Online Appendix

Import Tariffs and the Systematic Response of Monetary Policy

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Contents

A Data sources

All data sources are described below. We use the arithmetic average across observations to aggregate to a quarterly frequency for all monthly data except the monetary shocks.

Table A.1: Import tariff measures

Variable	Data identifier and details
Trade-weighted average tariff rate	Computed as customs duties (*B235RC1Q027SBEA*) divided by dutiable imports. Dutiable imports are given by all goods imports (*A255RC1Q027SBEA*) multiplied by the average share of dutiable goods over all imported goods taken from the DataWeb of the United States International Trade Commission.
Not trade-weighted average tariff rate	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. The data is retrieved from the DataWeb of the United States International Trade Commission.
Trade restrictiveness index	The index is provided by Schmitt-Grohé and Uribe (2025) and can be downloaded here.

Notes: Data identifiers are in italic letters if taken from FRED, provided by the FRB of St. Louis.

Table A.2: Macroeconomic data

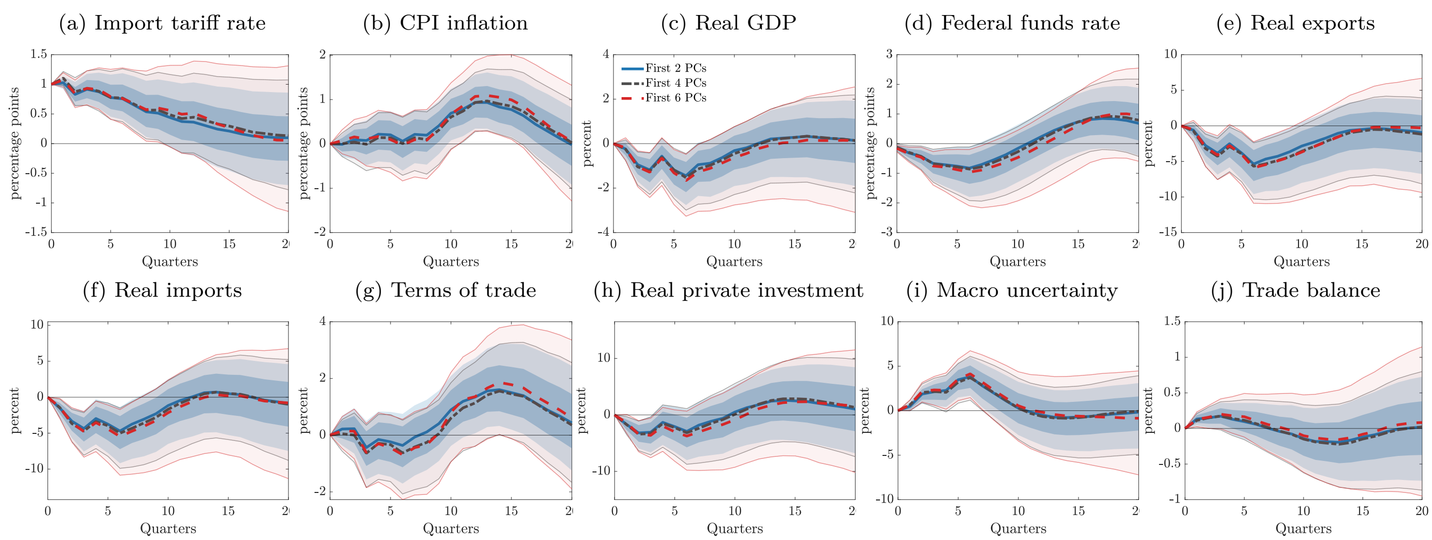
Variable	Data identifier and details
CPI inflation	*CPIAUCSL* and implied year-over-year inflation.
CPI core inflation	*CPILFESL* and implied year-over-year inflation
Inflation expectations.	*MICH* (One-year horizon).
PPI inflation	*PPIACO* and implied year-over-year inflation.
Real GDP	*GDPC1*
Real investment	*GPDIC1*
Real consumption	*PCECC96*
Imported consumption goods	Computed as nominal imported consumption goods (excluding automotive and food) (*A652RC1Q027SBEA*) divided by the GDP deflator (*GDPDEF*).
Real government spending	*GCEC1*
Real exports	*EXPGSC1*
Real imports	*IMPGSC1*
Unemployment rate	*UNRATE*
Industrial production	*INDPRO*
Output gap	Computed as real GDP (*GDPC1*) divided by potential output (*GDPPOT*).
Terms of trade (non-petrolium goods)	*W371RG3Q020SBEA*
Federal funds rate	*DFF*
One-year treasury yield	*GS1*
Real federal debt	Computed as nominal federal debt (*FGSDODNS*) divided by the GDP deflator (*GDPDEF*).
Real government receipts	Computed as nominal federal debt (*FGRECPT*) divided by the GDP deflator (*GDPDEF*) minus real customs duties (*B235RC1Q027SBEA*).
Macroeconomic uncertainty	We use the 12-month index, which can be downloaded here.
Shadow federal funds rate	We use the shadow federal funds rate from Wu and Xia (2016), which can be downloaded here.
Romer and Romer (2004) shock	We use the extended shock that ends in 2007Q4, taken from McKay and Wolf (2023).
Miranda-Agrippino and Ricco (2021) shock	We use the shock that ends in 2014Q4, taken from McKay and Wolf (2023). They take the shock corresponding to the posterior mode of the reduced-form parameters of the original paper.
Jarociński (2024) shock	We use the conventional monetary shock (*u1*), which can be downloaded here.
Hack, Istrefi, and Meier (2024)	We take the refined Romer and Romer (2004) shock kindly provided by the authors.

Notes: The displayed variables are from FRED, provided by the FRB of St. Louis. Data identifiers are in italic letters. All remaining variables are provided by the mentioned scholars as indicated in the second column.

B Testing partial invertibility

To ensure that our baseline VAR contains sufficient information to identify the tariff shock, we perform the orthogonality test proposed by Forni and Gambetti (2014). First, we estimate the principal components using a large quarterly dataset of macroeconomic and financial variables for the U.S. economy, taken from McCracken and Ng (2021). Then, we test for orthogonality with respect to the lags of these principal components. To select the optimal number of principal components to be included in the test, we rely on the criteria proposed by Alessi, Barigozzi, and Capasso (2010), which suggests the first four or first six principal components. The results of the orthogonality test are reported in Table B.1. In all cases, we cannot reject the null hypothesis of orthogonality, indicating a lack of shock predictability by the information set spanned by the principal components. As an additional test, we include the first two, four, and six principal components in the VAR and order them after the federal funds rate. The results in Figure B.1 are similar to the baseline. This indicates that our results are not driven by the omission of important macroeconomic and financial variables from our VAR.[1] Overall, both exercises indicate that our baseline VAR is informationally sufficient to identify the tariff shock.

Figure B.1: Include principal components in VAR vector



Notes: The solid blue, dashed-dotted gray, and dashed red lines represent posterior medians. The blue shaded areas are 68% and 90% credible sets, and the thin-dotted lines indicate 90% credible sets. We include principal components in the VAR and allow the tariff shock to impact these principal components in the quarter of the shock; see text for details.

[1] Including more principal components does not meaningfully change the results.

Table B.1: Testing partial invertibility based on Forni and Gambetti (2014)

	First 4 PCs, k lags				First 6 PCs, k lags			
	$k=1$	$k=2$	$k=3$	$k=4$	$k=1$	$k=2$	$k=3$	$k=4$
F-stat	0.161	0.429	0.425	0.472	0.249	0.497	0.569	0.527
p-value	0.958	0.902	0.951	0.956	0.959	0.913	0.915	0.964

Notes: The table shows the results of the "Structuralness" test proposed in Forni and Gambetti (2014). Specifically, we report the F-statistics and the p-values for regressions of the tariff shock on up to k lags of the first four and six principal components. The shock is based on the posterior median of the Tariff VAR, taken over the reduced-form parameters.

C Narrative identification

Our baseline tariff rate measure is trade-weighted and, thus, may also be affected by compositional changes in imports and import prices. To address the concern that our estimates pick up these alternative sources of variation, we compile a series of narratively identified tariff policy changes, which are unlikely to be confounded by the above-described issues. To this end, we define an indicator, $\mathbb{I}_t\{\text{tariff policy event}\} \in \{0, 1\}$, which is only activated when we identify a tariff policy change in quarter t. Table C.1 lists all of these events. Finally, we compute our narrative tariff change time series as $\Delta\tau_t^{narr} = \mathbb{I}_t\{\text{tariff policy event}\}\Delta\tau_t$, where $\Delta\tau_t$ denotes the quarter-on-quarter change in the trade-weighted average tariff rate. We include this series as an exogenous variable in the VAR.

Table C.1: Narratively identified tariff policy changes

#	Event description	Quarterly date
(1)	NAFTA Agreement	1994Q1
(2)	WTO Establishment	1995Q1
(3)	US–Canada SLA Agreement I	1996Q2
(4)	WTO ITA I	1997Q3
(5)	Trade & Development Act (Sub-Saharan Africa)	2000Q2
(6)	Bush Steel Safeguard	2002Q1
(7)	Early Removal of Bush Steel Safeguard	2003Q4
(8)	US–Canada SLA Agreement II	2006Q4
(9)	WTO ITA II	2016Q3
(10)	US Tariffs (Solar, Washing Machines, Steel, Aluminum)	2018Q1
(11)	Section 232 Expansion (EU, Canada, Mexico)	2018Q2
(12)	Section 301 China Tariffs – List 1 & 2	2018Q3
(13)	Section 301 China Tariffs – List 3	2018Q4
(14)	Section 301 China Tariffs – List 3 Increase	2019Q1

D Comparison with Schmitt-Grohé and Uribe (2025) and Barnichon and Singh (2025)

Schmitt-Grohé and Uribe (2025) estimate transitory and permanent U.S. import tariff shocks. Different from our results, they find that transitory import tariff shocks are deflationary and expansionary. Their permanent shocks deliver a very transitory inflation response and a mostly insignificant expansion of output. Barnichon and Singh (2025) estimate an annual VAR model over 150 years and also find that tariffs are deflationary. However, different from Schmitt-Grohé and Uribe (2025), they document contractionary effects of tariffs. Below, we investigate why their results differ from our findings.

The core methodological differences of Schmitt-Grohé and Uribe (2025) relative to our approach are that they (i) use a state-space model following Uribe (2022), (ii) impose that the trade-weighted average tariff rate is exogenous to the economy (in their baseline), (iii) consider a different set of macroeconomic variables, and (iv) use a sample that starts already in 1959Q2.

To compare with their results, we use our baseline identification approach and focus on (iv), the sample period. First, we re-estimate our VAR but let our sample start in 1980Q1 to ensure that our results are not unduly sensitive to starting the sample in 1990Q1.[2] The results are shown as solid blue lines in Figure D.1. In this sample, our main results remain unchanged. In particular, we still find that tariff shocks are inflationary and contractionary. Next, we go further and start the sample in 1967Q1, which is the earliest feasible sample start due to data availability.[3] The results are shown as gray dashed-dotted lines. Indeed, in this long sample, we find that the shock is deflationary and not contractionary anymore, broadly consistent with Schmitt-Grohé and Uribe (2025).

However, the extended sample includes two large tariff spikes, the so-called Nixon and Ford shocks, which are also discussed in Schmitt-Grohé and Uribe (2025); see their Figure 4. However, the Nixon shock partly captures the endogenous response of the US government to

[2]Recall that this sample start is chosen because all three tariff measures are available from 1990 onward.
[3]An earlier sample start is infeasible since the terms of trade index is only available starting in 1967.

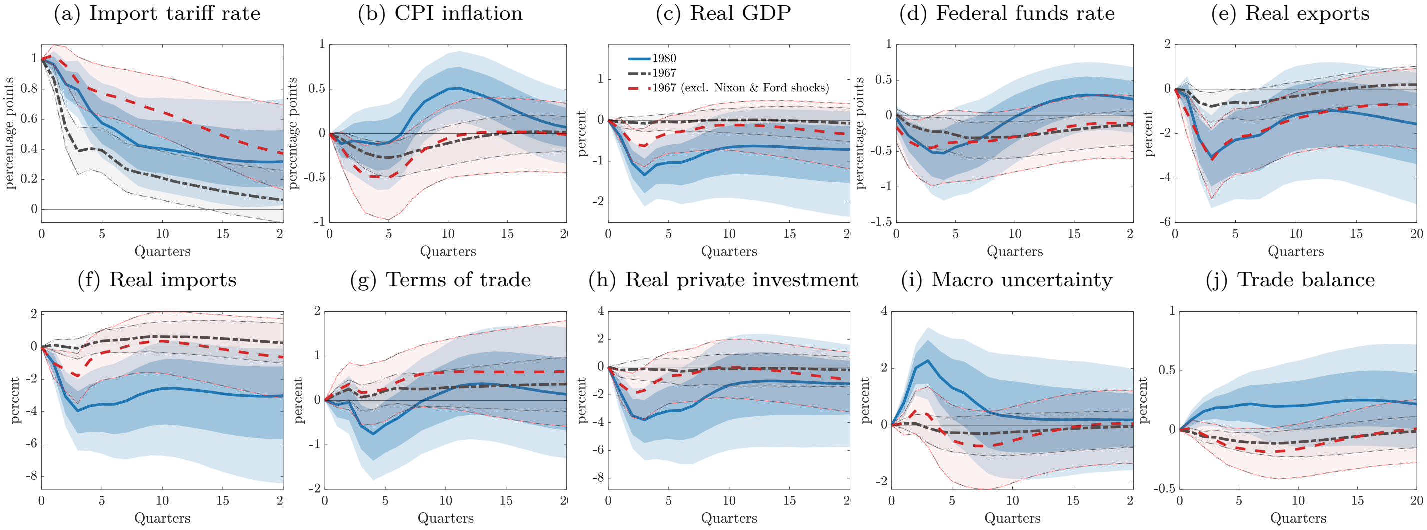
the turmoil associated with the end of the Bretton Woods system. The Ford shock was a tariff on oil imports, partly in response to high oil prices (Dainauskas and Lastauskas, 2024). Note that Barnichon and Singh (2025) raise similar concerns in their narrative account. Because of these potential endogeneity concerns, we would like the estimates not to be unduly affected by these events.

Thus, we investigate how the results change if one takes out these shocks. Specifically, we smooth out these events from the average tariff rate time series in the following way: We replace the values during these shock episodes with the average import tariff across the pre- and post-event tariff rate.[4] The responses using the smoothed import tariff series are shown as dashed red lines in Figure D.1. It turns out that we recover a significant output contraction, which is also visible in other components of aggregate demand, e.g., in real private investment. Thus, we conclude that there is robust evidence for tariffs being contractionary, consistent with Barnichon and Singh (2025), while the effects on inflation are more sample dependent.

A potential reason for this sample dependence is that supply chain length and supply chain complexity have increased substantially, so that more products are affected by tariff changes in today's economy. In a similar vein, Bergin and Corsetti (2023) show that a sufficiently low share of material inputs in marginal cost may predict tariff hikes to be deflationary. Investigating such dependencies in greater detail is left for future research, however.

[4] The Nixon shock took place in the third and fourth quarters of 1971. The Ford shock took place during all quarters of 1975.

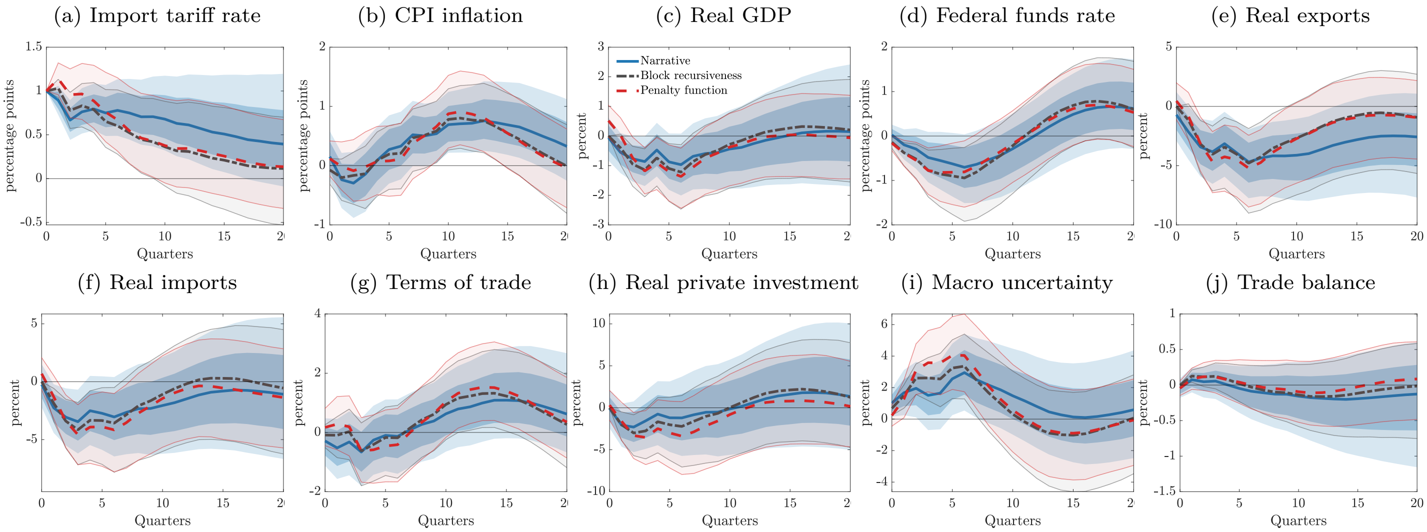
Figure D.1: Varying sample starts to compare with Schmitt-Grohé and Uribe (2025)



Notes: The solid blue, dashed-dotted gray, and dashed red lines represent posterior medians. The blue shaded areas are 68% and 90% credible sets, and the thin-dotted lines indicate 90% credible sets. The legend indicates the sample start of the respective specification; see text for details.

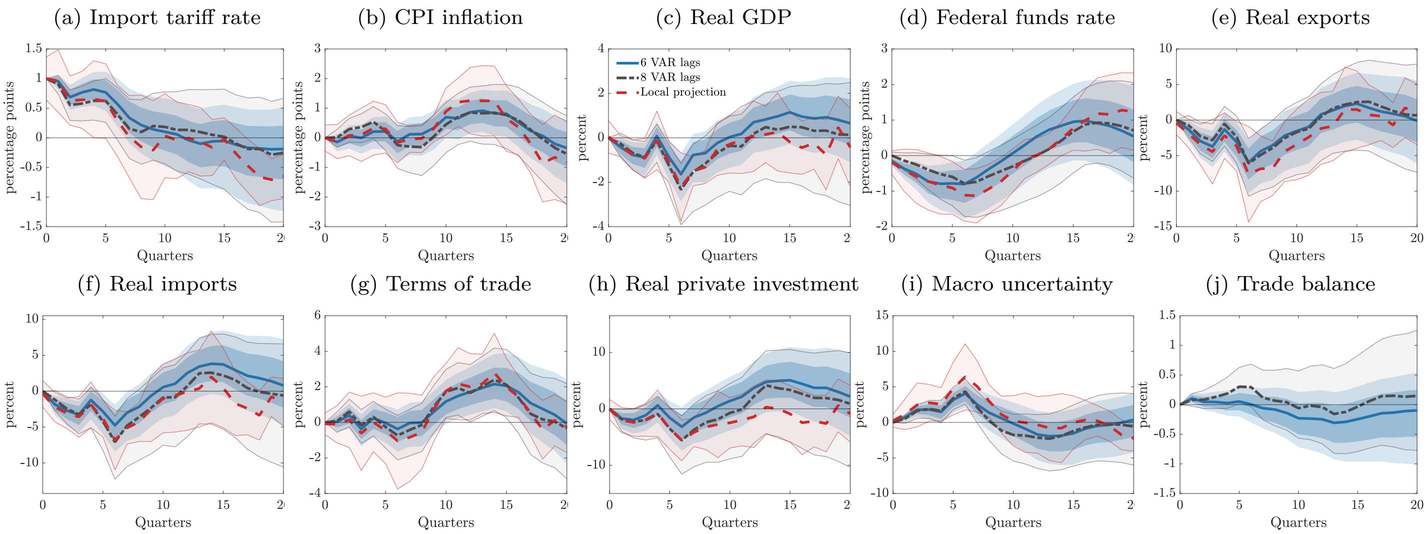
E Additional results and robustness for tariff shocks

Figure E.1: Alternative identification approaches



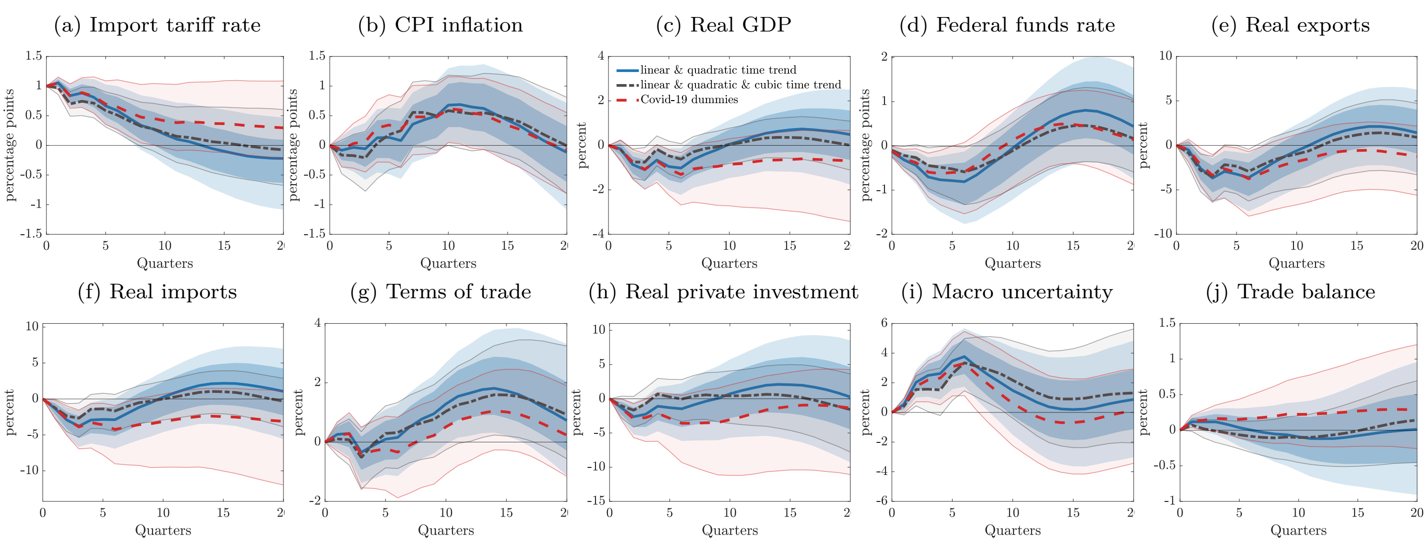
Notes: The solid blue, dashed-dotted gray, and dashed red lines represent posterior medians. The blue shaded areas are 68% and 90% credible sets, and the thin-dotted lines indicate 90% credible sets. The legend indicates the identification approach of the respective specification; see main text for details.

Figure E.2: Relaxing VAR assumptions



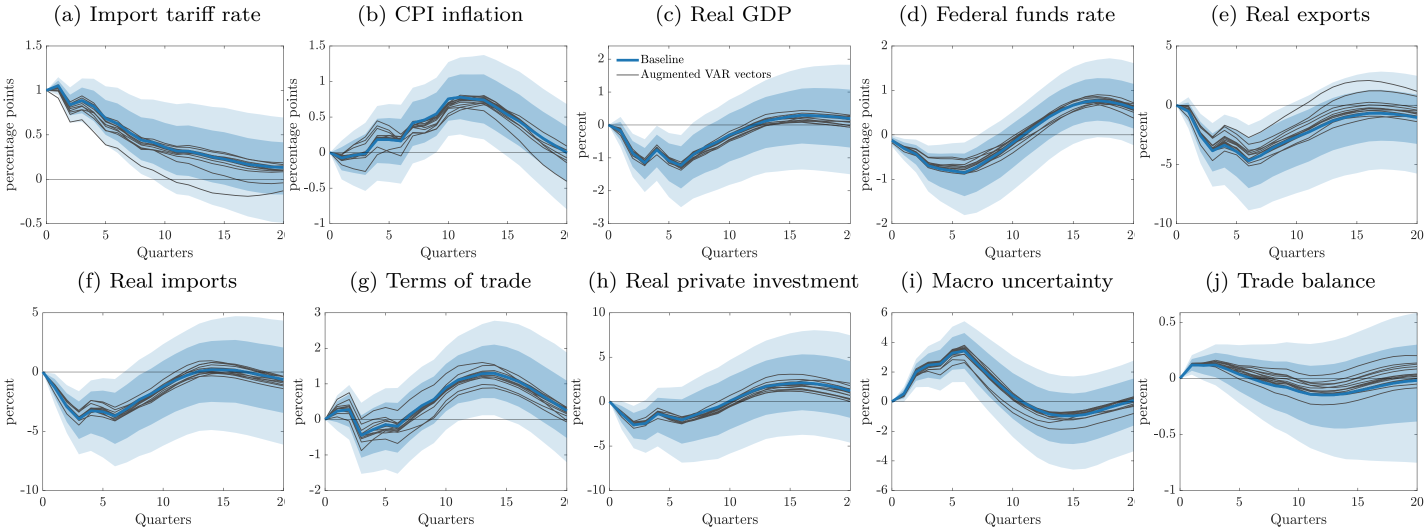
Notes: The solid blue and dashed-dotted gray lines represent posterior medians. The blue shaded areas are 68% and 90% credible sets, and the thin-dotted gray lines indicate 90% credible sets. The dashed red line corresponds to a local projection point estimate, and the thin-dotted red lines indicate 90% confidence bands based on standard errors robust to heteroskedasticity and serial correlation. The local projection includes four lags of the shock and the outcome variable as controls. The shock is based on the posterior median of the baseline tariff VAR, taken over the reduced-form parameters.

Figure E.3: Additional deterministic variables



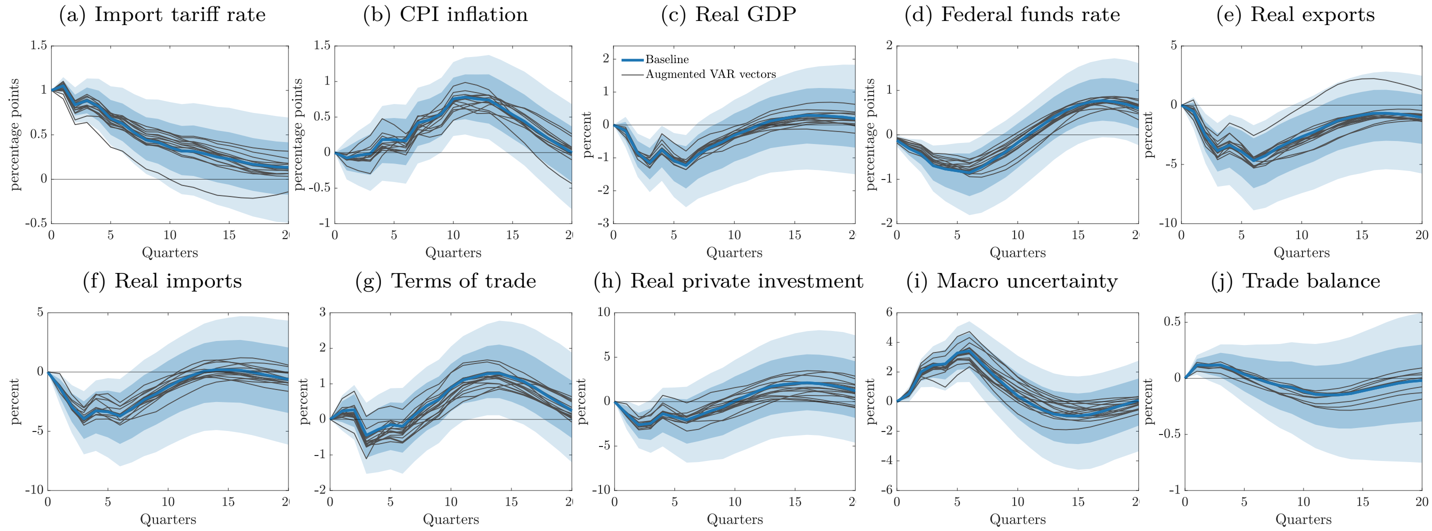
Notes: The solid blue, dashed-dotted gray, and dashed red lines represent posterior medians. The blue shaded areas are 68% and 90% credible sets, and the thin-dotted lines indicate 90% credible sets. The legend indicates the included deterministic variables of the respective specification.

Figure E.4: Controlling for additional measures of uncertainty



Notes: The solid blue lines represent the posterior median of the baseline tariff VAR, and the blue shaded areas are 68% and 90% credible sets. Each thin gray line corresponds to the posterior median of an augmented VAR, where we include an additional measure of uncertainty and allow the tariff shock to impact this variable in the quarter of the shock. We consider the 12 categorical economic policy uncertainty indices from Baker, Bloom, and Davis (2016), the geopolitical risk measure from Caldara and Iacoviello (2022), and the trade policy uncertainty index from Caldara, Iacoviello, Molligo, Prestipino, and Raffo (2020). All indices are available via the website https://www.policyuncertainty.com.

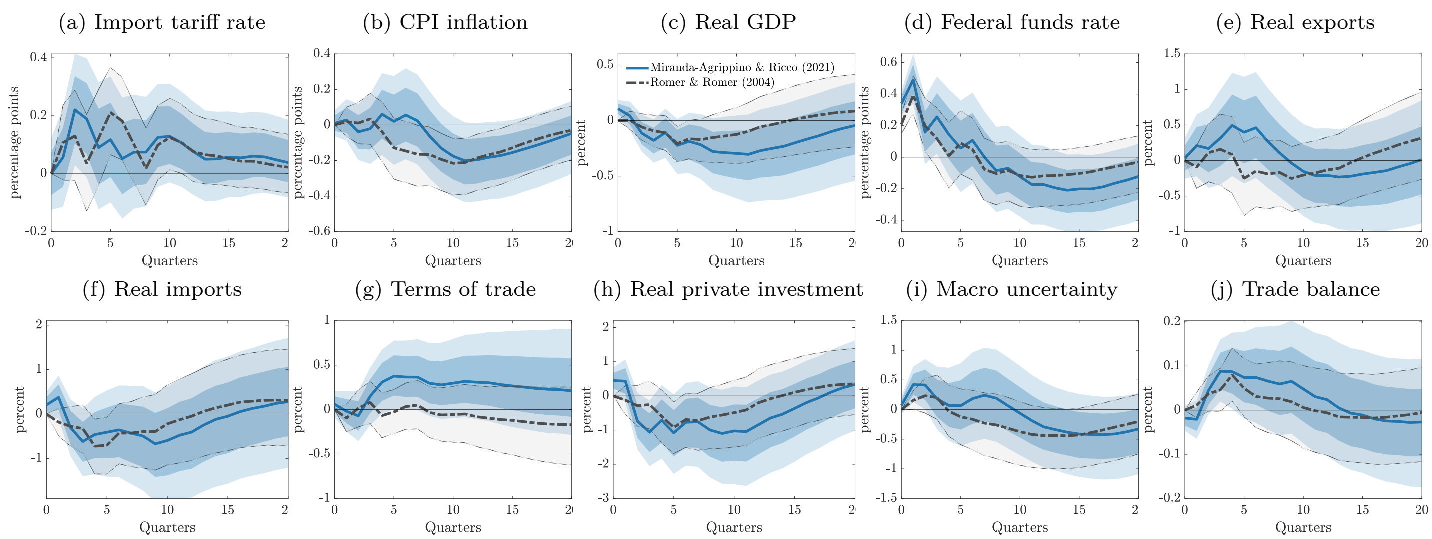
Figure E.5: Controlling for additional variables from Figure 3 in the main text



Notes: The solid blue lines represent the posterior median of the baseline tariff VAR, and the blue shaded areas are 68% and 90% credible sets. Each thin gray line corresponds to the posterior median of an augmented VAR, where we include an additional variable to the VAR or replace a baseline measure by a different variable. The displayed specifications correspond to all VAR results shown in Figure 3 of the main text.

F Additional results and robustness for counterfactuals

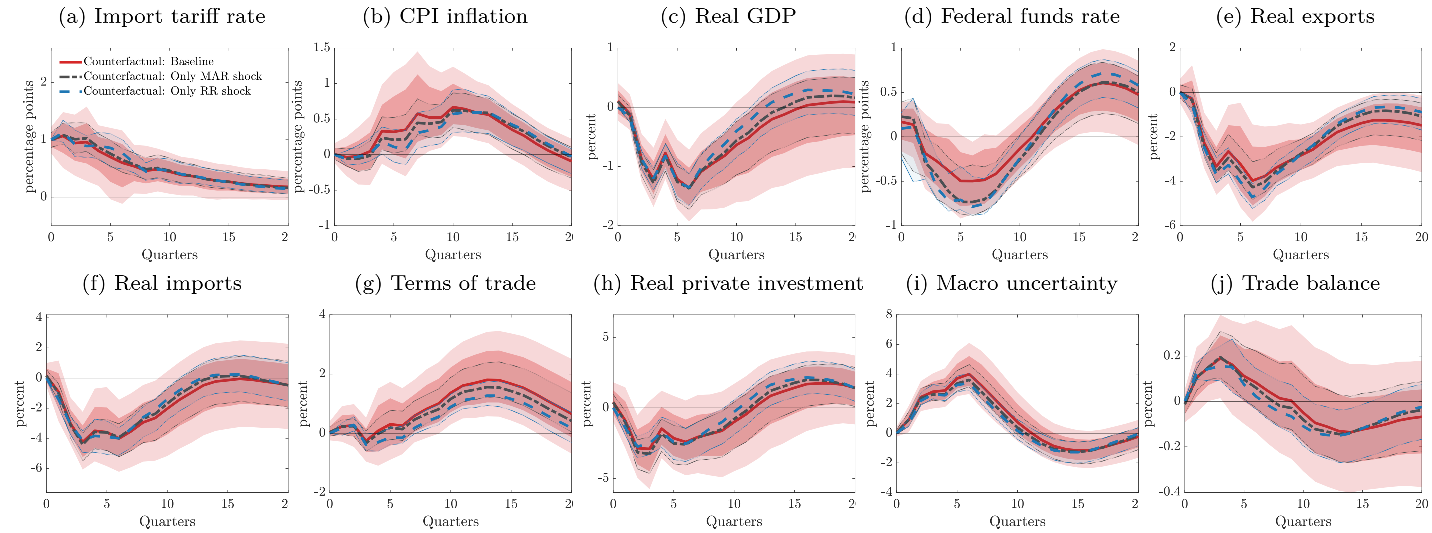
Figure F.1: Baseline responses to monetary policy shocks



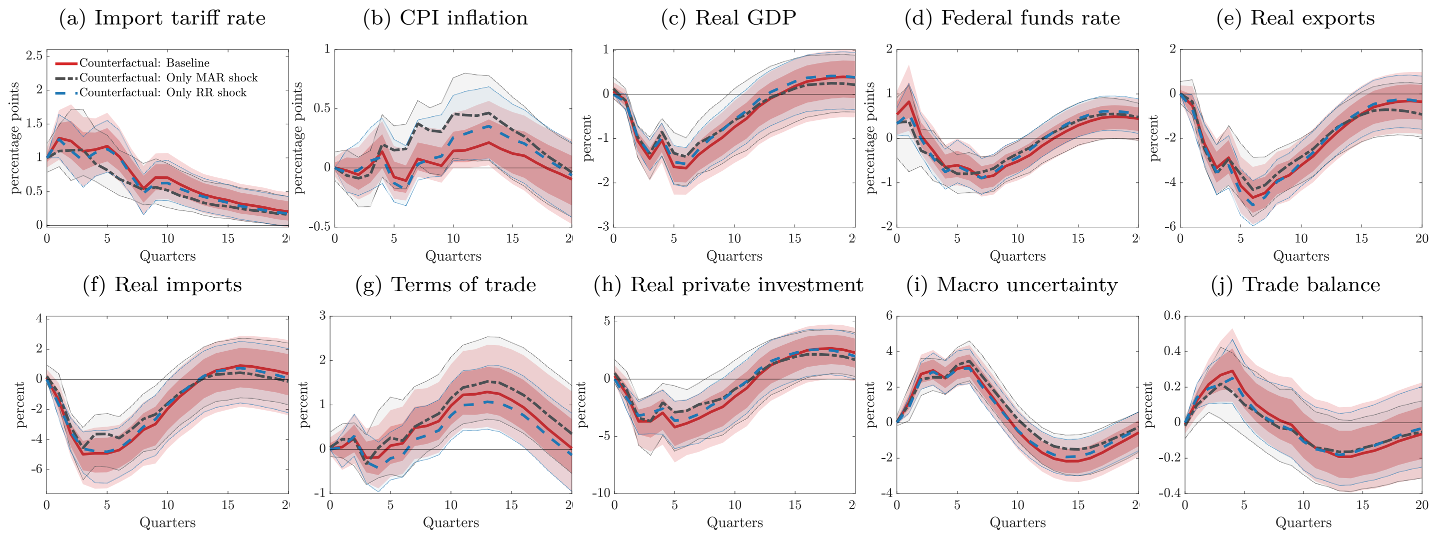
Notes: The solid blue and dashed-dotted gray lines represent posterior medians. The blue shaded areas are 68% and 90% credible sets, and the thin-dotted gray lines indicate 90% credible sets. The results are from the baseline VAR.

Figure F.2: Counterfactuals using only a single monetary policy shock

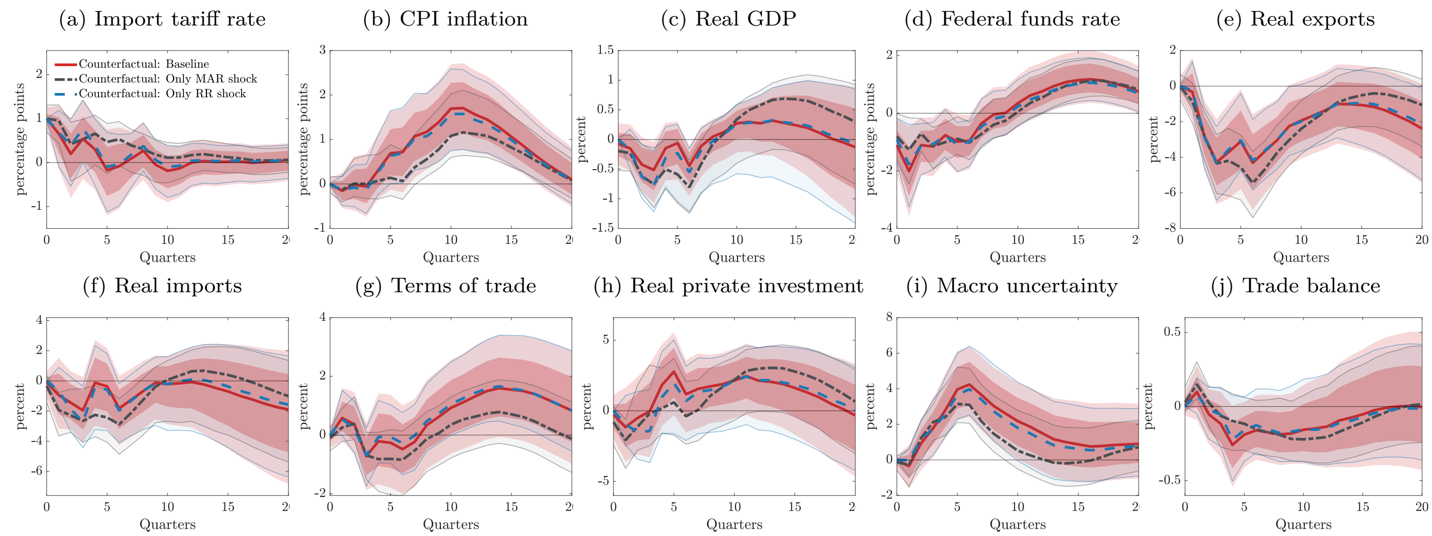
Counterfactual 1: No federal funds rate response



Counterfactual 2: Strict inflation stabilization



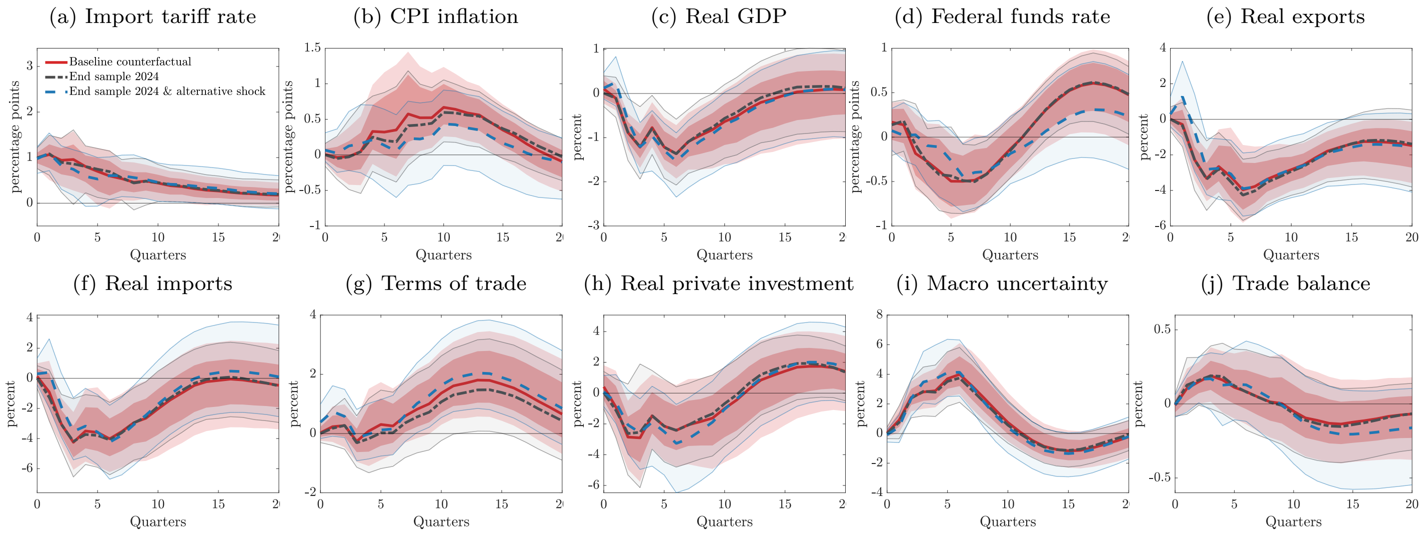
Counterfactual 3: Strict output stabilization



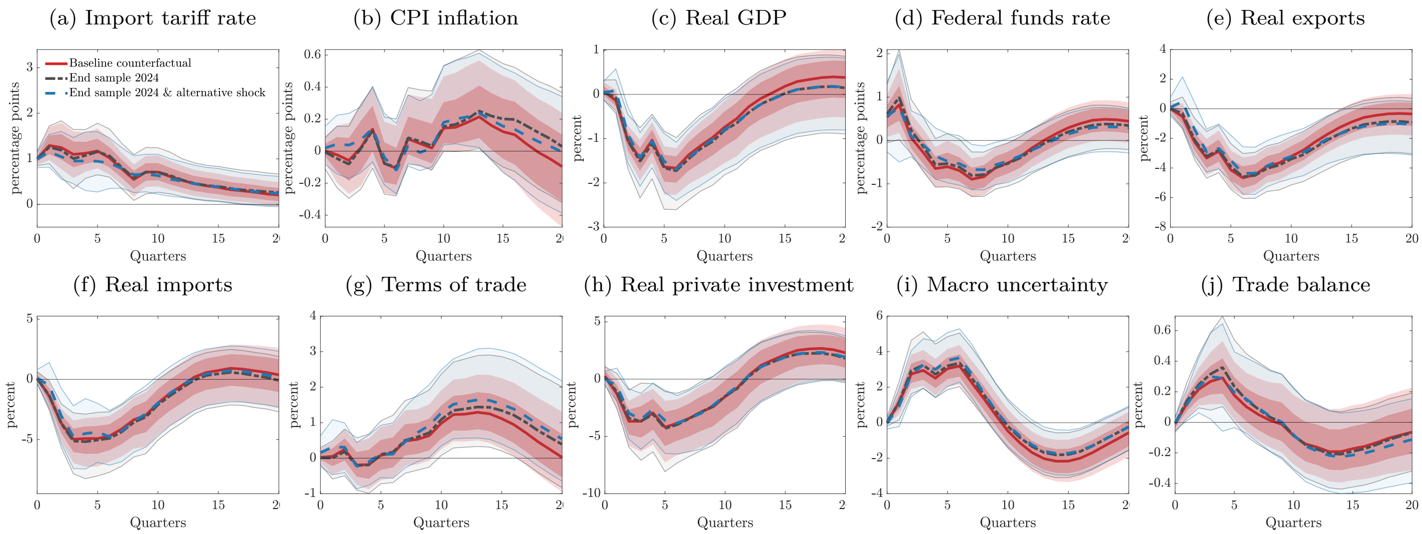
Notes: Alternative monetary policy counterfactuals in comparison to the baseline counterfactual.

Figure F.3: Counterfactuals using an extended sample and the Jarociński (2024) shock

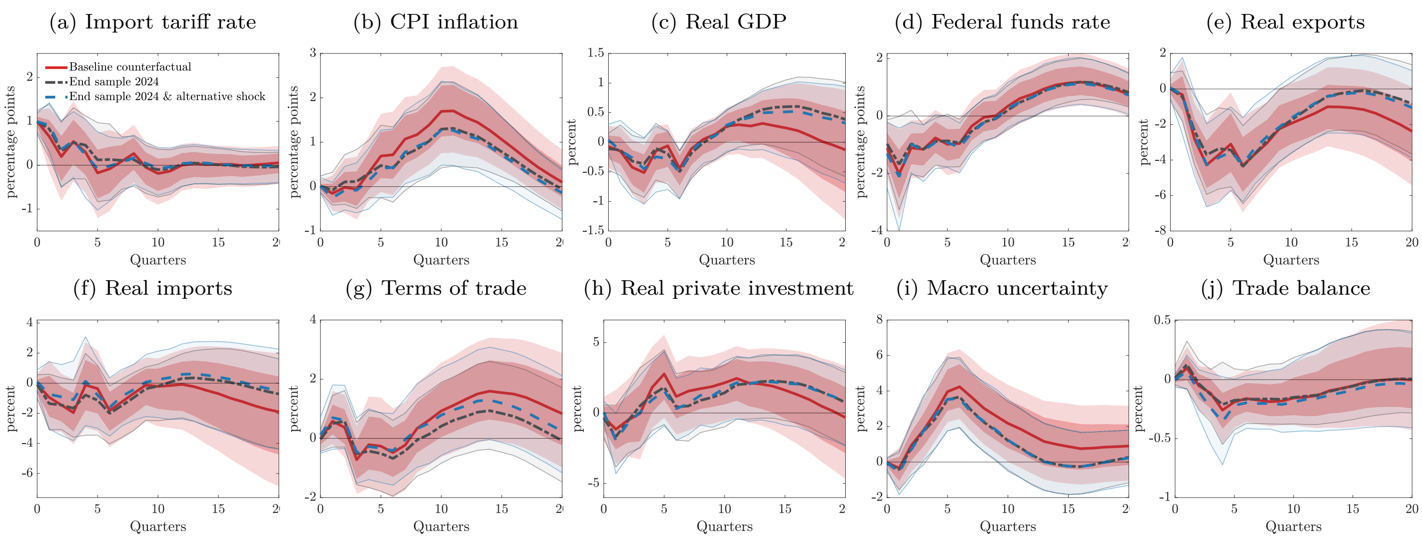
Counterfactual 1: No federal funds rate response



Counterfactual 2: Strict inflation stabilization

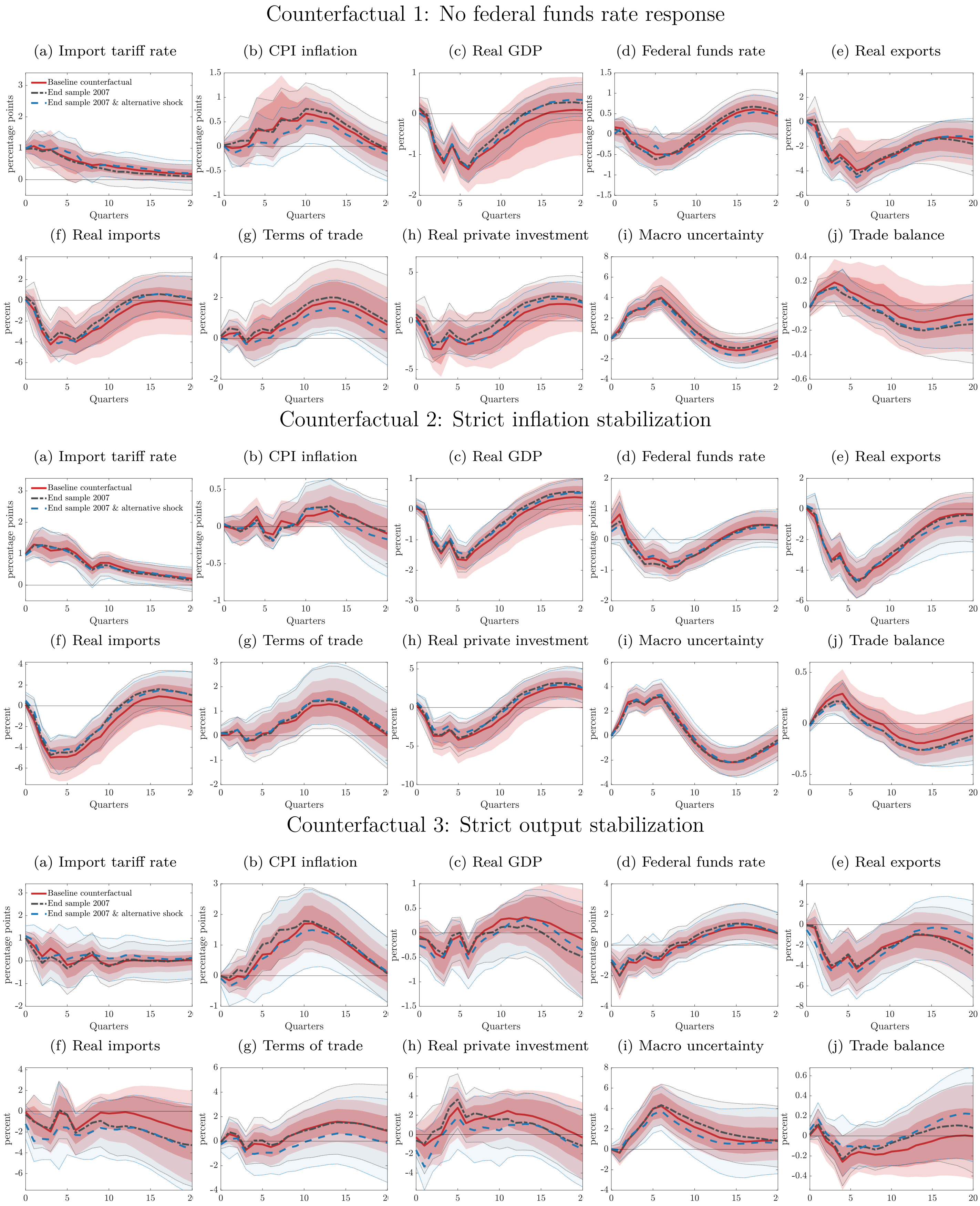


Counterfactual 3: Strict output stabilization



Notes: Alternative monetary policy counterfactuals in comparison to the baseline counterfactual. Extended sample end to 2024 and Jarociński (2024) *u1* shock instead of MAR.

Figure F.4: Counterfactuals using an shorter sample and the Hack et al. (2024) shock



Notes: Alternative monetary policy counterfactuals in comparison to the baseline counterfactual. Reduced sample end to 2007 and Hack et al. (2024) shock instead of RR.

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