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Targeted Taylor rules: monetary policy responses to demand- and supply-driven inflation[1]

This feature documents that central banks operating under inflation targeting or similar regimes have in practice pursued their objectives in a targeted manner in the sense that they have reacted more forcefully to demand-driven than to supply-driven inflation. This new finding comes from the estimation of Taylor-type monetary policy rules for seven major advanced economies. The estimated targeted response aligns with both monetary theory prescriptions and central banks' doctrine as reflected in their official statements. Our analysis further suggests that during the post-pandemic inflation surge, policy rates were initially slow to respond but eventually caught up with the levels predicted by the targeted Taylor rules.

JEL classification: E12, E3, E52

Mainstream monetary theory prescribes an asymmetric response to fluctuations in inflation, depending on their underlying drivers. If inflation stems from demand factors, the theory calls for a strong response to stabilise both inflation and output. By contrast, if inflation is due to supply factors, the central bank should give more weight to economic activity and partly "look through" associated inflationary pressures as long as inflation expectations remain firmly anchored (eg Erceg et al (2000); Bodenstein et al (2008)).

The doctrine of central banks operating under flexible inflation targeting or similar regimes reflects these principles. Central banks commonly acknowledge a more muted response to supply-driven inflation due to the often transitory nature of underlying shocks and to the induced macroeconomic trade-offs. As supply shocks push prices and output in opposite directions, central banks tend to respond more mildly to supply-driven inflationary (disinflationary) pressures to avoid reinforcing economic downturns (overheating). Central banks' common approach to accommodate supply-driven (dis)inflation underpins their medium-term price stability objectives.

1 The views expressed do not necessarily reflect those of the Bank for International Settlements. We thank Ryan Banerjee, Claudio Borio, Matthieu Chavaz, Gaston Gelos, Marco Lombardi, Tsvetelina Nenova, Daniel Rees, Tom Rosewall, Damiano Sandri, Andreas Schrimpf, Hyun Song Shin and John Williams for helpful comments and suggestions. We are also grateful to Jose María Vidal Pastor for excellent research assistance.

Key takeaways

- *Over recent decades, central banks in advanced economies have responded much more strongly to demand- than to supply-driven inflation as gleaned from estimated targeted Taylor rules.*
- *This new finding corroborates both prescriptions of monetary theory and central bank doctrine as reflected in official statements.*
- *During the post-pandemic inflation surge, policy rates were initially slow to respond but eventually caught up with the levels predicted by the targeted Taylor rules.*

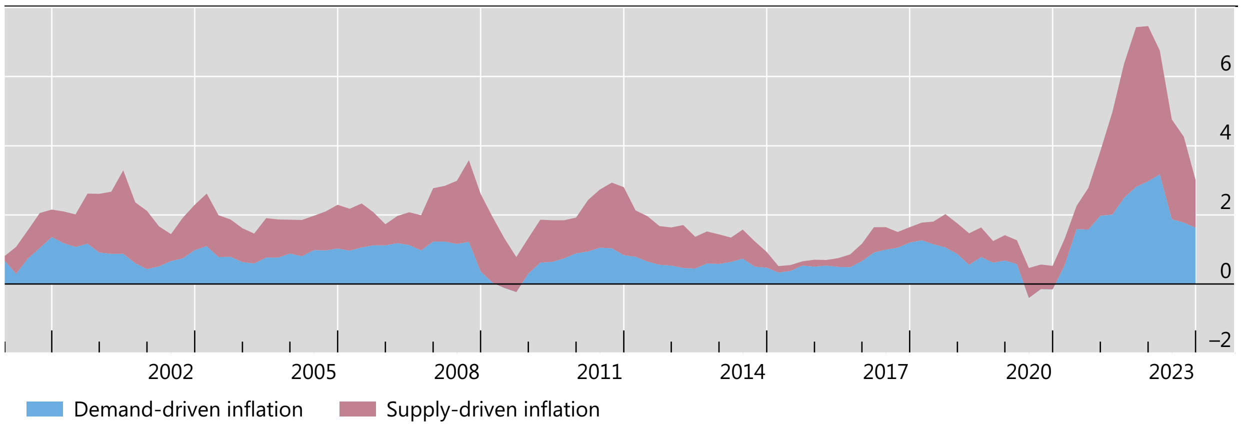
That said, conventional policy rules used to describe monetary policy reaction functions do not account for this asymmetric response. Instead, these rules essentially assume that policy rates respond to inflation in a uniform way irrespective of its underlying drivers (eg Taylor (1993); Clarida et al (2000); Smets and Wouters (2007)). In more refined versions of such rules, the lack of response to supply shocks due to their transitory nature is sometimes taken into account by formulating the policy rule in terms of core inflation (Carvalho et al (2021)) or an inflation forecast (Svensson (1997)).

This special feature bridges the gap between theory and doctrine on the one hand and the conventional description of policy reaction functions on the other.[2] We do so by estimating targeted Taylor rules that allow for different (targeted) responses to demand- and supply-driven inflation. To achieve this, we build on recent contributions by Shapiro (2022) and Eickmeier and Hofmann (2022) that disentangle the demand and supply factors underlying observable inflation dynamics. These approaches identify the time series of demand- and supply-driven inflation based on the basic conceptual consideration that a demand shock moves inflation and output

Decomposition of inflation in demand and supply factors[1]

Headline inflation, year on year, in per cent

Graph 1



[1] Average across AU, CA, EA, GB, KR, SE and US. See Graph A.1 in the annex for the underlying individual series.

Sources: Eickmeier and Hofmann (2022); Shapiro (2022); OECD; authors' calculations.

[2] The present analysis extends the empirical analysis in Hofmann et al (2024) by providing evidence beyond the United States. See the latter reference for a discussion of the implications of our results for the transmission of business cycle shocks and normative aspects pertaining to targeted versus conventional (unconditional) Taylor rules.

in the same direction, while a supply shock moves them in opposite directions. The resulting time series of demand- and supply-driven inflation highlight the changes in inflation drivers over time and, notably, reveal that the post-Covid-19 pandemic inflation surge was due to both demand and supply factors (Graph 1). We use these time series to estimate targeted Taylor rules for seven major jurisdictions (Australia, Canada, the euro area, Korea, Sweden, the United Kingdom and the United States) over periods when these economies operated price stability-oriented monetary policy regimes such as flexible inflation targeting.

Our core finding is that central banks have responded strongly to demand-driven inflation, and only weakly, if at all, to supply-driven inflation. For our baseline sample, the estimated response to demand-driven inflation is more than four times greater than that to supply-driven inflation. The difference is both statistically and economically significant. Thus, our findings suggest that central banks have pursued their price stability mandates in a *targeted* fashion, very much in line with both the prescriptions of monetary theory and central bank doctrine. Our results also imply that conventional monetary policy reaction functions are mis-specified, essentially estimating an average of the strong reaction of central banks to demand-driven inflation and their muted reaction to supply-driven inflation.

The feature proceeds as follows. The first section reviews the prescriptions of monetary theory and the central bank doctrine on how monetary policy should respond to demand- and supply-driven inflation. The second section describes the empirical analysis and compares our estimates of targeted Taylor rules to those of conventional Taylor rules. The third section sheds some new light on central bank responses during the post-pandemic inflation surge through the lens of our novel estimated targeted Taylor rules. The final section concludes and discusses potential challenges ahead for targeted policy reaction functions.

Theory and central bank doctrine

Several theoretical considerations call for a more muted policy response to supply- than to demand-driven inflation. At the same time, official central bank communication suggests that these considerations also underpin central banks' doctrine with respect to interest rate setting.

Theory

Two main reasons justify an asymmetric response to demand- versus supply-driven inflation.

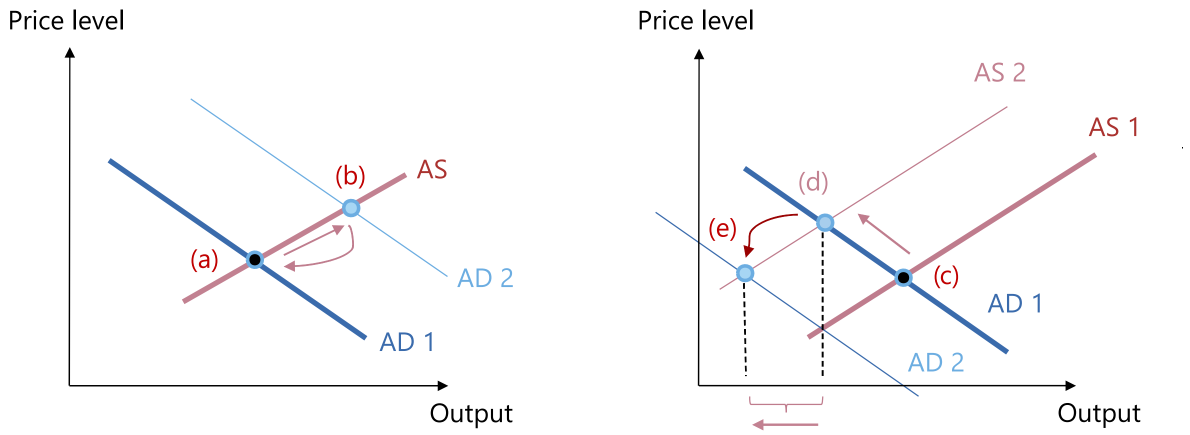
First, certain types of supply shocks, like supply-driven commodity price shocks, tend to be transitory (Avalos et al (2025)). Despite their significant short-term impact on headline inflation, these shocks typically do not lead to persistently higher inflation (unless they induce large second-round effects on prices in other economic sectors). Because of long monetary policy transmission lags, responding to the uptick in inflation caused by such transient disturbances would be destabilising. By the time monetary policy would start to have traction, typically with a lag of 12 months or more, the effects of the shock on inflation would have largely subsided. Thus, reacting to the inflationary effects of such shocks would end up pushing inflation down too late and might risk unnecessarily weakening the economy (Mishkin (2007); Bandera et al (2023); Guerrieri et al (2023)).

A second reason for "looking through" supply-driven inflation arises from the specific stabilisation trade-off between inflation and real activity associated with supply shocks.[3] This can be illustrated with a simple aggregate demand (AD)–aggregate supply (AS) diagram (Graph 2). An inflationary demand shock (Graph 2.A) pushes both economic activity and prices up, ie in the same direction (shift of AD from (a) to (b)). Tighter monetary policy can thus counteract the shock's effects, essentially shifting the demand curve back (AD shift from (b) to (a)).[4] By contrast, a supply shock (Graph 2.B) gives rise to a trade-off between stabilising inflation or output. Specifically, an inflationary supply shock shifts the aggregate supply curve up and to the left, pushing prices up and output down (AS shift from (c) to (d)).[5] When monetary policy tightens to contain the rise in prices, aggregate demand shifts to the left from AD1 to AD2, reducing output even further and potentially leading to a severe recession (AD shift from (d) to (e)). For this reason, in standard macroeconomic models, the response of monetary policy to inflationary supply shocks is to tighten, but not as much as for demand shocks, especially if there is a chance that the shock itself (or its impact on inflation) is temporary (eg Erceg et al (2000); Blanchard and Galí (2007); Bodenstein et al (2008)).[6]

Monetary policy trade-offs in the face of supply shocks | Graph 2

A. Monetary policy can counteract the effects of inflationary demand shocks on both inflation and output

B. Monetary policy response to inflationary supply shocks further dampens economic activity



AD = aggregate demand; AS = aggregate supply.

Source: Authors' elaboration.

3 This is the macroeconomic stabilisation trade-off applying to business cycle frequency. Central banks may face an additional trade-off applying to lower time frequencies between price stability and financial stability. It may arise in particular from very persistent favourable supply shocks and may constitute a third reason to look through supply-driven inflation (see Borio (2006) for the case of the disinflationary effects of globalisation).

4 The lack of a trade-off between stabilising inflation and stabilising output around its desired level is known in the literature as the "divine coincidence" (Blanchard and Galí (2007)). According to monetary theory, this property generally holds for demand shocks, but not for supply shocks (Galí (2015)).

5 Typical inflationary supply shocks are increases in markups or in the price of energy, or decreases in the pace of productivity.

6 The same logic applies to disinflationary supply shocks (eg an acceleration of productivity or a decrease in the price of energy), which push output up and inflation down potentially below target.

A necessary condition for central banks' ability to look through is that longer-term inflation expectations are firmly anchored to central banks' inflation targets. Well anchored inflation expectations limit the risk that the initial impact of supply shocks is amplified through wider price and wage adjustments, preventing supply-driven inflation from turning into wage-price spirals. By contrast, when there is a risk that inflation expectations de-anchor, central banks are called upon to react forcefully to inflation irrespective of its underlying drivers (eg Reis (2022); Bandera et al (2023)).[7]

Central bank doctrine: official communications — Table 1

Institution	Communications
Reserve Bank of Australia	• A central bank may "look through" the price effects of a supply shock if it is expected to be short-lived and inflation expectations remain anchored (RBA (2023)). • Life is more complicated in a world of supply shocks; an adverse supply shock increases inflation and reduces output and employment (Lowe (2022)). • If inflation expectations do increase and wage- and price-setting behaviour responds to the higher inflation, an interest rate response is required (Lowe (2023)).
Bank of England	• The orthodox monetary response to a global shock to energy prices is to "look through" them. • When the economy is hit by temporary cost shocks, policymakers face a trade-off [between] output and inflation (Tenreyro (2022)). • If inflation expectations drift away, monetary policy needs to lean against inertia to return inflation to target (Bandera et al (2023)).
Federal Reserve Board	• Standard monetary prescription is to "look through" commodities price shocks (Brainard (2022)). • The response to the inflationary effects of supply shocks should be attenuated. Supply shocks tend to move prices and employment in opposite directions (Powell (2023)). • Supply shocks that drive inflation high enough can affect the longer-term inflation expectations. Monetary policy must forthrightly address risks of de-anchoring of expectations (Powell (2023)).
European Central Bank	• When faced with supply shocks, central banks can, in principle, "look through" them, as these shocks will usually leave no lasting imprint on inflation. • The appropriate policy response will depend on the type of shock. For a supply shock, price stability may conflict with the contractionary impact of the shock. (Papademos (2003)). • In situations where inflation expectations can de-anchor, central banks must then react forcefully to prevent above-target inflation becoming entrenched (Lagarde (2024)).
Bank of Canada	• The bank's framework for inflation targeting allows temporary supply shocks to be largely ignored, as long as they do not feed into inflation expectations (Dodge (2002)). • Supply shocks present central banks with a difficult trade-off between growth and inflation. We focus on balancing the upside risks to inflation with the downside risks to growth (Macklem (2024)).
Sveriges Riksbank	• Supply shocks such as shortage of snow that restricted the supply of hydroelectric power can occasion deviations from the inflation target (Bäckström (2002)). • Supply shocks present a challenge: policymakers want to prevent inflation from becoming entrenched at a high level but want to avoid exacerbating the downturn. (Thedéen (2023)). • If there is a risk that inflation exceeds 2 percent for a long time, a tighter monetary policy may be necessary to maintain confidence in the inflation target (Löf and Stockhammar (2024)).
Bank of Korea	• If inflation is projected to exceed the target but the real sector faces supply shocks, the central bank should decide whether to adjust interest rates to ensure price stability (Bank of Korea (2017)).

Sources: Central bank statements; authors' elaboration.

In that case, monetary policy would loosen but not as much as in case of a disinflationary demand shock, as in the case of the latter output is below its potential.

[7] See also Maechler (2024) for a recent discussion of this point.

Central bank doctrine

Central bank doctrine – according to central bank official statements – aligns with these conceptual prescriptions (Table 1). All of the seven central banks included in our analysis refer to the transitory nature of many supply shocks and to the stabilisation trade-offs between inflation and real activity associated with such shocks as reasons to at least partially look through them. They also typically refer to the anchoring of inflation expectations as a precondition for their ability to do so.

Empirical analysis

Are the prescriptions of monetary theory and the stated central bank doctrine also reflected in practice, ie in the actual conduct of monetary policy? If this were the case, the monetary policy response to demand-driven inflation would be measurably stronger than that to supply-driven inflation. This is an empirical question, which we address by estimating monetary policy reaction functions.

Our analysis draws on recent empirical contributions providing a decomposition of inflation into demand- and supply-driven components. Specifically, we use the decompositions of inflation based on the methods proposed by Shapiro (2022) for Australia, Canada, Korea, Sweden, the United Kingdom and the United States, and by Eickmeier and Hofmann (2022) for the euro area; see Box A for details.[8]

We determine the sample period according to the availability of the inflation decomposition and the beginning of price stability-focused monetary policy regimes in each of the seven jurisdictions covered by our analysis. Our sample includes observations starting in the third quarter of 1979 (when Paul Volcker was appointed Chair of the Federal Reserve) for the United States, post-2002 for the euro area, post-2000 for the United Kingdom and post-1999 for the other jurisdictions. The sample ends with the most recently available observation, respectively, ranging between the second quarter of 2024 for the US and the first quarter of 2023 for Korea (see annex B for details). To address the challenge posed by the (proximity to the) zero lower bound, we include in our baseline specification only observations for which the policy rate was above 0.5%.[9]

[8] The analysis covers the seven jurisdictions for which such decompositions are available. In the case of the United States, for which both decompositions are available, we use the series derived with the method in Shapiro (2022) as our baseline, and then check that our findings carry through when using the series based on the method in Eickmeier and Hofmann (2022).

[9] Our findings also hold if we use Wu and Xia (2016) shadow rates when available (for the US, the euro area and the UK). Under this specification, the estimated coefficient of demand-driven inflation is slightly higher compared with our baseline, while that of supply-driven inflation does not materially change. Moreover, we assessed the sensitivity of the results to the calibration of the threshold for the lower bound. When choosing a lower bound below 0.5% under our baseline specification, the estimated monetary policy responses to demand-driven and supply-driven inflation slightly decrease, consistent with the limited policy space characterising the additional observations included in the estimations in these cases compared with our baseline. These results are available upon request.

Box A

Decomposing inflation into demand and supply components

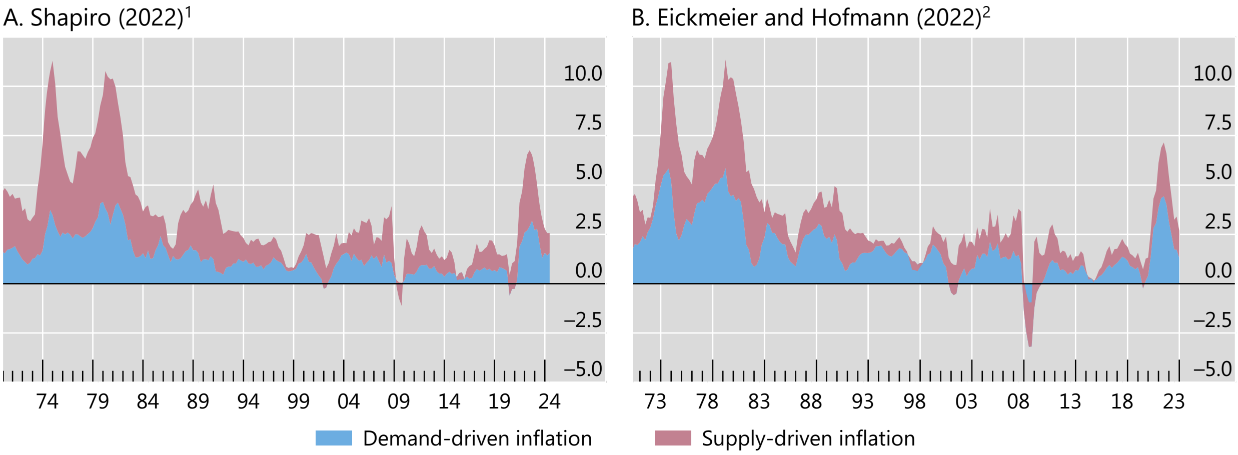
To decompose inflation into its demand- and supply-driven components, we primarily rely on the approach of Shapiro (2022), complemented with that of Eickmeier and Hofmann (2022). Both methods are based on sign restrictions motivated by a standard supply and demand framework. That is, changes in supply move inflation and output in opposite directions, while changes in demand move both variables in the same direction.

Shapiro (2022) decomposes personal consumption expenditure (PCE) inflation in two time series, the supply- and demand-driven contributions, which quantify the degree to which either demand or supply is driving inflation in each month. The identification relies on the signs of the residuals from separate price and quantity regressions for each of the more than 100 goods and services categories in the PCE price index. Specifically, for each category current price (quantity) levels are regressed on their own lagged values and lagged values of quantity (price) levels. Categories for which the residuals of the two regressions have the *same sign* in a given month are classified as subject to a demand shock in that month; the corresponding price change is then labelled as *demand-driven*. By contrast, categories with residuals of *opposite signs* in a given month are classified as subject to a supply shock in that month; the corresponding price change is then labelled as *supply-driven*. The demand-driven (supply-driven) contribution to inflation in a given month is then measured as the expenditure-weighted average of the price changes of those categories labelled as demand-driven (supply-driven) in that month. Decompositions from the Shapiro approach are available for the Australia, Canada, Korea, Sweden, the United Kingdom and United States, but not for the euro area.

Demand/supply inflation decomposition for the US

Headline inflation, year on year, in per cent

Graph A1



[1] Quarterly average of monthly series. [2] The original Eickmeier and Hofmann (2022) inflation decomposition is expressed in quarter-on-quarter changes, and refers to standardised inflation series. For our estimations, we use the mean and standard deviation of the aggregate inflation series to back out the demand and supply components of inflation, and then express those two components as year-on-year changes.

Sources: Eickmeier and Hofmann (2022); Shapiro (2022); authors' calculations.

We complement the data from the Shapiro approach with the demand-supply inflation decomposition for the euro area based on Eickmeier and Hofmann (2022). This approach estimates indicators of demand- and supply-driven inflation based on a factor model using more than 140 quarterly time series of inflation and real activity measures. The estimation relies on imposing sign restrictions on factor loadings. Supply is identified as a factor that loads negatively on inflation and positively on economic activity; demand, in turn, is identified as a factor that loads positively on both inflation and economic activity.

While the two approaches are different, they yield broadly similar decompositions of inflation into demand and supply components. This is what a comparison suggests for the United States, the only economy for which both decompositions are available (Graph A.1). For instance, for the post-pandemic inflation surge, the two decompositions indicate that both demand and supply forces contributed to the inflation surge, with the Shapiro approach attributing a somewhat larger role to supply factors. More generally, the correlation coefficient of the demand (supply) series derived with the two methods is in the ballpark of 86% and is highly statistically significant.

We consider two empirical specifications of the Taylor rule: a conventional one (our benchmark) whereby the central bank is assumed to care about fluctuations in inflation and real activity, and a targeted one, which allows for a different response to the demand- and supply-driven components of inflation.

The benchmark specification for the monetary policy reaction function – as described by a conventional Taylor rule with interest rate smoothing, takes the following form:

$$i_t = i + \rho i_{t-1} + (1-\rho)[\alpha\pi_t + \beta\, y_t] + \varepsilon_t \qquad (1)$$

where i_t is the (annualised) policy rate in quarter t, π_t is (year-on-year) inflation, y_t is the output gap[10] and i is a constant reflecting the long-term level of interest rates.[11] The lagged interest rate i_{t-1} captures central banks' proclivity for smoothing adjustments in the policy rate over time.

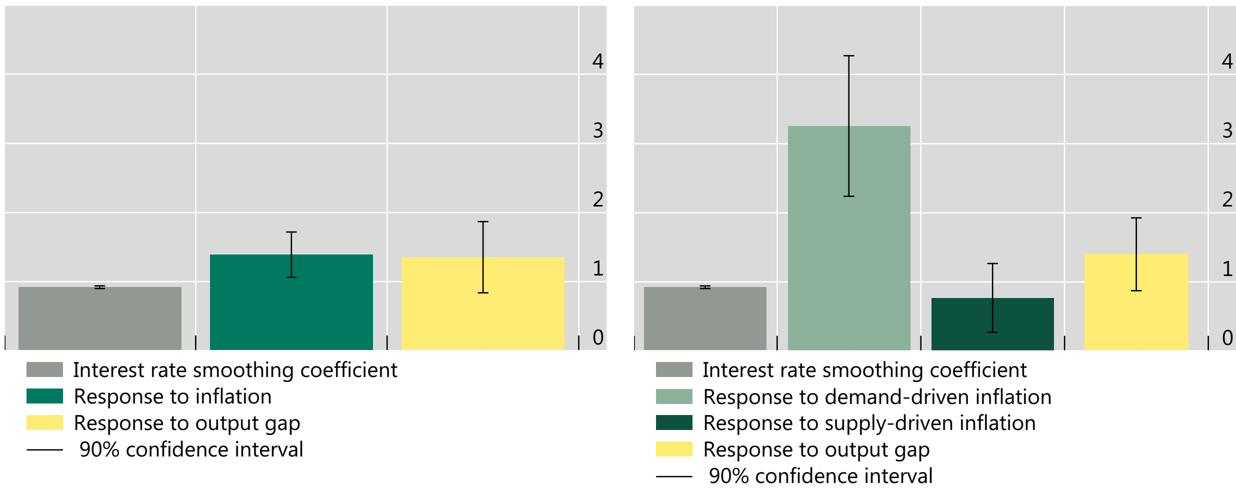
The targeted Taylor rule is an extension of the benchmark specification in (1), in which we replace overall inflation π_t with its demand- and supply-driven components π_t^d and π_t^s , where $\pi_t = \pi_t^d + \pi_t^s$:

$$i_t = i + \rho i_{t-1} + (1-\rho)[\alpha^d\pi_t^d + \alpha^s\pi_t^s + \beta\, y_t] + \varepsilon_t \qquad (2)$$

Conventional and targeted Taylor rules: panel estimates[1]

In percentage points | Graph 3

A. Conventional Taylor rule[2] | B. Targeted Taylor rule[3]



[1] Panel estimates for AU, CA, EA, GB, KR, SE and US. [2] Estimated coefficients of ρ, α, β in the conventional Taylor rule in equation (1). [3] Estimated coefficients of $\rho, \alpha^d, \alpha^s, \beta$ in the targeted Taylor rule in equation (2).

Sources: Eickmeier and Hofmann (2022); Shapiro (2022); OECD; national data; authors' calculations.

[10] As measures of the output (real GDP) gap, we use national series from central bank sources whenever available (ie for the United States, Canada and Australia) and standard two-sided Hodrick-Prescott (HP) filtered measures of the output gap otherwise. Our findings carry over when using the two-sided HP filtered measures for all jurisdictions. As we use the latest vintage of data available – and not the data available in real time to policymakers – our estimates provide de facto an ex post description of central banks' monetary policy reaction functions.

[11] In the simplified way the Talyor rule is specified in equation (1), the constant i is an amalgam of the long-term level of the real interest rate, the central bank's inflation target and the model parameters.

The first set of estimates, reported in Graph 3, describes the average monetary policy reaction function of the central banks in focus.[12]

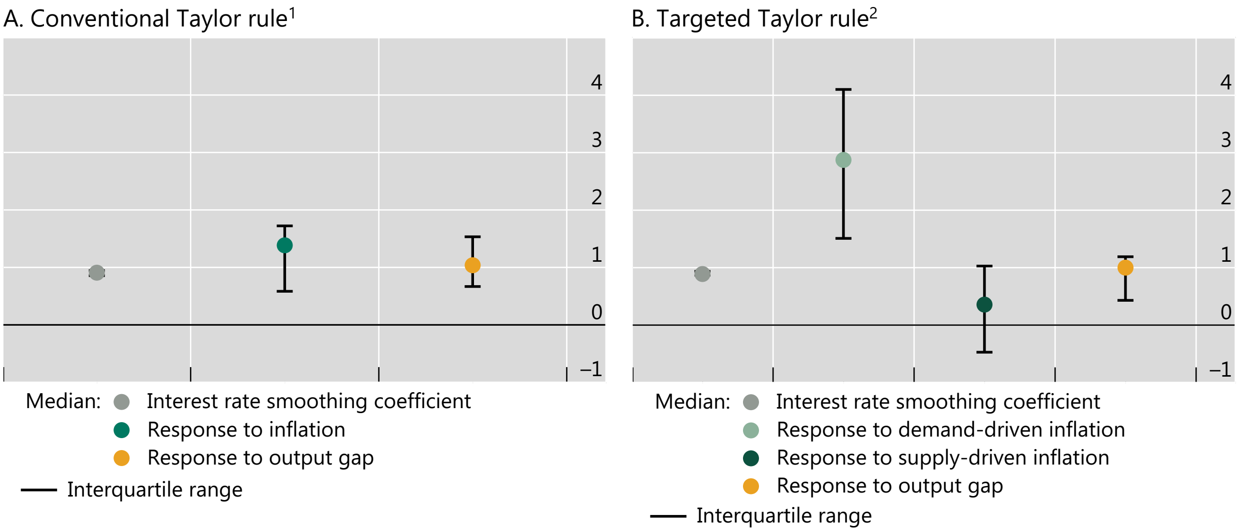
The results strongly support the targeted specification of the Taylor rule. For the standard Taylor rule from equation (1), the estimated inflation coefficient (α) equals 1.39, while that of the output gap (β) equals 1.35 (Graph 3.A). The coefficient of inflation is slightly below that prescribed by the original Taylor (1993) rule (1.38 instead of 1.5), while that of the output gap is higher (1.35 instead of 0.5) consistent with recent estimates for the post-Volcker period.[13] However, the estimates of the targeted specification of the Taylor rule from equation (2) suggest that there is a significant difference in the response to demand- versus supply-driven inflation (Graph 3.B). Notably, central banks appear to respond more forcefully to demand- than to supply-driven inflation (more than fourfold, 3.26 versus 0.77). The difference is both statistically and economically significant.

Individual estimates at the jurisdiction level of the conventional Taylor rule (Graph 4.A) and of the targeted Taylor rule (Graph 4.B) confirm this result. In particular, for the targeted Taylor rule the interquartile range of individual responses to demand-driven inflation ranges from 1.5 to 4.1 and lies on top of that of supply-driven inflation which ranges from –0.47 to 1.03.

How do our targeted Taylor rules compare with alternative ways of capturing the dependence of the monetary policy response on the underlying drivers of inflation? A common approach to model such a dependence is to specify the monetary policy reaction function in terms of core and non-core inflation, with the former capturing

Conventional and targeted Taylor rules: individual estimates across economies

In percentage points | Graph 4



[1] Individual coefficient estimates of ρ, α, β in the conventional Taylor rule (1) estimated at jurisdiction level. [2] Individual coefficient estimates of $\rho, \alpha^d, \alpha^s, \beta$ in the targeted Taylor rule (2) estimated at jurisdiction level.

Sources: Eickmeier and Hofmann (2022); Shapiro (2022); OECD; national data; authors' calculations.

[12] See annex B for further technical details on the estimation procedure.

[13] For example, Carvalho et al (2021) report a value of 0.81 on the output gap coefficient for the post-Volcker pre-Great Financial Crisis period for the United States.

developments in underlying inflation and the latter more transitory inflation fluctuations. There are different approaches to estimating core inflation (and non-core as the residual to headline inflation). One simple approach is to measure non-core inflation as the rate of change in the energy and food components of the consumer price index, and core inflation as the rate of change of the remainder of the index. To the extent that food and energy price changes are more transitory and often supply-driven, while underlying core inflation may often reflect primarily demand conditions, the core versus non-core inflation distinction may capture similar aspects as our demand- versus supply-driven inflation distinction.

We again estimate two different specifications of the monetary policy reaction function, focusing on the reaction of the US Federal Reserve to core inflation and its demand- and supply-driven components. We conduct this analysis only for the United States because the demand versus supply decomposition of core inflation is not available in other jurisdictions. The first specification splits inflation π_t into its core inflation π_t^c and non-core inflation π_t^{nc}, ie changes in food and energy prices:

$$i_t = i + \rho i_{t-1} + (1-\rho)[\alpha^c \pi_t^c + \alpha^{nc}\pi_t^{nc} + \beta\, y_t] + \varepsilon_t \quad (3)$$

The second specification splits inflation into its core- and non-core components, and in addition the former into its demand- and supply-driven components:

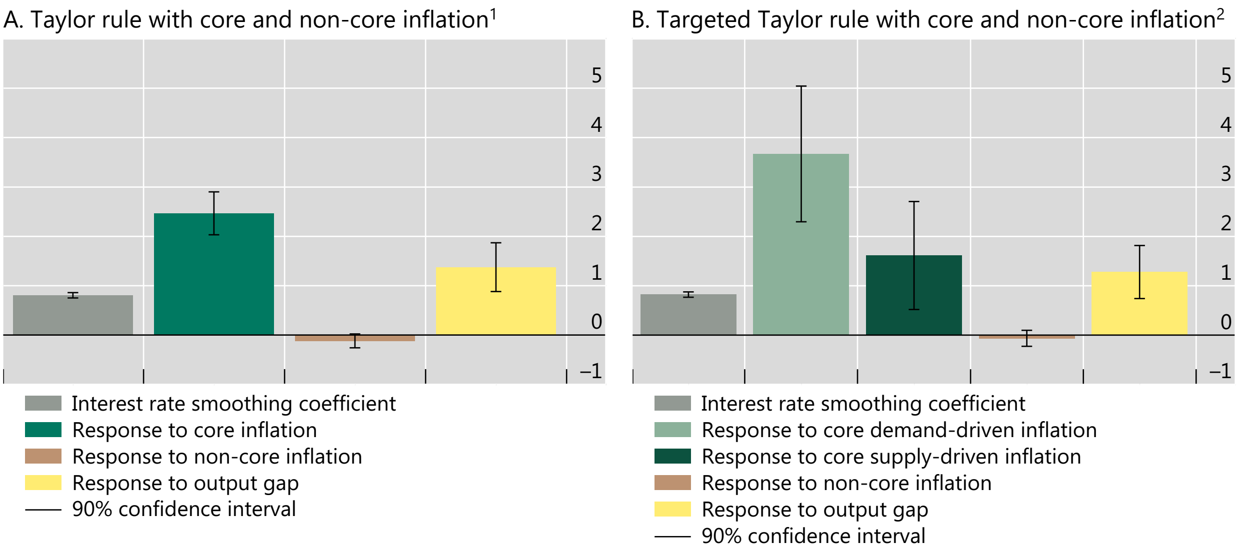
$$i_t = i + \rho i_{t-1} + (1-\rho)\left[\alpha^{c,d}\pi_t^{c,d} + \alpha^{c,s}\pi_t^{c,s} + \alpha^{nc}\,\pi_t^{nc} + \beta\, y_t\right] + \varepsilon_t \quad (4)$$

The coefficients $\alpha^{c,d}$ and $\alpha^{c,s}$ are now the coefficients on the demand and supply components of core inflation.

The results reported in Graph 5 suggest that the distinction between core and non-core inflation does not capture the distinction between demand- and supply-driven inflation. We find that the Federal Reserve responded strongly to core inflation, with a response coefficient of above 2, while it essentially ignored the energy and

Taylor rules for the US: core versus non-core inflation

In percentage points — Graph 5



[1] Coefficient estimates of ρ, α^c, α^{nc}, β in a conventional Taylor rule specification with core and non-core inflation. [2] Coefficient estimates of ρ, $\alpha^{c,d}$, $\alpha^{c,s}$, α^{nc}, β in a targeted Taylor rule specification with core and non-core inflation.

Sources: Eickmeier and Hofmann (2022); Shapiro (2022); national data; authors' calculations.

food price changes (Graph 5.A), consistent with the pattern found for a broader group of advanced economies in Avalos et al (2025). However, the estimates of equation (4) suggest that the response to demand-driven fluctuations of core inflation was about three times stronger than that to supply-driven fluctuations (Graph 5.B). Thus, our result that the central bank reacted more strongly to demand-driven fluctuations in inflation holds also when focusing on core inflation.[14]

Targeted Taylor rules and the post-pandemic inflation surge

What does our analysis have to say about the monetary policy reaction to the post-pandemic inflation surge? To answer this question, we compare the observed path of policy rates with those implied by the estimated targeted Taylor rules since the beginning of the inflation surge. The latter corresponds, for each jurisdiction, to the first quarter after Q3 2020 when inflation exceeded 2%.

The results of this exercise suggest that policy rates were initially slow to respond to inflation but then rapidly caught up with the levels implied by the estimated Taylor rules. Central banks set policy rates at lower levels than those predicted by the estimated rule in the first four quarters of the inflation surge (Graph 6.A, blue bars). By the fourth quarter, the policy rate was more than 50 basis points below the implied rate in half of the jurisdictions in focus. Subsequently, as both supply- and demand driven inflation took hold (red and blue line, respectively), central banks tightened more forcefully, bringing policy rates up to, and eventually even above, levels consistent with the targeted Taylor rules.

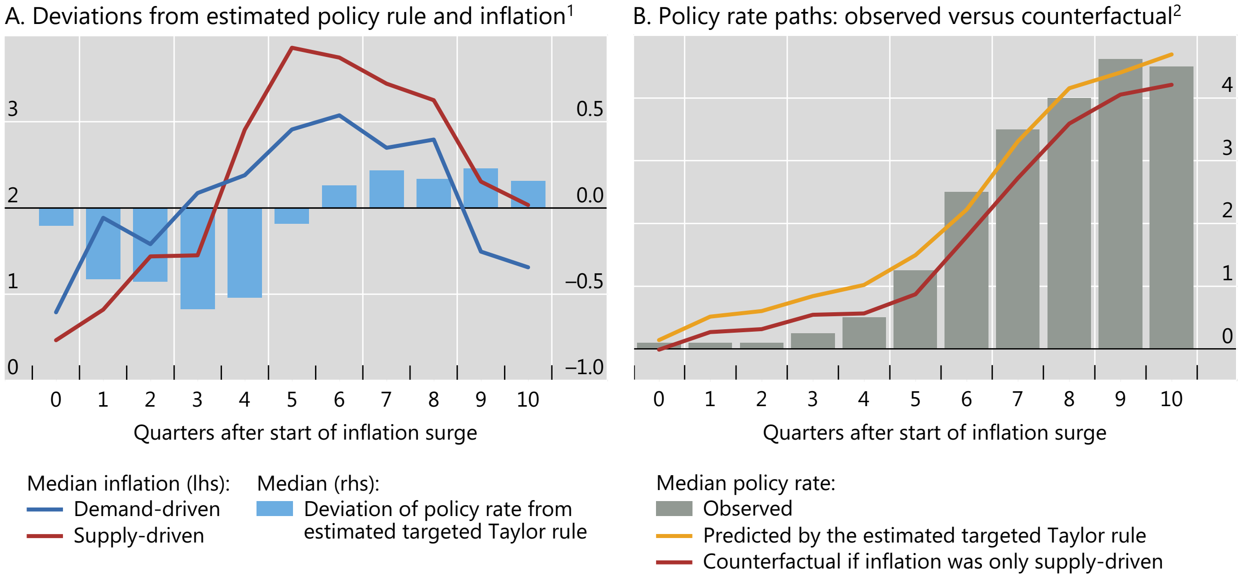
The initial slow reaction may at least partly reflect an initial misdiagnosis that the increase in inflation was primarily supply-driven at that stage, so that central banks could look through it.[15] Indeed, in late 2020 and throughout 2021 policy rates were close to the level implied by the estimated targeted rule if inflation were exclusively supply-driven (Graph 6.A, red line). However, there was a significant demand-driven component, reflected in the considerably higher level of policy rates predicted by the estimated targeted Taylor rules based on the actual decomposition of inflation (Graph 6.B, yellow line).

[14] We also checked whether the strong estimated response to demand-driven inflation is not equivalent to reacting to the inflation forecast. We add the consensus inflation forecast as an additional regressor in equation (2) and obtain highly statistically significant coefficients for all terms in our regressions, with the coefficient of supply-driven inflation turning negative. These results suggest that central banks account for both contemporaneous inflation and its forecast, and that everything else equal, react less when contemporaneous supply-driven inflation is high. This is consistent with central banks' concern of stabilisation trade-off between inflation and real activity in those latter cases. The results are available upon request.

[15] Other complementary explanations could also be relevant. One such example is that central banks delivered on the promises made under forward guidance (or flexible average inflation targeting in the United States) to overshot inflation targets once exiting the zero lower bound.

Post-pandemic inflation surge: deviations from the estimated targeted Taylor rule

In percentage points Graph 6



[1] The blue bars show the median deviation of the observed policy rate from the targeted Taylor rule estimates during the inflation surge. The beginning of the inflation surge in each jurisdiction is defined as the first quarter post-Q3 2020 when inflation exceeded 2%. [2] The yellow line shows the median predicted targeted policy rate path given the observed demand- and supply-driven inflation series. The red line shows the counterfactual policy rate path if the observed aggregate level of inflation was entirely supply-driven. Note that the difference between the median of the predicted policy rate (yellow line) and the median of observed policy rate (grey bars) is not equal to the median of the deviations of the observed policy rate from the estimated rule (panel A, blue bars).

Sources: Eickmeier and Hofmann (2022); Shapiro (2022); OECD; national data; authors' calculations.

Conclusions

The analysis in this special feature suggests that central banks operating under inflation targeting or similar regimes have conducted policy in a "targeted" manner. They did so by responding strongly to demand-driven inflation, but only mildly to supply-driven inflation. These findings are consistent with both central bank doctrine and the prescriptions of the prevailing monetary theory paradigm. They also suggest that conventional monetary policy reaction functions commonly used in academic research and central bank analytical models which assume a one-size-fits-all policy with respect to inflation are mis-specified.

An important question concerns the feasibility of targeted Taylor rules as a guide to monetary policy in real time. The measures of demand- and supply-driven inflation we have used became available only recently. Our findings therefore imply that central banks were able to infer similar information about the supply- versus demand-driven nature of inflation from their indicators, analytical toolboxes and judgment. However, the finding of a potential misdiagnosis of the nature of inflation at the beginning of the inflation surge suggests that this inference can be difficult in real-time conditions. The availability of the new indicators of demand- and supply-driven inflation could help mitigate this problem as they seem to have provided quite reliable decompositions in real time.[16]

Going forward, greater supply headwinds may force central banks to react more forcefully to supply disturbances to ensure inflation expectations stay firmly anchored. This may, in turn, constrain central banks' ability to conduct their policy in a targeted fashion. As recently highlighted by the central bank community (eg Bandera et al (2023); Maechler (2024)), geopolitical tensions and climate change could lead to larger, more frequent and more persistent adverse supply disturbances. At the same time, ageing populations and deglobalisation may render the supply side of the economy less elastic, magnifying the effect of business cycle shocks on inflation, irrespectively of their nature. If such changes materialise, they will call for a stronger reaction to supply-driven inflation to curb the second-round effects of supply shocks and prevent a de-anchoring of inflation expectations.

16 See the real-time analysis in Eickmeier and Hofmann (2022).

References

Avalos, F, R Banerjee, M Burgert, B Hofmann, C Manea and M Rottner (2025): "Commodity prices and monetary policy: old and new challenges", *BIS Bulletin*, forthcoming.

Bäckström, U (2002): "Sweden's economy and monetary policy", speech at Skanes Provinsbank, Helsingborg, 7 March.

Bank of Korea (2017): *Monetary policy in Korea,* Bank of Korea, December.

Bandera, N, L Barnes, M Chavaz, S Tenreyro and L von dem Berge (2023): "Macroeconomic stabilisation in a volatile inflation environment", paper presented at the 2023 ECB Forum on Central Banking.

Blanchard, O and J Galí (2007): "Real wage rigidities and the New Keynesian model", *Journal of Money, Credit and Banking*, vol 39, pp 35–65.

Bodenstein, M, C Erceg and L Guerrieri (2008): "Optimal monetary policy with distinct core and headline inflation rates", *Journal of Monetary Economics*, vol 55, pp S18–S33.

Borio, C (2006): "Monetary and prudential policies at a crossroads? New challenges in the new century", *BIS Working Papers*, no 216, September.

Brainard, L (2022): "What can we learn from the pandemic and the war about supply shocks, inflation, and monetary policy?", speech at the 21st BIS Annual Conference "Central banking after the pandemic: challenges ahead", Basel, 28 November.

Carvalho, C, F Nechio and T Tristao (2021): "Taylor rule estimation by OLS", *Journal of Monetary Economics*, vol 124, pp 140–54.

Clarida, R, J Galí and M Gertler (2000): "Monetary policy rules and macroeconomic stability: evidence and some theory", *The Quarterly Journal of Economics*, vol 115, no 1, pp147–80.

Dodge, D (2002): "Macroeconomic stabilization policy in Canada", speech at the Federal Reserve Bank of Kansas City Jackson Hole symposium, 31 August 31.

Eickmeier, S and B Hofmann (2022): "What drives inflation? Disentangling demand and supply factors", *BIS Working Papers*, no 1047, forthcoming in *International Journal of Central Banking*.

Erceg, C, D Henderson and A Levin (2000): "Optimal monetary policy with staggered wage and price contracts", *Journal of Monetary Economics*, vol 46, no 2, pp 281–313.

Galí, J (2015): *Monetary policy, inflation, and the business cycle: an introduction to the New Keynesian framework* (2nd ed), Princeton University Press.

Guerrieri, V, M Marcussen, L Reichlin and S Tenreyro (2023): "The art and science of patience: relative prices and inflation", *Geneva Reports on the World Economy*, vol 26.

Hofmann, B and B Bogdanova (2012): "Taylor rules and monetary policy: a global 'Great Deviation'?", *BIS Quarterly Review*, September, pp 37–49.

Hofmann, B, C Manea and B Mojon (2024): "Targeted Taylor rules: some evidence and theory", *BIS Working Papers*, no 1234, December.

Lagarde, C (2024): "Monetary policy in an unusual cycle: the risks, the path and the costs", introductory speech at the opening reception of the ECB Forum on Central Banking, Sintra, 1 July.

Löf, M and P Stockhammar (2024): "What factors drove the surge in inflation?", Sveriges Riksbank *Staff Memos*, June.

Lowe, P (2022): "Price stability, the supply side and prosperity", speech at the CEDA Annual Dinner Address, Melbourne, 22 November.

——— (2023): "Monetary policy, demand and supply", speech at the National Press Club, Sydney, 5 April.

Macklem, T (2024): "Rewired, recast and redirected: global trade and implications for Canada", speech at the Canada-UK Chamber of Commerce, London, 10 September.

Maechler, A (2024): "Monetary policy in an era of supply headwinds: do the old principles still stand?", speech at the London School of Economics, London, 2 October.

Mishkin, F (2007): "Headline versus core inflation in the conduct of monetary policy", remarks at the "Business cycles, international transmission and macroeconomic policies" conference, HEC Montréal, 20 October.

Papademos, L (2003): "Economic cycles and monetary policy", speech at the. International Symposium of the Banque de France on "Monetary policy, the economic cycle and financial dynamics", Paris, 7 March.

Powell, J (2023): "Monetary policy challenges in a global economy", opening remarks at a policy panel at the 24th Jacques Polak Annual Research Conference, Washington DC, 9 November.

Reis, R (2022): "The burst of high inflation in 2021–22: how and why did we get here?", *BIS Working Papers*, no 1060, December.

Reserve Bank of Australia (RBA) (2023): "Statement on monetary policy – Box C: Supply and demand drivers of inflation in Australia", February.

Shapiro, A (2022): "Decomposing supply and demand driven inflation", Federal Reserve Bank of San Francisco *Working Papers*, no 2022-18, forthcoming in *Journal of Money, Credit and Banking*.

Smets, F and R Wouters (2007): "Shocks and frictions in US business cycles: a Bayesian DSGE approach", *American Economic Review*, vol 97, no 3, pp 586–606.

Svensson, L (1997): "Inflation forecast targeting: implementing and monitoring inflation targets", *European Economic Review*, vol 41, no 6, pp 1111–46.

——— (1999): "Inflation targeting as a monetary policy rule", *Journal of Monetary Economics*, vol 43, no 3, pp 607–54.

Taylor, J (1993): "Discretion versus policy rules in practice", *Carnegie-Rochester Conference Series on Public Policy*, vol 39, pp 195–214.

Tenreyro, S (2022): "The economy and policy trade-offs", 2022 Dow Lecture, National Institute of Economic and Social Research, London, 23 February.

Thedéen, E (2023): "Lessons from a turbulent period", speech at the Carnegie Fonder, Stockholm, 20 December.

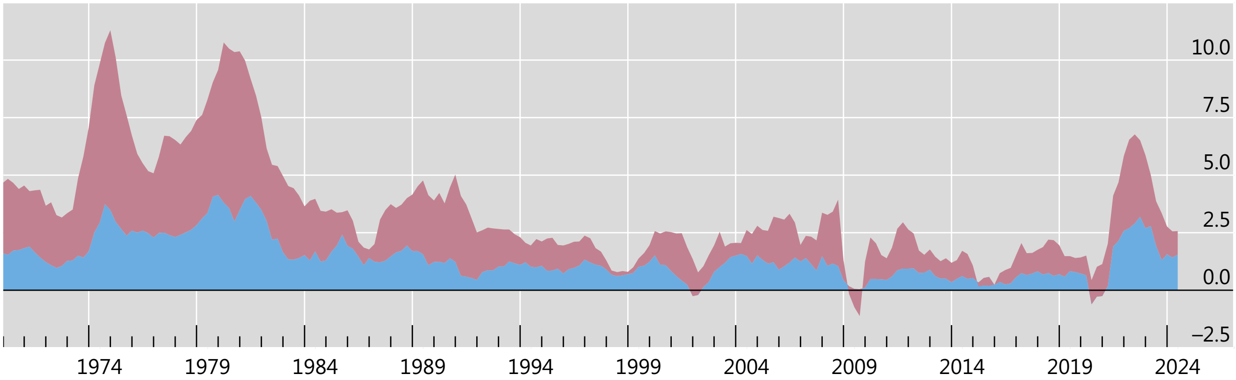
Wu, J C and D Xia (2016): "Measuring the macroeconomic impact of monetary policy at the zero lower bound", *Journal of Money, Credit, and Banking*, vol 48, no 2–3, pp 253–91.

Annex A

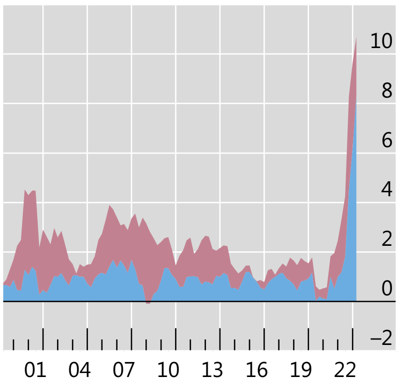
Decomposition of inflation in demand and supply factors: baseline specification[1]

Headline inflation, year on year, in per cent — Graph A.1

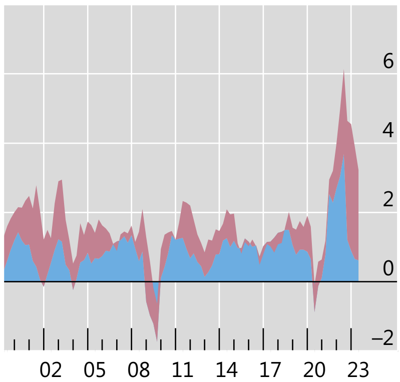
A. United States[2]



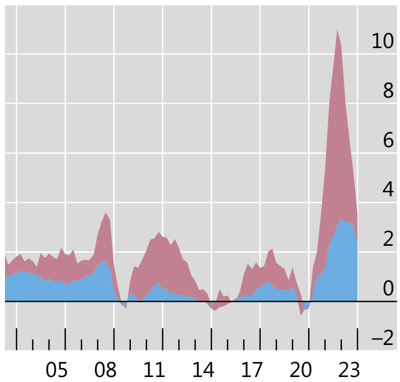
B. Australia[3]



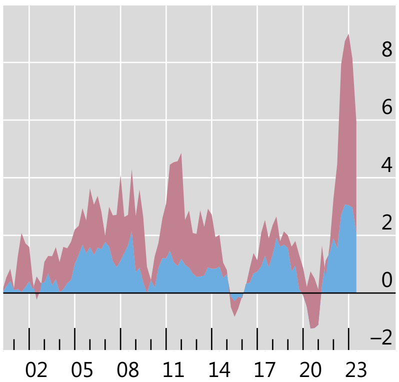
C. Canada[3]



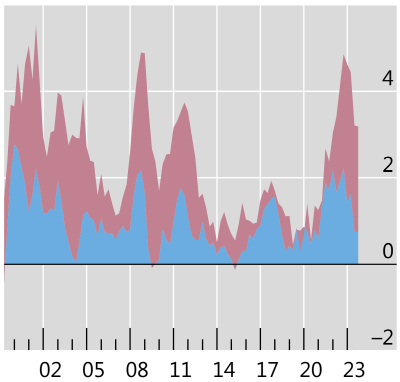
D. Euro area[3]



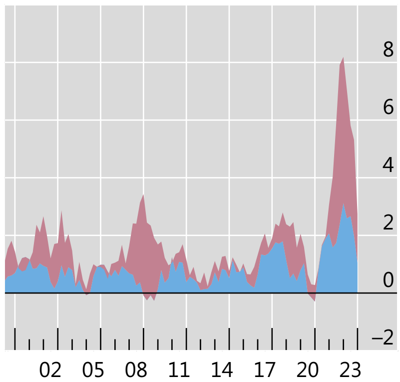
E. United Kingdom[3]



F. Korea[3]



G. Sweden[3]



[1] The original Eickmeier and Hofmann (2022) inflation decomposition is expressed in quarter-on-quarter changes and concerns standardised inflation series. For our estimations, we use the mean and standard deviation of the aggregate inflation series to back out the demand and supply components of inflation, and then express those two components as year-on-year changes. [2] Decomposition based on the method in Shapiro (2022). Quarterly averages of monthly observations for the United States. [3] Decomposition based on the method in Eickmeier and Hofmann (2022).

Sources: Eickmeier and Hofmann (2022); Shapiro (2022); OECD; authors' calculations.

Annex B

Estimation procedure

Following the literature (eg Hofmann and Bogdanova (2012); Carvalho et al (2021)), we estimate the structural Taylor rule specifications in (1) and (2) based on reduced form OLS regressions. These regressions write:

- for the conventional Taylor rule:

$$i_t = \alpha + \rho^{aux} i_{t-1} + \alpha^{aux} \pi_t + \beta^{aux}\, y_t + \varepsilon_t$$

where the structural parameters of (1) are backed out from the auxiliary regression as follows: $\rho = \rho^{aux}$, $\alpha = \alpha^{aux} / (1 - \rho^{aux})$, $\beta = \beta^{aux} / (1 - \rho^{aux})$.

- for the targeted Taylor rule:

$$i_t = \alpha^{aux} + \rho^{aux} i_{t-1} + \alpha^{d,aux} \pi_t^d + \alpha^{s,aux} \pi_t^s + \beta^{aux}\, y_t + \varepsilon_t$$

where the structural parameters of (2) are backed out as follows: $\rho = \rho^{aux}$, $\alpha^s = \alpha^{s,aux} / (1 - \rho^{aux})$, $\alpha^d = \alpha^{d,aux} / (1 - \rho^{aux})$, $\beta = \beta^{aux} / (1 - \rho^{aux})$.

Estimation sample

The jurisdiction-specific samples are as follows: Australia: Q1 1999–Q1 2023; Canada: Q1 1999– Q2 2023; the euro area: Q1 2002 –Q4 2023; Korea: Q1 1999–Q3 2023; Sweden: Q1 1999–Q4 2023; the United Kingdom: Q1 2000–Q2 2023, the United States: Q3 1979 –Q2 2024 .