# Import Tariffs and the Systematic Response of Monetary Policy*

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**Abstract**

We estimate the macroeconomic effects of U.S. import tariff shocks, using several distinct tariff measures and identification approaches. We find that tariff shocks reduce output but increase consumer prices. Monetary policy partially accommodates this shock with a transitory policy easing. To quantify the dependence on systematic monetary policy, we construct counterfactuals using identified monetary policy shocks. This avoids specifying a full structural model, making the results robust against model misspecification. When monetary policy strictly stabilizes inflation, the output contraction is 32% larger at the trough. In contrast, strict output stabilization implies a sizable sacrifice of price stability, with the peak inflation effect doubling.

**Keywords:** tariffs, trade, imports, monetary policy, counterfactuals
**JEL Codes:** C32, E31, E32, E52, F14

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# 1 Introduction

What are the macroeconomic effects of tariff shocks? How are these effects shaped by the systematic response of central banks? Partly motivated by the 2025 rise in tariffs by the Trump Administration, a myriad of papers emerged that attempt to answer the above questions, relying on (fully specified) structural models. These papers focus on the business cycle effects of tariffs (e.g., Antonova, Huxel, Matvieiev, and Müller, 2025; Auclert, Rognlie, and Straub, 2025; Kalemi-Özcan, Soylu, and Yildirim, 2025; Costinot and Werning, 2025), the design of tariff policies (e.g., Becko, Grossman, and Helpman, 2025; Dávila, Rodríguez-Clare, Schaab, and Tan, 2025; Itskhoki and Mukhin, 2025; Kocherlakota, 2025), and the optimal monetary policy response to tariff shocks (e.g., Bergin and Corsetti, 2023, 2025; Bianchi and Coulibaly, 2025; Monacelli, 2025; Werning, Lorenzoni, and Guerrieri, 2025).[1] However, there is little empirical evidence on the business cycle effects of tariffs, with Schmitt-Grohé and Uribe (2025) being a noteworthy exception that we discuss below. Moreover, to the best of our knowledge, there is no empirical evidence on how the effects of tariffs are shaped by systematic monetary policy. We fill this gap by estimating the macroeconomic effects of U.S. import tariff shocks and their dependence on the monetary policy response, without relying on a fully specified structural model. This approach follows McKay and Wolf (2023) and is particularly appealing because it is robust against model misspecification.

Our identified tariff shock reduces real activity, increases prices, and is partially accommodated by monetary policy. As alternatives to partial accommodation, we consider counterfactuals featuring a central bank that aims to (i) not respond to the tariff shock, (ii) strictly stabilize prices, or (iii) strictly stabilize real activity. Relating to optimal policy, our counterfactual scenarios map into a loss function that puts a zero weight (iii) on price stabilization, or (ii) on output stabilization, and (i) an intermediate case, where monetary policy "looks through" the shock, as sometimes advocated for supply shocks. As such, our results quantify the policy tradeoff and provide novel data moments to discipline structural models.

[1] Alessandria, Ding, Khan, and Mix (2025) focus on tariff revenues and that enable tax cuts.

We estimate the effects of import tariff shocks using a vector auto-regression (VAR) and quarterly U.S. data from 1990 to 2024. Import tariffs are measured using three distinct approaches, including trade-weighted and unweighted average tariff rates as well as the tariff restrictiveness index from Schmitt-Grohé and Uribe (2025), which also captures cross-sectional tariff variation. The responses are identified via the timing restriction that import tariff shocks affect macroeconomic outcomes with a one-period lag, except for the federal funds rate. We impose this assumption to allow other macroeconomic shocks to impact the import tariff measure through changes in import prices or compositional changes, e.g., in terms of imported product categories and trading partners. Furthermore, we firmly establish that our identifying restrictions are appropriate by considering alternative identification approaches that relax those assumptions. The first alternative adopts the penalty function approach of Uhlig (2005) and the second imposes a block-recursiveness assumption along the lines of Christiano, Eichenbaum, and Evans (2005). Indeed, the unrestricted contemporaneous effects are very close to zero, and the implied dynamic effects hardly change.

We find that a shock that increases the trade-weighted U.S. import tariff rate by 10 percent induces considerable pressure on consumer prices. The CPI inflation rate responds with a delay of 4 quarters and, subsequently, increases continuously to its peak effect at 0.43 percentage points after 11 quarters. The trough of real GDP is at -0.60% and reached after 6 quarters. This confirms the theoretical predictions that U.S. import tariffs are contractionary (Auclert et al., 2025) and act as a supply shock (Werning et al., 2025). Furthermore, we estimate an increase in macroeconomic uncertainty and a decrease in real investment, imports, and exports. The terms of trade improve, albeit with a delay. We obtain similar results when considering the above-mentioned alternative import tariff measures.

Monetary policy partially accommodates the tariff shock with a temporary easing, potentially contributing to the inflationary pressure while cushioning the decline in output. Interestingly, such partial accommodation can be the optimal response to an import tariff shock (e.g., Bergin and Corsetti, 2025; Bianchi and Coulibaly, 2025; Monacelli, 2025; Werning et al., 2025). The finding of partial accommodation raises several questions. How much of the inflation is genuinely caused by the tariff hike, and how much is due to the monetary easing? Similarly, how much output must be sacrificed to fully stabilize prices? And, conversely, how much inflation must be tolerated if the central bank fully stabilizes real activity?

To study these questions, we follow McKay and Wolf (2023) and use identified monetary policy shocks to construct policy counterfactuals. These counterfactuals are valid in a broad class of macroeconomic models, including the New Keynesian frameworks considered in the majority of theoretical contributions cited in the first paragraph. As in McKay and Wolf (2023), we estimate a monetary VAR with the high-frequency identified monetary policy shock from Miranda-Agrippino and Ricco (2021) and the Taylor rule residual from Romer and Romer (2004), and use the resulting responses to construct three counterfactuals.[2]

First, we consider a counterfactual in which the federal funds rate is unresponsive to the tariff shock. This scenario is useful for comparison with the model-based findings from Auclert et al. (2025), who also consider such a case. Additionally, it resembles the commonly expressed idea of "looking through" supply shocks.[3] Interest rates are higher compared to the baseline estimates, leading to moderately lower real GDP and CPI inflation. Further, the persistence increases for real GDP but decreases for inflation. Hence, we confirm that the inflationary impact of tariffs is partly driven by the monetary easing.

The above counterfactual keeps monetary policy neutral in terms of the nominal policy rate. But how potent is monetary policy in fighting the inflationary pressure from the tariff shock? To answer this question, we consider a second counterfactual in which monetary policy aims to perfectly stabilize prices. Instead of an initial easing, monetary policy sharply raises interest rates by 0.46 percentage points in the short run. As a result, the tariff shock does not lead to meaningful inflation, with the peak impact only at 0.10 percentage points.[4] The

[2] We provide a sensitivity analysis using alternative monetary policy shocks.

[3] For example, U.S. Fed Chair Jerome Powell discussed this idea on November 9, 2023 (https://www.federalreserve.gov/newsevents/speech/powell20231109a.htm?).

[4] The counterfactual does not exactly achieve full inflation stabilization since an exact counterfactual would require infinitely many distinct monetary policy (news) shocks.

baseline inflation response in the same quarter is four times larger. However, this sacrifices a considerable amount of real GDP, which is 32 percent lower at the trough.

Finally, we consider the opposite counterfactual, in which monetary policy aims to strictly stabilize output. In this scenario, monetary policy cuts the federal funds rate more aggressively and more swiftly compared to the baseline estimates. The trough interest rate impact is at minus one percentage point. This policy reduces the adverse output effects but does not achieve full output stabilization. Yet, the easing generates a pronounced amplification of the inflationary impact, which is more than double in size at the peak.

Overall, our results confirm that the monetary response to tariff shocks is critical for the impact of import tariffs on the U.S. economy. Pursuing extreme policies of only stabilizing output or only stabilizing prices induces considerable costs in terms of the other untargeted variable. Quantitative optimal policy analysis can be disciplined by comparing with our counterfactuals, while actual optimal policy likely constitutes an intermediate case.

**Related literature.** Beyond the theoretical papers discussed above, our work is connected to three strands of literature. First, we relate to the surprisingly scant literature that identifies the macroeconomic effects of tariff shocks from aggregate time series data. Schmitt-Grohé and Uribe (2025) identify transitory and permanent tariff shocks, imposing the identifying assumption that changes in the trade-weighted average tariff rate are an exogenous measure of tariff policy. Instead, we consider an intermediate case and identify a persistent (but not permanent) tariff shock. Additionally, we consider three distinct tariff rate measures and allow that other macroeconomic shocks affect these measures via changes in import prices or import composition. Boer and Rieth (2024) impose sign restrictions to identify shocks to U.S. trade policy uncertainty and import tariffs, whereas Barattieri, Cacciatore, and Ghironi (2021) use short-run zero restrictions to study shocks to trade barriers for Canada. Further, both Barattieri et al. (2021) and Furceri, Hannan, Ostry, and Rose (2018) use annual cross-country data to study trade barrier shocks and tariff shocks, respectively. Lastly, Ostry, Lloyd, and Corsetti (2025) focus on the financial market response to tariff changes. Relative to these papers, we identify a pure tariff rate shock (not trade barriers) and focus on quarterly macroeconomic data (not high-frequency financial data) to provide monetary policy counterfactuals that may be readily compared with the theoretical literature. Furthermore, while there is a closely connected literature on trade policy uncertainty (e.g., Caldara, Iacoviello, Molligo, Prestipino, and Raffo, 2020; Poilly and Tripier, 2025) and geopolitical risk (e.g., Caldara and Iacoviello, 2022; Franconi, 2024), we focus on the first-order effects of import tariff shocks instead.[5]

Second, we relate to the recent literature that studies the tariff announcements by the Trump Administration on the so-called "Liberation Day" using structural models (e.g., Ignatenko, Lashkaripour, Macedoni, and Simonovska, 2025; Rodríguez-Clare, Ulate, and Vasquez, 2025) or high-frequency data (e.g., Acharya and Laarits, 2025; Jiang, Krishnamurthy, Lustig, Richmond, and Xu, 2025; Pinter, Uslu, and Smets, 2025). Such event studies provide valuable insights into the economic consequences of the tariff trade war launched by the Trump Administration in 2025. However, the Liberation Day likely reflects a combination of an uncertainty shock and a tariff news shock, which complicates the comparison with the pure tariff shocks from the theoretical literature. Instead, we identify only a tariff shock, do not rely on a single event, and provide the above-mentioned counterfactuals. Further related are the complementary works by Coibion, Gorodnichenko, and Weber (2025), who surveyed U.S. Americans about the potential Trump tariffs before the 2025 inauguration, and Cavallo, Llamas, and Vazquez (2025), who track the 2025 impact of tariffs on prices in real-time.

Finally, we relate to the literature that is concerned with the impact of systematic monetary policy on the consequences of macroeconomic shocks. Using identified monetary policy shocks, Barnichon and Mesters (2023) focus on assessing the optimality of policy, whereas McKay and Wolf (2023) and Caravello, McKay, and Wolf (2024) focus on the construction of counterfactuals. Wolf (2023) uses the McKay and Wolf (2023) approach to estimate

[5]Our results are robust to the inclusion of trade policy uncertainty and geopolitical risk in the VAR, as shown in the Supplemental Appendix.

a counterfactual in which monetary policy strictly stabilizes inflation that originates from government spending shocks. Bouscasse and Hong (2023) use the same method to construct fiscal policy counterfactuals to monetary policy shocks, and Breitenlechner, Geiger, and Klein (2024) use alternative time series techniques to study the same question. Different from these approaches, Hack, Istrefi, and Meier (2023) leverage the exogenous rotation of voting rights in conjunction with time variation in the hawkishness of the Federal Open Market Committee. Instead of their non-linear framework, we use a linear model that facilitates the identification of the tariff shock.

# 2 Data and econometric methodology

## 2.1 Tariff shocks

**Tariff VAR model.** We estimate a quarterly vector auto-regression model (VAR) with a deterministic intercept and a linear time trend. The VAR includes nine endogenous variables. Specifically, we use real GDP, CPI inflation, and the federal funds rate as measures of real activity, prices, and monetary policy, respectively. Beyond these core variables, we include real imports and real exports as well as a terms-of-trade index to capture international trade dynamics. Lastly, we include real investment, macroeconomic uncertainty from Jurado, Ludvigson, and Ng (2015), and an import tariff measure. All variables are in logs except for the federal funds and the CPI inflation rate. The sample period spans 1990Q1-2024Q4 and is determined by the availability of disaggregated tariff data. Additionally, we view it as favorable to use a comparatively recent sample to capture the typical propagation of tariffs in today's economy. Finally, we estimate the VAR using conventional Bayesian techniques by imposing inverse-Wishart priors on the reduced-form VAR parameters.[6]

[6] All reported results are based on 20,000 draws from the posterior distribution.

**Tariff measurement.** We consider three distinct import tariff measures. First, following Schmitt-Grohé and Uribe (2025), we use the trade-weighted average import tariff rate. The advantage is that it captures not only statutory tariff rates but also weighs them by their aggregate importance. However, it has the disadvantage that its variation can be partly driven by changes in import composition and import prices, both across origin countries and product categories. Thus, as an alternative, we consider an unweighted average import tariff rate as a second measure.[7] Both of these tariff rates focus on the aggregate. Yet, tariffs can induce distortions and misallocation even if the (weighted or unweighted) average tariff rate remains unchanged. To address this, we use the tariff restrictiveness index originally proposed by Feenstra (1995) and expanded by Schmitt-Grohé and Uribe (2025) as a third tariff measure. This index has the advantage of capturing distortions due to cross-sectional variation in import tariff rates, but has the drawback of being a trade-weighted import tariff measure. Overall, every tariff measure has its distinct advantages and disadvantages. This motivates the use of all three approaches to investigate whether we obtain consistent results across tariff measures.

**Tariff shock identification.** The tariff shock is identified based on two assumptions. First, we assume partial invertibility of the VAR, so that we can recover the tariff shock (Forni, Gambetti, and Sala, 2019).[8] Given that our baseline VAR includes nine macroeconomic variables, we believe this is a reasonable assumption. Moreover, Forni and Gambetti (2014) show that this assumption can be evaluated by testing whether lagged principal components estimated from a large macroeconomic and financial data set granger causes the tariff shock. Following their testing procedure, we find strong evidence that partial invertibility holds. We provide these complementary results in the Supplemental Appendix.

[7]We use an approximate unweighted average tariff rate computed as follows. First, we compute all disaggregated trade-weighted tariff rates at the four-digit HTS times origin country level. Then, we compute the (unweighted) arithmetic average across these disaggregated tariff rates. To limit the influence of small trading partners, we drop all countries with average import values below the median, where average import values are computed over the full sample.

[8]We emphasize that our VAR is partially identified and we only impose restrictions on the tariff shock but not on other macroeconomic shocks that affect, e.g., supply and demand.

Second, we impose the timing restriction that a tariff shock affects all macroeconomic variables only with a one-period lag, except for the federal funds rate and the tariff measure. In turn, we allow other macroeconomic shocks to impact the tariff measure contemporaneously. This is important because variation in (trade-weighted) tariff measures can result from the tariff shock, but could also be due to changes in import composition or differential changes in import prices. By allowing other macroeconomic shocks to impact the tariff rate contemporaneously, we may control for these channels. Importantly, we allow the federal funds rate to respond to tariff shocks contemporaneously, remaining agnostic about the monetary response to tariffs, which we eventually perturb in the counterfactual exercises.

The second identifying assumption could be restrictive. Thus, we carefully evaluate the imposed zero restrictions with three alternative identification approaches. First, we relax each zero restriction individually by allowing the tariff rate to affect the corresponding variable contemporaneously. Second, we employ a block-recursive identification along the lines of Christiano et al. (2005). That is, we relax the zero restrictions jointly on all "fast-moving" variables, which are the terms-of-trade, macroeconomic uncertainty, and the inflation rate. Finally, we relax all zero restrictions jointly by identifying the tariff shock via the penalty function approach of Uhlig (2005). Specifically, we identify the tariff shock as the one that increases the tariff rate the most over the first four quarters after a shock. This is sufficient to achieve point identification, and no other restrictions are required.

## 2.2 Monetary policy counterfactuals

**Counterfactual method.** We construct monetary policy counterfactuals following McKay and Wolf (2023) (MW, henceforth). Their method relies on the core assumption of *instrument sufficiency*, i.e., private agents do not care about the monetary rule per se, but only about the movements of the policy instrument, which is the federal funds rate in our application. This assumption holds in a broad class of macroeconomic models, including conventional New Keynesian theory. With this assumption, MW prove that many monetary policy (news) shocks can be used to correctly identify impulse responses to a macroeconomic shock that prevail under a counterfactual monetary policy rule. To conserve space, we omit a formal description of the method and refer interested readers to the original paper for more details. Instead, we focus on the empirical implementation of the counterfactual method.

**Counterfactual implementation.** The aim is to compute counterfactual responses when the central bank tries to stabilize a given variable of interest $i$, e.g., inflation. To expound the computation of counterfactuals, we denote the impulse response of variable $i$ to shock $j$ by vector $IRF_i^j$. In anticipation of our empirical implementation, we assume that we have two distinct monetary shocks, $s^1$ and $s^2$, and the associated impulse responses at our disposal. Similarly, we assume to possess a baseline response to a tariff shock, $IRF_i^\tau$. Given these inputs, the counterfactual is constructed by choosing the size of both monetary shocks that materialize simultaneously to the tariff shock. Formally, we solve

$$(\hat{s}^1, \hat{s}^2) = \arg\min \| IRF_i^\tau + s^1 IRF_i^1 + s^2 IRF_i^2 \|_\omega, \tag{1}$$

where $\| \cdot \|_\omega$ denotes a weighted Euclidean norm. Our baseline weights decay at a quadratic rate, placing more weight on the short-run responses in the above minimization.[9] Intuitively, we pick both monetary shocks, $\hat{s}^1$ and $\hat{s}^2$, to take values so that variable $i$ is as unresponsive as possible. Given these shocks, we can compute the implied counterfactual responses for any variable $k$ as $IRF_k^\tau + \hat{s}^1 IRF_k^1 + \hat{s}^2 IRF_k^2$, provided that we have all three impulse responses available. Our counterfactuals consider a monetary authority that aims to (i) not respond to the tariff shock with its policy rate, (ii) strictly stabilize inflation, or (iii) strictly stabilize output. These counterfactuals are implemented by solving (1), with variable $i$ being (i) the federal funds rate, (ii) CPI inflation, and (iii) real GDP, respectively.

[9]This assumption is not restrictive. It only reflects our preferences for the desired counterfactual being more accurate for smaller response horizons. Effectively, one can solve the minimization problem by weighted least squares in impulse response space. The baseline sequence of weights is proportional to $(H+1)^2, (H)^2, (H-1)^2, .., (1)^2$, where $H$ is the maximum response horizon that we report.

**Monetary VAR model.** We follow MW and estimate a separate monetary VAR model that uses the high-frequency identified monetary policy shock from Miranda-Agrippino and Ricco (2021) (MAR) and the Taylor rule residuals from Romer and Romer (2004) (RR) as two distinct shocks. For maximal consistency with the baseline tariff VAR, we choose the same VAR variables, lag specification, and estimation method. Following the internal instruments approach from MW, we further include both monetary shocks in the VAR vector. The MAR shock is ordered first, and the RR shock is ordered before the federal funds rate, but after all other variables, and identification is achieved via a lower-triangular Cholesky decomposition.[10] The estimation sample is 1969Q1-2014Q4 and determined by the availability of the monetary policy shocks, which we take directly from MW.[11] Finally, to obtain valid inference over the counterfactual, we take the baseline response to the tariff shock as given and account for the joint estimation uncertainty of both monetary shocks by solving the minimization in (1) for each posterior draw of the monetary VAR.

# 3 The macroeconomic effects of tariff shocks

## 3.1 Baseline estimates

In Figure 1, we present impulse responses to a shock that raises the import tariff rate by 10 percent on impact. The baseline estimates show a shock to the trade-weighted average import tariff rate as a blue solid line, which indicates the median of the posterior distribution. The shaded areas are 68% and 90% credible sets. As can be seen from Panel (a), the effects on the tariff rate are persistent and slowly revert over the five-year response horizon.

[10] Ordering the RR shock second-to-last is also done in MW and is often used as "exogeneity insurance" to address residual identification concerns (see, e.g., Ramey, 2016).

[11] The MAR shock is available from 1980Q1-2014Q4, and the RR shock from 1969Q1-2007Q4. We set missing values within the estimation sample to zero. In the Supplemental Appendix, we provide additional results by changing the sample period and using alternative monetary policy shock measures.

**Core outcomes.** Panels (b)-(d) show the responses of CPI inflation, real GDP, and the federal funds rate. Inflation starts increasing with a delay and peaks at 0.43 percentage points after 11 quarters. This inflation effect is somewhat persistent, and the 68% credible set includes zero only after 17 quarters. In contrast, real GDP declines more quickly. The trough is reached 6 quarter after the shock, where output is 0.60 percent lower. This decline is transitory and vanishes after 8 quarters, where even the 68% credible sets overlap the zero line. Lastly, we find partial monetary accommodation of the tariff shock. The federal funds rate responds negatively for two years. Quantitatively, at the trough, the fed funds rate is 0.43 percentage points lower after 6 quarters and starts to revert thereafter.

**Additional outcomes.** The responses of the remaining VAR variables are displayed in Panels (e)-(i) of Figure 1. These variables enable us to further understand the mechanism by which tariff shocks are transmitted. Focusing on trade, we find declines in real exports and real imports that are similarly shaped as the GDP response, and a more delayed increase in the terms of trade.[12] Finally, we find an increase in macroeconomic uncertainty and a corresponding transitory decline in investment, as real option theory suggests.

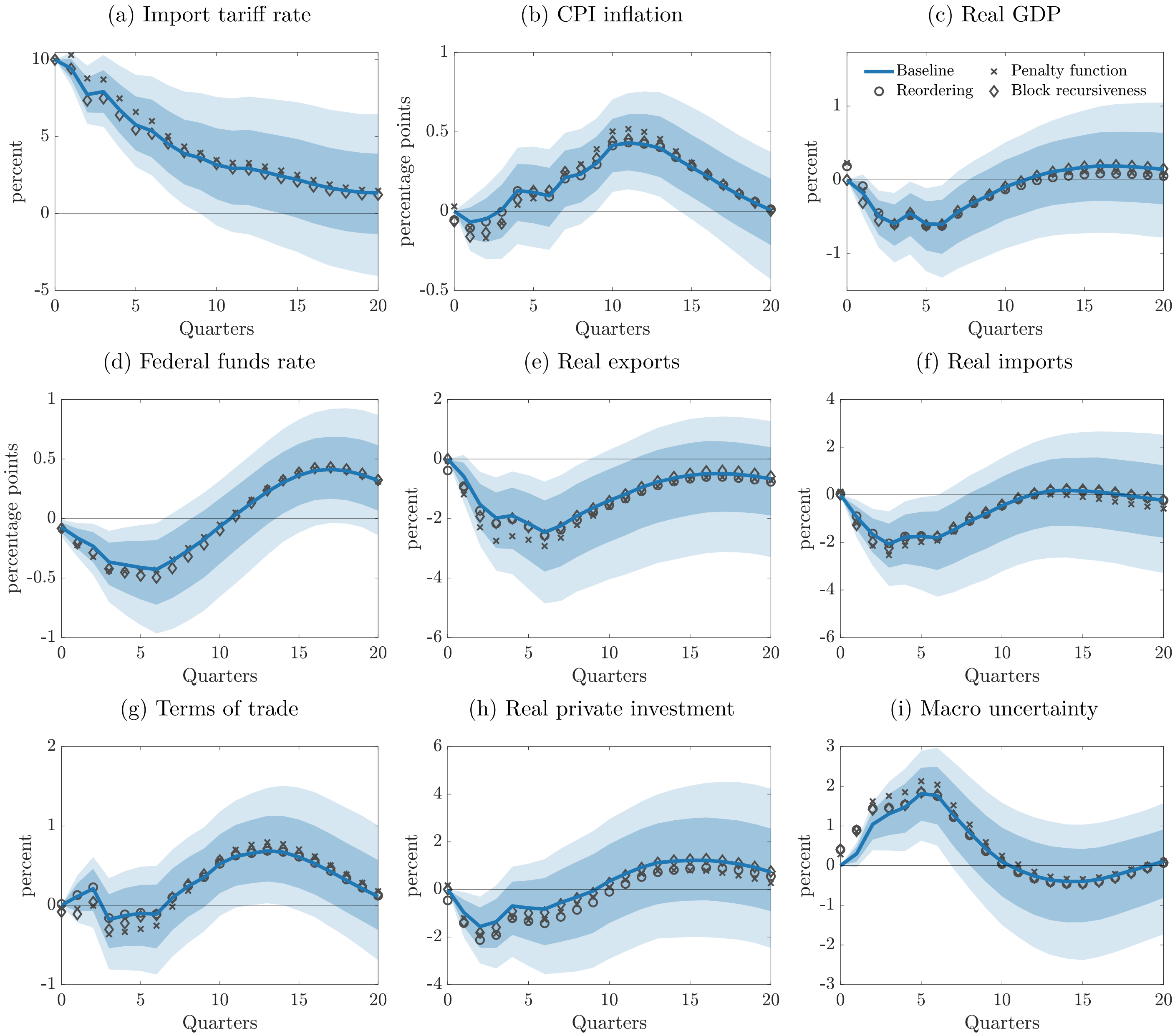
**Discussion.** The responses align well with the theoretical literature. First, we confirm that tariff shocks are contractionary, in line with, e.g., Auclert et al. (2025).[13] Second, as a result, tariffs act as a supply shock, consistent with Werning et al. (2025). Third, we find that monetary policy partially accommodates the contractionary tariff shock to cushion its effect on real activity, albeit at the expense of higher prices. Interestingly, such partial accommodation can be the optimal response to a tariff shock (e.g., Bergin and Corsetti, 2025; Bianchi and Coulibaly, 2025; Monacelli, 2025; Werning et al., 2025). Fourth, we find that tariff shocks yield no meaningful improvement in the trade balance and in private investment,

[12]These percent responses imply a transitory improvement in the trade balance due to the imports exceeding exports in levels in the data. We also present the trade balance responses in Section 4.

[13]The theory from Antonova et al. (2025) suggests that our tariff shocks mostly capture tariffs imposed on upstream sectors, since they find only upstream sector tariffs being clearly recessionary.

suggesting they are an impotent policy tool to reduce trade deficits and boost investment.

Figure 1: Responses to the import tariff rate shock



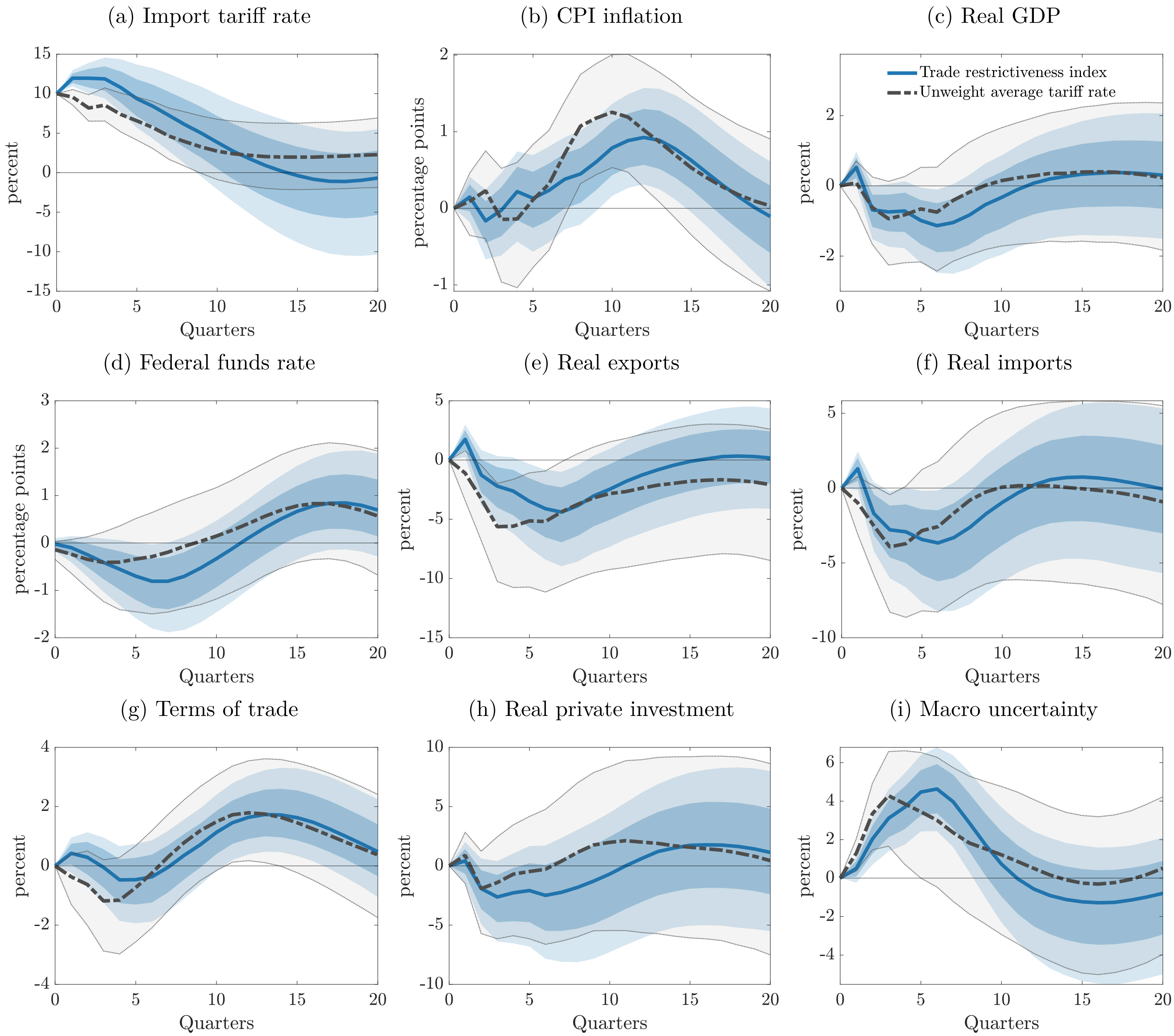

**Notes:** This figure shows impulse responses estimated based on a Bayesian VAR, as specified in Section **2**. The solid blue line represents the posterior median, and the shaded areas are 68% and 90% credible sets. The baseline estimates impose the identifying restriction that the shock affects only the import tariff rate and the federal funds rate contemporaneously. The gray markers show the posterior medians using alternative identification approaches that relax the baseline assumptions. Reordering: We relax each zero restriction individually by reordering the VAR vector. Block recursiveness: Along the lines of Christiano et al. (2005), we jointly relax the zero restrictions for all "fast moving" variables, which are macro uncertainty, terms of trade, and CPI inflation. Penalty function: Following Uhlig (2005), we identify the tariff shock by maximizing the impact on the tariff rate for the first four quarters after the shock and imposing no zero restrictions at all.

**Relaxing identifying assumptions.** Next, we carefully evaluate the bite of our identifying assumptions by considering three alternative identification approaches, as explained in Section 2.1. We show corresponding median posteriors as gray markers in Figure 1. We suppress the posterior credible sets because they are very similar to the baseline, but provide them in the Supplemental Appendix. Across all alternative approaches, we find that our results are virtually unchanged. Importantly, even if we do not restrict a zero impact effect, we find that the unrestricted estimates are remarkably close to zero. This firmly establishes that our baseline identification approach is not unduly restrictive.

**Alternative tariff measures.** In Figure 2, we provide the responses when using two alternative tariff measures, as introduced in Section 2.1. The magnitudes relative to the trade-weighted tariff rate increase considerably simply because a ten percent increase has a different meaning across tariff measures. However, the relative magnitudes between the remaining macroeconomic variables and the shape of the responses remain comparable to the baseline measure. Yet, we find that the responses to the trade restrictiveness index are more delayed, and the responses to the unweighted average import tariff rate are less precisely estimated. Nevertheless, we view it as reassuring that these results confirm that tariff shocks are inflationary, recessionary, and, if anything, partly accommodated by monetary policy.

**Further sensitivity analysis.** We further investigate the sensitivity of our results regarding various modeling choices and present this complementary analysis in the Supplemental Appendix. We relax VAR assumptions by adjusting the lag order or by estimating local projections, as recommended by Montiel Olea, Plagborg-Møller, Qian, and Wolf (2025). We account for the Covid-19 pandemic being part of our sample by dummying out the pandemic period as recommended by Lenza and Primiceri (2022). We include higher-order deterministic time trends to account for slow-moving trends in international trade. None of these extensions changes our conclusions. Moreover, in the next subsection, we augment the VAR by various additional variables to further study the propagation of tariff shocks. When doing so, we find that the responses of the baseline variables remain similar, suggesting that our results are not driven by the omission of important variables from the VAR.

Figure 2: Responses to the import tariff shock using alternative tariff measures




**Notes:** This figure shows impulse responses estimated based on a Bayesian VAR, as specified in Section 2. The solid blue line represents the posterior median using the trade restrictiveness index from Schmitt-Grohé and Uribe (2025), and the shaded areas are 68% and 90% credible sets. The dashed-dotted gray line represents the posterior median using an unweighted average import tariff rate, and the thin dotted lines indicate the 90% credible sets.

## 3.2 A further look at the propagation of tariff shocks

In Figure 3, we present the responses of various additional variables to the baseline tariff shock to further understand the propagation mechanisms.[14]

**Fiscal implications.** Motivated by Alessandria et al. (2025), we focus on the implications for the government budget constraint. In the first row of Panel A, we show that a tariff shock generates revenues via customs duties and induces a corresponding transitory increase in government spending, consistent with the narratives of some tariff proponents. However, government receipts tend to decline due to the recessionary impact. Overall, we find that tariffs have a negative impact on the government budget, and real federal debt increases.

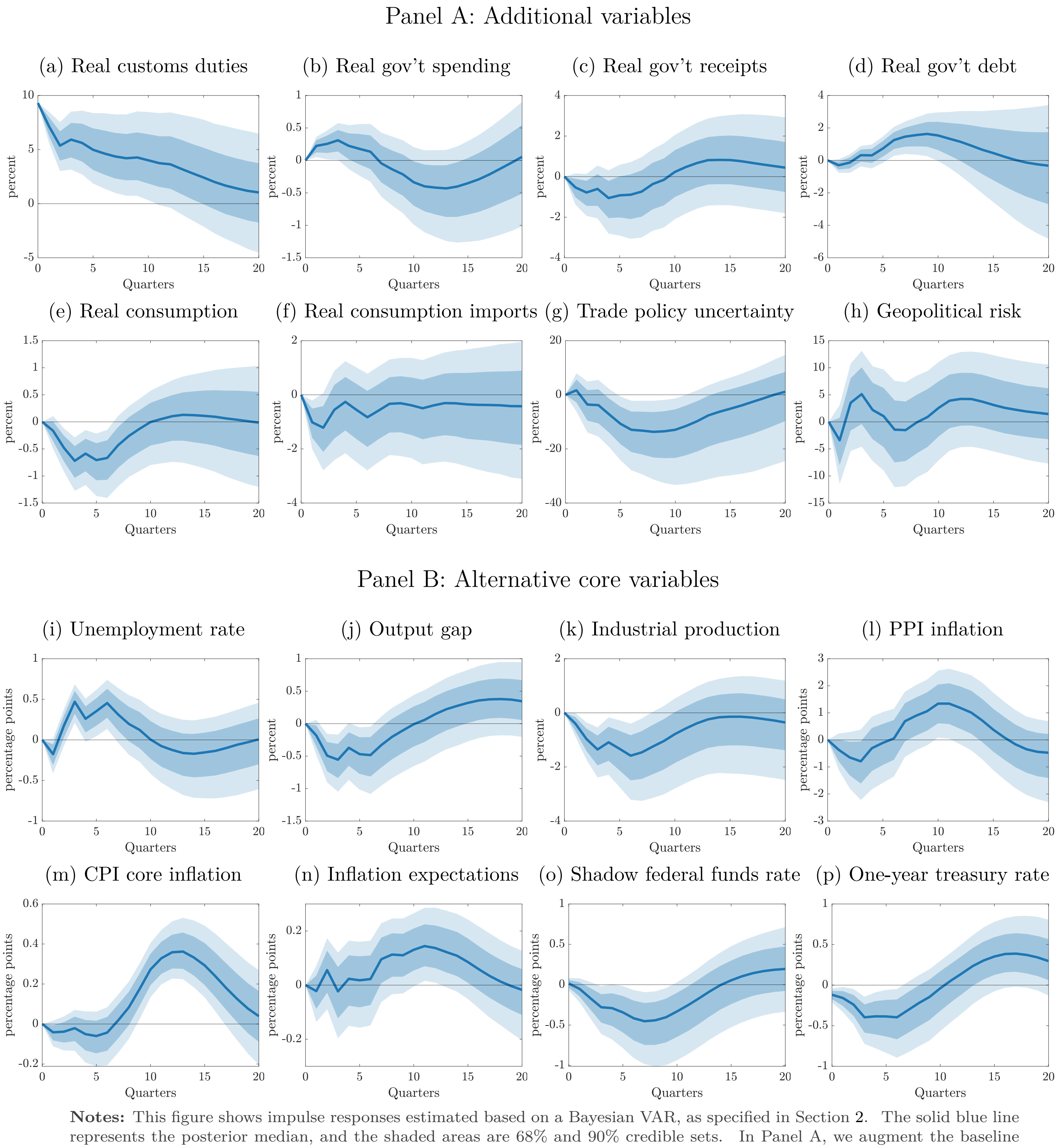
**Consumption.** Since the main mechanism in Auclert et al. (2025) operates via consumption, we study the effects on private consumption and on the imports of consumption goods and report the responses in Panel A. The former confirms that the contractionary effects are partly driven by consumption, while the latter shows that imports of consumption goods decline only very transitorily.

**Geopolitics and trade.** Finally, in Panel A, we show newspaper-based indices that measure geopolitical risk (Caldara and Iacoviello, 2022) and trade policy uncertainty (Caldara et al., 2020). We find that tariff shocks only affect the latter, which declines. One interpretation could be that the realization of a shock that persistently raises tariffs resolves some uncertainty.

**Alternative core variables.** In Panel B of Figure 3, we consider alternative measures of real activity, prices, and interest rates. Throughout, we always use the new variable to replace the corresponding baseline variable in the VAR. All measures of real activity – unemployment rate, output gap, and industrial production – indicate that a tariff hike

[14] We impose a zero impact effect on all additional variables in Panel A, except for customs duties.

Figure 3: Responses of further macroeconomic variables to the import tariff shock




**Notes:** This figure shows impulse responses estimated based on a Bayesian VAR, as specified in Section 2. The solid blue line represents the posterior median, and the shaded areas are 68% and 90% credible sets. In Panel A, we augment the baseline VAR by each variable individually and re-estimate the model. In Panel B, we replace individual variables from the baseline VAR by alternative measures. We replace real GDP by alternative measures of real activity in Panels (i) to (k). We replace CPI inflation by other price measures in Panels (l) to (n). We replace the federal funds rate by alternative interest rates in Panels (o) to (p).

is recessionary. Similarly, all price measures – PPI inflation, CPI core inflation, and one-year inflation expectation from the Michigan survey – indicate that tariffs are inflationary. Finally, we consider alternative interest rates that account for the presence of the zero lower bound in our sample. Both the one-year treasury yield and the shadow federal funds rate from Wu and Xia (2016) confirm partial monetary accommodation to the tariff shock.

# 4 The monetary response to tariff shocks

We construct three distinct monetary policy counterfactuals using the methodology from McKay and Wolf (2023), as outlined in Section 2.2. The counterfactuals use the baseline responses to the tariff shock, as shown in Figure 1. We focus our discussion on the counterfactual responses of the core variables, which we present in Figure 4. The displayed 68% and 90% credibility sets account for the joint estimation uncertainty of both monetary shocks. For comparison, we also show the baseline responses to the tariff shock as a gray dashed line. Finally, we also discuss the remaining variables and the sensitivity of the results.

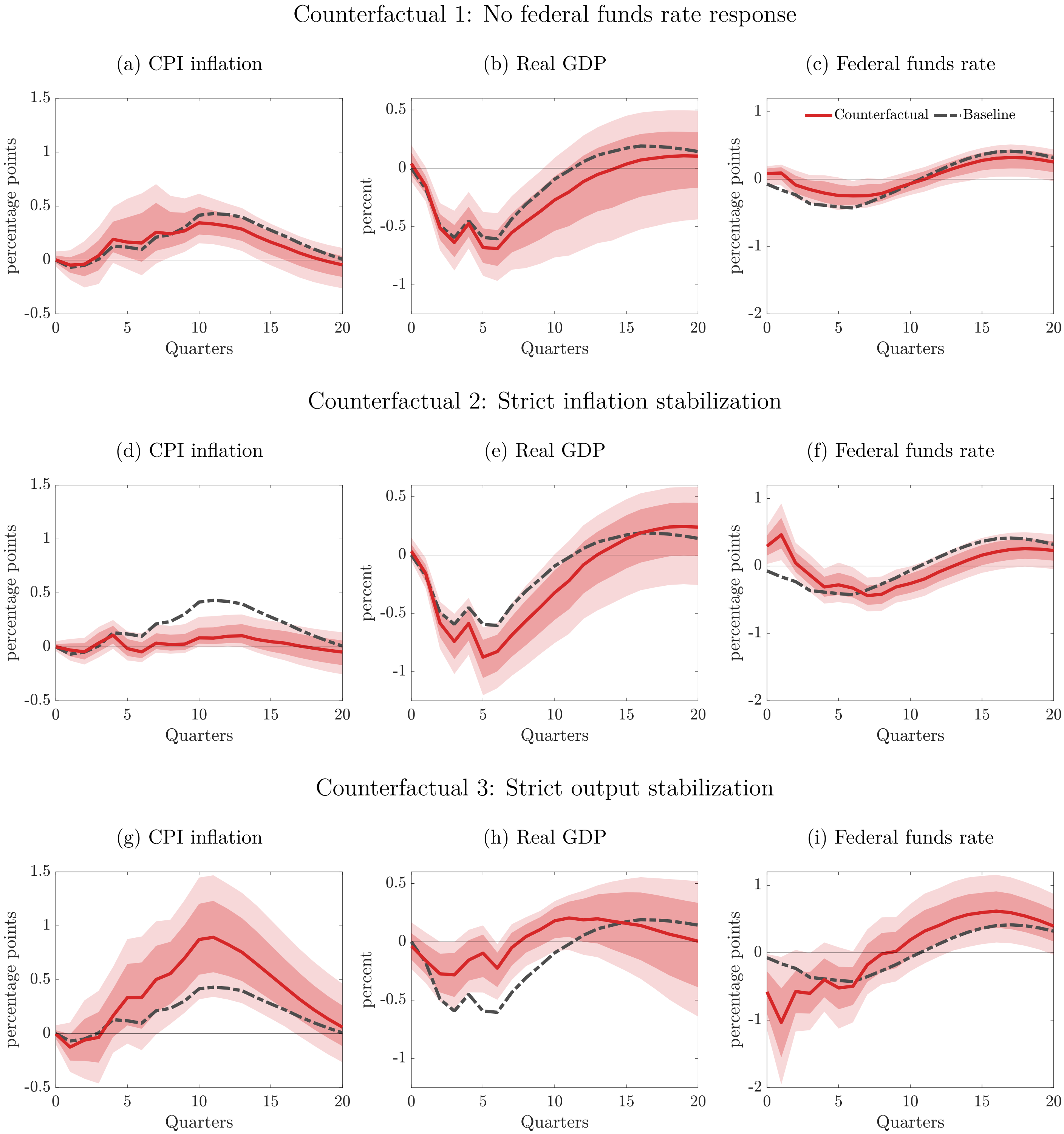
**No interest rate response.** The baseline responses to the tariff shock from Section 3 suggest that U.S. monetary policy partly accommodates the effect of the tariff shock by reducing interest rates. Such an easing is consistent with a Taylor rule that puts relatively more weight on stabilizing real activity. However, a natural benchmark is a scenario in which nominal interest rates do not respond to a temporary tariff shock, as considered by Auclert et al. (2025). Therefore, we construct a corresponding counterfactual in which the federal funds rate responds as little as possible to the tariff shock. The counterfactual is in the first row of Figure 4. Panel (c) shows that the federal funds rate is considerably less responsive than in the baseline.[15] Real GDP is broadly unaffected by this alternative

[15] A perfectly unresponsive federal funds rate would require not only two, but infinitely many distinct monetary shocks. Alternatively, one would require more structural assumptions to extrapolate from the existing empirical evidence (Caravello et al., 2024). We refrain from doing so to keep the structural assumptions to a minimum.

monetary response for around 5 quarters. However, the adverse GDP effects are stronger at the trough and more persistent, absent the monetary easing from the baseline. In turn, this pays off via a 19 percent lower peak inflation effect (0.08 percentage points lower) and via a less persistent inflation response. After 13 quarters, the baseline inflation response is above the 68% credible set of the counterfactual. Thus, we conclude that the monetary accommodation from the baseline is not responsible for short-term inflation, but plays a meaningful role in inflation persistence over the medium term.

**Strict inflation stabilization.** Since inflation is less persistent absent partial monetary accommodation, we aim to explore how potent monetary policy is in stabilizing prices and what output costs such a policy entails. To this end, we consider a counterfactual in which CPI inflation responds as little as possible and present the results in the second row of Figure 4. Implementing such a policy requires a short-lived interest rate hike that peaks at 0.46 percentage points only 1 quarter after the shock. Then, the policy rate falls quickly, reaching the baseline response after 7 quarters and undershooting thereafter. Such a sharp and short-lived interest rate hike is sufficient to tame inflation. Indeed, the peak inflation impact is reduced from 0.43 to only 0.10 percentage points. However, this policy amplifies the recessionary impact of the shock considerably. The counterfactual real GDP trough is 0.28 percentage points lower than the baseline. In comparison, this represents a 32% increase in the adverse output effects between the baseline and counterfactual troughs. Moreover, it takes 16 quarters for the counterfactual response to catch up to the baseline, suggesting that the adverse output effects are quite persistent.

Figure 4: Responses of core variables to tariffs under counterfactual monetary policy




**Notes:** This figure shows counterfactual impulse responses estimated based on a Bayesian VAR, as specified in Section 2. The counterfactuals are computed using monetary policy shocks following McKay and Wolf (2023). The solid red line represents the posterior median of the counterfactual, and the shaded areas are 68% and 90% credible sets. The dashed gray line corresponds to the baseline median response to a tariff shock, as displayed in Figure 1. For comparison, we keep the vertical axis for each variable across counterfactuals fixed.

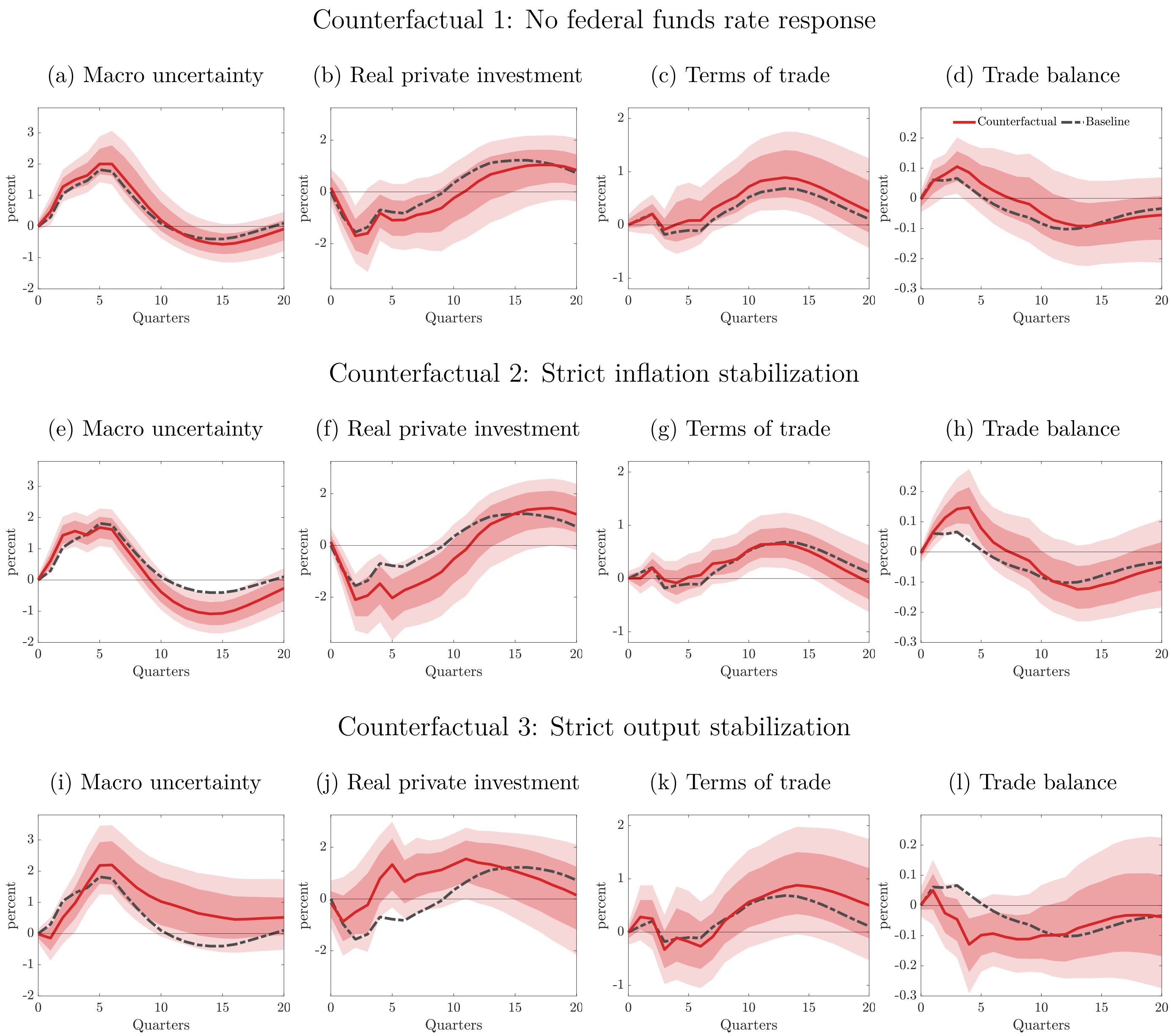
**Strict output stabilization.** As the last counterfactual, we estimate the alternative policy scenario in which monetary policy aims to fully stabilize real activity but ignores inflation. This counterfactual is given in the third row of Figure 4and is implemented with a peak interest rate cut of about one percentage point reached only 1 quarter after the tariff shock. As expected, inflation increases considerably in this counterfactual scenario. Specifically, the peak inflation effect more than doubles compared with the baseline (an increase by 0.46 percentage points). This suggests a sizable sacrifice of price stability to minimize the adverse GDP impact, which is strongly dampened. However, the interest rate cut is not large enough to fully undo the adverse GDP effects. Thus, an even more pronounced monetary easing would be necessary to achieve full output stabilization. This suggests the increase in inflation is likely a lower bound for the strict output stabilization counterfactual.[16]

**Additional counterfactual outcomes.** We present counterfactual responses of the additional outcome variables in Figure 5. The results suggest that real investment is an important channel through which counterfactual interest rate responses are transmitted. Instead, macro uncertainty is less affected by the different monetary responses over the first part of the response horizon. Further, we find that output stabilization reverses the effects on the trade balance, whereas inflation stabilization amplifies the trade balance improvement.[17] This pattern is consistent with the dominant currency paradigm (Gopinath, Boz, Casas, Díez, Gourinchas, and Plagborg-Møller, 2020), in which muted expenditure-switching effects imply that monetary policy primarily influences the trade balance through its impact on domestic demand. This illustrates that there is a tradeoff between avoiding the recessionary impact of tariffs and improving the trade balance. While President Trump expressed hopes to achieve both, we find that such a scenario is infeasible. Finally, we find corresponding effects on the terms of trade, but these effects are small and delayed.

[16]This is the best approximation of the targeted counterfactual we can deliver; see Footnote 15.

[17]We compute the trade balance response based on our estimated impulse responses. We convert our estimated semi-elasticities of real exports and real imports into level effects by multiplying by average real exports and average real imports, respectively. Finally, we use the implied level effects to compute real exports minus real imports and divide by average real GDP to rescale the response.

Figure 5: Responses of additional variables to tariffs under counterfactual monetary policy




**Notes:** This figure shows counterfactual impulse responses estimated based on a Bayesian VAR, as specified in Section 2. The counterfactuals are computed using monetary policy shocks following McKay and Wolf (2023). The solid red line represents the posterior median of the counterfactual, and the shaded areas are 68% and 90% credible sets. The dashed gray line corresponds to the baseline median response to a tariff shock, as displayed in Figure 1. For comparison, we keep the vertical axis for each variable across counterfactuals fixed.

**The role of monetary policy shocks.** McKay and Wolf (2023) forcefully explain that there are only two reasons why one may disagree with our estimated counterfactuals. The first reason is that the class of models for which the approach is valid may be too small. While this is a legitimate concern, we view the class of models as being sufficiently broad since they include conventional New Keynesian theory. The second reason for disagreement pertains to the impulse responses to monetary policy shocks that are used to construct the counterfactual. Therefore, we provide a complementary analysis of these responses in the Supplemental Appendix, in which we show the responses to both monetary shocks, which conform well with economic theory. We also construct counterfactuals using only one of the two monetary policy shocks. Regardless of which shock we pick, we can only partly achieve our baseline counterfactuals. This suggests that both shocks contribute meaningfully to the counterfactuals. Beyond this, we also vary the sample period and use a shock identified via a heteroskedasticity-based approach (Jarociński, 2024) and via an augmented Romer and Romer (2004) regression that accounts for time variation in systematic monetary policy (Hack, Istrefi, and Meier, 2024).

# 5 Conclusion

This paper presents impulse responses to a U.S. import tariff shock. These responses align well with economic theory, are robust to the measurement of tariffs and to the imposed identifying restrictions. On average, we find that a tariff increase acts as an adverse supply shock, which monetary policy partially accommodates by lowering interest rates. Our first monetary policy counterfactual exercise reveals that the moderate loosening of monetary policy has a non-negligible impact on macroeconomic aggregates, compared with monetary policy being unresponsive to the shock. The remaining counterfactual exercises consider two extreme monetary policy configurations with either strict inflation or strict output stabilization. Our estimates suggest that strict inflation stabilization leads to sizable output costs, and strict output stabilization amplifies the inflationary impact of tariffs considerably. While these results are expected, we view the quantification of these scenarios without imposing a full model as a key contribution. Importantly, research that quantifies the optimal policy response to import tariff shocks should be consistent with our estimates.

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