Supply-Side Information and Monetary Policy Surprises

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Abstract

Monetary policy surprises, measured using high-frequency asset price revisions around central bank announcements, are the leading tool for identifying the effects of unexpected monetary actions. Recent research shows, however, that they partly reflect the Federal Reserve's information about demand conditions. This paper shows that supply conditions also enter these surprises, as revealed by the comovement of interest rates and the exchange rate. When a supply shock hits and the Fed is expected to raise rates while tolerating some supply-driven inflation, surprises signal higher medium-term rates and dollar depreciation. Accounting for this component helps explain why previous estimates find little decline in prices after tighter forward guidance.

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1 Introduction

A key question in macroeconomics is how monetary policy affects inflation. Identifying these effects requires controlling for the economic conditions to which policy endogenously responds. Federal Reserve announcements provide an ideal setting to measure unexpected policy variation (Gertler and Karadi, 2015), but market reactions can also reflect information about the Federal Reserve's assessment of the economy or its response to public news (Nakamura and Steinsson, 2018; Bauer and Swanson, 2023a). Previous research has mainly focused on demand information, which moves output and prices in the same direction (Jarociński and Karadi, 2020; Miranda-Agrippino and Ricco, 2021). Given recent supply disruptions, Federal Reserve announcements might also communicate information to the market about supply conditions and the Federal Reserve's response to them. If so, market reactions reflect supply information and might bias estimates of monetary transmission when treated as measures of unexpected policy decisions. This paper sheds light on how to use exchange-rate movements to separate unexpected monetary actions from supply information and how this changes previous estimates of monetary transmission.

Consider the Federal Reserve announcement of March 16, 2022. The Federal Open Market Committee (FOMC) statement raised concerns about supply conditions: "The invasion and related events are likely to create additional upward pressure on inflation and weigh on economic activity." The Committee also stated that it "anticipates that ongoing increases in the target range will be appropriate." This communication about the future path of policy is typically referred to as forward guidance (Campbell et al., 2012). Markets reacted with an increase of 5.1 basis points in the two-year Treasury yield, but the dollar depreciated by 0.34 per cent against the euro. This is puzzling from the perspective of a standard model. Under uncovered interest parity, higher expected US policy rates relative to foreign rates make dollar assets more attractive, so the dollar should appreciate immediately. One possible explanation is that markets expected the Federal Reserve to partly 'look through' the supply-driven inflation. The Federal Reserve would raise rates but tolerate some temporary inflation to avoid a larger decline in economic activity, as discussed by Nakamura et al. (2025). If the resulting increase in expected US prices relative to foreign prices outweighed that in interest rates, the dollar could depreciate even as medium-term rates rose. Can we use these exchange-rate movements systematically to identify supply information in FOMC announcements?[1]

In this paper, I use exchange-rate movements around Federal Reserve announcements to identify supply information and study its implications for the transmission of forward guidance. I show that part of the medium-term interest-rate revisions used to measure forward guidance reflects what markets learn about the Federal Reserve's assessment of supply conditions and its response to the resulting inflation. I use a New Keynesian model in the spirit of Blanchard and Galí (2007a) to show how supply information can raise medium-term interest rates, lower stock prices

[1]March 2022 FOMC statement and press conference. High-frequency surprises are from Acosta et al. (2025). Reuters linked the dollar depreciation to the absence of an additional hawkish surprise in "Dollar falls as hawkish Fed delivers without an extra kick."

and depreciate the dollar when the Federal Reserve tolerates part of the resulting inflation. I then use this comovement to separate the supply component from unexpected monetary tightening and demand information. Empirically, I validate the supply interpretation using Federal Reserve statements and press conferences, commodity prices, supply-chain pressures, and independently identified oil-supply news. I show that separating this component helps explain a puzzle in the transmission of forward guidance: previous research finds little decline in prices after tighter forward guidance, whereas I find a larger and statistically significant decline when I account for supply information.[2]

I use stock prices and the exchange rate to distinguish why medium-term interest rates rise around a Federal Reserve announcement. Investors know the model but do not observe shocks to monetary policy, demand and supply. They use Federal Reserve announcements to learn about them. All three cases can raise medium-term interest rates, so interest rates alone do not reveal why they rise. Stock prices first distinguish stronger perceived demand from the other two cases. Following Jarociński and Karadi (2020), stronger demand makes investors more optimistic about future growth and, despite the higher discount rates coming from the expected monetary-policy response, stock prices rise. Stock prices instead fall after unexpected monetary tightening and after information about supply disruptions. The exchange rate then distinguishes these two cases: the dollar appreciates after unexpected monetary tightening but can depreciate after supply information.

The model explains why supply information can produce this combination. The model has sticky prices, real-wage rigidity, and an imported input. When the price of this input increases, real wages do not adjust enough to absorb it, raising firms' costs and inflation. Higher input costs reduce firms' future profit margins, while expected activity eventually declines, so stock prices fall. Increasing interest rates can contain inflation but can also damage economic activity. Following Hofmann et al. (2026), I use a targeted Taylor rule that allows the Federal Reserve to respond differently to demand- and supply-driven inflation. I estimate this rule and use its coefficients in the baseline calibration. The estimates suggest a weaker response to supply-driven inflation. With this response, the nominal-rate differential increases by less than the expected inflation differential. The sum of revisions in the expected real-rate differential between the United States and foreign economies is therefore negative. Under uncovered interest parity, this leads the dollar to depreciate after supply information.[3] After unexpected monetary tightening, the real-rate differential instead increases and the dollar appreciates. Table 1 summarises these three cases.[4]

I implement this identification using high-frequency asset-price changes around Federal Reserve announcements from the dataset of Acosta et al. (2025). The data include interest-rate revisions

[2] Swanson (2024), for instance, finds that the CPI initially rises after tighter forward guidance and declines only slightly at longer horizons.

[3] I abstract from currency-premium revisions. Appendix D.5 finds no significant response in EUR/USD risk reversals and no persistent response in the Treasury convenience yield.

[4] Stronger perceived demand could in principle depreciate the dollar. Jarociński (2024) leaves the exchange rate unrestricted when identifying Delphic forward guidance and finds an impact appreciation. Appendix B.1 reports similar results when I leave the exchange-rate response to demand unrestricted.

Table 1: Asset-price responses used to distinguish the three components.

Markets' interpretation	Medium-term interest-rate revision	Stock prices	Dollar value against the euro
Unexpected monetary tightening	Up	Down	Appreciates
Stronger perceived demand	Up	Up	Appreciates
Greater perceived supply pressures	Up	Down	Depreciates

Notes: The signs refer to the separate components. The medium-term interest-rate revision is measured by the forward-guidance factor used in the identification. The supply row assumes that markets expect the Federal Reserve to tolerate part of the supply-driven inflation and that the relative-price effect outweighs the effect of the interest-rate differential.

at short, medium, and long maturities, together with stock-market and exchange-rate movements, from February 1999 to May 2025. I start in February 1999 with the first FOMC meeting after the introduction of the euro, which allows me to use the exchange rate between the euro and the dollar. To study monetary policy during the zero lower bound, I use revisions in medium-term interest rates to measure forward guidance. I separate these revisions from surprises about the current policy rate, in the spirit of Gürkaynak et al. (2005). To distinguish revisions related to forward guidance from those related to asset purchases, I also consider long-term interest rates. I use the fact that large-scale asset purchases became an important policy tool during the financial crisis to separate the two, in the spirit of Swanson (2021).

I then decompose high-frequency monetary-policy surprises into monetary-policy, demand, and supply components within a monthly Bayesian vector autoregression, using the sign restrictions in Table 1. In particular, I use the forward-guidance factor to measure medium-term interest-rate revisions, the S&P 500 to measure changes in stock valuations, and the EUR/USD exchange rate to measure changes in the dollar's value against the euro. I assume that only unexpected monetary policy and revisions related to perceived demand and supply conditions systematically affect these announcement surprises.

I find three main results. First, the narrative evidence and the relationship with commodity prices and past oil-supply shocks show that the supply component is closely related to supply disruptions. Its largest positive observations tend to occur around meetings where the Federal Reserve discusses worsening supply conditions, while negative observations tend to coincide with easing supply pressures. I document these episodes using the Federal Reserve statements, press conferences, and minutes. I also show that past oil-supply news identified around OPEC announcements (Känzig, 2021) predicts the supply component, but not the monetary-policy or demand components. Increases in commodity prices before Federal Reserve meetings also predict the supply component.

Second, the supply component raises prices and inflation expectations, with little persistent increase in expected real rates. Market-based measures also point to a decline in US real rates relative to the euro area, consistent with the model's exchange-rate mechanism. Long-run inflation expectations rise over the weeks after the announcement. I also find that the supply component

increases the probability of inflation reaching at least four per cent in the next calendar year. Commodity prices rise by about one per cent within a quarter, and the New York Fed's Global Supply Chain Pressure Index (Benigno et al., 2022) rises immediately and peaks after one month. The price level rises by about seven basis points after two years, while real GDP changes little. Using the classification of Shapiro (2024), I also show that the increase in prices is concentrated in consumption categories classified as supply-driven based on opposite movements in prices and quantities relative to their predicted values.

Third, separating the supply component helps explain why tighter forward guidance has been found to have little effect on prices. Swanson (2024) finds that the CPI initially rises after tighter forward guidance and declines only slightly at longer horizons. I find a similar response when I do not control for the supply component and use only changes in medium-term interest rates and equity prices: the price level declines by only about four basis points after two years. By adding the exchange rate to separate the supply component, I find a larger and statistically significant decline in prices, reaching thirteen basis points after two years.[5]

Related literature. This paper contributes to the literature that uses high-frequency monetary-policy surprises to estimate monetary transmission to financial markets and the real economy (Gertler and Karadi, 2015; Swanson, 2021, 2024). Romer and Romer (2000) show that policy actions reveal information about inflation that private forecasters do not already possess. Romer and Romer (2004) account for the Federal Reserve's forecasts when constructing a narrative measure of monetary-policy shocks, removing the systematic response to its assessment of economic conditions. Nakamura and Steinsson (2018), Jarociński and Karadi (2020), and Miranda-Agrippino and Ricco (2021) study the information effect in the high-frequency setting using different approaches. Jarociński and Karadi (2020) separate monetary policy from information using interest rates and stock prices, while Miranda-Agrippino and Ricco (2021) use the Federal Reserve's forecasts to account for the information contained in policy surprises. My paper studies how perceived supply conditions enter these surprises. Adverse supply news can raise medium-term interest rates and lower stock prices, just as unexpected monetary tightening does. Gürkaynak et al. (2021) show that currencies sometimes depreciate after announcements that raise interest rates and examine whether information about economic conditions, including supply conditions, can explain these movements. I use the exchange rate to distinguish these responses and then examine whether the resulting component is related to supply conditions using announcement narratives, commodity prices, and independently identified oil-supply news.

Bauer and Swanson (2023a) provide a different explanation based on the Federal Reserve's response to public news. Markets may underestimate how strongly the Federal Reserve will respond to information already available before the announcement. An interest-rate surprise can therefore reflect this response without revealing private information about the economy. In the model appendix, I also allow markets to learn about the Federal Reserve's response to supply conditions.

[5]The larger estimated decline in prices also remains when I normalise both monetary-policy responses so that the median initial increase in the two-year Treasury yield is 2.5 basis points.

An announcement can then change both their assessment of supply pressures and how much of the resulting inflation they expect the Federal Reserve to tolerate. Ricco and Savini (2025) examine this distinction between information about economic conditions and revisions in the perceived policy rule. They find that information effects explain the price and output puzzles in their sample, while policy-rule revisions play a smaller role.

Bauer and Swanson (2023b) address the predictability of monetary-policy surprises by controlling for pre-announcement economic and financial news. My results show that their corrected surprise remains correlated with the supply component. Accounting for public news and separating perceived supply conditions therefore address different aspects of the identification problem. My decomposition measures revisions related to the Federal Reserve's assessment of and response to supply conditions, without separately identifying how much comes from private information or learning about its response to public news.

Two closely related papers already consider perceived supply shocks. Jarociński and Karadi (2020) introduce supply information in an extension using stock prices and inflation compensation, leaving the interest-rate response unrestricted. Adding this component leaves their estimated monetary-policy responses broadly unchanged. Acosta (2026) combines newspaper-based measures of output and inflation forecast revisions with interest-rate surprises. He identifies the shocks using changes in their variances across Federal Reserve communication regimes and also studies the transmission of monetary news about future policy rates. My contribution is a different identification based on announcement-window exchange-rate movements, together with evidence on what the supply component captures. I then compare the estimated transmission of forward guidance with and without separating this component. In my sample, which includes the recent supply disruptions, separating perceived supply conditions substantially changes the estimated response of prices.

The paper also relates to work on monetary policy responses to supply-driven inflation (Gagliardone and Gertler, 2023; Benigno and Eggertsson, 2023; Hofmann et al., 2025; Nakamura et al., 2025). This literature studies the extent to which central banks should accommodate temporary inflation caused by supply disturbances. Building on the firm-turnover model of Adam and Weber (2019), Adam and Weber (2025) provide a different rationale for looking through supply shocks. Interestingly, they also raise an issue similar to the one studied in this paper: supply shocks can enter monetary-policy surprises when we only look at the comovement of interest rates and stock prices. In their high-frequency experiment, a positive shock followed by a partial reversal raises output and real profits and lowers real interest rates.[6] Stock prices increase because profits are higher and the lower real rate reduces the discounting of future profits. Since nominal interest rates also fall, the approach of Jarociński and Karadi (2020) can interpret this supply shock as unexpected

[6] As Adam and Weber (2025) point out, these supply shocks may help explain the increase in productivity found after identified monetary-policy easings. As a first pass, uncovered interest parity suggests that the lower real-rate response could also depreciate the dollar. Since their model is a closed economy and productivity can affect relative prices, extending it to an open economy and considering other asset prices is an interesting avenue for distinguishing the shocks and studying the effects of monetary policy on productivity.

monetary easing. I start from a similar observation but study a different form of adverse supply shock. An increase in the price of imported inputs can raise medium-term interest rates and lower stock prices, as after unexpected monetary tightening. I use the exchange rate to distinguish the two through the partial-accommodation mechanism: when the nominal-rate differential increases by less than the inflation differential, the dollar depreciates. Kase et al. (2026) also show how fiscal constraints can limit monetary tightening after inflationary supply shocks. Their mechanism provides one possible explanation for the accommodation that markets perceive in my estimates. I use asset-price movements around Federal Reserve announcements to measure how markets perceive its response to supply conditions and study the implications for expected real rates, inflation expectations, and forward guidance.

Finally, Boehm and Kroner (2026) identify asset-price variation around Federal Reserve announcements that is not explained by movements in the yield curve. Their positive non-yield shock raises equity prices, depreciates the dollar, and lowers implied volatility. The supply component also depreciates the dollar, but it lowers equity prices and raises implied volatility. Despite these differences, it has a positive association with the non-yield shock and explains about 7 per cent of its variation. The three announcement components jointly explain 23 per cent. This comparison shows that separating supply-related revisions helps account for some of the announcement variation missed by the yield curve, while the two objects capture different asset-price patterns.

The rest of the paper is organised as follows. Section 2 presents the model and derives the asset-price responses used in the identification. Section 3 describes the announcement data, and Section 4 explains how I separate the monetary-policy, demand, and supply components. Section 5 examines whether the supply component is related to supply disruptions using announcement narratives, commodity prices, and independent oil-supply news. Section 6 studies the financial and macroeconomic responses, while Section 7 studies inflation expectations. Section 8 shows how separating the supply component changes the estimated price response to forward guidance. Section 9 reports the robustness checks, and Section 10 concludes.

2 Policy responses and asset prices

The model explains how the trade-off created by supply disruptions can lead markets to expect higher policy rates while stock prices fall and the dollar depreciates. I derive the conditions for this comovement and compare it with the responses to monetary-policy and demand disturbances. The economy is in the spirit of Blanchard and Galí (2007a,b), with an imported-input shock and real-wage rigidity. Following Hofmann et al. (2026), I use a targeted Taylor rule that allows the Federal Reserve to respond differently to demand- and supply-driven inflation. I estimate this rule and use its coefficients in the baseline calibration. I then study how markets learn about demand and supply conditions during Federal Reserve announcements and how this affects revisions in market interest rates, stock prices and the dollar.

2.1 The economy and the policy response

The economy is in the spirit of Blanchard and Galí (2007a,b). Domestic firms use labour and an imported input. When the imported input becomes more expensive, real wages adjust only partly, leaving firms with higher production costs. This puts upward pressure on prices. The central bank then faces a trade-off: increasing interest rates to contain this inflation can damage economic activity.

Output, inflation and the nominal policy rate satisfy

$$y_t = \mathbb{E}_t y_{t+1} - (i_t - \mathbb{E}_t \pi_{t+1}) + a(s_t - \mathbb{E}_t s_{t+1}) + \varepsilon_t^d, \qquad a = \frac{\alpha}{1-\alpha}, \tag{1}$$

$$\pi_t = \beta \mathbb{E}_t \pi_{t+1} + \kappa y_t + \lambda s_t, \tag{2}$$

$$i_t = \rho_i i_{t-1} + (1-\rho_i)\left[\phi^d \bar{\pi}_t + (\phi^s - \phi^d)\bar{\pi}_t^s + \phi^y y_t\right] + \varepsilon_t^m. \tag{3}$$

Here y_t is log real domestic value added relative to steady state, π_t is domestic producer-price inflation, i_t is the nominal policy rate, and s_t is the log real imported-input price relative to steady state. The supply disturbance is $u_t^s = \lambda s_t$. It follows an autoregressive process, as do the demand disturbance ε_t^d and the independent monetary-policy disturbance ε_t^m.

The first Equation is the IS curve. A higher expected real rate, $r_t = i_t - \mathbb{E}_t \pi_{t+1}$, lowers current spending. The input-price term comes from purchasing power: as a temporary increase in s_t fades, the expected recovery supports current spending. The second Equation is the Phillips curve. The supply disturbance raises firms' marginal costs and therefore inflation. Appendix E derives these Equations.

The third Equation is the targeted Taylor rule. I define $\bar{\pi}_t = \frac{1}{4}\sum_{k=0}^{3} \pi_{t-k}$ to match the inflation measure used in the estimation. The variable $\bar{\pi}_t^s$ is the inflation generated by supply disturbances alone under this rule. The coefficient is ϕ^s for this inflation and ϕ^d for the remaining inflation. Setting $\phi^s = \phi^d = \phi^\pi$ gives the conventional Taylor rule. As in Hofmann et al. (2026), I solve separately for the supply response and the remaining responses, then add them together.

Appendix F derives the solution and verifies uniqueness.

2.2 The equilibrium response and partial accommodation

The empirical analysis concerns revisions in medium-term market interest rates. I therefore study how announcements change expectations about future policy rates, either through unexpected monetary actions or through information about demand and supply conditions.

I consider an announcement about a disturbance arriving next quarter, holding the current policy decision and goods prices fixed. Markets can immediately revise medium-term interest rates, stock prices and the exchange rate as they learn about the disturbance and the Federal Reserve's response.

Let ξ_1^j be the disturbance arriving next period, with $\xi_1^s = u_1^s$, and let $b_{x,h}^j$ be the response of

variable x in period h to one unit of disturbance j. For supply,

$$y_h^s = b_{y,h}^s u_1^s, \qquad \pi_h^s = b_{\pi,h}^s u_1^s, \qquad i_h^s = b_{i,h}^s u_1^s, \qquad h \geq 1. \tag{4}$$

The output response depends on monetary policy. Iterating the IS curve gives

$$y_h^s = a s_h - \sum_{k=0}^{\infty} \mathbb{E}_h r_{h+k}^s. \tag{5}$$

The first term reflects the expected recovery in purchasing power. The second is the effect of the expected real-rate path. Output falls when the second exceeds the first. A stronger policy response can therefore contain more inflation at the cost of weaker activity.

Let $B_x^j = \sum_{h=1}^{\infty} b_{x,h}^j$ denote the cumulative response of output, inflation or nominal rates. Summing the policy rule gives

$$B_i^j = \phi^j B_\pi^j + \phi^y B_y^j, \qquad j \in \{d, s\}. \tag{6}$$

When cumulative output falls after supply, the output term limits the rate increase. When output and inflation both rise after demand, it reinforces the response to inflation. Smoothing affects these paths, although the lagged-rate terms cancel when the rule is summed. Appendix G gives the calculation.

I call the supply response partially accommodative when

$$0 < B_i^s < B_\pi^s. \tag{7}$$

Expected nominal rates rise, but their cumulative increase is smaller than cumulative inflation. This comparison concerns the full paths of inflation and interest rates, and allows expected real rates to fall at some horizons and rise at others.

For $B_\pi^s > 0$, Equation (6) gives

$$\frac{B_i^s}{B_\pi^s} = \phi^s + \phi^y \frac{B_y^s}{B_\pi^s}. \tag{8}$$

Partial accommodation requires this ratio to lie between zero and one. With $\phi^y \geq 0$, a negative total output response lowers the ratio below ϕ^s, so the condition can hold even when $\phi^s > 1$. The ratio B_y^s/B_π^s itself depends on the policy response and the remaining parameters. A weaker inflation coefficient alone therefore does not establish partial accommodation.

2.3 The exchange rate and equity prices

The exchange rate reflects interest rates and prices in the United States relative to those abroad. Higher US interest rates relative to foreign rates strengthen the dollar, while higher expected US prices relative to foreign prices weaken it. Let e_t be the log dollar price of foreign currency, so an increase is a dollar depreciation, and let stars denote foreign variables. I abstract from revisions to

the currency premium to focus on these rate and price channels. I assess this benchmark empirically using relative rates and inflation compensation in Section 6.1, together with currency-option prices and indicators of demand for safe US assets in Appendix D.5. Comparing the returns on dollar and foreign-currency bonds gives uncovered interest parity:

$$e_t^j = \mathbb{E}_t e_{t+1}^j - (i_t^j - i_t^{*,j}). \tag{9}$$

For a given expected future exchange rate, a larger US interest-rate advantage strengthens the dollar today. An announcement can also change the dollar's expected future value through its effect on relative prices. Following the standard stationary open-economy benchmark, I assume that the temporary disturbance leaves the long-run real exchange rate unchanged, while allowing it to respond during the adjustment (Galí and Monacelli, 2005; Galí, 2020). With current goods prices fixed, the long-run nominal exchange-rate response then equals the change in US prices relative to foreign prices.[7] Iterating Equation (9) gives

$$e_0^j = -\sum_{h=0}^{\infty} \mathbb{E}_0 \left(r_h^{c,j} - r_h^{c,*,j} \right), \tag{10}$$

where $r_t^c = i_t - \mathbb{E}_t \pi_{t+1}^c$ uses consumer-price inflation in each economy. What matters for the dollar is therefore the full response of US real rates relative to foreign real rates. This includes the initial real rates as well as later rates, which can rise at some horizons and fall at others. Appendix G derives the expression.

In the numerical illustration, I hold foreign interest-rate and price responses fixed to isolate the Federal Reserve's policy trade-off. The exchange-rate response then reduces to

$$e_0^j = \underbrace{B_\pi^j \xi_1^j}_{\text{US price-level response}} - \underbrace{B_i^j \xi_1^j}_{\text{US nominal-rate path}} \equiv B_e^j \xi_1^j. \tag{11}$$

Under partial accommodation, the price-level effect exceeds the nominal-rate effect and the dollar depreciates. The empirical comparison allows foreign rates and inflation compensation to change and examines the corresponding relative-rate response.

In this numerical benchmark, substituting Equation (6) for supply and demand gives

$$B_e^j = (1 - \phi^j) B_\pi^j - \phi^y B_y^j, \qquad j \in \{d, s\}. \tag{12}$$

A supply disturbance can depreciate the dollar even when $\phi^s > 1$, if the cumulative output decline is large enough to limit the rate increase. Demand instead appreciates the dollar when cumulative inflation and output both rise, with $\phi^d > 1$ and $\phi^y \geq 0$. These different currency responses can also arise with the same inflation coefficient because demand and supply affect activity differently.

[7] Figure 35 reports the responses of US CPI and euro-area HICP to the supply component. After one year, the increase in US consumer prices is larger. These are realised price responses, rather than revisions in expected long-run prices.

The estimated targeted rule determines the strength of the responses in the baseline. Independent monetary tightening also appreciates the dollar when it raises cumulative nominal rates and lowers cumulative inflation.[8]

Equity prices depend on expected profits and the returns investors require to hold equity. I use

$$q_t = \bar{\rho}\mathbb{E}_t q_{t+1} + (1-\bar{\rho})\mathbb{E}_t\widehat{\text{div}}_{t+1} - r_t - \lambda_t^q, \qquad \lambda_t^q = -\Lambda_q y_t. \tag{13}$$

Here q_t is the log equity price in domestic-goods units, $\widehat{\text{div}}_t$ is log real dividends relative to steady state. I allow the required excess return λ_t^q to increase when economic activity weakens, consistent with Campbell and Cochrane (1999) and Campbell et al. (2020). I measure activity using y_t, the same output measure as in the policy rule.

A supply disruption makes production more expensive and reduces firms' profit margins. If investors also expect activity to weaken, they require a higher return to hold stocks. Both effects lower stock prices, while lower real interest rates work in the opposite direction. Stock prices fall when the effects on profits and the required return are stronger. After demand, higher profits and a lower premium support equity prices. They rise when these effects outweigh higher expected real rates, as in the interpretation of Jarociński and Karadi (2020). Appendix G derives the equity responses, written as $q_0^j = B_q^j \xi_1^j$, and the conditions for the three equity signs.

2.4 Announcements and market interpretation

Until now, I have considered one disturbance at a time, assuming that investors know its source and size. Around Federal Reserve announcements, investors use the policy decision and accompanying communication to revise their beliefs about all three disturbances. For simplicity, the Federal Reserve observes the disturbances arriving next quarter and follows a rule understood by investors.[9]

Let $\mathcal{I}_0^-$ and $\mathcal{I}_0^+$ denote information immediately before and after the announcement. The revision about disturbance j is

$$\Delta^j = \mathbb{E}[\xi_1^j \mid \mathcal{I}_0^+] - \mathbb{E}[\xi_1^j \mid \mathcal{I}_0^-]. \tag{14}$$

Consider a positive supply revision in the numerical benchmark. Markets now expect more adverse supply conditions and use the solution in Equation (4) to revise the inflation and interest-rate paths they expect. Since these paths are linear in the disturbance,

$$\Delta^A \mathbb{E}_0 i_h^s = b_{i,h}^s \Delta^s, \qquad \Delta^A e_0^s = (B_\pi^s - B_i^s)\Delta^s, \qquad \Delta^A q_0^s = B_q^s \Delta^s. \tag{15}$$

Under partial accommodation and the equity condition above, this revision depreciates the dol-

[8] Appendix B.1 shows that the results are robust even when I leave the exchange-rate response to the demand component unrestricted. The supply component and its responses are very similar to the baseline results.

[9] Appendix I allows markets to learn about both supply conditions and the Federal Reserve's response to them. The three identifying signs can still hold when the revision towards more adverse supply conditions is large enough, even when markets also revise how much supply-driven inflation they expect the Federal Reserve to tolerate.

lar and lowers equity prices. In Appendix H, I show how investors use the information in the announcement to revise their expectations about economic conditions.

Information about supply conditions can affect how markets interpret both the current policy decision and the Federal Reserve's future response. My empirical analysis focuses on revisions in medium-term interest rates, measured using the forward-guidance factor. This allows me to study announcements even when the current policy rate changes little. In the model, I measure these revisions through changes in the average policy rate that markets expect over the following eight quarters. For each source, define $B_F^j = \frac{1}{8}\sum_{h=1}^{8} b_{i,h}^j$ and $f^j = B_F^j \Delta^j$. The announcement movements are

$$\Delta^A F_0 = f^m + f^d + f^s, \tag{16}$$

$$\Delta^A x_0 = \frac{B_x^m}{B_F^m} f^m + \frac{B_x^d}{B_F^d} f^d + \frac{B_x^s}{B_F^s} f^s, \qquad x \in \{e, q\}. \tag{17}$$

The average excludes today's policy rate. I use the comovement of medium-term interest rates, stock prices and the dollar to distinguish unexpected monetary tightening from what markets learn about demand and supply conditions.

2.5 Calibration and numerical illustration

I estimate the rule using the output gap and the demand- and supply-driven contributions to core PCE inflation constructed by Shapiro (2024). Table 2 reports the baseline estimates.

Table 2: Baseline estimates of the targeted Taylor rule.

	Demand inflation ϕ^d	Supply inflation ϕ^s	Output ϕ^y	Smoothing ρ_i
Estimate	3.928	1.361	0.284	0.836
	(0.927)	(0.586)	(0.087)	(0.030)

Notes: Quarterly data, 1979Q3–2025Q2 (144 observations). Parentheses give standard errors. Long-run coefficient standard errors use the delta method. Quarters with an annualised federal funds rate at or below 0.5 per cent are excluded. Appendix J.1 describes the estimation.

The point estimates suggest a weaker response to supply-driven inflation. I use these coefficients in the baseline calibration. Appendix J.1 gives the estimation details.

I use the extended-sample rule estimates, $\phi^s = 1.361$, $\phi^d = 3.928$, $\phi^y = 0.284$ and $\rho_i = 0.836$. Demand and supply have the same persistence, $\rho_d = \rho_s = 0.95$. I use the same equity-premium coefficient for all three disturbances. Appendix J.2 reports the calibration and shows that it satisfies the conditions for the stock-price responses derived above.

Figure 1 holds the adverse supply disturbance fixed and changes only ϕ^s. Circles mark the estimated rule. Squares set $\phi^s = \phi^d = 3.928$, giving the same inflation coefficient to both sources. Every curve remains a response to supply. A stronger response contains more inflation but pro-

duces a larger cumulative decline in output. At the estimated rule, cumulative inflation exceeds cumulative nominal rates and the dollar depreciates. With the stronger common coefficient, the ordering reverses and the dollar appreciates.

Holding all other baseline parameters fixed, the price-level and nominal-rate effects exactly offset at $\phi^s \simeq 2.18$. Within the range of coefficients shown in the figure, lower values give partial accommodation and dollar depreciation, while higher values give appreciation. This cutoff is specific to the remaining calibration.

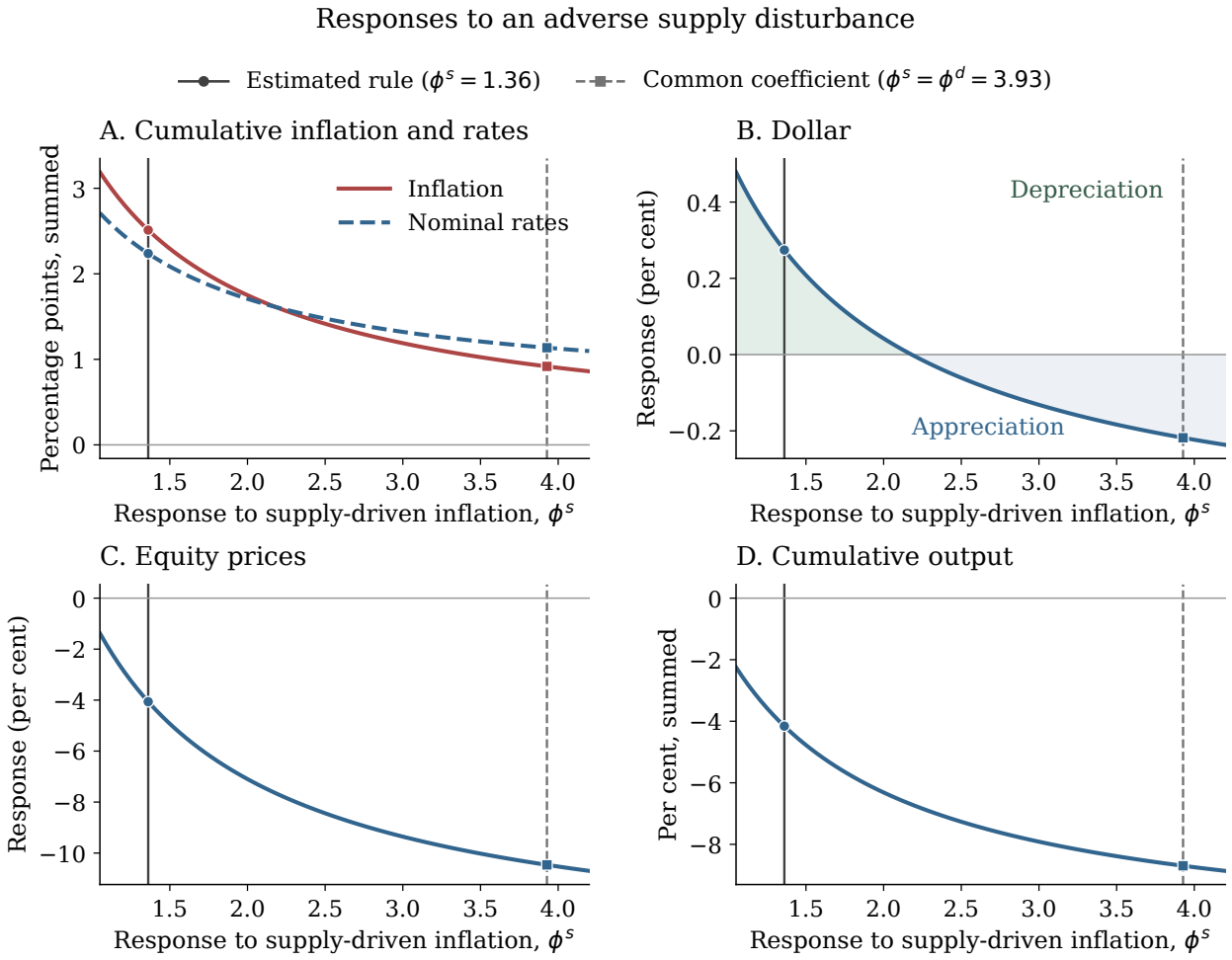


Figure 1: Responses to the same supply disturbance under different policy responses.

Notes: I hold the supply disturbance fixed and vary the response to supply-driven inflation. Circles mark the estimated rule, $\phi^s = 1.361$, and squares give supply and demand inflation the same coefficient, $\phi^s = \phi^d = 3.928$. The disturbance raises the average policy rate expected over quarters 1–8 by 25 annualised basis points under the estimated rule. Inflation, interest rates and output are cumulative responses from the disturbance's arrival. Stock-price and exchange-rate responses are measured when markets learn about the future increase in input prices. An increase in the exchange rate is a dollar depreciation.

With this calibration, supply news raises medium-term interest rates, lowers stock prices and depreciates the dollar. Output and consumption initially rise and then fall. Average expected real

rates decline over both the following two and five years. Appendix J reports these responses and the results using alternative estimates of the policy rule. I also show that the different currency responses can arise when the central bank responds equally to demand- and supply-driven inflation.

3 Data and announcement surprises

I use interest-rate surprises, the S&P 500 return, and the EUR/USD return around Federal Reserve announcements to identify the monetary-policy, demand, and supply components. The data come from the U.S. Monetary Policy Event-Study Database of Acosta et al. (2025). From these interest-rate and asset-price changes, I construct the forward-guidance factor described below.

My sample contains 216 FOMC announcements from February 1999 through May 2025. I take the announcement dates from the updated event list of Jarociński (2024) through September 2024 and add the five subsequent announcements. This list includes some unscheduled policy actions but excludes ten events in the complete database. These include several emergency announcements in March 2020 and the monetary-policy framework speech in August 2020. Appendix C reports the excluded dates.

The announcement window includes both the statement and the press conference when one is held. For meetings with a press conference, I measure changes from ten minutes before the statement to sixty minutes after the press conference begins. For announcements without a press conference, I use the window from ten minutes before to twenty minutes after the statement.

I construct three factors to measure surprises about the current policy rate, forward guidance, and asset purchases, following Gürkaynak et al. (2005) and Swanson (2021). The extraction uses ten series. Two come from federal funds futures: the current-meeting target-rate surprise and the change in the third monthly contract, counting the current month as the first. Three come from the second, third, and fourth quarterly Eurodollar futures contracts through 2021 and SOFR futures contracts from 2022. These contracts provide measures of three-month interest rates at different future dates. The remaining five series are changes in two-, five-, and ten-year Treasury yields, the S&P 500 index return, and the EUR/USD return.

I separate the three factors by imposing restrictions on their loadings and their variation over time. I first standardise the ten series and extract their first three principal components. I then rotate the components so that only the target factor loads on the current-meeting target-rate surprise. Among the other two factors, I choose the asset-purchase factor to maximise its sum of squared observations from September 2008 onward. The remaining factor measures forward guidance. I normalise the target, forward-guidance, and asset-purchase factors to have unit loadings on the standardised current-meeting surprise, two-year Treasury yield, and ten-year Treasury yield, respectively.

I use the forward-guidance factor because announcements can change medium-term interest rates even when the current policy rate does not move. This is particularly important during the periods in my sample when the federal funds rate was at its effective lower bound. A positive

factor represents an upward interest-rate revision associated with forward guidance. This revision can reflect how markets perceive the Federal Reserve's assessment of demand or supply conditions and its response to them. It can also reflect an unexpected monetary tightening.

4 Identification

I use the monthly Bayesian vector autoregression (BVAR) setup of Jarociński and Karadi (2020) to study how the three components transmit to financial markets and the real economy. I change the identification by also using the exchange rate to distinguish perceived supply conditions from unexpected monetary tightening. My identification uses the forward-guidance factor, the S&P 500 return, and the EUR/USD return to separate the monetary-policy, demand, and supply components. A positive EUR/USD return represents a dollar depreciation.[10]

I bring the announcement surprises to monthly frequency by summing their values across announcements within each month. In months without an announcement, I set these sums to zero. I denote the three series by m_t, which contains the forward-guidance factor, the EUR/USD return, and the S&P 500 return measured over the announcement window. The monthly financial and macroeconomic variables are collected in y_t: the two-year Treasury yield, the S&P 500, real GDP, the GDP deflator, and EUR/USD. The stock-price and exchange-rate variables in y_t measure their monthly levels, while those in m_t measure only their announcement-window changes.

I include the two-year Treasury yield to study the response of interest rates beyond the current policy rate. This is important during the periods when the federal funds rate was at its effective lower bound. Real GDP and the GDP deflator are observed quarterly. I interpolate them to monthly frequency using the Stock–Watson procedure described in Appendix C (Stock and Watson, 2010).

I treat the announcement surprises as unpredictable from lagged variables in the BVAR. I therefore set their intercept and lag coefficients to zero. The monthly financial and macroeconomic variables depend on twelve lags of both groups of variables and can respond to announcement news within the same month. The system is

$$\begin{pmatrix} m_t \\ y_t \end{pmatrix} = \sum_{p=1}^{P} \begin{pmatrix} 0 & 0 \\ B_{ym}^{p} & B_{yy}^{p} \end{pmatrix} \begin{pmatrix} m_{t-p} \\ y_{t-p} \end{pmatrix} + \begin{pmatrix} 0 \\ c_y \end{pmatrix} + \begin{pmatrix} u_t^m \\ u_t^y \end{pmatrix}, \qquad \begin{pmatrix} u_t^m \\ u_t^y \end{pmatrix} \sim \mathcal{N}(0, \Sigma), \tag{18}$$

where $P = 12$. In Section 5.3, I separately test whether public news available before a meeting predicts the identified components. I estimate the BVAR using a Minnesota prior. Appendix A reports the prior, estimation procedure, and diagnostics.

I identify the three announcement components by restricting their effects on m_t. Let $u_t = B\varepsilon_t$,

[10] Appendix C.4 repeats the identification using DXY, a broader measure of dollar movements. Since stocks and the exchange rate also enter the factor extraction, Appendix C.3 repeats the analysis using a forward-guidance factor constructed from interest rates alone. The resulting supply component has a correlation of 0.92 with my baseline component. I retain stock prices and the exchange rate in the factor extraction so that the factors also use information from these asset-price movements. This choice is motivated by Boehm and Kroner (2026) and Bauer et al. (2026), who show that Federal Reserve announcements generate movements in risk-sensitive asset prices that interest-rate surprises alone do not fully explain.

where u_t contains the reduced-form innovations and ε_t contains mutually uncorrelated structural innovations with unit variance. The matrix B gives their impact effects. I impose that the remaining macroeconomic shocks have zero impact on the announcement surprises. The three announcement components can affect all the variables in y_t immediately.

I choose the signs so that a positive value represents unexpected monetary tightening, more adverse perceived supply conditions, or stronger perceived demand. All three raise the forward-guidance factor. Monetary tightening lowers stock prices and appreciates the dollar. The supply component also lowers stock prices, but depreciates the dollar. The demand component raises stock prices and appreciates the dollar. Table 3 reports these restrictions, which follow the model in Section 2. I impose them only on the announcement surprises. The responses of the monthly variables, including output, prices, and the two-year yield, are unrestricted both on impact and at subsequent horizons.

Table 3: Identifying restrictions on the impact matrix.

	Monetary policy	Supply component	Demand component	Macro shocks
Forward-guidance factor	+	+	+	0
EUR/USD	−	+	−	0
S&P 500	−	−	+	0
Macroeconomic block y_t	•	•	•	•

Notes: sign (+, −), zero (0), and unrestricted (•) restrictions on the contemporaneous response of each variable to each structural innovation. The three announcement surprises respond only to the three announcement components (zeros in the last column) and with the signs of the model in Table 1; the macroeconomic block responds freely. EUR/USD is positive when the dollar depreciates.

For each posterior draw, I retain rotations that satisfy the signs in Table 3. I report responses to a one-standard-deviation component. Appendix A describes the estimation and identification procedure.

My supply component measures revisions in how markets perceive supply conditions and the Federal Reserve's response to them. Under the model, more adverse supply conditions can raise expected policy rates while lowering stock prices and depreciating the dollar when markets expect partial accommodation. An announcement may also change the degree of accommodation markets expect. The identification does not separately measure these two revisions. The next section examines what the component captures using narrative evidence, commodity prices, and external measures of economic news.

5 Evidence on the supply component

I use three exercises to study what my supply component captures. First, I compare it with commodity prices and discuss narrative evidence on some key dates, using the Federal Reserve statements and press conferences together with the movements in interest rates and the dollar.

Second, I show whether past oil-supply surprises identified around OPEC announcements predict my supply component. Third, I examine which past economic news predicts the supply, monetary-policy, and demand components.

5.1 Announcement history and commodity prices

Figure 2 plots the supply component for every announcement in the sample together with the commodity-price index, and Figure 3 compares the standardised cumulative sum of the supply component with the standardised log commodity-price index. Both figures show how my supply component moves with commodity prices. In Figure 2, periods in which the supply component is positive, shown by red dots, tend to coincide with periods in which commodity prices increase. Negative components, shown by blue dots, tend to coincide with decreasing commodity prices. Figure 3 then shows how, when I sum the supply component over time, it follows the log commodity-price index. This gives me visual evidence that my supply component is related to commodity-price pressures.

In this section, I also discuss narrative evidence on three key dates: April 2011, December 2021, and March 2022. I focus on the supply conditions perceived by the Federal Reserve, its policy response, and the movements in expected rates and the dollar. Appendix D.1 discusses the remaining episodes among the twenty largest observations in each tail.

The April 2011 press conference shows the trade-off behind partial accommodation. The statement linked part of the increase in oil prices to "concerns about global supplies of crude oil" and expected its effect on inflation to be transitory. When Bernanke was asked what the Federal Reserve could do about higher gasoline and food prices, he called the increase in oil prices a "double whammy": it raised inflation but also reduced households' purchasing power and growth. He said that little could be done about gasoline prices "without derailing growth entirely" and added that the Federal Reserve could not create more oil. Policy would instead try to stop the increase from passing into other prices and wages. The Federal Reserve would therefore not offset all the initial inflation because of the effect on growth.

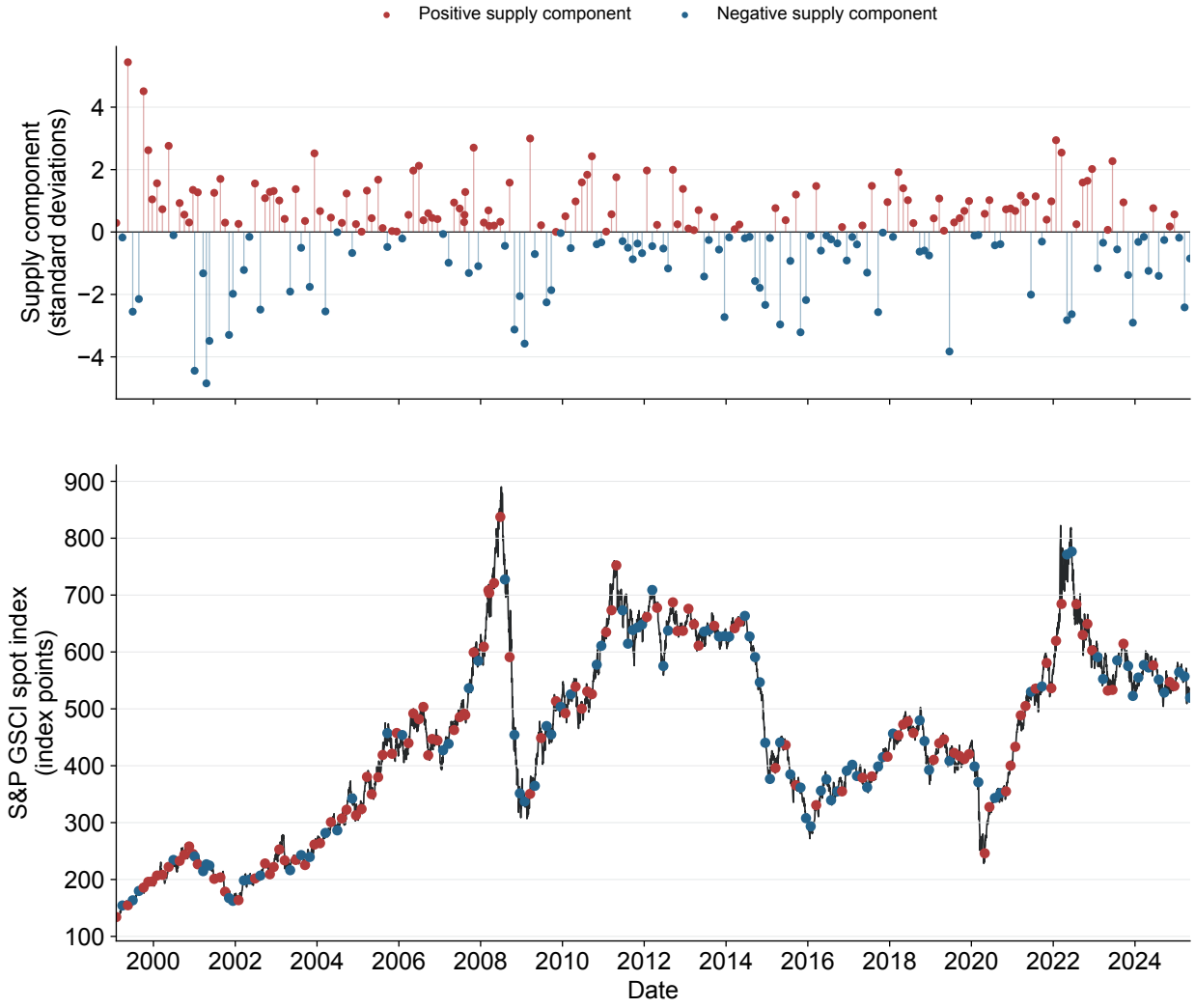
The April 2011 announcement combines a positive forward-guidance factor with a depreciation of the dollar. The factor is small: its value of 0.25 corresponds to one quarter of a standard deviation in announcement-window movements in the two-year Treasury yield. The dollar depreciates by 0.59 per cent, and the decomposition assigns 1.8 standard deviations to the supply component.[11] Contemporary reporting makes the same distinction. Reuters attributed the dollar decline to Bernanke's indication that the Federal Reserve was in no hurry to tighten and to the weaker near-term outlook.[12]

At the December 2021 meeting, the Federal Reserve attributed persistent inflation to supply constraints and signalled a gradual increase in interest rates. Powell said that bottlenecks and

[11] The announcement also contains a large dovish monetary-policy component: the raw two-year Treasury yield falls by 2.8 basis points and equity prices rise.

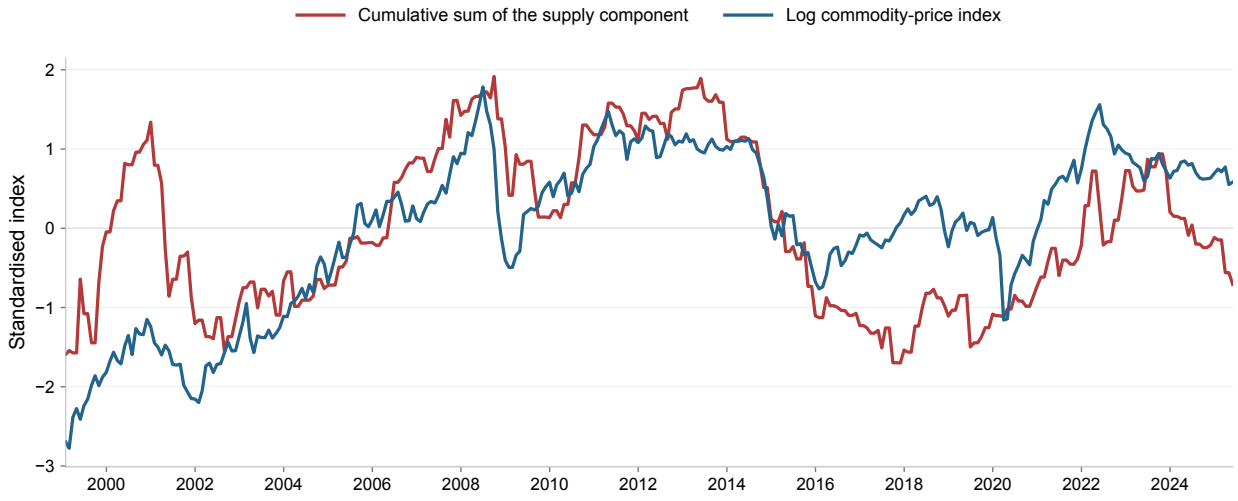
[12] FOMC statement and press conference of April 27, 2011; Reuters, "Dollar slide continues after Fed's Bernanke speaks", April 27, 2011.

Figure 2: The supply component around Federal Reserve announcements and commodity prices.



Notes: All announcements in 1999–2025. Red indicates positive supply components and blue indicates negative components. Dots on the daily S&P GSCI spot index mark the same announcement dates. Appendix D.1 discusses the largest observations in each tail.

Figure 3: The cumulative sum of the supply component and the log commodity-price index.



Notes: January 1999–May 2025. The supply component is summed within months and cumulated, with zero added in months without an announcement. Commodity prices are the log month-end S&P GSCI spot index. Each series is demeaned and divided by its own full-sample standard deviation.

supply constraints were "limiting how quickly production can respond" and had been "larger and longer lasting than anticipated." Inflation was therefore expected to remain well above two per cent into the following year. The Federal Reserve responded by accelerating the end of its asset purchases, and the projected policy rate for the end of 2022 rose from 0.3 to 0.9 per cent. Powell described the expected adjustment as a "gradual pace of policy firming."[13] Powell therefore described supply-driven inflation as more persistent, but the expected adjustment in interest rates as gradual.

Across the full December 2021 announcement, medium-term interest rates rise while the dollar depreciates. The forward-guidance factor is positive, at 1.49, and the dollar depreciates by 0.31 per cent. During Powell's press conference, the dollar depreciates by 0.46 per cent. The decomposition assigns one standard deviation to the supply component, so the supply-related revision is large relative to a typical announcement in the sample.

The March 2022 press conference links the change in the Federal Reserve's projections directly to the new supply pressures from the war in Ukraine. The Federal Reserve lowered its growth projection for 2022 from 4 to 2.8 per cent. When asked whether this revision reflected tighter monetary policy, Powell said that this was not a large part of it. He instead pointed to the spillovers from the war, including higher oil and commodity prices that would "weigh on GDP." He also said that the war could make supply chains more tangled and delay their expected improvement. At the same meeting, the Federal Reserve raised the current policy rate by 25 basis points and projected a rate of 1.9 per cent at the end of 2022, while its inflation projection rose to 4.3 per cent.

[13] FOMC statement, Summary of Economic Projections, and press conference of December 15, 2021; Reuters, "Fed signals three rate hikes in the cards in 2022 as inflation fight begins", December 15, 2021.

Across the full March 2022 announcement, medium-term interest rates also rise while the dollar depreciates. The forward-guidance factor is positive, at 1.03, and the dollar depreciates by 0.34 per cent. The depreciation occurs during Powell's press conference, when the dollar falls by 0.55 per cent. The supply component reaches 2.5 standard deviations. Reuters also reported that the dollar fell because the meeting delivered no additional hawkish surprise and investors reduced some of their more aggressive policy bets.[14]

Appendix D.1 applies the same approach to the other large positive and negative observations of the supply component and reports the complete rankings.

5.2 Independent oil-supply news

I also show that past oil-supply news predicts the supply component of monetary-policy surprises, whereas it does not predict the demand or monetary-policy component. I use the oil-supply surprises identified by Känzig (2021). Känzig measures revisions in expectations about future oil supply using daily changes in oil futures prices around production announcements by the Organization of the Petroleum Exporting Countries (OPEC). This exercise therefore shows that a measure used in the literature to study the macroeconomic transmission of oil-supply shocks is also related to FOMC monetary-policy surprises, but specifically to the supply component I identify.

To study this relationship, I regress each of my three components on the most recent oil-supply surprise identified by Känzig. For each FOMC meeting, I use the nearest earlier OPEC announcement within thirty, sixty, ninety, or one hundred and eighty days. I consider two measures. The first is Känzig's principal-component measure, which summarises the daily changes in West Texas Intermediate (WTI) crude-oil futures with maturities from one to twelve months. The second is the change in the front-month futures contract. Table 4 reports the results for each component and window.

Both the principal-component measure and the front-month futures measure predict the supply component. The relationship is strongest when the OPEC announcement occurs within thirty days of the FOMC meeting: the two measures have t-statistics of 2.73 and 2.96. As I extend the window to include oil-supply surprises further away from the FOMC announcement, the relationship becomes less clear, although the coefficients remain positive and most are statistically significant. I do not find the same pattern for the other two components. The demand component is unrelated to both oil measures in every specification, while the estimates for the monetary-policy component are generally small and insignificant.

5.3 Public news and existing monetary-policy surprises

I run a further exercise where I ask which past economic news predicts my supply component, together with the monetary-policy and demand components. I follow Bauer and Swanson (2023b), who show that monetary-policy surprises are predictable using six pieces of economic news. These

[14] FOMC statement, Summary of Economic Projections, and press conference of March 16, 2022; Reuters, "Dollar falls as hawkish Fed delivers without an extra kick", March 16, 2022.

Table 4: Prior oil-supply news and the three FOMC-day components.

Measure	Window	Supply component	Monetary policy	Demand component	N
Principal component	30 days	$+0.149^{***}$	$+0.013$	$+0.025$	84
		(2.73)	(0.33)	(0.41)	
	60 days	$+0.115^{*}$	$+0.060$	$+0.015$	139
		(1.89)	(1.53)	(0.32)	
	90 days	$+0.076$	$+0.038$	$+0.001$	156
		(1.49)	(1.14)	(0.04)	
	180 days	$+0.081^{**}$	$+0.046^{*}$	-0.002	209
		(2.26)	(1.73)	(-0.07)	
Front contract	30 days	$+0.134^{***}$	$+0.014$	$+0.021$	84
		(2.96)	(0.46)	(0.42)	
	60 days	$+0.123^{**}$	$+0.051$	$+0.013$	139
		(2.31)	(1.48)	(0.35)	
	90 days	$+0.086^{*}$	$+0.033$	$+0.001$	156
		(1.81)	(1.14)	(0.04)	
	180 days	$+0.080^{**}$	$+0.038$	$+0.003$	209
		(2.21)	(1.59)	(0.13)	

Notes: OLS of each identified FOMC-day component on the Känzig (2021) oil-supply-news shock at the nearest OPEC announcement in the W days before the meeting, one regression per cell, with t-statistics in parentheses and *, **, *** marking significance at the 10, 5, and 1 per cent levels. The principal-component measure aggregates the OPEC-day response of the oil futures curve. The front-contract measure is the front-month futures price change. N is the number of FOMC meetings with an OPEC announcement inside the window. Full 1999–2025 sample.

are the most recent nonfarm-payroll surprise, payroll growth over the previous year, changes over the previous three months in the S&P 500, the slope of the yield curve and commodity prices, and the option-implied skewness of the ten-year Treasury yield. They show that controlling for this news is important because markets may underestimate the Federal Reserve's response to it. Monetary-policy surprises can then be correlated with the systematic component of monetary policy.

I run the same exercise for each of my three components. The supply component is predicted mainly by news related to commodity prices, whereas the demand component picks up news related to payrolls, the stock market, and Treasury skewness. Commodity-price growth has a coefficient of 0.40 and a t-statistic of 3.25 for the supply component, but does not predict the other two components. Once I separate the supply and demand components from forward guidance, the remaining monetary-policy component is not predicted by any of the six pieces of news, either individually or jointly. The joint p-value is 0.48. This supports interpreting this component as an unexpected monetary-policy decision. Table 5 reports the results.

Table 5: Which news predicts which announcement component.

	Forward guidance	Monetary policy	Supply component	Demand component
Payroll surprise	0.06***	−0.04	0.15**	0.09**
	(2.79)	(−0.87)	(2.49)	(2.20)
Payroll growth, 12m	0.13***	0.05	0.13	0.22***
	(3.07)	(0.44)	(0.91)	(2.72)
S&P 500, 3m	0.15***	0.15	−0.08	0.30***
	(2.92)	(1.38)	(−0.67)	(3.19)
Yield-curve slope, 3m	−0.06	−0.02	−0.15	−0.06
	(−1.49)	(−0.18)	(−1.57)	(−0.90)
Commodity prices, 3m	0.08*	−0.05	0.40***	0.06
	(1.76)	(−0.53)	(3.25)	(0.68)
Treasury skewness	0.13**	0.10	0.13	0.20**
	(2.57)	(1.11)	(1.19)	(2.10)
R^2	0.21	0.03	0.10	0.17
Joint p-value	< 0.001	0.480	0.002	< 0.001
Meetings	199	199	199	199

Notes: OLS of the raw forward-guidance surprise and the three identified components (columns) on the six pre-announcement news variables of Bauer and Swanson (2023b) (rows), standardised, with heteroskedasticity-robust t-statistics in parentheses; *, **, and *** denote two-sided significance at the 10, 5, and 1 per cent levels. Payroll surprise is the latest nonfarm-payrolls surprise before the meeting; payroll growth is its twelve-month log change; the S&P 500, yield-curve-slope, and commodity-price variables are thirteen-week changes; Treasury skewness is the option-implied skewness of the ten-year yield. Scheduled FOMC meetings, 1999–2023.

The last exercise is again related to Bauer and Swanson (2023b). I show that their measure of unexpected monetary policy remains correlated with my supply component, but not with the demand component, even after they control for public news. Before their correction, its correlations with the supply and demand components are 0.42 and 0.23. After the correction, the correlation with demand falls to 0.11 and is no longer statistically significant, while the correlation with supply remains 0.31 and statistically significant. This exercise shows that monetary-policy surprises may still contain revisions in how markets assess supply conditions and the Federal Reserve's response to them. Controlling for their measures of public news does not therefore remove all the variation associated with my supply component. I use the exchange rate, together with interest rates and stock prices, to separate this supply-related variation from unexpected monetary tightening.

Table 6: The Bauer–Swanson surprises and the three components.

	Monetary policy	Supply component	Demand component	Joint R^2
MPS	$+0.55^{***}$	$+0.42^{***}$	$+0.23^{**}$	0.50
	(+6.42)	(+5.15)	(+2.04)	
$MPS^{\perp}$	$+0.52^{***}$	$+0.31^{***}$	+0.11	0.36
	(+6.35)	(+3.92)	(+1.08)	
$MPS^{\perp}$, residualised components	$+0.53^{***}$	$+0.35^{***}$	+0.13	0.43
	(+6.82)	(+4.62)	(+1.17)	

Notes: correlations of the Bauer and Swanson (2023b) monetary policy surprise (MPS) and its orthogonalised version ($MPS^{\perp}$) with the three identified components, all aggregated to FOMC months, 1999–2023. The third row first residualises each component on the same six pre-meeting variables. The last column is the R^2 from regressing the row variable on the three components jointly. Heteroskedasticity- robust t-statistics are in parentheses; *, **, and *** denote two-sided significance at the 10, 5, and 1 per cent levels. All series are standardised.

6 Financial and macroeconomic responses

This section reports how the monetary-policy, supply, and demand components propagate to financial markets and the real economy. To study their effects on financial markets, I regress changes in asset prices around announcements on the three components. I then study their effects after the announcement using daily local projections following Jordà (2005). To study their transmission to the real economy, I use the monthly Bayesian vector autoregression described in Section 4, which estimates how output, prices, and financial variables respond over time.

I have two main results. First, the supply component raises nominal yields through upward revisions to future policy rates, with little change in term premia. The average expected real rate rises only slightly, while real forward rates fall further ahead. The estimated total real-rate revision over the next ten years is negative. The US market real-rate measure also falls relative to the euro area over the second year. The same sign appears, less precisely, at five- and ten-year maturities. These findings are consistent with the model's exchange-rate mechanism: under partial accommodation, the increase in nominal rates need not fully offset higher expected inflation. The expected US real-rate path can therefore fall relative to foreign rates and weaken the dollar, even as medium-term nominal rates rise. Stock-market volatility also rises, as measured by the VIX. Second, the monthly responses show that the supply component raises prices while real GDP changes little. The increase in prices is concentrated in the supply-driven categories identified by Shapiro (2024), and is accompanied by higher commodity prices and greater pressure on global supply chains. In contrast, the monetary-policy component lowers both economic activity and prices.

6.1 Responses around announcements

Table 7 first shows that, over the announcement day, the two-year nominal yield, the stock market, and the exchange rate move in the directions implied by the identification of the three components. For a one-standard-deviation monetary-policy component, the two-year yield increases by 3.1 basis points, stock prices fall by 0.4 per cent, and the dollar appreciates by 0.4 per cent. The demand component raises the two-year yield by 1.8 basis points and stock prices by 0.2 per cent, while the dollar appreciates by 0.1 per cent. These changes are measured from the previous trading day's close to the end of the announcement day, extending beyond the narrow window used for identification.

Table 7: Asset-price responses on the announcement day.

	Monetary policy	Supply component	Demand component
Two-year nominal yield, 1999–2025	$+3.1^{***}$	$+0.9^{**}$	$+1.8^{***}$
	(+6.38)	(+2.48)	(+4.17)
S&P 500, 1999–2025	-0.4^{***}	-0.1^{**}	$+0.2^{***}$
	(−5.93)	(−2.14)	(+2.92)
EUR/USD, 1999–2025	-0.4^{***}	$+0.1^{**}$	-0.1^{**}
	(−7.40)	(+2.38)	(−2.16)
Two-year TIPS yield, 2005–2025	$+5.8^{***}$	$+1.3^{**}$	$+3.3^{***}$
	(+9.69)	(+2.29)	(+5.31)
VIX, 1999–2025	$+0.5^{***}$	$+0.1^{**}$	-0.3^{*}
	(+3.38)	(+2.08)	(−1.80)

Notes: each entry is the response to a one-standard-deviation component from an event-level local projection at horizon zero. The outcome is the cumulative change from the day before the meeting to the end of the announcement day. Yields are in basis points, the S&P 500 and EUR/USD in per cent, and the VIX in index points. A positive EUR/USD response is a dollar depreciation. Heteroskedasticity-robust t-statistics are in parentheses. *, **, and *** denote significance at the 10, 5, and 1 per cent levels. The yield on Treasury Inflation-Protected Securities (TIPS) is reported from 2005 because short-maturity TIPS were less liquid earlier in the sample.

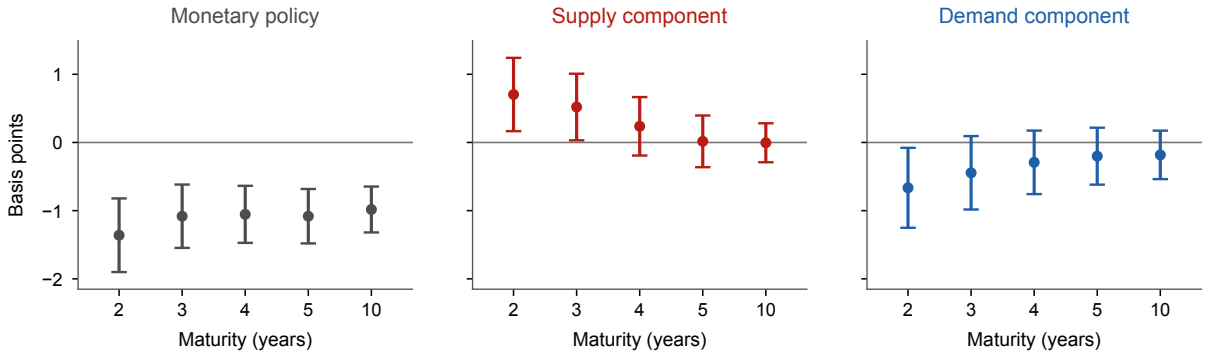
Table 7 also shows that the supply component raises the two-year nominal yield by less than the other two components, while lowering stock prices, depreciating the dollar, and increasing stock-market volatility. A one-standard-deviation supply component raises the yield by 0.9 basis point, lowers stock prices by 0.1 per cent, depreciates the dollar by 0.1 per cent, and raises the VIX by 0.1 index point. All four responses are statistically significant. These movements are consistent with the interpretation of partial accommodation in the model: nominal interest rates rise, but the dollar depreciates and stock prices fall.

I also study the announcement-day responses of breakeven inflation using the measures constructed by Gürkaynak et al. (2010). These measures are the differences between nominal and inflation-protected zero-coupon Treasury yields at the same maturity. I use them to examine how the three components affect inflation compensation on the announcement day and, in particular, whether the supply component raises it. For each maturity, I regress the change from the previous

trading day's close to the announcement day's close on the three components jointly.[15]

Figure 4 shows that the supply component raises inflation compensation at shorter maturities. The two-year measure rises by 0.70 basis point and the three-year measure by 0.52 basis point, with the increases statistically significant at the 5 and 10 per cent levels, respectively. The estimated response becomes smaller at longer maturities and is close to zero at five and ten years. This pattern is consistent with markets expecting the inflationary pressure to be concentrated in the near term. The monetary-policy component lowers inflation compensation at every maturity. The demand component has a slightly negative two-year response, significant at the 10 per cent level, while its longer-maturity responses are smaller and not statistically significant.

Figure 4: Breakeven inflation responses on the announcement day.



Notes: OLS responses of two-, three-, four-, five-, and ten-year breakeven inflation from Gürkaynak et al. (2010). The sample contains 158 FOMC announcements from January 2005 through May 2025, excluding July 2008 through June 2009. The dependent variable is the change from the preceding trading day's close to the announcement day's close, in basis points. Each regression includes an intercept and the three components jointly. The components retain their baseline normalisation. Dots show coefficients and whiskers show pointwise 90 per cent confidence intervals using heteroskedasticity-robust (HC1) standard errors. Breakevens include inflation-risk and liquidity premia.

I also show that the supply and monetary-policy components explain part of the Fed non-yield shock of Boehm and Kroner (2026). They identify asset-price movements around Federal Reserve announcements that changes in the yield curve do not explain. My supply component explains about 7 per cent of their measure and the monetary-policy component explains about 15 per cent. Together, the three components explain 23 per cent. The demand component explains

[15] I use the dollar rather than breakeven inflation in the identification for several reasons. First, TIPS were less liquid in the early years of the market, particularly at short maturities (Gürkaynak et al., 2010; Nakamura and Steinsson, 2018). I therefore start this exercise in 2005, which leaves out the first six years of my identification sample. Second, the disruption to TIPS liquidity during the financial crisis makes breakevens harder to interpret. Following Nakamura and Steinsson (2018), I exclude July 2008 through June 2009 from this exercise. Using the same restriction for identification would also remove policy announcements during the financial crisis. Third, breakevens contain inflation risk and liquidity premia as well as expected inflation (Gürkaynak et al., 2010). Their maturities also matter: the shortest measure used here covers two years, so an increase in inflation expected to last only a few months is averaged over a much longer period. In the model, the dollar responds to perceived supply conditions and the expected policy response even when the inflationary pressure is temporary. I therefore use breakevens as an additional check on the interpretation of the components.

less than 1 per cent. This result adds to the distinction I make in the introduction: looking only at revisions associated with a positive economic outlook misses supply news, which is related to part of these otherwise unexplained asset-price movements. Figure 30 in Appendix D.6 reports these comparisons.

My components can explain part of their measure even though they change interest rates. The reason is that an announcement can contain different news whose effects on rates offset each other. For example, adverse supply news raises interest rates, while unexpected monetary easing lowers them. Both depreciate the dollar. We can therefore observe a depreciation with little change in yields, even though each component changes rates.[16] In my data, the supply component is positively correlated with their measure, while unexpected monetary tightening is negatively correlated with it. This is consistent with the possibility discussed by Boehm and Kroner (2026) that their non-yield shock combines several underlying shocks.

To examine the exchange-rate mechanism, I first ask whether the increase in US nominal yields following supply information comes from revisions to future rates or term premia, and how much real-rate tightening it implies. I separate the two-year yield into the average expected short rate over the next two years and a term premium, which is the compensation investors require for holding a longer-maturity bond. Using the decomposition of Adrian et al. (2013), I find that the supply component raises the fitted two-year yield by 1.1 basis points and expected short rates by 1.2 basis points, with no statistically significant change in the term premium. The increase in nominal yields therefore comes from higher expected future rates. Table 8 reports these results together with the decomposition of real yields.

The increase in expected nominal rates following the supply component is accompanied by only a small increase in expected real rates. The nominal decomposition above does not tell us how much of the increase in expected rates compensates for expected inflation. I therefore use the decomposition of D'Amico et al. (2018) to measure the average expected short real rate over the next five years, the shortest horizon available in their data. On the announcement day, this measure rises by only 0.3 basis point after the supply component, compared with 1.4 basis points after monetary policy and 0.9 basis point after demand. I find no statistically significant change in the five-year real term premium following the supply component.

I also examine real forward rates and the total real-rate revision over the next ten years. Real forward rates fall at longer horizons after the supply component, and the estimated total revision is negative, although imprecisely estimated. Monetary-policy and demand news instead produce positive total revisions. Appendix D.2 reports these results.

The exchange-rate equation in the model depends on the path of US real rates relative to those abroad. I therefore compare US and euro-area market real-rate measures over the first

[16] To see this, suppose there are two independent shocks, z_s for adverse supply news and z_m for monetary tightening, each with variance one. Let the yield change be $g = z_s + z_m$ and consider the measure $n = z_s - z_m$. Its covariance with the yield change is $\mathrm{Cov}(g, n) = \mathrm{Var}(z_s) - \mathrm{Var}(z_m) = 0$: the two terms cancel. But its covariance with supply is $\mathrm{Cov}(n, z_s) = 1$, and with monetary tightening it is $\mathrm{Cov}(n, z_m) = -1$. So n is related to both shocks even though it is uncorrelated with their combined effect on yields. I use this example to explain the distinction, not to estimate the composition of BK's factor.

Table 8: Expected-rate and term-premium responses on the announcement day.

	Monetary policy	Supply component	Demand component
ACM fitted nominal yield, two years	3.81***	1.14***	2.01***
	(13.88)	(5.89)	(5.89)
ACM expected short rates, two years	3.00***	1.20***	1.69***
	(11.12)	(6.40)	(4.69)
ACM nominal term premium, two years	0.81***	-0.06	0.32*
	(2.89)	(-0.34)	(1.90)
DKW expected real rates, five years	1.38***	0.27***	0.89***
	(11.31)	(2.84)	(4.69)
DKW real term premium, five years	1.30***	0.01	0.68***
	(7.15)	(0.11)	(4.75)

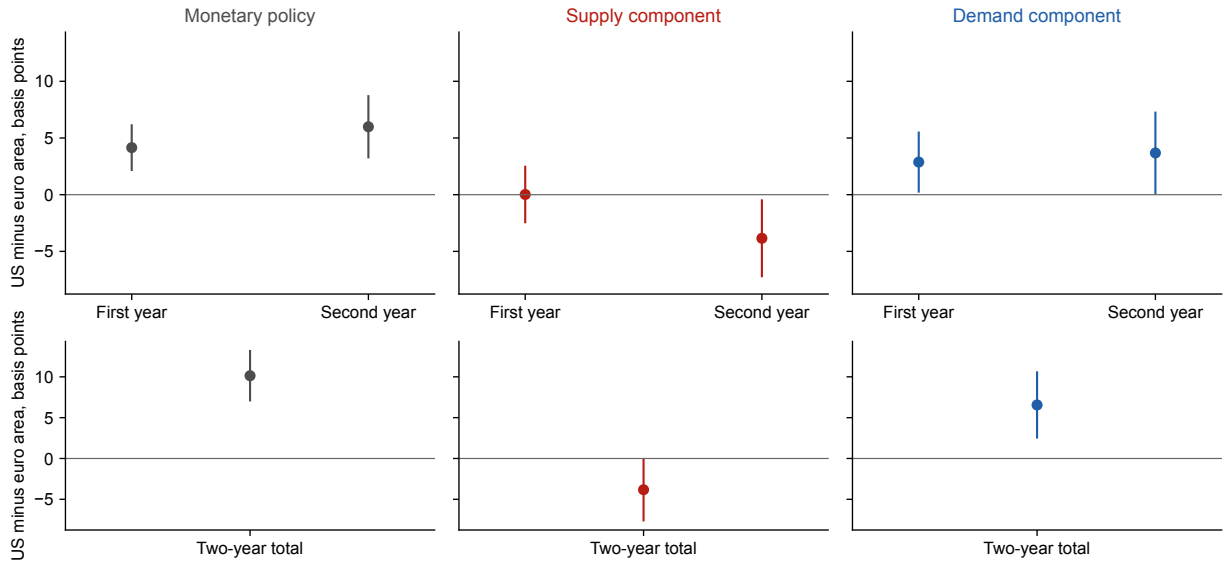
Notes: responses in basis points to a one-standard-deviation announcement component. Each row is estimated by regressing the change from the preceding trading day to the end of the announcement day on the three components jointly. Heteroskedasticity-robust t-statistics are in parentheses. The nominal decomposition uses the 1999–2025 sample. The D'Amico–Kim–Wei estimates use the 2005–2025 sample. Uncertainty in the estimated yield decompositions is not included in the reported standard errors. *, **, and *** denote significance at the 10, 5, and 1 per cent levels.

and second years after an announcement. For each economy, I combine nominal OIS rates with inflation swaps at one- and two-year maturities. I use daily closing data from LSEG Workspace and measure changes from the close before the Federal Reserve announcement to the close on the following trading day. This two-day window allows both US and euro-area rates to respond to the announcement, which takes place after European markets close. The common sample contains 133 announcements from August 2008 through May 2025.

Figure 5 shows a stark contrast between the supply component and the other two components. After the supply component, the US real-rate measure relative to the euro-area measure is close to zero over the first year and falls by 3.9 basis points over the second year. Its total response over the two years is −3.8 basis points. This decline is consistent with the model: higher inflation compensation can offset the increase in nominal rates and lower US real rates relative to those in the euro area. Monetary-policy and demand information instead raise the relative real-rate measure in both years, producing two-year totals of 10.1 and 6.6 basis points. Appendix D.3 repeats the comparison at five and ten years.[17]

[17] Appendix D.5 complements this evidence with currency-option prices and indicators of demand for safe US assets. One- and three-month EUR/USD risk reversals do not respond significantly to the supply component, and the Treasury convenience yield shows no persistent increase.

Figure 5: One- and two-year US–euro-area real-rate differentials.



Notes: responses of the US minus euro-area market real-rate measure to a one-standard-deviation component. The measure combines nominal OIS rates and inflation swaps. The top row reports the contribution over the first and second years. The bottom row reports their two-year total. The second-year contribution equals the two-year total less the first-year contribution. The sample contains 133 announcements from August 2008 through May 2025. Changes are measured from the close before the Federal Reserve announcement to the close on the following trading day, using common start and end dates across the eight series. Each regression includes an intercept and the three components jointly. Whiskers are pointwise 90 per cent confidence intervals using conventional OLS standard errors. Daily closing OIS and inflation-swap rates are from LSEG Workspace. These market measures can also contain term, inflation-risk and liquidity premia.

6.2 Daily responses

I then use daily local projections following Jordà (2005) to study how the three components transmit to financial markets over the following thirty trading days. I show that the supply component is followed by a dollar depreciation that lasts for about twenty trading days, a decline in stock prices, an increase in the VIX, and little persistent tightening in expected real rates.

For each variable, I estimate its change from the trading day before the announcement to day h after it:

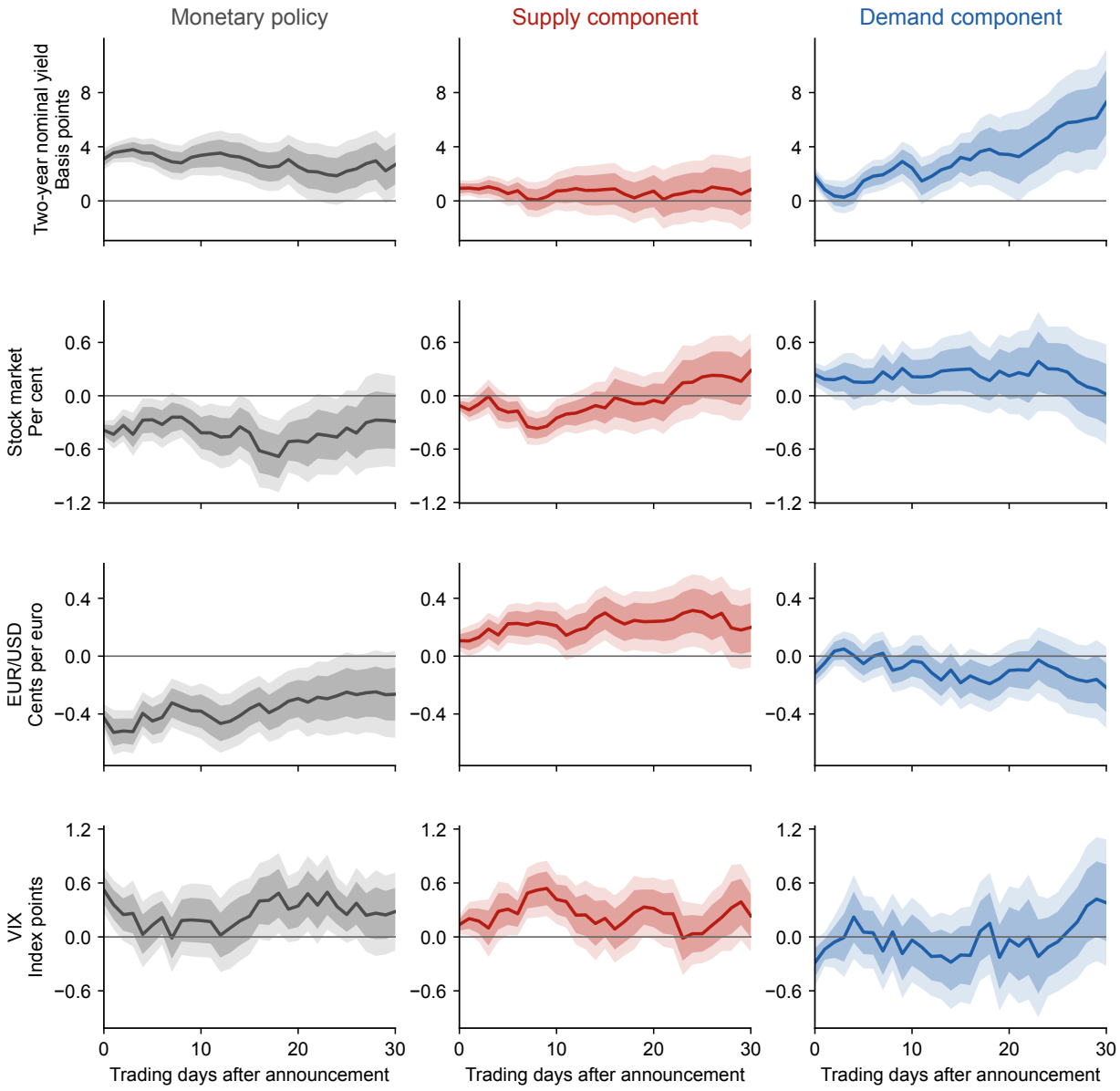
$$y_{i,h} - y_{i,-1} = \alpha_h + \beta_h^{\text{mp}} \varepsilon_i^{\text{mp}} + \beta_h^{\text{sup}} \varepsilon_i^{\text{sup}} + \beta_h^{\text{dem}} \varepsilon_i^{\text{dem}} + u_{i,h}. \tag{19}$$

Here i denotes the meeting and h the number of trading days after it. The three components enter together and are each scaled to one standard deviation.

Figure 6 shows that equity prices fall by about 0.25 per cent within ten days after the supply component before recovering. Its nominal-yield response becomes imprecisely estimated.

The decline in stock prices after the supply component is accompanied by an increase in expected stock-market volatility. The VIX rises by 0.1 index point on the announcement day and by 0.4 point after ten trading days, before the response fades. Together with the fall in equity prices, the increase in the VIX is consistent with markets revising towards more adverse economic conditions.

Figure 6: Daily asset-price responses after Federal Reserve announcements.

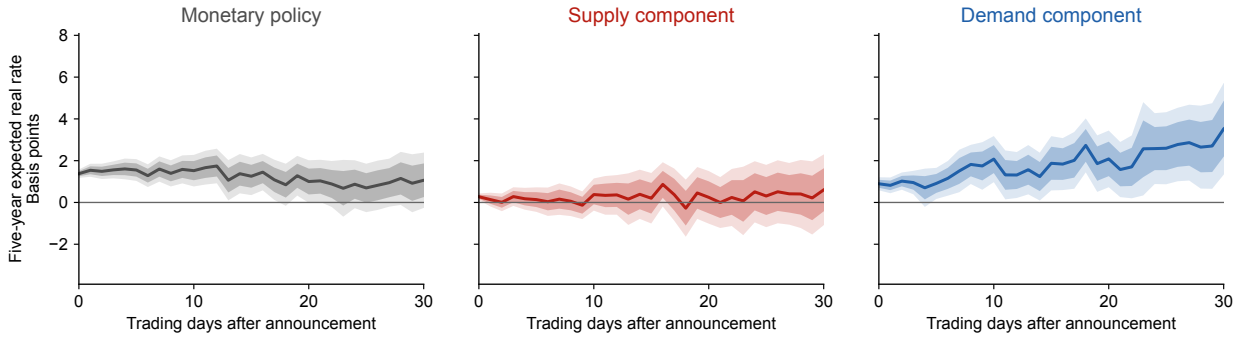


Notes: Event-level local projections from 1999 to 2025. The dependent variable is the cumulative change from the day before the announcement to the horizon shown. A rise in EUR/USD is a dollar depreciation. Solid lines are point estimates; inner and outer bands are 68 and 90 per cent confidence intervals. The three components enter each regression jointly.

The monetary-policy component produces the financial responses expected after an unexpected tightening: the two-year nominal yield rises, stock prices fall, the dollar appreciates, and the VIX increases. The yield remains about three basis points higher after thirty trading days. Following the demand component, the yield also rises, reaching about seven basis points after thirty trading days, but the VIX initially falls. The decline in expected stock-market volatility is consistent with the stronger economic outlook associated with demand news.

I find little evidence that the initial increase in expected real rates after the supply component develops into persistent tightening. I use the same daily regressions to follow the average expected short real rate over the next five years, measured using the D'Amico–Kim–Wei decomposition. The five years refer to the future rates included in this average. The thirty trading days refer to how long I follow changes in that average after the announcement. After rising by 0.3 basis point on the announcement day, its response remains small and is imprecisely estimated over the following month (Figure 7). The daily estimates therefore do not show a persistent, precisely estimated increase in expected real rates following the supply component. Appendix D.4 also reports the response of the forward real yield covering years five to ten after the announcement.

Figure 7: Expected real rates after the three announcement components.



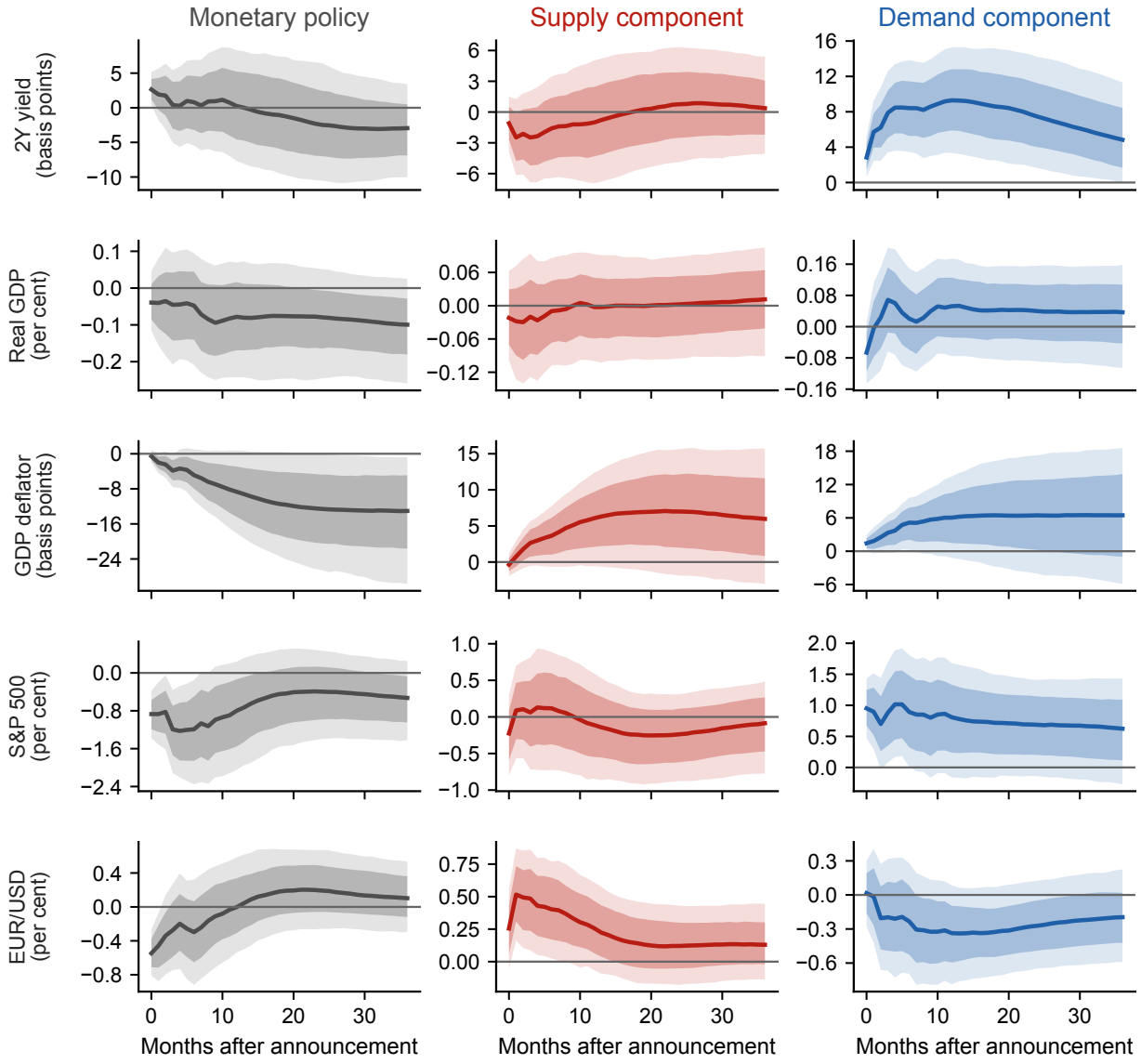
Notes: Daily local projections of the D'Amico–Kim–Wei five-year expected-real-rate component, in basis points, from 2005 to 2025. The measure is the average expected path of short real rates over the following five years. Solid lines are point estimates; inner and outer bands are 68 and 90 per cent confidence intervals. The estimation uncertainty in the D'Amico–Kim–Wei decomposition is not included in the bands.

6.3 Monthly macroeconomic propagation

I use the monthly Bayesian vector autoregression (BVAR) described in Section 4 to study the macroeconomic transmission of the monetary-policy, demand, and supply components. Figure 8 shows the responses to a one-standard-deviation increase in each component. A positive monetary-policy component represents an unexpected tightening, while positive demand and supply components represent revisions towards stronger perceived demand and more adverse perceived supply conditions.

The monetary-policy component has the textbook macroeconomic responses to an unexpected tightening. The two-year yield increases by around 2.5 basis points on impact, while real GDP and

Figure 8: Impulse responses to the three announcement components, baseline 1999–2025 sample.



Notes: responses to a one-standard-deviation monetary-policy component (left column), supply component (centre), and demand component (right), from the VAR identified in Section 4. Rows, top to bottom: the two-year Treasury yield, real GDP, the GDP deflator, the S&P 500, and the euro-dollar exchange rate (a rise is a dollar depreciation). Variables in logs are scaled by 100. The two-year yield and GDP deflator are reported in basis points, real GDP and the S&P 500 in per cent, and the euro-dollar rate as a percentage change using its full-sample mean of 1.18 dollars per euro. Solid line: posterior median; shaded bands: inner 68 and outer 90 per cent credible sets. The supply component raises the price level and depreciates the dollar while leaving output little changed; the demand component raises equities and appreciates the dollar.

the price level fall. After two years, real GDP is about 0.1 per cent lower and the price level is about thirteen basis points lower. Stock prices also fall, and the dollar initially appreciates.

The supply component instead raises the price level and depreciates the dollar, while real GDP changes little. The price level increases gradually, reaching about seven basis points after two years. The dollar depreciates by about one quarter of a per cent on impact and remains weaker for more than a year. Real GDP initially falls, but I do not find a statistically significant response at any horizon. The stock market decreases on impact and its response remains mostly negative over the subsequent months, although it is not precisely estimated.

The propagation of the perceived supply component is consistent with partial accommodation: the GDP deflator increases, real economic activity stays roughly flat, and the two-year yield does not increase persistently. The BVAR therefore points towards markets expecting the Federal Reserve to balance the trade-off between weaker economic activity and higher prices, without tightening as strongly as it does following news about stronger demand.

The demand component has macroeconomic responses consistent with the information effects discussed by Jarociński and Karadi (2020), although I find a less precisely estimated positive response of real GDP. Interest rates increase strongly and persistently, together with the price level, while real GDP rises after an initial decline. These responses suggest that markets perceive stronger demand and expect the Federal Reserve to tighten in response, partly offsetting its effect on economic activity and prices.

These results matter for the estimated transmission of forward guidance. If supply-related revisions are counted as unexpected monetary tightening, the increase in prices following supply news offsets part of the decline following monetary tightening. I may therefore estimate a small price response even when unexpected monetary tightening lowers prices. In Section 8, I compare the estimated responses with and without separating the supply component.

6.4 Input costs and inflation

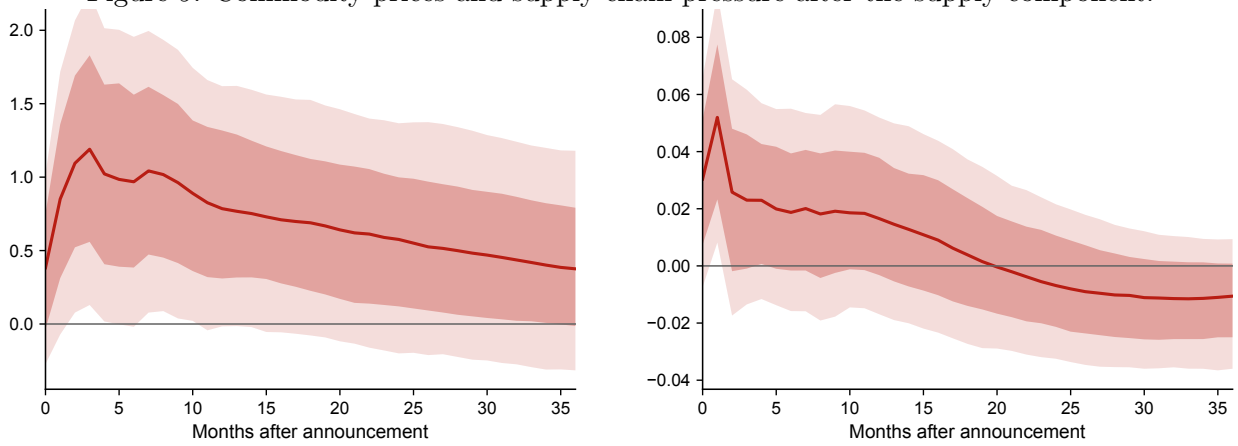
I also show that the supply component is followed by an increase in commodity prices and supply-chain pressures. To study these responses, I add the S&P GSCI commodity-price index and the Global Supply Chain Pressure Index of Benigno et al. (2022) to the BVAR. The second index is a measure of global supply-chain pressures constructed by the Federal Reserve Bank of New York.[18]

Following the supply component, commodity prices increase by about one per cent within a quarter and remain higher for roughly two years. Figure 9 also shows that supply-chain pressures increase immediately and reach their highest response after one month, before declining. The response after one month is statistically significant at the 90 per cent level. These results provide

[18]The components of the index include measures of global transportation costs and manufacturing supply-chain conditions. Transportation costs are measured using the Baltic Dry Index, the Harpex index, and airfreight cost indices from the U.S. Bureau of Labor Statistics. The index also uses Purchasing Managers' Index (PMI) surveys of manufacturing firms in seven economies: China, the euro area, Japan, South Korea, Taiwan, the United Kingdom, and the United States. The survey components are delivery times, backlogs, and purchased stocks. Delivery times measure delays affecting producers. Backlogs measure orders received but not yet started or completed. Purchased stocks measure firms' inventory accumulation.

further evidence that my component captures perceived supply conditions and are consistent with the increase in input costs considered in the model.

Figure 9: Commodity prices and supply-chain pressure after the supply component.



Notes: response of the S&P GSCI commodity index (left, in per cent) and the New York Fed Global Supply Chain Pressure Index (right, in index points) to a one-standard-deviation supply component. The two indices are added to the baseline monthly VAR over 1999–2025. Solid line: posterior median; shaded bands: inner 68 and outer 90 per cent credible sets. Neither variable enters the identification. Source for the Global Supply Chain Pressure Index: Federal Reserve Bank of New York.

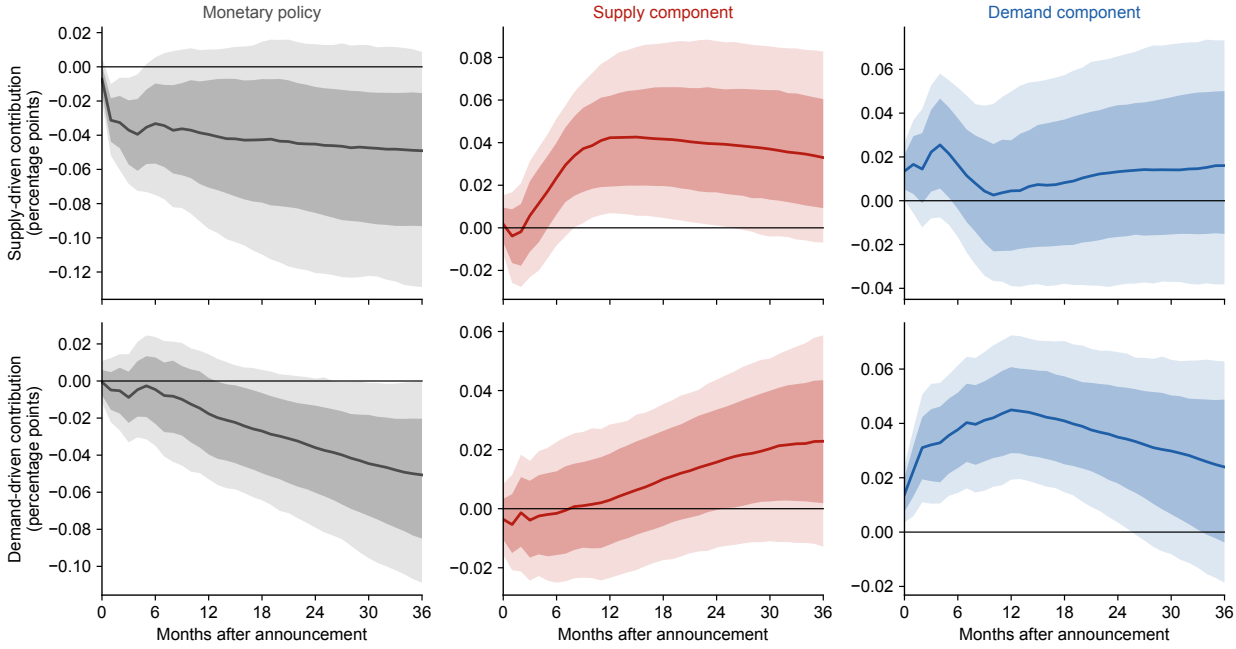
I then ask whether the increase in prices following my supply component comes from consumption categories related to supply pressures. I use the classification of Shapiro (2024), who estimates a vector autoregressive (VAR) model for each of 129 consumption categories with two variables, price and quantity. He uses twelve lags of both variables and a ten-year rolling window. He then takes the residuals and checks whether they are consistent with a demand or supply shock based on standard sign restrictions. Residuals with the same sign are consistent with a demand shock, while residuals with opposite signs are consistent with a supply shock.

He then takes the actual price change in each category and assigns its contribution to supply- or demand-driven inflation, weighting it by that category's share of PCE expenditure in the previous month. He repeats this procedure every month, so the same category can be classified as supply-driven in one month and demand-driven in another. I cumulate his published inflation contributions and add the resulting series separately to the BVAR to study each group's contribution to the PCE price level.

The supply component increases the supply-driven contribution to prices, while the demand component increases the demand-driven contribution. Figure 10 shows that, after the supply component, the supply-driven contribution rises gradually and reaches about 0.04 percentage point after one year. The increase is statistically significant at the 90 per cent level, while the demand-driven contribution remains close to zero. After the demand component, the demand-driven contribution increases by about 0.045 percentage point after one year, while the supply-driven contribution stays close to zero. This exercise shows that the increase in prices following my supply component comes

mainly from categories that Shapiro classifies as supply-driven. Appendix D.9 reports the results using his published year-on-year headline and core measures.

Figure 10: Supply- and demand-driven contributions to the headline PCE price level.



Notes: cumulative contribution of supply-driven inflation (top row) and demand-driven inflation (bottom row) to the headline PCE price level after a one-standard-deviation monetary-policy component (left), supply component (centre), and demand component (right). Shapiro's annualised monthly contributions are divided by twelve and cumulated from January 1969. A response is the cumulative difference from the path without the shock, in percentage points. Solid line: posterior median; shaded bands: inner 68 and outer 90 per cent credible sets. VAR sample: 1999–2025. The supply, demand, and ambiguous contributions sum to headline PCE inflation; the figure displays the first two. Appendix D.9 reports Shapiro's published year-on-year headline and core inflation contributions.

7 Inflation expectations

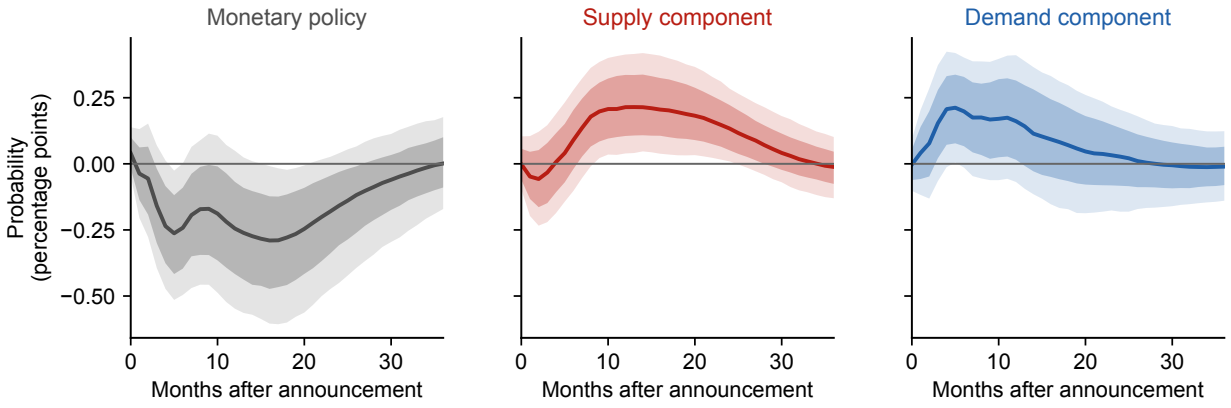
7.1 The upper tail of expected inflation

I also study whether my supply component increases the probability that forecasters assign to inflation of at least four per cent in the next calendar year. I use the Survey of Professional Forecasters, which asks each respondent to report probabilities for different ranges of inflation. I take the average probability across respondents that annual-average GDP-price inflation will be at least four per cent. Here, inflation is the percentage change in the annual-average GDP price index from one calendar year to the next. Since the survey is quarterly, I linearly interpolate this probability to monthly frequency and add it to the BVAR. Appendix C.9 describes the construction and reports the results for core PCE and core CPI inflation.

My supply component increases the probability that forecasters assign to inflation of at least

four per cent in the next calendar year. Figure 11 shows that this probability increases by about 0.21 percentage point over the following year. To give a sense of the magnitude, an increase of this size from the sample average of 3.9 per cent would bring the probability to approximately 4.1 per cent. In contrast, the demand component produces an increase of similar size, but it reaches its peak earlier and declines more quickly. The monetary-policy component instead lowers the probability by up to 0.29 percentage point. The supply component therefore produces a more persistent increase in this probability than the demand component.

Figure 11: The probability of inflation at or above 4 per cent.



Notes: response of the mean SPF probability that annual-average GDP-price inflation in the next calendar year is at least 4 per cent, measured in percentage points of probability. The quarterly survey measure is linearly interpolated to monthly frequency and added in levels to the baseline VAR. Solid lines are posterior medians; inner and outer bands are 68 and 90 per cent credible sets. Sample: 1999–2025.

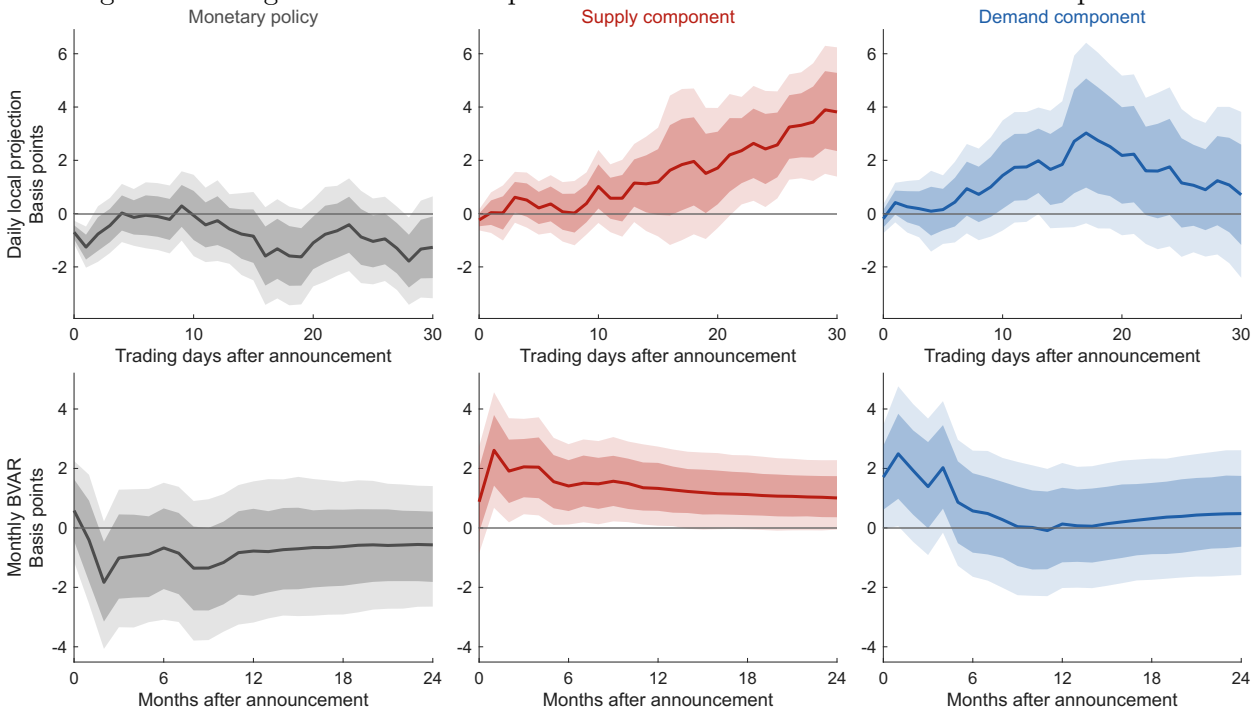
7.2 Long-run inflation expectations

I then study whether my supply component also raises long-run inflation expectations. I use five-year five-year-forward inflation compensation, calculated as the difference between nominal and inflation-protected Treasury forward yields using the data of Gürkaynak et al. (2010). This measure covers inflation over the five-year period beginning five years from the date of observation.[19] I use daily local projections to study its response over the following thirty trading days and the BVAR to study its persistence over subsequent months.

My supply component raises long-run inflation compensation, but the increase takes place in the weeks after the announcement. Figure 12 shows little change on the announcement day and an increase of 3.8 basis points after thirty trading days. In the BVAR, inflation compensation increases by 2.6 basis points after one month and remains 1.3 basis points higher after one year. These responses are statistically significant at the 90 per cent level. The demand component also raises inflation compensation, but its effect disappears within a year. The monetary-policy

[19] I use inflation compensation as a proxy for inflation expectations. It also includes inflation-risk and liquidity premia, so changes in the measure can reflect changes in these premia as well as expected inflation.

Figure 12: Long-run inflation compensation after the three announcement components.



Notes: response of five-year five-year-forward inflation compensation, in basis points, to a one-standard-deviation monetary-policy component (left), supply component (centre), and demand component (right). Top row: equation (19), with inner 68 and outer 90 per cent Newey–West intervals, across 166 FOMC announcements from 2005 to 2025. Bottom row: monthly BVAR from January 2005 to May 2025, with inner 68 and outer 90 per cent credible sets. The BVAR contains twelve lags and includes the D'Amico–Kim–Wei five-year expected-real-rate component.

component instead lowers it, although the estimates are less precise at longer horizons.

My supply component therefore increases the probability that forecasters assign to inflation of at least four per cent in the next calendar year and raises inflation compensation between five and ten years ahead. At the same time, I find little persistent increase in expected real rates. Taken together, these results support the interpretation that markets expect the Federal Reserve to accommodate part of the supply-driven inflation. Markets revise expected nominal rates upward, but they also expect some of the increase in inflation to remain.

8 The supply component and the price response to forward guidance

I now study whether the supply component helps explain why tighter forward guidance has been found to have little effect on prices. Swanson (2024) finds that the CPI initially rises after tighter forward guidance and declines only slightly at longer horizons. My previous results show that the supply component raises prices, whereas the monetary-policy component lowers them. However, both raise medium-term interest rates and lower stock prices during the announcement. Using only

these two asset prices can therefore assign part of the supply component to monetary policy and reduce the estimated decline in prices. I examine how this response changes when I also use the exchange rate to separate the supply component.

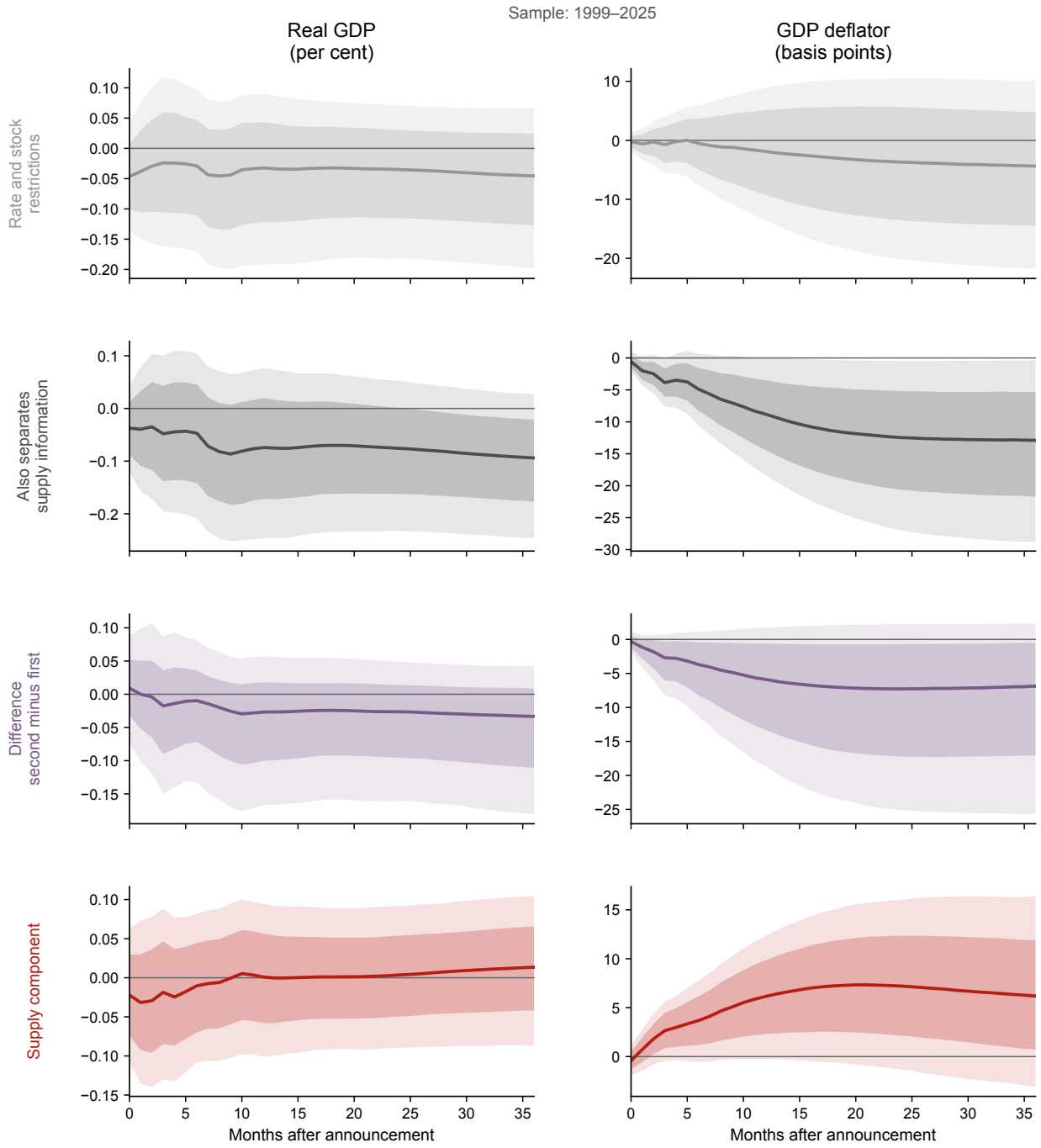
In Figure 13, I use the same estimated BVAR for both identifications. In the first, I follow Jarociński and Karadi (2020) and impose identifying restrictions on the forward-guidance factor and stock prices to separate monetary policy from perceived demand conditions. In the second, I also use the exchange rate to separate perceived supply conditions from monetary policy. All three announcement variables remain in the BVAR under both identifications, but in the first I leave the exchange-rate response and the third component unrestricted.

I find that prices fall by more when I separate the supply component from monetary policy. The light-grey response in the first row of Figure 13 shows a decline of about four basis points after two years when I use only the forward-guidance factor and stock prices. With my identification, the decline reaches thirteen basis points, as shown by the dark-grey response in the second row, and is statistically significant at the 90 per cent level. Real GDP also falls by more, although the estimate is less precise. The red response in the last row shows why supply news matters for this comparison: the supply component increases prices by about seven basis points after two years, while monetary policy lowers them.

The purple response in the third row of Figure 13 shows the difference between the two monetary-policy responses, calculated for each posterior draw. Both responses are to one-standard-deviation components. The median difference in the GDP-deflator response is negative at every horizon shown. After two years, the response is more negative under my identification in 87 per cent of the paired posterior draws.

For the comparison in Figure 13, Appendix A.2 also shows that the larger decline in prices remains when both responses are normalised to a median increase of 2.5 basis points in the monthly two-year Treasury yield on impact.

Figure 13: The supply component and the price response to forward guidance.

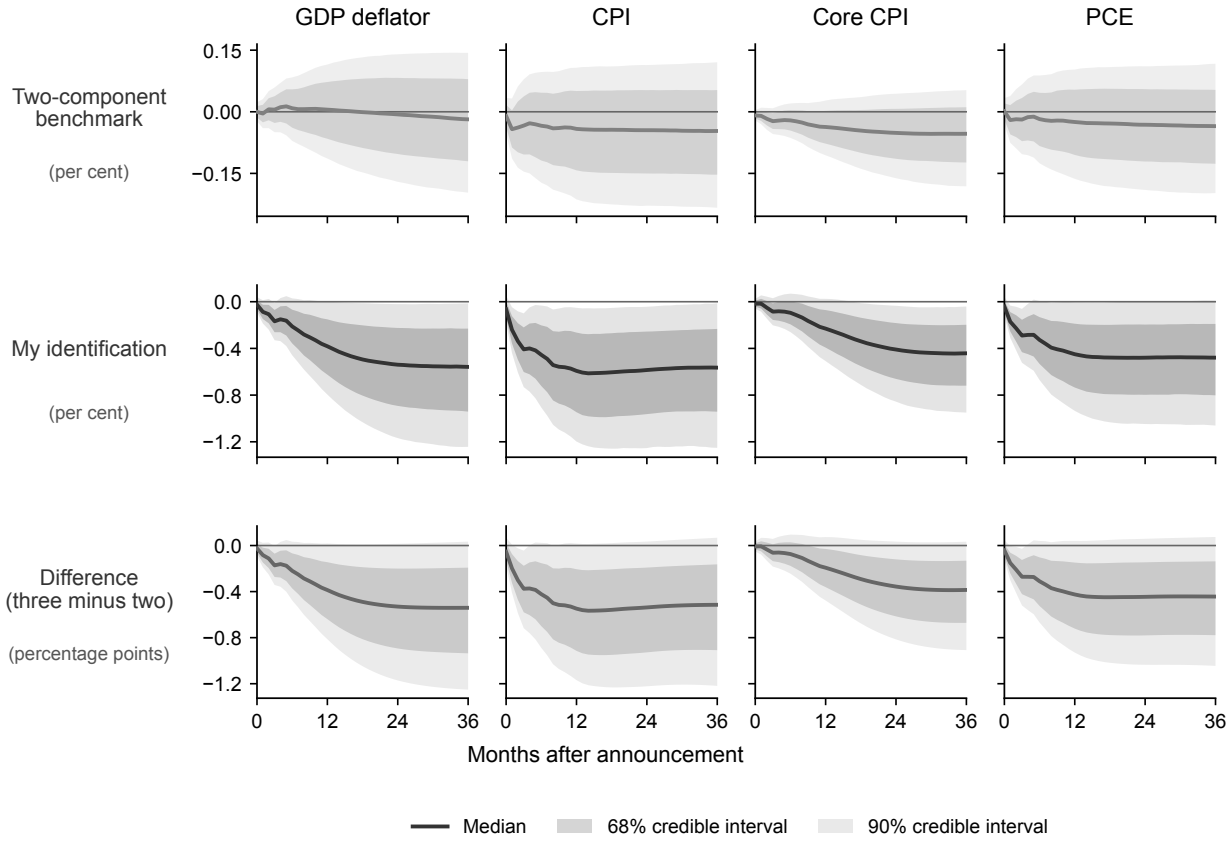


Notes: responses of real GDP (left) and the GDP deflator (right). The first row identifies monetary policy using restrictions on the forward-guidance factor and stock prices. The second row reports monetary policy under the three-component identification, which also uses the dollar. The third row reports the difference between the second and first rows, calculated within each posterior draw. For the GDP deflator, the median difference after two years is about −7 basis points. The fourth row reports the supply component. Both identifications retain all three announcement variables and use the same reduced-form posterior draws. Each response is scaled to a one-standard-deviation identified component. Inner and outer shading show 68 and 90 per cent credible intervals. Sample: 1999–2025.

In Figure 14, I compare my identification with a separately estimated BVAR that includes only the forward-guidance factor and stock-price changes among the announcement variables. I repeat this comparison using the GDP deflator, CPI, core CPI and PCE prices. To compare monetary-policy components of the same size, I normalise their median initial forward-guidance contribution to the two-year Treasury yield to 2.5 basis points. Prices fall by more under my identification for all four indices. After two years, the 90 per cent credible intervals for the GDP-deflator, CPI and core-CPI responses lie below zero, whereas those under the two-component benchmark include zero.

The estimated difference is also negative for all four price indices. After two years, the posterior probability of a larger decline under my identification is about 93–95 per cent.

Figure 14: Forward-guidance price responses across price indices at a common scale.



Notes: each column reports a different price index. The first row reports the monetary-policy response from a separately estimated two-component BVAR whose announcement variables are the forward-guidance factor and stock-price changes. The second row also uses the exchange rate to separate supply information. The third row is the second response minus the first. Both components are normalised to a median initial forward-guidance contribution of 2.5 basis points to the two-year Treasury yield. Price responses are in per cent and differences are in percentage points, with a common vertical scale within each row. Shading shows pointwise 68 and 90 per cent credible intervals. The distribution of the difference assumes independence between the separately estimated models' posterior draws. Sample: 1999–2025.

The larger estimated decline in prices also appears when I estimate transmission using local projections (Appendix B.4). In this comparison, the 90 per cent confidence interval for the difference lies below zero after two years for all four price indices, both with and without the pandemic-month restriction.

I therefore find that controlling for perceived demand conditions alone is not enough to recover the decline in prices that I estimate after monetary tightening. This helps explain the weak response to tighter forward guidance discussed by Swanson (2024): a measure that still includes supply news can combine the increase in prices after that news with the decline after unexpected monetary tightening.

9 Robustness

I check whether my results depend on how I construct the forward-guidance factor, the announcement window, and the sample period. I also use alternative price measures and estimate local projections to compare the results with those from the BVAR.

I first construct the forward-guidance factor using only interest-rate surprises. The resulting supply component has a correlation of 0.92 with my baseline component and produces similar impulse responses. I then use only the policy-statement window, excluding the press conference. The correlation with the baseline component is 0.90, and the dollar response remains similar. The price response is about two thirds of the baseline response, suggesting that information released during the press conference contributes to the estimated increase in prices. Appendix C.3 reports both exercises.

I also replace EUR/USD with the DXY dollar index in the high-frequency identification. The resulting supply component has a correlation of 0.99 with the baseline component across the same 216 announcements. Appendix C.4 reports this exercise.

I also estimate the macroeconomic transmission over different samples. Most median responses remain within the baseline's 90 per cent credible bands. The largest differences arise when I re-estimate the BVAR from October 2012. The two-year yield responds more strongly to the supply component, while the price response turns negative after about a year. When I instead keep the baseline lag coefficients and change the period used for identification, the price responses remain close to the baseline, while the stronger two-year yield response remains. This is consistent with markets perceiving a stronger policy response and less partial accommodation in the more recent period. Appendix B.3 compares these exercises in Figures 17 and 18.

I then check how much the results depend on the unusually large movements during the first months of the pandemic. I use pandemic priors that reduce the influence of March–August 2020. The median responses remain within the baseline's 90 per cent credible bands in Figure 17. The supply component still raises the price level, while monetary tightening lowers it.

I also replace the GDP deflator with headline CPI and PCE prices. Both increase at medium horizons after the supply component, although the estimates are less precise than those for the

GDP deflator. Appendix B.2 reports these estimates in Figure 16.

Finally, I use local projections to check whether the responses depend on the BVAR specification. Local projections estimate the response at each horizon directly and do not use the Minnesota prior. Following the supply component, I again find weak output, an increase in the GDP deflator, and a depreciation of the dollar, with little persistent change in the two-year yield. The confidence intervals are wider, particularly for stock prices. Appendix B.4 reports these estimates.

10 Conclusion

This paper shows how exchange-rate movements around Federal Reserve announcements can be used to study how markets perceive the Federal Reserve's assessment of and response to supply shocks. The key identification idea is that the Federal Reserve faces a trade-off between stabilising inflation and supporting economic activity after an adverse supply shock. Markets may therefore expect the Federal Reserve to tolerate some supply-driven inflation and price a depreciation of the dollar even when they revise future policy rates upward. The model shows how this combination can arise under partial accommodation.

I show that the resulting supply component is related to commodity prices, is predicted by past oil-supply shocks, and raises the price level.

These results point to the importance of measuring and separating this component when estimating monetary transmission to financial markets and the real economy. I find that without controlling for the supply component, tighter forward guidance has only a small and imprecisely estimated effect on prices. I thus show that looking at exchange-rate movements can help control for the supply component and reveal a larger decline in prices after tighter forward guidance.

These results also raise questions for further research. Beyond demand and supply, what other economic conditions do markets perceive the Federal Reserve to be responding to? Can movements in different asset prices help measure perceived monetary accommodation of expansionary fiscal policy? How do revisions in the Federal Reserve's assessment of risks to economic activity affect those same asset prices? These questions remain open and provide directions for my future research.

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Appendix

Contents

A The Bayesian VAR: estimation, identification, and diagnostics **48**

A.1 Estimation . . . 48

A.2 Identification . . . 49

A.3 Diagnostics . . . 50

B Robustness of the macroeconomic responses **51**

B.1 Leaving the exchange-rate response to demand unrestricted . . . 51

B.2 Alternative price measures . . . 53

B.3 Alternative samples and pandemic treatment . . . 53

B.4 Local projections . . . 57

C Data and factor construction **60**

C.1 Announcement sample and windows . . . 60

C.2 Construction of the forward-guidance factor . . . 61

C.3 Alternative factor constructions . . . 61

C.4 Using the DXY dollar index . . . 63

C.5 Monthly financial and macroeconomic variables . . . 63

C.6 Daily financial-market variables . . . 64

C.7 Independent oil-supply news . . . 64

C.8 Monthly GDP and the GDP deflator . . . 64

C.9 SPF upper-tail inflation expectations . . . 65

D Further validation and robustness **66**

D.1 Narrative review of the largest observations . . . 66

D.2 Real forward rates and the total real-rate revision . . . 74

D.3 Longer-maturity US and euro-area real-rate differences . . . 75

D.4 The forward real yield . . . 76

D.5 Risk and monetary-policy uncertainty . . . 77

D.6 The Fed non-yield shock . . . 79

D.7 The Fed non-yield shock through 2020 . . . 80

D.8 Oil-supply news before and after FOMC announcements . . . 81

D.9 Year-on-year supply- and demand-driven inflation . . . 82

D.10 A second oil-news shock . . . 85

D.11 US and euro-area consumer prices . . . 86

E Model derivations **86**
E.1 Consumption and the imported input . . . 86
E.2 Real wages and marginal costs . . . 87
E.3 Dividends . . . 89

F Equilibrium **89**
F.1 The solution after a supply disturbance . . . 89
F.2 The matrix solution and uniqueness . . . 91

G The exchange rate and equity **93**
G.1 The exchange rate . . . 93
G.2 Why demand and supply can have different currency responses . . . 95
G.3 Equity prices . . . 96

H The information in an announcement **98**
H.1 Beliefs before and after the announcement . . . 98
H.2 From perceived supply conditions to depreciation . . . 98
H.3 The future-rate revision and the three components . . . 99

I Learning about supply conditions and the policy response **100**
I.1 Uncertainty about the policy response . . . 100
I.2 What markets learn from the announcement . . . 100
I.3 Conditions for the three asset-price signs . . . 101
I.4 A numerical example . . . 102
I.5 Interpretation of the supply component . . . 103

J Calibration and additional responses **103**
J.1 The policy estimates . . . 103
J.2 The remaining parameters . . . 104
J.3 The numerical responses . . . 105

A The Bayesian VAR: estimation, identification, and diagnostics

A.1 Estimation

I estimate the BVAR using the monthly announcement surprises and the five financial and macroeconomic variables described in Section 4. The announcement block, m_t, contains the forward-guidance factor and the EUR/USD and S&P 500 returns measured within the announcement window. I sum each series across announcements within a month and set it to zero in months without an announcement. A positive EUR/USD return means that the dollar depreciates. Appendix C describes the announcement sample and lists the excluded events.

I use the monthly variables in y_t to study how the announcement components transmit to financial markets and the real economy. These variables are the two-year Treasury yield, the S&P 500 index, real GDP, the GDP deflator, and EUR/USD. The yield, stock index, and exchange rate are measured at the end of each month. For real GDP and the GDP deflator, I construct monthly estimates from quarterly data using the procedure of Stock and Watson (2010). The stock index, real GDP, and the GDP deflator enter as 100 times their natural logarithms, so their responses approximate percentage changes. The two-year yield comes from the Gürkaynak–Sack–Wright zero-coupon Treasury curve.

I allow each variable in y_t to depend on twelve lags of both the announcement surprises and the monthly variables. For m_t, I set the intercept and all lag coefficients to zero. This assumes that the announcement surprises are unpredictable from the lagged variables included in the BVAR. The reduced form is

$$m_t = u_t^m, \tag{20}$$

$$y_t = c_y + \sum_{\ell=1}^{12} \left(B_{ym}^{\ell} m_{t-\ell} + B_{yy}^{\ell} y_{t-\ell} \right) + u_t^y, \qquad \begin{pmatrix} u_t^m \\ u_t^y \end{pmatrix} \sim \mathcal{N}(0, \Sigma). \tag{21}$$

The covariance matrix Σ allows the announcement surprises and the innovations in the monthly variables to move together within the same month. The lag coefficients describe how the effects continue through subsequent months, both through past announcement surprises and through past values of the monthly variables.

I use a Minnesota prior because twelve lags of eight variables leave many coefficients to estimate. The prior pulls the lag coefficients towards their prior means, with tighter restrictions on more distant lags. For variables treated as persistent, the first own-lag coefficient has prior mean one. All other lag coefficients have prior mean zero. The overall tightness is $\lambda_1 = 0.2$ and the lag decay is $\lambda_2 = 1$. The prior variances also account for differences in the scales of the variables, using residual standard deviations from individual autoregressions.

I draw the coefficients and covariance matrix using a Gibbs sampler. The covariance matrix Σ has an inverse-Wishart prior. I discard the first 1,000 iterations and retain every fourth subsequent iteration until I obtain 1,000 posterior draws. The monthly sample runs from January 1999 to May

2025. Appendix B.3 reports the alternative-sample, fixed-coefficient, and pandemic-prior estimates.

A.2 Identification

I identify the monetary-policy, supply, and demand components using their effects on the forward-guidance factor, stock prices, and the exchange rate within the announcement window. The signs are those reported in Table 3. All three components raise the forward-guidance factor. Monetary tightening lowers stock prices and appreciates the dollar, while more adverse perceived supply conditions lower stock prices and depreciate the dollar. Stronger perceived demand instead raises stock prices and appreciates the dollar. I leave their effects on the monthly variables unrestricted.

To recover these components from the BVAR, I write its innovations as $u_t = B\varepsilon_t$. The shocks in ε_t have unit variance and are mutually uncorrelated, and B measures their contemporaneous effects on the eight variables. The estimated covariance matrix requires $BB' = \Sigma$, but several matrices satisfy this condition. I use the announcement-window restrictions to select among them.

I allow the three announcement components to affect all five monthly variables immediately. The other five shocks can affect the monthly variables, but their effects on the announcement surprises are set to zero. To impose this restriction, I order the three announcement surprises first in the Cholesky factor P and rotate only its first three columns:

$$B = PQ, \qquad Q = \begin{pmatrix} Q_m & 0 \\ 0 & I_5 \end{pmatrix}, \qquad Q_m Q_m' = I_3. \tag{22}$$

Each rotation Q_m gives a different combination of the three announcement innovations while preserving the estimated covariance matrix. I retain combinations whose effects satisfy the signs assigned to monetary policy, supply, and demand.

For each posterior draw of the BVAR coefficients and covariance matrix, I draw rotations following Rubio-Ramírez et al. (2010). I retain the first rotation that satisfies all nine restrictions in Table 3 and use it to calculate the impulse responses. The algorithm tries up to 1,000 rotations for each posterior draw. It finds an acceptable rotation for every baseline draw and for more than 98 per cent of the draws in each reported alternative specification.

To study how separating supply changes the estimated transmission of forward guidance, I also estimate an identification using only the forward-guidance factor and stock prices. Following the distinction in Jarociński and Karadi (2020), an increase in the forward-guidance factor together with lower stock prices identifies monetary tightening, while an increase in the factor together with higher stock prices identifies an information component. I leave the exchange-rate response and the third announcement component unrestricted. Table 9 reports these restrictions.

Without the exchange rate, adverse supply news can enter the component identified as monetary tightening because both raise the forward-guidance factor and lower stock prices. In my identification, the dollar appreciates after monetary tightening and depreciates after adverse supply news when markets expect partial accommodation. The comparison therefore shows how the estimated monetary-policy responses change when I also use the dollar to separate perceived supply

Table 9: Sign restrictions of the two-component identification.

	Monetary policy	Information	Unrestricted component
Forward-guidance factor	+	+	–
EUR/USD	–	–	–
S&P 500	–	+	–

Notes: The restrictions apply to the contemporaneous responses of the announcement surprises. A dash denotes an unrestricted response. The third announcement component remains in the system but is not assigned an economic interpretation.

conditions.

I keep the estimated BVAR unchanged when comparing the two identifications. For each posterior draw, I use the same Cholesky factor and select one rotation satisfying the three-component restrictions and another satisfying the two-component restrictions. I then subtract the two-component monetary-policy response from the three-component response at each horizon. Section 8 reports this difference.

I also check whether the larger estimated decline in prices reflects differences in the size of the monetary-policy components. I rescale the responses under each identification so that the posterior-median increase in the two-year Treasury yield is 2.5 basis points on impact. Within each identification, I apply the same scaling factor to all variables, horizons, and posterior draws. Under this common normalisation, the GDP deflator falls by about twelve basis points after two years under my identification, compared with about four basis points when I use only the forward-guidance factor and stock prices. The decline under my identification remains statistically significant at the 90 per cent level.

I report the median BVAR response across the accepted draws, together with pointwise credible intervals. The 68 per cent interval runs from the 16th to the 84th percentile, and the 90 per cent interval runs from the 5th to the 95th percentile. For the comparison between identifications, I calculate these percentiles from the differences obtained within each posterior draw.

A.3 Diagnostics

Table 10 shows how much each component contributes to the variation in the announcement surprises. The supply component accounts for 13 per cent of the variance in forward guidance, 12 per cent in EUR/USD, and 8 per cent in stock returns. Demand accounts for most of the variation in forward guidance, while monetary policy accounts for most of the exchange-rate variation. Monetary policy and demand together account for most of the variation in stock returns. The table also reports how each announcement surprise responds to a one-standard-deviation increase in each component.

The three estimated announcement components have small correlations in the event sample. The correlation between monetary policy and supply is 0.08, between monetary policy and demand is 0.02, and between supply and demand is -0.04.

Table 10: Diagnostics of the baseline identification.

	Impact response			Variance share		
Surprise	Monetary policy	Supply component	Demand component	Monetary policy	Supply component	Demand component
Forward guidance	+0.10	+0.15	+0.49	5%	13%	82%
EUR/USD	−0.35	+0.10	−0.06	84%	12%	4%
S&P 500	−0.47	−0.12	+0.38	55%	8%	38%

Notes: The first three columns report posterior-median impact responses to a one-standard-deviation increase in each component, in the units of the announcement surprises. The last three columns report posterior means of the variance shares. For each draw, I calculate a component's share by dividing its squared impact response by the sum of the squared responses to all three components. The sample runs from January 1999 to May 2025.

B Robustness of the macroeconomic responses

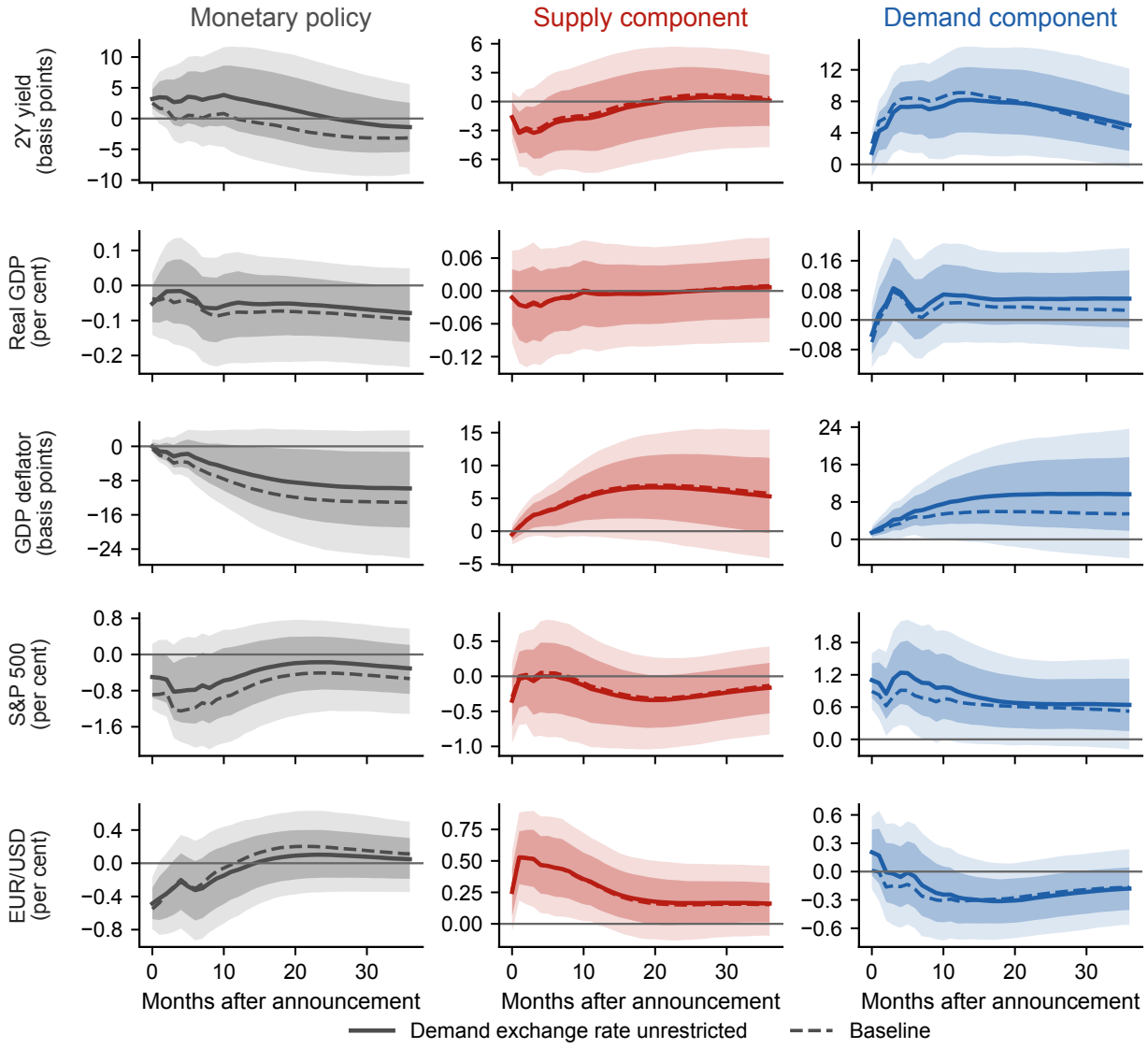
This appendix examines whether the macroeconomic responses depend on the exchange-rate restriction on the demand component, the price index, the sample used for estimation or identification, or the treatment of the pandemic.

B.1 Leaving the exchange-rate response to demand unrestricted

In the baseline identification, I impose that the dollar appreciates after the demand component. I check whether this restriction matters by leaving the exchange-rate response to demand unrestricted. I still impose that medium-term interest rates and stock prices increase.

Figure 15 compares the results. The supply component has a correlation of 0.9997 with the one obtained under the baseline restrictions, and its responses are very similar.

Figure 15: Leaving the exchange-rate response to demand unrestricted.



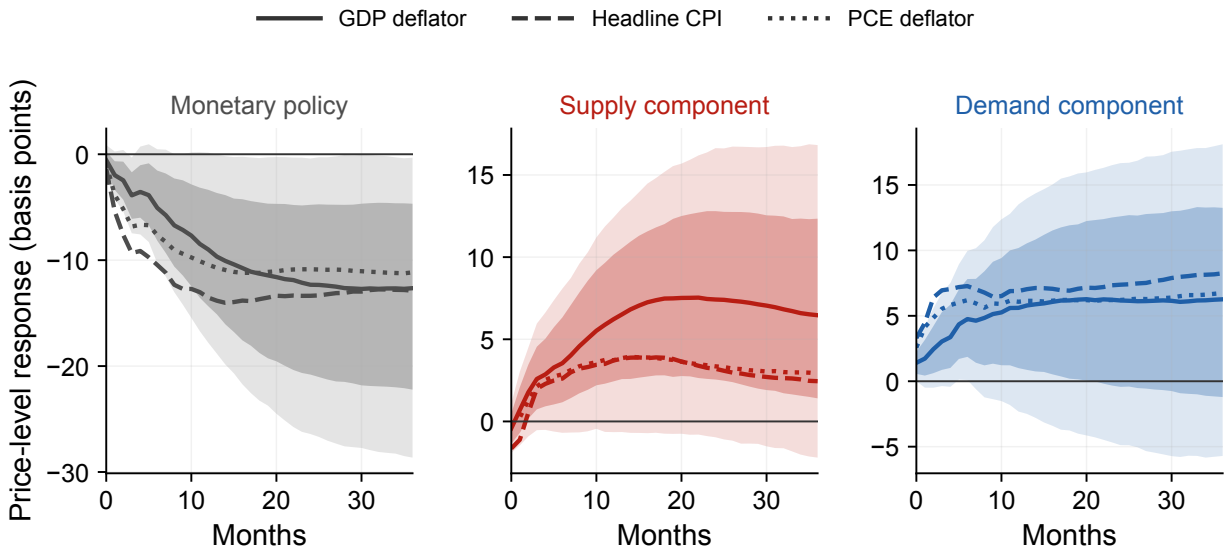
Notes: Solid lines and shaded areas show the median responses and the 68 and 90 per cent credible intervals when the exchange-rate response to demand is unrestricted. Dashed lines show the median responses under the baseline restrictions. An increase in EUR/USD is a dollar depreciation.

B.2 Alternative price measures

I also estimate the responses using headline CPI and the PCE deflator to see whether the increase in prices after the supply component depends on using the GDP deflator. In each exercise, I replace the GDP deflator and keep the other variables and estimation sample unchanged. Figure 16 compares the responses of the three price indices.

Both alternative price indices increase at medium horizons after the supply component. Their responses are smaller and less precisely estimated than the GDP-deflator response, but their medians remain within the baseline credible intervals. The increase in prices therefore also appears when I use measures of consumer prices, although their own credible intervals include zero.

Figure 16: Price-measure robustness.



Notes: median price-level responses in otherwise identical three-component VARs estimated over 1999–2025. The solid line and shaded regions are the GDP-deflator median and its 68 and 90 per cent credible bands. The dashed and dotted lines are the headline-CPI and PCE-deflator medians. Their own credible bands are omitted for readability and include zero under the supply component.

Forward-guidance transmission at a common scale.

Section 8 compares the monetary-policy price responses across the GDP deflator, CPI, core CPI and PCE prices in Figure 14. The two- and three-component BVARs are estimated separately. Both monetary-policy components are normalised to a median initial forward-guidance contribution of 2.5 basis points to the two-year Treasury yield.

B.3 Alternative samples and pandemic treatment

I also estimate the macroeconomic transmission over different samples. I first begin the sample in October 2012, then estimate the BVAR using only observations before 2020. I keep the same five macroeconomic variables, twelve lags, and prior settings as in the baseline. A third exercise uses

the full sample with the pandemic priors of Cascaldi-Garcia (2022), which reduce the influence of observations from March to August 2020.

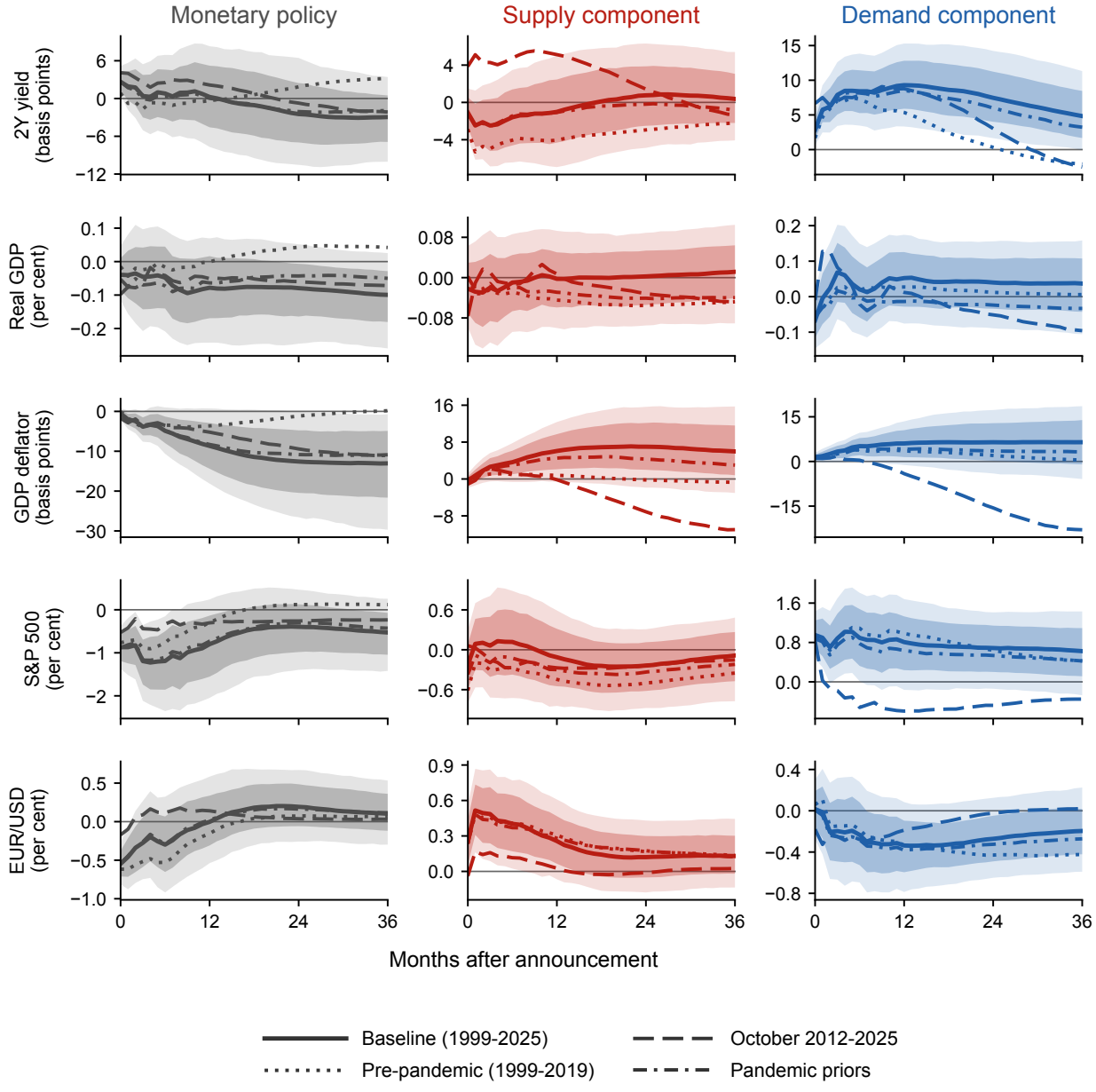
Figure 17 compares these responses with the baseline. Most median responses remain within the baseline's 90 per cent credible bands. The largest differences arise when I re-estimate the BVAR from October 2012. The two-year yield responds more strongly to the supply component, while the price-level response turns negative after about a year. Some longer-horizon responses also change when I end the sample in 2019. Under pandemic priors, the supply component still raises the GDP deflator by about four basis points after two years, while monetary tightening lowers it by about eleven basis points.

To avoid re-estimating the lag coefficients over shorter samples, I also keep the coefficients estimated from the baseline and change the period used for identification. For each full-sample coefficient draw, I calculate the innovations and use those from the selected period to estimate their covariance matrix. I then apply the same sign restrictions to identify the three components. This retains uncertainty in the baseline lag coefficients while keeping the estimated dynamics common across samples.[20]

Figure 18 shows that the price responses remain very similar to the baseline in this exercise. The supply component raises prices, while monetary tightening lowers them. Interestingly, the larger two-year yield response in the post-2012 sample remains even with the reduced-form coefficients fixed. The larger median response also remains when I match the initial forward-guidance-factor response across specifications. This is consistent with markets perceiving a stronger central-bank response to supply pressures and less partial accommodation in the more recent period. Taken together, these exercises support the main macroeconomic results while pointing to differences in the perceived policy response across samples.

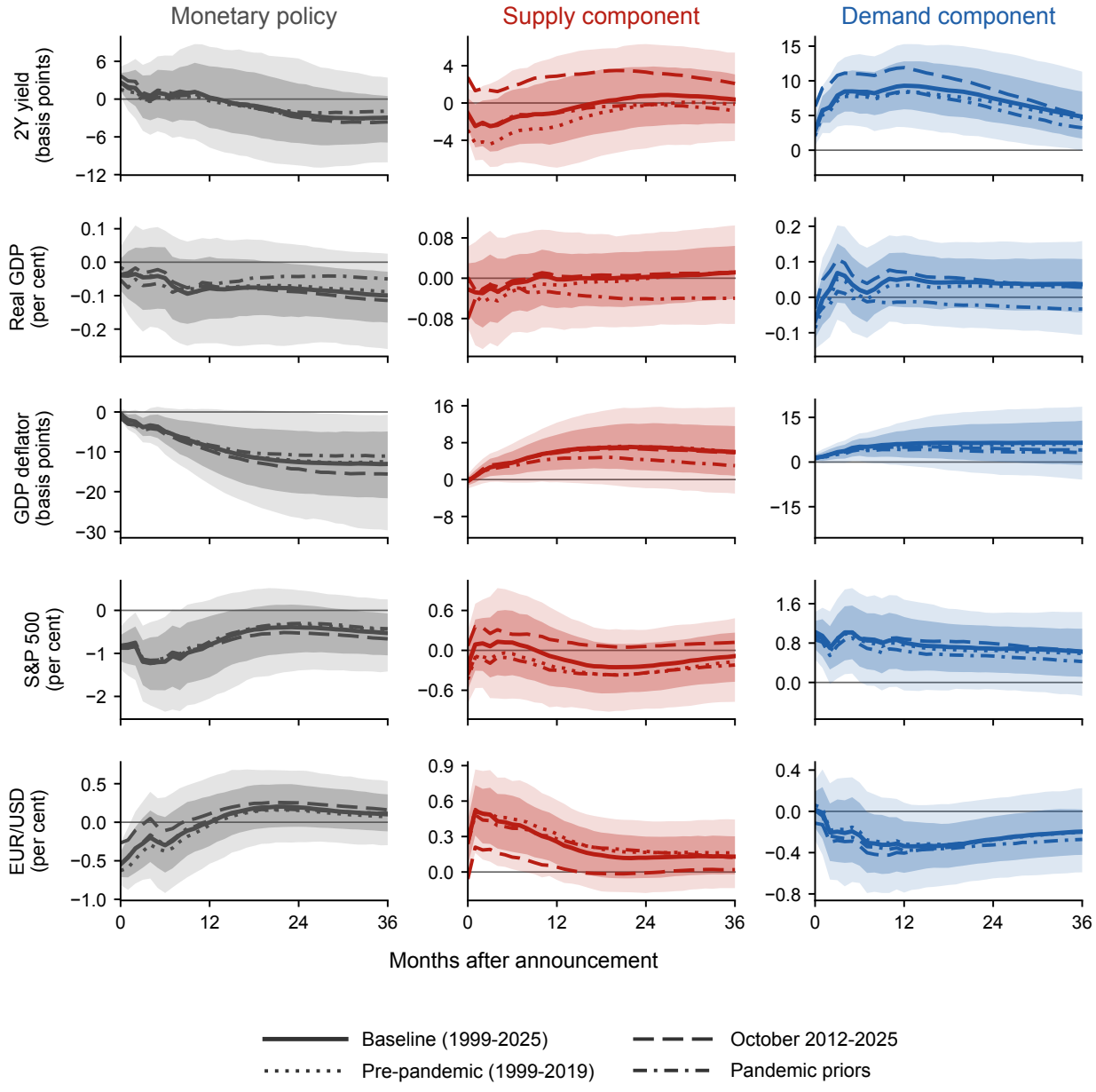
[20] For each coefficient draw, I demean the selected innovations and draw their covariance from an inverse-Wishart distribution with $n_S - 1$ degrees of freedom and scale equal to the sum of their outer products, where n_S is the number of selected months. The post-2012 exercise uses 152 monthly innovations, with lags formed from the full sample. The pre-2020 exercise uses 240 months after the twelve initial observations.

Figure 17: Alternative samples and pandemic priors: full BVAR re-estimation.



Notes: solid lines and shading show the baseline medians and pointwise 68 and 90 per cent credible intervals. Dashed lines: BVAR estimated from October 2012. Dotted lines: BVAR ending in December 2019. Dash-dotted lines: full-sample BVAR with pandemic priors. All specifications use the same five macroeconomic variables and twelve lags. Responses are to one-standard-deviation components, with units as in Figure 8. An increase in EUR/USD is a dollar depreciation.

Figure 18: Alternative identification periods with full-sample lag coefficients.



Notes: dashed and dotted lines show median responses using the post-2012 and pre-2020 periods to estimate the innovation covariance and identify the components, with full-sample lag-coefficient draws held fixed. The baseline medians and bands and the pandemic-prior responses are unchanged from Figure 17. The pandemic-prior BVAR is re-estimated rather than held fixed. Responses and units are as in Figure 17. Shading refers only to uncertainty around the baseline, not to differences across samples.

B.4 Local projections

I also use monthly local projections to study whether the macroeconomic responses depend on estimating their propagation with a BVAR. I keep the three announcement components from the baseline identification and estimate a separate regression at each horizon. This allows me to estimate their effects without using the Minnesota prior or obtaining later responses by iterating the VAR.

For each announcement, I recover the three components using the inverse of the posterior-median impact matrix and the observed announcement surprises. I sum each component across announcements within a month and set it to zero in months without an announcement. For each variable z_t and horizon h, I estimate

$$z_{t+h} = a_h + \beta_h^m \widehat{\varepsilon}_t^m + \beta_h^s \widehat{\varepsilon}_t^s + \beta_h^d \widehat{\varepsilon}_t^d + \sum_{\ell=1}^{12} \Gamma'_{h,\ell} X_{t-\ell} + e_{t+h}. \tag{23}$$

The three components enter each regression together. The vector X_t contains the three components and the five financial and macroeconomic variables in the baseline BVAR. I include twelve monthly lags of these variables and estimate responses through eighteen months.

I apply the Herbst–Johannsen bias correction using the implementation of Montiel Olea et al. (2025) and report 90 per cent heteroskedasticity-robust confidence intervals. The sample runs from 1999 to 2025. At each horizon, I exclude observations if either the announcement month or the month of the response falls between March and August 2020. The confidence intervals account for uncertainty in estimating these regressions, taking the extracted announcement components as given.

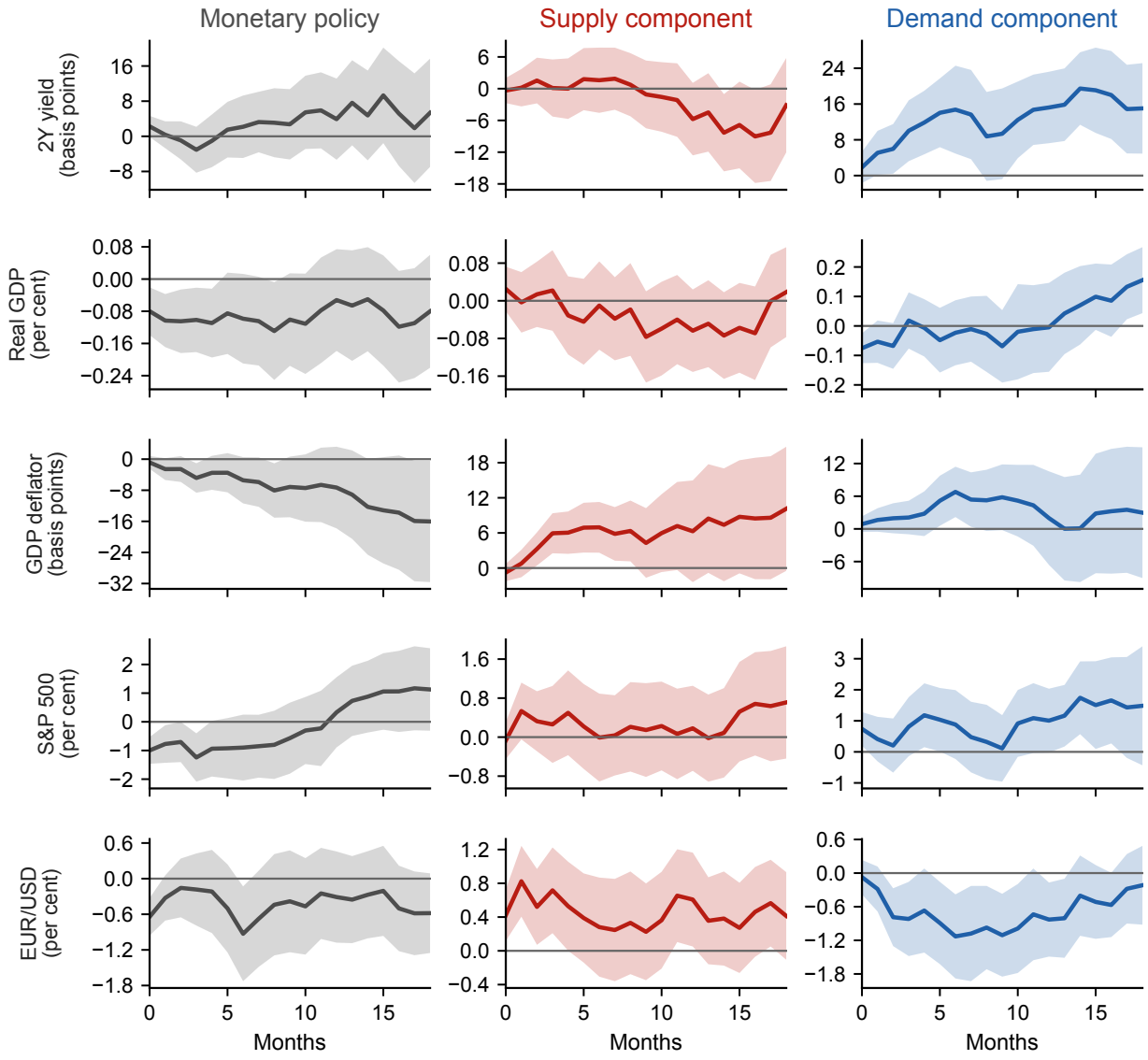
The local projections reproduce the main macroeconomic responses to the supply component. Figure 19 shows that the GDP deflator increases, the dollar depreciates, and real GDP changes little. The two-year yield does not increase persistently. These responses also appear when I estimate each horizon separately, without imposing the BVAR's dynamic structure or Minnesota prior.

Figure 20 compares these estimates directly with the BVAR responses. The increase in prices and the dollar depreciation after the supply component appear under both methods. The main difference concerns stock prices, whose local-projection response becomes positive at longer horizons and is imprecisely estimated. The evidence on prices and the exchange rate therefore extends beyond the baseline BVAR.

Comparing the price response to forward guidance. I also use local projections to compare the monetary-policy price responses under the two identifications. I use the same MATLAB implementation of Montiel Olea et al. (2025) as above, including the Herbst–Johannsen bias correction and heteroskedasticity-robust inference. Each regression contains all contemporaneous announcement components and twelve lags of those components and the five macroeconomic and financial variables. The extracted components are held fixed, and I extend the responses to 36 months.

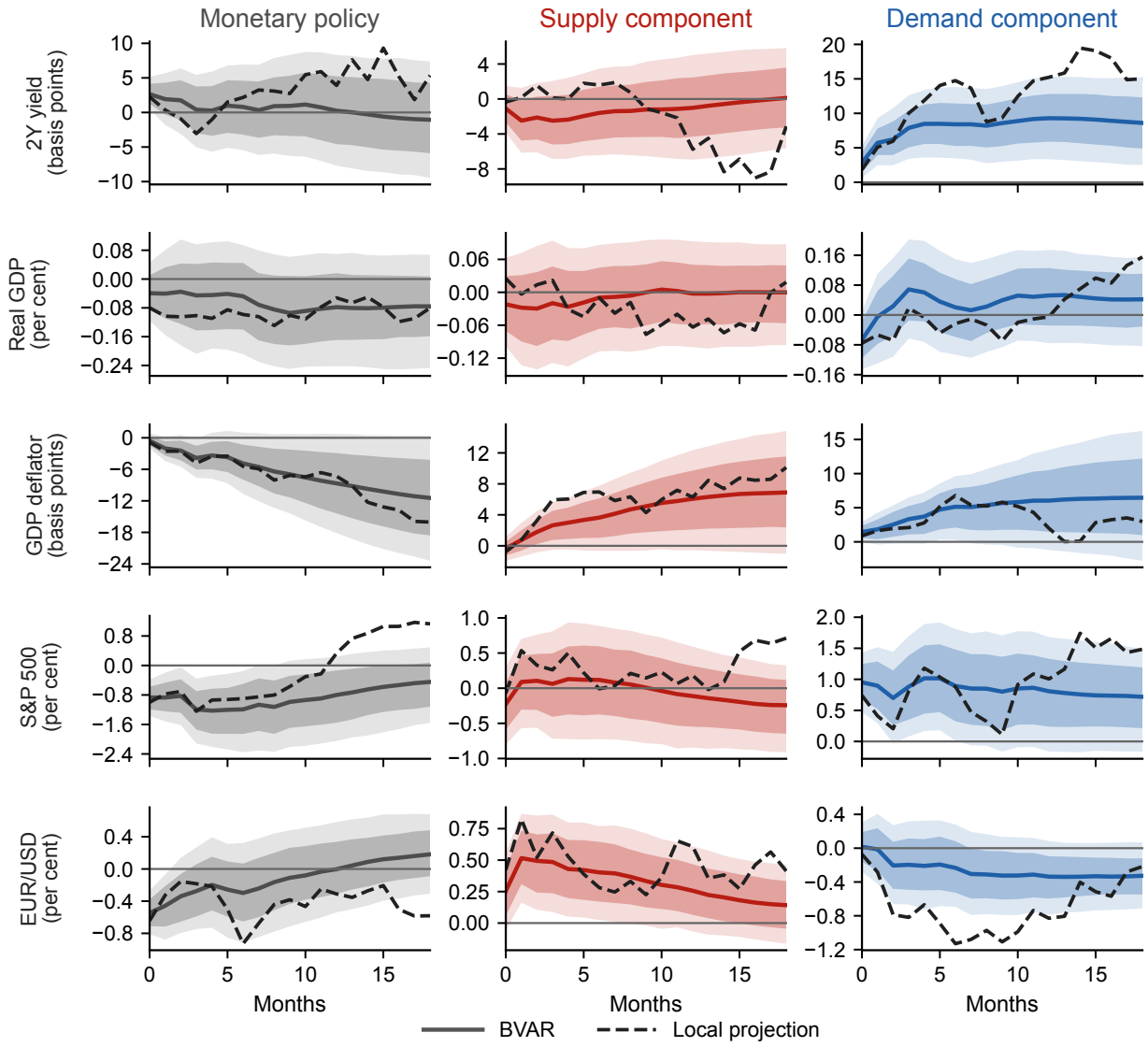
For this comparison, I retain monthly observations during March–August 2020. I also repeat the

Figure 19: Macroeconomic responses estimated by local projections.



Notes: responses to one-unit monetary-policy, supply, and demand components. Solid lines are bias-corrected local-projection estimates from equation (23); shaded regions are pointwise 90 per cent heteroskedasticity-robust confidence intervals. The two-year yield and GDP deflator are reported in basis points; real GDP, the S&P 500, and EUR/USD are reported in per cent. Full 1999–2025 sample excluding projections whose initial or response month falls in March–August 2020.

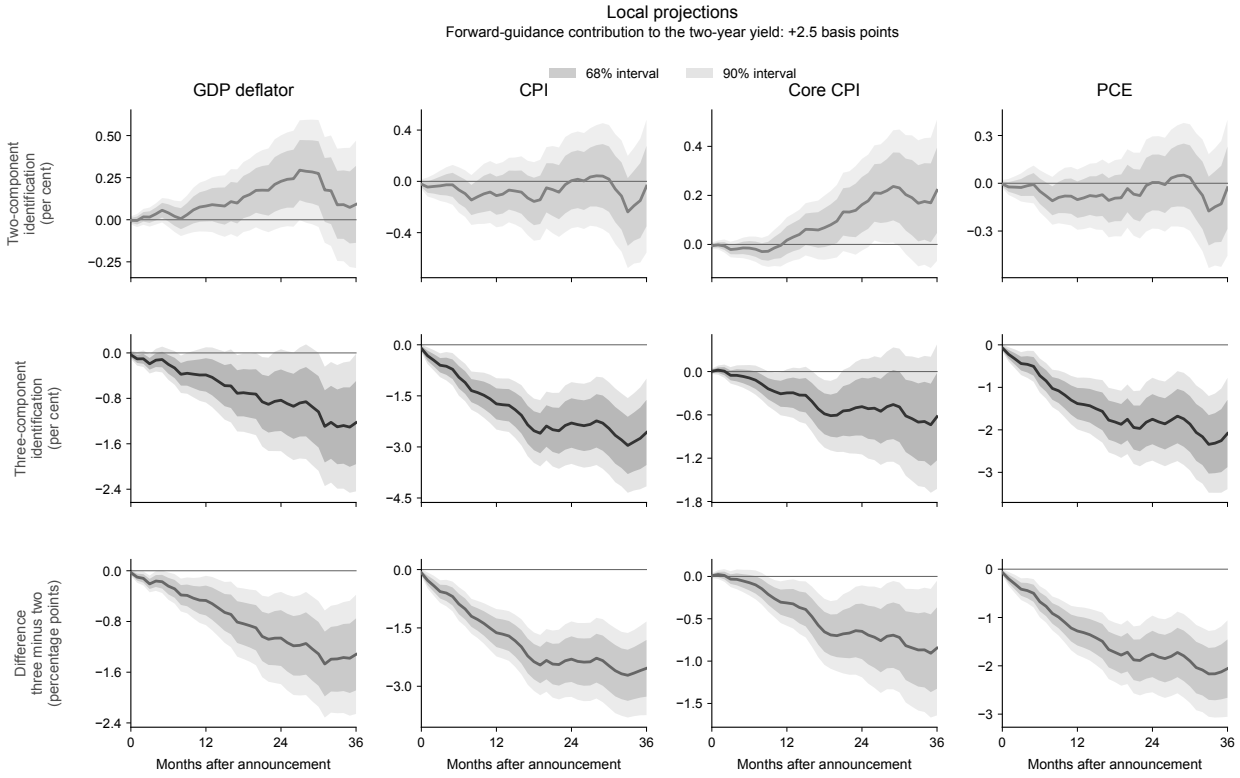
Figure 20: Local-projection and Bayesian VAR responses.



Notes: the solid coloured lines and shaded regions report the baseline Bayesian VAR posterior medians and their 68 and 90 per cent credible sets. The dashed lines report the local-projection estimates from Figure 19. Both estimators use the same extracted components, variables, and twelve monthly lags. The Bayesian VAR uses the full sample, whereas the local projections omit observations whose initial or response month falls between March and August 2020.

exercise with the exclusion rule used above as a separate check. Both monetary-policy components imply the same initial forward-guidance contribution of 2.5 basis points to the two-year Treasury yield. Figure 21 shows that the price response is more negative at medium horizons under my identification for each price index. After two years, the 90 per cent confidence interval for the difference lies below zero for all four indices. This finding also holds when I apply the March–August 2020 exclusion rule.

Figure 21: Local-projection price responses under the two identifications.



Notes: each column reports results using a different price index. The first row identifies monetary policy using the forward-guidance factor and stock prices. The second row also uses the exchange rate to separate supply information. The third row is the second response minus the first. Both components are normalised to an initial forward-guidance contribution of 2.5 basis points to the two-year Treasury yield. Price responses are in per cent and differences are in percentage points. Darker and lighter shading show pointwise 68 and 90 per cent confidence intervals, taking the estimated announcement components as given. The interval for the difference accounts for the covariance between the two estimates. Sample: 1999–2025, retaining pandemic months.

C Data and factor construction

C.1 Announcement sample and windows

The empirical analysis uses 216 Federal Reserve announcements from February 1999 through May 2025. For announcements through 18 September 2024, I use the updated event list of Jarociński

(2024). I then add the five announcements through 7 May 2025. The list contains scheduled FOMC meetings and unscheduled policy actions.[21]

I measure changes in interest rates, stock prices, and the exchange rate over the same announcement window. The window begins ten minutes before the FOMC statement and ends sixty minutes after the press conference begins. For announcements without a press conference, it ends twenty minutes after the statement. The baseline window therefore includes both the statement and the press conference when one is held. Appendix C.3 reports the results using only the statement window.

C.2 Construction of the forward-guidance factor

I construct the forward-guidance factor from ten announcement-window surprises in the U.S. Monetary Policy Event-Study Database of Acosta et al. (2025). The first five are constructed from changes in interest rates implied by futures contracts. `MP1` measures the unexpected change in the policy rate at the current meeting, while `FF3` measures the change in the third monthly federal funds futures contract. `ED2`, `ED3`, and `ED4` measure changes in the second through fourth quarterly contracts. These series use Eurodollar futures through 2021 and SOFR futures from 2022. The remaining interest-rate surprises are changes in the two-, five-, and ten-year Treasury yields. I also include the S&P 500 and EUR/USD returns. Interest-rate changes are in percentage points, while the two returns are in per cent. A positive EUR/USD return represents a depreciation of the dollar.

I standardise the ten surprises and extract their first three principal components. I then rotate them to obtain target, forward-guidance, and asset-purchase factors. The target factor has a unit loading on the standardised `MP1` surprise, while the other two factors have zero loadings on this variable. I identify the asset-purchase factor by choosing the rotation that maximises its variation from September 2008 onward and normalise it on the standardised ten-year Treasury-yield surprise. I normalise the remaining factor on the standardised two-year Treasury-yield surprise and use it as the forward-guidance factor. The identification in Section 4 combines this factor with the raw S&P 500 and EUR/USD returns measured over the same announcement window.

C.3 Alternative factor constructions

I check whether the supply component depends on how I construct the forward-guidance factor. The first exercise excludes stock prices and the exchange rate from the principal-component analysis and constructs the three factors using interest-rate surprises only. The second exercise uses the same ten variables as the baseline but measures them only around the policy statement, excluding the press conference. For each exercise, I re-estimate the BVAR and repeat the identification.

Excluding stock prices and the exchange rate from the factor construction has little effect on the results. The new supply component has a correlation of 0.92 with the baseline component. Its macroeconomic responses also remain within the baseline credible intervals. The use of the raw

[21] Relative to the complete USMPD list, I exclude 17 September 2001, 22 January and 8 October 2008, 9 May 2010, 4 October 2019, 15, 19, 23, and 31 March 2020, and the monetary-policy framework speech on 27 August 2020.

S&P 500 and EUR/USD returns in the identification is therefore not driving the supply component through their inclusion in the forward-guidance factor.

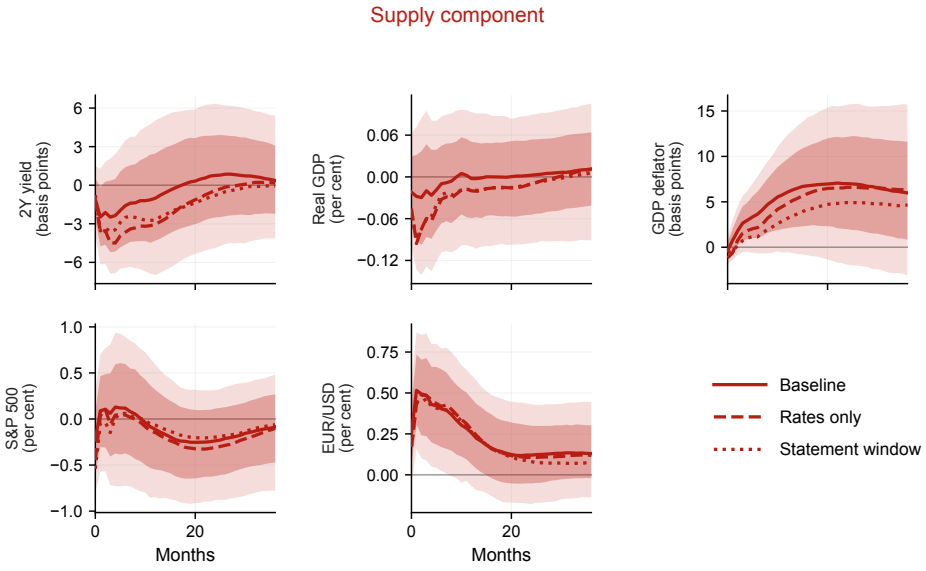
The statement-window supply component has a correlation of 0.90 with the baseline component. The dollar response remains similar, while the increase in prices is about two thirds of the baseline response and is less precisely estimated. This comparison shows that the press conference also contributes to the supply revisions measured over the full announcement. Table 11 compares the components event by event, and Figure 22 reports their macroeconomic responses.

Table 11: The identified components under alternative factor constructions.

	Rates-only factors		Statement window	
Component	Correlation	Sign agreement	Correlation	Sign agreement
Monetary policy	0.96	88%	0.84	92%
Supply component	0.92	90%	0.90	87%
Demand component	0.93	90%	0.89	86%

Notes: event-level correlation and sign agreement between the components from each alternative factor construction and the baseline components, across 216 FOMC announcements from 1999 to 2025. The rates-only construction uses interest-rate surprises alone. The statement-window construction uses the baseline variables from ten minutes before to twenty minutes after the statement. Each variant repeats the VAR estimation and the sign-restriction procedure of Section 4.

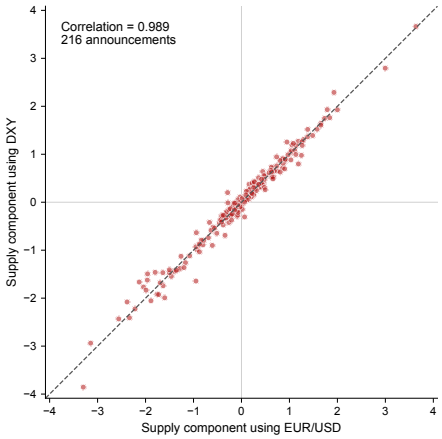
Figure 22: Macroeconomic responses under alternative factor constructions.



Notes: responses to a one-standard-deviation supply component. The solid line and shaded areas report the baseline posterior median and its 68 and 90 per cent credible sets. The dashed line uses the factor extracted from interest-rate surprises alone. The dotted line uses the baseline variables over the statement window. The two-year yield and GDP deflator are reported in basis points, real GDP and the S&P 500 in per cent, and EUR/USD as a percentage change using its full-sample mean of 1.18 dollars per euro. Full 1999–2025 sample.

C.4 Using the DXY dollar index

Figure 23: The supply component identified using EUR/USD and DXY.



Notes: each point is one of the 216 Federal Reserve announcements from February 1999 through May 2025. Both components are standardised. The horizontal axis uses EUR/USD; the vertical axis replaces it with DXY in the factor construction and high-frequency identification, while keeping the monthly variables, BVAR specification, and sign restrictions unchanged. I reverse the DXY sign because an increase represents a dollar appreciation. The component correlation is 0.989, or 0.992 when I keep the baseline forward-guidance factor fixed. The two forward-guidance factors have a correlation of 0.9996. The dashed line is the 45-degree line.

C.5 Monthly financial and macroeconomic variables

The monthly BVAR contains the two-year Treasury yield, the S&P 500 index, real GDP, the GDP deflator, and EUR/USD. The yield, stock index, and exchange rate are measured at the end of the month. The stock index, real GDP, and the GDP deflator enter as 100 times their natural logarithms. EUR/USD enters in dollars per euro. The two-year yield comes from the Federal Reserve Board's Gürkaynak–Sack–Wright zero-coupon Treasury curve. I obtain the S&P 500 and EUR/USD series through LSEG Workspace. The national accounts and the monthly indicators used to construct real GDP and the GDP deflator are obtained from the Bureau of Economic Analysis through FRED.

I add other variables to this system when studying the interpretation and transmission of the supply component. The exercises on supply pressures use the S&P GSCI commodity-price index from S&P Dow Jones Indices through LSEG Workspace and the Global Supply Chain Pressure Index from the Federal Reserve Bank of New York. The analysis of long-run inflation expectations uses five-year five-year-forward inflation compensation from the Federal Reserve Board's fitted Treasury curves. To study expected real rates, I use the five-year expected-real-rate measure of D'Amico et al. (2018). These variables are added as outcomes and do not enter the sign restrictions.

C.6 Daily financial-market variables

I use daily data to follow financial-market movements after each Federal Reserve announcement. The variables include nominal and inflation-protected Treasury yields, inflation compensation, the S&P 500, EUR/USD, and the VIX. Nominal and inflation-protected yields come from the Federal Reserve Board's fitted Treasury curves and are available at two, five, and ten years, as well as at the five-year five-year-forward horizon. I calculate inflation compensation as the difference between nominal and inflation-protected yields at the same maturity. The S&P 500 and EUR/USD series are from LSEG Workspace. The VIX is produced by the CBOE and obtained through FRED.

The analysis of real yields begins in 2005 because short-maturity inflation-protected Treasury securities were less liquid earlier in the sample. I also use the five-year expected-real-rate measure of D'Amico et al. (2018). I assign each identified component to its announcement date and estimate the subsequent changes in these variables over the following trading days.

C.7 Independent oil-supply news

I use the oil-supply surprises of Känzig (2021) as an external measure of supply news. These surprises are identified from changes in oil futures prices around announcements by the Organization of the Petroleum Exporting Countries. I use the 2025 vintage of the author's data and consider both measures provided by Känzig. The first is the change in the nearest-maturity oil futures contract. The second is the principal component of changes across the oil futures curve. I use the OPEC announcement dates to match each measure with the preceding or subsequent Federal Reserve announcement.

C.8 Monthly GDP and the GDP deflator

I construct monthly measures of real GDP and the GDP deflator because the original series are available only quarterly. Following Stock and Watson (2010), I use monthly indicators to distribute each quarterly observation across its three months.

For GDP, I first divide quarterly nominal GDP into its expenditure components. These include consumption, non-residential structures, equipment, residential investment, inventories, exports, imports, and government consumption and investment. I associate each component with monthly data that measure similar economic activity. For example, construction spending is used for structures and residential investment, manufacturers' orders and shipments for equipment, inventories for the change in private inventories, and monthly trade data for exports and imports. I use the monthly PCE price index to interpolate the GDP deflator. The quarterly national accounts and monthly indicators are obtained from the Bureau of Economic Analysis and other source agencies through FRED.

For each component, I remove its trend with a cubic spline and estimate a state-space model for the remaining monthly variation. The monthly indicators provide information about this variation, while the three monthly estimates are constrained to aggregate to the observed quarterly value. I

estimate the model by maximum likelihood and recover the monthly series with the Kalman filter and smoother. I then add the interpolated expenditure components to obtain nominal GDP and divide it by the interpolated deflator to obtain real GDP. I construct the series from 1959 onward, while the BVAR uses observations from January 1999 through May 2025.

C.9 SPF upper-tail inflation expectations

I use the Survey of Professional Forecasters to measure the probability that forecasters assign to elevated inflation. In each survey, respondents report probabilities for different ranges of annual-average GDP-price inflation in the next calendar year. I calculate the mean probability that this inflation rate will be at least 4 per cent.

Through 2013, I obtain this probability by adding the five reported ranges at or above 4 per cent in the SPF `PRPGDP` worksheet. From 2014 onward, the worksheet reports one range for inflation of 4 per cent or more. I express the resulting series in percentage points of probability.

The survey is conducted in February, May, August, and November. I interpolate between consecutive survey observations so that the probability can enter the monthly BVAR:

$$U_m = U_q + \frac{d_m - d_q}{d_{q+1} - d_q}(U_{q+1} - U_q), \tag{24}$$

where U_q is the probability reported in survey quarter q and d_m is the date of month m. I add this probability to the BVAR in levels. The identification does not restrict its response. The replication material also reports the results using the shorter core CPI and core PCE series, which begin in 2007.

D Further validation and robustness

D.1 Narrative review of the largest observations

I examine the twenty largest positive and twenty largest negative observations to understand how the supply component relates to the Federal Reserve's discussion of supply conditions and its expected policy response. For each meeting, I read the statement, press conference, and minutes to see what the Federal Reserve says about supply pressures, their effects on inflation and economic activity, and how monetary policy should respond. I also examine contemporary articles to understand how the announcement was interpreted at the time. I then compare this evidence with the movements in interest rates and the dollar over the announcement window.

Here, I discuss the meetings not covered in Section 5, where I examine April 2011, December 2021, and March 2022. For each episode, I report the size of the supply component and the movements in interest rates and the dollar. When the monetary-policy or demand components help explain these movements, I discuss them as well.

The statements and press conferences help me understand what the Federal Reserve communicated about supply conditions, but they do not directly show how this information differed from what markets expected before the meeting. This is particularly difficult for the earlier announcements, where the statement gives a shorter account of economic conditions and there is no press conference. I therefore read these accounts together with contemporary reporting and the movements in asset prices. An announcement can lead markets to revise their assessment of supply conditions, demand, and monetary policy at the same time. I therefore also discuss the monetary-policy and demand components when they help explain the movements in interest rates and the dollar.

Positive observations. The May 2006 meeting shows how the Federal Reserve responds to higher energy prices that add to inflation pressure while weakening economic activity. Brent had risen by about 12 per cent over the preceding thirty trading days. The Federal Reserve expected higher energy prices to contribute to slower growth, but also warned that energy and other commodity prices could add to inflation pressure. It raised the policy rate by 25 basis points and said that "some further policy firming may yet be needed."[22] My decomposition identifies a supply component of 2.0 standard deviations, making this a large supply-related revision in the sample. Medium-term interest rates rise during the announcement, with a positive forward-guidance factor of 0.71 and an increase of 6.3 basis points in the two-year Treasury yield. The dollar appreciates slightly, by 0.03 per cent. This meeting also contains positive monetary-policy and demand components, both of which contribute to dollar appreciation in my decomposition. The supply component therefore pushes the dollar towards depreciation, but the other two components offset this movement. The Federal Reserve's discussion of energy prices helps explain the supply-related revision within an announcement that also contains other news.

[22] FOMC statement of May 10, 2006.

The June 2006 announcement combines a positive forward-guidance factor with a depreciation of the dollar, while the Federal Reserve again discusses the effects of higher energy prices on inflation and growth. The statement attributes part of the slowdown in activity to earlier increases in interest rates and energy prices, but warns that energy and other commodity prices could sustain inflation pressures. The Federal Reserve raises the policy rate by 25 basis points and makes further tightening dependent on the "outlook for both inflation and economic growth."[23] The forward-guidance factor is positive, at 0.15, and the dollar depreciates by 0.81 per cent. My decomposition identifies a supply component of 2.1 standard deviations together with a monetary-policy component of -1.7 standard deviations. Both perceived adverse supply conditions and unexpected monetary easing contribute to dollar depreciation. Their contributions to the forward-guidance factor instead have opposite signs. The announcement also raises stock prices by 0.55 per cent and lowers the two-year Treasury yield by 4.6 basis points, even though the forward-guidance factor, which combines information across several asset prices, remains positive.

The October 2007 meeting shows the Federal Reserve supporting economic activity while facing renewed inflation pressure from energy and commodity prices. Brent had risen by about 15 per cent over the preceding thirty trading days. The Federal Reserve cut the policy rate by 25 basis points to limit the effects of financial-market disruption on the economy and expected the housing correction to slow growth. At the same time, it warned that higher energy and commodity prices could add to inflation. After the cut, it judged that "the upside risks to inflation roughly balance the downside risks to growth."[24] Contemporary reporting interpreted this assessment as indicating that further rate cuts were not immediately needed.[25] The forward-guidance factor is positive, at 0.80, and the two-year Treasury yield rises by 7.8 basis points during the announcement. My decomposition identifies a supply component of 2.7 standard deviations, together with positive monetary-policy and demand components. As in May 2006, these other revisions contribute to dollar appreciation and offset the depreciation associated with the supply component. The dollar therefore changes little overall, appreciating by 0.02 per cent, while stock prices fall by 0.43 per cent.

The January 2022 meeting combines news about persistent supply constraints with a stronger expected monetary-policy response. Powell explained that bottlenecks and supply constraints were preventing production from responding quickly to demand and had been "larger and longer lasting than anticipated." He also expected the Omicron wave to weigh on near-term growth. Although improvements in supply conditions were expected to help reduce inflation, their timing remained uncertain. The Federal Reserve therefore signalled that it would soon begin raising interest rates. Powell stressed that inflation was higher and the labour market stronger than when the previous tightening cycle began.[26] Reuters reported that markets interpreted his answers as leaving room for faster rate increases than previously expected.[27] My decomposition identifies a supply compo-

[23] FOMC statement of June 29, 2006.
[24] FOMC statement of October 31, 2007.
[25] MarketWatch, "Wall Street Rallies After Fed Decision", October 31, 2007.
[26] Press conference of January 26, 2022.
[27] Reuters, "Wall Street gains evaporate, S&P 500 ends lower on Fed tightening timeline", January 26, 2022.

nent of 2.9 standard deviations together with an unexpected monetary tightening of 2.3 standard deviations. Over the full announcement window, the forward-guidance factor is positive, at 0.10, the two-year Treasury yield rises by 10.5 basis points, and stock prices fall by 1.88 per cent. The dollar appreciates by 0.43 per cent. In my decomposition, the monetary-policy component contributes to this appreciation, offsetting the depreciation associated with the supply component and the negative demand component.

The December 2022 meeting shows that the Federal Reserve still saw supply constraints as a source of inflation, even as some supply-chain pressures were easing. Powell recognised that improving supply conditions were helping to reduce goods inflation, but described a "structural labor shortage" and explained that participation had not recovered as expected. The statement also linked the war in Ukraine to higher inflation and weaker global activity. The Federal Reserve raised its policy rate by 50 basis points, and Powell stressed that further increases would be needed despite the slowdown in growth.[28] Reuters also emphasised the prospect of further tightening despite the weak growth outlook.[29] My decomposition identifies a positive supply component of 2.0 standard deviations, a positive monetary-policy component of 1.3 standard deviations, and a negative demand component of -1.7 standard deviations. The demand revision lowers the forward-guidance factor, offsetting the increases associated with the other two components and leaving the total factor negative, at -0.42. The dollar appreciates by 0.13 per cent as the monetary-policy component offsets the depreciation associated with perceived supply conditions and weaker demand. Over the same announcement window, the two-year Treasury yield rises by 5.9 basis points and stock prices fall by 1.50 per cent.

The May and October 1999 announcements both have a positive forward-guidance factor while the dollar depreciates. The forward-guidance factor is positive, at 0.94 in May and 0.78 in October, and the dollar depreciates by 0.08 and 0.35 per cent, respectively. My decomposition identifies supply components of 5.4 and 4.5 standard deviations. At both meetings, the Federal Reserve leaves the current policy rate unchanged but signals that tightening may be needed to contain inflation. The May statement points to tight labour markets and demand growing faster than productivity. Reuters also links the inflation concerns to the preceding increase in consumer prices, partly driven by oil. In October, the Federal Reserve warns that costs could increase "significantly in excess of productivity." These statements discuss inflation risks arising from demand relative to productive capacity, rather than explicitly attributing them to adverse supply shocks.[30]

The November 1999 and May 2000 announcements also combine a positive forward-guidance factor with dollar depreciation, although the statements mainly discuss demand growing faster than productive capacity. The forward-guidance factor is positive, at 0.64 in November and 0.31 in May, while the dollar depreciates by 0.10 and 0.15 per cent, respectively. My decomposition identifies supply components of 2.6 and 2.8 standard deviations. In November, the Federal Reserve raises

[28] FOMC statement and press conference of December 14, 2022.

[29] Reuters, "Fed's Powell says inflation battle not won, more rate hikes coming", December 14, 2022.

[30] FOMC statements of May 18 and October 5, 1999. Reuters via Wired, "Fed Moves Spook Markets", May 18, 1999.

the policy rate by 25 basis points and warns that activity continues to expand faster than the economy's growth potential. In May, it raises the rate by 50 basis points, explaining that demand continues to exceed even the rapid productivity-driven growth in supply. Brent had risen by about 10 and 20 per cent over the preceding thirty trading days, respectively. Higher oil prices therefore provide additional context for the inflation concerns, while the statements emphasise pressure on productive capacity rather than a deterioration in supply. [31]

The August 2001 announcement combines monetary easing with concerns about weaker economic activity. The Federal Reserve cuts its policy rate by 25 basis points, pointing to declining business profits, weaker investment, and slowing growth abroad. Contemporary reporting also emphasises concern about a prolonged slowdown.[32] The forward-guidance factor is negative, at -1.94, and the dollar depreciates by 0.70 per cent. My decomposition identifies a positive supply component of 1.7 standard deviations alongside a large negative demand component and monetary easing.

The December 2003 announcement combines a positive forward-guidance factor with dollar depreciation, as the Federal Reserve reduces its assessment of deflation risk but maintains an accommodative policy stance. It leaves the policy rate at 1 per cent and says accommodation can continue for a "considerable period." The forward-guidance factor is positive, at 0.81, and the dollar depreciates by 0.11 per cent. My decomposition identifies a supply component of 2.5 standard deviations alongside positive monetary-policy and demand components. The minutes, released in January 2004, also report concerns about higher commodity prices and employee benefit costs adding to inflation pressure. They provide additional evidence on the Federal Reserve's assessment, although this discussion was not included in the announcement-day statement.[33] Over the surrounding period, the New York Fed attributes dollar weakness to concerns about the US current-account deficit and expectations that US rates would remain low relative to foreign rates.[34]

The March 2009 announcement combines a sharp dollar depreciation with an expansion of the Federal Reserve's asset purchases. The statement describes falling activity, tight credit conditions, and subdued inflation.[35] The dollar depreciates by 2.07 per cent, and my decomposition identifies a supply component of 3.0 standard deviations alongside a monetary easing component of -5.0 standard deviations. Both components contribute to depreciation in the decomposition. The statement explains the decision to provide further monetary support, but does not give a direct account of adverse supply news. For this meeting, the narrative therefore provides less support for the supply interpretation than in the episodes discussed above.

The September 2012 announcement combines a positive forward-guidance factor and dollar depreciation with a discussion of commodity-price pressures and further monetary accommodation. The statement notes that "the prices of some key commodities have increased recently." In the

[31] FOMC statements of November 16, 1999, and May 16, 2000.
[32] FOMC statement of August 21, 2001. ABC News, "Fed Cuts Rates Again", August 21, 2001.
[33] FOMC statement of December 9, 2003. Minutes of the December 9, 2003 meeting, released on January 29, 2004.
[34] Federal Reserve Bank of New York, "Treasury and Federal Reserve Foreign Exchange Operations, October–December 2003", February 5, 2004.
[35] FOMC statement of March 18, 2009.

press conference, Bernanke also discusses how drought and geopolitical tensions had contributed to fluctuations in food and fuel prices in recent years. With unemployment still elevated, the Federal Reserve announces additional purchases of mortgage-backed securities to support the recovery, while expecting inflation over the medium term to remain at or below its objective.[36] The forward-guidance factor is positive, at 1.32, and the dollar depreciates by 0.70 per cent. My decomposition identifies a supply component of 2.0 standard deviations alongside monetary easing and a positive demand component. The meeting therefore brings together commodity-price pressures and a policy decision to provide further support to economic activity.

The August and September 2010 announcements and the January 2012 meeting combine a positive forward-guidance factor with dollar depreciation, while the Federal Reserve announces further support for the recovery. In August 2010, it decides to reinvest principal payments from its securities holdings. In September, it signals that additional accommodation may be needed, and in January 2012 it extends its guidance for exceptionally low rates to late 2014. The statements in August and September 2010 describe weak activity as restraining cost pressures. In January 2012, Bernanke also explains that oil and commodity prices had flattened or declined after their earlier increases.[37] Contemporary reporting links the dollar's decline in September 2010 and January 2012 to the prospect of further monetary accommodation.[38] My decomposition also identifies monetary easing at all three meetings, alongside positive supply components ranging from 1.8 to 2.4 standard deviations. The dollar depreciates by about 0.7–0.8 per cent at each announcement. These meetings therefore illustrate how the estimated supply component can coexist with monetary easing within the same announcement.

The March 2018 and June 2023 press conferences discuss risks to supply and the persistence of supply constraints. In March 2018, Powell reports that businesses are concerned about changes in trade policy, although these concerns have not yet changed the Federal Reserve's current outlook. Reuters also links some stock-market selling during the press conference to his remarks about tariffs. My decomposition identifies a supply component of 1.9 standard deviations. The dollar depreciates by 0.51 per cent, while the forward-guidance factor is slightly negative, alongside negative monetary-policy and demand components. In June 2023, Powell explains that further declines in goods inflation require "continued healing in supply conditions." Supply conditions had improved substantially, but businesses still reported that they had not returned to normal.[39] The supply component is 2.3 standard deviations. At this meeting, the forward-guidance factor is positive, at 1.33, but the dollar appreciates by 0.25 per cent. The announcement also contains positive monetary-policy and demand components, both of which contribute to appreciation in my

[36] FOMC statement and press conference of September 13, 2012. Contemporary reporting also emphasised the unexpectedly open-ended commitment to asset purchases. Washington Post, "Stocks surge on Fed's QE3 plan", September 13, 2012.

[37] FOMC statements of August 10 and September 21, 2010, and January 25, 2012. Press conference of January 25, 2012.

[38] Reuters, "Dollar sells off on Fed statement", September 21, 2010. Business Recorder, "Dollar falls as Fed extends low-rate pledge", January 25, 2012.

[39] Press conferences of March 21, 2018, and June 14, 2023. Reuters, "World stocks flat as investors weigh inflation, trade concerns", March 21, 2018.

decomposition.

Negative observations. In June 1999, the Federal Reserve explained that stronger productivity was containing inflation despite tighter labour markets. The statement said that "strengthening productivity growth has contained inflationary pressures." It raised the policy rate by 25 basis points but also removed its bias towards further tightening. Contemporary reporting linked the rally in stocks and bonds to this change in the policy outlook.[40] In my announcement window, the forward-guidance factor is slightly negative, at −0.05, and the dollar depreciates by 0.34 per cent. I identify a negative supply component of −2.6 standard deviations alongside monetary easing. The productivity discussion supports the interpretation of improving supply conditions, while the easing component contributes to dollar depreciation.

In January 2001, lower oil prices had reduced import costs, although natural-gas and electricity prices were still rising. Brent had fallen by about 29 per cent over the preceding thirty trading days. In the later-released transcript, Greenspan explained that lower oil prices had reduced the implied "import tax." The public statement still described high energy costs as a burden on households and businesses.[41] I identify a negative supply component of −4.4 standard deviations alongside monetary easing and a large positive demand component. The forward-guidance factor is positive, at 3.21, and the dollar appreciates by 0.42 per cent.

The April 2001 rate cut followed a decline in energy costs for firms. The producer-price report published six days earlier showed that intermediate energy prices had fallen by 1.4 per cent in March. Contemporary industry reporting linked stabilising energy prices and lower inflation to the Federal Reserve's ability to cut rates.[42] I identify a negative supply component of −4.8 standard deviations alongside monetary easing of −4.0 standard deviations. The forward-guidance factor is negative, at −1.30, and the dollar depreciates by 0.92 per cent. In my decomposition, monetary easing offsets the appreciation associated with the negative supply component.

The May and November 2001 announcements combine a negative forward-guidance factor with a small appreciation of the dollar. The Federal Reserve cuts rates by 50 basis points at both meetings to support weak economic activity. The minutes, released later, also discuss how energy prices affect the inflation outlook. In May, policymakers expect "projected declines in energy prices" to help contain inflation, although energy costs remain high. By November, energy prices have fallen, partly because of weaker global demand, and policymakers expect these declines to reduce core inflation.[43] My decomposition identifies negative supply components of −3.5 and −3.3 standard deviations. The forward-guidance factor is negative at both meetings, at −1.01 and −0.73, while the dollar appreciates by 0.09 and 0.07 per cent, respectively.

[40] FOMC statement of June 30, 1999. CNNfn, "Wall Street gets a Fed gift", June 30, 1999.

[41] FOMC statement of January 3, 2001, and internal conference-call transcript, printed p. 4.

[42] Bureau of Labor Statistics, "Producer Price Indexes—March 2001", released April 12, 2001. Heavy Duty Trucking, "Fed Cuts Interest Rates Again", April 18, 2001. The April 18 FOMC statement focused on weak investment, profits, and the outlook for activity.

[43] FOMC statements of May 15, 2001, and November 6, 2001. The minutes of the May meeting were released on June 28, 2001, and those of the November meeting on December 13, 2001.

The August 2002, March 2004 and August 2009 announcements describe weak demand or limited inflation pressure. In August 2002, the Federal Reserve points to weaker demand and financial markets. In March 2004, low inflation and unused capacity allow it to remain patient before raising rates. In August 2009, it expects economic slack to contain cost pressures even though energy and commodity prices have risen.[44] The forward-guidance factor is negative at all three meetings. The dollar depreciates by 0.11 per cent in August 2002 and appreciates by 0.08 and 0.56 per cent in March 2004 and August 2009. I identify negative supply components ranging from -2.3 to -2.5 standard deviations, although these statements primarily discuss weak activity and subdued inflation rather than declining input costs.

The October 2008 and January 2009 announcements combine a negative forward-guidance factor with dollar appreciation, while the Federal Reserve links lower inflation to falling energy and commodity prices. Before the October meeting, Brent had fallen by about 26 per cent over thirty trading days. The statement identifies "declines in the prices of energy and other commodities" together with weaker activity as reasons to expect inflation to moderate. The Federal Reserve cuts its policy rate by 50 basis points. In January, it again points to lower commodity prices and economic slack as sources of subdued inflation, while keeping the policy rate near zero.[45] The forward-guidance factor is negative at both meetings, at -1.46 and -0.34, and the dollar appreciates by 0.68 and 0.88 per cent, respectively. My decomposition identifies supply components of -3.1 and -3.6 standard deviations.

The December 2013 and 2014 meetings and the April and October 2015 meetings associate low inflation with lower energy and import prices. In December 2013, Bernanke explains that falling oil prices are making it harder for inflation to return to target. By December 2014, Brent had fallen by about 27 per cent over the preceding thirty trading days. Yellen explains that lower oil prices reduce inflation but also support households' purchasing power. She describes their overall effect on the US economy as positive and expects their effect on inflation to be temporary. The April and October 2015 statements again attribute below-target inflation partly to lower energy and non-energy import prices.[46] My decomposition identifies negative supply components at all four meetings, ranging from -2.3 to -3.2 standard deviations. The dollar appreciates by 0.30 per cent in December 2013, 0.48 per cent in December 2014, and 0.70 and 1.23 per cent in April and October 2015. The forward-guidance factor is positive at the two December meetings and slightly negative at the two 2015 meetings.

In September 2017, the Federal Reserve expects the increase in gasoline prices after the hurricanes to raise inflation only temporarily. It also expects the disruption to activity to fade, while inflation apart from the hurricane effects remains below its objective.[47] The forward-guidance factor is positive, at 0.53, and the dollar appreciates by 1.05 per cent. My decomposition identifies

[44] FOMC statements of August 13, 2002, March 16, 2004, and August 12, 2009.
[45] FOMC statements of October 29, 2008, and January 28, 2009.
[46] FOMC press conferences of December 18, 2013, and December 17, 2014. FOMC statements of April 29, 2015, and October 28, 2015.
[47] FOMC statement of September 20, 2017.

a negative supply component of −2.6 standard deviations alongside positive monetary-policy and demand components.

In June 2019, Powell discussed how lower oil prices were supporting household spending, while also reducing investment. Brent had fallen by about 11 per cent over the preceding thirty trading days. He explained that lower oil prices were "leading to lower gas prices, which supports spending." At the same meeting, the Federal Reserve left rates unchanged but indicated that it could cut them, which Reuters linked to the increase in stock prices.[48] The forward-guidance factor is negative, at −1.44, and the dollar depreciates by 0.12 per cent. I identify a negative supply component of −3.8 standard deviations. The announcement also contains monetary easing and weaker perceived demand, which contribute to dollar depreciation in my decomposition. The dollar can therefore depreciate even though the supply component alone would imply an appreciation.

The May and June 2022 announcements also contain revisions to the expected pace of tightening. In May, Powell says that a 75-basis-point increase is not being actively considered. In June, after delivering an increase of that size, he says that he does not expect such moves to be common.[49] The forward-guidance factor is approximately zero in May and negative at −0.78 in June, while the dollar depreciates by 0.65 and 0.58 per cent. I identify negative supply components of −2.8 and −2.6 standard deviations alongside monetary easing at both meetings. These remarks concern the policy response while supply pressures remain elevated.

In December 2023, Powell linked the decline in inflation to improving supply conditions. More people were entering the labour force, immigration had recovered, and the shortages and bottlenecks from the pandemic were easing. He explained that these "significant supply-side gains" had helped the economy grow without the increase in unemployment that many forecasters had expected. He also said that interest rates were likely near their peak and that the Federal Reserve had started discussing when to cut them.[50] The forward-guidance factor is negative, at −1.60, and the dollar depreciates by 0.77 per cent. My decomposition identifies both improving perceived supply conditions, with a supply component of −2.9 standard deviations, and monetary easing, with a monetary-policy component of −2.8 standard deviations. The easing contributes to dollar depreciation, while the negative supply component works in the opposite direction.

In March 2025, Powell explains why higher projected inflation does not lead to a higher projected policy path. He attributes part of the inflation revision to tariffs and explains that weaker growth and higher inflation have offsetting implications for policy. He also says that looking through tariff inflation could be appropriate if its effects fade quickly and longer-term inflation expectations remain anchored.[51] The forward-guidance factor is negative, at −0.61, and the dollar depreciates by 0.22 per cent. My decomposition identifies a negative supply component of −2.4 standard deviations alongside monetary easing.

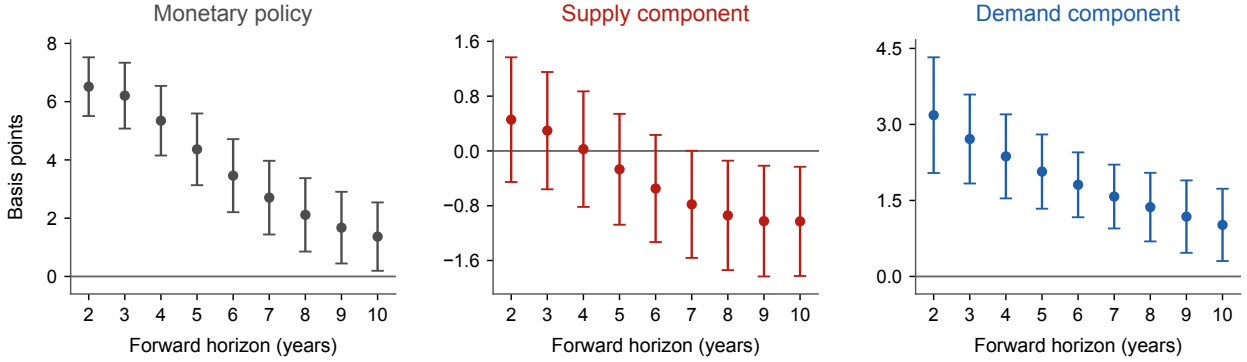
[48] FOMC press conference of June 19, 2019, p. 13. Reuters, "Stocks approach record as Fed soothes Wall Street's fears", June 19, 2019.
[49] FOMC press conferences of May 4, 2022, p. 7, and June 15, 2022, p. 4.
[50] FOMC press conference of December 13, 2023, pp. 1–2, 6–8.
[51] FOMC press conference of March 19, 2025, pp. 5–6.

D.2 Real forward rates and the total real-rate revision

The five-year expected real rate discussed in the main text is an average and does not show the response at more distant horizons. I therefore use the yield curves constructed by Gürkaynak et al. (2010) to examine real forward rates. A ten-year real forward rate describes the inflation-adjusted return implied by today's bond prices for a short investment beginning ten years ahead. At each horizon, I regress its announcement-day change on the three components jointly.

Figure 24 shows that the supply component produces small and imprecisely estimated responses at shorter horizons, while the declines at nine and ten years are statistically significant at the 5 per cent level. Real forward rates instead rise after monetary-policy and demand news.

Figure 24: Real forward-rate responses on the announcement day.



Notes: OLS responses of real instantaneous forward rates at horizons from two to ten years, using the yield curves of Gürkaynak et al. (2010). The sample contains 166 Federal Reserve announcements from February 2005 through May 2025. The dependent variable is the change from the preceding trading day's close to the announcement day's close, in basis points. Each regression includes an intercept and the three components jointly, retaining their baseline units. Dots show coefficients and whiskers show pointwise 90 per cent confidence intervals using heteroskedasticity-robust (HC1) standard errors.

I then add up the real-rate revisions from today through ten years to examine whether later declines outweigh earlier increases. In the numerical benchmark with foreign responses held fixed, Equation (10) reduces to

$$e_0^j = -\sum_{k=0}^{\infty} \mathbb{E}_0 r_k^{c,j} \approx -\sum_{k=0}^{39} \mathbb{E}_0 r_k^{c,j}, \qquad r_k^{c,j} = i_k^j - \mathbb{E}_k \pi_{k+1}^{c,j}.$$

With quarterly model rates, the finite sum covers ten years and approximates the infinite sum when the remaining contribution is small. For announcement i, let $\Delta f_i^{\text{real}}(h)$ and $\Delta Y_i^{\text{real}}(H)$ denote changes from the preceding trading day's close to the announcement day's close in the fitted real forward rate and zero-coupon real yield. For annual, continuously compounded rates and horizons measured in years,

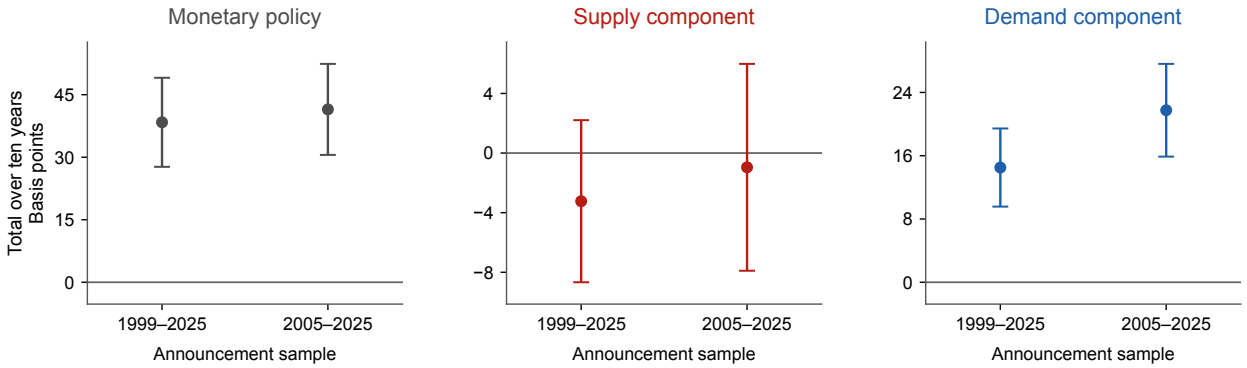
$$C_i(H) = \int_0^H \Delta f_i^{\text{real}}(h)\, dh = H\, \Delta Y_i^{\text{real}}(H), \qquad H = 10.$$

I estimate the response of this total using the same joint regression,

$$C_i(10) = \alpha + \beta^{\text{mp}}\varepsilon_i^{\text{mp}} + \beta^{\text{sup}}\varepsilon_i^{\text{sup}} + \beta^{\text{dem}}\varepsilon_i^{\text{dem}} + u_i.$$

Figure 25 shows that the estimated total is negative following the supply component in both samples, while monetary-policy and demand news produce positive totals. The supply estimates are imprecise.

Figure 25: Total real-rate revisions over ten years on the announcement day.



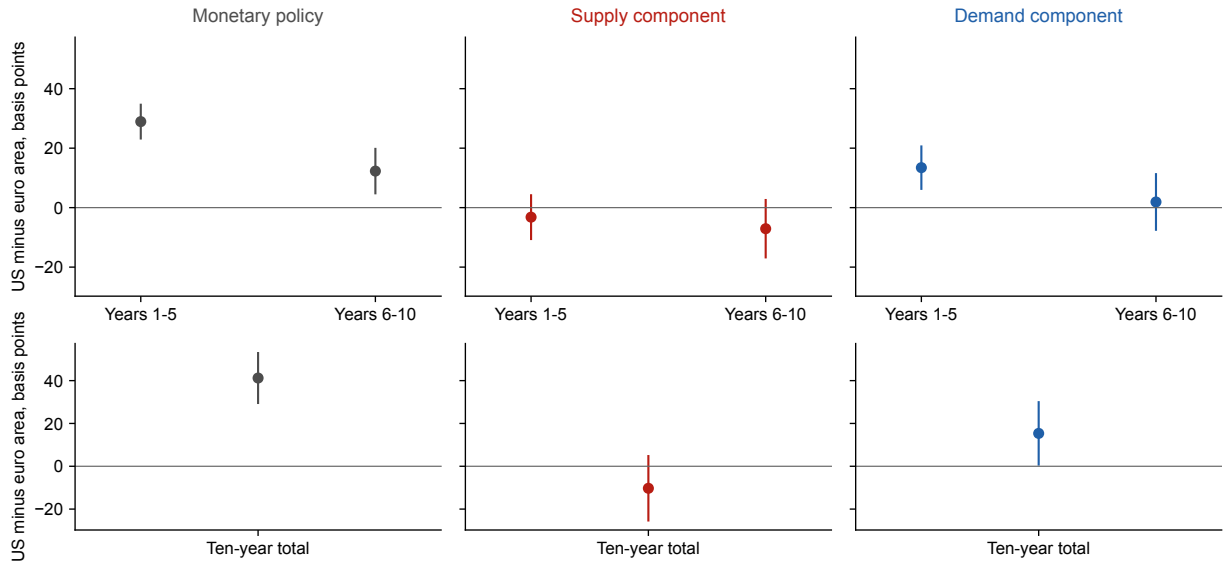
Notes: OLS responses of the total real-rate revision from today through ten years, in basis points. The outcome equals ten times the announcement-day change in the continuously compounded ten-year zero-coupon real yield of Gürkaynak et al. (2010). The samples contain 216 announcements from 1999–2025 and 166 announcements from 2005–2025. Changes are measured from the preceding trading day's close to the announcement day's close. Each regression includes an intercept and the three components jointly. The components retain the same baseline units in both samples. Dots show coefficients and whiskers show pointwise 90 per cent confidence intervals using heteroskedasticity-robust (HC1) standard errors.

D.3 Longer-maturity US and euro-area real-rate differences

I repeat the comparison in Figure 5 using five- and ten-year OIS and inflation swaps. Data availability limits the common sample to 109 announcements from August 2011 through May 2025. I use the same two-day window and include the three components jointly.

Figure 26 shows the contribution over the first five years and the additional contribution between years six and ten. After the supply component, the US real-rate measure falls relative to the euro-area measure by 3.2 basis points over the first five years and by a further 7.1 basis points between years six and ten. The ten-year total is therefore −10.3 basis points. Monetary-policy and demand news instead produce positive totals. The supply estimates are imprecise, but their signs are the same as in the shorter-maturity exercise. The wider confidence intervals reflect the shorter sample and the greater noise in the longer-maturity instruments.

Figure 26: Five- and ten-year US–euro-area real-rate differentials.



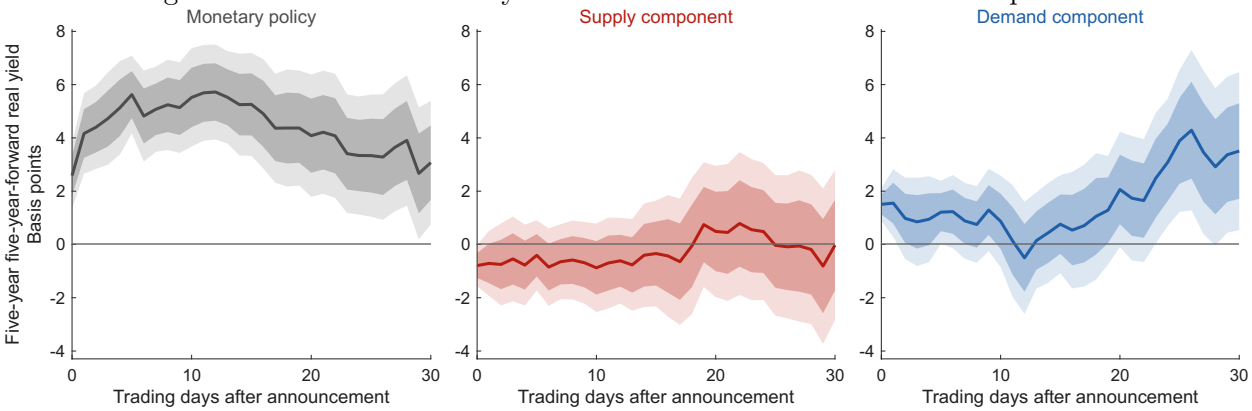
Notes: responses of the US minus euro-area market real-rate measure to a one-standard-deviation component. At each maturity, the annualised measure is the nominal OIS rate less the inflation-swap rate. I approximate the total revision through horizon H by multiplying the change in the H-year measure by H. The contribution over years six to ten equals the ten-year total less the five-year total. The sample contains 109 announcements from August 2011 through May 2025. Changes are measured from the close before the Federal Reserve announcement to the close on the following trading day, using common start and end dates across the eight series. Each regression includes an intercept and the three components jointly. Whiskers are pointwise 90 per cent confidence intervals using conventional OLS standard errors. Daily closing OIS and inflation-swap rates are from LSEG Workspace. These market measures can also contain term, inflation-risk and liquidity premia.

D.4 The forward real yield

I also study how the three components affect real yields at longer horizons. I use the five-year five-year-forward real yield, which covers the five-year period beginning five years after the announcement, and estimate its response using daily local projections.

Figure 27 shows that the supply component does not produce a persistent increase in the forward real yield. It falls by 0.8 basis point on the announcement day and returns to approximately zero after thirty trading days. The monetary-policy component instead raises the yield by 2.6 basis points on the announcement day and by 3.1 basis points after thirty trading days. The demand component also raises it, with the response increasing from 1.5 to 3.5 basis points over the same period.

Figure 27: The forward real yield after the three announcement components.



Notes: Daily local projections of the five-year five-year-forward real yield, in basis points, from 2005 to 2025. Solid lines are point estimates; inner and outer bands are 68 and 90 per cent confidence intervals. A traded real yield can contain real term and liquidity premia and is not a direct observation of the expected policy real rate.

D.5 Risk and monetary-policy uncertainty

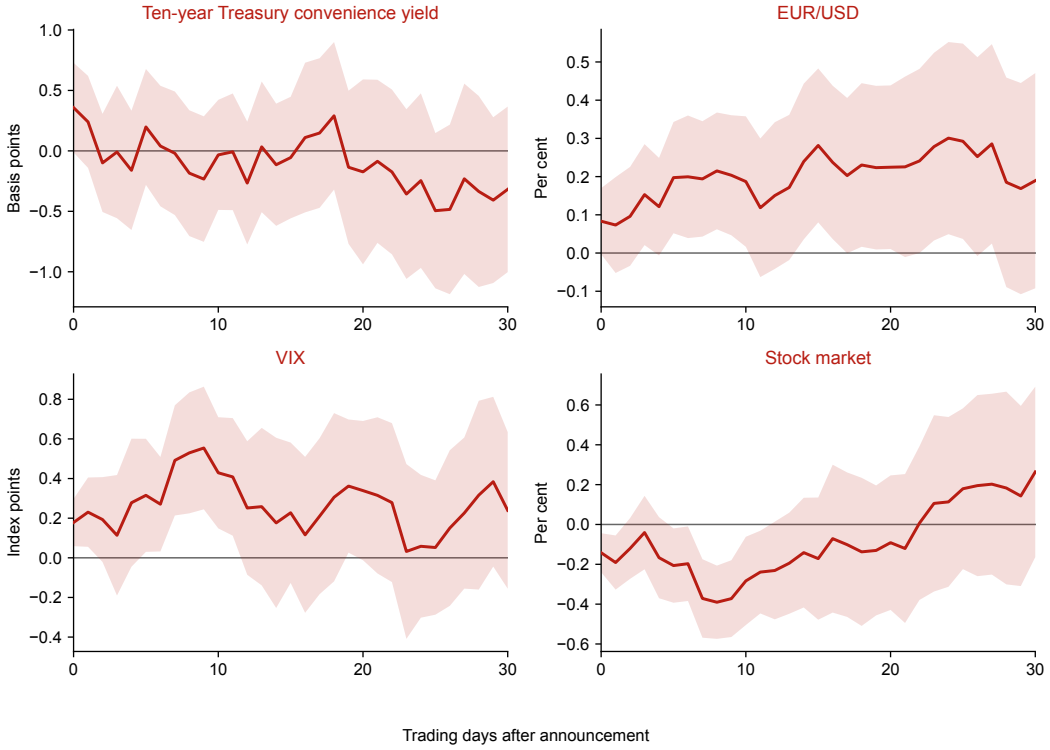
I first examine whether the fall in stock prices and the increase in the VIX after the supply component reflect a global flight to safety. In this case, investors would move towards dollar assets and US Treasuries, which would tend to appreciate the dollar and increase the Treasury convenience yield. This yield measures the additional value investors place on holding US Treasuries relative to comparable foreign government bonds. Figure 28 shows that the dollar instead depreciates and the convenience yield shows no persistent increase. These responses do not support a flight-to-safety interpretation of the supply component.

I also examine whether the supply component is associated with greater uncertainty about future policy rates. Table 12 reports its correlation with announcement-day changes in the monetary-policy uncertainty measure of Bauer et al. (2022), at horizons of twelve and twenty-four months. The correlations with the supply component are small and not statistically significant at either horizon. The monetary-policy and demand components instead have positive and statistically significant correlations with both measures. The increase in the VIX after the supply component therefore occurs without a clear increase in measured uncertainty about future policy rates.

To examine whether supply information is accompanied by changes in the pricing of currency risk, I use one- and three-month EUR/USD 25-delta risk reversals from LSEG. Under the standard EUR/USD quotation, risk reversals equal the implied volatility of euro calls minus that of euro puts. A positive change means that protection against dollar depreciation becomes more expensive relative to protection against appreciation. A negative change indicates the opposite. I regress their changes from the announcement date to the following trading day on the three components jointly. I use the same 109 announcements as in the US–euro-area real-rate comparison.

Figure 29 shows no statistically significant response of either risk reversal following supply information. There is therefore no clear shift in the relative pricing of protection against dollar

Figure 28: The supply component and the flight-to-safety pattern.



Notes: response of the ten-year Treasury convenience yield, measured as the covered-interest-parity basis of ten-year Treasuries against G10 government bonds, EUR/USD, the VIX, and the log NYSE index to a one-standard-deviation supply component. EUR/USD and the stock market are in per cent; a rise in EUR/USD is a dollar depreciation. Estimates are daily local projections from equation (19); the horizon is in trading days. Solid line: point estimate; shaded band: 90 per cent confidence interval. The estimation period begins when each series becomes available and ends in 2025.

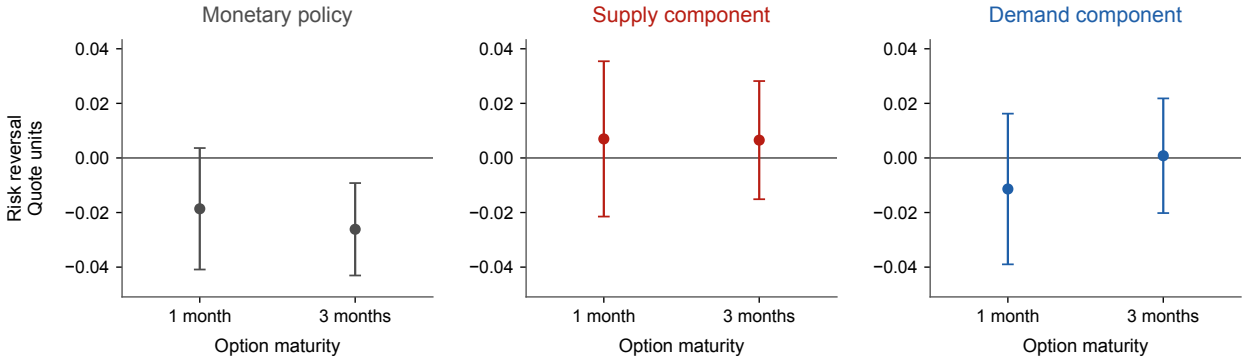
Table 12: The three announcement components and market-based monetary-policy uncertainty.

	ΔMPU (12m)	ΔMPU (24m)
Monetary policy	+0.275***	+0.368***
	(2.89)	(4.17)
Supply component	+0.095	+0.045
	(1.15)	(0.60)
Demand component	+0.237***	+0.153*
	(2.77)	(1.81)

Notes: correlation of monetary policy, the supply component, and the demand component with the FOMC-day change in the market-based monetary-policy uncertainty measure of Bauer et al. (2022), at the twelve- and twenty-four-month horizons. Heteroskedasticity-robust t-statistics from univariate regressions in parentheses; *, **, and *** denote two-sided significance at the 10, 5, and 1 per cent levels. Retained FOMC announcements with available data, $N = 216$.

depreciation and appreciation. The three-month risk reversal falls following the monetary-policy component, indicating that protection against dollar appreciation becomes relatively more expensive. Together with the convenience-yield evidence, these findings support focusing on relative interest rates and inflation when interpreting the dollar's response to supply information.

Figure 29: Currency-option prices around Federal Reserve announcements.



Notes: changes in the midpoints of EUR/USD one- and three-month 25-delta risk-reversal quotes from the announcement date to the next weekday. The sample contains 109 announcements from August 2011 through May 2025. Each regression includes an intercept and all three components, scaled by their standard deviations over the original 216 announcements. Dots are OLS coefficients and whiskers are pointwise 90 per cent t confidence intervals. Native quote units are retained. The source exports identify quote dates without quote times.

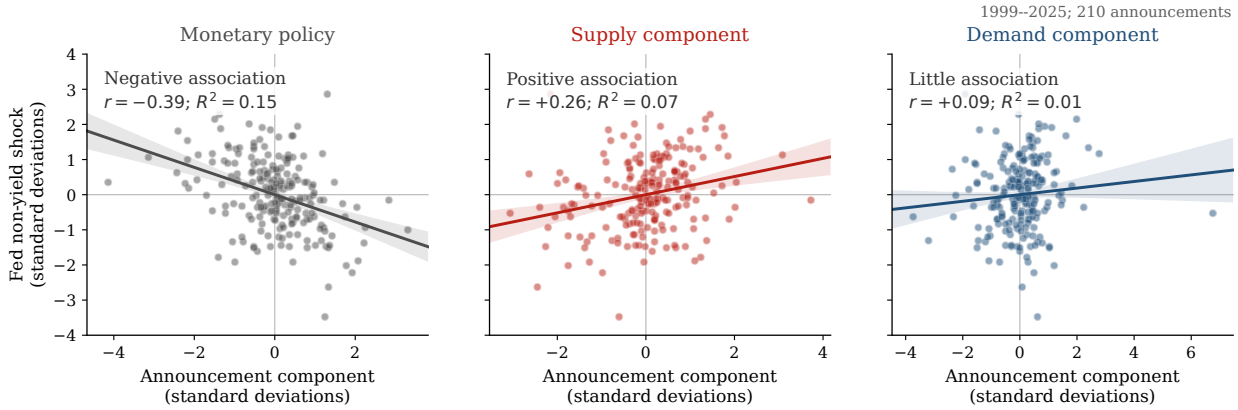
D.6 The Fed non-yield shock

I compare my three components with the Fed non-yield shock of Boehm and Kroner (2026) to study whether perceived supply conditions help explain asset-price movements that changes in the yield curve do not capture. Their measure summarises these movements around Federal Reserve announcements. A positive value is associated with higher stock and commodity prices, dollar depreciation, and lower implied volatility.

The supply and monetary-policy components explain part of the variation in their measure, while the demand component explains very little. Figure 30 reports the comparison across 210 matched announcements. The supply component is positively correlated with their measure and explains about 7 per cent of its variation. The monetary-policy component is negatively correlated with it and explains about 15 per cent. The demand component explains less than 1 per cent, while the three components together explain 23 per cent. Perceived supply conditions therefore help explain a part of the non-yield variation that demand-related revisions do not capture.

The relation with my components is possible even though their factor is orthogonal to changes in the yield curve. An announcement can contain adverse supply news together with unexpected monetary easing. The two revisions move interest rates in opposite directions, but both depreciate the dollar. Their effects on rates can therefore offset each other while still moving other asset prices, as discussed in Section 6. This helps explain how their factor can be related to both components without requiring either component to leave yields unchanged.

Figure 30: The Fed non-yield shock and the three announcement components.

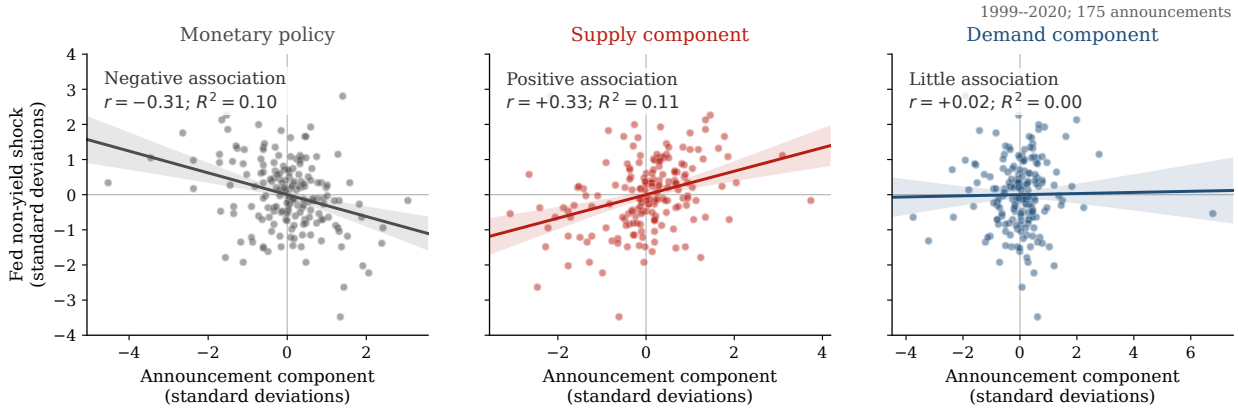


Notes: scatter plots of the Fed non-yield shock of Boehm and Kroner (2026) against monetary policy, the supply component, and the demand component. Each variable is standardised over the 210 matched announcements from 1999 to May 2025. Lines are univariate OLS fits; shaded areas are 90 per cent heteroskedasticity-robust confidence bands. The Fed non-yield shock is measured over the authors' fourteen-hour baseline window. The three components are measured from the statement through the press conference.

D.7 The Fed non-yield shock through 2020

The supply component is related to the Fed non-yield shock even before the increase in inflation in 2021–2022. I repeat the comparison using the 175 matched announcements from 1999 through 2020. Figure 31 shows that the supply component explains about 11 per cent of the variation in their measure, compared with 10 per cent for the monetary-policy component and less than 0.1 per cent for demand. The contribution of supply is therefore already present in the earlier part of the sample, when inflation was generally lower.

Figure 31: The Fed non-yield shock and the three announcement components through 2020.



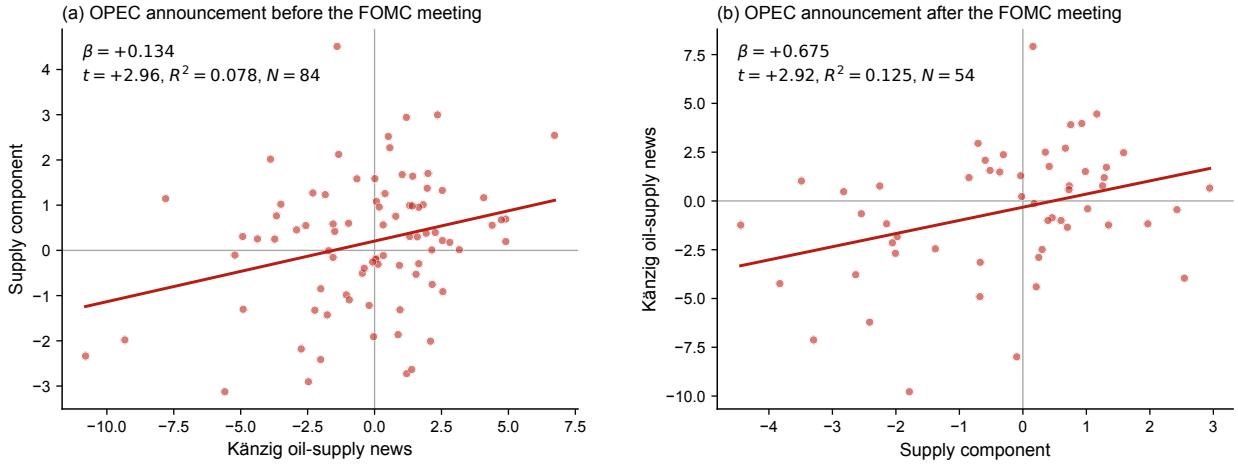
Notes: scatter plots of the Fed non-yield shock of Boehm and Kroner (2026) against monetary policy, the supply component, and the demand component. Each variable is standardised over the 175 matched announcements from 1999 through 2020. Lines are univariate OLS fits; shaded areas are 90 per cent heteroskedasticity-robust confidence bands. The Fed non-yield shock is measured over the authors' fourteen-hour baseline window. The three components are measured from the statement through the press conference.

D.8 Oil-supply news before and after FOMC announcements

My supply component is related to oil-supply news both before and after Federal Reserve announcements. Figure 32 first plots the relationship studied in Section 5.2. For each FOMC meeting, I take the most recent OPEC announcement within the preceding thirty calendar days and regress my supply component on Känzig's front-month futures surprise. The relationship is positive, with a t-statistic of 2.96 across 84 matched announcements.

I then ask whether my supply component predicts oil-supply news at the next OPEC announcement. I take the first OPEC announcement within thirty calendar days after each FOMC meeting and regress Känzig's principal-component measure on my supply component. The right panel shows a positive relationship, with a t-statistic of 2.92 across 54 matched announcements. The supply component therefore contains information related to subsequent oil-supply news, as well as to news already released before the Federal Reserve meeting.

Figure 32: The supply component and Känzig's oil-supply news.



Notes: left, the supply component against the front-contract Känzig shock at the nearest OPEC announcement in the thirty days before each FOMC meeting; right, the principal-component Känzig shock at the nearest OPEC announcement in the thirty days after each meeting against the supply component. Lines are OLS fits with HAC inference. Full 1999–2025 sample.

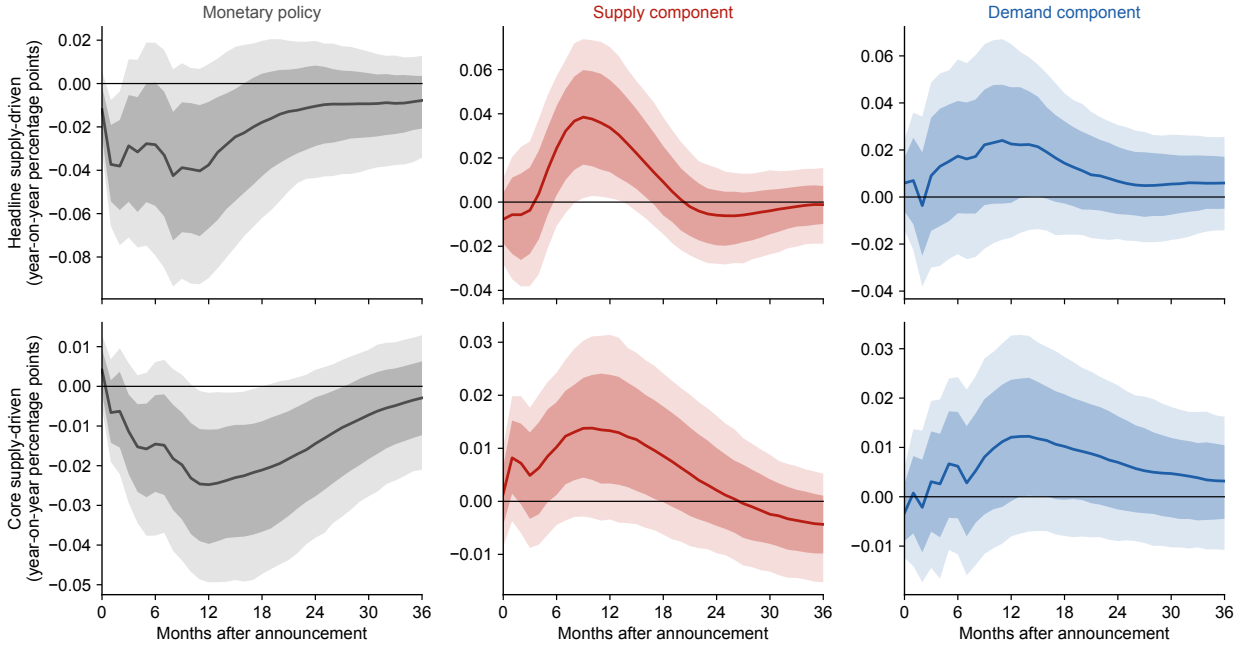
D.9 Year-on-year supply- and demand-driven inflation

I also estimate the responses using the year-on-year supply- and demand-driven contributions to inflation published by Shapiro (2024). In the main text, I cumulate his monthly contributions to study their effects on the price level. Here, I include the published year-on-year measures separately in the BVAR and consider both headline and core PCE inflation, which excludes food and energy.

The supply component raises supply-driven inflation in both headline and core PCE. Figure 33 shows that the headline response reaches about 0.04 percentage point within the first year. The core response is smaller and less precisely estimated, but it also increases. The positive response therefore remains when food and energy are excluded, although the evidence is stronger for headline inflation.

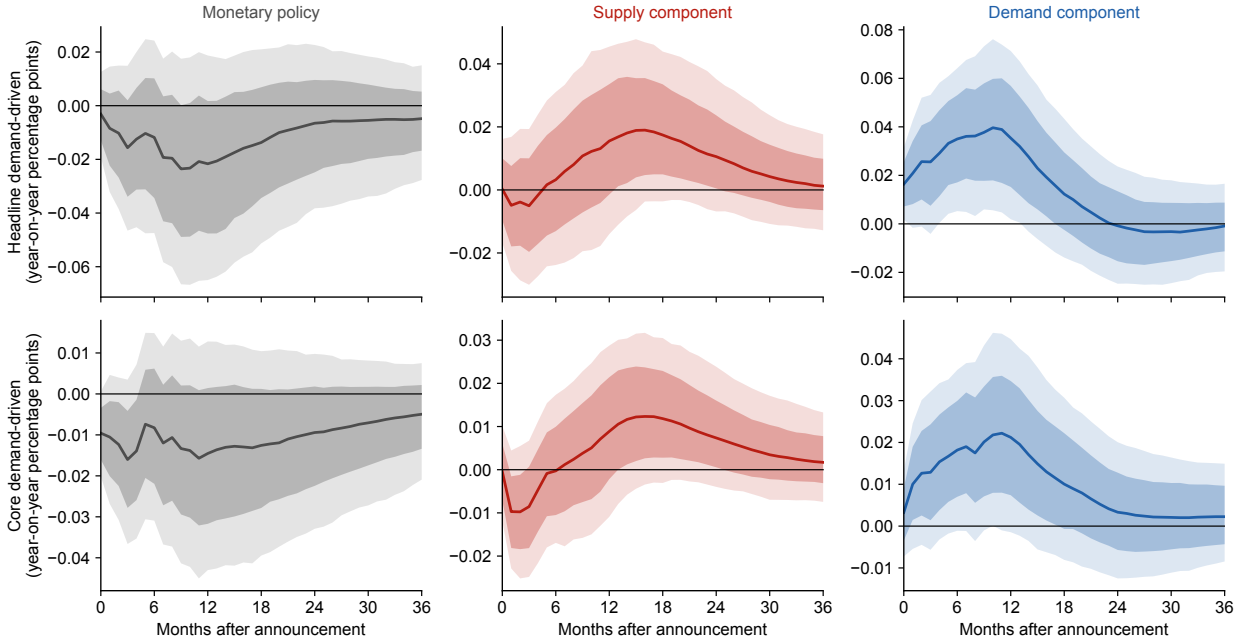
The demand component instead produces a larger increase in demand-driven inflation. Figure 34 shows positive responses for both headline and core PCE, which peak within the first year and then decline. The monetary-policy component lowers both supply- and demand-driven inflation, although some responses are imprecisely estimated.

Figure 33: Supply-driven PCE inflation after the three announcement components.



Notes: year-on-year supply-driven contributions to headline PCE inflation (top row) and core PCE inflation (bottom row), from Shapiro (2024), after a one-standard-deviation monetary-policy component (left), supply component (centre), and demand component (right). Solid line: posterior median; shaded bands: inner 68 and outer 90 per cent credible sets. VAR sample: 1999–2025.

Figure 34: Demand-driven PCE inflation after the three announcement components.



Notes: year-on-year demand-driven contributions to headline PCE inflation (top row) and core PCE inflation (bottom row), from Shapiro (2024), after a one-standard-deviation monetary-policy component (left), supply component (centre), and demand component (right). Solid line: posterior median; shaded bands: inner 68 and outer 90 per cent credible sets. VAR sample: 1999–2025.

D.10 A second oil-news shock

I also compare my supply component with the OPEC surprises of Degasperi (2023). He distinguishes oil-supply news from oil-demand news using the movements in oil futures and stock prices around OPEC announcements. Oil-supply news moves these prices in opposite directions, while oil-demand news moves them in the same direction. For each measure, I match each FOMC meeting to the most recent OPEC announcement of that type within the preceding thirty calendar days and regress my three components separately on the oil surprise.

Both oil-news measures predict my supply component, while neither has a statistically significant relationship with the monetary-policy or demand component. Table 13 reports positive coefficients for the stagflationary and expansionary measures, with t-statistics of 1.76 and 2.20, respectively. The regressions use 39 and 38 matched announcements. These results provide further evidence that my supply component is related to oil-market news, although the relationship is present for both types of news identified by Degasperi.

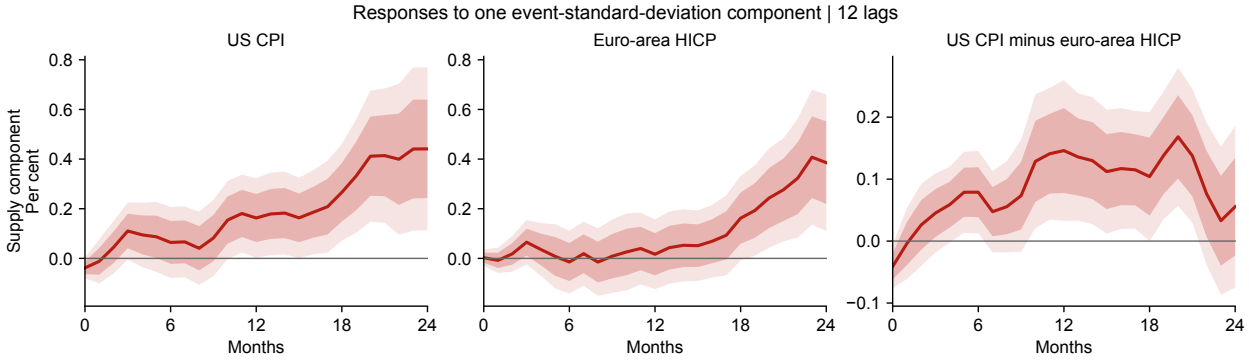
Table 13: Prior Degasperi oil news and the three FOMC-day components.

OPEC news	Monetary policy	Supply component	Demand component	N
Stagflationary	+0.000	+0.130*	+0.044	39
	(0.01)	(1.76)	(0.56)	
Expansionary	−0.005	+0.139**	+0.001	38
	(−0.17)	(2.20)	(0.01)	

Notes: OLS of each identified FOMC-day component on the Degasperi (2023) shock at the nearest OPEC announcement in the thirty days before the meeting, one regression per cell. HAC t-statistics are in parentheses; *, **, and *** denote significance at the 10, 5, and 1 per cent levels. Full 1999–2025 sample.

D.11 US and euro-area consumer prices

Figure 35: Consumer-price responses to the supply component over 24 months.



Notes: Monthly local projections using the existing 216 US announcement components from February 1999 to May 2025. Responses are to a one-standard-deviation supply component, with the standard deviation measured across announcements. All three components enter jointly. The regressions include twelve lags of the components, the US two-year yield, US real GDP, both price indices, the S&P 500 and log EUR/USD, together with calendar-month indicators. Price responses are changes in 100 log prices from the month before the announcement to each horizon. Shaded areas are pointwise 68 and 90 per cent confidence intervals based on Newey–West standard errors, conditional on the extracted components. The third panel estimates the relative-price response directly.

E Model derivations

E.1 Consumption and the imported input

I derive the supply disturbance from an increase in the real price of an imported input. The increase raises firms' production costs and reduces households' purchasing power. I follow the imported-input mechanism in Blanchard and Galí (2007a), retaining logarithmic consumption utility and real-wage rigidity.

Households have preferences

$$U(C_t, N_t) = \log C_t - \frac{N_t^{1+\varphi}}{1+\varphi}.$$

Here C_t is consumption, N_t is labour, and φ governs the curvature of labour disutility. Lower-case letters denote log deviations from steady state. The consumption Euler equation is

$$c_t = \mathbb{E}_t c_{t+1} - (i_t - \mathbb{E}_t \pi^c_{t+1}) + \varepsilon^d_t, \tag{25}$$

where π^c_t is consumer-price inflation. A higher expected real rate reduces current consumption relative to future consumption. The demand disturbance ε^d_t raises desired current spending. It changes households' willingness to consume today rather than in the future, but does not directly enter the wage-setting Equation below.

Domestic firms produce gross output using labour and an imported input:

$$Q_t(i) = M_t(i)^{\alpha} N_t(i)^{1-\alpha}.$$

Let $p_{q,t}$ be the domestic producer-price index and $p_{m,t}$ the imported-input price. The real input price is $s_t = p_{m,t} - p_{q,t}$. Domestic value added excludes the imported-input bill and is therefore different from gross output. I use the price indices

$$p_{y,t} = p_{q,t} - a s_t, \qquad p_{c,t} = p_{q,t} + \chi s_t, \qquad a = \frac{\alpha}{1-\alpha}. \tag{26}$$

Here $p_{y,t}$ is the value-added deflator and χ is the input's direct weight in the consumption basket. These price-index relations are part of the specification. With balanced trade, $P_{c,t}C_t = P_{y,t}Y_t$, so log-linearising gives

$$c_t - y_t = p_{y,t} - p_{c,t} = -(a + \chi) s_t.$$

Writing $\omega = a + \chi$, consumption is therefore

$$c_t = y_t - \omega s_t. \tag{27}$$

For a given level of domestic value added, consumption falls when the imported input becomes more expensive.

The consumer-price index also implies $\pi^c_{t+1} = \pi_{t+1} + \chi(s_{t+1} - s_t)$. Substituting this expression and Equation (27) into the Euler equation gives

$$y_t - \omega s_t = \mathbb{E}_t y_{t+1} - \omega \mathbb{E}_t s_{t+1} - i_t + \mathbb{E}_t \pi_{t+1} + \chi(\mathbb{E}_t s_{t+1} - s_t) + \varepsilon^d_t.$$

Collecting the input-price terms and using $\omega - \chi = a$ gives

$$y_t = \mathbb{E}_t y_{t+1} - (i_t - \mathbb{E}_t \pi_{t+1}) + a(s_t - \mathbb{E}_t s_{t+1}) + \varepsilon^d_t. \tag{28}$$

The input-price term depends on the difference between today's input price and the price expected next period. After the disturbance arrives, $\mathbb{E}_t s_{t+1} = \rho_s s_t$, so this term is $a(1 - \rho_s)s_t$. At the announcement, the input price has not yet risen, but households expect it to rise next period. With $s_0 = 0$, the term is then $-a\mathbb{E}_0 s_1$.

E.2 Real wages and marginal costs

I allow the real wage to respond only partly to households' marginal rate of substitution between consumption and labour:

$$w_t - p_{c,t} = (1 - \gamma)(c_t + \varphi n_t). \tag{29}$$

A larger γ makes the real wage respond less to consumption and employment. The wage is measured in consumer-price units. There is no additional wage-indexation term.

Let $\widehat{\mu}_t$ be the log deviation of the gross price markup from its steady-state value $\mathcal{M}$. Cost minimisation gives

$$w_t - p_{q,t} = -\frac{\widehat{\mu}_t}{1-\alpha} - as_t. \tag{30}$$

Thus, for a given markup, a higher input price requires a lower wage in domestic-goods units. To combine this condition with wage setting, I first express employment in terms of value added and the markup.

The imported-input bill is $\alpha/\mathcal{M}_t$ times gross sales. Nominal value added is therefore

$$P_{y,t}Y_t = P_{q,t}Q_t\left(1 - \frac{\alpha}{\mathcal{M}_t}\right).$$

Its log-linear approximation is

$$p_{y,t} + y_t = p_{q,t} + q_t^{\text{gross}} + \eta\widehat{\mu}_t, \qquad \eta = \frac{\alpha}{\mathcal{M}-\alpha}.$$

Using Equation (26) gives $q_t^{\text{gross}} = y_t - as_t - \eta\widehat{\mu}_t$. The labour first-order condition is $w_t - p_{q,t} = q_t^{\text{gross}} - n_t - \widehat{\mu}_t$. Combining it with Equation (30) yields

$$q_t^{\text{gross}} = y_t - as_t - \eta\widehat{\mu}_t, \qquad n_t = y_t + (a-\eta)\widehat{\mu}_t. \tag{31}$$

Substitute consumption and employment into the wage equation and express the wage in domestic-goods units:

$$w_t - p_{q,t} = (1-\gamma)\left[(1+\varphi)y_t - \omega s_t + \varphi(a-\eta)\widehat{\mu}_t\right] + \chi s_t.$$

Equating this expression to Equation (30) and collecting terms gives

$$-\left[\frac{1}{1-\alpha} + (1-\gamma)\varphi(a-\eta)\right]\widehat{\mu}_t = (1-\gamma)(1+\varphi)y_t + \gamma\omega s_t.$$

Define $D = 1/(1-\alpha) + (1-\gamma)\varphi(a-\eta)$. The markup response is

$$\widehat{\mu}_t = -\Gamma_y y_t - \Gamma_s s_t, \tag{32}$$

$$\Gamma_y = \frac{(1-\gamma)(1+\varphi)}{D}, \qquad \Gamma_s = \frac{\gamma\omega}{D}. \tag{33}$$

Both coefficients are positive in the calibration. Higher output raises marginal cost and reduces the markup. An increase in the input price also raises marginal cost because the real wage does not fall enough to absorb it. Without real-wage rigidity, $\gamma = 0$ and $\Gamma_s = 0$ in this specification.

Calvo price setting gives

$$\pi_t = \beta\mathbb{E}_t\pi_{t+1} - \lambda_p\widehat{\mu}_t, \qquad \lambda_p = \frac{(1-\theta)(1-\beta\theta)}{\theta},$$

where θ is the probability of keeping the previous price. Substituting the markup response gives

$$\pi_t = \beta \mathbb{E}_t \pi_{t+1} + \kappa y_t + \lambda s_t, \qquad \kappa = \lambda_p \Gamma_y, \quad \lambda = \lambda_p \Gamma_s. \tag{34}$$

The supply disturbance therefore raises inflation for a given level of output. To offset it, monetary policy must reduce spending and output.

E.3 Dividends

Firms' dividends in domestic-goods units are

$$\frac{\text{Div}_t}{P_{q,t}} = Q_t \left(1 - \frac{1}{\mathcal{M}_t}\right).$$

Log-linearising and substituting gross output from Equation (31) gives

$$\widehat{\text{div}}_t = q_t^{\text{gross}} + \frac{\widehat{\mu}_t}{\mathcal{M} - 1} \tag{35}$$

$$= y_t - a s_t + L \widehat{\mu}_t, \qquad L = \frac{1}{\mathcal{M} - 1} - \eta \tag{36}$$

$$= \delta_q y_t - \zeta_s u_t^s, \tag{37}$$

where $u_t^s = \lambda s_t$, $\delta_q = 1 - L\Gamma_y$ and $\zeta_s = (a + L\Gamma_s)/\lambda$. In the calibration, both coefficients are positive. The first term describes the effect of output on sales and profits. The second describes the effect of higher input costs and narrower profit margins. The same dividend equation applies to all three disturbances.

F Equilibrium

F.1 The solution after a supply disturbance

Consider first a supply disturbance, with demand and independent monetary policy held fixed. Let period zero be the announcement date and period one the arrival of the disturbance. I measure each response relative to the path without this disturbance. The current price level, current policy rate and earlier inflation are unchanged. Thus, their initial responses are zero. For $h \geq 1$, the supply disturbance follows

$$u_h^s = \rho_s^{h-1} u_1^s, \qquad s_h = \frac{u_h^s}{\lambda}.$$

Write the solution as in Equation (4). Substituting these responses into the IS curve, Phillips

curve and policy rule, and dividing by u_1^s, gives

$$b_{y,h}^s = b_{y,h+1}^s - b_{i,h}^s + b_{\pi,h+1}^s + \frac{a(1-\rho_s)}{\lambda}\rho_s^{h-1}, \tag{38}$$

$$b_{\pi,h}^s = \beta b_{\pi,h+1}^s + \kappa b_{y,h}^s + \rho_s^{h-1}, \tag{39}$$

$$b_{i,h}^s = \rho_i b_{i,h-1}^s + (1-\rho_i)\left[\frac{\phi^s}{4}\sum_{k=0}^{3} b_{\pi,h-k}^s + \phi^y b_{y,h}^s\right]. \tag{40}$$

The initial conditions are $b_{i,0}^s = 0$ and $b_{\pi,h}^s = 0$ for $h \leq 0$. I select the bounded solution, with responses converging to zero as the disturbance disappears. These three equations determine the coefficients in the main text. The next subsection gives the matrix solution and verifies uniqueness.

Equation (40) shows why the interest-rate path does not simply decline at rate ρ_s. Even as the disturbance fades, past rates and past inflation continue to affect policy. Inflation can rise before the nominal rate has fully adjusted. The expected real-rate response in period h is

$$b_{r,h}^s = b_{i,h}^s - b_{\pi,h+1}^s. \tag{41}$$

It can therefore be negative initially and positive later.

To see how this affects output, iterate the IS curve for $H+1$ periods, holding demand fixed:

$$y_h^s = \mathbb{E}_h y_{h+H+1}^s - \sum_{k=0}^{H} \mathbb{E}_h r_{h+k}^s + a\left(s_h - \mathbb{E}_h s_{h+H+1}\right).$$

In the bounded solution, the terminal output and input-price responses converge to zero. Taking the limit gives

$$y_h^s = a s_h - \sum_{k=0}^{\infty} \mathbb{E}_h r_{h+k}^s. \tag{42}$$

Output therefore falls in period h when the cumulative expected real-rate response exceeds as_h, and rises when it is smaller. The rate path depends on ϕ^s and the other policy coefficients. The output sign is thus a result of the solution for a given policy response. The supply disturbance itself raises inflation for a given level of output through the Phillips curve.

The Euler equation also determines output in period zero. At this date $s_0 = i_0 = 0$, while the anticipated real input price next period is u_1^s/λ. Equation (28) gives

$$y_0^s = \left(b_{y,1}^s + b_{\pi,1}^s - \frac{a}{\lambda}\right) u_1^s. \tag{43}$$

Since $s_0 = 0$, consumption equals output at this date. The expected real rate is $r_0^s = -b_{\pi,1}^s u_1^s$. The current price level and policy rate are held fixed only in this initial period; the usual inflation and policy equations determine the continuation from period one.

F.2 The matrix solution and uniqueness

I obtain the demand and monetary-policy responses in the same way. To see how the targeted rule separates the three cases, first solve the economy with supply disturbances alone and coefficient ϕ^s. Subtracting that solution from the full economy gives the equations for demand and independent monetary policy with coefficient ϕ^d. Linearity then allows the three responses to be added together. This follows the construction in Hofmann et al. (2026, Section 4.3). Their conventional rule is the common-coefficient case, and their Appendix A.1.4 also allows for interest-rate smoothing. In the present model, setting $\phi^s = \phi^d = \phi^\pi$ gives

$$i_t = \rho_i i_{t-1} + (1-\rho_i)\left(\phi^\pi \bar{\pi}_t + \phi^y y_t\right) + \varepsilon_t^m.$$

The same solution method therefore includes both the targeted and the conventional Taylor rule.

For each disturbance $j \in \{m, d, s\}$, let z_h^j be its value in period h, normalised so that $z_1^j = 1$. Use $\phi = \phi^s$ for supply and $\phi = \phi^d$ otherwise. Define

$$A_y = (1-\rho_i)\phi^y, \qquad A_\pi = (1-\rho_i)\phi/4.$$

The policy rule can then be written

$$i_h = A_y y_h + A_\pi(\pi_h + \pi_{h-1} + \pi_{h-2} + \pi_{h-3}) + \rho_i i_{h-1} + m_j z_h^j.$$

The coefficients on the disturbance in the IS curve, Phillips curve and policy rule are, respectively,

$$(d_s, v_s, m_s) = \left(\frac{a(1-\rho_s)}{\lambda}, 1, 0\right), \quad (d_d, v_d, m_d) = (1,0,0), \quad (d_m, v_m, m_m) = (0,0,1).$$

For example, a supply disturbance enters both the IS curve and the Phillips curve, while an independent monetary-policy disturbance enters the policy rule directly.

The Phillips curve gives

$$\mathbb{E}_h \pi_{h+1} = \frac{\pi_h - \kappa y_h - v_j z_h^j}{\beta}.$$

Substituting this and the policy rule into the IS curve gives

$$\mathbb{E}_h y_{h+1} = y_h + i_h - \mathbb{E}_h \pi_{h+1} - d_j z_h^j.$$

Collect these equations with the lag identities in

$$\mathbb{E}_h X_{h+1} = \mathcal{A}(\phi) X_h + b_j z_h^j, \qquad X_h = (y_h, \pi_h, i_{h-1}, \pi_{h-1}, \pi_{h-2}, \pi_{h-3})', \tag{44}$$

where

$$\mathcal{A}(\phi) = \begin{pmatrix} 1 + A_y + \kappa/\beta & A_\pi - 1/\beta & \rho_i & A_\pi & A_\pi & A_\pi \\ -\kappa/\beta & 1/\beta & 0 & 0 & 0 & 0 \\ A_y & A_\pi & \rho_i & A_\pi & A_\pi & A_\pi \\ 0 & 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 \end{pmatrix}, \qquad b_j = \begin{pmatrix} v_j/\beta - d_j + m_j \\ -v_j/\beta \\ m_j \\ 0 \\ 0 \\ 0 \end{pmatrix}.$$

The first two rows describe expected output and inflation. The last four carry the current rate and inflation into next period's lagged variables.

There are two forward-looking variables, y_h and π_h, and four predetermined endogenous variables. A unique bounded equilibrium requires exactly two eigenvalues of $\mathcal{A}(\phi)$ outside the unit circle and no roots on the unit circle. With stationary disturbances, these conditions give a unique equilibrium by Blanchard and Kahn (1980). The table below verifies this condition at the baseline calibration for both inflation coefficients.

Table 14: Roots of the equilibrium equations

	Outside the unit circle	Inside the unit circle
Supply	$1.2248,\ 1.0251$	$-0.0370,\ 0.0000,\ 0.0441,\ 0.6600$
Demand and monetary policy	$1.1473 + 0.0973i,\ 1.1473 - 0.0973i$	$-0.0600,\ 0.0000,\ 0.0816,\ 0.6009$

Notes: There are two forward-looking variables and four predetermined endogenous variables. Each system has exactly two roots outside the unit circle. The additional exogenous persistence roots are 0.95 for demand and supply and 0.5 for monetary policy.

To calculate the coefficients at every horizon, add the disturbance equation $\mathbb{E}_h z_{h+1}^j = \rho_j z_h^j$:

$$\mathcal{M}_j = \begin{pmatrix} \mathcal{A}(\phi) & b_j \\ 0 & \rho_j \end{pmatrix}.$$

I use an ordered real Schur decomposition to keep only the solutions that converge to zero. The columns of Z_j describe these five stable directions, and T_j describes how their coefficients change from one period to the next. They satisfy $\mathcal{M}_j Z_j = Z_j T_j$. This means that a state written as $Z_j w$ becomes $Z_j T_j w$ one period later. I can therefore use T_j to calculate the path without including the solutions that grow over time. The five initial conditions are $(i_0, \pi_0, \pi_{-1}, \pi_{-2}, z_1^j) = (0, 0, 0, 0, 1)$. Let S_j be the last five rows of Z_j. These conditions give $w_j = S_j^{-1}(0, 0, 0, 0, 1)'$. The matrix S_j is nonsingular at the reported calibration. The complete expected path is

$$\mathbb{E}_0(X_h', z_h^j)' = Z_j T_j^{h-1} w_j, \qquad h \geq 1. \tag{45}$$

Multiplying by a disturbance of size ξ_1^j gives the response to that disturbance rather than to a unit innovation.

For clarity, let Y_j and P_j be the output and inflation rows of Z_j, and let I_j be the row obtained by substituting these rows and the lagged variables into the policy rule. Then

$$b^j_{y,h} = Y_j T_j^{h-1} w_j, \qquad b^j_{\pi,h} = P_j T_j^{h-1} w_j, \qquad b^j_{i,h} = I_j T_j^{h-1} w_j. \tag{46}$$

For supply, these are exactly the coefficients satisfying Equations (38)–(40). This solution sums the infinite paths without truncating them. As a numerical check, I also solve the original equilibrium equations over 350 and 700 quarters; the solutions agree.

G The exchange rate and equity

G.1 The exchange rate

The exchange-rate equation follows from comparing the returns on dollar and foreign-currency bonds. Let $M^{\$}_{t+1}$ be the household's nominal dollar discount factor. A dollar bond satisfies

$$1 = \mathbb{E}_t[M^{\$}_{t+1}(1 + i_t)].$$

If e_t is the log dollar price of foreign currency, the dollar return on a foreign-currency bond is $(1 + i^*_t)\exp(e_{t+1} - e_t)$. Its pricing condition is

$$1 = \mathbb{E}_t[M^{\$}_{t+1}(1 + i^*_t)\exp(e_{t+1} - e_t)].$$

Subtracting the first-order approximations gives uncovered interest parity. Allowing for a currency premium, I write it as

$$e_t = \mathbb{E}_t e_{t+1} - (i_t - i^*_t) + \lambda^{\$}_t. \tag{47}$$

I abstract from announcement-induced revisions to the currency premium. Foreign interest-rate and price paths can respond in the exchange-rate relation, while the domestic model determines the US response.

Let $p_{c,t}$ and $p^*_{c,t}$ denote consumer-price levels, with inflation π^c_t and $\pi^{c,*}_t$. Define

$$r^c_t = i_t - \mathbb{E}_t \pi^c_{t+1}, \qquad r^{c,*}_t = i^*_t - \mathbb{E}_t \pi^{c,*}_{t+1}.$$

For news about disturbance j, iterating Equation (47) while holding currency-premium revisions fixed gives

$$e^j_0 = \mathbb{E}_0 e^j_H - \sum_{h=0}^{H-1} \mathbb{E}_0(i^j_h - i^{*,j}_h).$$

Since current goods prices are fixed, this can also be written as

$$e^j_0 = \mathbb{E}_0\left[e^j_H + p^{*,j}_{c,H} - p^j_{c,H}\right] - \sum_{h=0}^{H-1} \mathbb{E}_0(r^{c,j}_h - r^{c,*,j}_h). \tag{48}$$

The first term is the terminal real-exchange-rate response. With the long-run real exchange rate unchanged, taking the limit gives

$$\begin{aligned} e_0^j &= \sum_{h=1}^{\infty} \mathbb{E}_0(\pi_h^{c,j} - \pi_h^{c,*,j}) - \sum_{h=0}^{\infty} \mathbb{E}_0(i_h^j - i_h^{*,j}) \\ &= -\sum_{h=0}^{\infty} \mathbb{E}_0(r_h^{c,j} - r_h^{c,*,j}), \end{aligned} \tag{49}$$

as in Equation (10). The dollar depreciates when the total expected US real-rate response is smaller than the foreign response.

The numerical illustration holds foreign interest-rate and price responses fixed to isolate the domestic policy trade-off. The remaining expressions in this subsection specialise the general relation to that benchmark.

Consider a supply disturbance known at period zero. Iterating Equation (47) to horizon H gives its contribution to the exchange rate:

$$e_0^s = \mathbb{E}_0 e_H^s - \sum_{h=0}^{H-1} \mathbb{E}_0 i_h^s.$$

To determine the terminal term, assume that the long-run real exchange rate is unchanged. This is long-run purchasing-power parity: once the disturbance disappears, the exchange rate adjusts to the difference between US and foreign price levels. Foreign prices are held fixed and s_h converges to zero, so the long-run consumer- and producer-price responses coincide. It follows that

$$\mathbb{E}_0 e_\infty^s = \mathbb{E}_0 p_{q,\infty}^s = \sum_{h=1}^{\infty} b_{\pi,h}^s u_1^s.$$

The last equality uses the fixed initial price level. Since the current rate response is also zero, taking the limit as H increases gives

$$e_0^s = \left(\sum_{h=1}^{\infty} b_{\pi,h}^s - \sum_{h=1}^{\infty} b_{i,h}^s \right) u_1^s = (B_\pi^s - B_i^s) u_1^s. \tag{50}$$

The first sum is the accumulated US price-level increase. The second is the expected nominal-rate path. These sums are not discounted: inflation accumulates into the price level, and the coefficient in the iterated first-order interest-parity equation is one.

In this benchmark, for any source j, define $B_e^j = B_\pi^j - B_i^j$. From the solution above,

$$B_e^j = (P_j - I_j)(\mathrm{I} - T_j)^{-1} w_j. \tag{51}$$

Here I is the identity matrix. This follows from $\sum_{h=1}^{\infty} T_j^{h-1} = (\mathrm{I} - T_j)^{-1}$. With smoothing, the sums must use the complete response paths. An initial response divided by $1-\rho_j$ would not include

the effects of lagged rates and inflation.

The real-rate expression follows directly. Since $r_h = i_h - \mathbb{E}_h \pi_{h+1}$ and $i_0 = 0$,

$$\sum_{h=0}^{\infty} \mathbb{E}_0 r_h^j = \sum_{h=1}^{\infty} \mathbb{E}_0 i_h^j - \sum_{h=1}^{\infty} \mathbb{E}_0 \pi_h^j.$$

Therefore,

$$e_0^j = -\sum_{h=0}^{\infty} \mathbb{E}_0 r_h^j. \tag{52}$$

The initial real rate is $r_0^j = -\mathbb{E}_0 \pi_1^j$ and is part of this sum. A later increase in real rates can coexist with depreciation if their cumulative response, including this initial decline, is negative. Using consumer-price inflation instead of producer-price inflation gives the same cumulative real-rate response. The difference between the two price indices is χs_t. This difference is zero at the announcement and returns to zero as the input-price disturbance fades, so cumulative inflation is the same under both measures. Real-rate responses can still differ at individual horizons.

G.2 Why demand and supply can have different currency responses

In the numerical benchmark with foreign responses held fixed, summing the policy rule provides a useful way to see the role of the trade-off. For demand and supply, there is no independent monetary-policy disturbance in the rule. Since the initial and terminal rate responses are zero,

$$\sum_{h=1}^{\infty} i_h^j = \rho_i \sum_{h=1}^{\infty} i_h^j + (1-\rho_i) \left[\phi^j \sum_{h=1}^{\infty} \bar{\pi}_h^j + \phi^y \sum_{h=1}^{\infty} y_h^j \right].$$

The sum of four-quarter-average inflation equals the sum of quarterly inflation: each quarterly response enters four successive averages, with weight one quarter in each. Dividing by $1 - \rho_i$ therefore gives, per unit disturbance,

$$B_i^j = \phi^j B_\pi^j + \phi^y B_y^j, \qquad B_y^j = \sum_{h=1}^{\infty} b_{y,h}^j, \qquad j \in \{d, s\}. \tag{53}$$

Smoothing cancels from this identity but still affects the equilibrium paths being summed.

For a demand disturbance that raises cumulative inflation and output, $B_\pi^d > 0$ and $B_y^d > 0$. With $\phi^d > 1$ and $\phi^y \geq 0$,

$$B_e^d = (1 - \phi^d) B_\pi^d - \phi^y B_y^d < 0.$$

The central bank responds to higher inflation and stronger activity, and the dollar appreciates. For supply, when the policy response gives a cumulative decline in output, the output term limits the rate increase. Depreciation requires

$$B_e^s = (1 - \phi^s) B_\pi^s - \phi^y B_y^s > 0. \tag{54}$$

When $\phi^s > 1$, this is equivalent to $-\phi^y B^s_y > (\phi^s - 1)B^s_\pi$. The negative output response must be large enough relative to the inflation response. This gives the depreciation condition stated in the main text. With $B^s_i > 0$, it also gives partial accommodation. The numerical illustration uses the estimated rule to evaluate these conditions and shows how changing the supply coefficient changes the currency response.

G.3 Equity prices

I use the paths of output, inflation and interest rates derived above to calculate stock prices. A stock provides two sources of return: the dividend it pays and the price at which it can be sold. Let V_t be the stock price and D_t its dividend, both measured in domestic-goods units. Its gross return is

$$1 + R^q_{t+1} = \frac{V_{t+1} + D_{t+1}}{V_t}. \tag{55}$$

Investors require an expected return equal to the real risk-free rate plus an equity premium. Using the log-linear approximation of Campbell and Shiller (1988), and expressing log prices, dividends and returns relative to their reference values, gives

$$r_t + \lambda^q_t = \bar{\rho}\mathbb{E}_t q_{t+1} + (1 - \bar{\rho})\mathbb{E}_t \widehat{\text{div}}_{t+1} - q_t. \tag{56}$$

The coefficient $\bar{\rho}$ depends on the reference dividend–price ratio. Rearranging gives the equity-pricing Equation used in the main text:

$$q_t = \bar{\rho}\mathbb{E}_t q_{t+1} + (1 - \bar{\rho})\mathbb{E}_t \widehat{\text{div}}_{t+1} - r_t - \lambda^q_t. \tag{57}$$

Higher expected dividends raise today's stock price. Higher real interest rates or a higher required premium lower it. I allow the premium to increase when economic activity weakens, using $\lambda^q_t = -\Lambda_q y_t$.

The model determines both future dividends and the returns investors require. Dividends depend on output and production costs, as derived in Appendix E.3. Real interest rates and the premium depend on the paths of inflation, interest rates and output. I therefore use these paths to calculate the stock-price response to each disturbance.

Iterating Equation (57) gives

$$q^j_0 = \sum_{h=0}^{\infty} \bar{\rho}^h \left[(1 - \bar{\rho})\mathbb{E}_0 \widehat{\text{div}}^j_{h+1} - \mathbb{E}_0 r^j_h + \Lambda_q \mathbb{E}_0 y^j_h \right]. \tag{58}$$

I impose $\lim_{H\to\infty} \bar{\rho}^H \mathbb{E}_0 q^j_H = 0$, so the discounted terminal stock-price response does not contribute to the sum. The first term describes expected dividends, the second expected real rates, and the third the premium response. Weaker activity raises the premium and reduces the equity price.

Let $b^j_{\text{div},h}$ denote the dividend response to one unit of disturbance j. The production Equations

give, for $h \geq 1$,

$$b^j_{\text{div},h} = \delta_q b^j_{y,h} - \zeta_s \rho_s^{h-1} \mathbf{1}_{\{j=s\}}.$$

The indicator equals one for supply and zero otherwise. For each source, write the initial equity response as $q^j_0 = B^j_q \xi^j_1$, with

$$B^j_q = \mathcal{V}_j + \Lambda_q \mathcal{Y}_j, \tag{59}$$

$$\mathcal{V}_j = \sum_{h=0}^{\infty} \bar{\rho}^h \left[(1-\bar{\rho}) b^j_{\text{div},h+1} - b^j_{r,h} \right], \qquad \mathcal{Y}_j = \sum_{h=0}^{\infty} \bar{\rho}^h b^j_{y,h}. \tag{60}$$

These expressions separate the dividend and real-rate effects from the effect of the premium coefficient. They include the initial-period responses derived above.

The equity signs used in the identification require

$$\mathcal{V}_m + \Lambda_q \mathcal{Y}_m < 0, \qquad \mathcal{V}_d + \Lambda_q \mathcal{Y}_d > 0, \qquad \mathcal{V}_s + \Lambda_q \mathcal{Y}_s < 0.$$

These inequalities give the conditions on the premium coefficient. Demand raises expected profits and lowers the premium enough to outweigh higher expected real rates. For supply, the profit and premium effects lower equity prices despite the initial decline in the real rate. The calibration below reports the coefficient and verifies these conditions for all three disturbances.

Computing the responses. I evaluate the infinite sums using the matrix solution in Appendix F. Let D_j be the row giving dividends, and let $R_j = I_j - P_j T_j$ give the expected real rate. The output row Y_j was defined in Appendix F. Initial output is

$$Y_{0,j} = (Y_j + P_j) w_j - \frac{a}{\lambda} \mathbf{1}_{\{j=s\}}.$$

Then

$$\begin{aligned} B^j_q = {} & [(1-\bar{\rho}) D_j + P_j] w_j + \Lambda_q Y_{0,j} \\ & + \bar{\rho} \left[(1-\bar{\rho}) D_j T_j - R_j + \Lambda_q Y_j \right] (\mathrm{I} - \bar{\rho} T_j)^{-1} w_j. \end{aligned} \tag{61}$$

The first line collects the period-zero valuation terms. The second sums the remaining terms from period one onward. The current price level is fixed, so the real and nominal equity-price revisions coincide at the announcement. Expressing dividends and discounting consistently in consumer-price units gives the same initial equity-price revision.

H The information in an announcement

H.1 Beliefs before and after the announcement

For simplicity, I assume that the Federal Reserve observes the disturbances, while markets are uncertain about their source and size. This allows me to show how information about supply conditions changes market interest rates and asset prices. Markets may also be uncertain about how the Federal Reserve responds to economic conditions, as discussed by Bauer and Swanson (2023a). Appendix I allows investors to learn about both supply conditions and the policy response. The empirical supply component does not separately identify these two sources of revisions.

Let ξ_1^j be the next-period innovation in disturbance j, with $\xi_1^s = u_1^s$ for the supply experiment. Investors enter the announcement with independent priors

$$\xi_1^j \mid \mathcal{I}_0^- \sim N(\mu_j, v_j).$$

Here μ_j is their initial expectation and v_j measures their uncertainty. The announcement provides noisy signals

$$z_j = \xi_1^j + \nu_j, \qquad \nu_j \sim N(0, \tau_j^2),$$

where the signal errors are independent of the disturbances and of one another. After the announcement, investors add these signals to their information, $\mathcal{I}_0^+ = \mathcal{I}_0^- \cup \{z_m, z_d, z_s\}$. Their expectation changes by

$$\Delta^j = \frac{v_j}{v_j + \tau_j^2}(z_j - \mu_j). \tag{62}$$

A more precise signal receives more weight. A signal above the initial expectation makes markets perceive tighter monetary policy, stronger demand or worse supply conditions, depending on the source.

H.2 From perceived supply conditions to depreciation

Consider first the supply signal alone. For every possible value of u_1^s, Equation (4) gives the future inflation and interest-rate paths. Before the announcement, investors expect

$$\mathbb{E}[\pi_h^s \mid \mathcal{I}_0^-] = b_{\pi,h}^s \mu_s, \qquad \mathbb{E}[i_h^s \mid \mathcal{I}_0^-] = b_{i,h}^s \mu_s.$$

After receiving the signal, they replace μ_s by $\mu_s + \Delta^s$:

$$\mathbb{E}[\pi_h^s \mid \mathcal{I}_0^+] = b_{\pi,h}^s (\mu_s + \Delta^s), \qquad \mathbb{E}[i_h^s \mid \mathcal{I}_0^+] = b_{i,h}^s (\mu_s + \Delta^s).$$

Subtracting the initial expectations gives

$$\Delta^A \mathbb{E}_0 \pi_h^s = b_{\pi,h}^s \Delta^s, \qquad \Delta^A \mathbb{E}_0 i_h^s = b_{i,h}^s \Delta^s. \tag{63}$$

The coefficients are the ones derived above. The announcement changes the size of the disturbance that markets expect.

The expected long-run price-level revision is therefore

$$\Delta^A \mathbb{E}_0 p^s_{q,\infty} = \sum_{h=1}^{\infty} b^s_{\pi,h} \Delta^s = B^s_\pi \Delta^s.$$

The revision in cumulative nominal rates is $B^s_i \Delta^s$. Substituting both into the exchange-rate equation gives

$$\Delta^A e^s_0 = (B^s_\pi - B^s_i)\Delta^s. \tag{64}$$

Under partial accommodation, $B^s_\pi > B^s_i > 0$. A signal of more adverse supply conditions, $z_s > \mu_s$, therefore depreciates the dollar. Markets expect higher interest rates, but the increase in expected US prices has a larger effect on the dollar. A signal of easing supply pressures gives the opposite response.

The equity response follows from the same calculation:

$$\Delta^A q^s_0 = B^s_q \Delta^s.$$

Under the equity condition derived above, $B^s_q < 0$, so a positive supply revision also lowers stock prices.

H.3 The future-rate revision and the three components

For each source, the revision in the expected average policy rate over the next eight quarters is

$$f^j = B^j_F \Delta^j, \qquad B^j_F = \frac{1}{8} \sum_{h=1}^{8} b^j_{i,h}.$$

All three B^j_F are positive in the numerical illustration. Each source can therefore raise medium-term interest rates, but with different effects on stock prices and the dollar. The current policy rate is excluded from this average.

An announcement can change markets' assessment of all three sources at the same time. Adding their contributions gives

$$\Delta^A F_0 = f^m + f^d + f^s, \qquad \Delta^A x_0 = B^m_x \Delta^m + B^d_x \Delta^d + B^s_x \Delta^s.$$

Replacing Δ^j by f^j / B^j_F gives Equation (17) in the main text. It expresses each asset-price response relative to the revision in medium-term interest rates from that source. In the empirical model, the sign restrictions allow a set of decompositions rather than a unique one.

I Learning about supply conditions and the policy response

In the main text, investors know how the Federal Reserve responds to economic conditions. Here, I also allow them to learn about this response, as discussed by Bauer and Swanson (2023a). Markets can learn that supply conditions are worse and revise how much of the resulting inflation they expect the Federal Reserve to tolerate. I show when medium-term interest rates rise, stock prices fall and the dollar depreciates as markets make both revisions.

I.1 Uncertainty about the policy response

Let $U \equiv u_1^s$ be the supply disturbance arriving next quarter. Investors know that the coefficient on supply-driven inflation takes one of two values,

$$\phi^s \in \{\phi_L, \phi_H\}, \qquad \phi_L < \phi_H. \tag{65}$$

The lower coefficient means a weaker response to a given amount of supply-driven inflation. All other parameters are unchanged. The Federal Reserve knows both its coefficient and the disturbance, while markets receive noisy signals during the announcement in period zero. I assume that both become known before decisions and prices are set in period one. I can then use the equilibrium derived in Appendix F for each coefficient. Both must give a unique bounded equilibrium. Today's policy rate and price level remain fixed.

For $x \in \{F, q, e\}$, write $B_{x,L} = B_x^s(\phi_L)$ and $B_{x,H} = B_x^s(\phi_H)$. Each coefficient gives the response to one unit of the supply disturbance under the corresponding policy rule. For F, this is the average policy rate over quarters 1–8. Investors form expectations using the possible values of both U and ϕ^s. The announcement revision is

$$\Delta^A x_0^s = \mathbb{E}[B_x^s(\phi^s)U \mid \mathcal{I}_0^+] - \mathbb{E}[B_x^s(\phi^s)U \mid \mathcal{I}_0^-]. \tag{66}$$

The policy coefficient itself is fixed. The announcement changes what markets believe about that coefficient and the supply disturbance.

I.2 What markets learn from the announcement

Suppose that investors initially have independent beliefs about the supply disturbance and the policy coefficient:

$$U \mid \mathcal{I}_0^- \sim N(\mu^-, v), \qquad \Pr(\phi^s = \phi_L \mid \mathcal{I}_0^-) = p^-.$$

The announcement provides two signals,

$$z_U = U + \nu_U, \qquad z_\phi = \phi^s + \nu_\phi. \tag{67}$$

The errors are independent of each other, the disturbance and the policy coefficient, with $\nu_U \sim N(0, \tau_U^2)$ and $\nu_\phi \sim N(0, \tau_\phi^2)$. Under these assumptions, beliefs about supply and policy remain

independent after the announcement. Bayes' rule gives

$$\mu^+ = \mu^- + \frac{v}{v+\tau_U^2}(z_U - \mu^-), \tag{68}$$

$$p^+ = \frac{p^-\ell_L(z_\phi)}{p^-\ell_L(z_\phi) + (1-p^-)\ell_H(z_\phi)}, \tag{69}$$

where $\ell_r(z)$ is the normal density with mean ϕ_r and variance τ_ϕ^2, for $r \in \{L, H\}$. A positive $\Delta\mu = \mu^+ - \mu^-$ means that markets perceive worse supply conditions. A positive $\Delta p = p^+ - p^-$ means that they assign a higher probability to the more accommodative policy response.

After the announcement, the response coefficient investors expect is A_x^+. The difference between the coefficients under the two policy rules is D_x:

$$A_x^+ = p^+ B_{x,L} + (1-p^+)B_{x,H}, \qquad D_x = B_{x,L} - B_{x,H}. \tag{70}$$

Substituting into Equation (66) gives

$$\Delta^A x_0^s = \underbrace{A_x^+ \Delta\mu}_{\text{revision in supply conditions}} + \underbrace{\mu^- D_x \Delta p}_{\text{revision in the policy response}}. \tag{71}$$

The first term is the revision in supply conditions, given what markets now expect about policy. The second is the change in the expected policy response to the supply pressures markets already expected. Using A_x^+ in the first term includes the effect of changing both expectations at the same time.

I.3 Conditions for the three asset-price signs

Suppose that, under each possible policy rule, adverse supply news raises medium-term rates, lowers stock prices and depreciates the dollar:

$$B_{F,r} > 0, \qquad B_{q,r} < 0, \qquad B_{e,r} > 0, \qquad r \in \{L, H\}. \tag{72}$$

These signs also hold for the weighted averages A_F^+, A_q^+ and A_e^+. The numerical example below verifies them using the model solution for both policy coefficients.

Proposition. Let $\mu^- > 0$ and suppose that Equation (72) holds. Define $\epsilon = \Delta\mu/\mu^-$ and

$$\mathcal{T}(p^+, \Delta p) = \max\left\{0, -\frac{D_F \Delta p}{A_F^+}, \frac{D_q \Delta p}{-A_q^+}, -\frac{D_e \Delta p}{A_e^+}\right\}. \tag{73}$$

For any posterior probability $p^+ \in [0,1]$, a supply revision satisfying $\epsilon > \mathcal{T}(p^+, \Delta p)$ gives

$$\Delta^A F_0^s > 0, \qquad \Delta^A q_0^s < 0, \qquad \Delta^A e_0^s > 0. \tag{74}$$

The three signs can therefore hold whether markets learn that the Federal Reserve will tolerate

more or less inflation, provided that the revision towards worse supply conditions is large enough.

Proof. Dividing Equation (71) by $\mu^- > 0$ gives the rate, currency and equity conditions:

$$\epsilon > -\frac{D_F \Delta p}{A_F^+}, \qquad \epsilon > -\frac{D_e \Delta p}{A_e^+}, \qquad \epsilon > \frac{D_q \Delta p}{-A_q^+}.$$

Together with $\epsilon > 0$, these give the stated bound. For any fixed $\epsilon > 0$, the strict signs and continuity imply that the inequalities also hold for sufficiently small positive or negative Δp. □

I.4 A numerical example

I set $\phi_L = 1.211$ and $\phi_H = 1.511$, leaving the other parameters unchanged. Markets initially assign equal probabilities to the two coefficients, with a mean of 1.361, close to the baseline estimate. Both rules give unique bounded equilibria and the three signs in Equation (72). I average their responses using the probabilities markets assign to each rule.

I choose μ^- so that, before the announcement, the expected supply contribution to the average policy rate over quarters 1–8 is 25 annual basis points. The announcement raises the expected supply disturbance by ten per cent, so $\mu^+ = 1.10\mu^-$. In the first row of Table 15, markets also assign a higher probability to greater accommodation. In the second, they assign a higher probability to the stronger policy response.

Table 15: Asset-price revisions when markets learn about supply and policy.

Policy assessment	p^+	$\Delta^A F_0^s$ (annual bp)	$\Delta^A q_0^s$ (per cent)	$\Delta^A e_0^s$ (per cent)
More accommodation	0.60	2.995	−0.167	0.0451
Stronger response	0.40	2.005	−0.617	0.0108

Notes: Both rows have $p^- = 0.5$, $\phi_L = 1.211$, $\phi_H = 1.511$ and a ten per cent increase in the expected supply disturbance. All other parameters are unchanged from the baseline, using the unrounded policy estimates. Before the announcement, the expected supply contribution to the average policy rate over quarters 1–8 is 25 annual basis points. Entries are revisions relative to these prior expectations. A positive exchange-rate revision is a dollar depreciation.

The ten per cent supply revision exceeds the bound in Equation (73) in both cases. Medium-term rates rise, stock prices fall and the dollar depreciates. Greater accommodation makes the stock-price decline smaller and the depreciation larger.

Greater accommodation also leads to a larger increase in medium-term nominal rates in this calibration. For given inflation and activity, a lower policy coefficient reduces the rate response. But inflation and activity also change. The weaker response allows inflation to rise more and activity to remain stronger, which in turn raises nominal rates. Expected inflation rises by more than nominal rates, so expected real rates fall further.

I.5 Interpretation of the supply component

The supply component can reflect what markets learn about both supply conditions and the Federal Reserve's response. Under the conditions above, these revisions together produce the three identifying signs. The empirical decomposition does not separately measure the two revisions.

If the two revisions vary independently across announcements, the stock-price and exchange-rate responses per unit of the interest-rate revision can also vary. The fixed ratios in the main text apply when the policy rule is known. Here, I show when the same signs hold as markets learn about both supply conditions and policy.

J Calibration and additional responses

J.1 The policy estimates

I estimate the targeted Taylor rule by OLS using quarterly data:

$$i_t = c + \rho_i i_{t-1} + (1 - \rho_i)(\phi^d \pi_t^d + \phi^s \pi_t^s + \phi^y x_t) + v_t. \tag{75}$$

The policy rate is the quarterly average effective federal funds rate. The output gap is $100(Y_t/Y_t^{\text{pot}} - 1)$, where Y_t is real GDP and Y_t^{pot} is CBO potential GDP. I use the two-category baseline decomposition of core PCE inflation into demand- and supply-driven contributions constructed by Shapiro (2024). I average the monthly year-on-year contributions within each quarter and divide them by four. I also divide the annualised policy rate by four. The output gap remains in percentage units.

The re-estimated baseline uses Shapiro's original public workbook. The extended sample uses the updated two-category data and ends in 2025Q2. Both use current-vintage macroeconomic data. In the extended sample, I exclude quarters when the annualised federal funds rate is at or below 0.5 per cent. I construct the lagged rate before excluding these observations, so it always refers to the previous calendar quarter. The extended regression has 144 observations.

I divide the estimated coefficients on inflation and the output gap by $1 - \widehat{\rho}_i$ to obtain the long-run policy responses, with standard errors calculated using the delta method. The table reports the estimates of Hofmann et al. (2026) alongside my re-estimates. I use these estimates to calibrate the policy response away from the effective lower bound. The inflation contributions and CBO output gap approximate the model's inflation and output variables.

Table 16: Estimated responses to demand- and supply-driven inflation

	Sample	ϕ^d	ϕ^s	ϕ^y	ρ_i
Authors' baseline	1979Q3–2007Q4	3.750	1.020	0.220	0.720
Re-estimated baseline	1979Q3–2007Q4	3.606	1.270	0.225	0.740
		(0.627)	(0.388)	(0.058)	(0.043)
Extended sample	1979Q3–2025Q2	3.928	1.361	0.284	0.836
		(0.927)	(0.586)	(0.087)	(0.030)

Notes: The first row reproduces the reported baseline in Hofmann et al. (2026). The other rows are my OLS estimates using the two-category inflation decomposition of Shapiro (2024), the effective federal funds rate and the CBO output gap. Parentheses give standard errors; long-run coefficient standard errors use the delta method. The extended sample excludes quarters when the annualised policy rate is at or below 0.5 per cent. The model uses the extended-sample point estimates. Appendix J.1 describes the data and sample.

J.2 The remaining parameters

Table 17 reports the baseline calibration, including the estimated policy coefficients and the coefficients implied by the household and production Equations.

Table 17: Model calibration.

Parameter	Value	Description
Policy		
ϕ^d	3.928	Response to demand-driven inflation, estimated rule.
ϕ^s	1.361	Response to supply-driven inflation, estimated rule.
ϕ^y	0.284	Output response, estimated rule.
ρ_i	0.836	Interest-rate smoothing, estimated rule.
Households and firms		
β	0.99	Quarterly discount factor.
θ	0.75	Share of firms keeping their price each quarter.
γ	0.90	Real-wage rigidity.
κ	0.024	Phillips-curve slope.
$\mathcal{M}$	1.30	Steady-state gross price markup.
φ	1.8315	Labour-disutility curvature, implied by κ.
Input prices and persistence		
α	0.012	Imported-input share in production.
χ	0.017	Direct input weight in the consumption price index.
$\rho_d = \rho_s$	0.95	Common persistence of demand and supply.
ρ_m	0.50	Persistence of independent monetary policy.
Asset prices		
$\bar{\rho}$	0.995	Equity-duration coefficient.
Λ_q	1.2696	Response of the equity premium to output relative to steady state.
Implied coefficients		
λ	0.002223	Input-price coefficient in the Phillips curve.
δ_q	0.0706	Dividend response to output, holding the input price fixed.
ζ_s	44.189	Dividend coefficient on $u_t^s = \lambda s_t$.

Notes: One period is one quarter. Policy coefficients are estimated through 2025Q2. The other parameters and the premium comparison are described below. Implied coefficients follow from the household, wage, production and dividend Equations.

The discount factor, price stickiness, real-wage rigidity and input shares follow Blanchard and Galí (2007a). The markup follows Hall (2018), and the Phillips-curve slope follows Rotemberg and Woodford (1997). I choose the labour coefficient to match this slope, using $\kappa = \lambda_p \Gamma_y$. The remaining coefficients follow from the household and production Equations.

Demand and supply have the same persistence of 0.95, following Hofmann et al. (2026). I set monetary-policy persistence to 0.5 for the illustration. For equity valuation, $\bar{\rho} = 0.995$ is the Campbell–Shiller coefficient based on a reference dividend–price ratio, as described in Appendix G. For the equity-premium coefficient, I use the same value for all three disturbances:

$$\Lambda_q = \frac{4.71}{1 + 0.95 + 0.95^2 + 0.95^3} = 1.269585.$$

This uses the coefficient of -4.71 on the output gap in the one-year excess-return regression reported by Campbell et al. (2020, Table 4). The denominator adds four quarterly responses of a variable with persistence 0.95. This gives an approximate quarterly benchmark rather than an estimate of Λ_q in this model. Here, the premium responds to output relative to steady state, as in the policy rule.

At the extended-sample policy coefficients, the three equity conditions jointly require $\Lambda_q > 0.7272$. The demand condition gives the binding lower bound. The chosen value satisfies all three conditions. The identifying signs also hold when I reduce Λ_q to 1, including under the alternative policy estimates.

J.3 The numerical responses

Table 18: Responses to news about next-quarter disturbances

	Future nominal rates, bp	Stocks, %	Dollar, %	GDP on arrival, %
Monetary	25	-4.087	-0.666	-0.617
Demand	25	1.083	-1.629	0.355
Supply	25	-4.063	0.274	0.195

Notes: Each revision raises the annualised average expected nominal policy rate at horizons 1–8 by 25 basis points. A positive dollar response denotes depreciation. Asset prices refer to the announcement; GDP refers to the disturbance's arrival next quarter. The current policy rate and current price level are unchanged. These are model responses, not estimated impulse responses.

I normalise each revision to raise the annualised average expected nominal policy rate over quarters one to eight by 25 basis points. Under the estimated rule, supply news raises this future-rate measure, lowers equity prices and depreciates the dollar. Consumption falls from period two. Output initially rises and becomes negative in period three, two quarters after the disturbance arrives. The two- and five-year averages of expected domestic real rates, starting at the announcement date, fall by about 24.8 and 8.2 annual basis points.

The comparison in Figure 1 holds the supply disturbance fixed. A stronger policy response

contains more inflation but leads to a larger cumulative decline in output and can reverse the dollar depreciation. The different currency responses to supply and demand also hold when both inflation coefficients equal 1.361 or 1.5.

The three identifying patterns also hold under the alternative policy estimates, using each rule's estimated smoothing coefficient and keeping the remaining parameters unchanged. They also hold when the rule responds to quarterly inflation rather than the average of four quarters.