand shock

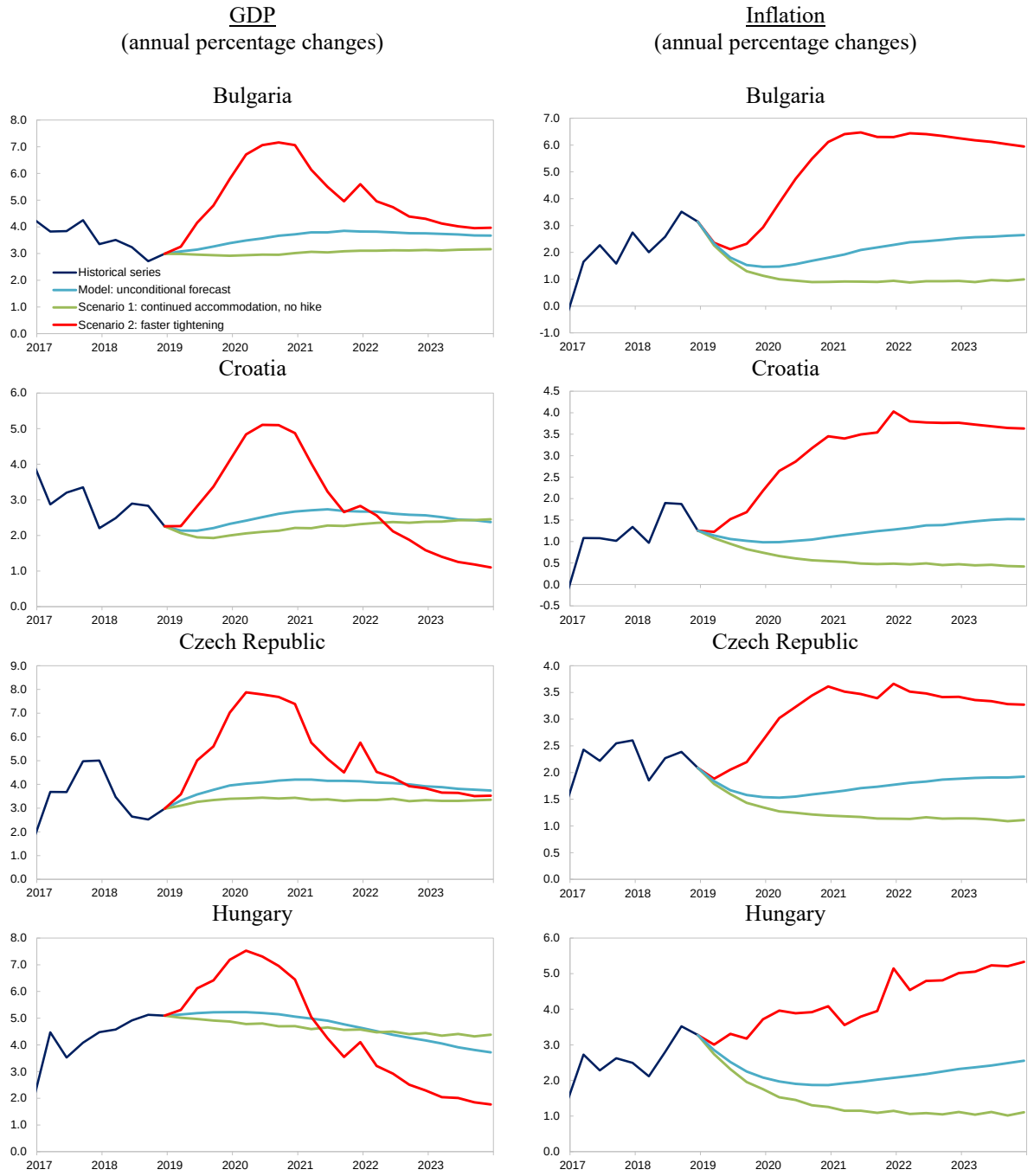
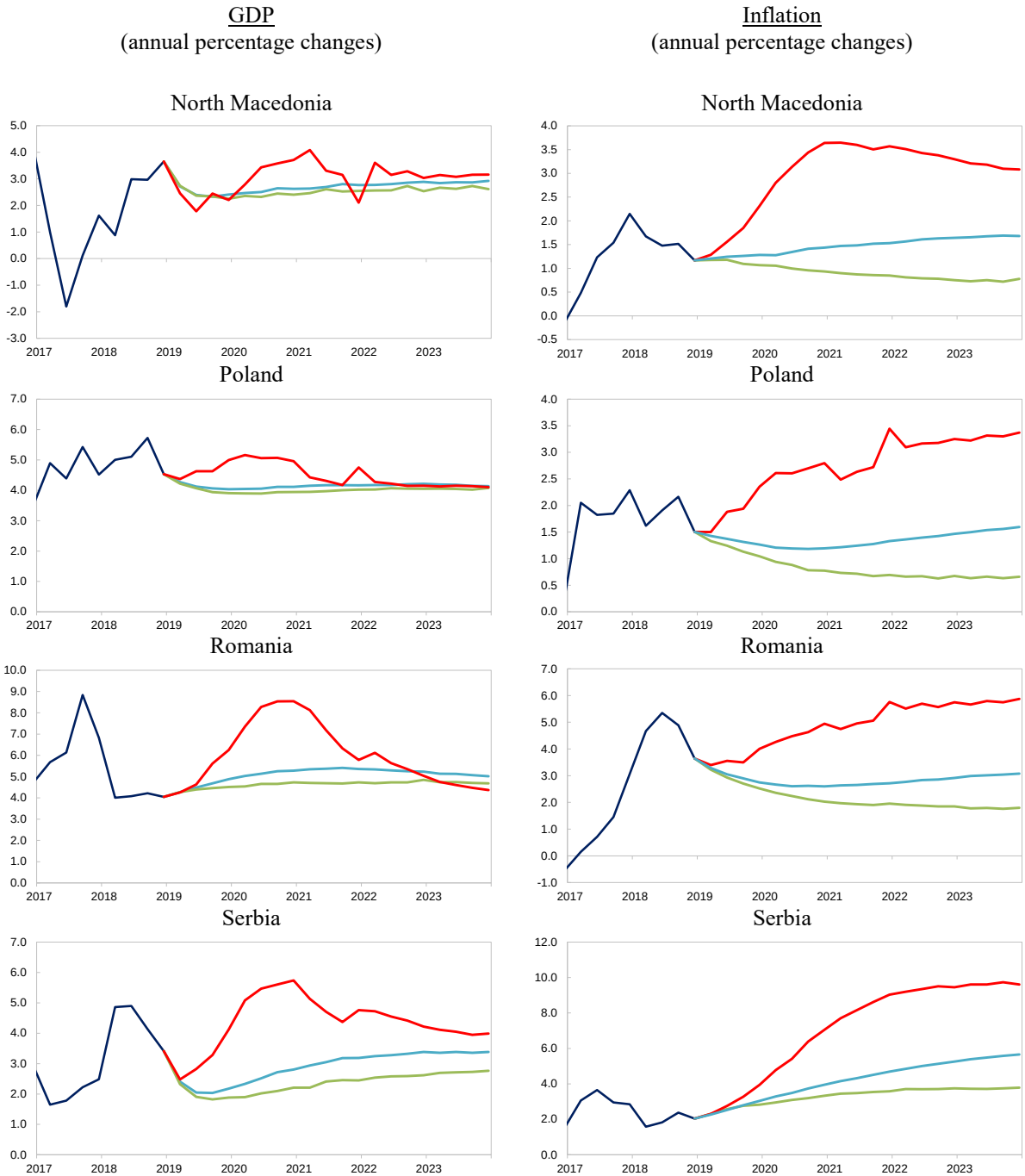


Chart 9 cont.: CESEE variables, median posteriors of conditional forecasts based on demand shock

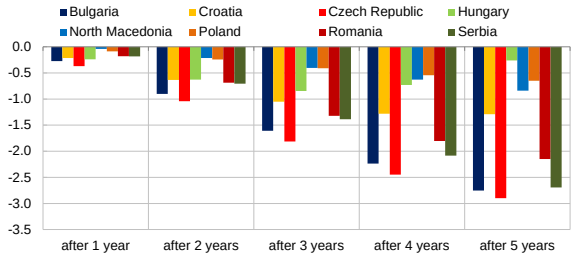


Sources: Haver and authors' calculations.

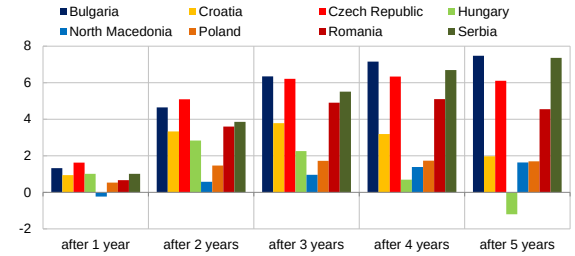
Chart 10: CESEE GDP and consumer prices: deviations from baseline levels, median posterior forecasts conditioned on a euro area demand shock and different monetary policy scenarios

GDP levels

Scenario 1 - continued accommodation
(cumulative percentage difference from baseline level)

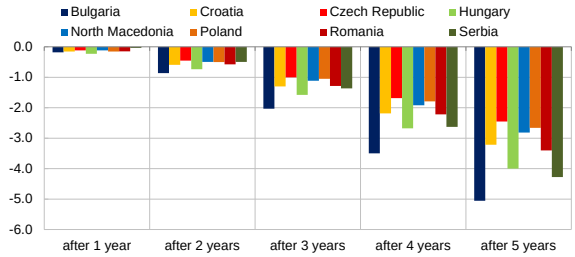


Scenario 2 - faster tightening
(cumulative percentage difference from baseline level)

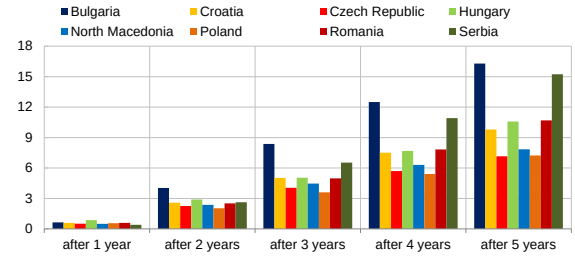


Consumer price levels

Scenario 1 - continued accommodation
(cumulative percentage difference from baseline level)



Scenario 2 - faster tightening
(cumulative percentage difference from baseline level)



Source: Authors' calculations.

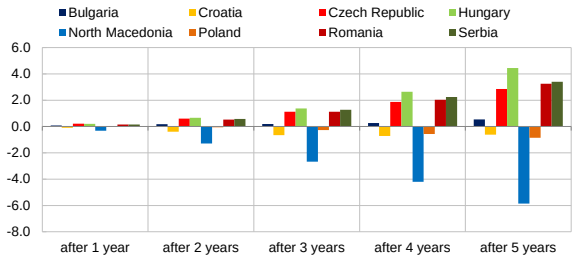
Chart 11: CESEE GDP and consumer prices: deviations from baseline levels, median posterior forecasts conditioned on a euro area monetary policy shock and different monetary policy scenarios

GDP levels

Consumer price levels

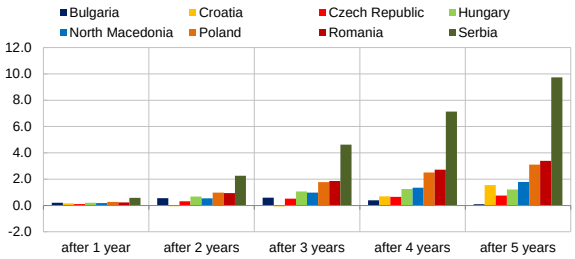
Scenario 1 - continued accommodation

(cumulative percentage difference from baseline level)



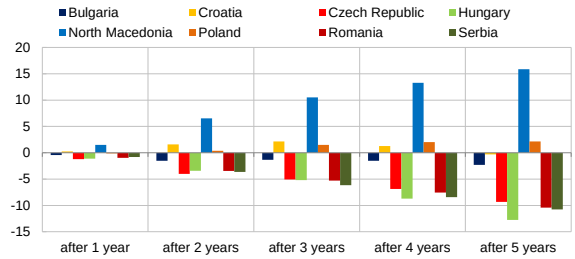
Scenario 1 - continued accommodation

(cumulative percentage difference from baseline level)



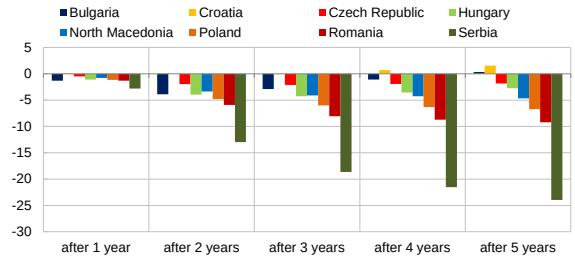
Scenario 2 - faster tightening

(cumulative percentage difference from baseline level)



Scenario 2 - faster tightening

(cumulative percentage difference from baseline level)



Source: Authors' calculations.

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