NBER WORKING PAPER SERIES

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Working Paper 35076
http://www.nber.org/papers/w35076

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
April 2026

The views expressed are those of the authors and do not necessarily reflect those of the Federal Reserve System or the National Bureau of Economic Research. All errors and omissions are the sole responsibility of the authors. Devereux gratefully acknowledges the Social Science and Humanities Council of Canada for research funding. Auray and Eyquem acknowledge financial support from the French National Research Agency (ANR-20-CE26-0018-02). Diercks is the corresponding author.

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NBER Working Paper No. 35076
April 2026
JEL No. C50, E10, G1

ABSTRACT

Inflation expectations derived from financial markets exhibited unprecedented dynamics in 2025: the correlation between one-year inflation swaps and one-year-ahead one-year forward rates turned significantly negative for the first time on record. We show that this decoupling occurred primarily on days when tariff news dominated market pricing, using a two-stage event classification validated by Bloomberg news trends. Standard small open-economy New Keynesian models in which tariffs generate a one-time price-level increase imply positive comovement across horizons and cannot explain this pattern.

We explain these occurrences through the lens of an amended small open-economy New Keynesian model. Three ingredients prove critical for reproducing the observed negative conditional correlation between spot and forward inflation after tariff shocks: targeting year-on-year inflation, substantial interest-rate inertia, and persistent tariffs. Under empirically plausible calibrations, the model generates a negative correlation conditional on tariff shocks while preserving a positive unconditional correlation, suggesting that the 2025 twist in the term structure reflects expectations of a persistent policy response to trade shocks.

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1 Introduction

Inflation expectations are one of the most important inputs for monetary policy, providing the signal required to distinguish whether shocks are projected to be transitory or persistent. This decomposition is essential for forward-looking policy, which seeks to stabilize prices without overreacting to temporary volatility. For decades, the market signals informing this distinction have followed a reliable pattern, one in which near-term and medium-term inflation expectations have broadly moved in tandem. However, in 2025, the correlation between near-term and medium-term inflation expectations turned significantly negative for the first time on record.[1] This study documents this unprecedented divergence and explores the theoretical mechanisms capable of rationalizing it.

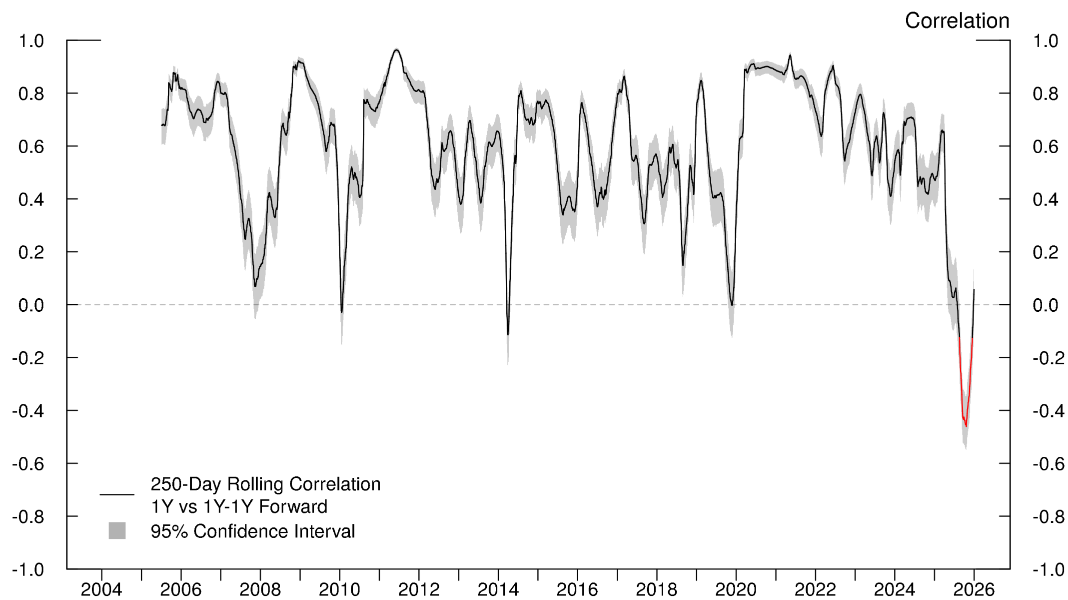

Figure 1: **Correlation of 1-Year Inflation Swap and 1-Year Ahead Forward Rate**

Note: This figure shows the 250-day (annual) correlation between the one-year inflation swap rate and the one-year-ahead one-year forward inflation swap rate from July 21, 2004 to December 31, 2025. The gray portion reflects the 95% confidence interval for the correlation statistic and the red portion denotes the period that the correlation is significantly below zero.

Figure 1 illustrates the phenomenon. It plots the 250-day (annual) rolling correlation between the one-year inflation swap rate and the one-year-ahead one-year forward inflation swap rate. Historically, this correlation has been persistently positive, averaging around 0.6 over our sample. In sharp contrast, the correlation collapsed in 2025, reaching levels that are not just lower than in previous episodes of macroeconomic stress, but significantly below zero for a sustained period. We show that this breakdown in co-movement is not a general feature of the macro environment but is tightly linked to the timing of tariff announcements and trade-policy news.

[1]In this context, 'on record' refers to the span of our historical dataset sourced from Bloomberg, which begins in July 2004. This period captures the entirety of the liquid, actively traded history of the US zero-coupon inflation swap market.

Narrative identification. To provide rigor in attributing these dynamics to trade policy, we conduct an event study of the 2025 period. Using computational text analysis of daily financial market commentary paired with strict manual verification, we classify trading days into *Trade Tension* and *Trade Alleviation* events. We then refine these events by assigning a news intensity level, and we independently validate this classification against quantitative peaks in Bloomberg tariff-related story counts. Our narrative identification strategy confirms that the decline in the correlation between short- and medium-term inflation expectations was driven by tariff announcements and their subsequent partial reversals. Specifically, we find that the divergence between the one-year and one-year-ahead forward rates is heavily concentrated on trade-event days, and that a simple text-based intensity metric explains a substantial portion of the variance in the term structure's daily movement over these episodes.

Survey-based evidence. A natural concern with market-based measures is that they embed time-varying risk premia, potentially conflating compensation for risk with genuine shifts in expected inflation. To address this, we cross-validate our findings using Blue Chip Economic Indicators and Financial Forecasts. We find that professional forecasters exhibited a similar twist during the 2025 tariff episodes: one-year inflation forecasts rose, while further-out projections declined. The fact that survey expectations—which are immune to liquidity and risk-premia distortions—roughly coincide with swap market dynamics confirms that the negative correlation reflects a genuine revision in the perceived path of inflation rather than changes in risk compensation.

Puzzle. These empirical patterns create a puzzle for standard open-economy New Keynesian models with tariffs. In the simplest benchmark, a permanent tariff hike is akin to a one-time increase in the domestic price level via more expensive imports: it raises measured inflation for a short window, after which inflation returns to baseline. Such a mechanism cannot generate a systematic decline in medium-term inflation expectations conditional on an increase in near-term inflation expectations. At best, it implies little change in forward inflation once the one-off price-level adjustment is absorbed. More broadly, if tariffs are expected to be persistent, the usual prediction is that inflation pressures should also be more persistent, implying positive co-movement across horizons rather than the observed negative correlation.

Model. The negative correlation observed in 2025 therefore suggests that market participants priced not only near-term tariff pass-through, but also a subsequent force pushing inflation down at annual horizons. To interpret this configuration, we develop a small open-economy New Keynesian model designed to quantify how tariff shocks affect CPI inflation dynamics and the term structure of inflation expectations. The model builds on the framework of Auray et al. (2025b) and features monopolistic competition with Rotemberg price adjustment costs, imported intermediates in production, incomplete international financial markets closed by balanced trade, and sluggish effective import prices that generate incomplete and distributed pass-through. Tariffs influence the economy through two central channels: a mechanical CPI wedge due to higher border prices of imported final goods and inputs, and a contractionary channel operating through output, marginal costs, and producer-price inflation.

A key element of our analysis is the monetary-policy regime. In contrast to much of the New Keynesian literature, which focuses on quarterly CPI or PPI inflation targets, we assume that the central bank follows a Taylor rule with interest-rate smoothing that responds to year-on-year CPI inflation. This choice brings the model closer to actual inflation-targeting practices and aligns the policy rule with the annual inflation objects that underlie the swap market term structure. We show that this alignment is crucial for generating medium-run disinflationary forces after tariff shocks: when the central bank reacts to the elevated year-on-year inflation generated by tariffs, the resulting tightening and its inertia can push inflation below baseline at annual horizons even as spot year-on-year inflation rises on impact.

Mechanisms. We highlight three sets of mechanisms that jointly determine whether tariff shocks produce a positive or negative conditional correlation between spot and forward inflation. First, the inflation-target horizon matters: targeting year-on-year CPI is much more conducive to reversals in year-on-year inflation dynamics than targeting quarterly inflation, particularly quarterly PPI, which largely insulates marginal costs and leaves CPI inflation dominated by the one-off import-price wedge. Second, the persistence of both tariffs and monetary-policy inertia shapes the horizon profile of the response: when tariff shocks are highly persistent and the policy rule displays substantial interest-rate smoothing, the contractionary effect of higher real rates is more persistent than the mechanical inflation spike. This combination generates a "higher-for-longer" real rate profile that amplifies the output contraction and compresses marginal costs at medium horizons. Third, amplification channels such as incomplete pass-through in final and intermediate imports and the possibility of symmetric retaliation can strengthen the reversal by spreading the CPI impulse over time and deepening the trade-driven contraction, though they are not sufficient on their own to overturn the sign of the correlation.

Quantitatively, we use the model to compute the conditional correlation between spot and one-year-ahead forward year-on-year inflation under tariff shocks and compare it to the unconditional correlation that arises from a mixture of tariff and productivity disturbances. We show that, for reasonable parameter values, the model can generate a negative conditional correlation under tariff shocks while preserving a positive unconditional correlation that mirrors the historical data before 2025. The negative conditional correlation is robust to moderate variations in trade shares, trade elasticities, risk aversion, and pass-through, but it does require (i) sufficiently sticky prices to generate persistence in inflation dynamics, (ii) sufficiently inertial monetary policy, and (iii) sufficiently persistent tariffs. These conditions are exactly those under which the 2025 tariff episodes would be expected to induce a twist in the inflation term structure.

Additional interpretations. While our mechanism is fundamentally contractionary—medium-run disinflation arises from the interaction of tariff-induced cost pressures with an inertial, year-on-year CPI-targeting policy rule—it is worth noting that alternative, more positive supply-side interpretations are conceivable. In richer environments with endogenous productivity or markups, tariffs could in principle trigger reallocation, learning-by-doing, or reshoring forces that lower marginal costs at medium horizons. Our baseline framework abstracts from these channels and instead isolates the extent to which realistic monetary-policy design alone can account for the observed twist in the term structure of inflation expectations.

The rest of the paper is organized as follows. Section 2 connects our work with the existing literature on tariffs, trade wars, and monetary policy in open-economy New Keynesian models. Section 3 documents the recent evolution of the inflation term structure and establishes the central empirical facts: the negative correlation between near-term and medium-term inflation expectations, the attribution of this divergence to tariff news, and the consistency between market- and survey-based expectations. Section 4 presents our small open-economy model of tariff-induced inflation dynamics, emphasizing the role of the CPI wedge, imported intermediates, and the monetary-policy rule. Section 5 reports our main quantitative results, including the conditions under which tariff shocks generate a negative conditional correlation between spot and forward inflation and the role of alternative policy regimes and pass-through assumptions. Section 6 concludes and discusses the broader implications for monetary policy design in environments where trade policy is a first-order source of shocks.

2 Literature

This paper relates to the literature on the macroeconomic effects of tariffs and trade wars, and in particular to work studying the interaction between trade policy and monetary policy in open-economy New Keynesian (NK) models with nominal rigidities.

Early analyses of protectionism emphasized general-equilibrium feedbacks through the exchange rate and the terms of trade. Krugman (1982) shows that under floating exchange rates, expenditure-switching effects of tariffs may be offset—or even reversed—by exchange-rate appreciation. In trade theory, the optimal-tariff tradition from Johnson (1953) and Eaton and Grossman (1985) highlights the strategic terms-of-trade motive and the possibility of tariff wars. However, these frameworks abstract from nominal rigidities and monetary stabilization, which are central for understanding short- and medium-run inflation dynamics.

A growing literature embeds tariffs into dynamic NK open-economy environments. Lindé and Pescatori (2019) analyze tariffs in a DSGE setting and characterize the conditions under which Lerner symmetry holds. Empirically, Furceri et al. (2018) show that tariff increases are associated with persistent output losses and declines in productivity, consistent with models in which protectionism acts as a negative supply disturbance.

Within this macro-trade framework, Auray et al. (2025a) develop a quantitative two-country NK model to study unilateral tariffs and retaliation. They show that tariffs are typically contractionary in the long run, that retaliation eliminates unilateral welfare gains, and that monetary policy critically shapes short-run outcomes. Importantly, they emphasize the distinction between the impact response under sticky prices and the steady-state adjustment once prices and capital have fully adjusted. Our analysis builds on this dynamic perspective but shifts the focus to the cross-horizon behavior of inflation and inflation expectations under tariff news.

The recent literature has critically focused on how the macroeconomic effects of tariff shocks depend on the monetary-policy regime. Bergin and Corsetti (2020) and Bergin and Corsetti (2023) show that welfare and macroeconomic outcomes are highly sensitive to the inflation measure targeted by the central bank (CPI versus domestic inflation) and to the structure of trade. In related work, Monacelli (2025) demonstrates that CPI targeting can generate a contractionary bias, as tariff-inclusive import prices enter directly into the policy target, whereas targeting domestic inflation leads to markedly different exchange-rate and output responses.

A complementary perspective is provided by Bianchi and Coulibaly (2025), who show that tariffs may create a fiscal externality when revenues are rebated to households. In their framework, optimal monetary policy can be expansionary in response to tariff hikes, offsetting inefficient contractions in imports. This highlights that tariffs are not generically equivalent to standard cost-push shocks; their macroeconomic implications depend on fiscal closure and on how policy internalizes the revenue channel.

Our paper is also closely related to Auray et al. (2025b), who study endogenous trade wars in a two-country model with sticky prices. They show that monetary policy regimes and financial market structures crucially affect equilibrium tariffs and welfare: under flexible inflation targeting, tariffs are lower than in a flexible-price economy, whereas under discretionary monetary policy, both inflation and tariffs are significantly higher. Here we take these interactions as given—tariffs are exogenous and monetary policy follows a Taylor-type rule—and instead focus on how persistent tariff shocks, monetary-policy inertia, and the inflation target jointly shape the term structure of inflation dynamics.

Beyond realized tariff changes, trade policy uncertainty also plays an important role. Caldara et al. (2020) document that heightened trade policy uncertainty leads to significant declines in activity and investment. This reinforces the importance of expectations about the persistence of tariff shocks and policy responses—an aspect that is central in our analysis of inflation dynamics across horizons.

Finally, our paper relates to the large literature on inflation expectations and inflation forecasts. A number of studies evaluate the informational content of various expectations measures, including Ang et al. (2007), Wright and Faust (2012), Aruoba (2020), Bennett and Owyang (2022), Verbrugge and Zaman (2021), and Jarrow and Yildirim (2023). Several studies also highlight liquidity and pricing distortions in Treasury Inflation-Protected Securities (see Campbell et al. (2009), Pflueger and Viceira (2011a,b), Fleckenstein et al. (2014), Christensen et al. (2010), D'Amico et al. (2018), and Abrahams et al. (2016)). These issues tend to be less severe for inflation swaps, which are the focus of our study. As also noted in Diercks et al. (2023), inflation swaps have substantially lower capital requirements relative to TIPS because only net cash flows are exchanged. Diercks et al. (2023) further show that one-year inflation swap rates tend to outperform survey forecasts outside of the global financial crisis and the pandemic, making them useful proxies for market-based inflation expectations. Haubrich et al. (2012) also conclude that inflation swaps face fewer distortions than TIPS yields, while Fleming and Sporn (2013a,b) document that inflation swap markets are reasonably liquid with modest bid-ask spreads. We build on this literature by using daily inflation swap rates to study how trade policy shocks affect the term structure of inflation expectations.

In sum, the literature has established that tariffs in NK open-economy models can act through demand, supply, and terms-of-trade channels, and that monetary-policy design is critical for determining output, inflation, and welfare outcomes (e.g., Lindé and Pescatori, 2019; Bergin and Corsetti, 2023; Monacelli, 2025; Cuba-Borda et al., 2025; Bianchi and Coulibaly, 2025; Auray et al., 2025b). Our contribution is to connect these mechanisms to the joint behavior of short- and medium-term inflation under tariff news, highlighting how persistence and policy inertia can generate medium-run disinflationary forces even when spot inflation rises on impact.

3 Empirical Evidence

In this section, we characterize the dynamics of inflation expectations throughout 2025 and link their evolution to tariff developments. We restrict our analysis to the period from January 17, the final business day prior to the presidential inauguration, through October 31. This window captures the complete, active lifecycle of the administration's tariff policy shocks, from initial market positioning and major announcements to subsequent retaliation and tentative de-escalation. By late autumn, the volume of trade-related news normalized, making October 31 a natural endpoint to isolate the trade conflict. Our analysis tracks the daily behavior of market-based expectations, specifically examining the term structure through the 1-year spot and 1-year forward rate one year ahead (1y1y). We validate these trends by cross-referencing them with survey-based measures, which, while coarser in resolution, provide a benchmark theoretically free of risk premia.

3.1 Market-Based Inflation Expectations

To track the daily evolution of inflation expectations around tariff policy developments, we utilize end-of-day prices of inflation swaps. Specifically, we examine the term structure of these expectations through the 1-year zero-coupon inflation swap and the implied 1-year forward rate one year ahead (1y1y). We focus on these annual horizons because they represent the standard frequency for monetary policy targets and the primary window over which households and firms anchor their price-setting behavior. This decomposition allows us to isolate immediate tariff pass-through from its expected medium-run persistence.

Figure 2 plots the daily time series of the 1-year spot and 1y1y forward rates from late January through October. A striking divergence emerges in early April, coinciding with the Liberation Day tariff announcements.[2] As illustrated, between early April and mid-May, the 1-year swap

[2]For a detailed chronological narrative of the specific tariff announcements, retaliatory measures, and negotiation phases driving these market movements throughout 2025, see Appendix A.2.

rate (black line) rose by approximately 35 basis points, reflecting a sharp upward shift in short-term inflation expectations. In stark contrast, the 1y1y forward rate (blue line) declined by roughly 30 basis points over the same window, implying that the initial surge in inflation was expected to dissipate or reverse rather than persist into the medium term.

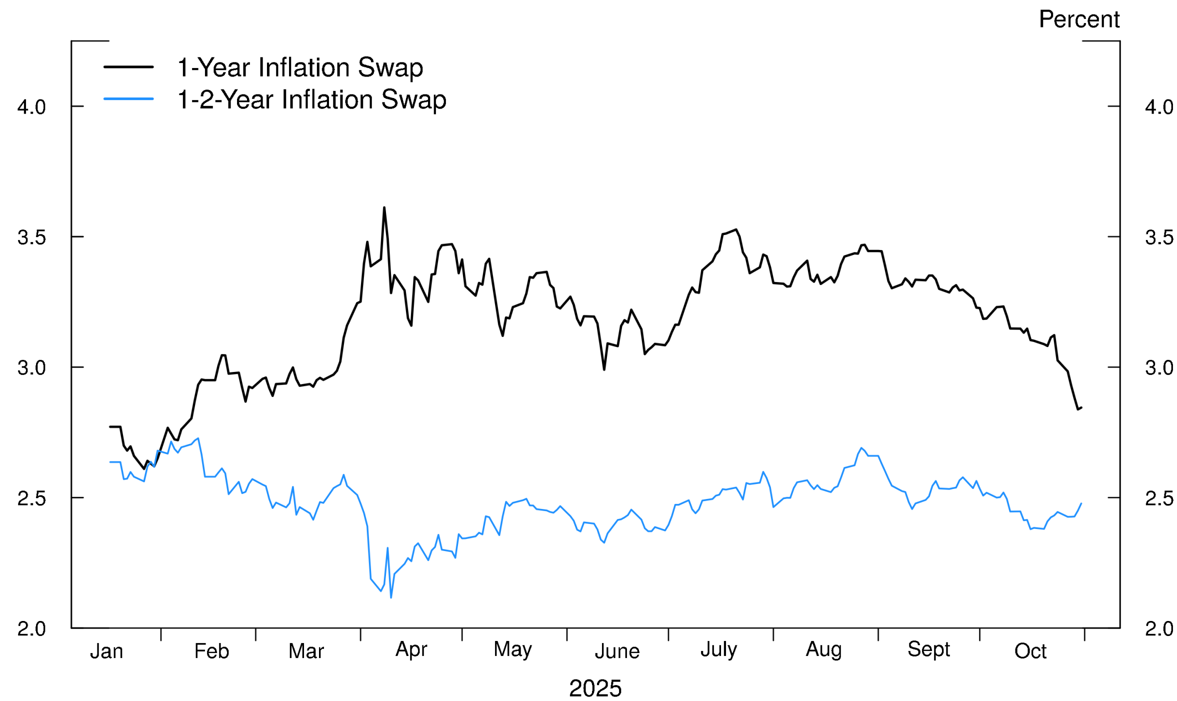

Figure 2: **Evolution of 1-Year Inflation Swap and 1-Year Ahead Forward Rate**

Note: This figure shows the daily level of the one-year inflation swap rate and the one-year ahead one-year forward inflation swap rate from January 17, 2025 to October 31, 2025.

The decoupling of the 1-year and 1y1y forward rates was a historical anomaly. As discussed in the introduction, the rolling 250-day correlation between the 1-year spot and the 1y1y forward rate has been positive since 2004. The abrupt shift to a negative correlation observed in 2025 marks a distinct structural break, underscoring the unique nature of the market's reaction to developments in tariff policy.

3.2 Survey-Based Inflation Expectations

While inflation swaps provide a necessary granular view of inflation trends, they remain subject to time-varying risk premiums. In times of elevated uncertainty, changes in swap rates can theoretically stem from shifting risk aversion rather than changes in expected inflation. To verify the robustness of our market-based findings, we examine survey-based measures of inflation expectations. While surveys lack the granularity to capture day-to-day reactions to news, they provide a risk-neutral anchor that helps validate the broader trends observed in the swap market.[3]

We utilize consensus forecasts from Blue Chip Economic Indicators and Financial Forecasts. A key challenge in comparing these data sources is that, while swaps trade at constant maturities (e.g., a rolling 2-year window), Blue Chip forecasts target fixed calendar horizons (e.g., Q4 2026). Constructing a comparable 2-year spot measure requires a vector of inflation forecasts extending nine quarters into the future. However, because the survey horizon is fixed to a specific calendar end-date, the forecast visibility shrinks as the year progresses. For instance, the January 2025 survey extends only to Q4 2026 (providing at most seven quarters of data) while the October 2025 survey extends only four quarters ahead.

To address this duration mismatch and construct a consistent 2-year measure, we impute the missing quarters using the survey's long-run 2027 CPI forecasts. Specifically, we anchor these long-run expectations using five specific releases that included 2027 long-run projections: the December 2024, June 2025, and December 2025 Financial Forecasts, as well as the March 2025 and October 2025 Economic Indicators.

By linearly interpolating between these release dates, we generate a continuous monthly series of 2027 inflation expectations from December 2024 through December 2025. These interpolated values are then used to populate the missing quarters, filling the forecast vector up to the required nine-quarter horizon for each month. This procedure allows us to derive a synthetic, constant-maturity 2-year survey rate that is directly comparable to the swap market data.

Figure 3 overlays these survey-derived expectations as discrete points on the daily swap chart. As illustrated by the red (1-year) and purple (1y1y) diamonds, the survey data tracks the term structure of the swap market closely. From January to May, consensus forecasts penciled in a 50-basis point rise in the 1-year outlook, coinciding with a 20-basis point decline in the 1y1y forward expectation. Despite the well-documented inertia present in professional forecasts, the survey data reflects a shift of the same sign and a comparable order of magnitude to the swap market. This suggests that the divergence in the inflation term structure reflects a genuine revision in expectations rather than a shift in risk premia.

3.3 Tariff News and Identification

Sections 3.1 and 3.2 established that the 1-year spot and 1-year ahead forward inflation rates diverged sharply in 2025, with near-term expectations rising while medium-term expectations fell. This pattern represents a fundamental departure from the historical co-movement between these measures. We now investigate the extent to which this divergence can be attributed to tariff policy developments.

[3] Survey-based measures are not without their own limitations. Issues such as informational rigidity, anchoring bias, and the tendency of forecasters to report the mode rather than the mean have been well documented in the literature (see, e.g., Berge, 2018; Coibion and Gorodnichenko, 2015; Trehan, 2015; Engelberg et al., 2009). These factors can cause survey expectations to exhibit significant inertia relative to market prices, particularly during periods of elevated tail risk.

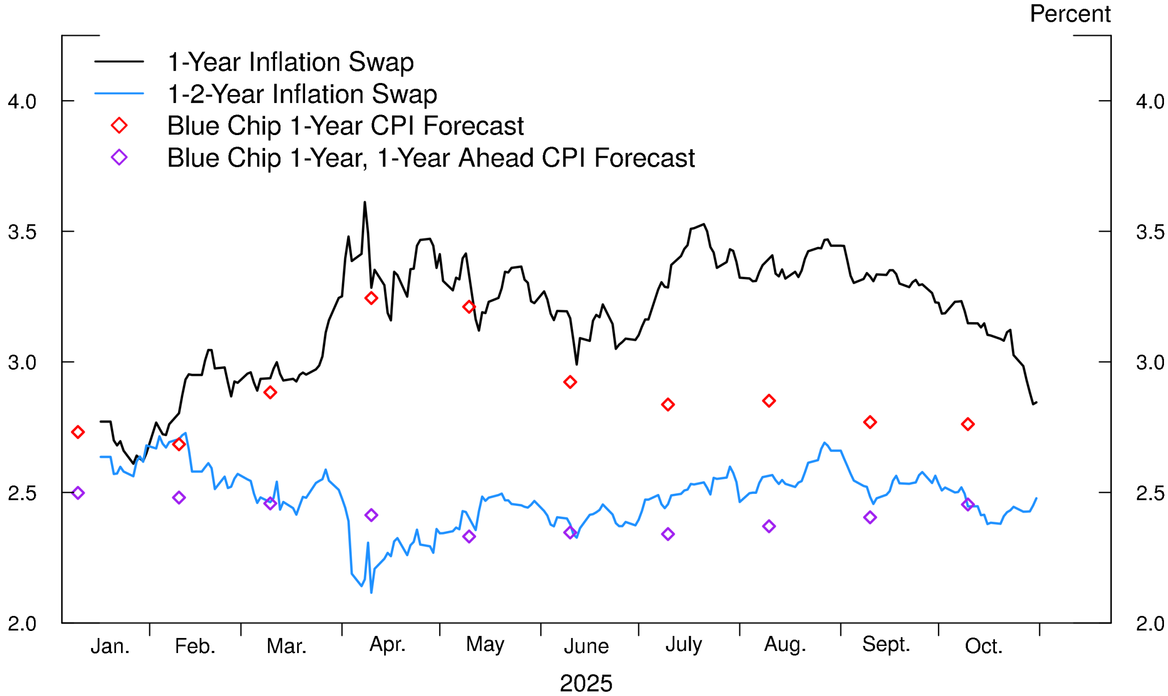

Figure 3: **Blue Chip forecast of 1-Year and 1-Year Ahead Forward Inflation Rate**

Note: This figure overlays the daily one-year inflation swap rate and one-year ahead one-year forward inflation swap rate with the monthly Blue Chip-implied forecast of one-year and one-year ahead one-year forward inflation. Blue Chip-implied forecasts are dated on the 10th of each calendar month.

To quantify this impact, we construct a measure of daily divergence, defined as the difference in daily changes between the two horizons. Positive values indicate that the 1-year rate rises more (or fell by less) than the 1y1y rate, while a negative divergence indicates the opposite:

$$Divergence_t = \Delta(\textit{1-year spot})_t - \Delta(\textit{1-year forward})_t$$

To isolate days when tariff policy was the dominant market driver, we implement a two-stage event classification strategy based on daily financial market commentary.[4] We distinguish between *Trade Tension* days (e.g., tariff announcements or escalations) and *Trade Alleviation* days (e.g., tariff suspensions or negotiations). Days are included in our event sample only if trade news was identified as either the primary market driver (*Major intensity*) or a significant contributing factor (*Moderate intensity*).

Applying this methodology to the 206 trading days from January 17 to October 31, 2025, we identify 25 Trade Tension days and 21 Trade Alleviation days. Figure 4 demonstrates the strong correspondence between our classification scheme and spikes in Bloomberg news coverage. The majority of local maxima in the daily story count coincide with our identified Trade Tension (green circles) or Trade Alleviation (red circles) days, confirming that our narrative identification

[4] See Appendix A.1 for strict definitional bounds and our complete classification protocol.

successfully identifies meaningful tariff-related information shocks.[5]

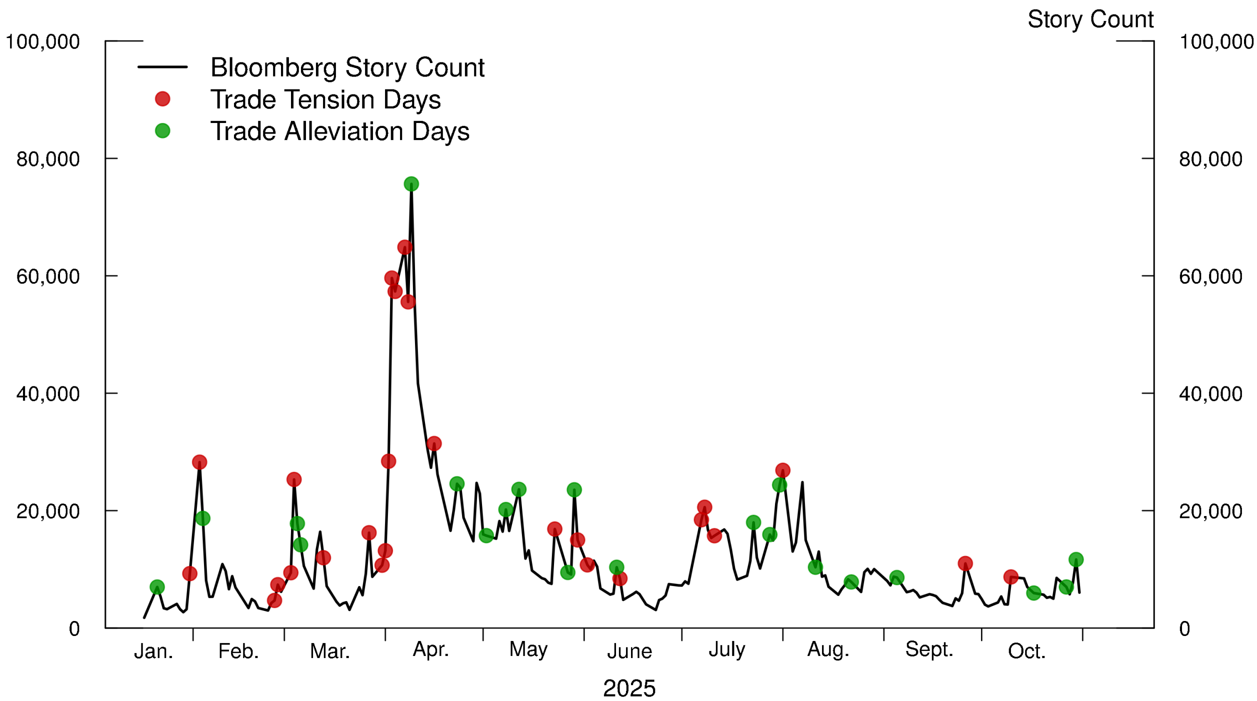

Figure 4: **Validation of Event Classification Using Bloomberg News Trends**

Note: This figure overlays the daily Bloomberg News Trends story count of articles containing keywords related to "tariffs" and "trade wars" (solid black line) with the authors' narrative event classification. The data covers business days from January 17 to October 31, 2025. Red circles indicate identified *Trade Tension* days, while green circles indicate *Trade Alleviation* days.

Table 1 reports average daily changes in inflation expectations by event type. Trade Tension days exhibit positive divergence (+5.22 basis points, $p < 0.01$) driven by near-term expectations rising while medium-term expectations fall. Notably, 52% of tension days exhibit opposite-signed moves, which is nearly double the baseline rate of 29% observed on non-event days. This pattern is consistent with markets pricing tariff escalations as generating immediate inflation pressures while simultaneously creating medium-run disinflationary forces.

Crucially, this structural 'twist' has never been observed before: standard macroeconomic surprises typically act as aggregate shocks that shift the inflation curve in parallel. This unique directional movement suggests the divergence is driven specifically by trade policy rather than coincident background noise.[6]

[5] We do not expect perfect correspondence, as (i) some days with high story counts involved speculation rather than concrete developments, and (ii) days with offsetting tension and alleviation signals were excluded. Additionally, Bloomberg story counts naturally spiked on days with major macroeconomic data releases (e.g., CPI, NFP) that revealed the realized economic impacts of tariffs. As detailed in Appendix A.1, we strictly exclude these data-release days from our event sample to isolate pure policy-news shocks.

[6] To formally confirm the statistical significance of this effect and account for time-series autocorrelation, Appendix Table 2 presents a full OLS event-study regression using Newey-West HAC standard errors (5 lags).

	N	Δ1Y (bps)	Δ1Y1Y (bps)	Divergence (bps)	Opp.Signs (%)
Tension Days	25	+2.99	−2.23	**+5.22*****	**52**
Alleviation Days	21	−4.25	−0.05	**−4.20*****	**29**
Non-Event Days	160	+0.14	+0.25	−0.11	29

Table 1: **Daily Changes in Inflation Expectations by Event Type**

Note: Sample includes 206 trading days from January 17 to October 31, 2025. Average daily changes in basis points. Divergence = Δ1Y − Δ1Y1Y. Opp.Signs = Percentage of days with opposite-signed moves. $^{**}p < 0.05$, $^{***}p < 0.01$ in two-tailed t-tests comparing divergence to zero for each event type.

By contrast, Trade Alleviation days show significant negative divergence (-4.25 basis points, $p < 0.01$), with both near-term and medium-term expectations declining on average. However, the frequency of opposite-sign movements (29%) remains at baseline levels, suggesting that alleviations operate primarily through the differential unwinding of tariff premia rather than generating a structural twist in the term structure like that seen with tension days.

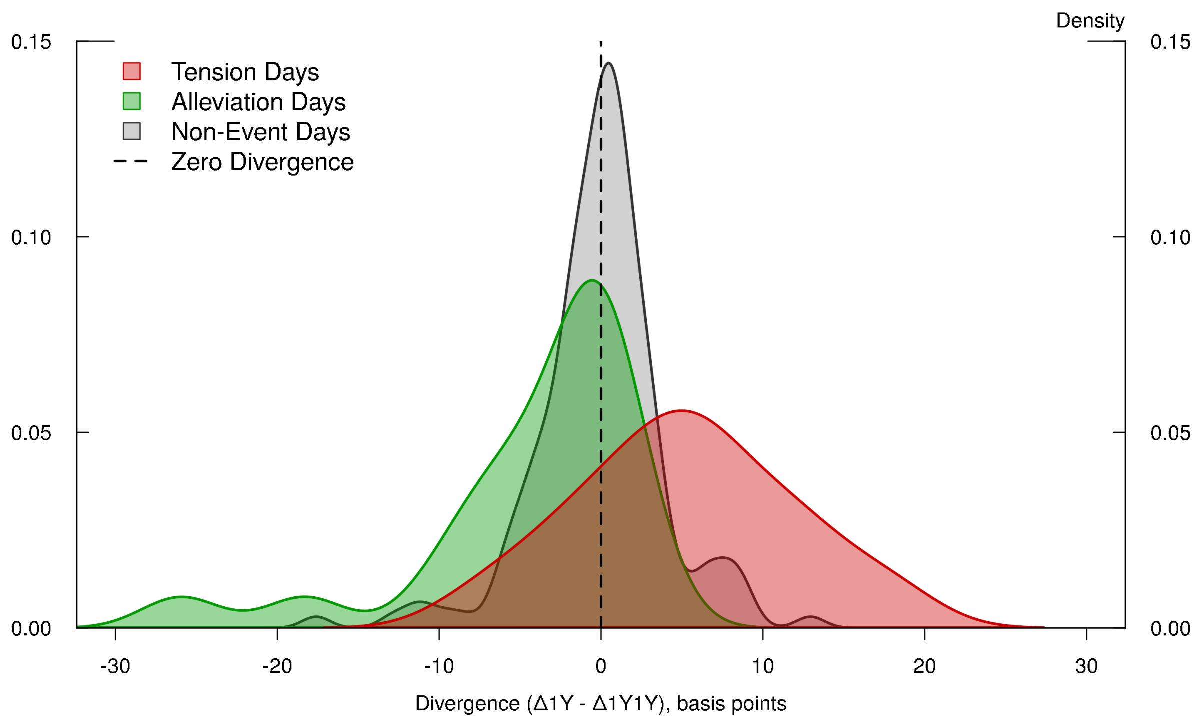

Figure 5: **Distribution of Divergence by Event Classification**

Note: This figure plots the kernel density estimates of daily divergence by event classification. Divergence is measured in basis points as the difference between the change in the 1y spot and 1y1y forward rate implied by inflation swaps. Event classifications and sample sizes are reported in Table 1. The vertical dashed line indicates zero divergence.

Figure 5 visualizes these patterns across the full distribution of daily divergence measures. Tension days are concentrated in the positive range, alleviation days in the negative range, while non-event days exhibit a symmetric distribution centered around zero. This clear separation across event classifications further lends support to trade policy being the mechanism that reshapes the dynamics of the term structure.

To further support this result, we find that the divergence effect is concentrated in high-intensity events where trade policy was identified as the primary market driver. Tension days categorized as *Major intensity* generate an estimated +9.02 basis points of divergence ($p < 0.01$), while similarly categorized *Major intensity* alleviation days generate -5.69 basis points ($p < 0.05$). Moderate-intensity events exhibit directionally consistent but smaller effects. The presence of this intensity gradient, where stronger signals produce proportionally larger term structure responses, confirms the robustness of the highlighted underlying mechanism.[7]

The empirical evidence firmly establishes that tariff tensions generate divergence between near-term and forward inflation expectations, with opposite-signed movements in the 1-year spot and 1-year ahead forward rates occurring more than half the time. Standard models in which tariffs operate through one-time price-level effects cannot rationalize this pattern. We now develop a theoretical framework to identify the conditions under which tariff shocks produce medium-run disinflation alongside near-term inflation pressures.

4 A Simple Open-Economy Model of Inflation Dynamics

We now describe a microfounded small open-economy New Keynesian (SOE-NK) model designed to study how tariff shocks affect CPI inflation dynamics and the inflation term structure. The model draws on the simple model of Auray et al. (2025b) with balanced trade but features *sluggish effective import prices* (imperfect pass-through, see Burstein and Gopinath (2014)) implemented via a CES "usage" aggregator that combines current border purchases with a predetermined component tied to past effective imports. This device generates distributed pass-through of border-price changes into (i) the CPI and (ii) firms' marginal costs through imported intermediate inputs, allowing tariffs to propagate gradually rather than as a pure one-time level shift.

The model also includes (i) monopolistic competition with Rotemberg price adjustment costs, (ii) imported intermediates in production, (iii) export demand and retaliation, and (iv) a Taylor rule with interest-rate smoothing. International financial markets are *incomplete*. To keep the model parsimonious and avoid tracking net foreign assets, we close the SOE with a *balanced-trade* condition each period. After deriving the equilibrium in levels, the model is log-linearized around a stationary steady state with constant foreign prices and yields a compact reduced system expressed in terms of relative-price states and the terms of trade.

[7] See Appendix Table 2 for detailed intensity breakdowns and regression results.

4.1 Environment

Time is discrete, $t = 0, 1, 2, \ldots$. Home is a small open economy. Foreign variables are exogenous. We impose balanced trade each period as the external closing condition.[8] Foreign-currency prices and Foreign output are constant in steady state and in deviations. In the linearized model we impose $\hat{p}_t^* = 0$ and set the foreign-demand shifter to $\hat{x}_t^* \equiv 0$. Home levies an ad valorem tariff τ_t on imports. Foreign may levy an ad valorem tariff τ_t^* on Home exports (retaliation).

4.2 Households

In the Home economy the representative household maximizes:

$$\mathbb{E}_0 \sum_{t=0}^{\infty} \beta^t \left[\frac{C_t^{1-\sigma}}{1-\sigma} - \zeta \frac{N_t^{1+\psi}}{1+\psi} \right], \tag{1}$$

where $\beta \in (0, 1)$ is the subjective discount factor, $\sigma > 0$ is a measure of relative risk aversion, ζ a labor disutility parameter and $\psi > 0$ is the inverse of the Frisch elasticity.

Final consumption is a CES composite of the Home good $C_{H,t}$ and an *effective* imported final good $C_{M,t}$:

$$C_t = \left[(1-\omega)^{1/\eta} C_{H,t}^{\frac{\eta-1}{\eta}} + \omega^{1/\eta} C_{M,t}^{\frac{\eta-1}{\eta}} \right]^{\frac{\eta}{\eta-1}}, \qquad \eta > 1,\ \omega \in (0, 1). \tag{2}$$

where η is the trade elasticity. The associated true price index is:

$$P_t = \left[(1-\omega) P_{H,t}^{1-\eta} + \omega P_{M,t}^{1-\eta} \right]^{\frac{1}{1-\eta}}, \tag{3}$$

where $P_{H,t}$ is the Home-good price and $P_{M,t}$ is the price of the effective imported final good $C_{M,t}$.

Let $\widetilde{C}_{M,t}$ denote current border purchases of imported final goods. The border consumer price is:

$$P_t^F \equiv (1 + \tau_t) S_t P_t^*, \tag{4}$$

where S_t is the nominal exchange rate (home currency per unit of foreign currency) and P_t^* is the foreign-currency price level – exogenous here due to the small open-economy assumption.

Effective imported final consumption $C_{M,t}$ is a CES aggregator of current border purchases and a predetermined component tied to $C_{M,t-1}$:

$$C_{M,t} = \left[(1-\chi)^{1/\nu} \widetilde{C}_{M,t}^{\frac{\nu-1}{\nu}} + \chi^{1/\nu} C_{M,t-1}^{\frac{\nu-1}{\nu}} \right]^{\frac{\nu}{\nu-1}}, \qquad \nu > 1,\ \chi \in [0, 1). \tag{5}$$

This is the import-usage analog of external habit: since $C_{M,t-1}$ is predetermined at t, the effective import bundle adjusts sluggishly when $\chi > 0$, parameter ν determining the extent of

[8] Allowing for incomplete markets with an internationally traded bond would introduce net foreign assets as an endogenous state variable; the balanced-trade condition provides a convenient benchmark that preserves terms-of-trade effects without tracking external wealth dynamics.

substitution between desired and past imports. We can rationalize this with the assumption that households in our small economy purchase final finished import goods at price $P_{M,t}$, while assembly firms purchase raw import goods at price P_t^F and, in conjunction with the existing final goods from the period before, produce the current output of final goods to sell to households, rebating any profits directly back to the household. Cost minimization by these assembly firms yields:

$$P_{M,t} = \left[(1-\chi)(P_t^F)^{1-\nu} + \chi(P_{M,t-1})^{1-\nu}\right]^{\frac{1}{1-\nu}}, \tag{6}$$

and the associated demand by assembly firms for current border purchases

$$\widetilde{C}_{M,t} = (1-\chi)\left(\frac{P_t^F}{P_{M,t}}\right)^{-\nu} C_{M,t}. \tag{7}$$

Equation (6) is the pass-through mechanism: tariffs move P_t^F one-for-one, while $P_{M,t}$ reacts gradually when $\chi > 0$. Cost minimization for (2) implies

$$C_{H,t} = (1-\omega)\left(\frac{P_{H,t}}{P_t}\right)^{-\eta} C_t, \tag{8}$$

$$C_{M,t} = \omega\left(\frac{P_{M,t}}{P_t}\right)^{-\eta} C_t. \tag{9}$$

Let B_t denote one-period nominal bonds purchased at t and paying gross return R_t between t and $t+1$. The household budget constraint is

$$P_t C_t + B_t = W_t N_t + \Pi_t + R_{t-1} B_{t-1} + \mathcal{T}_t, \tag{10}$$

where W_t is the nominal wage, Π_t are firm profits, and $\mathcal{T}_t$ are lump-sum transfers that include tariff revenue rebates.

The Home nominal bond satisfies the Euler equation:

$$1 = \mathbb{E}_t[\Lambda_{t,t+1} R_t], \qquad \Lambda_{t,t+1} = \beta\left(\frac{C_{t+1}}{C_t}\right)^{-\sigma} \frac{P_t}{P_{t+1}}. \tag{11}$$

Define CPI inflation as $\Pi_t \equiv P_t/P_{t-1}$. Then (11) is equivalently:

$$1 = \beta \mathbb{E}_t\left[\left(\frac{C_{t+1}}{C_t}\right)^{-\sigma} \frac{R_t}{\Pi_{t+1}}\right]. \tag{12}$$

Finally labor supply is given by:

$$\frac{W_t}{P_t} = \zeta C_t^{\sigma} N_t^{\psi}. \tag{13}$$

4.3 Firms

A continuum of monopolistically competitive firms $i \in [0,1]$ produce differentiated goods:

$$Y_t(i) = A_t\, N_t(i)^{1-\alpha} X_t(i)^{\alpha}, \qquad \alpha \in (0,1). \tag{14}$$

The intermediate composite combines Home and imported intermediate inputs in a way that mirrors the final goods bundle:

$$X_t(i) = \left[(1-\omega_x)^{1/\eta_x} X_{H,t}(i)^{\frac{\eta_x - 1}{\eta_x}} + \omega_x^{1/\eta_x} X_{M,t}(i)^{\frac{\eta_x - 1}{\eta_x}} \right]^{\frac{\eta_x}{\eta_x - 1}}, \qquad \eta_x > 1,\ \omega_x \in (0,1), \tag{15}$$

where η_x is the intermediate-specific trade elasticity. The intermediate price index is:

$$P_{X,t} = \left[(1-\omega_x) P_{H,t}^{1-\eta_x} + \omega_x (P_{M,t}^x)^{1-\eta_x} \right]^{\frac{1}{1-\eta_x}}. \tag{16}$$

Imported intermediates are purchased at the same border price P_t^F as final goods. Let $\widetilde{X}_{M,t}(i)$ denote current border purchases, and define the effective imported intermediate $X_{M,t}(i)$ as:

$$X_{M,t}(i) = \left[(1-\chi_x)^{1/\nu_x} \widetilde{X}_{M,t}(i)^{\frac{\nu_x - 1}{\nu_x}} + \chi_x^{1/\nu_x} X_{M,t-1}(i)^{\frac{\nu_x - 1}{\nu_x}} \right]^{\frac{\nu_x}{\nu_x - 1}}, \quad \nu_x > 1,\ \chi_x \in [0,1). \tag{17}$$

Following the same analogy used for final goods, we can write the effective price of imported intermediates, derived from cost minimization by assembly firms, as:

$$P_{M,t}^x = \left[(1-\chi_x)(P_t^F)^{1-\nu_x} + \chi_x (P_{M,t-1}^x)^{1-\nu_x} \right]^{\frac{1}{1-\nu_x}}, \tag{18}$$

and

$$\widetilde{X}_{M,t}(i) = (1-\chi_x) \left(\frac{P_t^F}{P_{M,t}^x} \right)^{-\nu_x} X_{M,t}(i). \tag{19}$$

As before, tariffs move P_t^F immediately. When $\chi_x > 0$, however, the effective input price $P_{M,t}^x$ adjusts gradually, which smooths and delays the impact of tariffs on firms' marginal costs.

Each firm chooses $(N_t(i), X_t(i))$ to minimize $W_t N_t(i) + P_{X,t} X_t(i)$ subject to (14). Real marginal cost (in units of $P_{H,t}$) is

$$MC_t = \frac{1}{A_t} \frac{1}{\alpha^{\alpha}(1-\alpha)^{1-\alpha}} \left(\frac{W_t}{P_{H,t}} \right)^{1-\alpha} \left(\frac{P_{X,t}}{P_{H,t}} \right)^{\alpha}. \tag{20}$$

Let $\Pi_{H,t} \equiv P_{H,t}/P_{H,t-1}$ denote producer-price (PPI) inflation. Firms face Rotemberg adjustment costs:

$$\frac{\kappa}{2}(\Pi_{H,t} - 1)^2 Y_t. \tag{21}$$

Symmetric equilibrium yields the following Rotemberg NKPC in levels:

$$(\Pi_{H,t}-1)\Pi_{H,t} = \beta \mathbb{E}_t \left[\left(\frac{C_{t+1}}{C_t} \right)^{-\sigma} \frac{Y_{t+1}}{Y_t} \frac{P_t}{P_{t+1}} (\Pi_{H,t+1}-1)\Pi_{H,t+1} \right] + \frac{\epsilon-1}{\kappa} \left(MC_t - \frac{\epsilon-1}{\epsilon} \right), \quad (22)$$

with cross-variety elasticity of substitution $\epsilon > 1$.

4.4 Exports, market clearing, and transfers

Exports are determined by Foreign demand for the Home good. We simplify by assuming a demand schedule consistent with CES demand and retaliation:

$$X_t^{\text{exp}} = \bar{X}^* \left(\frac{(1+\tau_t^*)P_{H,t}}{S_t P_t^*} \right)^{-\eta_e}, \quad (23)$$

where $\eta_e > 0$ is the Foreign price elasticity and $\bar{X}^*$ denotes the (constant) level of Foreign aggregate demand. Retaliation enters through τ_t^*.

Gross output equals total demand for Home goods:

$$Y_t = C_{H,t} + X_{H,t} + X_t^{\text{exp}}, \quad (24)$$

where $C_{H,t}$ is (8) and $X_{H,t}$ represents firms' demand for home produced intermediate goods.

Tariff revenues are rebated lump-sum:

$$\mathcal{T}_t = \tau_t S_t P_t^* \left(\widetilde{C}_{M,t} + \widetilde{X}_{M,t} \right), \quad (25)$$

where $\widetilde{X}_{M,t}$ aggregates (19) across firms.

4.5 External balance

Let $\widetilde{M}_t$ denote *border* imports (quantities purchased from abroad at world prices), aggregating imported final and intermediate border purchases:

$$\widetilde{M}_t \equiv \widetilde{C}_{M,t} + \widetilde{X}_{M,t}. \quad (26)$$

Imports are purchased from foreign producers at the world price P_t^* in foreign currency (the tariff wedge is a domestic transfer). Export receipts are obtained at the Home-good price $P_{H,t}$ (foreign tariffs are paid to the Foreign government). The trade balance condition imposes equality between export receipts and import payments, both expressed in Home currency:

$$P_{H,t} X_t^{\text{exp}} = S_t P_t^* \widetilde{M}_t. \quad (27)$$

This condition endogenously determines the nominal exchange rate (and thus the terms of trade) in response to tariff shocks, without introducing net foreign assets.

4.6 Monetary policy and tariff processes

The central bank sets the nominal interest rate according to a Taylor rule with inertia:

$$\log R_t = \rho_R \log R_{t-1} + (1-\rho_R)\phi_\pi \log \Pi_{Y,t}, \qquad \rho_R \in [0,1). \tag{28}$$

where $\Pi_{Y,t} = P_t/P_{t-4}$ is the year-on-year CPI inflation rate. This assumption differs from the standard NK models in which the central bank targets the quarterly CPI or PPI inflation rates but is a more accurate description of actual central bank inflation targets. Home and Foreign tariffs follow exogenous processes:

$$\log(1+\tau_t) = (1-\rho_\tau)\log(1+\bar{\tau}) + \rho_\tau \log(1+\tau_{t-1}) + \varepsilon_t^\tau, \tag{29}$$

$$\log(1+\tau_t^*) = (1-\rho_{\tau^*})\log(1+\bar{\tau}^*) + \rho_{\tau^*} \log(1+\tau_{t-1}^*) + \varepsilon_t^{\tau^*}. \tag{30}$$

4.7 Model Summary

Appendix B shows how the above model can be loglinearized around its steady state. The reduced system defines the dynamics of:

$$\{\hat{c}_t,\ \hat{y}_t,\ \pi_{H,t},\ \pi_t,\ \hat{mc}_t,\ \hat{i}_t,\ \hat{q}_t^f,\ \hat{q}_t^x,\ \hat{t}_t\},$$

conditional on exogenous processes for $\{\hat{\tau}_t, \hat{\tau}_t^*, \hat{a}_t\}$ and $\hat{p}_t^* = \hat{x}_t^* = 0$.

$$\text{Euler:} \qquad \hat{c}_t = \mathbb{E}_t\hat{c}_{t+1} - \frac{1}{\sigma}(\hat{i}_t - \mathbb{E}_t\pi_{t+1}), \tag{31}$$

$$\text{NKPC:} \qquad \pi_{H,t} = \beta\mathbb{E}_t\pi_{H,t+1} + \frac{\epsilon-1}{\kappa}\hat{mc}_t, \tag{32}$$

$$\text{Marginal cost:} \qquad \hat{mc}_t = \psi\hat{y}_t + (1-\alpha)(\sigma\hat{c}_t + \omega\hat{q}_t^f) + \alpha\omega_x\hat{q}_t^x - (1+\psi)\hat{a}_t, \tag{33}$$

$$\text{Policy:} \qquad \hat{i}_t = \rho_R\hat{i}_{t-1} + (1-\rho_R)\phi_\pi\sum_{s=0}^{3}\pi_{t-s}, \tag{34}$$

$$\text{CPI inflation:} \qquad \pi_t = \pi_{H,t} + \omega(\hat{q}_t^f - \hat{q}_{t-1}^f), \tag{35}$$

$$\text{Final wedge:} \qquad \hat{q}_t^f = (1-\chi)(\hat{\tau}_t + \hat{t}_t) + \chi\hat{q}_{t-1}^f - \chi\pi_{H,t}, \tag{36}$$

$$\text{Intermediates wedge:} \qquad \hat{q}_t^x = (1-\chi_x)(\hat{\tau}_t + \hat{t}_t) + \chi_x\hat{q}_{t-1}^x - \chi_x\pi_{H,t}, \tag{37}$$

$$\text{Gross output:} \qquad \hat{y}_t = \alpha_c\hat{c}_t + \alpha_f\hat{q}_t^f + \alpha_x\hat{q}_t^x + \alpha_t(\hat{t}_t - \hat{\tau}_t^*), \tag{38}$$

$$\begin{aligned}\text{Trade balance:} \qquad (\eta_e - 1)\hat{t}_t &= \eta_e\hat{\tau}_t^* + \mu_c\Big(\hat{c}_t - \big[\eta(1-\omega) - \nu\big]\hat{q}_t^f - \nu(\hat{\tau}_t + \hat{t}_t)\Big) \\ &\quad + \mu_x\Big(\hat{y}_t - \big[\eta_x(1-\omega_x) - \nu_x\big]\hat{q}_t^x - \nu_x(\hat{\tau}_t + \hat{t}_t)\Big).\end{aligned} \tag{39}$$

Here σ is the relative risk-aversion parameter, ψ the inverse of the Frisch elasticity, and the

NKPC slope depends on the usual cross-variety elasticity ϵ and the Rotemberg parameter κ. Parameter α is the share of intermediate goods in production, ω and ω_x are the final and intermediate import shares, χ, χ_x, ν and ν_x are the pass-through parameters (full pass-through holds when $\chi = \chi_x = 0$). Composite parameters given by:

$$\alpha_c = \frac{\gamma_c}{1-\gamma_x}, \quad \alpha_f = \frac{\omega\gamma_c\eta}{1-\gamma_x}, \quad \alpha_x = \frac{\gamma_x\eta_x\omega_x}{1-\gamma_x}, \quad \alpha_t = \frac{\gamma_e\eta_e}{1-\gamma_x}$$

are the gross-output parameters, where $(\gamma_c, \gamma_x, \gamma_e)$ represent the steady-state absorption shares (domestic final, domestic intermediate, exports; see Appendix B for details), η is the final-goods trade elasticity, η_x the input-trade elasticity, and η_e the foreign demand elasticity for exports. Parameters μ_c and μ_x are the steady-state shares of border imports used for final absorption and intermediate inputs, $\mu_c + \mu_x = 1$ (see Appendix B for details). Finally, we map the model objects to our empirical measures of inflation expectations. The pair $(\pi_t, \pi_{Y,t})$ corresponds to the one-year and one-year-ahead one-year forward year-on-year CPI inflation rates, respectively, while the law of motion for $\hat{mc}_t$ governs the medium-run behavior of marginal costs that ultimately drives the twist in the term structure.

4.8 Analytical Transmission of Tariff Shocks

We now describe the transmission of a tariff shock within the compact linear system. The objective is to clarify the economic mechanisms through which a change in $\hat{\tau}_t$ affects CPI inflation at different horizons, and to identify the ingredients required to generate distinct short- and medium-run inflation dynamics. Throughout this discussion we abstract from productivity shocks and focus on an exogenous innovation to $\hat{\tau}_t$.

Direct CPI pass-through channel The most immediate effect of a tariff shock operates through the border price. From the import wedge equation, a positive $\hat{\tau}_t$ raises $\hat{q}_t^f$, the relative price of effective imported consumption goods. CPI inflation satisfies:

$$\pi_t = \pi_{H,t} + \omega(\hat{q}_t^f - \hat{q}_{t-1}^f),$$

so any increase in $\hat{q}_t^f$ relative to its lag directly raises current CPI inflation. This channel is purely mechanical and holds even if domestic marginal cost and output were unchanged. Under full pass-through ($\chi = 0$), this effect is front-loaded: the increase in $\hat{q}_t^f$ is immediate and CPI inflation spikes contemporaneously. When $\chi > 0$, the wedge becomes partially predetermined and the CPI response is distributed over time. This channel primarily affects short-horizon inflation expectations.

Imported-input cost channel Tariffs also affect firms' marginal cost through imported intermediate inputs. The marginal cost equation includes

$$(1-\alpha)\omega\hat{q}_t^f + \alpha\omega_x\hat{q}_t^x.$$

An increase in $\hat{\tau}_t$ raises $\hat{q}_t^x$, the relative price of effective imported intermediates. This feeds directly into $\hat{mc}_t$ and therefore into domestic producer inflation via the Phillips curve:

$$\pi_{H,t} = \beta \mathbb{E}_t \pi_{H,t+1} + \frac{\epsilon - 1}{\kappa} \hat{mc}_t.$$

Unlike the CPI wedge channel, this mechanism operates through firms' cost structure and therefore generates endogenous persistence through the forward-looking Phillips curve. It affects inflation at both short and medium horizons. The strength of this channel depends on the intermediate import share ω_x and on the sluggishness parameter χ_x.

Terms-of-trade and competitiveness channel Under balanced trade, the terms of trade $\hat{t}_t$ are pinned down by external balance rather than risk sharing. Exports are:

$$\hat{x}_t^{\text{exp}} = \eta_e(\hat{t}_t - \hat{\tau}_t^*),$$

so a tariff shock affects activity through (i) relative-price effects (via $\hat{t}_t$, $\hat{q}_t^f$, and $\hat{q}_t^x$) and (ii) potential retaliation through $\hat{\tau}_t^*$:

$$\hat{y}_t = \alpha_c \hat{c}_t + \alpha_f \hat{q}_t^f + \alpha_x \hat{q}_t^x + \alpha_t(\hat{t}_t - \hat{\tau}_t^*).$$

Since the marginal cost depends positively on output via $\psi \hat{y}_t$, any contraction in activity lowers $\hat{mc}_t$ and therefore exerts downward pressure on future domestic inflation. This channel primarily influences medium-horizon inflation dynamics.

Intertemporal substitution and policy channel Monetary policy transmits tariff shocks forward through the Euler equation:

$$\hat{c}_t = \mathbb{E}_t \hat{c}_{t+1} - \frac{1}{\sigma}(\hat{i}_t - \mathbb{E}_t \pi_{t+1}).$$

A tariff-induced increase in CPI inflation raises the policy rate under inflation targeting:

$$\hat{i}_t = \rho_R \hat{i}_{t-1} + (1 - \rho_R)\phi_\pi \sum_0^3 \pi_{t-s}.$$

Higher nominal rates increase the real rate, depressing current consumption and output. Through the marginal-cost channel, this contraction reduces future inflation. The strength and timing of this effect depend critically on (i) the inflation target (year-on-year inflation in the baseline case), (ii) the inflation coefficient ϕ_π, (iii) policy inertia ρ_R, and (iv) the persistence of the tariff process. With interest-rate smoothing ($\rho_R > 0$), the policy response is distributed over time. This can generate medium-horizon disinflation even if short-run CPI inflation rises.

Sluggish pass-through as an internal propagation mechanism When $\chi > 0$ and $\chi_x > 0$, the wedges $\hat{q}_t^f$ and $\hat{q}_t^x$ inherit internal persistence. Thus tariffs affect inflation not only directly but also through endogenous state variables. Sluggish pass-through spreads the CPI impulse over multiple periods and alters the timing of the marginal-cost response. It therefore reshapes the horizon profile of expected inflation without requiring changes in policy or retaliation.

Horizon decomposition. A tariff shock propagates through several distinct but interacting channels. First, it generates a contemporaneous CPI impulse through the final-goods wedge, $\omega(\hat{q}_t^f - \hat{q}_{t-1}^f)$, which mechanically raises measured inflation. Second, it exerts a cost-push effect through imported intermediates, as $\hat{q}_t^x$ enters marginal cost and feeds into producer price inflation via the Phillips curve. Third, it induces a demand effect through the contraction in output $\hat{y}_t$, itself shaped by expenditure switching and the balanced-trade condition operating through the terms of trade $\hat{t}_t$. Fourth, monetary policy responds to inflation developments, affecting intertemporal consumption $\hat{c}_t$ and amplifying or dampening the real adjustment. Finally, when pass-through is incomplete ($\chi, \chi_x > 0$), wedge dynamics introduce additional internal persistence, smoothing and redistributing inflation pressures across horizons.

At short horizons, inflation dynamics are typically dominated by the mechanical CPI wedge and the immediate cost component embedded in marginal cost. By contrast, medium-horizon inflation reflects the interaction of Phillips-curve dynamics, the contractionary policy response, external adjustment through $\hat{t}_t$, and – when present – retaliation and shock persistence. In particular, the strength and duration of the output contraction determine how strongly marginal cost falls, which in turn governs expected producer inflation at longer horizons. Thus, a divergence between spot and forward year-on-year inflation arises when the medium-run compression in marginal costs generated by the demand, terms-of-trade, and monetary-policy channels dominates the CPI wedge after a few quarters.

The sign and magnitude of inflation responses across horizons therefore depend on the relative strength of several competing forces: mechanical pass-through, cost amplification through intermediates, demand contraction, monetary-policy persistence, internal price sluggishness, and the external adjustment implied by balanced trade. The model thus may admit configurations in which short-run CPI inflation rises while medium-run expected inflation declines, generating a divergence between spot year-on-year rates and one-year-ahead year-on-year forward rates. Determining which configuration is empirically relevant is ultimately a quantitative question addressed by the simulations of the next Section.

5 Results

Calibration We calibrate the model at quarterly frequency using standard parameter values. In a quarterly set-up $\beta = 0.99$ pins down the steady-state real interest rate, which, with an inflation target implicitly at $\Pi = 1$ implies a real interest rate around 4% on average. The risk-aversion coefficient is $\sigma = 1.5$ and the Frisch elasticity of labor supply is $1/\psi = 0.4$ as in Chetty et al. (2011). We calibrate the trade shares to U.S. values to deliver a 25% openness ratio in the steady state, implying $\omega = \omega_x = 0.125$. The literature is unclear regarding the value of trade elasticities, split between macro models, featuring an elasticity between 1.5 and 2, and trade models using larger elasticities, around 5-7 (see Imbs and Méjean (2017)). We choose an intermediate value and set $\eta = \eta_x = \eta_e = 3$. Regarding the parameters governing the substitutability of effective and past imports, we set $\nu = \nu_x = 1$ and consider two polar situations: full pass-through of border price changes ($\chi = \chi_x = 0$), in line with recent empirical evidence (see Amiti et al. (2026)), or partial final goods pass-through ($\chi = 0.5$).[9] The share of intermediate goods in production follows Bergin and Corsetti (2023) or Auray et al. (2025a) at $\alpha = 0.35$. As shown in Appendix B these values pin down the composite weight parameters γ_c, γ_x and γ_e, as well as μ_c and μ_x. Finally, we set the cross-variety elasticity to $\epsilon = 6$ consistent with an average 20% markup and a Rotemberg parameter $\kappa = 100$. In combination these parameters imply a 0.06 slope of the NK Phillips Curve. This is within the range of estimated New Keynesian Phillips curve slopes for U.S. data once marginal cost is measured by the labor share. The Taylor rule parameters are $\phi_\pi = 1.5$ and we consider either an inertial rule ($\rho_R = 0.85$, in line with empirical estimates of Taylor-type rules for the United States, e.g. Clarida et al. (2002)) or a more aggressive rule with no inertia ($\rho_R = 0$).

IRF to a productivity shock As a benchmark, we consider a one-percent positive productivity shock under full pass-through and monetary-policy inertia in Appendix C. Assuming that $\rho_a = 0.95$ we show that a productivity improvement lowers marginal cost and generates PPI deflation, while CPI inflation declines by less due to higher imported inflation following the depreciation of the terms of trade. Output rises more than consumption because of expenditure switching toward Home goods. The central bank responds by gradually lowering the policy rate, reinforcing the expansion. Both spot year-on-year inflation and one-year-ahead forward inflation decline, implying a positive co-movement between the two measures. This benchmark confirms that a negative spot-forward correlation cannot arise from standard supply-side disturbances.[10]

5.1 Tariff shocks: baseline transmission mechanisms

We now consider the effects of a 10pp permanent tariff hike.[11] We briefly summarize the baseline quantitative transmission of a unilateral tariff shock under full pass-through and no additional frictions. The analytical channels have been detailed in Subsection 4.8; here we simply highlight how they interact in the baseline simulation.

A tariff increase raises the border price of imports and, under full pass-through, immediately increases both the consumption and intermediate import wedges. The higher relative price of foreign goods induces expenditure switching toward Home goods and triggers an adjustment in the terms of trade under balanced trade. Imports contract and absorption is reallocated domestically, while external demand weakens.

Inflation responds through two opposing forces. First, the direct import-price wedge generates a front-loaded increase in quarterly CPI inflation. This mechanical effect is sufficient to raise spot (year-on-year) inflation on impact. Second, a contraction in activity lowers marginal cost and

[9] Amiti et al. (2026) find that 94% of US tariff hikes were born by importers, suggesting high levels of pass-through. Further, the extent of intermediate pass-through χ_x happens to matter very little.

[10] Standard demand shocks (e.g., discount rate) also yield positive correlation.

[11] For this exercise we set the persistence to $\rho_\tau \approx 1$ but < 1 to keep simulations non-explosive.

therefore producer-price inflation.[12] As output and external demand decline, the disinflationary force operating through the Phillips curve gradually dominates.

Tariff shocks therefore combine an immediate CPI inflation impulse with a medium-run disinflationary adjustment driven by weaker marginal cost. The term-structure implications hinge on the manner in which monetary policy translates this short-run inflation spike and subsequent real contraction into the path of real interest rates and expected inflation at annual horizons. We now explore how this mapping depends on the inflation target, policy inertia, pass-through or retaliation.

5.2 Tariff shocks and the inflation target

A standard assumption in quantitative New Keynesian models is that monetary policy targets *quarterly* CPI inflation. In practice, however, most central banks formulate their objectives in year-on-year terms. Since our empirical object of interest concerns the behavior of year-on-year inflation and its term structure following tariff shocks, it is important to assess whether the horizon of the policy target itself is quantitatively relevant.

Figure 6 compares three otherwise identical versions of the model: (i) the baseline specification in which the Taylor rule reacts to year-on-year CPI inflation ($\pi_{Y,t}$), (ii) a policy rule targeting quarterly CPI inflation (π_t), and (iii) a policy rule targeting quarterly producer-price inflation ($\pi_{H,t}$). In all cases we deliberately consider the most stripped-down environment: no interest-rate smoothing ($\rho_R = 0$) and full pass-through ($\chi = \chi_x = 0$). The comparison isolates the role of the target horizon.

When policy targets quarterly PPI inflation, marginal cost and producer-price inflation are effectively stabilized. The central bank offsets the cost pressures induced by the tariff so that $\pi_{H,t}$ remains close to zero. CPI inflation therefore reflects only the one-time increase in the import wedge associated with the tariff. The resulting movement in year-on-year inflation is purely mechanical and does not generate a medium-run reversal. In this case, there is no scope for a divergence between short- and medium-horizon inflation dynamics.

Under quarterly CPI targeting, the policy rule responds directly to the high-frequency CPI spike,

$$\pi_t = \pi_{H,t} + \omega(\hat{q}_t^f - \hat{q}_{t-1}^f),$$

which is front-loaded under full pass-through. The central bank therefore tightens immediately, and inflation quickly returns toward steady state. Although activity and marginal cost adjust, year-on-year inflation does not exhibit a pronounced reversal pattern. As a result, this specification also does not naturally generate the spot–forward divergence observed in Section 3.

By contrast, when policy targets year-on-year CPI inflation, the tariff-induced increase in $\pi_{Y,t}$ feeds into the policy rule through an annualized measure that mechanically embeds past

[12]The tariff affects output through a number of channels. A rise in the cost of intermediate inputs raises marginal cost directly. An improvement in the terms of trade generates a wealth effect which reduces labor supply, reducing output and marginal costs. Lastly, and most importantly, the response of monetary policy is critical for the magnitude of the output contraction, as seen below.

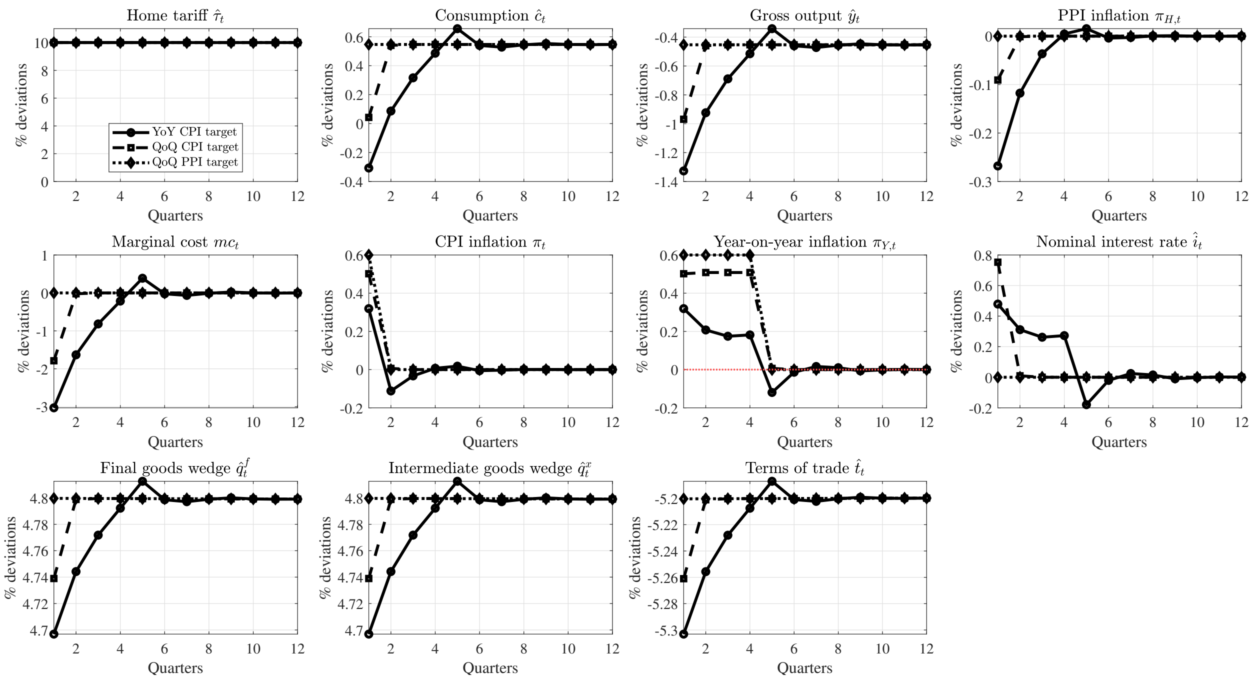

Figure 6: **IRFs to a unilateral 10pp tariff increase under alternative inflation targets.**

Note: Full pass-through ($\chi = \chi_x = 0$) and no monetary-policy inertia ($\rho_R = 0$). Solid line: policy targets year-on-year CPI inflation ($\pi_{Y,t}$). Dashed line: quarterly CPI inflation (π_t). Dotted line: quarterly PPI inflation ($\pi_{H,t}$).

inflation. The tightening therefore reflects not only the contemporaneous CPI spike but also its accumulated effect over previous quarters. This alters the timing of the real adjustment and can generate a temporary reversal in year-on-year inflation dynamics. Whether this reversal is quantitatively strong enough to produce a negative correlation between spot and forward year-on-year inflation is, however, a matter for the stochastic simulations examined later on.

Overall, the inflation target horizon is far from innocuous in this environment. Quarterly CPI or PPI targeting largely eliminates the reversal mechanism, whereas targeting year-on-year CPI inflation amplifies it by aligning the policy response with the annual measure that enters the empirical analysis and with the practice of central banks. Under year-on-year CPI targeting, the resulting overshooting in medium-run marginal costs implies that tariff shocks can generate a negative conditional correlation between spot and forward year-on-year inflation, unlike under quarterly CPI or PPI targeting.

5.3 Tariff shocks: the role of monetary-policy inertia

Figure 7 isolates the role of interest-rate smoothing by comparing a non-inertial rule ($\rho_R = 0$) to an inertial rule ($\rho_R = 0.8$), holding the rest of the environment fixed (full pass-through, no retaliation).

The tariff shock triggers the baseline transmission described in Section 5.1: a front-loaded CPI impulse through the import wedge, followed by weaker marginal costs and PPI inflation

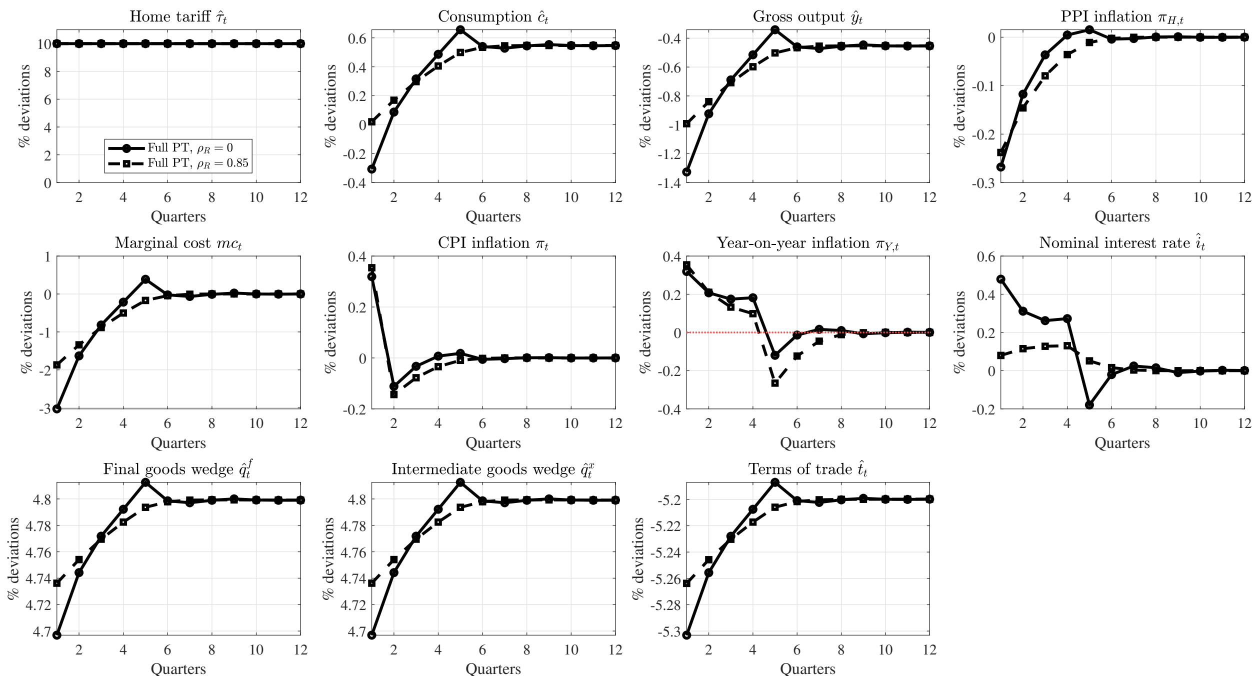

Figure 7: **IRFs to a unilateral 10pp tariff increase: the role of monetary policy inertia.**

Note: Full pass-through ($\chi = \chi_x = 0$). Solid line: $\rho_R = 0$; dashed line: $\rho_R = 0.85$.

as activity contracts. Monetary-policy inertia affects how this initial inflation spike translates into the path of real interest rates and, therefore, into the subsequent contraction in output and marginal cost.

Monetary policy and real adjustment. Monetary policy reacts to year-on-year inflation according to:

$$\hat{i}_t = \rho_R \hat{i}_{t-1} + (1 - \rho_R)\phi_\pi \pi_{Y,t}.$$

The initial rise in $\pi_{Y,t}$ induces a tightening under both rules. Without inertia ($\rho_R = 0$), the policy rate increases sharply on impact and then declines rapidly as year-on-year inflation falls. The real-rate increase is therefore front-loaded, and the contraction in output and marginal cost is relatively short-lived.

With inertia ($\rho_R = 0.85$), the adjustment of the policy rate is more gradual but more persistent. Real interest rates remain high for longer, which prolongs the decline in output and keeps marginal cost below steady state for a more extended period. As a result, PPI inflation remains lower for longer than under the non-inertial rule.

Implications for year-on-year inflation dynamics. The timing of the real contraction matters for the path of year-on-year inflation. Under the non-inertial rule, the inflation spike is followed by a relatively quick normalization. With inertia, the more persistent real-rate increase generates a more sustained disinflationary phase once the mechanical import-price effect fades.

Inertia therefore amplifies the medium-run decline in inflation relative to the initial tariff-induced spike. Whether this strengthened reversal is quantitatively sufficient to generate a negative co-movement between spot and forward year-on-year inflation is now even more likely. What Figure 7 makes clear is that interest-rate smoothing materially alters the timing and persistence of the disinflationary phase that follows the tariff shock. The stronger and more persistent contraction in marginal costs under high interest-rate inertia translates into a more negative conditional correlation between spot and forward inflation in response to tariff shocks.

5.4 Tariff shocks: the role of pass-through

We now examine how incomplete pass-through in final consumption goods modifies the transmission of tariff shocks. Figure 8 compares three cases: (i) full pass-through without inertia, (ii) incomplete final-goods pass-through ($\chi = 0.5$) without inertia, and (iii) incomplete pass-through combined with monetary-policy inertia.

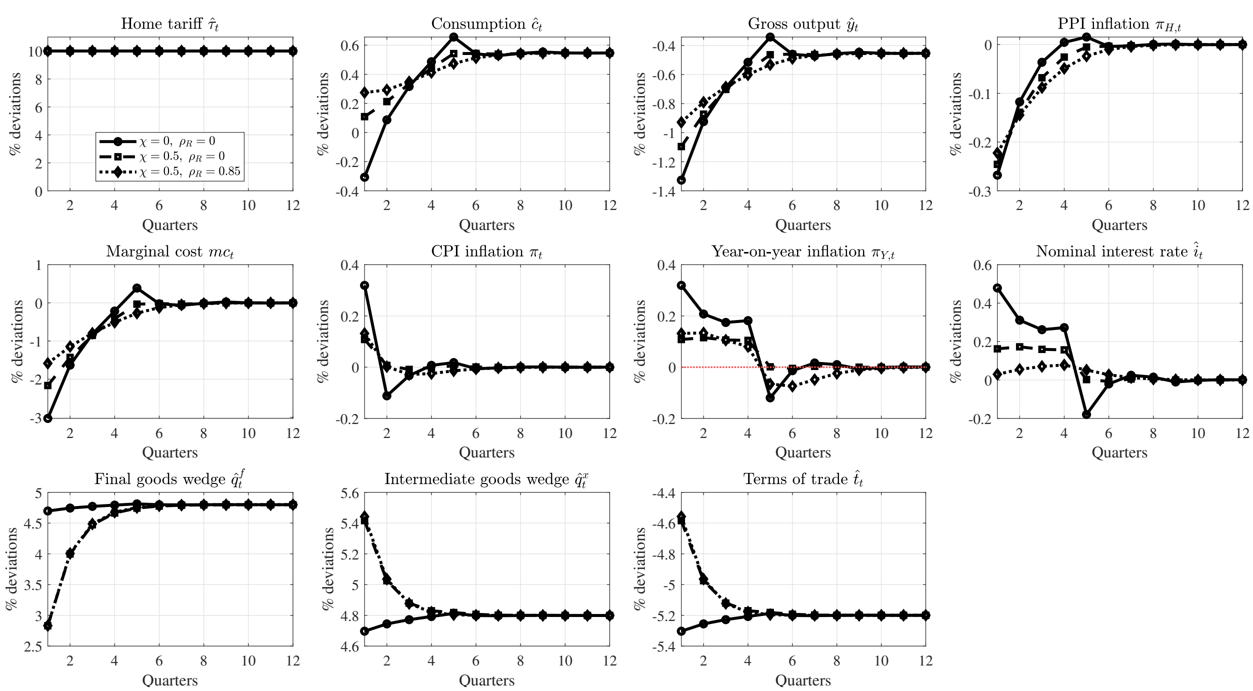

Figure 8: **IRFs to a unilateral 10pp tariff increase: the role of pass-through.**

Note: Full pass-through ($\chi = 0$) and no inertia (solid line); incomplete pass-through ($\chi = 0.5$) and no inertia (dashed line); incomplete pass-through with inertia (dotted line).

Defining $\hat{b}_t \equiv \hat{p}_t^F - \hat{p}_{H,t}$, with incomplete pass-through in final goods, the import wedge evolves according to:

$$\hat{q}_t^f = (1-\chi)\hat{b}_t + \chi\hat{q}_{t-1}^f - \chi\pi_{H,t},$$

so that import prices adjust gradually rather than instantaneously. The mechanical import-price component of CPI inflation,

$$\pi_t = \pi_{H,t} + \omega(\hat{q}_t^f - \hat{q}_{t-1}^f),$$

is therefore smoothed over time. Under full pass-through, the tariff shock produces a sharp jump in $\hat{q}_t^f$, which generates a front-loaded spike in quarterly and year-on-year inflation. When $\chi > 0$, this jump is distributed across several periods. The initial increase in CPI inflation is smaller, and its subsequent normalization is more gradual.

When monetary policy is non-inertial ($\rho_R = 0$), incomplete pass-through (dashed line) modifies the pattern of adjustment by smoothing CPI inflation dynamics and offsetting the reversal observed under full pass-through without inertia (solid line). The policy rate still responds to the inflation spike, and the real contraction remains relatively short-lived. As shown in Figure 8, year-on-year inflation declines only gradually and does not exhibit the pronounced medium-run reversal relative to the initial spike. Incomplete pass-through alone therefore does not generate the inflation dynamics required for a negative co-movement between spot and forward inflation rates.

When incomplete pass-through is combined with monetary-policy inertia, the two mechanisms reinforce each other. Sluggish import pricing spreads the CPI impulse over time, while interest-rate smoothing prolongs the real-rate increase induced by the tariff shock. The resulting contraction in output and marginal cost becomes more persistent, and the subsequent disinflation phase is amplified.

In this sense, incomplete pass-through acts as a form of private-sector inertia that complements policy inertia. While it does not generate a reversal on its own, it has the potential to strengthen the medium-run disinflationary effects once monetary-policy persistence is present.

By contrast, imperfect pass-through in intermediate goods ($\chi_x > 0$, not reported but available upon request) has quantitatively limited effects on inflation dynamics. The intermediate wedge evolves gradually, but its influence on marginal cost:

$$\hat{mc}_t = \psi \hat{y}_t + (1-\alpha)\sigma \hat{c}_t + \omega(1-\alpha)\hat{q}_t^f + \alpha\omega_x \hat{q}_t^x,$$

is proportional to $\alpha\omega_x$, the share of imported inputs in production, which remains quite small in our calibration. This channel is therefore not sufficiently large or significant to alter the dynamics of marginal cost in a substantial way. As a result, PPI inflation and the Phillips-curve transmission remain close to the full pass-through case. CPI dynamics are therefore largely unaffected relative to the benchmark. While incomplete pass-through and imported intermediates amplify the twist in the inflation term structure, they do so primarily by strengthening the negative conditional correlation between spot and forward inflation rather than changing its sign on their own.

5.5 Tariff shocks: retaliation

We now introduce symmetric retaliation by the foreign country. In Figure 9, the foreign economy raises its tariff by the same 10 percentage points as Home. The environment features full pass-through ($\chi = \chi_x = 0$) and no monetary-policy inertia ($\rho_R = 0$).

Retaliation largely amplifies the mechanisms already present under unilateral tariffs. Without retaliation, the Home tariff generates a terms-of-trade appreciation that raises purchasing power

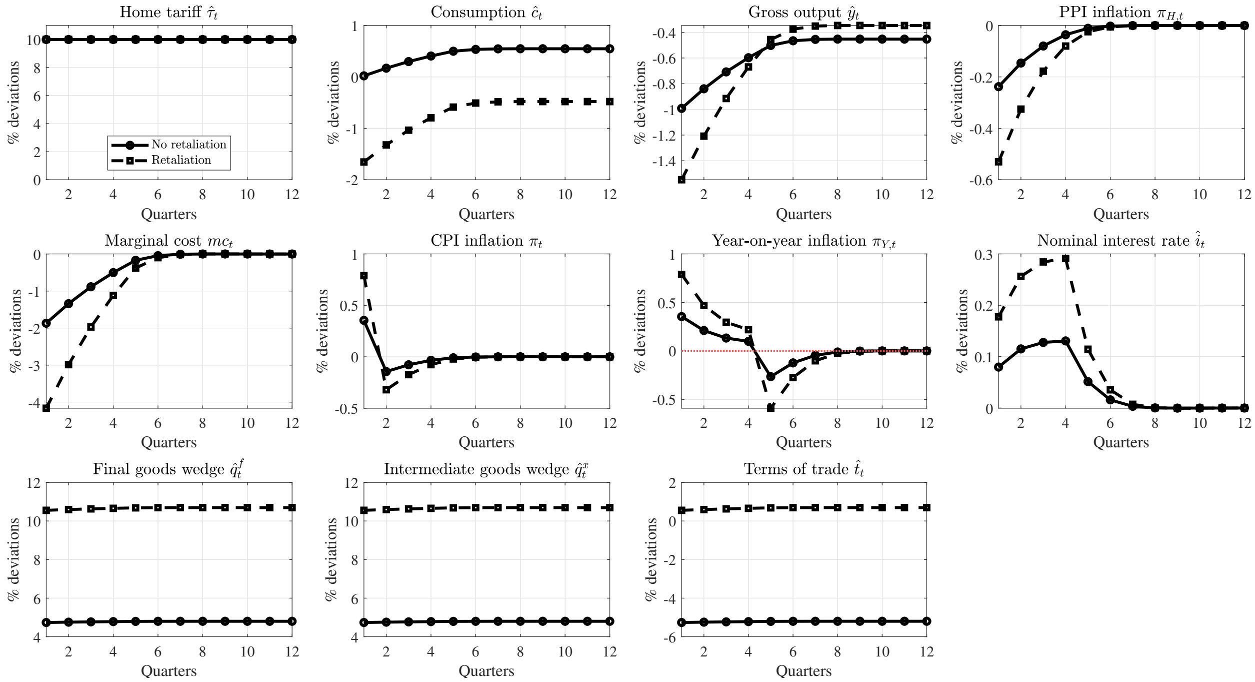

Figure 9: **IRFs to a 10pp tariff increase with or without retaliation.**

Note: Full pass-through ($\chi = \chi_x = 0$) and no monetary-policy inertia ($\rho_R = 0$). Solid line: no retaliation; dashed line: retaliation.

and eventually supports consumption. When the foreign country retaliates, this terms-of-trade advantage disappears. Home exports contract, consumption falls rather than rises, and output declines more strongly.

The deeper contraction translates into a larger and more persistent decline in marginal cost, leading to stronger PPI disinflation. At the same time, because both countries raise tariffs, traded goods become more expensive globally. The final and intermediate import wedges are larger, which amplifies the CPI inflation impulse.

Retaliation therefore reinforces the stagflationary configuration of tariff shocks: stronger real contraction and deeper PPI deflation materialize while higher CPI inflation is driven by rising import prices worldwide. Importantly, the qualitative transmission mechanism remains unchanged. Retaliation does not overturn the unilateral dynamics; it magnifies them. Only asymmetries in tariff size, pass-through, or elasticities would alter this conclusion in a fundamental way. These amplification mechanisms therefore deepen the negative conditional correlation between near-term and forward inflation conditional on tariff shocks, while leaving its dependence on monetary-policy design intact.

5.6 The spot-forward correlation: sensitivity

We now examine the unconditional correlation between spot year-on-year inflation and one-year-ahead forward year-on-year inflation, $\text{Corr}(\pi_{Y,t}, \pi_{forw,t})$, as a function of key structural parameters. Productivity shocks are calibrated to somewhat standard values $\rho_a = 0.95$ and

$\sigma_a = 0.7\%$. Tariff shocks follow Caldara et al. (2020) in terms of volatility ($\sigma_\tau = 0.25\%$) and are still assumed to be quasi-permanent ($\rho_\tau \approx 1$).

Figure 10 reports the model-implied correlation as parameters vary. Each panel plots two objects: (i) the correlation when both productivity and tariff shocks are active, and (ii) the correlation when only tariff shocks are active. The vertical dotted line marks the baseline calibration and the horizontal red line marks zero correlation.

The top-right, middle-left, and bottom-middle panels show that the Frisch elasticity parameter ψ, the price-adjustment parameter κ, and the policy inertia parameter ρ_R are crucial in determining the sign of the conditional correlation, whereas the remaining panels mainly illustrate robustness to other dimensions of the calibration.

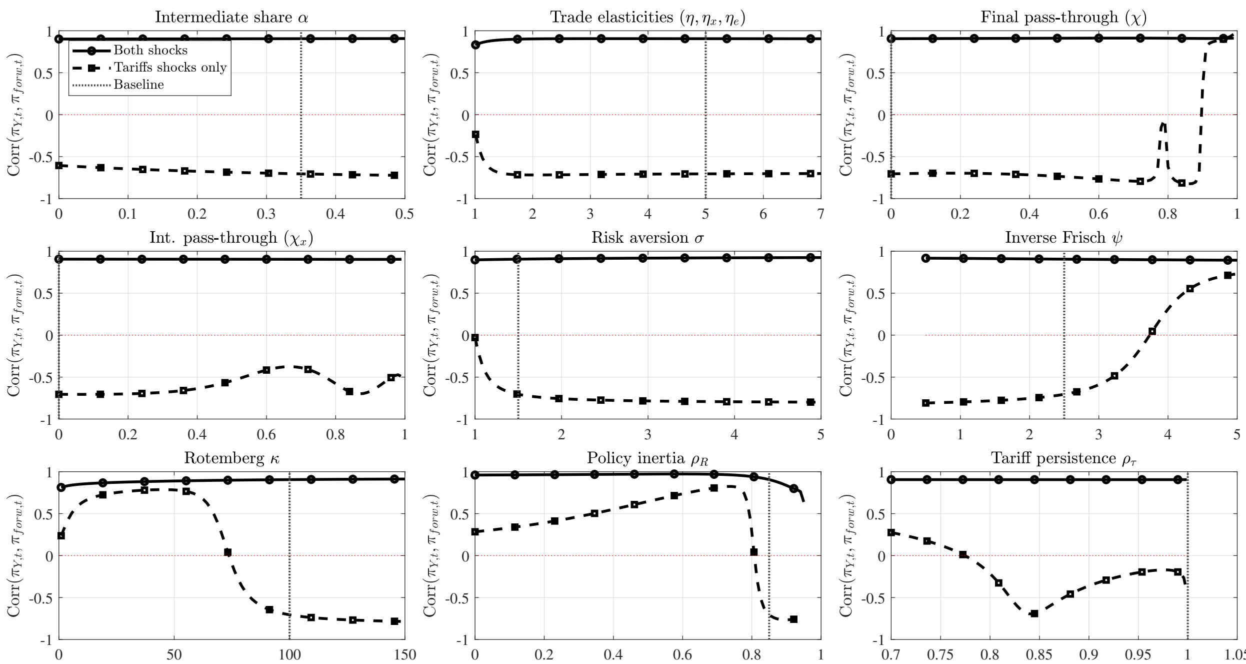

Figure 10: **Sensitivity of** $\mathrm{Corr}(\pi_{Y,t}, \pi_{forw,t})$ **to key parameters.**

Note: This figure shows the spot-forward correlation across various parameters in the model. The model with both shocks active is the solid line, while the model with only tariff shocks active is the dashed line. The vertical line corresponds to the baseline calibration.

When both shocks are active, the correlation is uniformly positive and remarkably stable across parameter values. This reflects the fact that productivity shocks generate standard New Keynesian co-movement (see Appendix C): both $\pi_{Y,t}$ and $\pi_{forw,t}$ decline after a positive TFP shock. As long as productivity shocks account for a substantial share of inflation variance at business-cycle frequencies, the unconditional correlation remains positive regardless of how tariff transmission is reshuffled.

Under tariff shocks only, the sign of the correlation depends on the balance between (i) the mechanical CPI-wedge channel, which raises near-term inflation, and (ii) the medium-run marginal-cost compression channel, which lowers future inflation. A negative correlation emerges when the latter dominates beyond the impact window.

The figure reveals a broad region of parameter space in which the baseline mechanism is robust. Varying the share of imported intermediates (α) has virtually no effect on the sign of the correlation. For trade elasticities (η, η_x, η_e) above roughly unity, the correlation remains negative and stable. Only at very low substitution elasticities does the mechanism weaken. Final-goods pass-through matters only when it is extremely low (χ above 0.8), a region that is empirically unrealistic given recent evidence (see Amiti et al. (2026)). For moderate degrees of sluggish pass-through, the baseline negative correlation survives. Intermediate-goods pass-through χ_x has negligible effects. Changes in intertemporal substitution ($1/\sigma$) have almost no impact on the correlation. Finally, as long as tariff shocks are sufficiently persistent ($\rho_\tau \gtrsim 0.8$), the sign of the correlation is preserved. Only at low persistence does the medium-run disinflation channel weaken substantially.

By contrast, three parameters play a decisive role. Changes in the inverse Frisch elasticity (ψ) operate through two opposing channels. On the one hand, a larger ψ increases the direct sensitivity of marginal cost to output fluctuations (via the $\psi\hat{y}_t$ term), which tends to amplify marginal-cost compression for a given output decline. On the other hand, when labor supply is more inelastic, employment adjusts less in equilibrium, so the contraction in output induced by tariffs is smaller. In the quantitative model, the latter effect dominates beyond $\psi \approx 4$: the recession becomes too muted to generate sufficient medium-run marginal-cost compression, and the spot-forward correlation turns positive. Thus, a sufficiently elastic labor supply (moderate ψ) is required for the negative correlation to obtain.

Further, if prices are insufficiently sticky ($\kappa < 60$), producer inflation adjusts too quickly to changes in marginal cost. The disinflationary phase following the tariff-induced contraction is therefore short-lived, and expected inflation does not fall sufficiently relative to the initial CPI wedge. In that region, the negative spot-forward correlation disappears. Sufficient inflation persistence is thus necessary for the medium-run channel to dominate.

Last, monetary-policy smoothing is also critical. When ρ_R is low, the policy tightening in response to the initial inflation spike is short-lived. Real rates revert quickly, limiting the depth and duration of the contraction. As a result, marginal-cost compression is not sustained and the correlation becomes positive. For $\rho_R \gtrsim 0.8$, the policy response is sufficiently persistent to maintain the medium-run disinflationary phase required for the reversal.[13]

Overall, the sensitivity analysis shows that the negative spot-forward correlation generated by tariff shocks is not fragile. It does not hinge on trade shares, trade elasticities, risk preferences, or moderate deviations from full pass-through. Instead, it requires three structural ingredients: (i) a sufficiently elastic labor supply (moderate ψ), (ii) sufficiently persistent inflation dynamics (large κ), and (iii) sufficiently inertial monetary policy (high ρ_R). These elements jointly ensure that the medium-run marginal-cost compression dominates the initial CPI wedge beyond the impact window.

[13] Temporary tariffs lack persistence for reversal.

5.7 Stochastic simulations and the 2025 correlation reversal

We now ask whether a regime shift in the volatility of tariff shocks – and the associated rise in the share of inflation and output variance explained by tariffs – can quantitatively generate the 2025 reversal in the spot-forward correlation documented in Section 3. In the data, the rolling one-year correlation between spot year-on-year inflation and the one-year-ahead year-on-year forward rate drops sharply in 2025 and turns negative for the first time on record.

Design. We simulate the quarterly model with two aggregate disturbances: productivity and tariffs. Productivity follows a standard AR(1) process with parameters $\rho_a = 0.95$ and $\sigma_a = 0.7\%$. Tariffs are quasi-permanent, with $\rho_\tau \approx 1$, and baseline volatility $\sigma_\tau = 0.25\%$, calibrated from Caldara et al. (2020) using data prior to 2020.[14] We run 5000 Monte Carlo simulations per scenario. For each simulated path, we compute the rolling one-year correlation between spot year-on-year inflation $\pi_{Y,t}$ and the one-year-ahead year-on-year forward inflation rate $\pi_{forw,t}$, and then report the average correlation across replications.

To mimic the post-2025 environment, we impose a regime shift in tariff volatility beginning in April 2025. Specifically, we multiply the standard deviation of tariff innovations by 20, from $\sigma_\tau = 0.0025$ to $\sigma_\tau = 0.05$. With the tariff process written in log form, a one-standard-deviation innovation in the tariff state corresponds to $\hat{\tau}_t \equiv \log\left(\frac{1+\tau_t}{1+\bar{\tau}}\right) = 0.05 \Rightarrow \Delta\tau_t \approx (1+\bar{\tau})\big(\exp(0.05) - 1\big) \approx 5$pp, so the regime shift is economically large.[15]

Results. Figure 11 compares the observed rolling correlation to the model-implied correlations under alternative calibrations. In the pre-2025 portion of the sample, the model generates a stable, positive correlation across all scenarios. This reflects the same composition logic emphasized in Section 5.6: when productivity shocks account for a substantial share of fluctuations, standard New Keynesian co-movement keeps $\text{Corr}(\pi_{Y,t}, \pi_{forw,t})$ positive.

Once tariff volatility increases in 2025, the model correlation drops sharply across scenarios. This decline reflects a shift in the dominant driver of inflation dynamics: large, persistent tariff shocks raise spot year-on-year inflation through the mechanical CPI wedge, while the induced contraction – and the associated marginal-cost compression – pushes medium-horizon inflation lower. The resulting spot-forward divergence is precisely the mechanism highlighted in the previous Sections.

Mechanisms. The figure also makes clear that the *depth* of the correlation decline is systematically shaped by the same channels highlighted in the deterministic analysis.

Holding pass-through and retaliation fixed, scenarios with interest-rate smoothing exhibit a larger and more persistent decline in the correlation. With ρ_R high, the policy tightening induced

[14] The baseline volatility is intended to capture a 'normal' pre-2020 environment in which tariff shocks are present but clearly not the dominant driver of inflation dynamics at business-cycle horizons.

[15] For low steady-state tariffs, $\exp(0.05) - 1 \simeq 5.1\%$. This magnitude is broadly consistent with the observed increase in U.S. effective tariffs between the pre-2025 period (around 3%) and 2026 (around 13%).

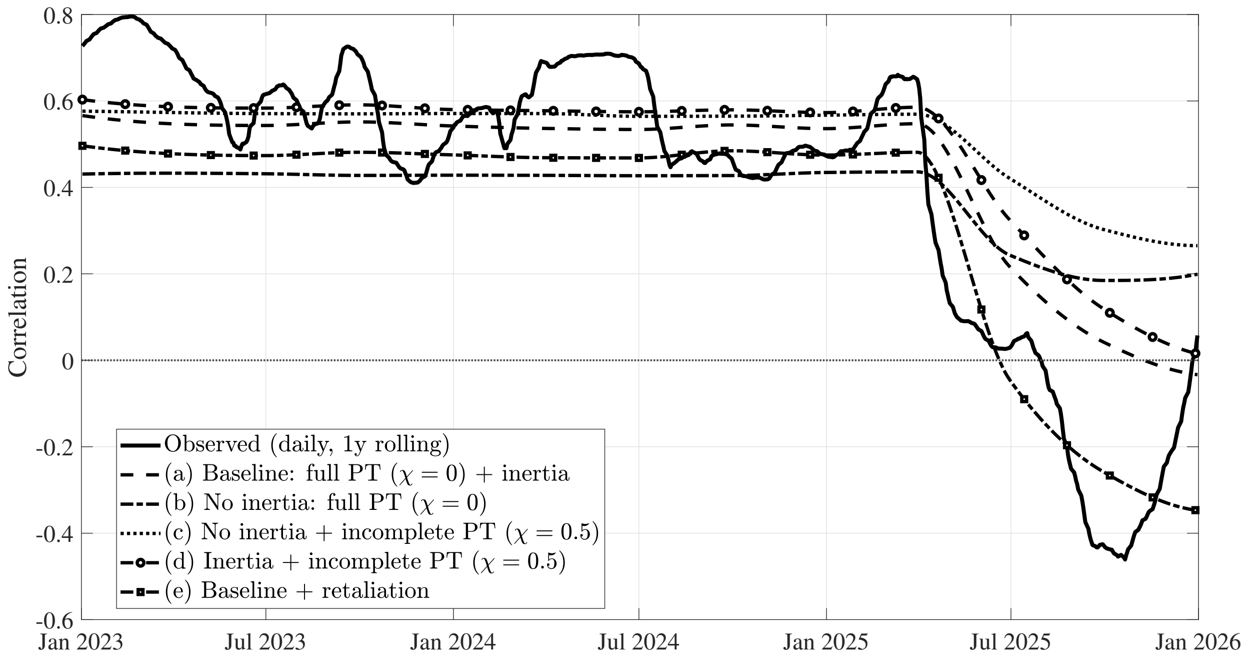

Figure 11: **Rolling 1-year spot–forward correlation: data vs. model.**

Note: This figure compares the observed rolling correlation to the model-implied correlations under alternative calibrations.

by the tariff-driven increase in year-on-year inflation remains elevated for longer, sustaining the output contraction and prolonging marginal-cost compression. This strengthens the medium-run disinflationary phase relative to the initial CPI wedge and therefore deepens the spot-forward reversal.

Introducing sluggish pass-through in final consumption goods ($\chi > 0$) primarily reshapes the *timing* of the CPI wedge and, through it, the timing of the policy response. By spreading the CPI impulse over several quarters, incomplete pass-through can either attenuate or reinforce the reversal depending on whether it amplifies the persistence of restrictive policy and the associated real contraction. Consistent with Section 5.4, incomplete pass-through is not the sole driver of the reversal, but it interacts with inertia to affect how strongly the medium-run channel dominates.

Symmetric retaliation generates the largest drop in the correlation. In the model, retaliation amplifies the contractionary component of tariff shocks by weakening external demand and undoing part of the unilateral terms-of-trade advantage. The deeper and more persistent decline implies stronger marginal-cost compression and hence a stronger medium-run disinflationary force, making the spot-forward divergence more pronounced.

Overall, these stochastic simulations reinforce our main message. The reversal in the spot-forward correlation does not require a change in model structure or in monetary-policy design. Rather, once tariff shocks become sufficiently volatile and persistent relative to standard productivity disturbances, the model predicts a sharp decline in the spot-forward correlation, with the magnitude of the decline governed by the interaction of policy inertia, pass-through dynamics, and (when present/priced) retaliation.

5.8 Taking Stock

Following tariff news in 2025, near-term inflation expectations rose while one-year-ahead forward expectations declined, and the unconditional correlation between the two turned negative. The question is therefore not whether tariffs raise short-run inflation – they do – but under what conditions they can simultaneously depress inflation at medium horizons.

In a stripped-down New Keynesian environment with full pass-through, no policy inertia, and a conventional quarterly inflation target, a permanent tariff increase behaves essentially as a one-time price-level shock. CPI inflation rises mechanically through the import wedge, but producer-price inflation is quickly stabilized and year-on-year inflation does not exhibit a meaningful reversal. Such a framework cannot generate a negative co-movement between spot and forward inflation rates. If this were the correct model that markets have in mind to price future inflation, the observed correlation should remain non-negative.

When monetary policy targets year-on-year CPI inflation, the tariff-induced spike propagates into the policy rule through an annual measure that mechanically embeds past inflation. This feature generates a delayed tightening relative to the quarterly benchmark. The resulting contraction in output reduces marginal cost and produces a subsequent disinflationary phase. Targeting year-on-year inflation therefore opens the door to a reversal in the path of annual inflation – a necessary condition to flip the term structure of inflation.

While the target horizon is necessary, it is not sufficient. Without interest-rate smoothing, the tightening response is short-lived, and the contraction in activity fades quickly. Monetary-policy inertia fundamentally changes the timing. By committing the central bank to a more persistent restrictive stance, inertia prolongs the decline in output and sustains marginal-cost compression. This amplifies the medium-run disinflationary phase relative to the initial CPI spike. Quantitatively, inertia is the key force transforming a modest reversal into one strong enough to generate a negative spot-forward correlation.

Other mechanisms reinforce, but do not overturn, this logic. Incomplete pass-through in final goods spreads the CPI impulse over time, acting as a form of private-sector inertia that complements policy persistence. Retaliation strengthens the contraction in activity and deepens the marginal-cost channel. These mechanisms amplify the reversal when policy is inertial, but on their own they do not generate it. Intermediate-goods pass-through, by contrast, is quantitatively small in the calibrated economy.

The sensitivity analysis shows that the negative spot-forward correlation does not hinge on trade elasticities, trade shares, or moderate deviations from full pass-through. Instead, the three essential ingredients are: (i) sufficiently elastic labor supply (so that output contracts meaningfully), (ii) sufficiently persistent inflation dynamics (so that marginal-cost compression translates into sustained disinflation), and (iii) sufficiently inertial monetary policy (so that the contraction is prolonged). When these conditions hold and tariff shocks are sufficiently persistent, the medium-run marginal-cost compression dominates the initial CPI wedge, producing a decline in forward inflation expectations even as spot inflation rises.

Overall, the results imply that the 2025 reversal in inflation expectations cannot be rationalized by the mechanical price-level effect of tariffs alone. It requires agents to internalize a policy-induced reduction in economic activity following the initial inflation spike. In this sense, the negative spot-forward correlation is not evidence that markets viewed tariffs as transitory, but rather that they anticipated a sufficiently persistent monetary tightening and real contraction to reverse inflation beyond the first year.

The quantitative framework therefore reconciles the empirical evidence with standard monetary transmission: tariffs raise near-term inflation through import prices, but – under year-on-year targeting and policy inertia – they also induce a sustained contraction that depresses inflation at medium horizons.

5.9 Alternative supply-side interpretations

Our preferred interpretation of the negative conditional correlation between spot and forward inflation is rooted in a contractionary mechanism: tariff shocks raise near-term inflation through the CPI wedge, while the combination of year-on-year CPI targeting, policy inertia, and persistent tariffs generates a medium-run compression of marginal costs via weaker activity. In this sense, the medium-run disinflation in the model is not the result of a "positive" supply shock, but rather of a policy-induced demand slowdown interacting with nominal rigidities and the open-economy structure.

It is natural to ask whether a decline in inflation expectations beyond one year could instead arise from genuinely favorable supply developments triggered by tariffs. In richer environments, one could construct such mechanisms. For example, tariffs might induce a reallocation of production toward more productive domestic firms, generate learning-by-doing or scale effects in protected sectors, or spur innovation that reduces dependence on imported inputs. Over time, these forces could shift the marginal-cost schedule downward, lowering inflation at horizons beyond one year even in the absence of a pronounced contraction in demand. Similarly, changes in market structure caused by reshoring or higher domestic content could compress markups and reduce prices for a given path of costs.

Our framework abstracts from these channels by design. We model tariffs as exogenous wedges on import prices in a representative small open economy with a single composite sector, exogenous productivity, and fixed markup structure. Within this environment, tariffs are unambiguously cost-push disturbances, and the only way to generate lower medium-run inflation after an initial spike is through the interaction of monetary policy, nominal rigidities, and external adjustment. Embedding endogenous productivity, sectoral heterogeneity, or markup dynamics would be required to formally analyze a "positive supply" interpretation. We view this as a promising avenue for future work, but complementary to the main message of this paper: under a realistic monetary-policy regime, tariff shocks can themselves generate a twist in the term structure of inflation expectations, even in the absence of medium-run supply gains.

6 Conclusion

We have documented a novel configuration of the inflation term structure during the 2025 tariff episodes: near-term inflation compensation rose while one-year-ahead forward inflation fell, driving the correlation between these horizons into negative territory for the first time in the historical sample. An event study based on narrative and quantitative news measures shows that a small set of high-intensity tariff episodes accounts for most of this twist, and survey data confirm that it reflects genuine revisions in expected inflation rather than changes in risk premia.

Standard open-economy New Keynesian models with tariffs, in which tariff hikes primarily act as one-off price-level shocks, predict positive co-movement across horizons and cannot reproduce this configuration. To address the gap, we developed a small open-economy model with imported intermediates, incomplete and sluggish pass-through, and monetary policy that follows an inertial Taylor rule targeting year-on-year CPI inflation. In this environment, tariff shocks operate through both a mechanical CPI wedge and a contractionary channel working via output, marginal costs, and producer-price inflation.

Our quantitative analysis highlights three conditions under which tariff shocks generate a negative conditional correlation between spot and forward inflation: a year-on-year CPI target, substantial policy inertia, and highly persistent tariffs. When these ingredients are present, the policy-induced medium-run disinflation more than offsets the initial CPI impulse at annual horizons, even though spot year-on-year inflation rises on impact. The model can thus reconcile the negative conditional correlation observed in 2025 with a positive unconditional correlation driven by a mixture of tariff and productivity shocks.

These findings imply that the horizon of the inflation target and the degree of policy inertia could be central for understanding how trade shocks are priced across maturities. They also suggest that the 2025 twist in the inflation term structure could be interpreted as evidence that markets may have anticipated a persistent, contractionary policy response to tariff hikes. Future work could extend our framework to richer financial structures, endogenous tariff setting, and alternative policy regimes, and could explore whether similar mechanisms have operated in other episodes where trade policy has been a first-order macroeconomic driver.

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Appendix

A Tariff News Developments

This appendix provides additional detail on the tariff news developments that underlie our event-study analysis. We describe our two-stage narrative classification procedure, summarize the sequence of major tariff announcements and reversals in 2025, and present the formal econometric results mapping these events to the term structure of inflation.

A.1 Narrative classification and news intensity

Our event identification employs a two-stage process combining computational text analysis with manual verification. For each of the 206 trading days between January 17 and October 31, 2025, we classify the prevailing trade-policy narrative into three mutually exclusive categories: (i) *Trade Tension* days, defined by the announcement of new tariffs, the escalation of existing levies, or a breakdown in trade negotiations; (ii) *Trade Alleviation* days, defined by the reduction, suspension, or postponement of tariffs, or credible reports of progress in trade talks; and (iii) *Non-Event* days, where trade policy does not feature prominently in market commentary.

We further refine this classification by assigning an intensity level to each event. Days are classified as *Major intensity* when trade policy was the primary driver of market movements, and *Moderate intensity* when trade policy was one of several important factors influencing markets. Days where tariff news was merely mentioned in passing or clearly secondary to other developments are relegated to the *Non-Event* sample.

Stage 1: Computational Identification. We use a large language model to parse daily market commentary from sources spanning January 17 to October 31, 2025. The model flagged days containing content related to tariffs, trade negotiations, Section 301/232 actions, and retaliatory measures, extracting the relevant text. This initial screening identified 175 days with trade-related keywords, including 47 potential Trade Tension days, 46 Trade Alleviation days, and 82 days with mixed or minor signals.

Stage 2: Manual Verification and Refinement. We manually verified all 175 flagged days against the original source documents and broader market context. This verification process is crucial to ensuring that classifications reflect actual market-moving events rather than mere keyword matches or routine trade-policy mentions. Days were reclassified or excluded if: (i) the event represented the routine implementation of previously priced policies rather than an information shock; (ii) offsetting tension and alleviation signals occurred within the same day; or (iii) the primary market driver was a major macroeconomic data release (e.g., CPI or NFP).[16]

[16] While these data prints often reveal the realized economic effects of tariffs, we exclude them because they do not represent a new policy implementation or a development in trade negotiations. Consequently, by restricting our sample solely to pure policy-news shocks, our methodology provides a conservative, lower-bound estimate of the true cumulative impact of trade policy on the term structure.

This manual filtering restricts the final sample to 46 confirmed event days: 25 Trade Tension days and 21 Trade Alleviation days. The relatively small number of event days confirms that our identification strategy successfully isolates high-salience trade shocks rather than capturing diffuse background noise. As detailed in Section 3.3, this classification strongly aligns with local maxima in Bloomberg News Trends story counts (Figure 4).

A.2 Chronology of tariff episodes in 2025

This section briefly recounts the main tariff-related episodes in 2025 that drive our results. The goal is not to provide an exhaustive narrative of all trade-policy developments, but rather to document the timing and nature of the largest shocks.

Early-year positioning (January–March). The first quarter of 2025 was characterized by rising rhetoric and incremental policy moves that set the stage for later escalations. Several Trade Tension days in February and March correspond to announcements of investigations, the publication of tariff schedules, and the introduction of targeted levies on specific product categories. While these early actions generated modest increases in the one-year inflation swap rate, the accompanying movements in the one-year-ahead forward rate were relatively muted, and the correlation between the two horizons remained positive over this window.

Liberation Day announcement and escalation (April). The most prominent episode occurs around the so-called Liberation Day announcement in early April, when a broad-based package of tariffs on consumer and intermediate goods was unveiled. This announcement marks one of the largest spikes in tariff-related news intensity in our sample and is classified as a Trade Tension day. As documented in Section 3, the one-year inflation swap rate surged over a narrow window surrounding this announcement, while the one-year-ahead forward rate experienced a corresponding collapse. Subsequent clarifications, implementation details, and discussions of potential retaliation generated additional Trade Tension days later in April, reinforcing the pattern of rising near-term inflation compensation and falling medium-term expectations.

Retaliation and negotiation phases (May–August). In the months following the Liberation Day tariffs, foreign trading partners announced a series of retaliatory measures and counter-tariffs, which we classify as Trade Tension days. These episodes generally coincided with renewed increases in the one-year swap rate and further compression of the one-year-ahead forward rate, consistent with markets pricing both higher near-term price pressures and a more pronounced medium-run contraction. At the same time, intermittent signs of negotiation progress and temporary suspensions of specific tariff lines generated Trade Alleviation days. On these days, the one-year swap rate typically declined, while the one-year-ahead forward rate recovered part of its earlier losses, partially reversing the twist in the term structure.

Late-year de-escalation and policy guidance (September–October). By early autumn, a tentative de-escalation of the trade conflict emerged, with announced rollbacks of selected tariffs and renewed commitments to negotiating frameworks. These developments are reflected in a cluster of Trade Alleviation days in September and October. The associated moves in the inflation term structure are characterized by modest declines in the one-year swap rate and increases in the forward rate, bringing the correlation between the two horizons closer to its historical positive range, although not fully restoring it to pre-2025 levels. Around the same time, central-bank communications began to emphasize the conditional nature of policy responses to trade shocks, which appears to have stabilized medium-term inflation expectations.

A.3 Event-study statistics for inflation swaps

Table 2 formalizes the descriptive statistics presented in the main text by estimating an ordinary least squares (OLS) regression of daily divergence on our Trade Tension and Trade Alleviation indicators. To correct for heteroskedasticity and autocorrelation inherent in daily financial time series, all standard errors are estimated using the Newey-West HAC estimator with 5 lags.

	Coefficient	Std. Error	t-value	p-value
Panel A: Basic Specification				
Intercept	-0.11	0.33	-0.33	0.741
Trade Tension	$+5.33^{***}$	1.47	3.63	< 0.001
Trade Alleviation	-4.09^{***}	1.52	-2.68	0.008
Adj. $R^2 = 0.178$, $N = 206$				
Panel B: Intensity Interaction (Trade Days Only)				
Intercept (Major Alleviation)	-5.69^{**}	2.53	-2.24	0.030
Tension (Relative to Alleviation)	$+14.71^{***}$	3.66	4.02	< 0.001
Moderate (Relative to Major)	$+3.46$	2.64	1.31	0.197
Tension $\times$ Moderate Interaction	-9.40^{**}	3.98	-2.36	0.023
Adj. $R^2 = 0.373$, $N = 46$				

Table 2: **Event-Study Regressions – Divergence and Trade News**

Note: Dependent variable is divergence (Δ1Y $-$ Δ1Y1Y) in basis points. Standard errors are Newey-West HAC with 5 lags. Panel A includes all 206 trading days (Jan 17 - Oct 31, 2025). Panel B restricts to the 46 trade event days. Major intensity indicates trade policy was the primary market driver; Moderate indicates one of several important factors. Durbin-Watson statistic: 1.92 (p=0.27); Breusch-Godfrey LM test (5 lags): 9.75 (p=0.08). $^{**}p < 0.05$, $^{***}p < 0.01$.

The regression results confirm that the divergence effect is statistically significant and concentrated in high-intensity events. As shown in Panel B, Major Trade Tension days generate an average divergence of $+9.02$ basis points (the sum of the intercept and the Major Tension coefficient), while Major Trade Alleviation days average -5.69 basis points. The statistically significant interaction term (-9.40^{**}) confirms the presence of a strong intensity gradient. Finally, post-estimation diagnostic tests (Durbin-Watson and Breusch-Godfrey) confirm no significant residual autocorrelation, validating the robust error specification.

A.4 Relation to the model

The chronology and event-study evidence documented here provide the empirical foundation for the tariff shock processes we introduce in our theoretical framework. In our quantitative exercises, we calibrate the size and persistence of tariff shocks to match the structural divergence identified in our event-study regression (Table 2).

By anchoring our calibration to the isolated basis-point impact of Major Trade Tension and Alleviation days, controlling for coincident macroeconomic noise via our HAC specification, we ensure the model accurately reflects the market's pricing of trade policy. The model then generates the corresponding responses of year-on-year CPI inflation, output, and the one-year-ahead forward inflation rate under different monetary-policy regimes and pass-through assumptions. The robust term-structure twist we isolate in the 2025 data confirms that it is appropriate to interpret this divergence primarily as a tariff-driven phenomenon, rather than a generic aggregate demand or supply disturbance, directly motivating our focus on trade frictions in Section 4.

B Linearized Model

The model is linearized around a deterministic steady state with constant tariffs $(\bar{\tau}, \bar{\tau}^*)$, constant foreign variables, and zero steady-state inflation ($\bar{\Pi} = \bar{\Pi}_H = 1$). For any variable Z_t, define log deviations

$$\hat{z}_t \equiv \log\left(\frac{Z_t}{\bar{Z}}\right).$$

B.1 Inflation objects

CPI and producer-price inflation (to first order) are

$$\pi_t \equiv \widehat{\Pi}_t \simeq \hat{p}_t - \hat{p}_{t-1}, \qquad \pi_{H,t} \equiv \widehat{\Pi}_{H,t} \simeq \hat{p}_{H,t} - \hat{p}_{H,t-1}. \tag{B.1}$$

B.2 Tariff wedges

We work with log deviations of *gross* tariff factors:

$$\hat{\tau}_t \equiv \log\left(\frac{1+\tau_t}{1+\bar{\tau}}\right), \qquad \hat{\tau}_t^* \equiv \log\left(\frac{1+\tau_t^*}{1+\bar{\tau}^*}\right). \tag{B.2}$$

This convention is convenient because the border price is proportional to $(1+\tau_t)$ and retaliation scales the foreign-currency buyer price of Home goods by $(1+\tau_t^*)$.

B.3 SOE and relative prices with balanced trade

Assume $\hat{p}_t^* = 0$ since the Home economy is small.

Terms of trade and the border relative price. Define the (log) terms of trade as the Home-good price in foreign currency:

$$\hat{t}_t \equiv \hat{s}_t - \hat{p}_{H,t}. \tag{B.3}$$

With $P_t^F = (1+\tau_t)S_t P_t^*$ and $\hat{p}_t^* = 0$, the log border price is $\hat{p}_t^F = \hat{\tau}_t + \hat{s}_t$. Define the *border relative price* (border price relative to $P_{H,t}$):

$$\hat{b}_t \equiv \hat{p}_t^F - \hat{p}_{H,t} = \hat{\tau}_t + \hat{t}_t. \tag{B.4}$$

Hence, under balanced trade, the external adjustment operates through $\hat{t}_t$ (equivalently through $\hat{b}_t$ once $\hat{\tau}_t$ is given).

Relative-price states. Define the relative price of effective final imports and the relative price of effective imported inputs, both relative to the Home-good price:

$$\hat{q}_t^f \equiv \hat{p}_{M,t} - \hat{p}_{H,t}, \qquad \hat{q}_t^x \equiv \hat{p}_{M,t}^x - \hat{p}_{H,t}. \tag{B.5}$$

From the linearized CPI index, the CPI–PPI wedge is

$$\hat{p}_t - \hat{p}_{H,t} = \omega \hat{q}_t^f, \tag{B.6}$$

where $\omega \in (0,1)$ is the steady-state share of (effective) imports in the CPI basket. A useful corollary is $\hat{p}_{M,t} - \hat{p}_t = (1-\omega)\hat{q}_t^f$.

Sluggish pass-through in relative prices. Log-linearizing the sluggish-import price recursions for final goods (Equation (6)) and for intermediate goods (Equation (18)) and expressing them in relative terms yields:

$$\hat{q}_t^f = (1-\chi)\hat{b}_t + \chi \hat{q}_{t-1}^f - \chi \pi_{H,t}, \tag{B.7}$$
$$\hat{q}_t^x = (1-\chi_x)\hat{b}_t + \chi_x \hat{q}_{t-1}^x - \chi_x \pi_{H,t}, \tag{B.8}$$

where $\chi \in [0,1)$ and $\chi_x \in [0,1)$ are the weights of sluggish imports in the CES bundles. The term $-\chi\pi_{H,t}$ reflects that lagged effective import prices are predetermined in *levels* while the benchmark for relative prices is the contemporaneous Home-good price.

Equations (B.7)-(B.8) show that the two import wedges are ultimately driven by the single relative price $\hat{b}_t$ (the border price relative to the Home-good price), plus their own internal state components (lags) and domestic inflation $\pi_{H,t}$. In particular, when $\chi = \chi_x = 0$ (full pass-through), both wedges move one-for-one with $\hat{b}_t$ (up to the scaling in (B.7) induced by the CPI aggregator).

CPI inflation. Using $\hat{p}_t = \hat{p}_{H,t} + \omega \hat{q}_t^f$, CPI inflation satisfies

$$\pi_t = \pi_{H,t} + \omega(\hat{q}_t^f - \hat{q}_{t-1}^f). \tag{B.9}$$

Thus the entire CPI pass-through channel is summarized by the single variable $\hat{q}_t^f$, while $\hat{q}_t^x$ matters primarily through marginal costs.

B.4 Exports, competitiveness, and retaliation

A minimal CES foreign-demand schedule with retaliation is

$$\hat{x}_t^{\text{exp}} = \eta_e(\hat{t}_t - \hat{\tau}_t^*), \tag{B.10}$$

where $\eta_e > 0$ is the foreign price (trade) elasticity for Home exports and, recall, $\hat{x}_t^* = 0$ and therefore neglected here. Retaliation affects exports only through $\hat{\tau}_t^*$ and is scaled by η_e, the Foreign trade elasticity.

B.5 Domestic demands and gross-output market clearing

Domestic final demand for Home goods. From CES final-demand allocation:

$$\hat{c}_{H,t} = \hat{c}_t - \eta(\hat{p}_{H,t} - \hat{p}_t) = \hat{c}_t + \eta\omega\hat{q}_t^f, \tag{B.11}$$

where $\eta > 1$ is the substitution elasticity between Home and imported final goods.

Domestic intermediate demand for Home goods. The intermediate price index implies $\hat{p}_{X,t} - \hat{p}_{H,t} = \omega_x\hat{q}_t^x$, with $\omega_x \in (0,1)$ the steady-state share of imported inputs in the intermediate bundle. CES input demand then gives (up to a constant) $\hat{x}_{H,t} \approx \hat{x}_t + \eta_x\omega_x\hat{q}_t^x$, where $\eta_x > 1$ is the substitution elasticity between Home and imported intermediate inputs. To keep the quantity block parsimonious, we adopt the first-order approximation consistent with Cobb–Douglas production and constant cost shares:

$$\hat{x}_t \approx \hat{y}_t \quad \Rightarrow \quad \hat{x}_{H,t} \approx \hat{y}_t + \eta_x\omega_x\hat{q}_t^x. \tag{B.12}$$

Gross-output market clearing. Let $(\gamma_c, \gamma_x, \gamma_e)$ denote the steady-state shares of Home-good absorption going to domestic final demand, domestic intermediate demand, and exports, with $\gamma_c + \gamma_x + \gamma_e = 1$. Gross-output market clearing linearizes to:

$$\hat{y}_t = \gamma_c\hat{c}_{H,t} + \gamma_x\hat{x}_{H,t} + \gamma_e\hat{x}_t^{\text{exp}}. \tag{B.13}$$

Substituting Equations (B.11), (B.12), and (B.10) yields:

$$\hat{y}_t = \alpha_c\hat{c}_t + \alpha_f\hat{q}_t^f + \alpha_x\hat{q}_t^x + \alpha_t(\hat{t}_t - \hat{\tau}_t^*), \tag{B.14}$$

where the composite coefficients are:

$$\alpha_c \equiv \frac{\gamma_c}{1-\gamma_x}, \quad \alpha_f \equiv \frac{\omega\gamma_c\eta}{1-\gamma_x}, \quad \alpha_x \equiv \frac{\gamma_x\eta_x\omega_x}{1-\gamma_x}, \quad \alpha_t \equiv \frac{\gamma_e\eta_e}{1-\gamma_x}. \tag{B.15}$$

B.6 Balanced-trade

We close the SOE with balanced trade each period. We assume that the foreign demand shifter is constant and normalized so that, in steady state, *foreign absorption matches Home absorption* (per capita),

$$\bar{X}^* \equiv \bar{C} + \bar{X},$$

so that steady-state trade shares are pinned down by the domestic absorption decomposition $(\gamma_c, \gamma_x, \gamma_e)$ used in (B.13). Under this normalization, balanced trade implies that (i) export receipts equal import payments at world prices, and (ii) the relative composition of border imports between final and intermediate uses is governed by the same steady-state absorption weights.

Border import volumes. From the sluggish-import demand (7), log-linear border purchases of final imports satisfy:

$$\hat{\tilde{c}}_{M,t} = \hat{c}_{M,t} - \nu(\hat{p}_t^F - \hat{p}_{M,t}) = \hat{c}_{M,t} - \nu(\hat{b}_t - \hat{q}_t^f), \tag{B.16}$$

where we used $\hat{p}_t^F - \hat{p}_{M,t} = (\hat{p}_t^F - \hat{p}_{H,t}) - (\hat{p}_{M,t} - \hat{p}_{H,t}) = \hat{b}_t - \hat{q}_t^f$. From CES final-good demand (9) and Equation (B.6),

$$\hat{c}_{M,t} = \hat{c}_t - \eta(\hat{p}_{M,t} - \hat{p}_t) = \hat{c}_t - \eta(1-\omega)\hat{q}_t^f. \tag{B.17}$$

Combining Equations (B.16)-(B.17) gives border purchases of final imports in terms of $(\hat{c}_t, \hat{b}_t, \hat{q}_t^f)$:

$$\hat{\tilde{c}}_{M,t} = \hat{c}_t - \eta(1-\omega)\hat{q}_t^f - \nu(\hat{b}_t - \hat{q}_t^f). \tag{B.18}$$

Similarly, for imported intermediates, Equation (19) implies:

$$\hat{\tilde{x}}_{M,t} = \hat{x}_{M,t} - \nu_x(\hat{b}_t - \hat{q}_t^x), \tag{B.19}$$

and from intermediate CES demand (using $\hat{x}_t \simeq \hat{y}_t$),

$$\hat{x}_{M,t} = \hat{x}_t - \eta_x(\hat{p}_{M,t}^x - \hat{p}_{X,t}) \simeq \hat{y}_t - \eta_x(1-\omega_x)\hat{q}_t^x, \tag{B.20}$$

so that:

$$\hat{\tilde{x}}_{M,t} \simeq \hat{y}_t - \eta_x(1-\omega_x)\hat{q}_t^x - \nu_x(\hat{b}_t - \hat{q}_t^x). \tag{B.21}$$

Balanced trade. Let border imports be $\widetilde{M}_t \equiv \widetilde{C}_{M,t} + \widetilde{X}_{M,t}$ (aggregating across firms). In log-linear form:

$$\hat{\tilde{m}}_t = \mu_c \hat{\tilde{c}}_{M,t} + \mu_x \hat{\tilde{x}}_{M,t}, \qquad \mu_c \equiv \frac{\gamma_c}{\gamma_c + \gamma_x}, \quad \mu_x \equiv \frac{\gamma_x}{\gamma_c + \gamma_x}, \tag{B.22}$$

so that the relative weight of final versus intermediate border imports is pinned down by (γ_c, γ_x) under the normalization $\bar{X}^* = \bar{C} + \bar{X}$.

Balanced trade equates export receipts and import payments at world prices. Using $P_t^* = 1$ in log deviations and the definition of terms of trade, the condition is:

$$\begin{aligned}(\eta_e - 1)\hat{t}_t - \eta_e \hat{\tau}_t^* \quad &= \quad \mu_c(\hat{c}_t - (\eta(1-\omega) - \nu)\hat{q}_t^f - \nu\hat{b}_t) \\ &+ \quad \mu_x(\hat{y}_t - (\eta_x(1-\omega_x) - \nu_x)\hat{q}_t^x - \nu_x\hat{b}_t).\end{aligned} \tag{B.23}$$

This equation pins down $\hat{t}_t$ as a function of domestic absorption $(\hat{c}_t, \hat{y}_t)$ and the import-price wedges $(\hat{q}_t^f, \hat{q}_t^x)$.

B.7 Macro block: IS, marginal cost, Phillips curve, policy

IS (Euler equation). Linearizing Equation (12) yields:

$$\hat{c}_t = \mathbb{E}_t\hat{c}_{t+1} - \frac{1}{\sigma}(\hat{i}_t - \mathbb{E}_t\pi_{t+1}), \tag{B.24}$$

where $\hat{i}_t \equiv \log(R_t/\bar{R})$ and π_{t+1} is given by Equation (B.9).

Marginal cost. From cost minimization under Cobb-Douglas production (14) with intermediate composite X_t, the log-linear real marginal cost (in units of $P_{H,t}$) satisfies, up to an irrelevant constant:

$$\hat{mc}_t = (1-\alpha)\big(\hat{w}_t - \hat{p}_{H,t}\big) + \alpha\big(\hat{p}_{X,t} - \hat{p}_{H,t}\big) - \hat{a}_t. \tag{B.25}$$

Using (i) labor supply $\hat{w}_t - \hat{p}_t = \sigma\hat{c}_t + \psi\hat{n}_t$, (ii) the CPI-PPI wedge $\hat{p}_t - \hat{p}_{H,t} = \omega\hat{q}_t^f$ from Equation (B.6), and (iii) the input-price wedge $\hat{p}_{X,t} - \hat{p}_{H,t} = \omega_x\hat{q}_t^x$, we get:

$$\hat{mc}_t = (1-\alpha)\sigma\hat{c}_t + (1-\alpha)\psi\hat{n}_t + (1-\alpha)\omega\hat{q}_t^f + \alpha\omega_x\hat{q}_t^x - \hat{a}_t. \tag{B.26}$$

To eliminate labor, we use the same parsimonious approximation as in the gross-output reduction: $\hat{x}_t \approx \hat{y}_t$. The production function then implies:

$$\hat{y}_t = \hat{a}_t + (1-\alpha)\hat{n}_t + \alpha\hat{x}_t \approx \hat{a}_t + (1-\alpha)\hat{n}_t + \alpha\hat{y}_t \quad \Rightarrow \quad \hat{n}_t \approx \frac{\hat{y}_t - \hat{a}_t}{1-\alpha}.$$

Substituting in Equation (B.26) yields the explicit wedge representation:

$$\hat{mc}_t = \psi\hat{y}_t + (1-\alpha)(\sigma\hat{c}_t + \omega\hat{q}_t^f) + \alpha\omega_x\hat{q}_t^x - (1+\psi)\hat{a}_t. \tag{B.27}$$

Phillips curve. With Rotemberg adjustment costs and a steady state with zero inflation (and the usual production subsidy removing the steady-state markup distortion), the first-order NKPC is:

$$\pi_{H,t} = \beta\mathbb{E}_t\pi_{H,t+1} + \frac{\epsilon-1}{\kappa}\,\hat{mc}_t, \tag{B.28}$$

where $\epsilon > 1$ is the elasticity of substitution across varieties and $\kappa > 0$ governs price adjustment costs.

Policy rule. Linearizing Equation (28) yields:

$$\hat{i}_t = \rho_R\hat{i}_{t-1} + (1-\rho_R)\phi_\pi\pi_{Y,t}, \tag{B.29}$$

where $\rho_R \in [0,1)$ captures interest-rate smoothing, $\pi_{Y,t} = \sum_0^3 \pi_{t-s}$ and ϕ_π is the inflation feedback coefficient.

Model summary Using the definition of the border relative price $\hat{b}_t \equiv \hat{\tau}_t + \hat{t}_t$, the reduced system is expressed in:

$$\{\hat{c}_t,\ \hat{y}_t,\ \pi_{H,t},\ \pi_t,\ \hat{mc}_t,\ \hat{i}_t,\ \hat{q}_t^f,\ \hat{q}_t^x,\ \hat{t}_t\},$$

with exogenous processes for $\{\hat{\tau}_t, \hat{\tau}_t^*, \hat{a}_t\}$ and $\hat{p}_t^* = \hat{x}_t^* = 0$.

$$\text{Euler:} \qquad \hat{c}_t = \mathbb{E}_t \hat{c}_{t+1} - \frac{1}{\sigma}(\hat{i}_t - \mathbb{E}_t \pi_{t+1}), \tag{B.30}$$

$$\text{NKPC:} \qquad \pi_{H,t} = \beta \mathbb{E}_t \pi_{H,t+1} + \frac{\epsilon - 1}{\kappa} \hat{mc}_t, \tag{B.31}$$

$$\text{Marg. cost:} \qquad \hat{mc}_t = \psi \hat{y}_t + (1-\alpha)(\sigma \hat{c}_t + \omega \hat{q}_t^f) + \alpha \omega_x \hat{q}_t^x - (1+\psi)\hat{a}_t, \tag{B.32}$$

$$\text{Policy:} \qquad \hat{i}_t = \rho_R \hat{i}_{t-1} + (1-\rho_R)\left(\phi_\pi \sum_0^3 \pi_{t-s}\right), \tag{B.33}$$

$$\text{CPI infl.:} \qquad \pi_t = \pi_{H,t} + \omega(\hat{q}_t^f - \hat{q}_{t-1}^f), \tag{B.34}$$

$$\text{Final wedge:} \qquad \hat{q}_t^f = (1-\chi)(\hat{\tau}_t + \hat{t}_t) + \chi \hat{q}_{t-1}^f - \chi \pi_{H,t}, \tag{B.35}$$

$$\text{Int. wedge:} \qquad \hat{q}_t^x = (1-\chi_x)(\hat{\tau}_t + \hat{t}_t) + \chi_x \hat{q}_{t-1}^x - \chi_x \pi_{H,t}, \tag{B.36}$$

$$\text{Gross out.:} \qquad \hat{y}_t = \alpha_c \hat{c}_t + \alpha_f \hat{q}_t^f + \alpha_x \hat{q}_t^x + \alpha_t(\hat{t}_t - \hat{\tau}_t^*), \tag{B.37}$$

$$\begin{aligned} \text{Bal. trade:} \qquad (\eta_e - 1)\hat{t}_t &= \eta_e \hat{\tau}_t^* + \mu_c\Big(\hat{c}_t - \big[\eta(1-\omega) - \nu\big]\hat{q}_t^f - \nu(\hat{\tau}_t + \hat{t}_t)\Big) \\ &\quad + \mu_x\Big(\hat{y}_t - \big[\eta_x(1-\omega_x) - \nu_x\big]\hat{q}_t^x - \nu_x(\hat{\tau}_t + \hat{t}_t)\Big). \end{aligned} \tag{B.38}$$

Here σ is the relative risk-aversion parameter, ψ the inverse of the Frisch elasticity, and the NKPC slope depends on the usual cross-variety elasticity ϵ and the Rotemberg parameter κ. Parameter α is the share of intermediate goods in production, ω and ω_x are the final and intermediate import shares, χ, χ_x, ν and ν_x are the pass-through parameters (full pass-through when $\chi = \chi_x = 0$). Composite parameters:

$$\alpha_c = \frac{\gamma_c}{1-\gamma_x}, \quad \alpha_f = \frac{\omega \gamma_c \eta}{1-\gamma_x}, \quad \alpha_x = \frac{\gamma_x \eta_x \omega_x}{1-\gamma_x}, \quad \alpha_t = \frac{\gamma_e \eta_e}{1-\gamma_x}$$

are the gross-output parameters with $(\gamma_c, \gamma_x, \gamma_e)$ the steady-state absorption shares (domestic final, domestic intermediate, exports, see below), η is the final-goods trade elasticity, η_x the input-trade elasticity, and η_e the foreign demand elasticity for exports. Parameters μ_c and μ_x are the steady-state shares of border imports used for final absorption and intermediate inputs, $\mu_c + \mu_x = 1$ (see below).

We consider the following steady-state normalizations: $\bar{\tau} = \bar{\tau}^* = 0$, $S = 1$, $P^* = 1$, and $A = 1$, which imply that all relative prices equal one ($P_H = P = P_M = P_X = P_M^x = 1$) in levels. We choose the labor-disutility parameter so that $N = 1$ in steady state. With the usual production subsidy eliminating the steady-state markup distortion, real marginal cost is normalized and expenditure shares coincide with Cobb-Douglas exponents. The CES bundles then imply:

$$C_H = (1-\omega)C, \qquad C_M = \omega C, \qquad X_H = (1-\omega_x)X, \qquad X_M = \omega_x X.$$

From Cobb-Douglas production, the intermediate expenditure share implies $X/Y = \alpha$. Home-good market clearing, $Y = C_H + X_H + X^{\exp}$, together with balanced trade at world prices, yields the resource constraint $Y = C + X$, hence $C/Y = 1 - \alpha$ and $X/Y = \alpha$.

Therefore the steady-state absorption shares used in the linearized gross-output equation are fully pinned down by deep parameters:

$$\gamma_c \equiv \frac{C_H}{Y} = (1-\omega)(1-\alpha), \quad \gamma_x \equiv \frac{X_H}{Y} = (1-\omega_x)\alpha, \quad \gamma_e \equiv \frac{X^{\exp}}{Y} = \omega(1-\alpha) + \omega_x\alpha.$$

Border imports at world prices are $M = \omega C + \omega_x X$, so the composition shares entering the balanced-trade condition are:

$$\mu_c \equiv \frac{\omega C}{\omega C + \omega_x X} = \frac{\omega(1-\alpha)}{\omega(1-\alpha) + \omega_x \alpha}, \qquad \mu_x \equiv \frac{\omega_x X}{\omega C + \omega_x X} = \frac{\omega_x \alpha}{\omega(1-\alpha) + \omega_x \alpha}.$$

Full pass-through Consider full pass-through, $\chi = \chi_x = 0$. Then Equations (36)-(37) collapse and the effective import-price wedges move one-for-one with the contemporaneous border relative price:

$$\hat{q}_t^f = \hat{q}_t^x = \hat{b}_t, \qquad \hat{b}_t \equiv \hat{\tau}_t + \hat{t}_t.$$

Substituting $\hat{q}_t^f = \hat{q}_t^x = \hat{\tau}_t + \hat{t}_t$ into the general system yields the reduced model in

$$\{\hat{c}_t,\ \hat{y}_t,\ \pi_{H,t},\ \hat{mc}_t,\ \pi_t,\ \hat{i}_t,\ \hat{t}_t\},$$

with exogenous processes for $\{\hat{\tau}_t, \hat{\tau}_t^*, \hat{a}_t\}$ (and $\hat{p}_t^* = \hat{x}_t^* = 0$):

$$\text{Euler:} \qquad \hat{c}_t = \mathbb{E}_t \hat{c}_{t+1} - \frac{1}{\sigma}(\hat{i}_t - \mathbb{E}_t \pi_{t+1}), \tag{B.39}$$

$$\text{NKPC:} \qquad \pi_{H,t} = \beta \mathbb{E}_t \pi_{H,t+1} + \frac{\epsilon - 1}{\kappa}\hat{mc}_t, \tag{B.40}$$

$$\text{Marg. cost:} \qquad \hat{mc}_t = \psi \hat{y}_t + (1-\alpha)\sigma \hat{c}_t + ((1-\alpha)\omega + \alpha\omega_x)(\hat{\tau}_t + \hat{t}_t) - (1+\psi)\hat{a}_t, \tag{B.41}$$

$$\text{Policy:} \qquad \hat{i}_t = \rho_R \hat{i}_{t-1} + (1-\rho_R)\phi_\pi \sum_{s=0}^{3} \pi_{t-s},, \tag{B.42}$$

$$\text{CPI infl.:} \qquad \pi_t = \pi_{H,t} + \omega\Big[(\hat{\tau}_t + \hat{t}_t) - (\hat{\tau}_{t-1} + \hat{t}_{t-1})\Big], \tag{B.43}$$

$$\text{Gross out.:} \qquad \hat{y}_t = \alpha_c \hat{c}_t + (\alpha_f + \alpha_x)(\hat{\tau}_t + \hat{t}_t) + \alpha_t(\hat{t}_t - \hat{\tau}_t^*), \tag{B.44}$$

$$\begin{aligned}\text{Bal. trade:} \quad (\eta_e - 1)\hat{t}_t &= \eta_e \hat{\tau}_t^* + \mu_c\Big(\hat{c}_t - \eta(1-\omega)(\hat{\tau}_t + \hat{t}_t)\Big) \\ &\quad + \mu_x\Big(\hat{y}_t - \eta_x(1-\omega_x)(\hat{\tau}_t + \hat{t}_t)\Big).\end{aligned} \tag{B.45}$$

Under full pass-through, ν and ν_x drop out of the external-balance block because border purchases depend on $(\hat{b}_t - \hat{q}_t)$, which is identically zero when $\hat{q}_t = \hat{b}_t$. Tariffs affect CPI inflation mechanically via $\omega\Delta(\hat{\tau}_t + \hat{t}_t)$ in (B.43), and affect marginal costs and activity through $(\hat{\tau}_t + \hat{t}_t)$ in (B.41)-(B.45).

C Impulse response functions to a positive productivity shock

We report the impulse responses to a one-percent positive innovation to productivity under full pass-through ($\chi = \chi_x = 0$) and monetary-policy inertia ($\rho_R = 0.85$) in Figure 12. The responses display standard New Keynesian open-economy dynamics.

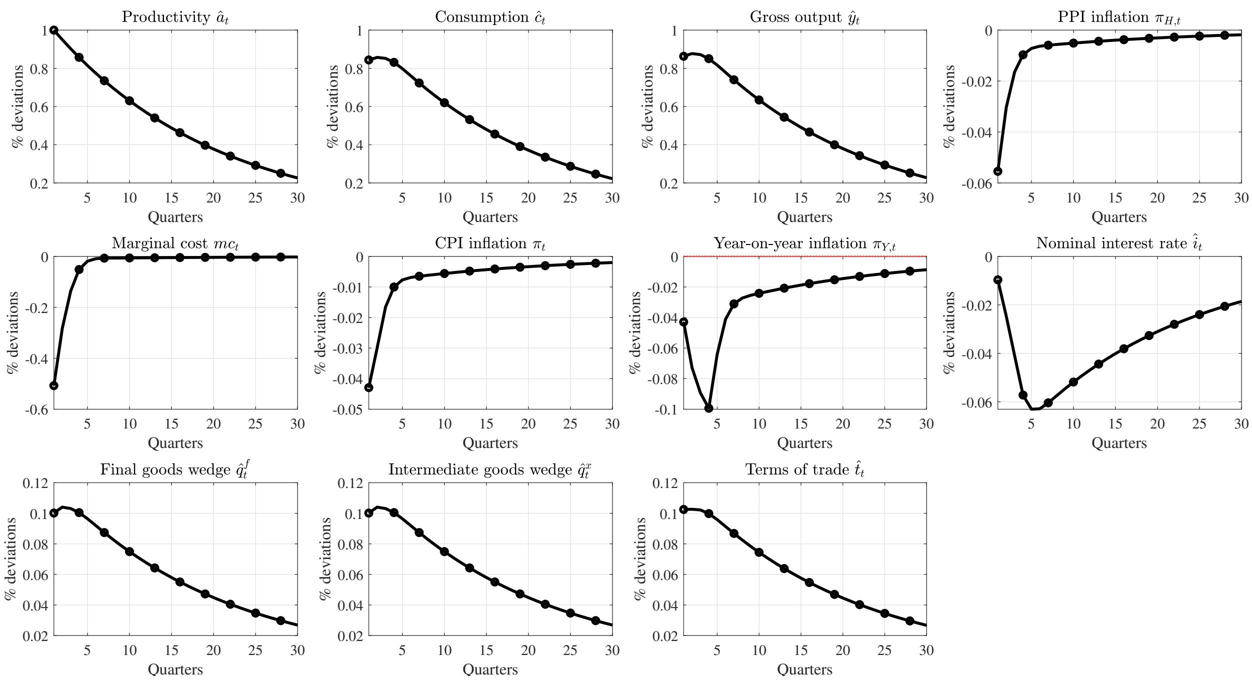

Figure 12: **Impulse response functions to a 1% increase in productivity.**

Real activity. The productivity improvement raises output and consumption on impact. The expansion in output exceeds that of consumption. This reflects two complementary mechanisms. First, higher productivity lowers marginal cost and increases production capacity. Second, relative prices adjust in a way that generates expenditure switching toward Home goods. In our sign convention, the terms of trade and both import wedges increase, corresponding to a depreciation. As Home goods become relatively cheaper in producer terms, demand shifts toward domestic production, amplifying the output response relative to domestic absorption.

Marginal cost and inflation. The decline in marginal cost induces PPI deflation through the Phillips curve. CPI inflation also falls, but by less than PPI inflation. The reason is that the relative price of foreign goods rises following the depreciation, which increases imported inflation and partially offsets domestic deflation in the CPI. As a result, the magnitude of CPI deflation is smaller than that of PPI deflation on impact.

Monetary policy transmission. The fall in inflation triggers a gradual monetary easing under interest-rate inertia. The nominal rate declines persistently, lowering the real interest rate and reinforcing the expansion through intertemporal substitution. This contributes to the sustained increase in output and consumption.

Inflation term structure. Clearly in this set-up spot year-on-year inflation ($\pi_{Y,t}$) and one-year-ahead year-on-year forward inflation decline after a productivity shock. The forward measure responds more gradually, reflecting the persistence induced by monetary-policy inertia and the forward-looking Phillips curve. Importantly, the co-movement between $\pi_{Y,t}$ and $\pi_{\text{forw},t}$ is positive: conditional on a productivity shock, both measures move in the same direction (downward). This provides a useful benchmark when contrasting with the response to tariff shocks, where the sign of the co-movement may differ.