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UNDERSTANDING THE PREVALENCE OF DEMAND SHOCKS IN THE RECENT INFLATION SURGE: AN INTERNATIONAL PERSPECTIVE *

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ØRJAN ROBSTAD^{||}

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Abstract: The paper investigates the international dimension of the recent inflation surge by disentangling domestic and foreign factors through an extended structural vector autoregressive (SVAR) model applied to Norway, Sweden, the United Kingdom, and the United States. International factors, including foreign supply and demand shocks, are identified and quantified by imposing novel restrictions on variables like import prices and trading partner output. Results indicate that the role of international demand shocks varies across countries, with a significant impact observed in European nations such as Norway and Sweden, while domestic demand dominates in the U.S. Importantly, foreign supply shocks are found to absorb some explanatory power from domestic supply shocks but do not undermine the predominance of demand factors overall. Monetary policy shocks have contributed significantly to keep interest rates lower than the value prescribed by the implicit historical monetary policy rule in all the four economies that we consider, thus highlighting that part of the synchronization in the recent interest rate cycle is due to the unsystematic component of monetary policy, and not only to the presence of global shocks.

Keywords: *Bayesian vector autoregression, foreign factors, inflation dynamics.*

JEL Classification: *C11, C32, E32.*

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1 INTRODUCTION

MOTIVATION In the aftermath of the COVID-19 pandemic, the world economy has witnessed a dramatic surge in price inflation. After reaching unprecedented levels since the late 1970s, inflation has fallen relatively quickly in most countries. Although supply chain disruptions and shocks to energy prices played a substantial role in the first phase of the surge, demand factors have become prevalent since 2022. This result emerges across a broad spectrum of macroeconomic models, from simple structural vector autoregressive (SVAR) models and factor models ([Ascari et al. \(2023\)](#), [Ascari et al. \(2024\)](#), [Bergholt et al. \(2025a\)](#), [Eickmeier and Hofmann \(2022\)](#), [Giannone and Primiceri \(2024\)](#), [Mori \(2025\)](#)), to fully specified dynamic macroeconomic models ([Bardóczy et al. \(2025\)](#), [Benigno and Eggertsson \(2023\)](#), [Bocola et al. \(2024\)](#), [Comin et al. \(2023\)](#), [Di Giovanni et al. \(2023\)](#), [Schmitt-Grohé and Uribe \(2023\)](#)). Although some papers find a larger or comparable explanatory power for supply shocks ([Bai et al. \(2024\)](#), [Beaudry et al. \(2024\)](#), [Shapiro \(2024\)](#) and [Gagliardone and Gertler \(2025\)](#)), our reading of the literature is that there is a growing consensus on the role of expansionary monetary and fiscal policy, together with the spending of excess savings accumulated during the pandemic, as the prevalent drivers of inflation dynamics in recent years.

A key open question is whether the prevalence of demand shocks is confirmed once international factors are explicitly taken into account. Investigating international factors in the recent episode is particularly important for at least two reasons. First, as shown in [Forbes et al. \(2024\)](#), the recent interest rate cycle has been the most synchronized between countries, with global factors being important drivers of interest rate fluctuations. However, it is not clear ex-ante whether these international factors act mainly as demand or supply shocks at the level of individual countries. Second, supply chain efficiency (or inefficiency) and energy prices are essentially determined at the global level. Although global factors have been considered important well before the recent inflation surge (see [Ciccarelli and Mojon \(2010\)](#) and [Ascari and Fosso \(2024\)](#)), it seems particularly important to consider them when studying the recent inflation cycle.

CONTRIBUTION We build a simple SVAR model that separately identifies foreign factors, thus extending the baseline framework used by [Bergholt et al. \(2025a\)](#) and [Giannone and Primiceri \(2024\)](#) to study the inflation surge. We perform our analysis for four countries (Norway, Sweden, the United Kingdom and the United States) that are rather heterogeneous in terms of size and exposure to international factors. An important novelty in our set-up is that it does not impose that the domestic economy cannot affect the foreign block, as is commonly assumed in standard open economy SVARs ([Cushman and Zha \(1997\)](#)). Thus, the very same model can be applied to both small and large open economies to assess whether demand shocks remain the dominant drivers of recent inflation dynamics once foreign factors is taken into account. In addition, we quantify the importance of these foreign factors with respect to domestic drivers and investigate the role of monetary policy during the inflation surge.

In a first step, we introduce a foreign supply shock in addition to the standard domestic shocks to demand and supply. Building on [Blanchard et al. \(2015\)](#) and [Benigno and Eggertsson \(2023\)](#) among others, we believe that the ratio of import prices over CPI prices is informative to capture supply shocks. While previous papers used this variable as a

direct measure of the shocks, we treat it as a fully endogenous variable. We use it simply to disentangle a foreign supply shock from a domestic supply shock by using a novel magnitude restriction on the *relative* effects of the shock on import prices and core CPI. The idea is that foreign supply shocks should have a larger effect on import prices in the short run while it is natural to expect domestic shocks to have a larger effect on core CPI.

In a second step, we decompose the aggregate demand shock into a domestic component and a foreign component. This is achieved by imposing an intuitive restriction on the ratio of domestic GDP over trade-weighted GDP of trading partners. If the shock originates domestically, it is natural to expect that the numerator increases more than the denominator while if the shock originates abroad the denominator will respond more, at least in the short run. The identification of such a shock is particularly important to interpret the results of [Bernanke and Blanchard \(2024\)](#) who find that shocks to prices, and in particular energy prices, are the dominant drivers of inflation, when compared, for example, to shocks to labor market tightness: high energy prices can reflect supply disruptions but also strong world demand. In addition, decomposing demand shocks into a domestic and foreign component seems important because the appropriate monetary policy response may depend on the source of the shock.

RESULTS Our first result is that the prevalence of demand shocks is confirmed even in presence of a foreign supply shock. This novel shock absorbs explanatory power from the domestic supply shock but does not impact at all the supremacy of demand shocks. However, these demand shocks do not have only a domestic origin. When we allow for the presence of foreign demand shocks, we find that domestic and foreign shocks are of similar importance for GDP and inflation dynamics. Thus, foreign factors matter, and quite substantially so, but they manifest themselves mainly as demand shocks.¹

Once established that demand factors matter even in presence of foreign factors, we focus on the propagation of the various demand shocks. The Fed Strategy review in 2020 mentioned explicitly that the benefits of running the economy hot were substantial on the basis of the assumption that the Phillips curve was quite flat at that time. The implication was that substantial monetary and fiscal stimuli to facilitate the recovery from the pandemic were unlikely to generate sustained inflation. We find that historical relationships are inconsistent with the idea of a flat Phillips curve: our estimates of the Phillips multiplier, a statistics proposed by [Barnichon and Mesters \(2021\)](#) which offers a dynamic (and thus more complete) characterization of the inflationary effects, show that both demand shocks generate substantial inflationary pressures.

In addition, we use our model to evaluate the trade-offs for monetary policy and the role of the unsystematic component of monetary policy during the episode. When we extend our framework to identify monetary policy shocks, we find that they have contributed significantly to the inflation surge. Interestingly, this is the case in all the four economies that we consider, thus highlighting that part of the synchronization in the recent interest

¹While our paper focuses on the recent inflation surge, a large earlier literature documented empirically the importance of foreign factors for small open economies. A partial list includes [Aastveit et al. \(2016\)](#), [Cushman and Zha \(1997\)](#), [Kose et al. \(2003\)](#), [Mumtaz and Surico \(2009\)](#) and [Fernández et al. \(2017\)](#). The result of a strong transmission of both global and regional shocks to small open economies is difficult to replicate in small open economy dynamic stochastic general equilibrium (DSGE) models that incorporate foreign factors, as shown in [Justiniano and Preston \(2010\)](#).

rate cycle is also due to the unsystematic component of monetary policy, and not only to the presence of global shocks.

RELATED LITERATURE We relate to a few studies that have explicitly evaluated the role of international factors in the recent inflation surge. [Forbes et al. \(2024\)](#) estimate a FAVAR model for Canada, the euro area, the United Kingdom, and the United States in which they identify several domestic and global shocks. They focus on the role of global shocks for interest rate fluctuations and on the synchronization of interest rate cycles across countries. A similar model is estimated by [Ha et al. \(2023\)](#) on a sample of 55 individual countries. They find that global shocks explain about 26 percent of inflation variation in a typical economy. [Aastveit et al. \(2025\)](#) study the crucial role of inflation expectations in the propagation of various global shocks. [Di Giovanni et al. \(2023\)](#) track both domestic and foreign sectoral and aggregate shocks in a multi-country multi-sector New Keynesian model and find a much larger spillover of shocks from the rest of the world into the euro area than into the US. Our contribution is to take the perspective of four individual countries (rather than a panel of countries) that are heterogeneous in terms of size and exposure to international factors and propose an identification scheme to explore the role of international factors. Notably, the very same scheme can be used for both small and large countries and does not rely on the block-exogeneity assumption often invoked in the literature ([Cushman and Zha \(1997\)](#)). This allows us to compare the US and UK experience (two countries that cannot be considered small from a global perspective) to small open economies like Norway and Sweden. In our scheme, we do not use global variables but import prices and trading partners output which are different for each country. Thus, the rest of the world is not alike for each country. To the best of our knowledge, such a perspective is novel in the literature.

OUTLINE The rest of the paper is organized as follows: Section 2 describes the empirical model and the theoretical foundations for the identification assumptions. Section 3 proposes our results on the importance of international factors. Section 4 investigates the cross-country synchronization in the recent interest rate cycle. Section 5 provides a validation exercise for our identification strategy. Finally, Section 6 concludes. A detailed description of the data sources and definitions is provided in Appendix A.

2 METHODOLOGY AND THEORETICAL FOUNDATIONS

In order to decompose inflation into domestic and international drivers, we rely on a simple SVAR model estimated on quarterly data for the US, the UK, Norway and Sweden in log-levels. The sample period goes from 1993:Q1 to 2023:Q4 for all countries. The model in reduced form reads as follows:

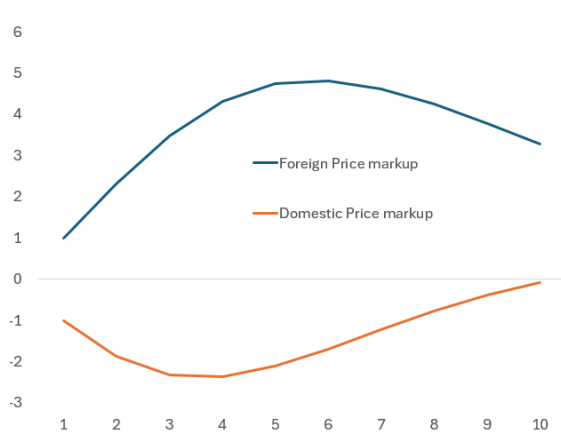
$$\mathbf{y}_t = \mathbf{c} + \sum_{l=1}^p \mathbf{B}_l \mathbf{y}_{t-l} + \boldsymbol{\nu}_t \quad (1)$$

Where $\mathbf{y}_t$ is a vector of the endogenous variables and $\boldsymbol{\nu}_t$ is the vector containing the reduced form residuals. $\mathbf{B}_l$ is the matrix of the reduced form VAR-parameters, while $\mathbf{c}$ is

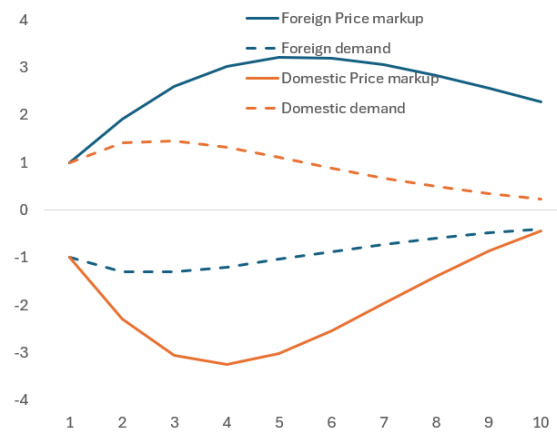
a vector of constants. The lag length, p , is four. The vector of endogenous variables includes GDP, core consumer prices (which corresponds to CPI excluding its most volatile components, with the exact definition for each country presented in the Appendix) and imported consumer prices.

Table 1: *Identification Restrictions*

Baseline				
	Demand	Dom. supply	Int. supply	
Core CPI	+	+	+	
GDP	+	-	-	
CPI imported/Core CPI	NA	-	+	
Extension: international demand				
	Dom. demand	Dom. supply	Int. supply	Int. demand
Core CPI	+	+	+	+
GDP	+	-	-	+
CPI imported/Core CPI	NA	-	+	NA
GDP domestic/GDP trading partners	+	-	+	-
Extension: monetary policy				
	Demand	Dom. supply	Int. supply	Monetary policy
Core CPI	+	+	+	+
GDP	+	-	-	+
CPI imported/Core CPI	NA	-	+	NA
Interest rate	+	NA	NA	-



(a) CPI imported/Core CPI



(b) GDP domestic/GDP trading partners

The table describes the sign restrictions on the impact impulse response function used for each variable or ratio (in rows) to shocks (in columns). NA indicates that the response of the variable is left unrestricted.

Panels (a) and (b) show the impulse responses to various foreign shocks in the model of [Bergholt et al. \(2025c\)](#).

This constitutes the simplest extension of bivariate systems that have been used to study the inflation surge without explicitly accounting for international factors (Bergholt et al. (2025a) and Giannone and Primiceri (2024)). In the extensions, we additionally use data on weighted GDP among each country’s biggest trading partners and interest rates.² To decompose the reduced form residuals from equation (1) into interpretable structural shocks, we use the Bayesian algorithm of Rubio-Ramirez et al. (2010) and introduce sign restrictions on the impact responses to shocks. The identification assumptions are summarized in Table 1. Following Canova and De Nicolò (2002), we impose that a positive demand shock leads to a rise in both consumer prices and output, while a negative supply shock leads to higher prices and lower output.

Our contribution consists in further decomposing the supply disturbance into shocks that originate domestically and abroad. The two shocks are set apart by imposing a magnitude restriction that is implemented with a sign restriction on the ratio of two variables.³ The intuition is very simple. If the supply shock originates internationally, it is natural to assume that import prices should increase more than core CPI on impact. Core CPI is of course allowed to increase, we just assume that on impact it cannot increase more than the import price index. The opposite is true for a domestic supply shock. In this case, prices of domestically produced consumer goods and services are supposed to increase more than those that are imported. Interestingly, the ratio between import price inflation and a measure of headline inflation is often used as a proxy for supply shocks in Phillips curve regressions (see Blanchard et al. (2015) and Benigno and Eggertsson (2023)). Here, we follow that tradition and argue that the ratio is informative to identify supply shocks but we make one step further by disentangling domestic and international supply shocks.

We believe that our magnitude restriction is relevant given the prominent role of import prices in the first phase of the inflation surge. In addition, while quite intuitive, it finds also support from the well-known New Keynesian small open economy DSGE model of Justiniano and Preston (2010), as recently calibrated and extended to include a richly specified public sector by Bergholt et al. (2025c). The model features nominal price and wage stickiness, imperfect exchange rate pass-through, wage and price indexation, habit persistence in consumption, as well as an endogenous risk premium that depends on the net foreign asset position. In the bottom-left panel of Table 1, we plot the impulse responses of the ratio between the import price index and core CPI to a negative supply shock originating abroad (a foreign markup shock) and to a domestic supply shock (a price markup shock). Not surprisingly, the impulse responses are consistent with our identification assumption.

In a second step, we extend the baseline model to investigate whether the demand shock originates mainly domestically or abroad. We rely once again on a magnitude restriction, in this case on the relative response of domestic output to trading partner output for each country. Clearly, it seems natural that a domestic shock, on impact, should have a larger effect on the former while a foreign shock should have a larger effect on the latter. Not surprisingly, this is the case also in the theoretical model, as shown in the

²Interest rates are given by estimated shadow rates for the US, UK and Sweden, and the policy rate in Norway.

³Restrictions on ratios provide a simple and intuitive way to implement magnitude restrictions. They can be used when it is natural expect the effect of a shock on a specific variable is large relative to the other variables in the system. Previous examples can be found in Furlanetto et al. (2019), Caggiano et al. (2021) and Brianti (2025).

bottom-right panel of Table 1 where we plot impulse-response function to a domestic demand shock and to a foreign demand shock. In both cases, we consider a discount factor shock as an example of demand shock.

A convenient feature of this identification scheme is that it can be used for each country independently from its size. The rest of the world is different for each country because import prices and output trading partners are different for each country. Let us consider a couple of illustrative examples: Sweden is an important trading partner for Norway but not for the US while shocks in Canada are naturally expected to impact the US much more than Norway. Our framework takes into account that trade relationships are largely heterogeneous across countries.⁴ In addition, domestic shocks can affect foreign variables: clearly, we expect larger spillovers from the US and, to some extent, also the UK. A benefit of this specification is that we do not need to rely on a block-exogenous structure with no feedback from the country of interest to the rest of the world (Cushman and Zha (1997)). Such an assumption would be clearly inappropriate for both the US and the UK.

A potential issue when estimating VARs is that the deterministic trend (initial conditions) can account for large part of the fluctuations, even at the end of the sample. In addition, the deterministic component is estimated with substantial uncertainty, the so-called excess dispersion problem discussed in Bergholt et al. (2025a), which is particularly problematic when computing historical decompositions. In order to deal with the first issue we use the sum-of-coefficients prior that reduces the overfitting problem (Doan et al. (1984)). We combine this prior with the standard Minnesota (Litterman (1979)) prior and dummy-initial-observation prior and optimize the hyperparameters as in Giannone et al. (2015). In addition, to take into account the excess dispersion problem, we draw from the posterior distribution of all model parameters, we construct the distribution of historical decompositions and take the pointwise median contribution of each shock at each quarter (Bergholt et al. (2025a)). Hence, at each quarter, the data is decomposed into the median contribution of each shock and a residual component that absorbs the difference between data and the sum of these median contributions (see also Bergholt et al. (2025b)). Such an approach does not reduce the excess dispersion of the deterministic component but takes it into account when computing a summary historical decomposition measure. A median measure is more robust than a historical decomposition based on a single draw since the latter could be associated to an extreme deterministic component, thus providing a distorted narrative over history.

3 THE ROLE OF FOREIGN SHOCKS

In this Section, we discuss inflation dynamics in the baseline model and in a first extension in which we disentangle foreign demand shocks. In addition, we compute Phillips multipliers and discuss the propagation of both demand shocks.

⁴Note that we do not include global variables into the system. Our goal is not to disentangle the drivers of global variables (see Cascaldi-Garcia et al. (2024) and Ha et al. (2024)) but rather to isolate the domestic and international components of demand and supply shocks for each individual country.

3.1 BASELINE MODEL

In Figure 2, we present historical decompositions of Core CPI inflation in deviation from their level in 2019:Q4 for the four countries considered in our study.⁵ We note that the dynamics in the European countries lag the US by around 2-4 quarters, a point made earlier by [Giannone and Primiceri \(2024\)](#) for euro area inflation, and are quite heterogeneous with Sweden experiencing the fastest disinflation.

Our main result is that the prevalence of demand shocks is clearly confirmed also when international supply shocks are identified. Demand shocks contribute negatively to inflation in 2020 in all countries but since 2021 they are the main drivers of the inflation surge in the US and the UK (and since 2022 in Norway and Sweden). This is consistent with the previous literature (see [Bergholt et al. \(2025a\)](#), [Giannone and Primiceri \(2024\)](#) among others). International supply shocks are important, and more so in the three European countries, but they absorb explanatory power from domestic supply shocks and not from demand shocks. These shocks explain on average over the sample around 40 per cent of inflation fluctuations in Sweden. Sweden is the only country where the two supply shocks combined are prevalent. One possible explanation to rationalize the more important role of demand forces in Norway than in Sweden is that fiscal policy has been substantially less expansionary in Sweden. In addition, COVID-related restrictions were less pervasive in Sweden ([Ingves \(2024\)](#)). All in all, demand shocks are prevalent in the US, the UK and Norway, while supply shocks are more important in Sweden.

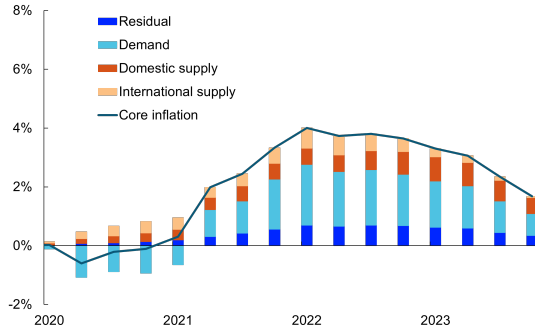
3.2 EXTENSION WITH FOREIGN DEMAND SHOCKS

One open question is whether demand shocks originate domestically or internationally. The first extension of our baseline model where we separately identify foreign demand shocks can tackle this issue. Results are presented in the right column of Figure 2. First, as in the baseline model, the two demand shocks combined are still prevalent (if not dominant) in all countries except Sweden. Second, when we compare the role of the two demand shocks during the inflation surge, domestic demand shocks are still prevalent in the US while international demand shocks are of comparable importance in Norway and the UK and even more pervasive in Sweden. Third, when we compare domestic and international shocks, the two international shocks jointly do not play a major role in the US but explain the bulk of the inflation surge in the three European countries.

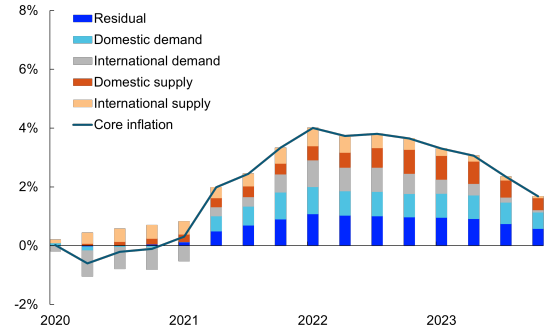
The prevalent role of shocks to prices given wages highlighted by [Bernanke and Blanchard \(2024\)](#) is not necessarily in contrast with our results. As an example, high oil and commodity prices (the most important shocks to prices considered by [Bernanke and Blanchard \(2024\)](#)) can reflect supply disruptions but also the strong recovery in world demand, a point forcefully made by [Peersman \(2025\)](#).⁶ The former case is captured by the international supply shock in our framework (at least in most countries) while the latter is associated to the international demand shock.

⁵The residual component in dark blue captures the small variation in the deterministic component since 2019 (in keeping with [Schmitt-Grohé and Uribe \(2024\)](#)) together with the residual induced by taking the median contribution of each shock, as discussed at the end of Section 2.

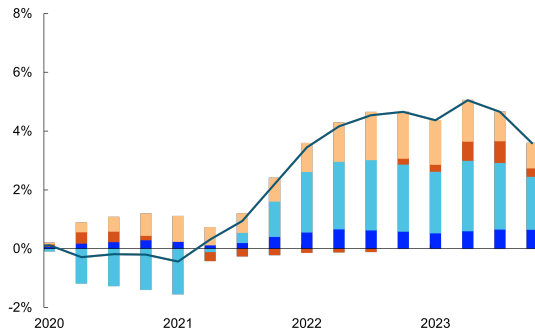
⁶[Castelnuovo et al. \(2024\)](#) disentangle the pure supply-driven component in food, oil and industrial input price fluctuations and highlight the role of monetary policy in shaping different dynamics in response to each shock.



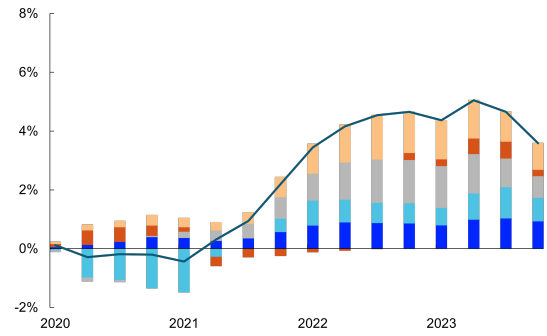
(a) US - Baseline model



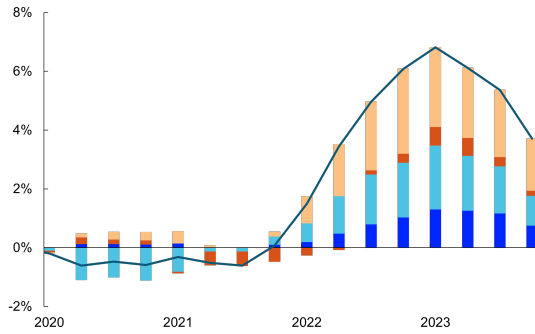
(b) US - International demand extension



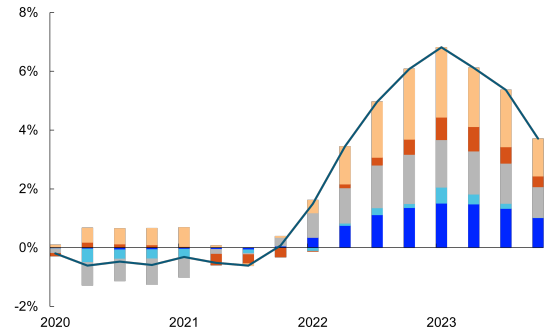
(c) UK - Baseline model



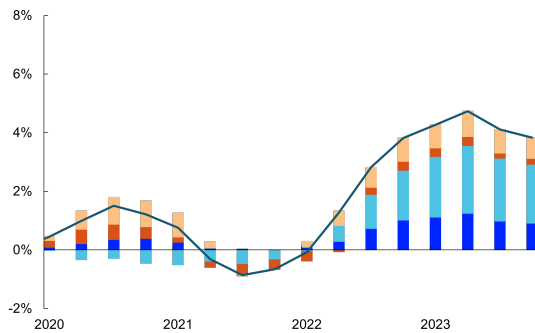
(d) UK - International demand extension



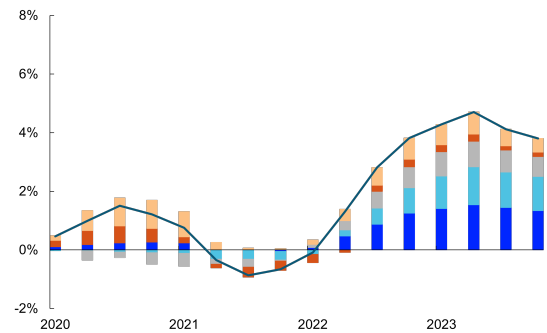
(e) Sweden - Baseline model



(f) Sweden - International demand extension



(g) Norway - Baseline model



(h) Norway - International demand extension

Figure 2: Results from the baseline model and the international demand extension. Historical decompositions for inflation relative to 2019:Q4.

3.3 PHILLIPS MULTIPLIERS

Another remaining question is whether the transmission mechanism is different if the strong recovery in aggregate demand is driven by domestic or international factors. We compare the propagation of the two demand shocks on the basis of the Phillips multiplier, a statistics introduced by [Barnichon and Mesters \(2021\)](#). Consider a variable x and its impulse response conditional on a shock (or a set of shocks) ε_t . Let $\mathcal{I}_j^x$ denote the impulse response $j \geq 0$ periods after the shock was realized, and let $\mathcal{I}_h^{\bar{x}} = \frac{1}{h} \sum_{j=0}^h \mathcal{I}_j^x$ denote the *average* impulse response at horizon h . The Phillips multiplier is then given by

$$\mathcal{P}_h = \mathcal{I}_h^{\bar{\pi}} / \mathcal{I}_h^{\bar{y}}, \quad h = 0, 1, 2, \dots,$$

where $\mathcal{I}_h^{\bar{\pi}}$ and $\mathcal{I}_h^{\bar{y}}$ represent the average impulse responses of inflation and output, respectively. The concept is equivalent to the government spending multiplier on output. [Barnichon and Mesters \(2021\)](#) show that the multiplier can be estimated from the cumulative regression

$$\sum_{j=0}^h \pi_{t+j|\varepsilon_t} = \mathcal{P}_h \sum_{j=0}^h y_{t+j|\varepsilon_t} + e_{t+h},$$

where $\pi_{t+j|\varepsilon_t}$ and $y_{t+j|\varepsilon_t}$ represent the variation in inflation and output projected by the shock ε_t .

In their application, [Barnichon and Mesters \(2021\)](#) consider a monetary policy shock as an instrument to obtain $\pi_{t+j|\varepsilon_t}$ and $y_{t+j|\varepsilon_t}$. We instead condition on the demand shocks obtained in our SVAR model. Notably, in a closed economy, the slope of the Phillips curve is equal to the multiplier if the shocks are independent and identically distributed but it is only proportional if the shocks are persistent (see [Furlanetto and Lepetit \(2025\)](#)). Thus, the slope of the Phillips curve is relevant in the context of a static model or when dealing with purely transitory shocks. Yet, the Phillips multiplier offers a much more complete characterization of the transmission mechanism of shocks. In addition, the multiplier can be computed easily both in SVAR models and in DSGE models, thus allowing to compare the propagation of shocks conveniently both across countries and across models.

In the first column of Figure 3, we report for each country the Phillips multipliers in our baseline model. The multipliers are rather large but their dynamics are quite heterogeneous across countries. First, the Phillips multipliers are clearly increasing with respect to the horizon in the US: this is consistent with a gradual transmission of demand shocks whose impact effect may be dampened by nominal rigidities. In other countries, the transmission of demand shocks to inflation is more rapid. Second, the Phillips multiplier is quite similar across countries, around a value of 0.3 in the US, Norway and Sweden (but lower in the UK). Thus, we do not find a clear connection between openness and size of the multiplier. In fact, it is important to keep in mind that these four economies are different in many dimensions, and not only in the degree of openness, a point we will develop further below.

In the second and third column of Figure 3, we plot the multipliers conditional on domestic and international demand shocks in the first extension of our model. Here we appreciate that the source of the shock matters. Domestic shocks generate larger multipliers in the US and Norway, while the opposite is true in Sweden and UK. All in all, not

all demand shocks are alike and the multipliers are shock dependent. Thus, appropriately disentangling domestic and foreign shocks is important to tailor an appropriate monetary policy response.

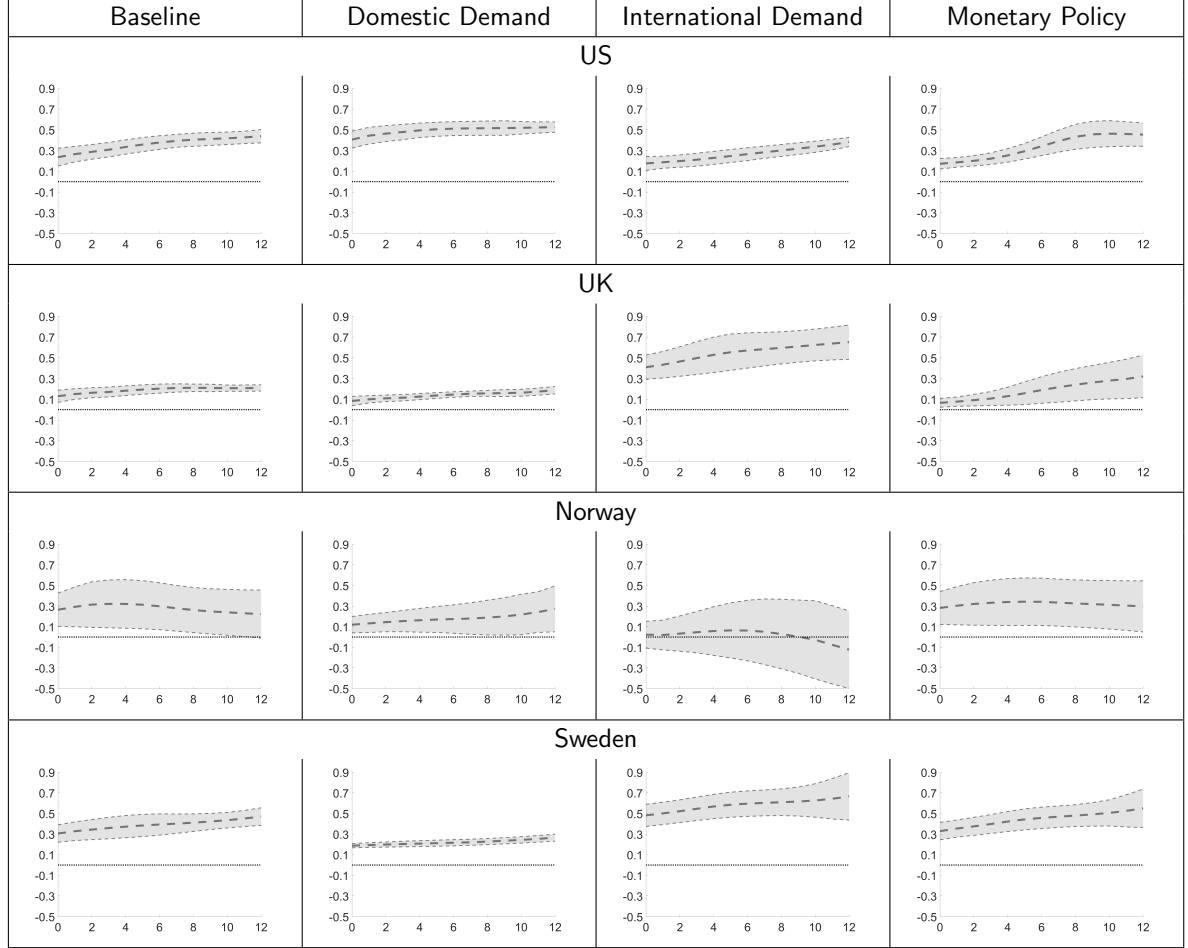
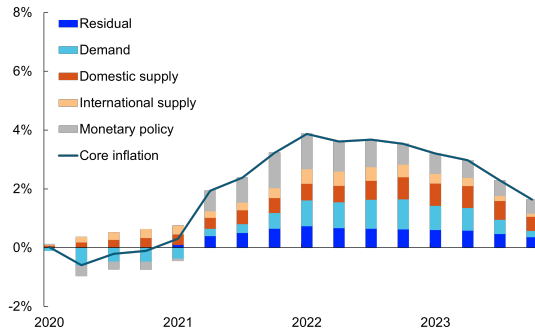


Figure 3: Phillips multipliers for different countries and shocks. Confidence bands are computed as $\pm 1.65 \times$ Newey-West robust standard errors

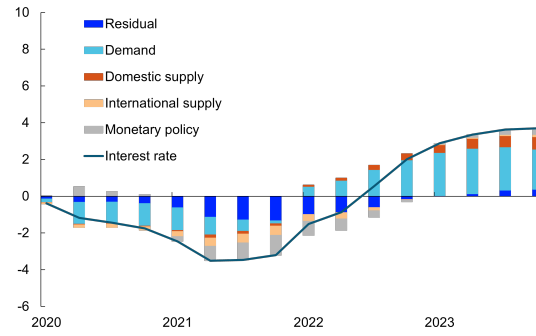
4 THE ROLE OF MONETARY POLICY SHOCKS

In this Section, we investigate the role of monetary policy during the inflation surge. We thus extend the baseline model in a second direction by allowing for the presence of domestic monetary policy shocks. These shocks are the only shocks generating a negative co-movement between interest rates and inflation, as is standard in the literature. The identification assumptions are summarized in Table 1.

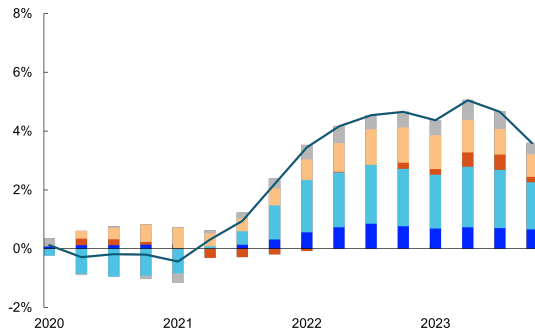
In Figure 4, we plot historical decompositions of inflation and interest rates in the post-pandemic period for this version of the model. Two key results are worth emphasizing. First, expansionary monetary policy shocks contribute positively to the inflation surge in all four countries. This means that quite large deviations from the historical rule implied by the SVAR were in place during the surge. Put differently, central banks were cautious at increasing nominal interest rates and thus have to some extent fueled inflation dynamics.



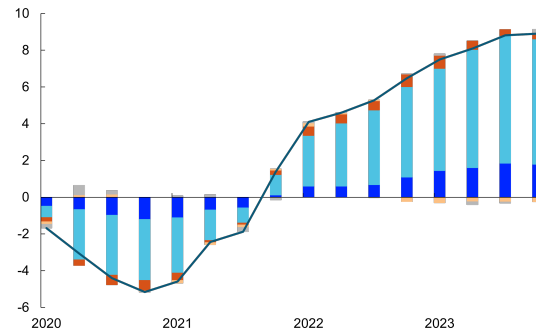
(a) US - Inflation



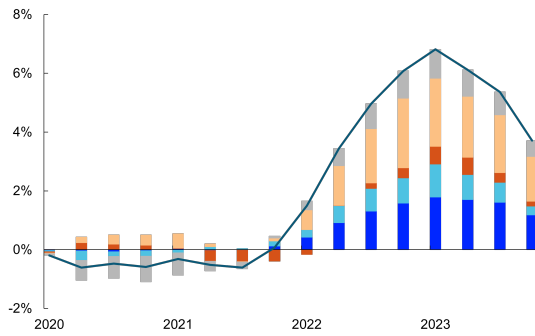
(b) US - Interest rate



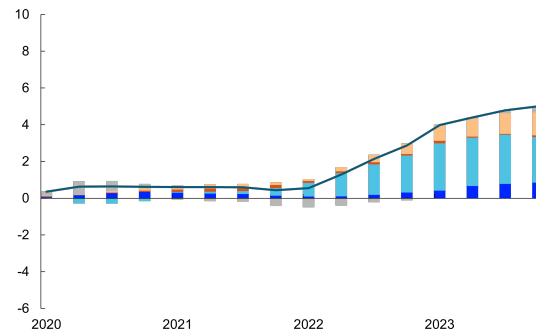
(c) UK - Inflation



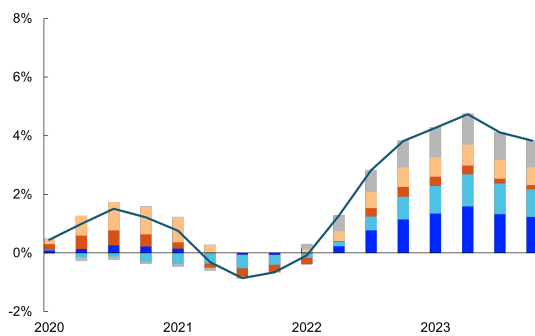
(d) UK - Interest rate



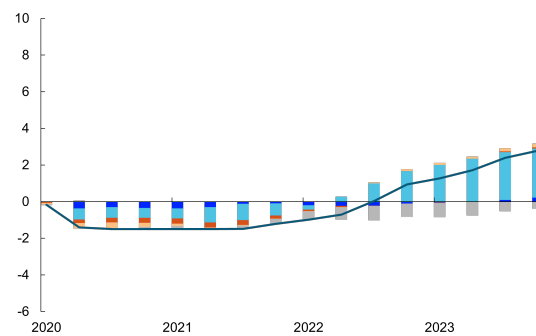
(e) Sweden - Inflation



(f) Sweden - Interest rate



(g) Norway - Inflation



(h) Norway - Interest rate

Figure 4: Results from monetary policy shock-extension. Historical decomposition of inflation and interest rates relative to 2019Q4.

In fact, an expansionary monetary shock can be a failure to raise rates and not just an active reduction in the policy rate. Second, interest rates are overwhelmingly driven by demand shocks in this episode (and more generally over the entire sample period), in keeping with the widespread belief that central banks respond to demand shocks but “look through” supply shocks. Notably, expansionary policy shocks materialize at least half a year earlier in the US than in the other countries, consistently with the dynamics of inflation that was lagging in the European countries.

[Forbes et al. \(2024\)](#) emphasize that *“the 2020-24 rate cycle has been unprecedented in many dimensions: it features the fastest pivot from active easing to a tightening phase, followed by the most globally synchronized tightening, and an unusually long period of holding rates constant”*. Our analysis shows that the most globally synchronized tightening reflected not only the presence of global shocks that affected all countries simultaneously but also the occurrence of rather large deviations from the historical rule in all countries due to the unsystematic component of policy.

Although our analysis finds evidence of deviations from the historical rule, the interpretation of these deviations is a more subtle exercise.⁷ The most natural option to consider is that central banks responded late to the inflation surge. As shown in [Hakamada and Walsh \(2024\)](#), the costs of a delayed response to an inflationary episode are large and the response of policy needs to be more aggressive if the central bank is behind the curve. The point is reinforced in [Walsh \(2025\)](#) in a broader evaluation of the mandate of the Fed over recent years. An alternative possibility is that the deviations were intentional and part of an optimal policy strategy. [Nakamura et al. \(2025\)](#) provide examples in which optimal policy implies a lower than one-for-one response of interest rate to inflation. One prominent case is if the dominant source of the inflation surge is a cost-push shock. Notably, however, this interpretation is inconsistent with our historical decompositions. A third possibility is that the deviations from the historical rule largely reflect data revisions. As shown by [Giannone and Primiceri \(2024\)](#), real-time data on economic activity painted a more pessimistic picture than the subsequently revised data in several countries.

Finally, we compute the Phillips multipliers also conditionally on monetary policy shocks. In this case, the multiplier constitutes a summary measure of the trade-offs faced by the monetary policy authority. A small Phillips multiplier indicates a severe trade-off between inflation and output. In fact, the Phillips multiplier is inversely related to the so-called sacrifice ratio which is typically defined ([Ball \(1994\)](#)) as the cumulative increase in unemployment from a 1ppt permanent reduction in inflation. As discussed in [Barnichon and Mesters \(2021\)](#), this definition of the inflation-unemployment trade-off relies on the assumption that a change in policy has a permanent effect on inflation which might not hold uniformly across time, see [Benati \(2015\)](#).

The estimated multipliers (plotted in the fourth column of Figure 3) confirm previous patterns with gradual dynamics in the US and larger multipliers in the US and Sweden. Notably, all these multipliers are larger than the ones in the baseline model with values around 0.5 for the US and Sweden and around 0.3 for the UK and Norway at 10 quarter horizon. Once again, not all demand shocks are alike. [Gnocchi et al. \(2024\)](#) provide

⁷Other papers finding evidence for large deviations from the historical rule during the inflation surge include [Bocola et al. \(2024\)](#), [Comin et al. \(2023\)](#), [Giannone and Primiceri \(2024\)](#), [Gagliardone and Gertler \(2025\)](#), and [Mori \(2025\)](#) among others.

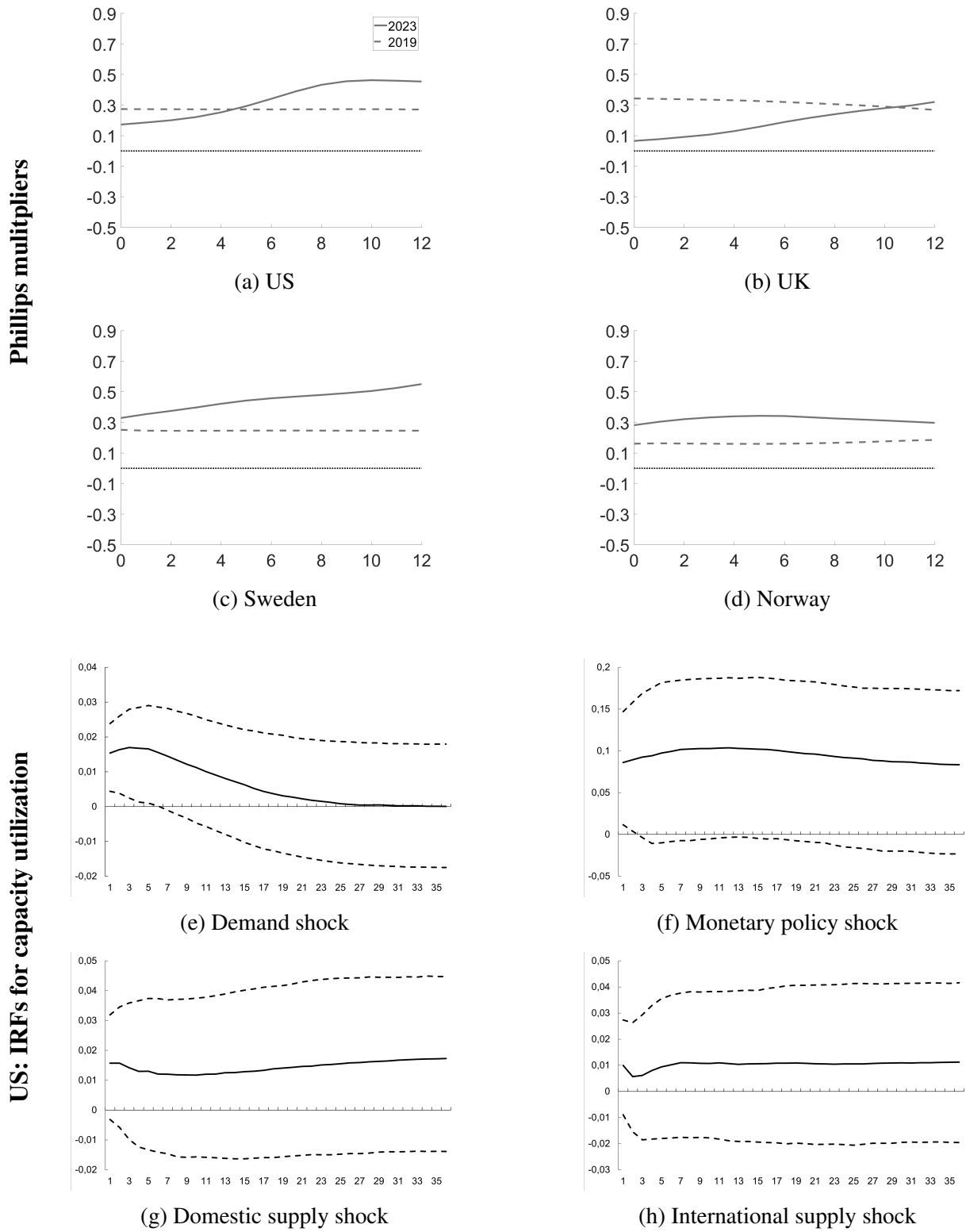


Figure 5: Robustness checks: Phillips multipliers with different sample end dates and IRFs of capacity utilization

estimates of the same statistics for Canada around 0.3 using SVAR models and around 0.4 using the Bank of Canada's policy model.

The literature on the sacrifice ratio ([Romer \(1993\)](#)) has highlighted that it is natural to expect lower sacrifice ratios in open economies (and thus higher Phillips multipliers) because an exchange rate depreciation amplifies the inflationary effects of expansionary monetary policy shocks. According to this logic, it is perhaps surprising to find that the US, the most closed economy in our analysis, features the largest Phillips multiplier. However, as alluded before, the four economies are largely heterogeneous, and not only in the degree of openness. One key aspect highlighted by [Bache \(2024\)](#) is that cash flow effects of monetary policy are very strong in Norway given that the level of household debt is particularly high and that the overwhelming majority of mortgages features adjustable rates. This amplifies the transmission of policy to the real economy and clearly affects the trade-off between inflation and real economic activity. According to this logic, it is not so surprising that the Phillips multiplier is lower in Norway than in the US.⁸

More broadly, our estimates point in the direction of a substantial impact of monetary policy on inflation. In other words, they hint that central banks are able to use their interest rate policy to transform GDP or unemployment into inflation. This ability is potentially enhanced by non-linearities that are not captured by our simple model. In the current episode, non-linearities in the Phillips curve, as in [Schmitt-Grohé and Uribe \(2023\)](#), [Benigno and Eggertsson \(2023\)](#) and [Harding et al. \(2023\)](#), may explain why the disinflation was almost immaculate in most countries.

Testing for non-linearities using time series is difficult given how short is the inflation surge. One very simple exercise that can provide some insights is to compare estimates of Phillips multipliers for the full-sample against a sample stopping in 2019:Q4. The results are presented in the four upper panels of Figure 5. We see that Phillips multipliers are larger in the full sample (solid lines) in the US, Sweden and Norway. The increase is particularly pronounced at long horizons in the US and in Sweden while in Norway we detect a quite large effect also in the short run. The exception is the UK where the multiplier is estimated to be lower in the full sample, at least at short horizons. This exercise is purely illustrative but seems to indicate some changes in the transmission mechanism in recent years. Once again, we believe that the Phillips multiplier offers a more complete estimate of the trade-offs for the monetary policy authority given that most of the changes materialize at long horizons. Consistently with our results, [Forbes et al. \(2025\)](#) estimate the sacrifice ratio over tightening cycles and find that the estimate over the latest cycle is by far the lowest in their sample starting in 1970. In fact, it is often mentioned (see [Benigno and Eggertsson \(2023\)](#) among many others) that the cost of reducing inflation is lower under a steep Phillips curve (and low sacrifice ratio). However, it is important to remember that the costs of inaction are also higher. A central bank that responds little to inflation will implicitly induce an expansionary monetary shock that will fuel inflation, thus reinforcing the narrative proposed by [Walsh \(2025\)](#).

⁸Interestingly, in his original analysis of the sacrifice ratio, [Ball \(1994\)](#) found no support for a relation between the output-inflation trade-off and the openness of the economy.

5 VALIDATING THE IDENTIFICATION STRATEGY

We believe that sign restrictions constitute the best approach to identify demand and supply shocks if one wishes to obtain an exhaustive decomposition of the inflation surge. Short-run zero restrictions cannot disentangle demand and supply shocks because there is no reason to impose that one of the two shocks has a zero impact on either economic activity or inflation. Long-run restrictions are also invalid if demand shocks generate hysteresis effects. Narrative shocks can explain only a limited share of the surge and would not be jointly exhaustive.

Nonetheless, it is well-known that sign restrictions can fail. In some cases, negative supply shocks may lower inflation on impact (see [Adam and Weber \(2025\)](#) for a specific kind of productivity shock (experience productivity shocks) and [Wieland \(2019\)](#) for standard productivity shocks at the zero lower bound). Similarly, demand shocks may move inflation and real economic activity in opposite directions under specific conditions (see [Jørgensen and Ravn \(2022\)](#) for government spending shocks and [Bergholt et al. \(2025c\)](#) for various demand shocks in open economy models with strong exchange rate effects).

In light of these examples, it would be desirable to validate our estimated demand and supply shocks on the basis of a variable that is supposed to respond differently to demand and supply shocks. We believe that an accurate measure of capacity utilization can be the best example of such variable. In fact, we expect positive demand shocks to increase capacity utilization while positive supply shocks should either lower capacity utilization (productivity or labor supply shocks) or have some positive effects (mark-up shocks). It would be natural to find that capacity utilization is more responsive to demand shocks as long as mark-up shocks are not prominent.

Unfortunately, to the best of our knowledge, there is no established measure of capacity utilization with a sufficiently long time series for most countries. The exception is the US where the Federal Reserve Board has constructed a good measure consistently updated over time, as discussed in [Boehm and Pandalai-Nayar \(2022\)](#). We include it as an unrestricted variable in our specification with monetary shocks that features two demand and two supply shocks and we check the impulse responses which are plotted in the four bottom panels of Figure 5.

Reassuringly for our purposes, capacity utilization responds significantly to the two demand shocks while we do not detect any discernible response to the two supply shocks. While this exercise is not definitive and is limited only to the case of the US, we believe that we offer here an important validation tool that so far has not been used in the literature. Conditional on having good measures of capacity utilization, we provide an alternative way to identify demand and supply shocks.

6 CONCLUSION

This study refines the existing evidence in favor of demand-side factors as the main drivers of the inflation surge. We show that this result is confirmed once the SVAR model is extended to account for foreign demand and supply shocks. Foreign factors are important drivers of inflation in all countries considered in our analysis, although to a different extent, but foreign factors should not be associated only to supply shocks: demand forces are crucial. Expansionary monetary policy shocks are present in all countries and explain

a non-negligible share of the synchronization in the recent interest rate cycle across countries. Estimates of the Phillips multiplier conditional on monetary policy shocks indicate a substantial impact of monetary policy shocks on inflation, and more so during the recent episode.

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A DATA

The analysis is based on quarterly data for output, inflation, imported consumer prices, and monetary policy variables for advanced economies. All data are sourced from official national statistical agencies or international institutions to ensure consistency and comparability.

- **Output:**

- Output measured as GDP for each country in log-level terms. For Norway output is given by mainland GDP.
- Sources: Bureau of Economic Analysis (BEA), Office of National Statistics (ONS), Statistics Sweden (SCB), Statistics Norway (SSB).

- **Inflation:**

- Measures of core inflation in log-level terms for each country; definitions vary across countries.
- US: The personal consumption expenditures (PCE) Index excluding food and energy published by the BEA.
- UK: Consumer price index excluding energy, good, alcoholic beverages and tobacco, published by the ONS.
- Sweden: Core inflation measured as consumers price index with fixed interest rate excluding energy (CPIF-XE), published by SCB.
- Norway: Core inflation measured as the consumer price index excluding taxes and energy goods (CPI-ATE), published by SSB.

- **Imported inflation:**

- Imported inflation given in log-level terms. Measured as imported consumer prices where available, otherwise the import deflator.
- US: End-use import price index for consumer goods, excluding automotives, published by the BEA.
- UK: Imports of goods and services deflator, published by the ONS.
- Sweden: Imported goods and services in the consumer price index (category H 997 in “*Riksbank tabeller*”), published by SCB.
- Norway: Imported goods in the consumer price index, published by SSB.

- **International Extension:**

- Export-weighted GDP for each country’s five largest trading partners (by exports).
- US: Export weights calculated based on total domestic exports in 2023, published by the United States International Trade Commission (DataWeb). GDP-figures for the five largest trading partners (Canada, China, Japan, Mexico and the Netherlands) from the OECD.

- UK: Export weights calculated base on dataset "*UK total trade: all countries, seasonally adjusted*" for 2023, published by the ONS. GDP-figures for the five largest trading partners (US, Germany, Ireland, the Netherlands, France) from the OECD.
 - Sweden: Export weights calculated based on total value of exports of goods to country of destination for 2023, published by SCB. GDP-figures for the five largest trading partners (Germany, Norway, US, Denmark, Finland) from the OECD.
 - Norway: Export weights calculated based on value of mainland exports of goods in 2023, published by SSB. GDP-figures for the five largest trading partners (Sweden, the Netherlands, UK, US, Germany) from the OECD.
- **Monetary Policy:**
 - U.S.: Shadow policy rates estimated by [Wu and Xia \(2016\)](#).
 - U.K.: Shadow rate estimated by [Wu \(2016\)](#) spliced with actual policy rate from February 2022.
 - Sweden: Shadow rate estimated by [De Rezende \(2023\)](#).
 - Norway: Policy rate (Norges Bank), as it has never been negative and QE has not been implemented.
 - **Capacity utilisation**
 - Capacity utilisation for US, total index from Federal Reserve Board, accessed using [FRED, Federal Reserve Bank of St. Louis \(2025\)](#)