The Effects of Transitory, Permanent, and Anticipated U.S. Import Tariff Shocks*

by

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Motivation

• Theory suggests that the macro effects of import tariff shocks depend on their persistence and anticipation:

– transitory tariff increases reduce current demand and improve the external accounts.

– permanent tariff increases have less of an effect on demand and the external accounts.

– anticipated tariff increases stimulate current demand and worsen the external accounts.

• Accordingly, we estimate the impact of tariffs on the macroeconomy using an empirical model that explicitly distinguishes between transitory, permanent, and anticipated tariff shocks.

Main findings

• transitory tariff increases are neither inflationary nor contractionary, are not associated with monetary tightening, and improve the trade balance.

• permanent tariff increases trigger a brief rise in inflation and tightening of monetary policy, leaving output and the trade balance largely unchanged.

• anticipated tariff increases are inflationary and contractionary and worsen the trade balance.

• tariff shocks have insignificant effects on external competitiveness.

• overall, tariff shocks are estimated to be a minor driver of U.S. business cycle fluctuations on average and even during episodes of substantial tariff hikes, such as Nixon 1971, Ford 1975, and Trump 2018.

Related Literature

• Empirical literature on macro effects of tariff shocks is surprisingly thin: Boer and Rieth (2024), dDoesn't distinguish transitory,permanent, anticipated tariff shocks; imposes that tariff increases are inflationary. Barattieri, Cacciatore, and Ghironi (2021).
• Empirical literature using microdata: Amiti et al. (2019); Fajgelbaum et al. (2020); Flaaen et al. (2020); Cavallo et al. (2021); Amiti et al. (2024). Static models, cannot speak to difference between transitory, permanent, or anticipated tariff shocks.
• Theory: early contributions, Razin and Svensson (1983) and Calvo (1987). More recent contributions stronger emphasis on quantitative and normative implications, Barattieri, Cacciatore, and Ghironi (2021), Auray, Devereux, and Eyquem (2022, 2024), Erceg, Prestipino, and Raffo (2023), Bergin and Corsetti (2023), Boer and Rieth (2024), Jeanne and Son (2024), Monacelli (2025), Bianchi and Coulibaly (2025), Cuba-Borda et al. (2025), Auclert, Rognlie, and Straub (2025), Kalemli-Özcan, Soylu, and Yıldırım (2025), Itskhoki and Mukhin (2025), Costinot and Werning (2025), and Werning, Lorenzoni, and Guerrieri (2025).
• Econometric methodology follows Uribe (2022).

U.S. Import Tariff Rates

How to measure the import tariff rate, τ_t: 3 approaches

1. trade-weighted import tariff rate, ratio of import duties to imports of goods, (aggregate data, 1959:Q1–2024:Q4)

$$\tau_t = \frac{d_t}{m_t},$$

where d_t = import duties in t; m_t = value of goods imports in t.

pros: easy to compute; quarterly data since 1959:Q1 from NIPA.
cons: composition bias. To see this let m_{it} =imports of good i in t, d_{it} = duties on good i in t, so

$$\tau_t = \frac{d_t}{m_t} = \frac{\sum_i d_{it}}{m_t} = \frac{\sum_i m_{it}\tau_{it}}{m_t} = \sum_i s_{it}\tau_{it},$$

where τ_{it}=tariff on good i, and $s_{it} = m_{it}/m_t$= share of good i in total imports.

If τ_{it} increases, s_{it} may fall, attenuating the effect on τ_t. Is this a problem?

2. **Fixed-Weight Measure**

Fixed-weight average ratio of import duties to imports,

$$\tau_t^F = \sum_i s_i \tau_{it},$$

where s_i = import share of import good i in a given year (2006).

We compute $\tau_{it} \equiv d_{it}/m_{it}$ and $s_i = m_i/m$ using 4,025 HTS 6-digit level import goods, since 1990:Q1. The data source is United States International Trade Commission (USITC). This time series didn't exist, so we constructed it and made it available online.

pros: fixed-weight index controls for composition bias.
cons: requires quarterly (USITC) microdata on imports and duties, which starts only in 1990:Q1.

Examples of imported goods at the HTS 6-digit level

HS 1988/1992 (H0)

Code	Description
080450	Fruit, edible; guavas, mangoes and mangosteens, fresh or dried
090411	Spices; pepper (of the genus piper), neither crushed nor ground
151530	Vegetable oils; castor oil and its fractions, whether or not refined, but not chemically modified
160412	Fish preparations; herrings, prepared or preserved, whole or in pieces (but not minced)
180610	Cocoa; powder, containing added sugar or other sweetening matter
220710	Undenatured ethyl alcohol; of an alcoholic strength by volume of 80% vol. or higher
240120	Tobacco; partly or wholly stemmed or stripped
650200	Hat-shapes; plaited or made by assembling strips of any material, neither blocked to shape, nor with made brims, nor lined, nor trimmed
691390	Ceramic statuettes and other ornamental ceramic articles; other than of porcelain or china
820340	Tools, hand; pipe-cutters, bolt croppers, perforating punches and similar tools
830250	Hat-racks, hat-pegs, brackets and similar fixtures, of base metal
841990	Machinery, plant and laboratory equipment; parts of equipment for treating materials by a process involving a change of temperature
844712	Knitting machines; circular, with cylinder diameter exceeding 165mm
845129	Drying machines; of a dry linen capacity exceeding 10kg

3. **Trade Restrictiveness Index (TRI)**

Feenstra's (1995) simplified version of Anderson and Neary's (1994) trade restrictiveness index (TRI), defined as the uniform tariff in a given period that delivers the same level of welfare as the actual tariff schedule.

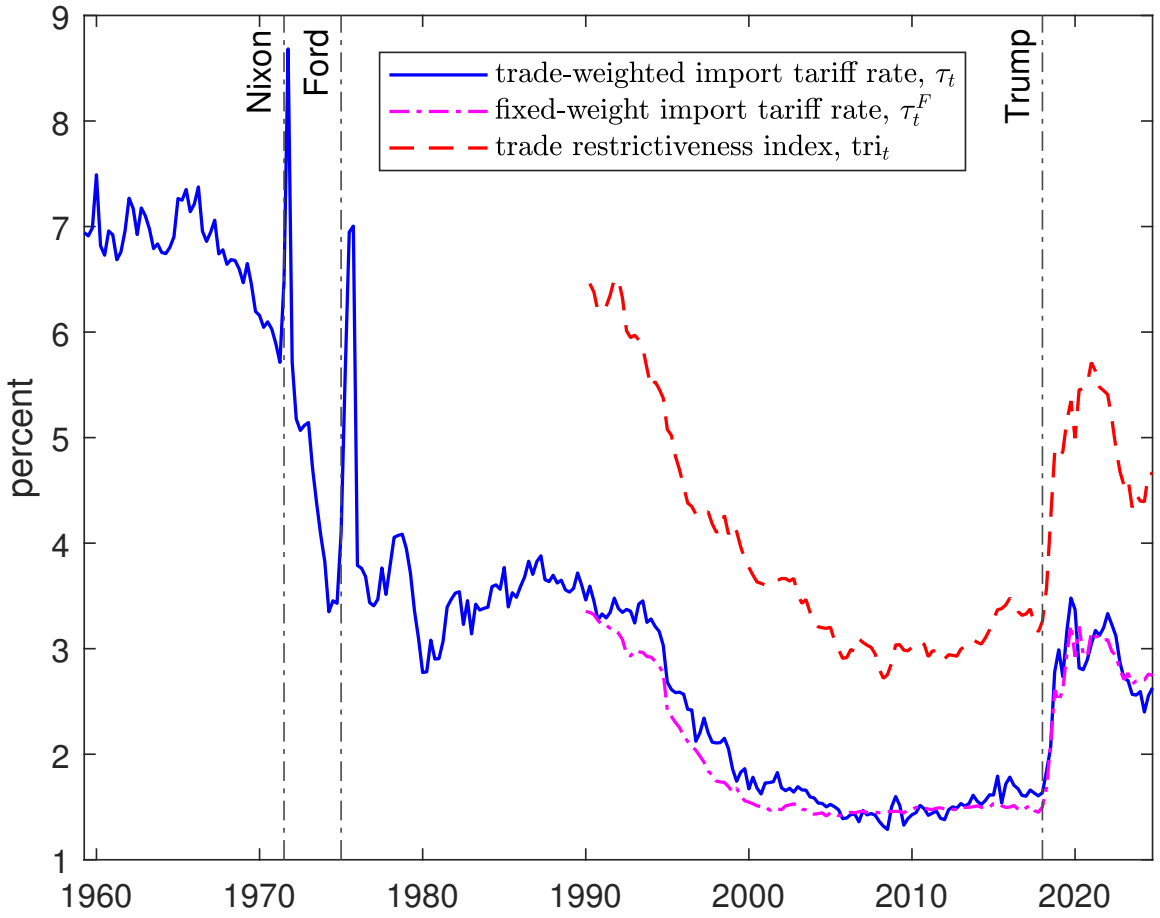
$$\text{tri}_t = \left(\frac{\sum_i s_{it} \epsilon_i \tau_{it}^2}{\sum_i s_{it} \epsilon_i} \right)^{\frac{1}{2}}, \tag{1}$$

where ϵ_i = price elasticity of import demand of good i (from Kee, Nicita, Olarreaga, 2008).

Computed using 2,761 HTS 6-digit level import goods, since 1990:Q1. This time series didn't exist at a quarterly frequency prior to this paper, so we made it available online.

pros: based on a welfare criterion.
cons: requires estimates of import demand elasticities, which reduces the sample of goods included relative to the fixed-weight tariff measure.

U.S. Trade-Weighted Import Tariff Rate, Fixed-Weight Import Tariff Rate, and Trade Restrictiveness Index, 1959:Q2–2024:Q4



Takeaway: The three import tariff measures track one another closely over time and display a synchronized increase around the Trump 2018 episode. (Source: authors' calculations.)

Econometric Model

Key Features

– state-space model based on Uribe (2022)

– 6 observables:
$\Delta\tau_t =$ change in import tariff rate
$\Delta y_t =$ output growth
$\Delta moy_t =$ import-to-output ratio
$\Delta tby_t =$ change in trade-balance-to-output ratio
$\Delta i_t =$ change in the nominal interest rate
$i_t - \pi_t =$ interest-rate-inflation differential

– 10 shocks compete to explain the 6 observables:
6 transitory shocks, including a transitory tariff shock, z_t^τ
4 permanent shocks, including a permanent tariff shock, X_t^τ

The 6 (unobserved) cyclical components

$\widehat{\tau}_t \equiv \tau_t - X_t^{\tau}$; $\widehat{y}_t \equiv y_t - X_t^{y}$; $\widehat{moy}_t \equiv moy_t - X_t^{x}$; $\widehat{tby}_t \equiv tby_t - \alpha X_t^{x}$; $\widehat{i}_t \equiv i_t - X_t^{m}$; $\widehat{\pi}_t \equiv \pi_t - X_t^{m}$

evolve over time as:

$$\begin{bmatrix} \widehat{\tau}_t \\ \widehat{y}_t \\ \widehat{moy}_t \\ \widehat{tby}_t \\ \widehat{i}_t \\ \widehat{\pi}_t \end{bmatrix} = \sum_{i=1}^{L} B_i \begin{bmatrix} \widehat{\tau}_{t-i} \\ \widehat{y}_{t-i} \\ \widehat{moy}_{t-i} \\ \widehat{tby}_{t-i} \\ \widehat{i}_{t-i} \\ \widehat{\pi}_{t-i} \end{bmatrix} + \begin{bmatrix} 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ c_{2,1} & 1 & 0 & 0 & 0 & 0 & c_{27} & c_{2,8} & c_{2,9} & c_{2,10} \\ c_{3,1} & c_{3,2} & 1 & 0 & 0 & 0 & c_{3,7} & c_{3,8} & c_{3,9} & c_{3,10} \\ c_{4,1} & c_{4,2} & c_{4,3} & 1 & 0 & 0 & c_{4,7} & c_{4,8} & c_{4,9} & c_{4,10} \\ c_{5,1} & c_{5,2} & c_{5,3} & c_{5,4} & 1 & 0 & c_{5,7} & c_{5,8} & c_{5,9} & c_{5,10} \\ c_{6,1} & c_{6,2} & c_{6,3} & c_{6,4} & c_{6,5} & 1 & c_{6,7} & c_{6,8} & c_{6,9} & c_{6,10} \end{bmatrix} \begin{bmatrix} z_t^{\tau} \\ z_t^{y} \\ z_t^{moy} \\ z_t^{tby} \\ z_t^{i} \\ z_t^{\pi} \\ \Delta X_t^{\tau} \\ \Delta X_t^{y} \\ \Delta X_t^{x} \\ \Delta X_t^{m} \end{bmatrix}$$

The z's are stationary and the X's are nonstationary. They are unobservable and follow the $AR(1)$ process

$$\begin{bmatrix} z_t^{\tau} \\ z_t^{y} \\ z_t^{moy} \\ z_t^{tby} \\ z_t^{i} \\ z_t^{\pi} \\ \Delta X_t^{\tau} \\ \Delta X_t^{y} \\ \Delta X_t^{x} \\ \Delta X_t^{m} \end{bmatrix} = \rho \begin{bmatrix} z_{t-1}^{\tau} \\ z_{t-1}^{y} \\ z_{t-1}^{moy} \\ z_{t-1}^{tby} \\ z_{t-1}^{i} \\ z_{t-1}^{\pi} \\ \Delta X_{t-1}^{\tau} \\ \Delta X_{t-1}^{y} \\ \Delta X_{t-1}^{x} \\ \Delta X_{t-1}^{m} \end{bmatrix} + \psi \begin{bmatrix} \epsilon_t^1 \\ \epsilon_t^2 \\ \epsilon_t^3 \\ \epsilon_t^4 \\ \epsilon_t^5 \\ \epsilon_t^6 \\ \epsilon_t^7 \\ \epsilon_t^8 \\ \epsilon_t^9 \\ \epsilon_t^{10} \end{bmatrix}$$

with $\epsilon_t^i \sim \mathcal{N}(0,1)$ i.i.d. The matrices ρ and ψ are diagonal.

We wish to estimate the elements of the matrices B_i, for $i = 1, \ldots, L$, C, ρ, and ψ. However, the 2 equations in the previous slide cannot be directly taken to the data because none of the variables in the model are observable.

Observation equations

$$\Delta\tau_t = \widehat{\tau}_t - \widehat{\tau}_{t-1} + \Delta X_t^{\tau},$$

$$\Delta y_t = \widehat{y}_t - \widehat{y}_{t-1} + \Delta X_t^{y},$$

$$\Delta moy_t = \widehat{moy}_t - \widehat{moy}_{t-1} + \Delta X_t^{x},$$

$$\Delta tby_t = \widehat{tby}_t - \widehat{tby}_{t-1} + \alpha\Delta X_t^{x},$$

$$\Delta i_t = \widehat{i}_t - \widehat{i}_{t-1} + \Delta X_t^{m},$$

$$i_t - \pi_t = \widehat{i}_t - \widehat{\pi}_t.$$

- model is estimated using the Kalman Filter and Bayesian methods.
- **Prior Distributions**

Parameter	Distribution	Mean	Std. Dev.
Estimated diagonal elements of B_1	Normal	0.95	0.5
Other estimated elements of B_i, $i = 1, \ldots, L$	Normal	0	0.25
Estimated elements of C	Normal	0	0.5
Diagonal elements of ψ	Gamma	1	1
Diagonal elements of ρ (stationary shocks)	Beta	0.7	0.2
Diagonal elements of ρ (permanent shocks)	Beta	0.3	0.2
α	Normal	0	0.25

Results

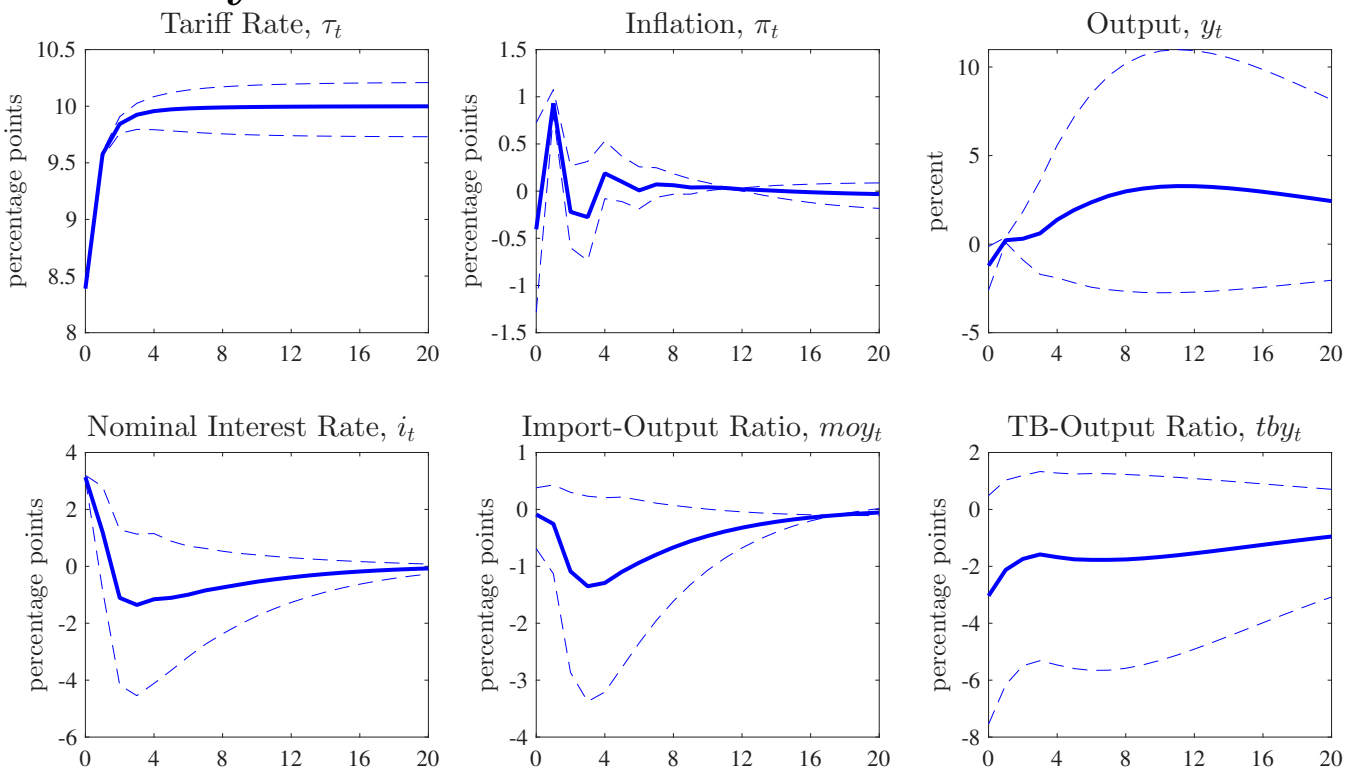
Variance Decomposition

	$\Delta\tau_t$	$\Delta\pi_t$	Δy_t	Δi_t	Δmoy_t	Δtby_t
$z_t^\tau + \Delta X_t^\tau$	100	6	3	5	9	19

Notes. Variance shares are expressed in percent and are posterior means computed from a random subsample of 100,000 posterior draws from an MCMC chain of 1,000,000 draws.

Takeaway: Tariff shocks are a minor driver of the domestic dimension of the U.S. business cycle (output, inflation, and interest rates), but a relevant one for its external dimension (imports and the trade balance).

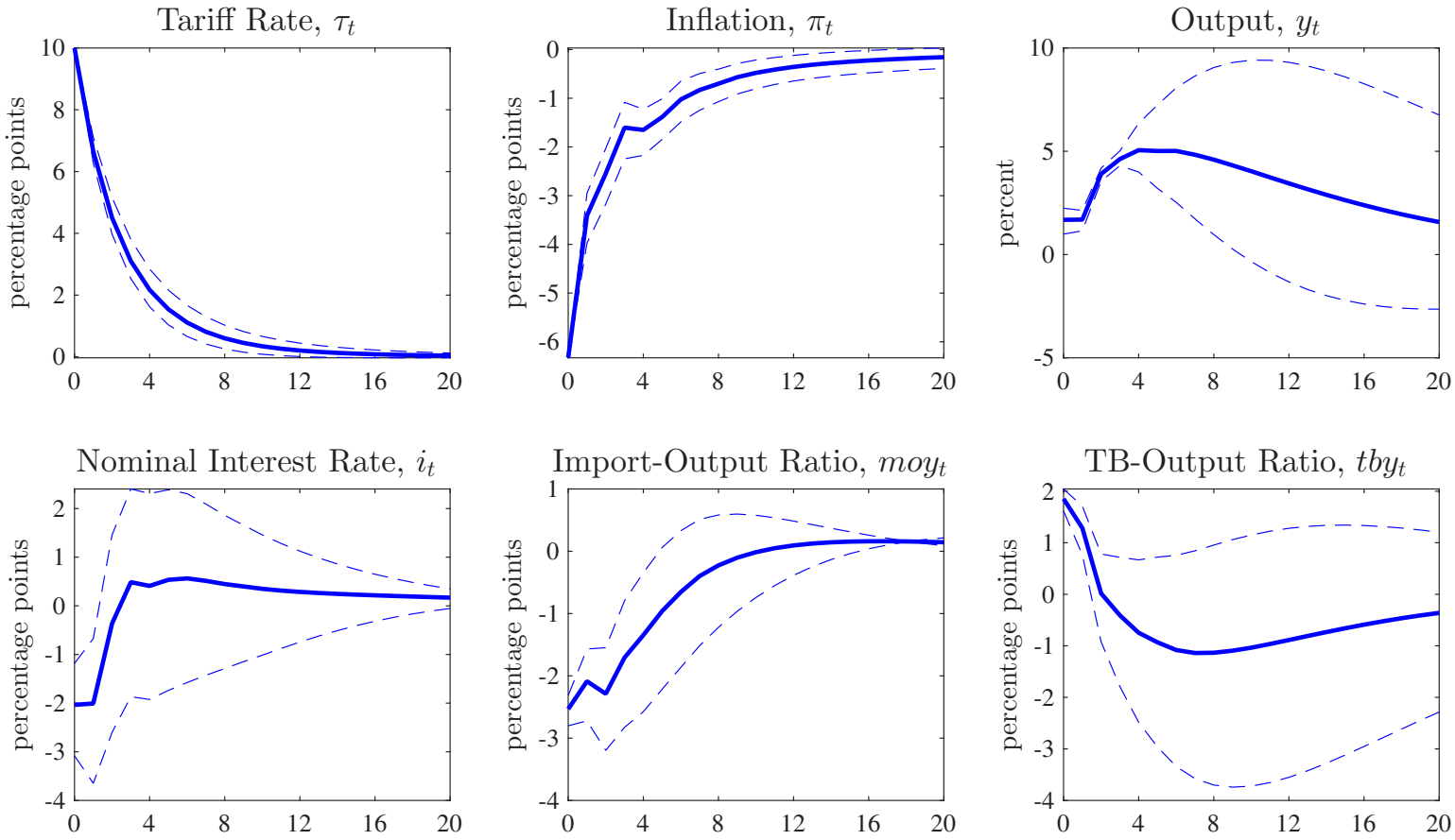
Impulse Responses to an Increase in the Permanent Import Tariff Shock, X_t^τ



Note. Solid lines are posterior means and dashed lines are 90-percent credible bands.

Takeaway: Permanent tariff increases are estimated to generate a short-lived increase in inflation (a one-off price increase) and interest rates, and an insignificant response of output. Consistent with the intertemporal approach to the balance of payments, they do not cause a significant increase in the trade balance.

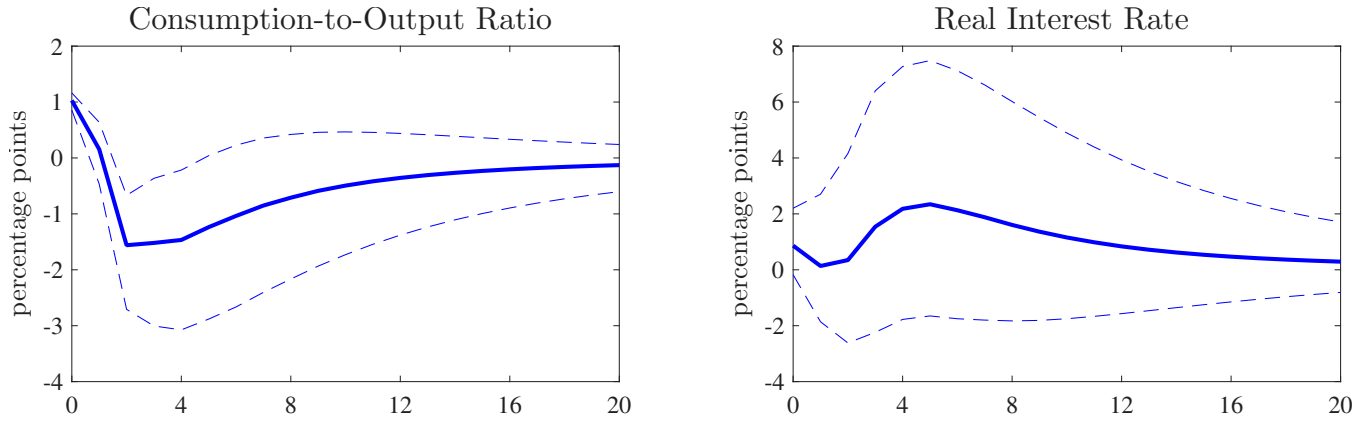
Impulse Responses to a Ten-Percentage-Point Increase in the Transitory Import Tariff Shock, z_t^τ



Note. Solid lines are posterior means and dashed lines are 90-percent credible bands.

Takeaway: Transitory tariff increases are estimated to be neither inflationary nor contractionary. Consistent with the intertemporal approach to the balance of payments, they cause an increase in the trade balance.

IRF of the Consumption-to-Output Ratio and the Real Interest Rate to a 10% Transitory Import Tariff Increase, z_t^τ



Note. Solid lines are posterior means and dashed lines are 90-percent credible bands.

Takeaway: Consumption-to-output ratio falls and the real interest rate rises, suggesting that transitory tariff increases depress inflation through a demand channel to which the Fed responds by easing.

Anticipated Tariff Shocks

$$x_t = \rho_x x_{t-1} + \sum_{j=0}^{J} \sigma_j^x \nu_{j,t-j}^x,$$

for $x = z^\tau, \Delta X^\tau$, where J denotes the longest anticipation horizon.

Introduce auxiliary state vectors ϵ_t^j

$$\begin{aligned}
\epsilon_t^1 &= \epsilon_{t-1}^2 + \sigma_1 \nu_t^1 \\
\epsilon_t^2 &= \epsilon_{t-1}^3 + \sigma_2 \nu_t^2 \\
&\vdots \\
\epsilon_t^{J-1} &= \epsilon_{t-1}^J + \sigma_{J-1} \nu_t^{J-1} \\
\epsilon_t^J &= \sigma_J \nu_t^J
\end{aligned}$$

Structure of model with 4-quarters (J=4) of anticipated shocks:

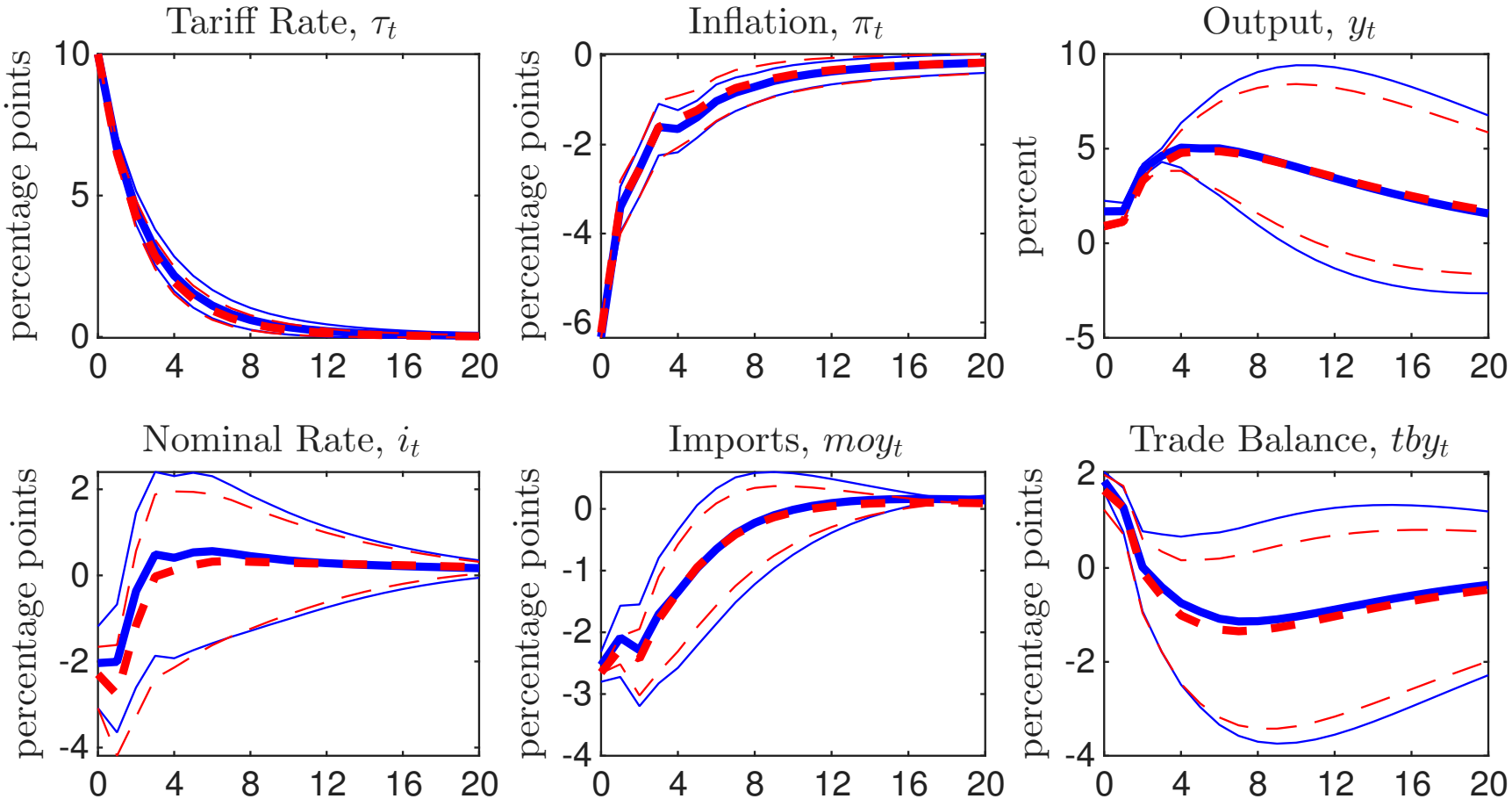
$$\begin{bmatrix} \widehat{\tau}_t \\ \widehat{y}_t \\ \widehat{moy}_t \\ \widehat{tby}_t \\ \widehat{i}_t \\ \widehat{\pi}_t \end{bmatrix} = \sum_{i=1}^{L} B_i \begin{bmatrix} \widehat{\tau}_{t-i} \\ \widehat{y}_{t-i} \\ \widehat{moy}_{t-i} \\ \widehat{tby}_{t-i} \\ \widehat{i}_{t-i} \\ \widehat{\pi}_{t-i} \end{bmatrix} + [C_0 \quad C_1 \quad C_2 \quad C_3 \quad C_4] \begin{bmatrix} u_t \\ \epsilon_t^1 \\ \epsilon_t^2 \\ \epsilon_t^3 \\ \epsilon_t^4 \end{bmatrix}$$

$$C_i = \begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ c_{2,1}^i & 0 & 0 & 0 & 0 & 0 & c_{2,7}^i & 0 & 0 & 0 \\ c_{3,1}^i & 0 & 0 & 0 & 0 & 0 & c_{3,7}^i & 0 & 0 & 0 \\ c_{4,1}^i & 0 & 0 & 0 & 0 & 0 & c_{4,7}^i & 0 & 0 & 0 \\ c_{5,1}^i & 0 & 0 & 0 & 0 & 0 & c_{5,7}^i & 0 & 0 & 0 \\ c_{6,1}^i & 0 & 0 & 0 & 0 & 0 & c_{6,7}^i & 0 & 0 & 0 \end{bmatrix} \quad \text{for } i = 1, 2, 3, 4.$$

$$\begin{bmatrix} u_{t+1} \\ \epsilon_{t+1}^1 \\ \epsilon_{t+1}^2 \\ \epsilon_{t+1}^3 \\ \epsilon_{t+1}^4 \end{bmatrix} = \begin{bmatrix} \rho & I & \emptyset & \emptyset & \emptyset \\ \emptyset & \emptyset & I & \emptyset & \emptyset \\ \emptyset & \emptyset & \emptyset & I & \emptyset \\ \emptyset & \emptyset & \emptyset & \emptyset & I \\ \emptyset & \emptyset & \emptyset & \emptyset & \emptyset \end{bmatrix} \begin{bmatrix} u_t \\ \epsilon_t^1 \\ \epsilon_t^2 \\ \epsilon_t^3 \\ \epsilon_t^4 \end{bmatrix} + \begin{bmatrix} \sigma_0 & \emptyset & \emptyset & \emptyset & \emptyset \\ \emptyset & \sigma_1 & \emptyset & \emptyset & \emptyset \\ \emptyset & \emptyset & \sigma_2 & \emptyset & \emptyset \\ \emptyset & \emptyset & \emptyset & \sigma_3 & \emptyset \\ \emptyset & \emptyset & \emptyset & \emptyset & \sigma_4 \end{bmatrix} \begin{bmatrix} \nu_{t+1}^0 \\ \nu_{t+1}^1 \\ \nu_{t+1}^2 \\ \nu_{t+1}^3 \\ \nu_{t+1}^4 \end{bmatrix}, \tag{2}$$

with $\nu_t^i \sim \mathcal{N}(0, I)$ i.i.d. The matrices ρ and σ_i, for $i = 0, 1, 2, 3, 4$, are diagonal.

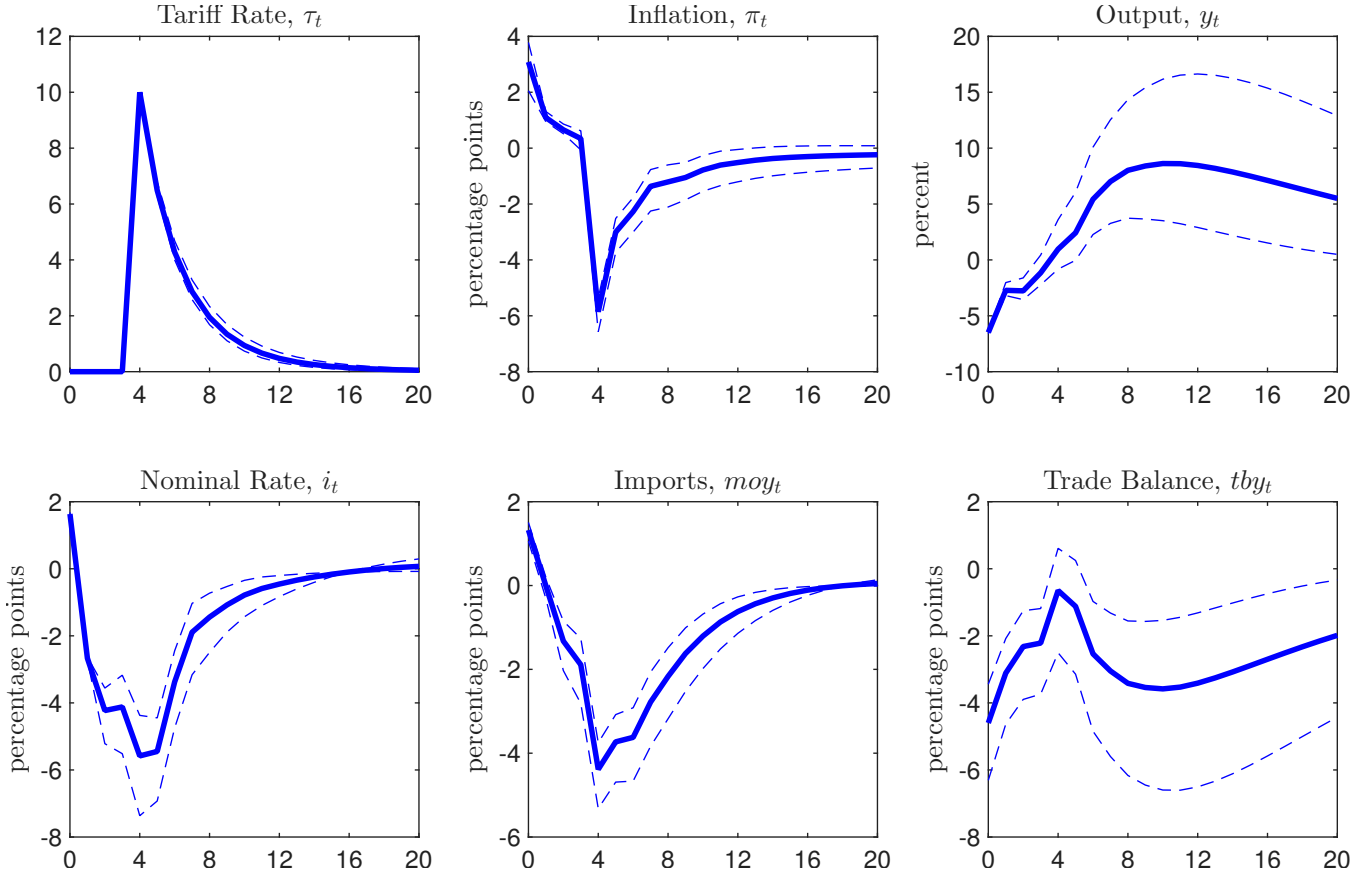
Impulse Responses to a Unanticipated Ten-Percentage-Point Increase in the Transitory Import Tariff Shock



Note. Solid lines baseline model. Dashed lines model that allows for anticipated shocks as well.

Takeaway: Allowing for anticipation does not change the estimated effects of the unanticipated transitory tariff shock.

Impulse Responses to a 4-Quarter Anticipated Ten-Percentage-Point Increase in the Transitory Import Tariff Shock



Note. Solid lines are posterior means and dashed lines are 90-percent credible bands.

Takeaway: In the short run, anticipated tariff increases are inflationary and contractionary, boost imports, and worsen the external accounts.

Anticipated Tariff Shocks: Variance Decomposition

Share	$\Delta\tau_t$	$\Delta\pi_t$	Δy_t	Δi_t	Δmoy_t	Δtby_t
			Baseline			
Unanticipated	100.0	6.3	3.1	5.0	8.9	18.9
			0 and 4 Quarter Anticipation			
Unanticipated	58.0	3.6	1.6	3.4	5.6	9.7
4 Qrts Anticipated	42.0	4.8	4.7	4.9	7.9	18.7
Total	100.0	8.5	6.3	8.3	13.5	28.4

Takeaways: Anticipated tariff shocks account for a larger share of the variance of endogenous variables than unanticipated ones. Quantitatively, however, tariff shocks continue to be a modest driver of U.S. business-cycle fluctuations as they continue to explain less than 10 percent of the variance of inflation, output, and nominal interest rate changes.

Empirical findings are robust to:

- allowing for endogenous import tariffs,

- treating inflation during the Nixon price controls as missing observations,

- including the fixed-weight tariff index (τ_t^F) as an additional observable,

- including the trade restrictiveness index (tri_t) as an additional observable.

Are they consistent with theory? We will address this question next.

Theory: Calvo (1987) SOE + Import-Competing Sector

Households

$$\max \quad \sum_{t=0}^{\infty} \beta^t [u(c_t) - v(h_t)]$$

$$p_t c_t + b_t^* + b_t = x + w_t h_t + (1 + r^*) b_{t-1}^* + \frac{1 + i_{t-1}}{1 + \epsilon_t} b_{t-1} + \Phi_t + T_t$$

FOCs

$$u'(c_t) = \lambda_t p_t$$

$$\lambda_t = \beta(1 + r^*)\lambda_{t+1}$$

Assume $\beta(1 + r^*) = 1$, $\rightarrow \lambda_t = \lambda_0$. Use $p_t = 1 + \tau_t$.

- in response to a purely transitory τ_0 increase, $p_0 \uparrow$, $c_t > c_0$ for all $t > 0$.
- in response to a permanent τ_t increase, $c_t = c_0$ for all $t > 0$.

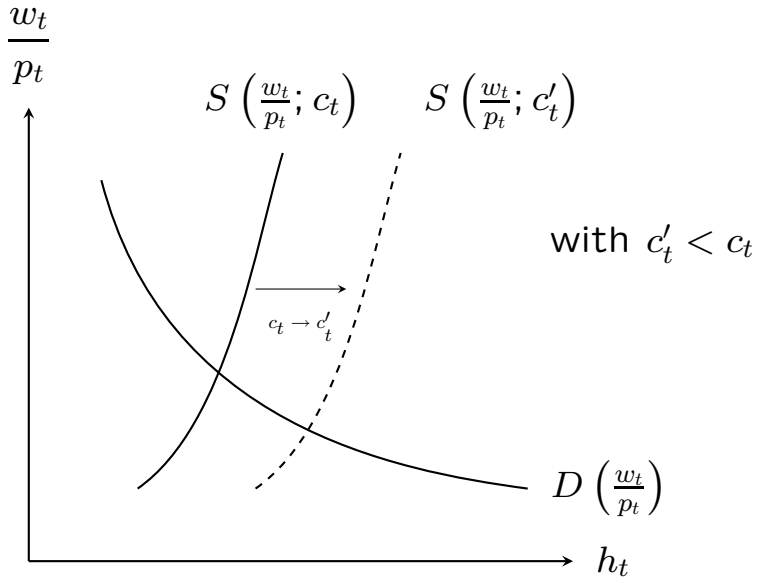
c_t = importable good; h_t = hours worked; $p_t = (1 + \tau_t)$ price of importables in terms of export good; b_t^* = foreign bond; r^* = foreign interest rate; b_t = domestic bond; i_t domestic nominal rate; ϵ_t = depreciation rate; w_t = real wage; x = endowment of export goods; Φ_t = profit income; T_t = lump-sum transfers.

Import competing firm

$$\max \quad p_t F(h_t) - w_t h_t$$

$$F'(h_t) = \frac{w_t}{p_t}$$

Equilbrium in the labor market, given c_t



Labor supply: $$\frac{v'(h_t)}{u'(c_t)} = \frac{w_t}{p_t}$$

Labor demand: $$F'(h_t) = \frac{w_t}{p_t}$$

If c_t falls, h_t rises and output in the import competing sector expands.

• in response to a purely transitory τ_0 increase, $h_0 > h_t$ for all $t > 0$. Imports ($m_t = c_t - F(h_t)$) fall, $m_0 < m_t$ for all $t > 0$. Trade balance ($x - m_t$) improves, $tb_0 > tb_t$ for all t.

• in response to a permanent τ_t increase, $h_t = h_0$ for all $t > 0$. And imports constant, $m_t = m_0$ for all $t > 0$. Trade balance also constant, $tb_t = tb_0$ for all $t > 0$

The government

– imposes a tariff on imports, τ_t

– rebates tariff receipts to households: $T_t = \tau_t \mathcal{E}_t c_t$

Equilibrium intertemporal budget constraint

$$(1+r^*)b^*_{-1} = \sum_{t=0}^{\infty} \frac{c_t - F(h_t) - x}{(1+r^*)^t} = -\sum_{t=0}^{\infty} \frac{tb_t}{(1+r^*)^t}$$

which we can write as

$$r^* b^*_{-1} = -\left[\frac{r^*}{1+r^*} tb_0 + \frac{1}{1+r^*} tb_1\right]$$

Note, in $t=-1$, $r^* b^*_{-1} = -tb_{-1}$. Thus

$$tb_{-1} = \begin{cases} \left[\frac{r^*}{1+r^*} tb_0 + \frac{1}{1+r^*} tb_1\right] & \Rightarrow \text{ transitory tariff increase} \quad \Delta tb_0 > 0 \\ tb_0 & \Rightarrow \text{ permanent tariff increase} \quad \Delta tb_0 = 0 \end{cases}$$

Summary of the Predictions of the Model with an Import Competing Sector

	Tariff Increase	
	Transitory	Permanent
$\Delta c_0/y_0$	< 0	0
Δm_0	< 0	0
$\Delta y_0 = \Delta(x + F(h_0))$	> 0	0
Δtb_0	> 0	0

Consistent with empirical findings that: transitory tariff increases depress imports, depress demand, improve the trade balance and expand output, whereas permanent tariff increases leave imports, demand (not shown), the trade balance, and output largely unchanged.

What about inflation, the nominal rate, and the depreciation rate?

The response of these variables depends on the stance of **monetary policy**.

Inflation: $1+\pi_t = \frac{P_t}{P_{t-1}} = \frac{(1+\tau_t)\mathcal{E}_t}{(1+\tau_{t-1})\mathcal{E}_{t-1}} = \frac{(1+\tau_t)(1+\epsilon_t)}{(1+\tau_{t-1})}$

• A transitory tariff increase, $\tau_0 > 0$, need not be inflationary nor need to be associated with monetary tightening (consistent with our empirical findings)

• An unexpected transitory tariff increase

$$\tau_t = \begin{cases} 0 & \text{for } t < 0 \\ \tau & \text{for } t = 0 \\ 0 & \text{for } t > 0 \end{cases}$$

To stabilize inflation, appreciate to offset tariff shock: $(1+\tau_0)(1+\epsilon_0) = 1$.

Suppose $\epsilon_1 = \epsilon_{-1}$, then by UIP

$$1 + i_0 = (1 + r^*)(1 + \epsilon_1) = (1 + r^*)(1 + \epsilon_{-1}) = 1 + i_{-1}$$

To ensure $\Delta\pi_0 = 0$, set $\Delta i_0 = 0$. (Looking through the tariff.)

- An unexpected permanent tariff increase

$$\tau_t = \begin{cases} 0 & \text{for } t < 0 \\ \tau & \text{for } t \geq 0 \end{cases}$$

Empirical model, delayed price increase. This can be achieved by appreciating the currency on impact to ensure $\Delta\pi_0 = 0$ and tightening $\Delta i_0 > 0$.

Conclusion

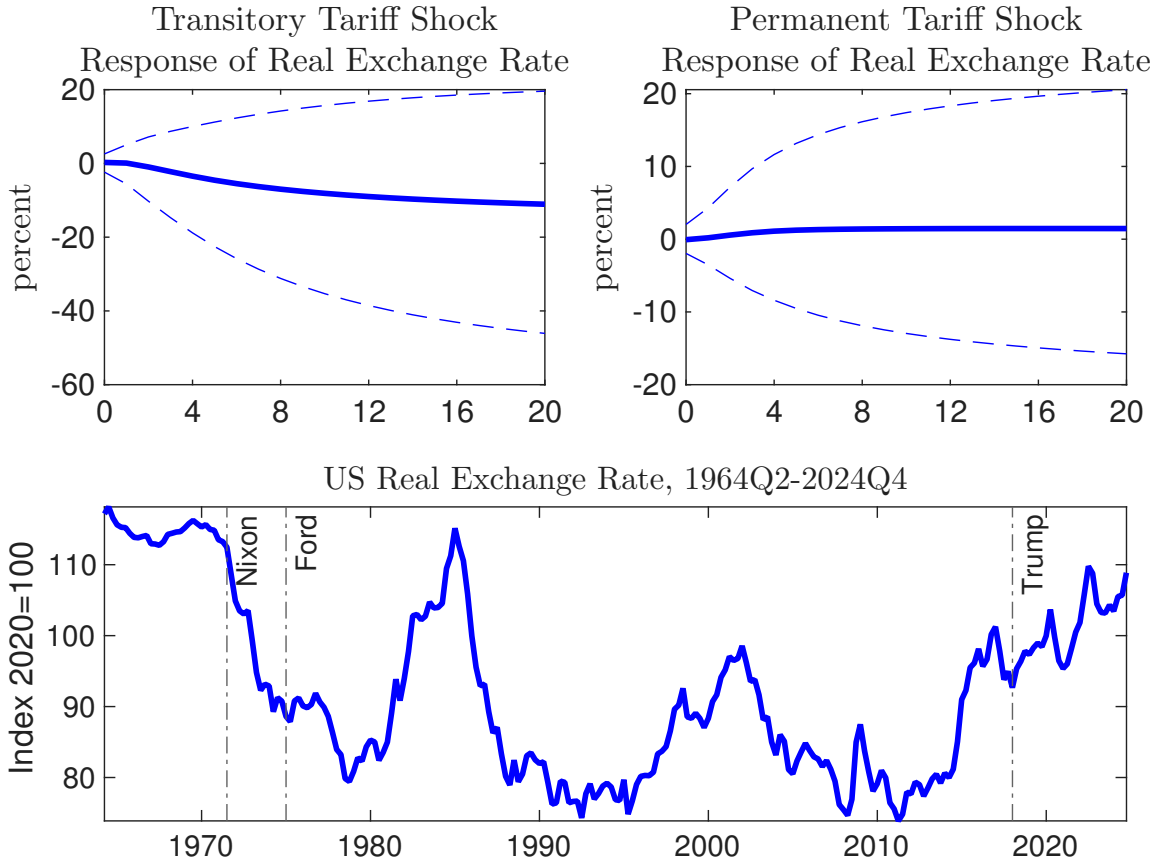
Using econometric evidence and theory, we provide answers to a number of central questions regarding the effects of import tariff shocks in the United States. We show that theory and evidence suggest that distinguishing between permanent, transitory, and anticipated tariff shocks is crucial:

- Are tariff increases inflationary?
  - No, if transitory.
  - Yes, if permanent or anticipated.
- Are they contractionary?
  - No, if transitory or permanent.
  - Yes, if anticipated.
- Do they improve competitiveness? No.
- Do they improve the trade balance?
  - Yes, if transitory.
  - No, if permanent or anticipated.
- Are they an important source of business-cycle fluctuations? No.

- The key ingredient of the theoretical model is an import-competing sector.

Extras

Do increases in U.S. import tariffs affect U.S. competitiveness?

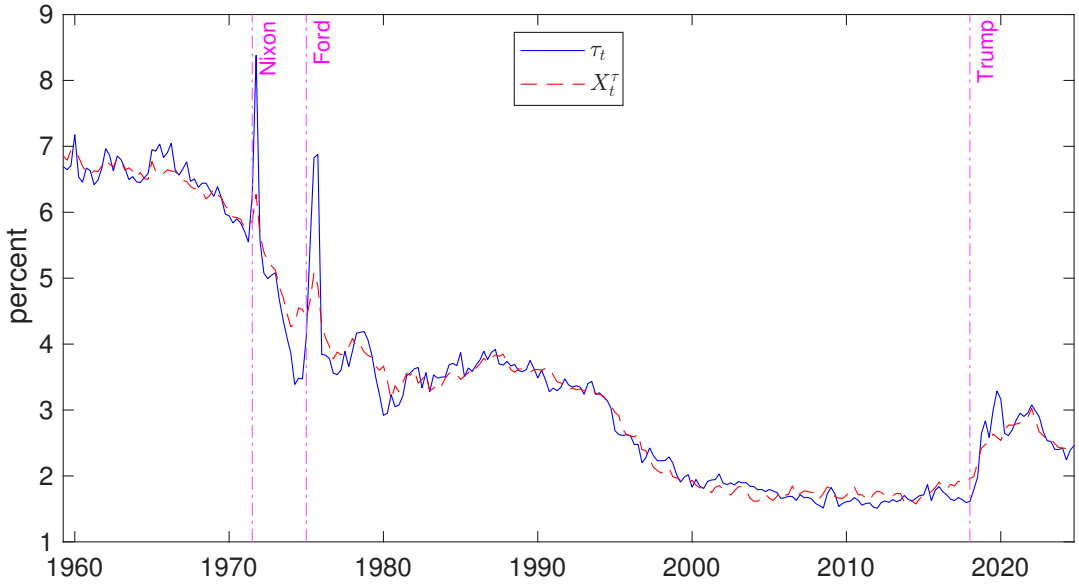


Notes. Top panel, impulse responses to a 10% point increase in tariff. An increase in the real exchange rate indicates a real appreciation of the U.S. dollar.

Takeaway: Import tariff shocks have no significant effect on U.S. competitiveness. In particular, tariff increases don't depreciate the real exchange rate.

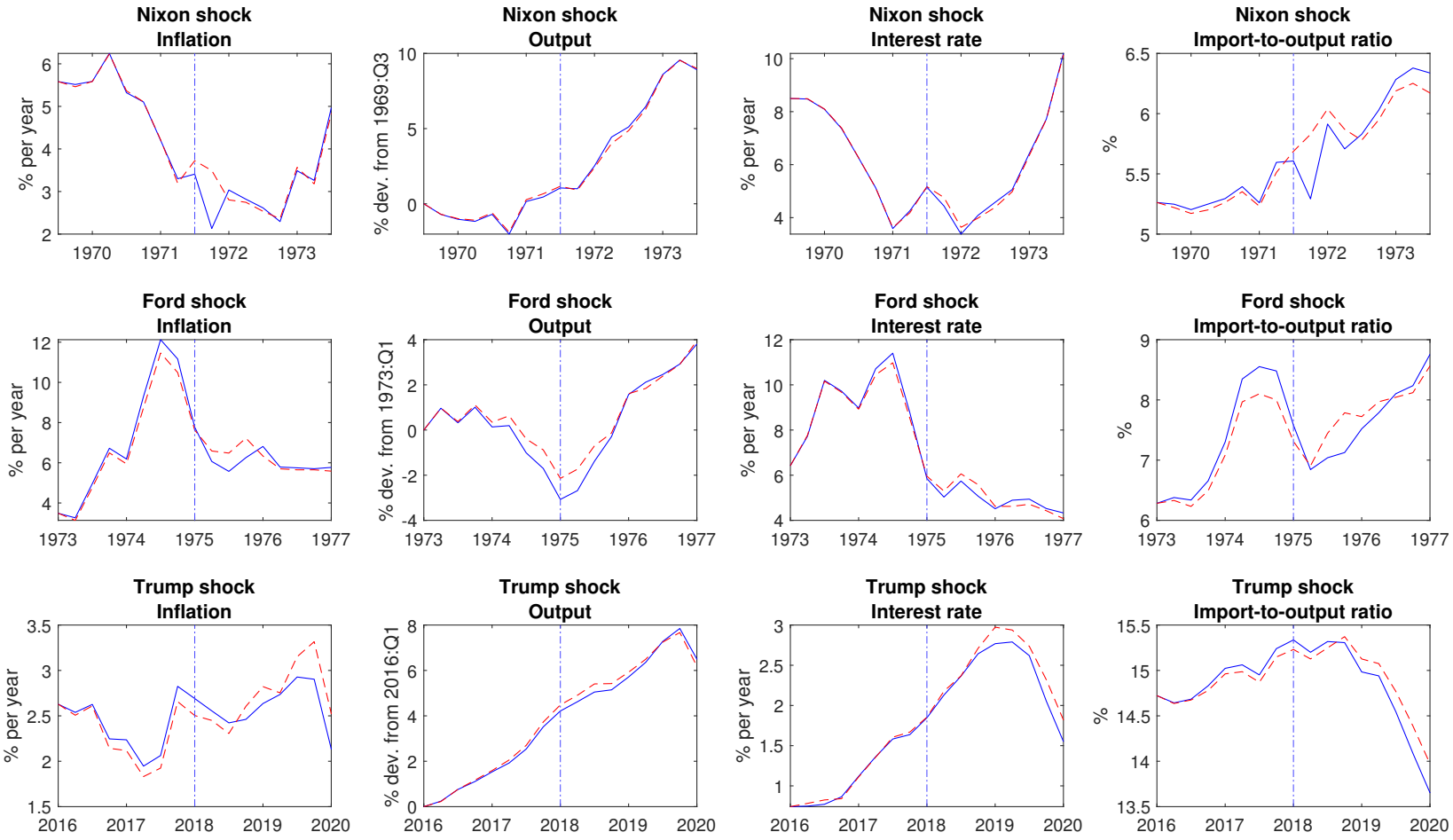
Large Tariff Surges: Nixon, Ford, and Trump

Predicted Time Path of the Import Tariff and Its Permanent Component



Takeaway: The model interprets the Nixon and Ford tariff shocks (1971:Q3 and 1975:Q1) as mostly transitory, and the Trump tariff shock (2018:Q1) as more permanent.

Predicted and Counterfactual Paths Around 3 Large Tariff Shocks



Note. Solid lines: all shocks active. Dashed lines: tariff shocks shut down.

Takeaway. Even large tariff shocks generate relatively small movements in real and nominal macroeconomic aggregates.

Excluding the Nixon Price Controls

Variance Decomposition

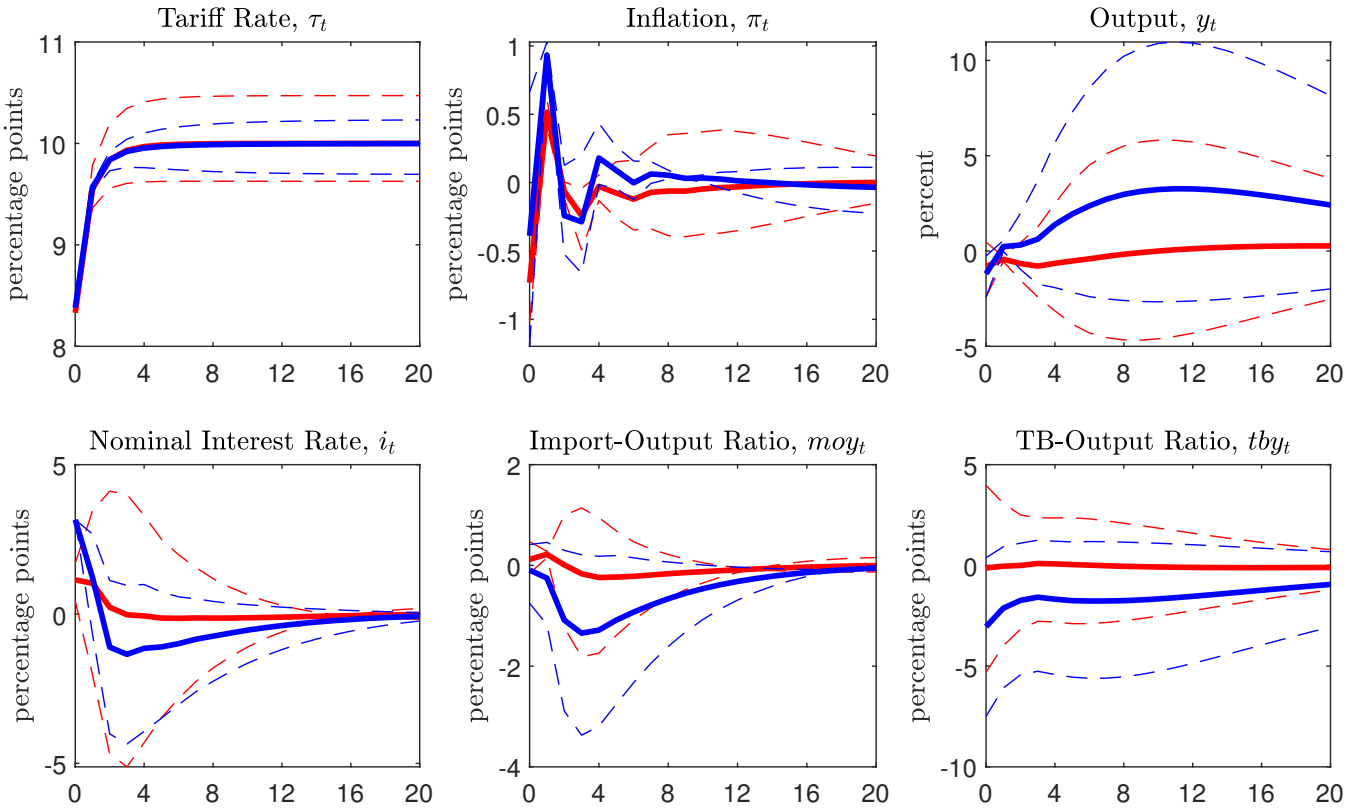
Share of Variance explained by z_t^τ and ΔX_t^τ

	$\Delta\tau_t$	$\Delta\pi_t$	Δy_t	Δi_t	Δmoy_t	Δtby_t
Baseline	100	6	3	5	9	19
Excluding Nixon price controls	100	5	3	5	10	15

Notes. Variance shares are expressed in percent and are posterior means computed from a random subsample of 100,000 posterior draws from an MCMC chain of 1,000,000 draws.

Takeaway: The finding that tariff shocks are a minor driver of U.S. business cycle fluctuations is robust to excluding π_t observations during Nixon price controls, 1971:Q3–1974:Q3.

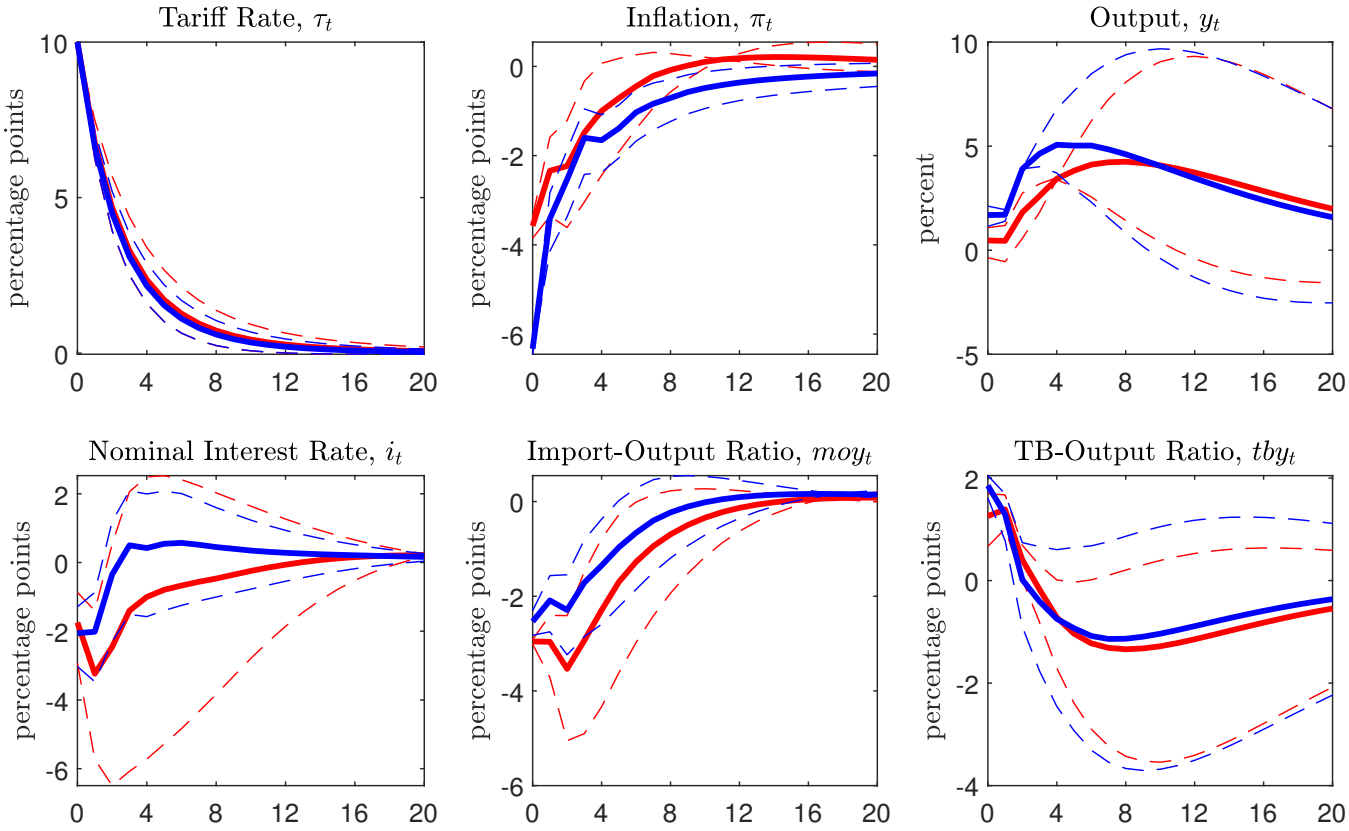
Impulse Responses to an Increase in the Permanent Import Tariff Shock, X_t^τ: Excluding Nixon Price Controls



blue = baseline; red = excluding π_t during, 1971:Q3–1974:Q3.

Takeaway: Prediction that permanent tariff increases generate a one-time increase in the price level is robust to excluding π_t observations during the Nixon price controls.

Impulse Responses to a Ten-Percentage-Point Increase in the Transitory Import Tariff Shock, z_t^τ: Excluding Nixon's Price Controls

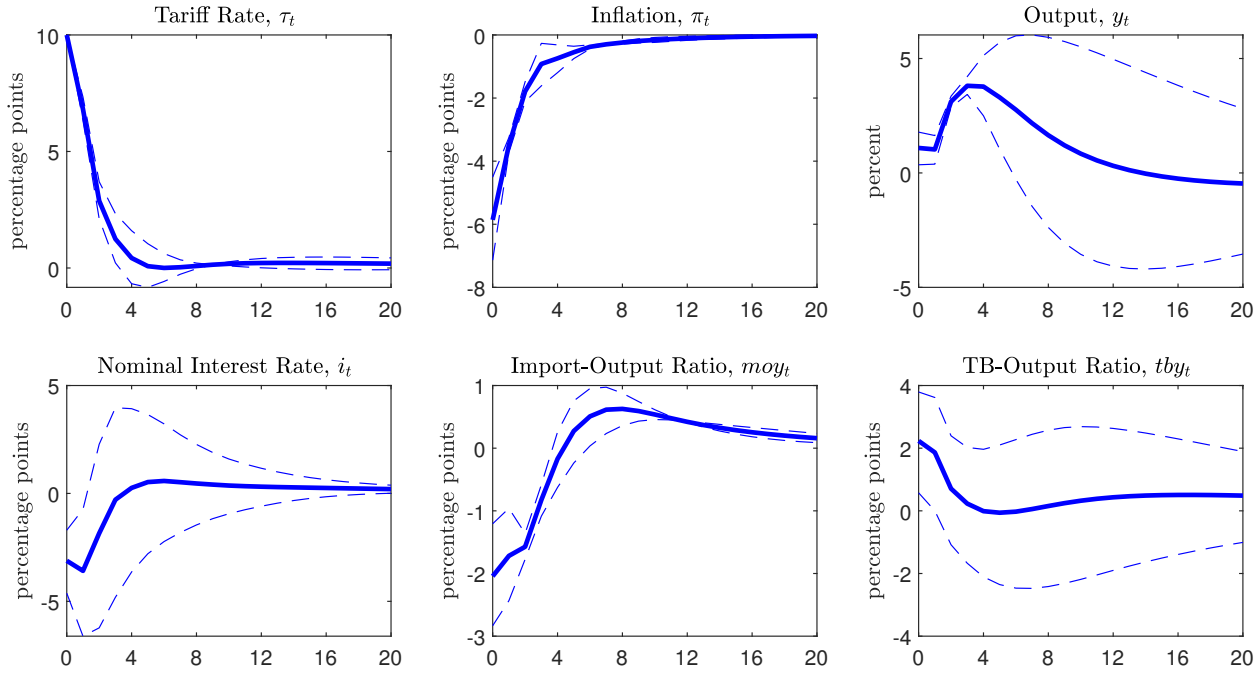


blue = baseline; red = excluding π_t during 1971:Q3–1974:Q3.

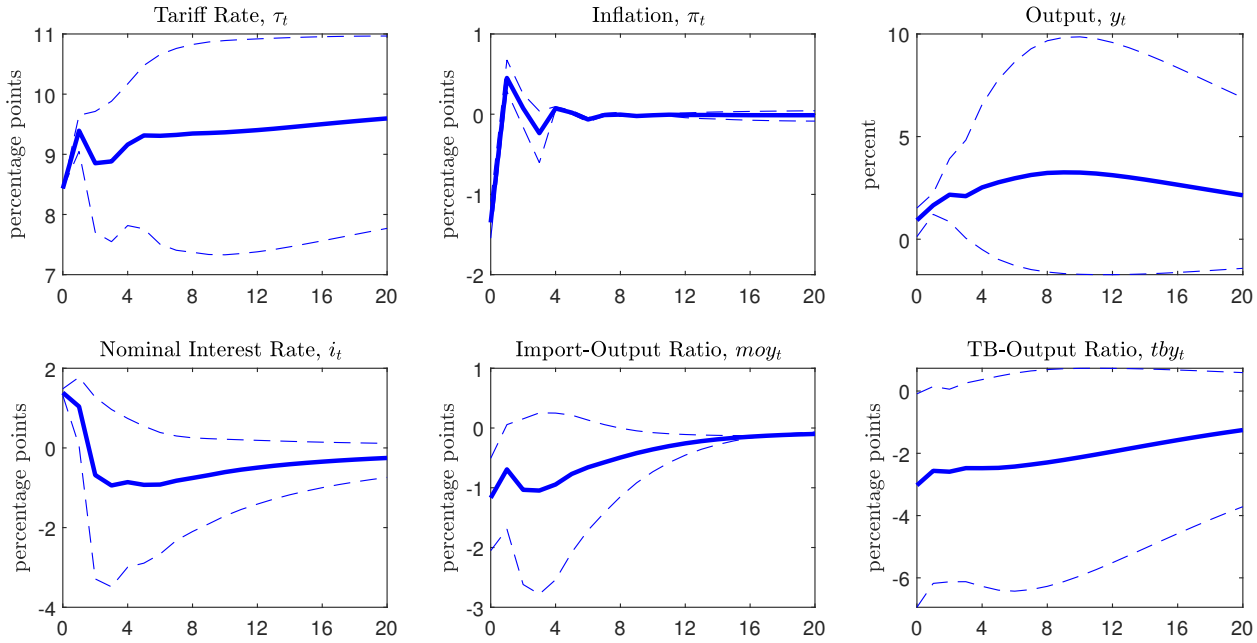
Takeaway: Prediction that transitory tariff increases do not raise inflation is robust to excluding observations on π_t during the Nixon price controls.

Endogenous Import Tariffs

Impulse Responses to a Ten-Percentage-Point Increase in the Transitory Import Tariff Shock, z_t^τ, in a Model with Endogenous Import Tariffs

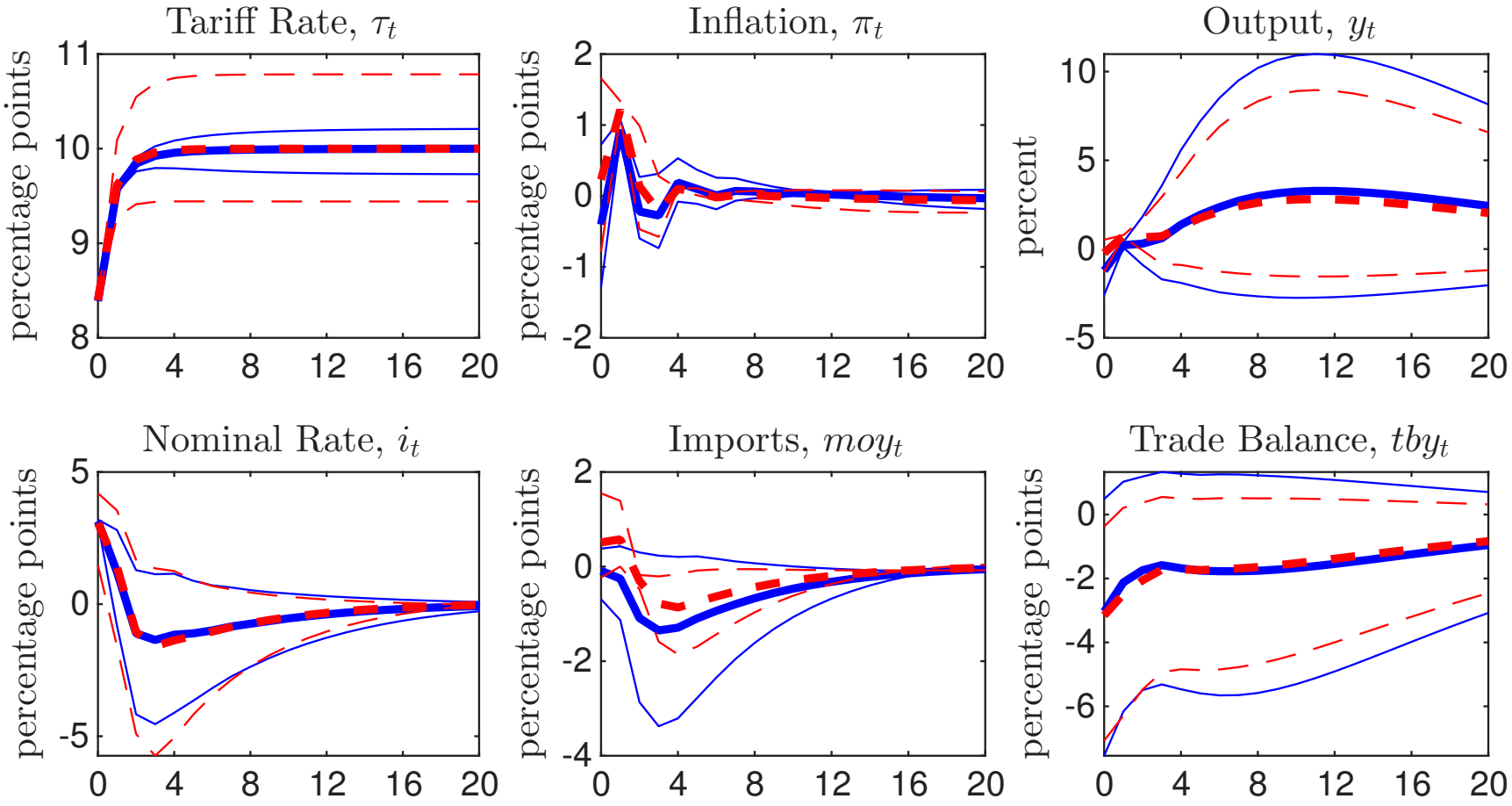


Impulse Responses to a Ten-Percentage-Point Increase in the Permanent Import Tariff Shock, X_t^τ, in a Model with Endogenous Import Tariffs



Robustness of Results to Allowing for Anticipation

Impulse Responses to an Unanticipated Ten-Percentage-Point Increase in the Permanent Import Tariff Shock



Note. Solid lines baseline model. Dashed lines model that allows for anticipated shocks as well.

Takeaway: Allowing for anticipation does not change the estimated effects of the unanticipated permanent tariff shock.