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* Views expressed are those of the authors and do not necessarily reflect official positions of De Nederlandsche Bank.

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Fiscal Policy and Inflation in the Euro Area*

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Abstract

We investigate the relationship between fiscal policy and inflation dynamics in the Euro Area, with a focus on the post-pandemic inflation surge. Using a BVAR identified via sign restrictions, we disentangle the effects of various demand- and supply-side shocks, including fiscal policy, on inflation. First, while both positive demand and adverse supply shocks contributed to the inflation surge, demand shocks were relatively more important. Second, fiscal stimulus played a substantial and progressively increasing role, particularly in influencing domestic-based measures of inflation. Finally, the relative impact of fiscal shocks on inflation dynamics varies across (selected) Euro Area countries.

Keywords: inflation, fiscal policy, monetary policy, global supply chain pressures, vector autoregression

JEL Classification: E30, E31, E50

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1 Introduction

Euro Area inflation hit double digits in October 2022, peaking just above 10%. From that point, a disinflation process began, bringing inflation closer to the European Central Bank's (ECB) target of 2%. Economists quickly investigated the causes behind this sudden and unprecedented surge in Euro Area inflation. A natural comparison emerged with similar experiences in other countries, particularly the United States. The prevailing narrative – especially in the press and policy debates – highlighted the relative roles of demand and supply shocks as a key distinction between the two sides of the Atlantic. The main premise of this view is that inflation in the Euro Area was largely driven by supply shocks, such as rising energy prices and the Russian invasion of Ukraine, to which the Euro Area is particularly vulnerable, while inflation in the US was primarily fueled by demand forces.[1] The different fiscal policy responses after the Covid pandemic are often cited as the main reason behind this narrative. The US government enacted two large-scale stimulus packages – the Coronavirus Aid, Relief, and Economic Security (CARES) Act in 2020 and the American Rescue Plan (ARP) Act in 2021 – explicitly aimed at accelerating the country's recovery from the economic fallout of the pandemic. In contrast, the second premise of this dominant narrative is that the Euro Area saw a more limited fiscal stimulus, and thus a negligible role for fiscal policy in driving Euro Area inflation.

Yet, some studies challenge the first premise of this narrative. Notably, a recent paper by Giannone and Primiceri (2024), presented at the 2024 ECB Sintra conference, underscores the significant role of demand in the Euro Area inflation surge. Contrary to popular belief, this suggests that demand forces played a comparable role in shaping inflation dynamics in both the US and the Euro Area.[2] This evidence casts doubt on the first premise of the dominant narrative, challenging the idea that demand played a minimal role in Euro Area inflation.

Moreover, the second premise of this dominant narrative – the negligible role of fiscal policy in the Euro Area – has received surprisingly less attention. While Giannone and Primiceri (2024) and others (see, e.g., Bonomolo et al., 2024) investigate the role of monetary policy, this paper extends the analysis by identifying fiscal policy shocks, and showing that the fiscal influence on Euro Area inflation is anything but negligible. We employ the same macroeconometric tools as these previous studies, specifically a Bayesian Vector Autoregression (BVAR) model with sign restrictions. This approach enables us to distinguish between three types of supply shocks – domestic, global supply chain, and energy – and three types of demand shocks – domestic and foreign demand, monetary policy, and fiscal policy. We identify fiscal shocks by leveraging the co-movements of output, prices, and primary deficits.[3] Thus, our framework encompasses many existing models in the literature by accounting for various sources of

[1] See, for example, Giles (2024) and Tenreyro (2023, page 2-3).

[2] Ascari et al. (2023) and Bergholt et al. (2024) offer earlier contributions that reach similar conclusions for the Euro Area. See the literature review below for more details.

[3] See Mori (2024) for an analysis of the role of fiscal policy in recent US inflation dynamics using this identification strategy.

supply and demand shocks and explicitly considering fiscal policy shocks, which previous analyses did not consider. Our work responds to the call by Altavilla et al. (2024) to deepen research on European macroeconomic issues and improve understanding of the coordination between monetary and fiscal policy, particularly in times of crisis.

Our key finding is that fiscal policy shocks significantly contributed to the inflation surge in the Euro Area. Specifically, our estimates show that fiscal policy shocks raised HICP inflation by 1.5 percentage points by the end of 2022, accounting for 18% of the overall inflation peak. As one would expect, the effect is even more pronounced when looking at the GDP deflator instead of HICP inflation, where fiscal policy shocks contributed to a 1 percentage point rise, representing 27% of the overall increase in the deflator during this period.

When decomposing demand and supply shocks, our estimates indicate that both of them played a sizeable role, with demand shocks being relatively more important. Demand shocks accounted for 58% of the overall increase in HICP inflation and 64% of the increase in the GDP deflator in the Euro Area. Given the results in the literature, it is important to stress that these findings are robust to: (i) the use of different series for energy prices – oil, gas or HICP energy; and (ii) different assumptions regarding the "exogeneity" of global supply indices to demand shocks. Regarding (i), it appears that, whatever the setup, a BVAR model with sign restrictions identifies a strong demand component in driving energy prices in the periods before, during, and after the Covid pandemic. Although the methodology – a BVAR model with sign restrictions – may face criticism despite its widespread use in applied macroeconomics, this approach appears to yield consistent findings that align with these dynamics (see also Giannone and Primiceri, 2024). Moreover, this is consistent with a recent paper by Adolfsen et al. (2024), which documents that demand shocks significantly contributed to the post Covid surge of gas prices in the Euro Area.

Thus, the second premise of the dominant narrative appears partially flawed as well. One reason the fiscal policy role in Euro Area inflation may have been overlooked is that the fiscal response in the Euro Area was more delayed and gradual compared to the rapid, large-scale stimulus implemented in the US. Fiscal policy loosened significantly during the period of rising inflation, and it increased its importance as a driver of inflation over time. Our results reflect two key aspects of European fiscal policy. First, the Next Generation EU (NGEU) program mobilized an unprecedented funding package equivalent to 6% of EU GDP. Although it was adopted in December 2020, funds are being disbursed gradually, with installments between 2021 and 2026. Second, in 2020, the European Commission activated the severe economic downturn clause for the first time, initially as a temporary emergency measure to support member states during the pandemic. This clause was extended for three additional years, until 2023 (but effectively also in 2024), *de facto* suspending the Stability and Growth Pact and leading to large budget deficits across the Euro Area.

In conclusion, the fiscal policy shocks' contribution to the inflation surge in the Euro Area is far from negligible and it has been delayed and gradual. The dominant popular narrative regarding the drivers of the Euro Area inflation surge rests on two main premises: (i) a negligible role for demand and (ii) a negligible role for fiscal policy. Macroeconometric analysis based on a BVAR model with sign restriction rejects both of these premises.

Finally, we extend our analysis to selected Euro Area countries, highlighting that the relative impact of fiscal shocks on inflation dynamics differs across these countries. In Germany and the Netherlands, the results closely mirror those observed for the broader Euro Area. However, in France, fiscal shocks were less pronounced, given that the country entered the pandemic with exceptionally high fiscal deficits and limited fiscal space, whereas in Italy, these shocks had a greater impact on GDP than on inflation.

1.1 Related Literature

The recent surge in inflation across the Euro Area, particularly in the aftermath of the Covid pandemic, prompted extensive research aimed at disentangling the roles of demand- and supply-side factors in shaping inflation dynamics. Some studies, such as Benigno and Eggertsson (2023), Harding et al. (2023), Jordà and Nechio (2023), and Erceg et al. (2024), emphasize the role of non-linearities in the supply curve and how inflationary pressures arising from aggregate shocks may be amplified when the economy shifts towards a region characterized by a relatively steep supply curve. Other empirical studies point to the dominant role, both in the US and Euro Area, of supply-side factors, such as (global) supply chain disruptions and surges in energy and food prices (e.g., Banbura et al., 2023, and Bernanke and Blanchard, 2023). These studies, however, primarily focus on supply-side dynamics, leaving a gap in understanding the demand-side influences, particularly those related to fiscal policy.

In contrast, our approach aligns with a broad body of empirical work that employs VAR models to distinguish between demand- and supply-side drivers of inflation. While this literature so far did not analyze the role of fiscal policy, we aim to quantify the role of fiscal policy shocks in the Euro Area, specifically examining the extent to which such shocks have contributed to the recent inflation dynamics. For example, Gonçalves and Koester (2022) use bivariate VAR models to estimate the effects of demand and supply factors on inflation across various sectors within the EU. While their findings suggest a comparable role for both demand and supply in driving inflation, their sectoral approach may underestimate the impact of demand at the aggregate level, as explained by Giannone and Primiceri (2024).[4] In our paper, we emphasize the broader macroeconomic implications of fiscal policy at the Euro Area aggregate level, while also providing novel insights from a group of major Euro Area countries.

Our analysis is closely related to recent studies, such as Ascari et al. (2023), Bergholt et al. (2024) and Giannone and Primiceri (2024), who point to demand shocks as main drivers for the recent inflation

[4] This is because sectoral demand curves are most likely less flat than aggregate demand curves, given that the monetary authority reacts to aggregate, and not sectoral, inflationary pressures.

surge. Giannone and Primiceri (2024) use a bivariate VAR model (and various extensions), estimated on pre-pandemic data, and find that the inflation surge was mainly driven by unexpectedly strong demand forces, not only in the US, but also in the Euro Area. The authors argue that, at the onset of the pandemic, activity in both economies was significantly depressed, as a result of unprecedentedly large negative supply and demand shocks. However, as economic activity started to resume, aggregate demand rebounded faster than expected, whereas aggregate supply recovered slower than expected. While our modeling approach is similar to that of Giannone and Primiceri (2024) there are some important differences. First, building on Ascari et al. (2024), we distinguish among three types of both demand and supply drivers of inflation, rather than focusing solely on *aggregate* demand and supply shocks. Second, following Mori (2024), we specifically identify fiscal policy shocks in the Euro Area by leveraging the co-movements of output, prices, and primary deficits.[5] Third, we use a longer sample that includes the most recent data and apply the approach suggested by Lenza and Primiceri (2022) to allow for temporary surges in the volatility of the shocks. Importantly, our results align with those of Giannone and Primiceri (2024) and also suggest that demand-side forces have contributed relatively more to the recent surge in inflation than supply-side forces.

Further, our work resonates with the findings of Ascari et al. (2024) and Bai et al. (2023), who highlight the significant role of global supply chain disruptions in driving inflation dynamics. However, as pointed out by Giannone and Primiceri (2024), these models assume no impact response of supply pressure indices to demand shocks, and therefore tend to overlook the feedback loop between demand shocks and supply chain pressures, despite the typically strong positive correlation between economic activity, commodity prices, shipping costs, and delivery times.[6] Our approach also connects to the work of Banbura et al. (2023), who emphasize the predominance of supply shocks in explaining the recent Euro Area inflation dynamics. Their model, which incorporates a rich set of variables and structural shocks, may overstate the role of supply factors due to its reliance on a methodology that saturates the model with supply-side indicators. By contrast, our analysis incorporates a more balanced consideration of both demand and supply factors, with a particular focus on how fiscal policy shocks can influence aggregate demand and, consequently, inflation.

Finally, our work also relates to di Giovanni et al. (2022), who use a calibrated multi-sector model to quantify the relative contributions of demand and supply shocks to inflation. While their model

[5] Mori (2024) employs this identification scheme for fiscal policy shocks in a smaller-scale BVAR applied to the US data, documenting a dominant role of fiscal inflation in the US inflation surge. In contrast, our focus is on the Euro Area – both at the aggregate level and across individual countries – and we employ a model that incorporates a wider range of supply shocks, explicitly addressing global supply disruptions by including the the GSCPI of Benigno et al. (2022).

[6] Another difference from Ascari et al. (2024) and Bai et al. (2023) is that we focus on a specification that uses quarterly data (versus monthly). Our choice is driven by the availability of the fiscal deficit series, which is crucial to identify fiscal shocks. We acknowledge that aggregating the supply chain pressure indices could smooth out some higher-frequency fluctuations that might help better identify supply chain shocks (e.g., the GSCPI showed significant month-to-month fluctuations during the Covid period). However, although this could lead to an underestimation of the impact of supply chain shocks, it is likely to result in an overestimation of other supply-related shocks. As a result, the identification of demand shocks, which is our primary focus, should remain largely unaffected.

attributes a significant portion of the inflation surge to demand forces, it is limited to the pre-2022 period and does not account for the dynamic effects of fiscal policy. Our paper fills this gap by extending the analysis to include the post-pandemic period and by explicitly modeling the impact of fiscal policy shocks on Euro Area inflation.

In summary, our study contributes to the existing literature by broadening the analysis to disentangle within the same model the role of various demand and supply shocks, and by specifically focus on the role of fiscal policy shocks in driving Euro Area inflation.

The rest of the paper is organized as follows. Section 2 describes the empirical model used to study the main drivers of inflation. Section 3 provides novel empirical evidence on the role of fiscal policy shocks for Euro Area inflation dynamics, while Section 4 showcases the relative impact of fiscal shocks on inflation dynamics in selected Euro Area countries. Finally, Section 5 concludes.

2 The empirical model

Our main focus is on quantifying the effects of fiscal policy shocks on inflation, while providing insights about the relative contribution of demand and supply forces to inflation dynamics. We investigate the drivers of inflation using a structural VAR model, estimated using Bayesian techniques. Our dataset includes the following Euro Area aggregate variables: real GDP (year-over-year growth rate), inflation (year-over-year growth rate, see below for details), the Krippner's shadow rate measure (as an indicator for the European Central Bank's effective monetary policy stance), Benigno et al. (2022)'s global supply chain pressure index (GSCPI), and the (log) real Brent oil price (deflated with the HICP). This information set is augmented with the primary deficit (expressed as a share of *trend* GDP – henceforth deficit-to-GDP for simplicity), which will be a critical variable to identify fiscal shocks.[7] Given our focus on inflation dynamics, we examine two alternative measures of Euro Area inflation, each considered separately. In our benchmark VAR, we use HICP inflation, as it aligns with the Eurosystem's price stability objectives. Additionally, we analyze GDP deflator inflation, which serves as a broader indicator of underlying domestic price developments (as prices for imported goods and services are not included in its calculation). Appendix A provides a detailed description of the data. The VAR model is estimated using four lags and a standard Minnesota prior, whose tightness is optimally chosen as in Giannone et al. (2015). Our quarterly sample runs from 2002:I to 2023:IV, where the initial observation is dictated by the availability of the deficit series. Hence, it encompasses the Covid pandemic, a period marked by extreme volatility. To avoid potential distortions in our inference due to temporary increases in the volatility of VAR residuals, we account for the latter following the approach outlined in Lenza and Primiceri (2022).

[7] Trend GDP is obtained by fitting a sixth-degree polynomial for the GDP series as in Ramey and Zubairy (2018). The use of the deficit-to-trend GDP allows us to focus on variations in the numerator of the ratio (i.e., the primary deficit), and not the denominator (i.e., GDP). However, we have verified that results are virtually indistinguishable when using the conventional deficit-to-GDP ratio as a proxy for fiscal stance.

We assume that the economy can be described by the following reduced-form VAR system:

$$y_t = c + B_1 y_{t-1} + \ldots + B_p y_{t-p} + s_t u_t$$
$$u_t \sim N(0, \Sigma),$$

where y_t is an $n \times 1$ vector containing the set of six variables described above. They are assumed to evolve as a function of their own past values, a constant, and forecast errors u_t. The factor s_t is introduced to scale up the residual covariance matrix during the Covid pandemic, as proposed by Lenza and Primiceri (2022). In particular, s_t is equal to 1 before the period 2020:I, i.e. the onset of the Covid pandemic, which we label by t^*. Following Lenza and Primiceri (2022), we assume that $s_{t^*} = \bar{s}_0, s_{t^*+1} = \bar{s}_1, s_{t^*+2} = \bar{s}_2$, and $s_{t^*+j} = 1 + (\bar{s}_2 - 1)\rho^{j-2}$, where $\theta = [\bar{s}_0, \bar{s}_1, \bar{s}_2, \rho]$ is a vector of unknown coefficients estimated using Bayesian techniques.[8] Assuming invertibility implies that the structural shocks ε_t, which have an economic interpretation, can be written as a linear combination of u_t:

$$u_t = A\varepsilon_t$$

with $\varepsilon_t \sim N(0, I)$, where I is an identity matrix and where A is a non-singular coefficient matrix. The variance-covariance matrix thus has the structure $\Sigma = AA'$. Given that the variance-covariance matrix is symmetric, $n(n-1)/2$ additional restrictions are needed to derive A from this relationship. We rely on sign restrictions to identify matrix A (see Canova and De Nicolo, 2002; Uhlig, 2005, among others), using the algorithm proposed by Arias et al. (2018).[9]

We use sign restrictions to identify six shocks. On the demand side, we distinguish between fiscal policy, monetary policy and non-policy forces. On the supply side, we differentiate between domestic cost-push shocks, global supply shocks and oil price shocks. Therefore, this exercise delivers novel estimates of the Euro Area inflation response to fiscal policy shocks, but also informs about the relative importance of these shocks versus that of other demand and supply shocks in driving the recent burst in Euro Area inflation.

Our identification strategy is discussed below and outlined in Table 2.1. The sign restrictions are in line with economic theory. Our assumptions are summarized as follows. (i) A positive fiscal shock increases the deficit, boosting both output and inflation. (ii) A positive monetary shock (i.e., monetary easing) stimulates output and inflation while reducing the fiscal deficit. (iii) A positive non-policy (residual) demand shock raises output, inflation, and the interest rate – consistent with Taylor-type monetary rules – and reduces the fiscal deficit. (iv) Adverse domestic cost-push shocks lower output,

[8] We report the posterior distribution of the overall standard deviation of the Minnesota prior, the volatility scaling factors and volatility decay parameter in Appendix B.

[9] Bergholt et al. (2024) show that the behavior of the deterministic component in conventional VARs can lead to unintended repercussions on historical decomposition analyses. To address this, we follow one of their recommended approaches by generating numerous historical decompositions – each corresponding to a different parameter draw – and subsequently calculating the point-wise median decomposition at each time point.

Table 2.1: Restrictions for identifying shocks

	Fiscal policy	Monetary policy	Non-policy demand	Cost push	Supply chain	Oil supply
GDP growth	+	+	+	-	-	-
Inflation	+	+	+	+	+	+
GSCPI				0	+	
Shadow rate		-	+			
Real oil price				-	0	+
Primary deficit (% GDP)	+	-	-			

Notes: An entry with +/-/0 denotes a positive/negative/zero response of the variable (rows) to the specific structural shock (columns). An empty cell implies an unrestricted response.

raise inflation, and decrease the real price of oil (due to the output contraction and raising inflation), while having no effect on the GSCPI. This restriction helps distinguish domestic supply shocks from global supply chain shocks, as discussed in Ascari et al. (2024) and Banbura et al. (2023). (v) Adverse global supply shocks indeed raise both the GSCPI and inflation, while reducing output. Additionally, we impose that a global supply chain shock is unrelated to oil price fluctuations on impact, ensuring the identification of shocks from global supply disruptions rather than oil-price-related shocks.[10] Finally, (vi) an adverse oil price shock increases the real oil price and inflation, while reducing output.

While most of the sign restrictions are standard, the ones imposed on the response of the primary deficit to a demand shock – which are key to distinguish fiscal policy shocks from the other two non-fiscal demand shocks – are taken from Mori (2024). The underlying assumption is that a positive fiscal policy shock (e.g., an increase in transfers) raises the primary deficit and stimulates the economy, which leads to an increase in output and inflation. A positive non-fiscal demand shock similarly stimulates both output and inflation, but in contrast it reduces the primary deficit. During expansions, revenues increase due to a larger tax base, while transfers decrease due to automatic stabilizers (Bianchi and Melosi, 2017; Forni and Gambetti, 2010). These restrictions are in line with theoretic macroeconomic models (e.g., Gabaix, 2020; Angeletos et al., 2024; Bianchi et al., 2023; Smets and Wouters, 2024, among others), in which the fiscal authority follows a conventional rule that has the primary balance respond endogenously to output fluctuations.

We impose the minimum set of restrictions to achieve identification. Restrictions are applied only on impact in all cases, except for the response of the primary deficit (to fiscal policy shocks) and the interest rate (to monetary policy shocks), which are imposed for four consecutive periods, following Mountford and Uhlig (2009) and Giannone and Primiceri (2024). We do so because we aim to identify meaningful deviations from past fiscal and monetary policy conduct.[11]

[10] As noted by Banbura et al. (2023), supply chain shocks are assumed to originate more on the product market and reflect increases in shipping costs other than those linked to energy.

[11] However, we find very similar results when imposing the restrictions only on impact.

3 Fiscal policy and inflation in the Euro Area

This section presents the main results. In what follows, we focus on three main variables of interest: inflation, GDP and primary deficit-to-GDP ratio. We start presenting the impulse response functions (IRFs). We then examine the main drivers of inflation dynamics, and the relative importance of supply versus demand shocks, with a particular focus on the role of fiscal and monetary policy shocks.

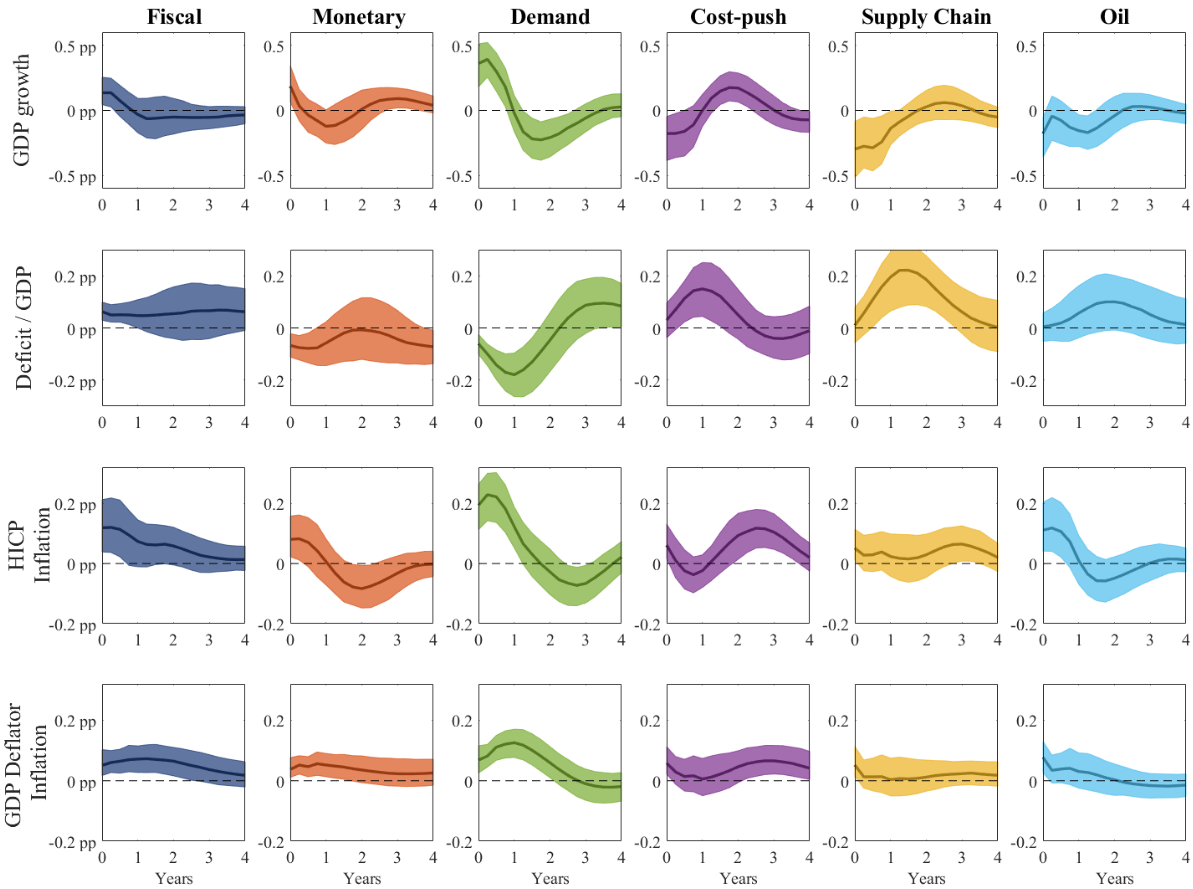
3.1 Impulse responses to demand and supply shocks

Figure 3.1 presents the IRFs of selected variables of interest – GDP growth , inflation and the primary deficit-to-GDP ratio (PDtG) – to all the shocks that we identify in the model. Throughout the paper, we present the results for the benchmark BVAR featuring HICP inflation. Additionally, we report the results for the GDP deflator – in place of HICP – from an alternative BVAR where HICP is replaced by the GDP deflator (all results for the remaining variables, not reported here due to space constraints, are very similar across specifications). The first three columns display the IRFs to the demand shocks, while the last three columns show the responses to the supply shocks.[12]

Given the sign restrictions that we impose, a fiscal policy shock has a positive impact on both GDP growth and inflation, and a persistent positive effect on the primary deficit. The persistence of the response of the primary deficit to its own shock goes well beyond the horizon of four quarters that we imposed, and the IRF remains flat (although not always statistically significant) during the entire impulse horizon of 4 years. The (imposed) positive reaction of GDP growth on impact is offset after one year, when the response of GDP growth becomes persistently negative. This implies a hump-shaped response of GDP in levels, peaking at around 4 quarters. Note, however, that the response of GDP growth is not significantly different from zero after 2 quarters. Turning to the response of inflation, we find that the effect of a fiscal shock on HICP is highly persistent and sizable, even after two years following the shock. A similar effect is observed when measuring inflation using the GDP deflator, featuring a lower impact effect but a more persistent response. In Appendix C, we show that the nominal interest rate persistently increases following a fiscal policy shock, even though the sign of the interest rate response was left unrestricted. Thus, on average over the sample period, monetary policy counteracted the expansionary effects of fiscal policy. Following a monetary policy shock, we find that the (imposed) positive impact on inflation is less persistent than that of the fiscal policy shock. Moreover, the responses of both GDP growth and HICP inflation following the monetary policy shock turn negative quite abruptly, especially for GDP growth. The GDP deflator response is again smaller but much more persistent than for HICP. In contrast, non-policy demand shocks have a sizable and persistent effect on GDP growth, inflation (both HICP and GDP deflator) and the primary deficit. All three variables exhibit a hump-shaped response, which reverts after 1 to 2 years following the shock.

[12] Appendix C displays the IRFs of all variables in the model.

Figure 3.1: Impulse response functions of GDP growth, inflation and primary deficit-to-GDP ratio



Notes. Impulse responses to one-standard-deviation shocks. First three rows: responses in the benchmark BVAR featuring HICP inflation. Last row: responses of inflation in the alternative VAR where we instead use the GDP deflator as a measure of inflation. Solid lines represent the posterior median at each horizon and the shaded areas indicate the 16th and 84th percentiles of the impulse responses.

While the three supply shocks have somewhat similar effects on impact on GDP growth and inflation – with the global supply (oil price) shock having the largest impact on GDP growth (inflation) –, there are some differences in the persistence of the effects. Specifically, while the responses of HICP to cost-push and oil-price shocks exhibit some fluctuations, the effects of a global supply shock on HICP inflation are relatively more persistent, remaining positive along the entire impulse response horizon, although mostly not-statistically significant. This result is broadly consistent with Ascari et al. (2024), although they find a much more persistent response of HICP inflation (excluding energy) to a global supply shock.[13] These dynamics could be linked to the slow adjustment of prices at various production stages in response to global supply bottlenecks, and difficulties in rapidly establishing new supply chains, which cause global supply chain bottlenecks to have a significant and long-lasting impact on import prices and thus inflation over time. Our results therefore suggest that, even as global supply disruptions are subsiding, they may continue to contribute to inflationary pressures for an extended period. The responses of the GDP

[13] A similar result for the response of US headline (PCE) inflation to global supply shocks is found by staff research at the Federal Reserve Bank of San Francisco (using a local projection model), see link.

deflator inflation to supply shocks are somewhat similar in shape to the ones of HICP inflation, but again they are more subdue (and mostly not-statistically significant). Note that GDP deflator inflation responses are lower on impact and relatively more persistent than the HICP ones in response to all demand shocks. Oil shocks and global supply shocks are also found to have a persistent effect on GDP growth, with the effect of the global supply shock on GDP growth being particularly sizable. The primary deficit rises in response to supply shocks, most likely reflecting the dynamics of GDP (i.e., through the numerator effect via automatic stabilizers).

In Appendix B, we show that the interest rate barely moves in response to supply shocks – especially in response to the global supply and oil-price shocks. Therefore, our results are consistent with the view that monetary policy in the Euro Area reacted by counteracting demand shocks, while "looking through" supply shocks. Finally, regarding the important point stressed by Giannone and Primiceri (2024) on the possible endogeneity of the GSCPI and oil prices to domestic Euro Area shocks, Appendix C shows that both the GSCPI and oil prices indeed respond to domestic demand and supply shocks. Notably, we find a significant, positive response of oil prices to non-policy demand shocks (without imposing it), which may help explain the substantial rise in commodity prices during the post-Covid recovery (Bernanke and Blanchard, 2023; Dao et al., 2024). It is well documented that commodity price fluctuations are largely driven by endogenous reactions to (possibly demand-driven) economic cycles, meaning price surges may not necessarily stem from exogenous supply disruptions (Kilian, 2009; Delle Chiaie et al., 2022).

3.2 The drivers of Euro Area inflation

Figure 3.2 displays the contributions of the identified shocks to inflation (both HICP and GDP deflator), GDP and the primary deficit ratio over time since 2020:I. In the three panels, the white circles (and the solid line) correspond to the total effects generated by the shocks through the lens of our VAR model.[14] We focus on the shocks during the period of interest, i.e. between 2020:I - 2023:IV, and therefore we abstract from both the (cumulative) contributions of the shocks during the pre-pandemic period and the deterministic component.[15]

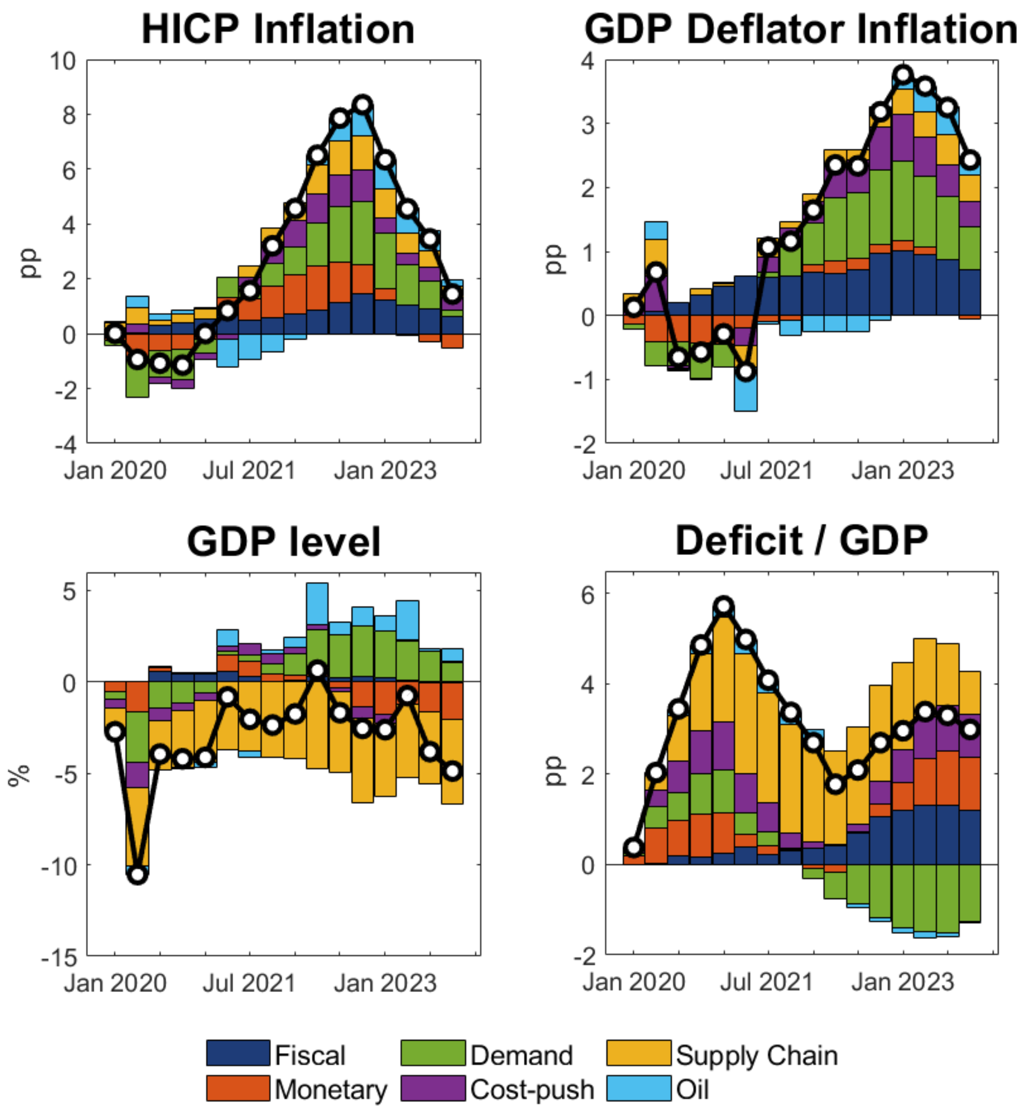
For the sake of exposition, it is convenient to divide the 2020:I - 2023:IV period into three sub-periods: low inflation (2020:I-2021:II), soaring inflation (2021:III - 2022:IV), and disinflation (2023). Let us analyze the role of the different shocks in these sub-periods, with a special focus on the impact of fiscal shocks, which is the main object of our analysis.

Low inflation: 2020:I-2021:II. This period is characterized by the Covid pandemic and the subse-

[14] To ease interpretability, we converted the GDP growth rates into GDP levels in the figures showing the decomposition (to do so, we normalize GDP to be constant during the entire year prior the pandemic). We report the decomposition for GDP growth in Figure B.2.

[15] This exercise is similar to Ascari et al. (2023) and Giannone and Primiceri (2024), among others. Specifically, having estimated the model on the whole sample, we obtained the model forecasts for each variable as of 2019:IV, and computed the historical decomposition of the forecast errors. In each of the four panels, the solid black line corresponds to the deviation of the actual realization of the data from the forecast. We report the standard historical shock decomposition over the full sample for inflation in Figure C.2.

Figure 3.2: Decomposition of Euro Area inflation, GDP and primary deficit-to-GDP ratio



Notes: Cumulative contribution of shocks after 2019:IV to selected macroeconomic indicators (initial conditions and pre-Covid shocks are filtered out).

quent re-opening of the economy. The pandemic involved a combination of adverse demand and supply shocks – with a prominent role for global supply shocks and demand shocks.[16] Together, these shocks initially had a strong negative effect on GDP, resulting in a large and negative impact in 2020:II. However, the quick rebound of economic activity upon the re-opening of the economy led GDP to almost fully revert back. The overall initial impact of the pandemic shock on (both HICP and GDP deflator) inflation has been negative, suggesting that the effects of the adverse demand shocks dominated those of the supply shocks. Again, as the economy rapidly recovered from the pandemic, positive demand shocks

[16] Note that our identification scheme does not explicitly distinguish between global and domestic demand shocks. However, the sign restrictions we use for the identification of domestic monetary and fiscal disturbances are not compatible with external (e.g. US) policy shocks. For instance, foreign expansionary fiscal shocks would, in the presence of spillovers, boost output and inflation in the Euro Area, and accordingly reduce the fiscal deficit. Hence, our non-policy demand shock may also capture shocks to global demand (see Aastveit et al., 2024, for a paper that separates domestic and global components).

pulled inflation back up.

According to our model, fiscal policy shocks had a relatively modest role in the dynamics of Euro Area HICP inflation during this low inflation period, and a relatively larger one for the GDP deflator inflation (the limited *initial* impact of fiscal shocks observed in the Euro Area contrasts with their corresponding effects in the US, where unprecedented fiscal packages were rapidly implemented, making fiscal shocks the primary driver of the inflation take-off in 2020-2021 – see Mori, 2024). In general, the historical decomposition in Figure 3.2 shows a relatively larger impact of fiscal policy on the GDP deflator inflation than on HICP one, as one would expect because fiscal policy affects relatively more domestic prices. Fiscal policy shocks point to a slightly expansionary fiscal stance, yet most of the increase in the primary deficit ratio (right panel of Figure 3.2) was due to the endogenous response of the primary deficit to the non-fiscal-policy shocks that were hitting the economy. These shocks pushed the primary deficit ratio steeply upward, reaching a peak of 6.6% in 2021:I. In annual terms, 2020 exhibited a sharp change in the Euro Area fiscal stance, with a primary surplus ratio of 1.1% (in 2019) turning into a primary deficit ratio of 5.5%. Although the dynamics of GDP partly drive these figures, they also reflect discretionary fiscal policy changes as governments implemented a series of measures to support the economy. In fact, the cyclically adjusted primary deficit (as a % of GDP; source: AMECO) – that filters out business cycles and automatic stabilizers – rose from 0.25% in 2019 to 2.72% in 2020. Finally, despite a very expansionary monetary policy stance and the launch of the substantial pandemic emergency purchase program (PEPP), monetary policy was still too tight initially as the nominal interest rate was constrained by the effective lower bound.

Soaring inflation: 2021:III - 2022:IV. Inflation started to surge rapidly in the second half of 2021, reaching a peak of more than 10% in October 2022. In line with many of the studies cited in Section 1.1, our BVAR model interprets the surge in inflation as being due to a combination of positive demand and adverse supply shocks, with the former having had a more prominent impact on inflation than the latter. While demand shocks were the dominant drivers of inflation dynamics during this period, global supply shocks are found to be the main drivers of GDP and constrained output from adjusting to changes in aggregate demand (recall from Figure 3.1 that global supply shocks cause a persistent and sizable drop in GPD *growth*). Hence, improved aggregate demand conditions generated inflation, because the supply-side of the Euro Area economy remained restricted, mainly due to severe global supply chain disruptions. Despite being non-structural, our model points to a relatively steep Phillips curve during this period, as, e.g., in the analysis by Benigno and Eggertsson (2023) for the US.

Fiscal policy became increasingly loose during the soaring inflation period, and gained growing importance as a driver of Euro Area inflation through its stimulative effect on aggregate demand. In fact, fiscal policy shocks contributed to one-fifth of the HICP inflation peak in 2022:IV, and more than one-fourth of GDP deflator. Given the aforementioned supply constraints plaguing the economy, the model assigns only modest positive effects of fiscal shocks on GDP. In terms of actual data, the primary deficit ratio improved during this period and gradually fell from 5.4% in 2021:II to 2% in 2022:IV. However, the cyclically adjusted primary deficit improved by less, falling from 3.5% in 2021 to only 2.8% in 2022, which points to a much more limited change in the expansionary fiscal stance compared to what is implied by the primary deficit ratio. Finally, the model interprets monetary policy as too loose at the beginning of the inflation surge, as it expected a stronger reaction to the abrupt rise in inflation. Heightened economic uncertainty, worsened by the potentially recessionary effects of the Russian invasion of Ukraine, and financial stability concerns, likely convinced the ECB to act cautiously during this period. After gradually concluding its asset purchases, and as the ECB started its hiking cycle in July 2022, our model correctly attributes the peak of monetary policy's contribution to inflation in 2022:II. This result is consistent with recent findings of Bonomolo et al. (2024) and Giannone and Primiceri (2024).

Disinflation: 2023. According to our model, the rapid disinflation process that characterized 2023 was due to the fading away of the positive contributions from all shocks to HICP inflation dynamics, with the exception of fiscal policy shocks. While contributions from positive demand shocks to HICP inflation gradually vanished, past demand shocks still affected GDP, GDP deflator inflation and the primary deficit ratio, a feature that is also apparent in the corresponding IRFs (see Figure 3.1). Similarly, global and domestic supply shocks became less important drivers of inflation, but remained important for the dynamics of GDP and the primary deficit. Fiscal policy shocks continued to exert sizeable – even if marginally decreasing – upward inflationary pressures in 2023, and thus did not contribute much to the disinflation process. This result can be explained by the highly persistent effects of fiscal shocks on inflation (as well as on the primary deficit). Finally, the strong monetary policy response to inflation after the summer of 2022 had the expected effects on both inflation and GDP, such that the contribution of monetary policy to inflation turned negative in the second part of 2023.

Robustness. In Appendix D we report multiple robustness checks for our main results. First, we show that the relative importance of demand versus supply shocks for inflation dynamics in the Euro Area is also confirmed when imposing stricter exogeneity assumptions on the supply pressure index. In addition to the restrictions in Table 2.1, we further impose that demand shocks do not affect the GSCPI on impact, making the index contemporaneously exogenous to demand shocks, thus significantly reducing the influence of demand saturation effects – in line with Ascari et al. (2024), yet in contrast to Giannone and Primiceri (2024). Figure D.1 shows that even in this case, while as expected supply chain shocks become relatively more important, the main conclusions of our analysis hold up (i.e., demand shocks jointly explain more than half of the inflation surge and fiscal shocks are responsible for a significant share of it). Second, Appendix D.2 considers a specification that features the energy component of HICP instead of oil prices as an alternative approach to identify energy shocks that take into account all energy HICP components (see Figure D.2). Third, it has been argued that for Europe gas prices, rather than oil prices, were the strongest source of supply shock. Hence, Appendix D.3 considers a specification that features gas prices instead of oil prices. Again, in all cases, our results are robust to this change. Regardless of the setup, therefore, a BVAR model with sign restrictions consistently identifies a demand component as an important driver of energy prices in the periods before, during, and after the Covid pandemic. These findings should not be too surprising, as they align with a large literature debating the relative importance of demand and supply in driving the oil prices, finding an important role for both (see, e.g., Baumeister and Hamilton, 2019; Kilian and Zhou, 2023). For the Euro Area, these findings are consistent with a recent paper by Adolfsen et al. (2024) that focuses specifically on the driver of gas prices. They distinguish three shocks: a supply shock, a demand shock and an inventory shock, the latter resembling a demand shock due to the need to refill inventories – so that inventories go up rather than down as for a demand shock. According to their model, the relative contribution to the volatility of gas prices of these three shocks on the overall sample 2007-2022 is 38% for supply shocks, 24% for demand shocks and 23% for inventory shocks.

Fiscal policy in the Euro Area. The prevalent narrative in the policy discussion with regards the post-Covid inflation surge in the Euro Area assigns a limited role for fiscal policy. Moreover, the very same narrative points to the role of fiscal policy as one of the main differences between the drivers of inflation in the Euro Area and the US, as the US government reacted promptly to the pandemic shock with massive fiscal measures, such as the American Rescue Plan Act in 2021.[17] However, the upper panels of Figure 3.2 paint a somewhat different picture that rejects this popular narrative and, instead, provides evidence that fiscal policy shocks generated increasing inflationary pressures over time in the Euro Area. While one could rationalize the prevailing narrative based on the sheer size of the initial fiscal response in the US relative to that in the Euro Area, one can not ignore the continued fiscal expansion that occurred in Europe on the back of two key events, as the data identify.

First, the European Commission adopted in December 2020 a new economic recovery package to support the EU member states to recover from the Covid pandemic. This package, called Next Generation EU (NGEU), mobilized an unprecedented funding volume of 750 billion euros (in 2018 prices), the equivalent of roughly 6% of EU GDP. NGEU has two important features: (i) disbursements to member states are divided into loans (which member states need to repay) and grants, and financed partly by EU bonds; (ii) disbursements are deployed gradually over time, in installments from 2021 to 2026, with the installments being conditional on whether projects can meet certain milestones. For our analysis, this second feature is particularly relevant, as it means that countries that requested NGEU funds are able to spend it only gradually over time.

Second, for the first time in 2020 the European Commission allows governments to use the severe economic downturn clause introduced in 2011 in the Stability and Growth Pact (SGP). This clause

[17] On fiscal policy and inflation in the US see Mori (2024).

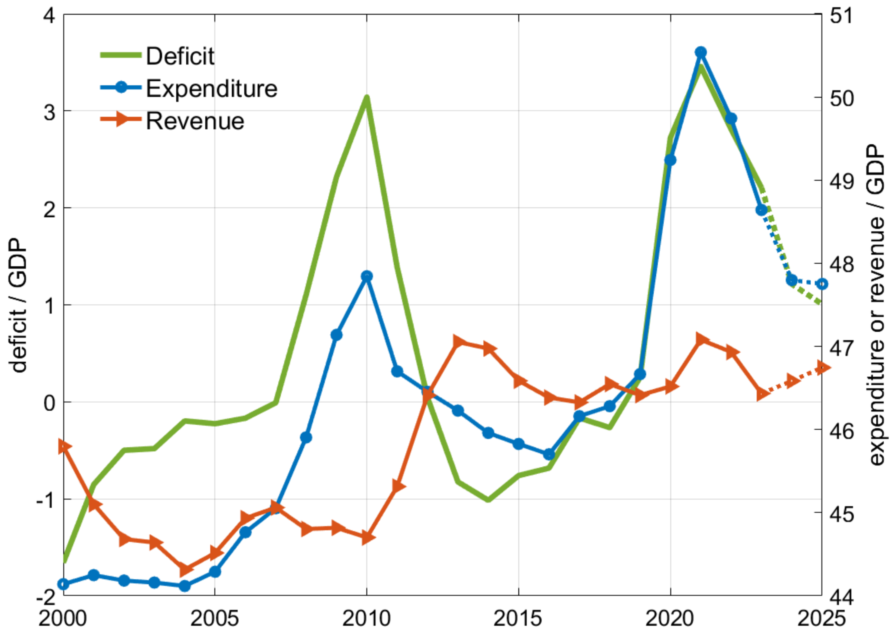
provides additional flexibility to the quantitative adjustment requirements under the SGP, and allowed governments to avoid costly pro-cyclical fiscal consolidations and, instead, pursue (large-scale) counter-cyclical fiscal policies. The activation of the escape clause was meant to be a purely temporary and emergency measure to help member states cope with the economic fallout and budgetary impact of the pandemic. Despite the economic rebound in 2021, the Commission extended the possibility of applying the escape clause on the basis of the uncertainty surrounding economic conditions. While the escape clause was intended to be used only during a severe economic downturn, the Commission and Council adopted a broader interpretation. Indeed, the Commission extended the possibility to appeal to the escape clause in 2022 and 2023, despite its assessment in the spring of 2023 of excessive deficits and public debt ratios in sixteen member states.[18] Contrary to the spirit of the general escape clause, these decisions were interpreted as if the commonly agreed European Commission fiscal rules or SGP procedures were suspended, despite the Commission regularly stressing the opposite. Indeed, as a result, the Commission opened excessive deficit procedures in 2024 for seven countries (Belgium, France, Hungary, Italy, Malta, Poland and Slovakia), which came on top of the one already in place for Romania from 2020, when the escape clause was lifted and the new rules of the revised EU economic governance framework came into effect.[19]

Consistently, data on the CAPB (i.e., cyclically adjusted primary balance – a common measure of the discretionary fiscal stance) also point to a strongly expansionary fiscal stance in the Euro Area, not only during, but also after the pandemic crisis. Figure 3.3 shows the primary deficit, total government expenditures (excluding interest) and total government revenue, as a percentage of GDP and adjusted for the cyclical component, – using trend GDP, as from the AMECO database – for the Euro Area. Not surprisingly, the deficit series shows two large spikes during the global financial crisis and pandemic crisis. However, both the size and persistence of the change in the fiscal stance has been larger during the latter crisis than during the former. Government expenditures in particular increased highly persistently. Following the 2008 crisis, primary government expenditures decreased slowly after 2009 and remained above their pre-crisis trend, resulting in an adjustment of the deficit – that was partly triggered by the European sovereign debt crisis – to occur mostly through increases in government revenues. During and after the pandemic, the rise in government spending seems to have been more persistent than implied

[18] On March 3, 2021, the Commission stated that the decision to lift the general escape clause of the SGP would be based on an "overall assessment", with the key factor being the level of economic activity in the EU or Euro Area relative to pre-crisis (i.e., end of 2019) levels, and thereby announced that the clause would remain in effect throughout 2022, but not in 2023. This position was confirmed in the Commission's winter forecast on February 10, 2022, which noted that Euro Area real GDP had already returned to pre-crisis levels by the end of 2021, with most EU member states being expected to exceed those levels by late 2022. However, on March 2, 2022, the Commission hinted at a possible reassessment, stating that the general escape clause would not be used in 2023, but rather that qualitative fiscal recommendations would be introduced, which could effectively imply a continuation of the escape clause and, in any case, introduced new flexibility. On May 25, 2022, the Commission proposed to extend the severe economic downturn clause throughout 2023. See Box 1 at p. 10 in European Fiscal Board (2022).

[19] Moreover, contrary to past common practice of accompanying the decision to open an excessive deficit procedure with recommendations on how to correct excessive deficits, guidance on what countries should do to correct their fiscal imbalance are, at the time of writing, still not known.

Figure 3.3: Fiscal policy indicators in the Euro Area

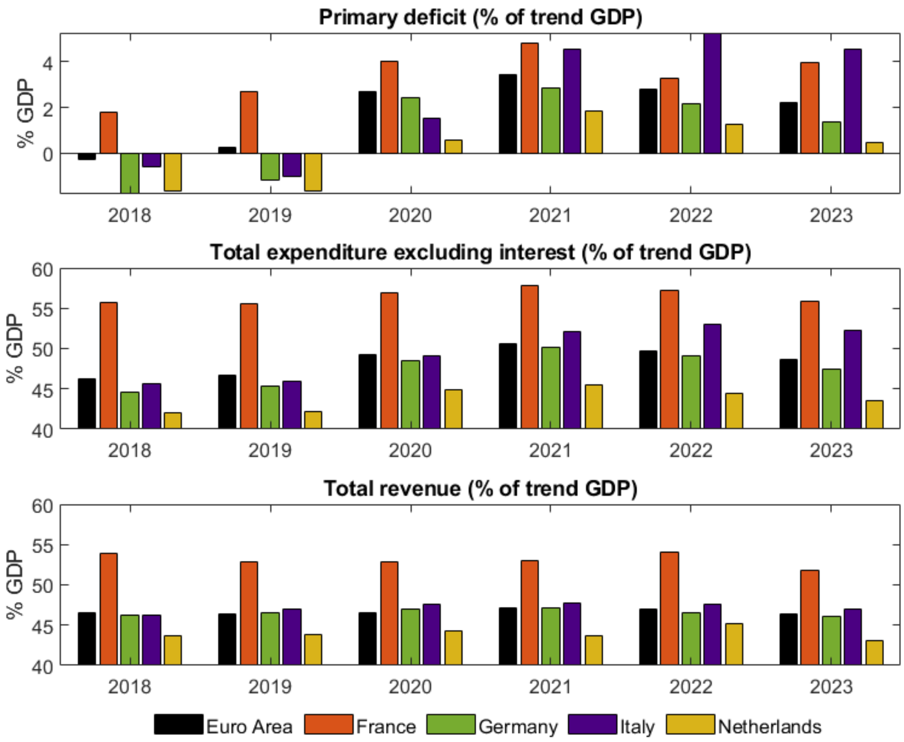


Sources: AMECO database, series: UBLGB, UUTGB, URTGA. Cyclically adjusted primary deficit (- CAPB), total expenditure excluding interest (G), and total revenue (T), as a percentage of GDP and adjusted for the cyclical component – using trend GDP. Dotted lines: projected values.

by the (supposedly) temporary support measures. Moreover, the fiscal stance is projected to contract only marginally in 2024 and 2025 (see the dotted lines in 3.3; source: AMECO). As cyclically adjusted primary expenditures lie substantially above their pre-pandemic level, expenditure growth has been significantly stronger than medium-term potential growth rates. The European Fiscal Board signaled its worries about these developments over recent years, as clearly stated in its most recent report (European Fiscal Board, 2024, p. 3): *"In the past few years, government expenditure has accelerated significantly in many Euro Area countries well beyond the temporary measures taken in response to the Covid crisis and the subsequent energy price hike. Growing demands on the public purse are accompanied by a significant deterioration in several Member States of the attention paid to sustainable public finances. The implication is a structural upward trend in public spending that will need to be addressed. As a consequence, fiscal support is significantly higher than what the macroeconomic outlook justifies."*

To conclude, the fiscal policy response in the Euro Area to the pandemic crisis has been large and very persistent, and thus should not be ignored when analyzing the drivers of inflation. The fiscal stance – as measured by the CAPB – has been expansionary and gradually increasing, well-beyond what the temporary support measures would suggest, likely supported by a prolonged suspension of the fiscal rules. As such, it is not surprising that our empirical results provide evidence of increasing and persistent effects of fiscal policy on Euro Area inflation. Moreover, the model shows very little effect of fiscal shocks on GDP. This is consistent with the idea that fiscal policy entered the stage only gradually and that the Phillips curve likely steepened amid high inflation, more flexible prices and (global) supply chain

Figure 4.1: Cyclically adjusted fiscal indicators in selected countries of the Euro Area



Sources: AMECO, series: UBLGB, UUTGB, URTGA, adjusted for the cyclical component using trend GDP.

disruptions.

4 Fiscal policy and inflation in selected Euro Area countries

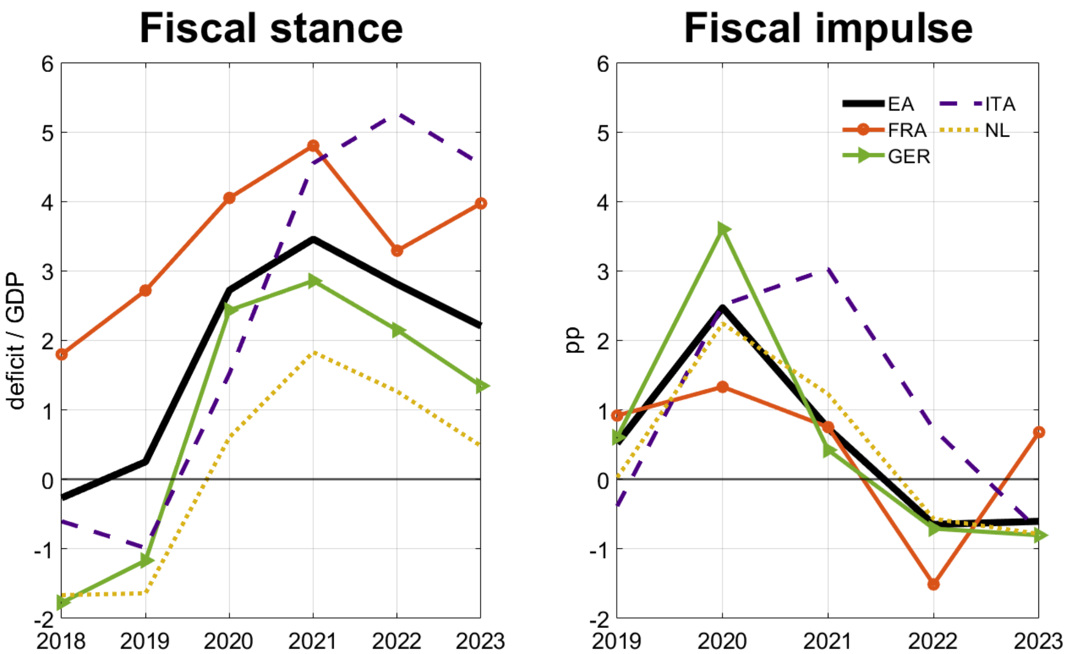
In this section, we perform the same exercise as we did for the Euro Area as a whole, yet now focus on selected Euro Area countries: France, Germany, Italy and the Netherlands. The focus on these particular countries allows us to reveal potential cross-country heterogeneities given the different extent countries were hit by the pandemic and/or the subsequent energy crisis and their different initial fiscal conditions. Specifically, the fiscal indicators for Germany and the Netherlands have been relatively similar, and similar to the Euro Area average, while this is not true for France and Italy. As before, we use the same BVAR model and identification strategy and investigate the role of the various shocks in explaining the dynamics of inflation, with a particular focus on the role of fiscal policy shocks.

Figure 4.1 displays the cyclically adjusted primary deficit and its two main components for the Euro Area and these four countries from 2018 to 2023.[20] The European Fiscal Board refers to the CAPB as a measure of the discretionary fiscal stance, and to its annual change as a measure of the fiscal impulse in any given year. Figure 4.2 displays these two fiscal indicators, again from 2018 to 2023.[21] The time

[20]Table E.1 reports the numbers used for Figure 4.1.

[21]In our exposition, positive values represent deficits. Hence, a positive value indicates a positive (i.e., expansionary) fiscal stance or fiscal stimulus. The fiscal impulse is defined as the (negative of the) annual change in the CAPB.

Figure 4.2: Fiscal stance and fiscal impulse in selected countries of the Euro Area

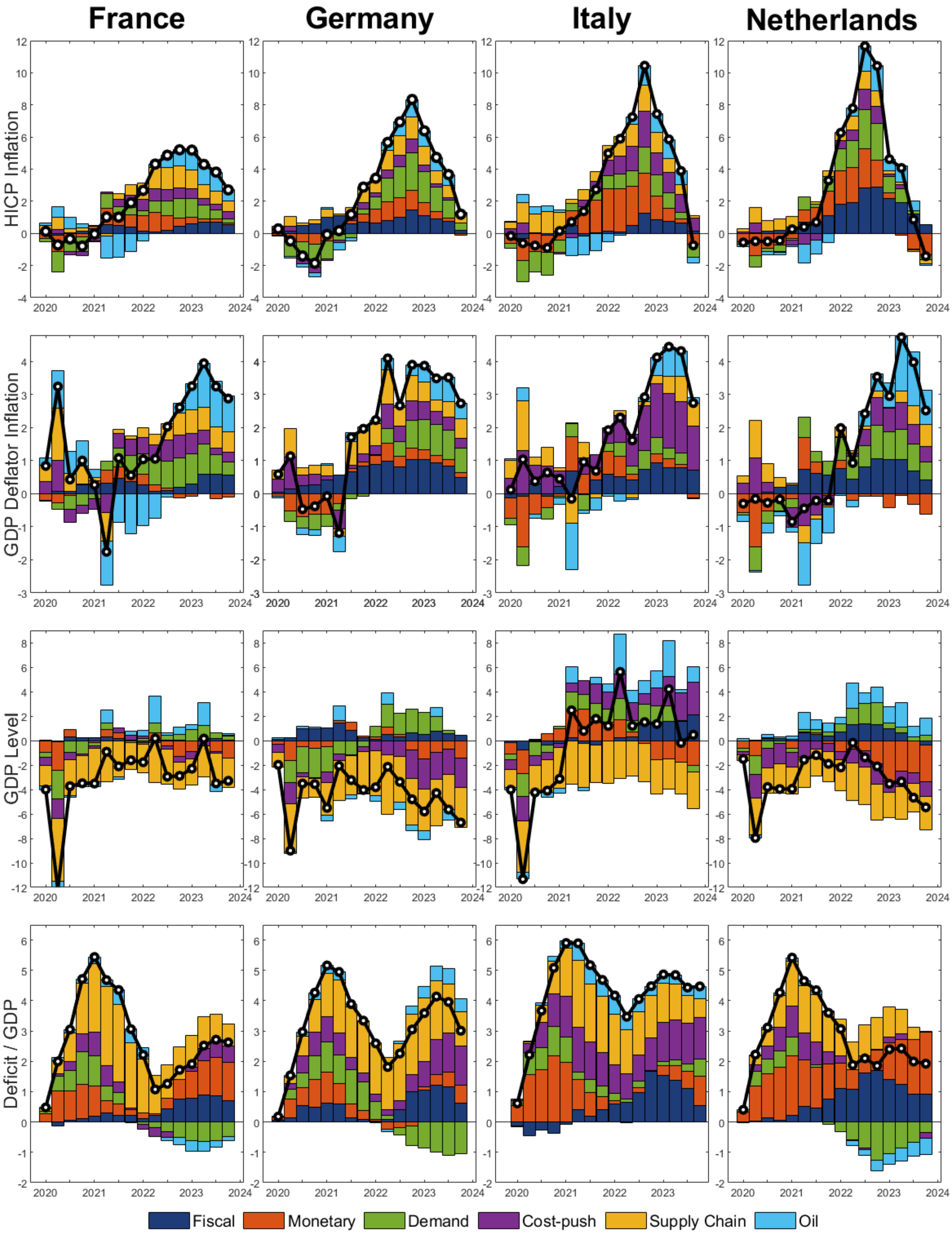


Sources: AMECO database, series: UBLGB. The Fiscal Stance is the Cyclically adjusted primary deficit (- CAPB); the Fiscal Impulse is the (absolute value) of the change the cyclically adjusted primary deficit (- ΔCAPB), both expressed as a percentage of GDP and adjusted for the cyclical component – using trend GDP.

profiles of both the fiscal stance and fiscal impulse of Germany and the Netherlands are broadly in line with that of the Euro Area aggregate, with the exception of a larger fiscal impulse in Germany in 2020. Fiscal policy developments in Germany and the Netherlands were characterized by a large expansion of the fiscal stance in 2020, resulting from pandemic-related support measures, which was followed by a slow and gradual fiscal contraction. Fiscal chronicles in France and Italy have been somewhat different than that in Germany and the Netherlands. For instance, France fiscal stance was already substantially looser before the pandemic, so that the fiscal impulse had been lower during the pandemic years. France maintained a lower fiscal impulse of about 1% of GDP over the period 2019-2021, which it mainly achieved through increases in government expenditures. While French fiscal policy contracted substantially in 2022, it expanded again in 2023, yet this time mostly through reductions in (cyclically adjusted) tax revenue (see Table E.1). Italy, which exhibited a fiscal tightening in 2018, saw its fiscal stance rapidly expanding after 2019 and reported fiscal impulses well above the Euro Area average, primarily due to strong increases in government expenditures. Despite facing one of the highest public debt to GDP ratios in the Euro Area already before the crisis, Italy's loose fiscal stance in 2023 has been the most pronounced among the countries that we consider in our analysis.

With these features in mind, we proceed to interpret the drivers of inflation in these Euro Area countries through the lens of our empirical model. Figure 4.3 shows the historical forecast error decomposition of inflation, GDP and the PDtG for each country by column. Interestingly, we find that our main result for the Euro Area aggregate, i.e., that the contribution of fiscal policy shocks to inflation has

Figure 4.3: Decomposition of inflation, GDP and primary deficit-to-GDP ratio for selected countries in the Euro Area



Sources: Cumulative contribution of shocks after 2019:IV to selected macroeconomic indicators (initial conditions and pre-Covid shocks are filtered out).

been non-negligible and steadily increasing in recent years, also broadly holds for each country under consideration, with some quantitative differences. First, the panels for Germany and the Netherlands are very similar to the ones for the Euro Area in Figure 3.2, in line with the fiscal indicators discussed above. The inflation surge was predominantly demand driven, fiscal policy shocks played an increasing role as a driver of inflation (up to roughly one-fifth at the inflation peak), and they had little effect on GDP. Second, the forecast errors of inflation for France are lower than in the other countries and the contribution of supply shocks to these errors to inflation is larger and more persistent. Supply shocks still explain a substantial part of inflation in the last quarters of the sample, while they play a negligible role for the other countries. Fiscal policy shocks have smaller, but similar (i.e., gradually increasing), effects on inflation, and no effect at all on GDP. This seems consistent with a lower fiscal impulse for France. The decomposition for Italy is in line with the delayed behavior of the fiscal indicators, since fiscal shocks affected inflation only after 2022. Note also that, contrary to the other countries, fiscal shocks exerted a positive effect on GDP.

The focus of this study is on aggregate variables, and on disentangling broad supply and demand forces driving them using a well established macroeconomic methodology (BVAR with sign restrictions). It should, hence, be clear what can be uncover with this methodology and what are the limits of this approach in comparing the effects of overall 'fiscal policy' across different countries. Total government expenditures and revenues hide a myriad of different support measures that countries put in place in response to the pandemic and energy crisis. Most measures were untargeted and price-distorting, e.g., cuts to excise duties and VAT, while some measures were more price- and income-targeted.[22] These various support measures, therefore, are likely to have a different effect on inflation and GDP, both directly and indirectly through their effect on other aggregate variables. For example, the direct (mechanical) effect of price-targeted energy-related support measures on inflation may be negative, yet may also create offsetting indirect effects on inflation to the extent they raise aggregate demand. Our aggregate BVAR model does not disentangle these direct and indirect effects, and could possibly interpret some fiscal measures as a combination of supply and demand shocks. We should resist, thus, the temptation to use our macroeconomic approach to assess the effectiveness of the 'micro' composition of these different measures across countries.

Having said that, and with this caveat in mind, the results seem to align to a the broader macroeconomic picture. On the supply side, Germany and the Netherlands were much less affected by Covid (in 2020 GDP growth was equal to -4.1% and -3.9% respectively) than France and Italy (GDP growth was equal to -7.4% and -8.9%, respectively). The labour market conditions were also quite different during our sample period. Italy was hit particularly hard in a situation in which the unemployment rate and

[22] For details on pandemic-related fiscal measures, see: https://www.imf.org/en/Topics/imf-and-Covid19/Policy-Responses-to-Covid-19, while for details on energy-related fiscal measures see: https://www.bruegel.org/dataset/national-policies-shield-consumers-rising-energy-prices.

the participation rate were the lowest among these countries. In the subsequent rebound phase in our sample, the unemployment rate diminished from a peak of 10.2% in April 2021 to a historically low level of 7.2% in December 2023, despite the steep increase in the participation rate (from 61.5% in April 2020 to 66.9% in December 2023). The statistics on the vacancy rate show that Italy had a much less tight labour market than Germany and the Netherlands. According to Eurostat, the vacancy rate fluctuated around 2% in Italy, 4% in Germany and 4.5% in the Netherlands. France labour market statistics are somewhat in between, with a vacancy rate fluctuating around 3%, an unemployment rate almost as high as Italy at the beginning of the sample (peaking at 9% in August 2020) but with a much flatter dynamics (7.6% in December 2023), similar to the ones in Germany and the Netherlands. These labour market conditions are naturally reflected in a different dynamics of wages, much muted in Italy comparing to the two northern countries (with France again mid way).[23] These dynamics suggest a more elastic aggregate labour supply in Italy, due to larger labour market slack, or, in other terms a flatter Phillips Curve in Italy than in the other countries under consideration. This aligns well with the results that fiscal policy stimulus in Italy was more effective in increasing GDP and had relatively less effects on inflation.

On the demand side, it is well-known that the inflation surge affected more lower-income households, who are also the one with a larger propensity to consume. Amores et al. (2024) measures the losses accrued to households in different income deciles in 2020, and the extent to which fiscal measures mitigated the loss in purchasing power of lower-income households across countries. They find that government measures, almost completely offset household losses in France and in Italy across deciles, but the initial losses – and hence also the compensating fiscal measures – were much smaller in France than in Italy.[24] These findings also aligned with the relative fiscal impulse dynamics in Figure 4.2, and with larger effects of fiscal shocks for Italy.

5 Conclusions

This paper investigates the drivers of Euro Area inflation. Our study expands on the existing literature by considering within the same model the role of various demand and supply shocks, i.e., domestic demand, monetary policy and fiscal policy on the demand side; domestic supply, global supply and oil prices on the supply side. Moreover, we provide a comprehensive analysis of the role of fiscal policy shocks in driving Euro Area inflation.

Our key and novel finding is that a significant portion of the demand-driven contribution to the inflation spike in the Euro Area is attributable to fiscal policy shocks. Specifically, our analysis indicates

[23] According to Eurostat (see Labour cost levels by NACE Rev. 2 activity for Industry, construction and services, `lc_lci_lev_custom_13329456`), the annual percentage rate of growth of wages in the years 2020-2023 was: 3.4, -1.6, 2.5, 1.4 for Italy; 2.8, 0.8, 6, 4.8 for Germany; 2.1, 1.1, 6.5, 6.8 for the Netherlands and 2.5, 1.2, 3.8, 3.6 for France.

[24] See Figure 5 in Amores et al. (2024). In Italy the welfare losses – defined as the additional expenditure necessary to keep the consumption bundle unchanged, – amounted to more than 20% in the bottom income decile, while only to more than 5% in France. Hence, in Italy the fiscal measures compensated almost entirely these 20% losses.

that these shocks were responsible for a 1.5 percentage point rise in HICP inflation by the end of 2022, accounting for 18% of the overall inflation peak, and for a 1 percentage point increase in the GDP deflator, representing 27% of its total rise during this period. In terms of the breakdown between demand and supply shocks, our estimates suggest that demand shocks collectively contributed 58% to the overall surge in HICP inflation and 64% to the rise in the GDP deflator.

Moreover, the impulse response functions show that fiscal shocks generate persistent inflationary effects in the Euro Area. Our paper, therefore, provides new insights into the dynamic interactions between fiscal policy, aggregate demand, monetary policy and inflation in the Euro Area.

Finally, we perform a similar analysis for selected Euro Area countries, revealing differences in how fiscal shocks influence inflation dynamics. In Germany and the Netherlands, the outcomes are consistent with those of the broader Euro Area. By contrast, fiscal shocks in France were more subdued, while in Italy, they had a relatively larger impact on GDP than on inflation.

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Appendix

A Data set

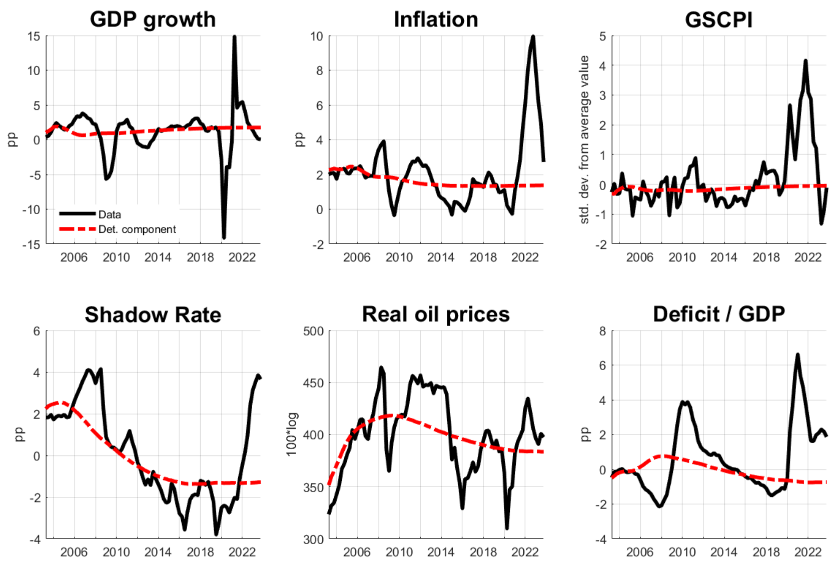
In this section we give an overview of our data set. In Table A.1 we describe all the variables used in the estimation and in Figure A.1 we display the data plots alongside the corresponding deterministic components (as estimated by our VAR model).

Table A.1: Data description

	Variable	Description
1	Gross Domestic Product	Real Gross Domestic Product for Euro Area. Year-on-year growth rate. Fred (CLVMEURSCAB1GQEA19)
2a	Inflation: HICP	GDP Deflator for Euro Area; Year-on-year growth rate. ECB Data Portal
2b	Inflation: GDP deflator	Harmonized Index of Consumer Prices: All Items for Euro Area; Year-on-year growth rate. Fred (CP0000EZ19M086NEST)
3	GSCPI	Global Supply Chain Pressure Index Index scaled by its standard deviation; Computed by Benigno et al. (2022).
4	Euro Area shadow interest rate	A measure to capture the ECB's effective monetary policy stance; Computed by Krippner (2013).
5	Real oil price	Brent oil price (euros per barrel) deflated by HICP; log(.)*100. Fred (DCOILBRENTEU)
6	Primary deficit	Euro Area government primary deficit as a % of GDP. ECB Data Portal.

Note: The data set has quarterly frequency and it covers the period 2002:I until 2023:IV.

Figure A.1: Data



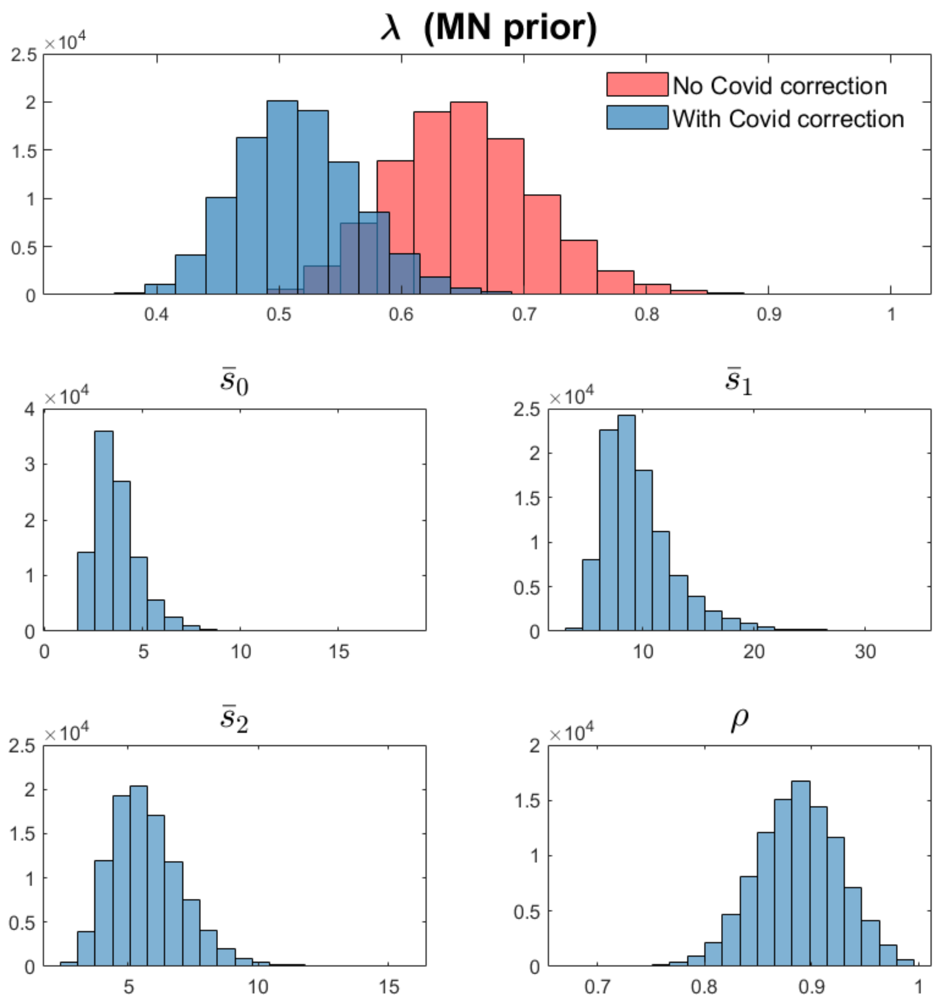
Notes. Data employed and (median) deterministic components as estimated by the benchmark BVAR.

B Estimation results

In this section we report additional results based on our benchmark BVAR estimation.

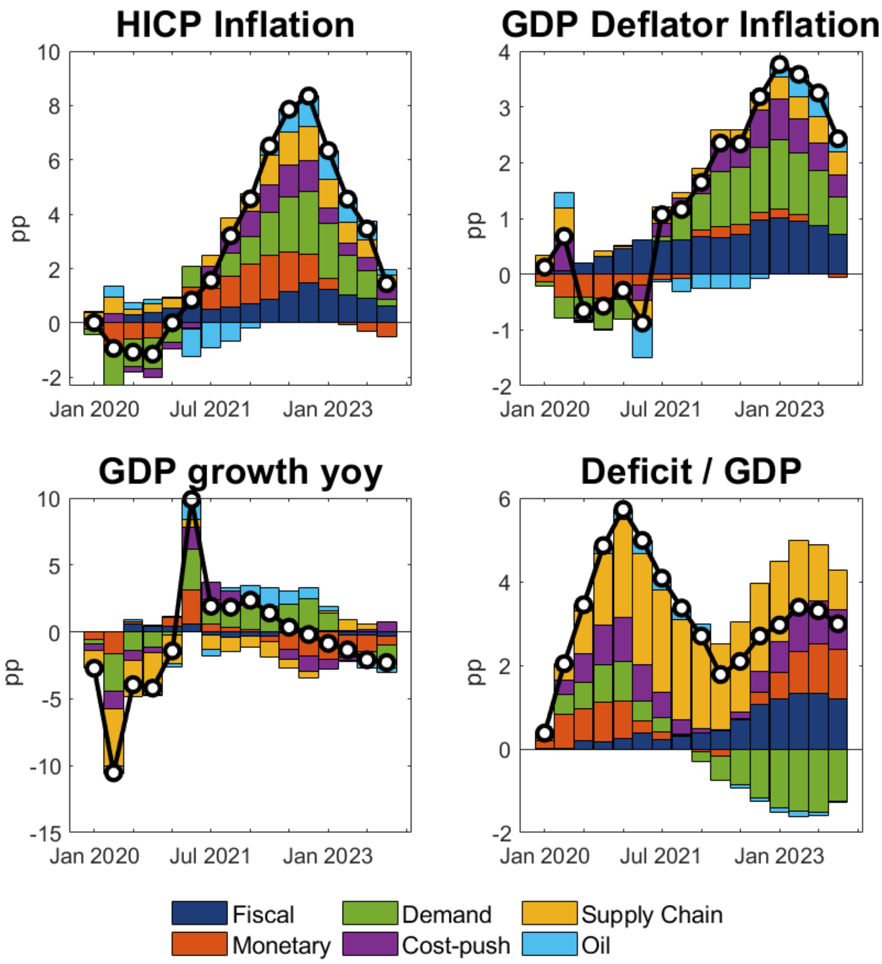
Since our estimation sample includes the Covid pandemic, in order to avoid potential distortions in our inference due to temporary increases in the volatility of VAR residuals, we closely follow the approach proposed by Lenza and Primiceri (2022). For completeness, we report in Figure B.1 the posterior distribution of the overall standard deviation of the Minnesota prior, the three volatility scaling factors and the volatility decay parameter. For comparison, the first panel of this figure shows with red bars the posterior of the overall standard deviation of the Minnesota prior (λ) when our BVAR is estimated without treating the Covid -related data (i.e., assuming $\bar{s}_0 = \bar{s}_1 = \bar{s}_2 = 1$). In this case, the posterior of λ shifts to the right, which implies less shrinkage for the VAR coefficients (i.e., $\beta \equiv vec([c, B_1, B_2, B_3, B_4]'))$. As explained in Lenza and Primiceri (2022), this diminished shrinkage is the implied cost paid to fit the higher variability in the Covid -related data with a change in the estimated VAR coefficients.

Figure B.1: Volatility adjustment for Covid



Notes. Posterior distribution of the overall standard deviation of the Minnesota prior (λ), the 2020:I ($\bar{s}_0$), 2020:II ($\bar{s}_1$) and 2020:III ($\bar{s}_2$) volatility scaling factors, and the 2020:III volatility decay parameter (ρ).

Figure B.2: Historical decomposition of GDP growth



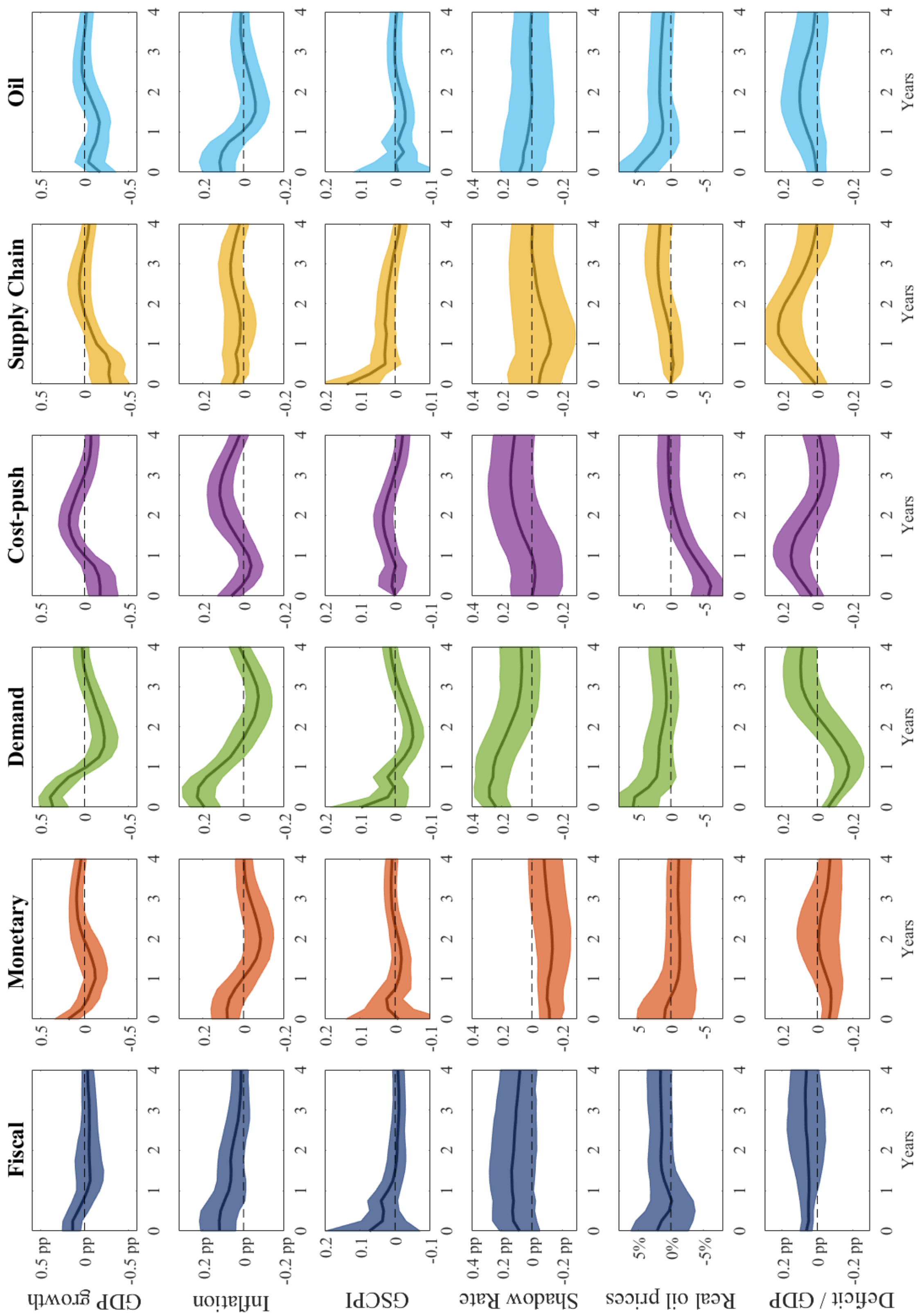
Notes. Historical decomposition when considering GDP growth instead of converting it to "level".

In the main text we converted the GDP growth rates into GDP levels in the figure showing the shock decomposition to ease interpretability (see Figure 3.2). Here, we report in Figure B.2 for completeness the contributions of the identified shocks to GDP growth instead of its level, alongside inflation and the primary deficit ratio, over time since 2020:I. At the onset of the Covid pandemic and as the health crisis unfolded, a combination of adverse demand and supply shocks (with global supply disruptions as a key driver) had a powerful negative impact on GDP growth. As the economy started to resume its activity, GDP growth saw a quick rebound, driven by most of the shocks. A notable exception are the global supply chain pressure shocks, which continued to constrain GDP growth. This is because these shocks cause a persistent and sizable decline in GPD growth (see Figure 3.1).

C Additional results for the benchmark model

This section reports the full set of impulse response functions for all the variables included in our baseline VAR model (Figure C.1). For completeness, we also show the historical shock decomposition of inflation

Figure C.1: Impulse responses using our benchmark VAR model with headline HICP



Notes. Impulse responses for the baseline model to one-standard-deviation shocks. Solid lines represent the posterior median at each horizon and the shaded areas indicate the 16th and 84th percentiles of the impulse responses.

based on both the benchmark (using headline HICP) and alternative (using GDP deflator) VAR models, respectively (Figure C.2).

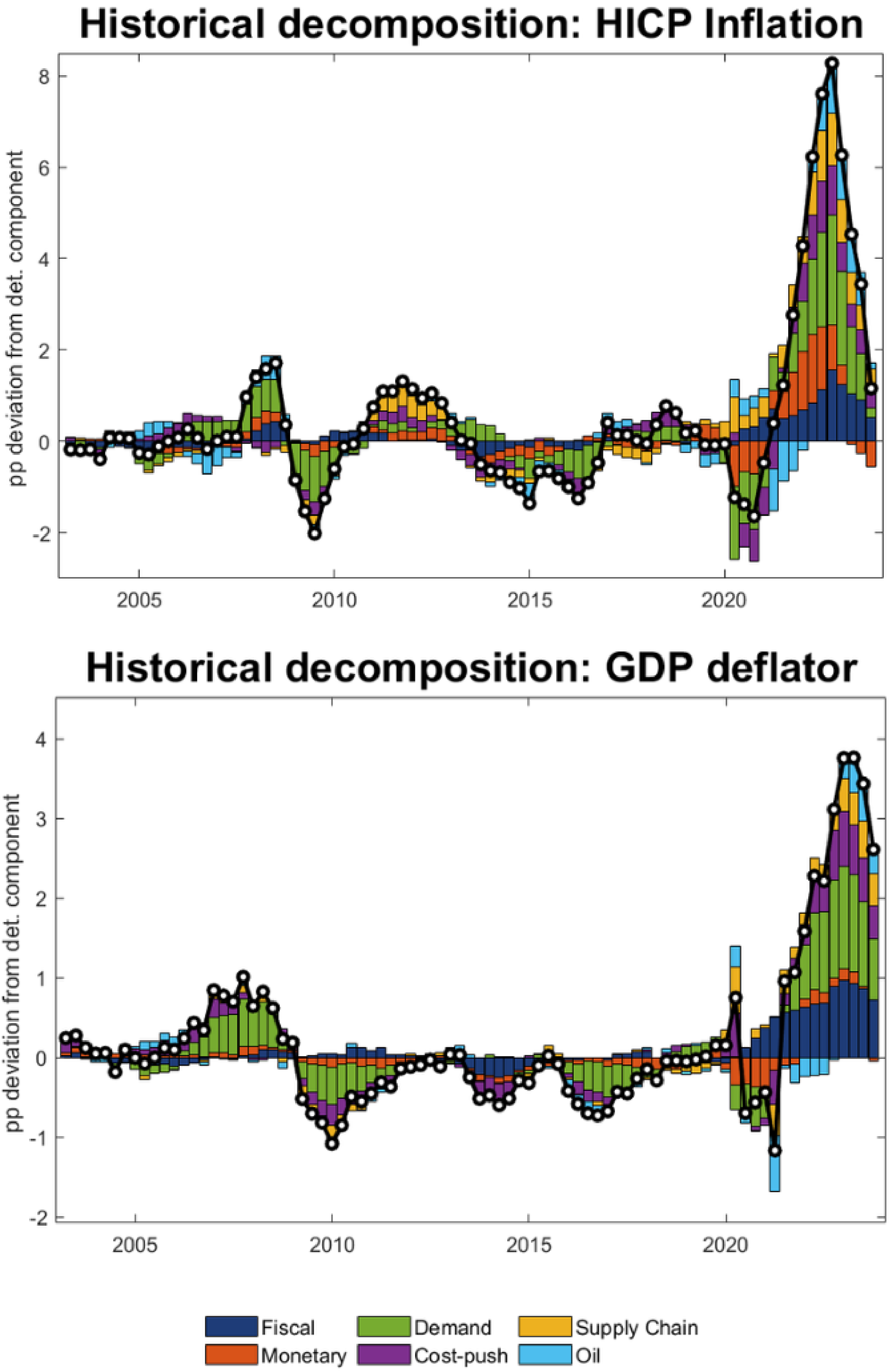
The first panel of the Figure C.2 shows the contributions of identified shocks to headline HICP inflation over time, measured as deviations from its deterministic component. We divide the sample into three key periods: (i) the run-up to the global financial crisis (GFC), its aftermath, and the European sovereign debt crisis (2002-2013), (ii) the post-crisis recovery (2014-2019), and (iii) the Covid pandemic and inflation surge (2020-2023).

During the first period (2002-2013), demand shocks were the primary drivers of inflation, particularly in the lead-up to the GFC. Supply shocks, largely driven by oil prices, exerted a dampening effect, moderating inflationary pressures. After the GFC, however, all shocks contributed significantly to deflationary pressures. In contrast, during the European sovereign debt crisis, all shocks pushed inflation higher. The positive contribution of global supply chain disruptions likely reflects the impact of the international trade collapse, a decline in global value chain participation, and the supply chain bottlenecks caused by two major natural disasters in 2011 − Japan's Tōhoku earthquake and the Thailand floods − which affected the automotive and electronics manufacturing sectors.

Second, during much of the post-crisis recovery (2014-2019), inflation persistently remained below the ECB's medium-term target. This was largely driven by structural shocks, including fiscal policy, especially in the first half of the period. In response, the ECB lowered its key policy rate to -0.5% by September 2019 to stimulate aggregate demand. Our results show that fiscal policy shocks, along with favorable shocks to global supply chains, played a significant role in suppressing Euro Area inflation. The former reflects austerity measures implemented by most European governments in response to the European sovereign debt crisis, while the latter corresponds to a globalization trend that continued until the China-US trade disputes of 2017-18.

Third, the Covid pandemic triggered overlapping waves of supply and demand shocks in the global economy. According to our model, demand-side factors were more influential in driving Euro Area inflation, while supply-side factors intensified inflationary pressures. Notably, fiscal policy shocks had a relatively minor impact during the low-inflation period (2020:I - 2021:II). However, as inflation surged (2021:III - 2022:IV), fiscal policy became increasingly expansionary, contributing to one-fifth of the inflation peak in 2022 by stimulating aggregate demand. Finally, the rapid disinflation in 2023 resulted from the fading of positive contributions from all shocks, except fiscal policy. More details are provided in the main text.

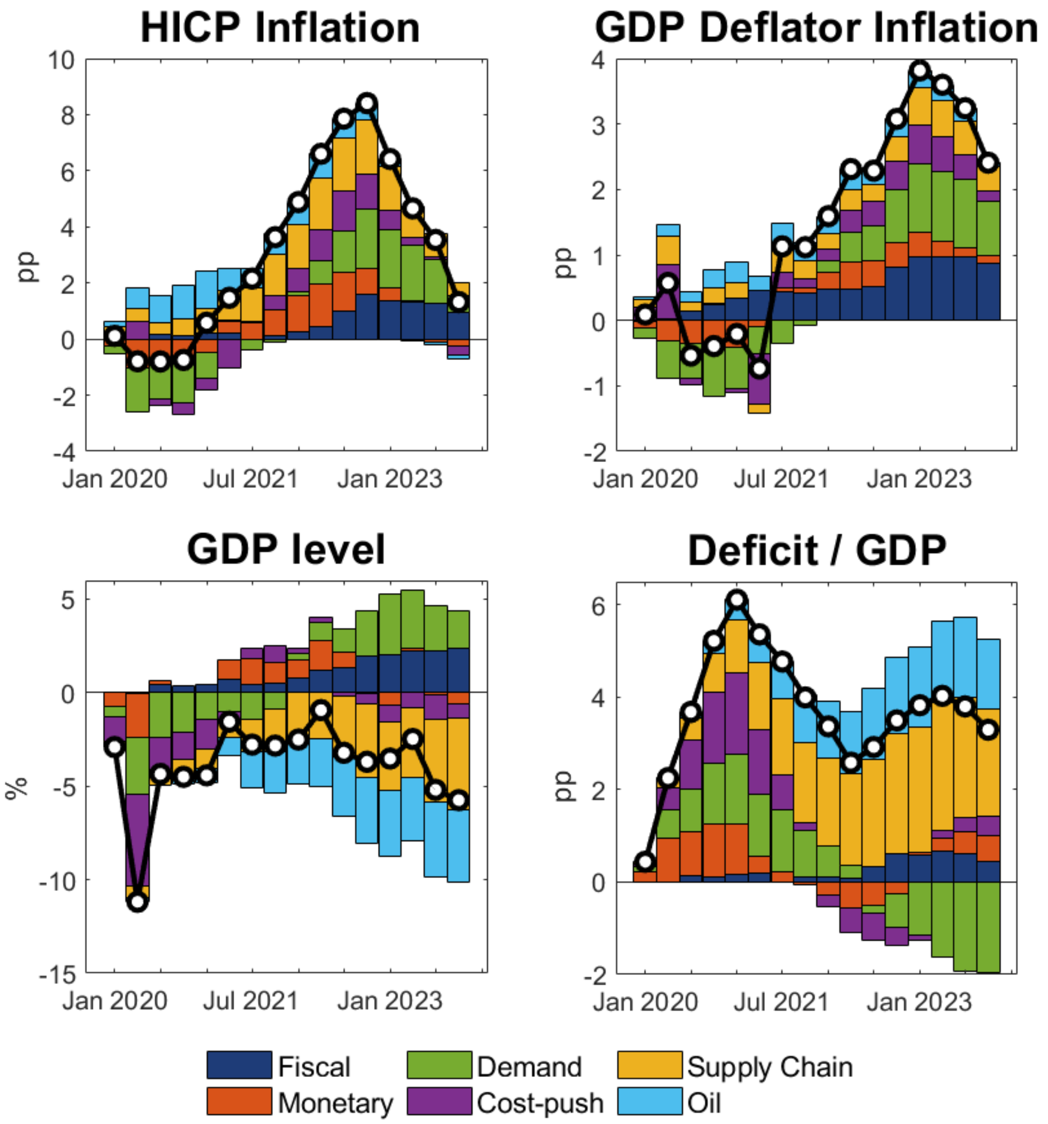
Figure C.2: Historical decomposition of inflation (full sample)



D Robustness analysis

D.1 Additional zero restrictions

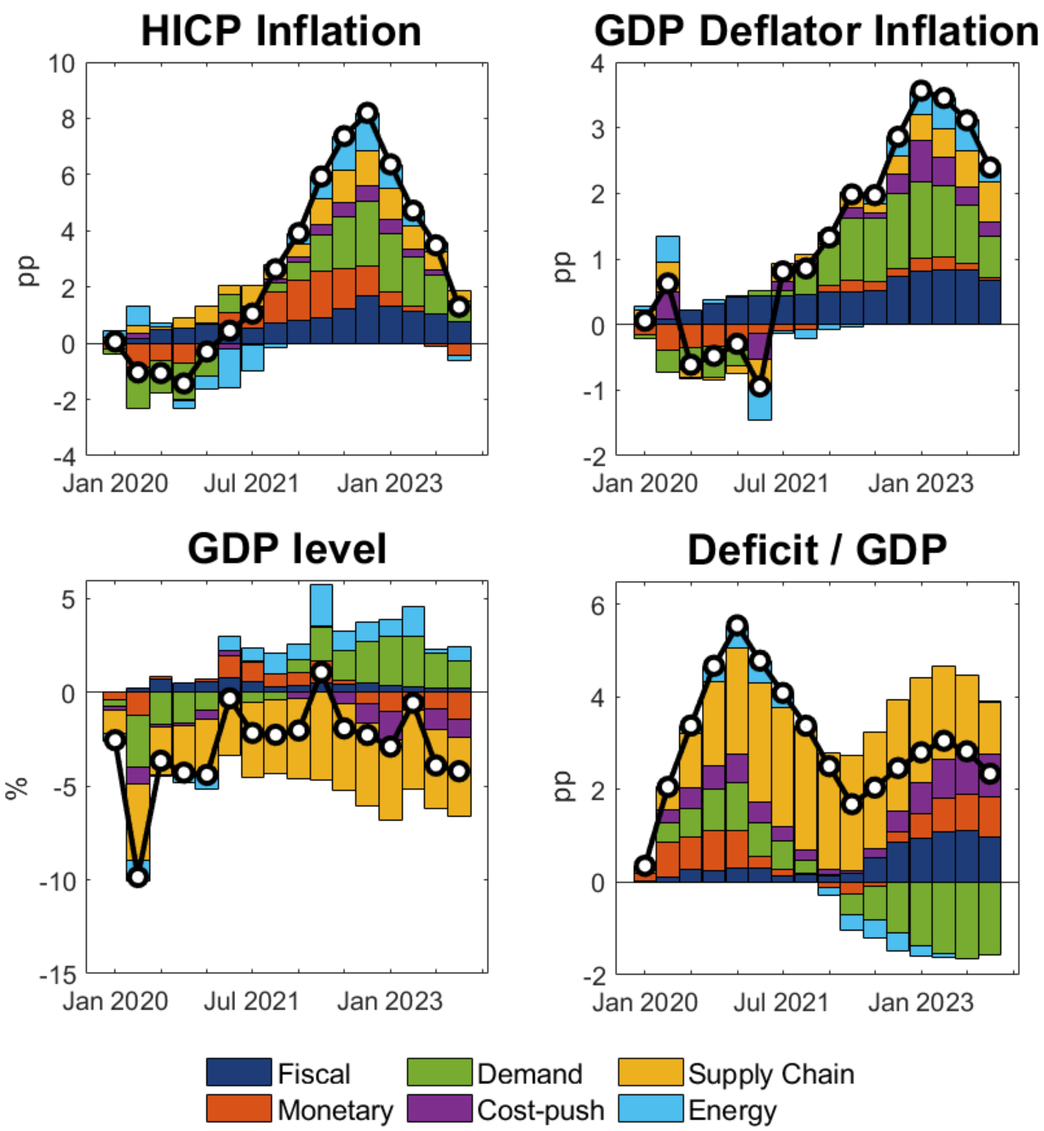
Figure D.1: Historical Decomposition – Adding Zero Restrictions on Demand Shocks



Note: Robustness check where we additionally assume that all demand shocks have zero impact effect on GSCPI.

D.2 Energy inflation instead of oil

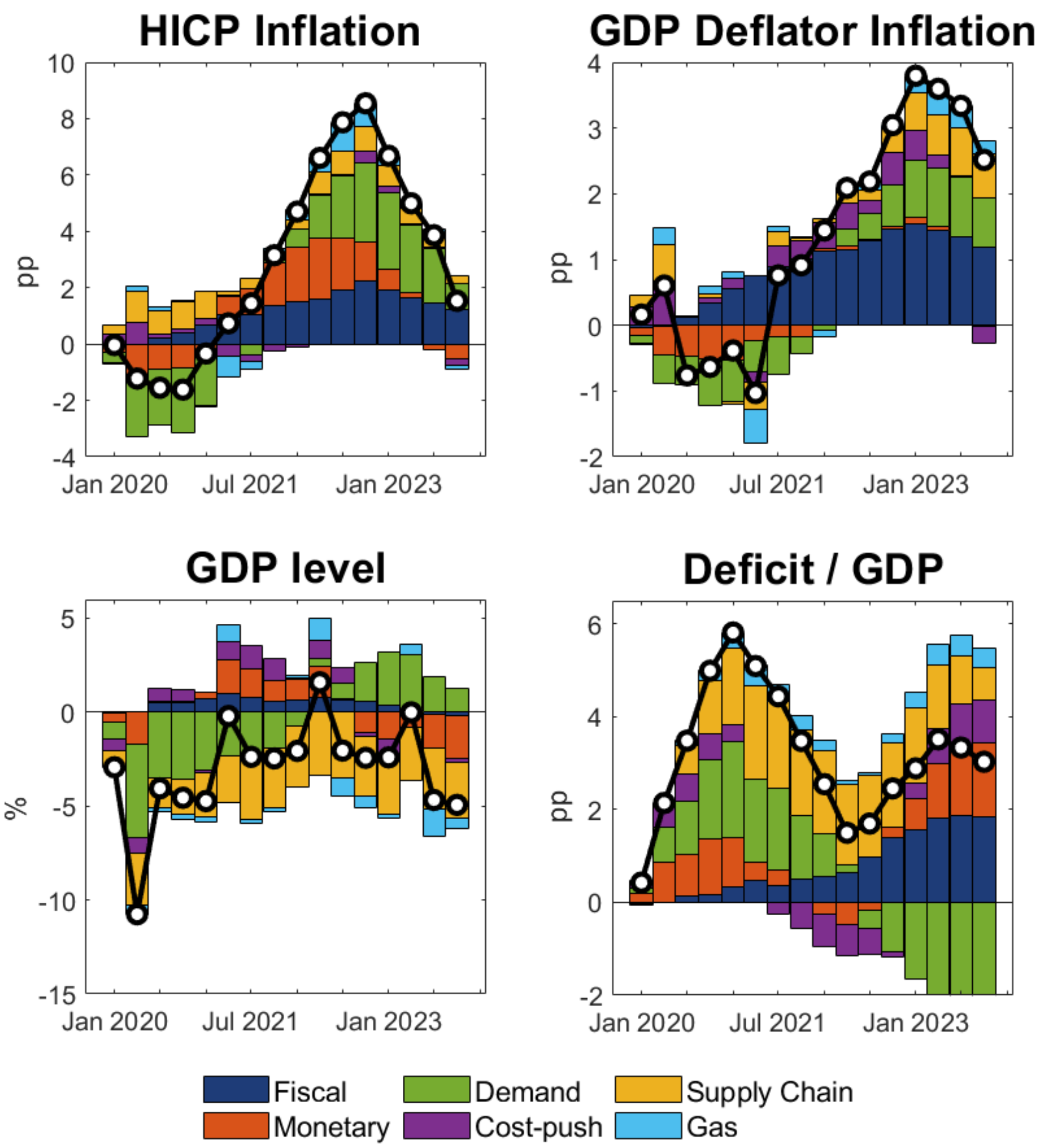
Figure D.2: Historical Decomposition – Energy Inflation



Note: Robustness check where we use HICP energy in place of the real oil price.

D.3 Gas price instead of oil

Figure D.3: Historical Decomposition – Gas Price



Note: Robustness check where we use real gas prices in place of the real oil price.

E Cyclically adjusted fiscal indicators in selected countries of the Euro Area

Table E.1: Cyclically adjusted fiscal indicators in selected countries of the Euro Area

Year	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
Primary deficit, % trend GDP						
Euro Area	-0.27	0.25	2.72	3.46	2.81	2.21
France	1.80	2.72	4.05	4.80	3.29	3.97
Germany	-1.78	-1.17	2.43	2.86	2.15	1.35
Italy	-0.60	-0.99	1.52	4.55	5.27	4.53
Netherlands	-1.67	-1.64	0.60	1.83	1.26	0.48
Total expenditure, excluding interest, % trend GDP						
Euro Area	46.28	46.67	49.24	50.54	49.74	48.64
France	55.66	55.54	56.85	57.81	57.28	55.82
Germany	44.52	45.39	48.53	50.20	49.13	47.49
Italy	45.59	45.95	49.10	52.12	52.94	52.29
Netherlands	42.05	42.20	44.94	45.55	44.51	43.53
Total revenue, % trend GDP						
Euro Area	46.55	46.41	46.52	47.08	46.93	46.43
France	53.86	52.82	52.80	53.01	53.99	51.85
Germany	46.30	46.55	46.09	47.35	46.98	46.14
Italy	46.19	46.93	47.58	47.57	47.66	47.75
Netherlands	43.72	43.84	44.33	43.72	43.25	43.05

Sources: AMECO, series: UBLGB, UUTGB, URTGA, adjusted for the cyclical component using trend GDP.

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