

**Discussion of**  
**“Tariffs, Uncertainty, and the Exchange Rate”**  
**by Alfonso Merendino and Tommaso Monacelli**

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# The puzzle

- Textbook: unilateral tariff → appreciation (expenditure switching)
- April 2025: tariffs ↑ sharply, dollar depreciates
- Authors' answer: *persistence* uncertainty flips the sign → state-dependent, not universal

# The contribution

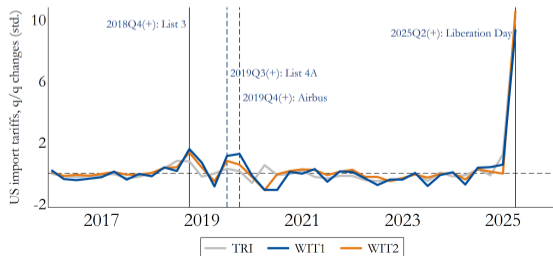
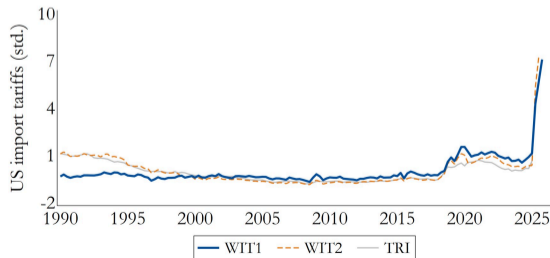
- **Agnostic Identification** → FX sign left free, not assumed; new to the setting
- **Right question** → durable regime, not news salience
- **First-moment belief channel** → misperception → Net Foreign Assets (NFA) path → depreciation; not a risk premium
- **One state variable** → S-TPU unifies the fact and the sign-flip

## Major Comment

Three headline-2025 features (depreciation, “transitory” S-TPU, persistent IRF) rest on a sample ending at the shock + a tariff calibrated too un-sticky.

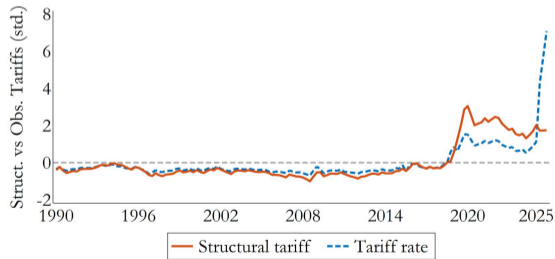
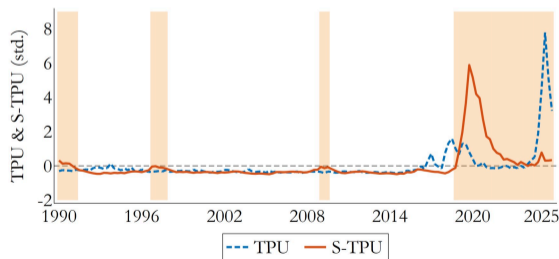
# 1. The BVAR: naming a tariff shock

- 10 US variables, quarterly, 1990–2025Q2
  - ▶ Real investment, real exports, real imports, trade balance/GDP, real GDP, CPI inflation, macro uncertainty, effective exchange rate, weighted import tariff, Fed funds rate
- Identification = narrative **dominance** at 2018Q4, 2025Q2. Only tariff + imports restricted; **FX sign free**
- **Flag**: FX = only asset price in the system
- **Flag**: 2025Q2 = +10.6 sd terminal point → dominance *near non-binding* there; identification rests on 2018Q4



## 2. S-TPU: regime vs noise

- Split tariff: **persistent**  $\tau_S$  (regime, level) + **transitory**  $\tau_T$  (noise), filtered
- S-TPU  $\equiv$  volatility of *persistent* innovations,  $e^{2\sigma_{S,t}}$ , **not** the level  $\tau_S$
- High 2018–20, muted 2025 = mirror of newspaper TPU (Caldara et al., 2020)



### 3. Local projections: the conditional fact

$$y_{t+h} = \alpha_h + \beta_h \varepsilon_t^\tau + \beta_h^H H_t \varepsilon_t^\tau + \delta_h H_t + \sum_{j=1}^4 \gamma_{j,h} y_{t-j} + u_{t+h}$$

$H_t = \mathbf{1}\{\text{S-TPU}_t > p_{70}\}$ ; low state  $\beta_h$ , high state  $\beta_h + \beta_h^H$ , split =  $\beta_h^H$ .

- Low: appreciation    high: depreciation + Fed cuts
- Vanishes under aggregate TPU  $\rightarrow$  persistence, not noise
- Flag: high state from same series; both anchors inside it
- Flag: for  $h > 0$ , 2025Q2 drops as a direct observation (no  $y_{t+h}$ ); the split is an  $h > 0$  object  $\rightarrow$  carried by 2018–20 (raw-appreciated)

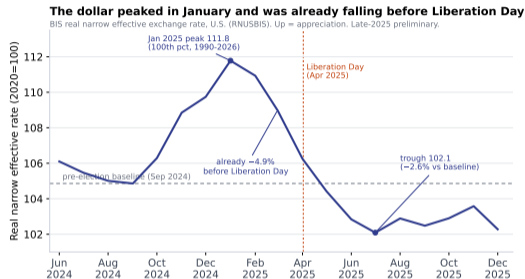
## 4. The model: belief channel for the flip

- Incomplete markets  $\rightarrow$  exchange rate prices the expected path of net foreign assets
- High S-TPU: misread transitory as durable  $\rightarrow$  borrow  $\rightarrow$  net foreign assets  $\downarrow \rightarrow$  depreciation now
- S-TPU level: low = appreciation, high = flip

# Comment 1: Weight on the terminal observation?

- 2025Q2 = +10.6 standard deviations; 2018Q4 = +1.83; pre-2025 exchange-rate response barely significant
- Three issues, all one way:
  1. No post-shock data → impulse response extrapolated
  2. +10 standard deviations → high leverage on the lag structure and residual covariance
  3. Dominance near non-binding → identification rests on 2018Q4
- Tariff right-skewed → impulse response off a handful of observations
- Suggestion: re-estimate ending 2024Q4, check out-of-sample 2025

# Comment 2: how much is a tariff effect?



- Record high in Jan (since 1990); already  $-4.9\%$  before Liberation Day
- Trough only  $-2.6\%$  vs baseline  $\rightarrow \sim 3/4$  retraces the run-up,  $\sim 1/4$  net depreciation
- Suggestion: end 2024Q4, or condition on the real-rate gap

## Realized data: real, but front-loaded

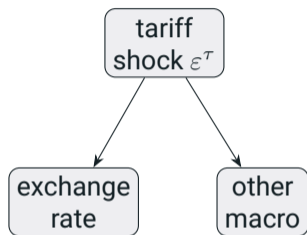
	imports	exports	NEER	REER
<i>2018Q4 anchor</i>				
h=0	+1.0	+0.4	+1.3	+1.5
h=1	-0.1	+0.9	-0.1	-0.5
h=2	+0.6	-0.5	+1.0	+1.0
<i>2025Q2 anchor</i>				
h=0	-8.3	-0.5	-5.8	-5.5
h=1	-1.1	+2.3	-1.5	-1.9
h=2	-0.2	-0.8	+1.7	+0.4

q/q %. BIS narrow effective (RNUSBIS, NNUSBIS). Up = appreciation. Cum. 3q NEER: +2.2 ('18) vs -5.6 ('25).

- Raw: appreciates '18Q4, depreciates only '25Q2
- The *high-S-TPU* episode (2018–20) appreciated; the depreciation sits in the filter's *muted* episode
- '25 fall front-loaded, reverses by Q4 (+1.7); IRF *builds* → delayed overshoot is out-of-sample

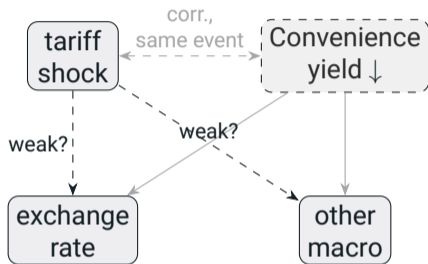
# Comment 3: what is bundled in?

## What dominance identifies



≈  
same data

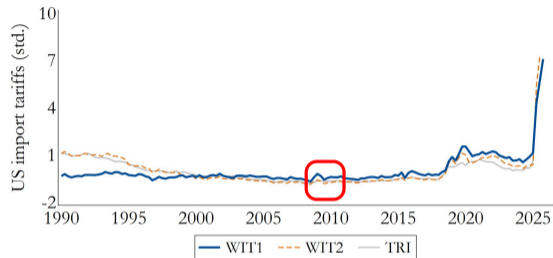
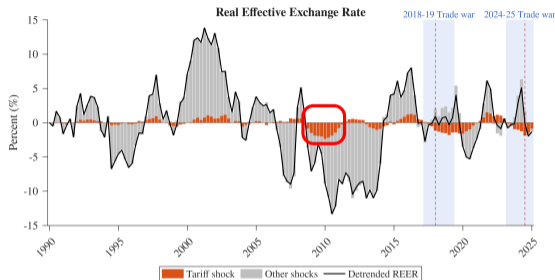
## Observationally equivalent



- FX split inherited from  $\Sigma_u$ ; can't separate two correlated shocks
- April: bonds, stocks, dollar down together; no Apr-9 bounce → convenience-yield drop (JKL)
- In 2018, the raw dollar *appreciated*; isolating a tariff depreciation in the decomposition leans on offsetting background shocks – worth plotting
- **Test: add 10y / equities / Treasury basis**

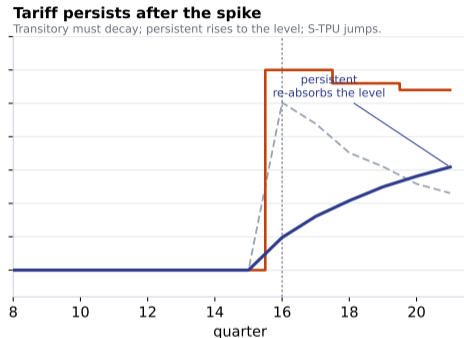
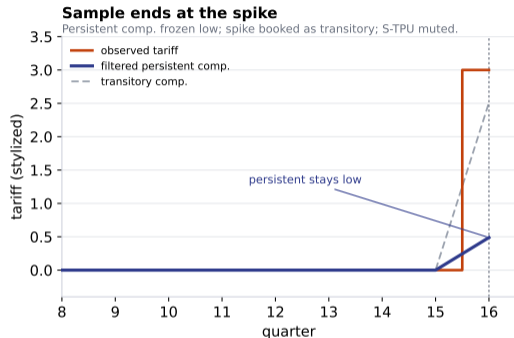
# Comment 3b: a non-policy tariff blip drives FX

Figure 7: Historical decomposition of the REER



- 2009–10 move is **WIT1-only** (flat in WIT2/TRI): composition, not policy [their own C2]. Yet Fig 7 gives it a **comparable** FX contribution  $\Rightarrow$  implausible FX-per-tariff sensitivity.
- It's the **ZLB/QE window**: with Fed funds pinned, the VAR can't see the real easing stance, so the tariff shock *absorbs monetary policy*. (Mirror of 2018–19, sign flipped.)
- **Ask**: re-run the decomposition with WIT2/TRI.

# Comment 4: S-TPU and the sample edge



- Same spike, same filter: at the sample edge the split is *identical* whether or not it persists → S-TPU muted either way
- Transitory decays ( $\rho_T=0.2$ ); only a *sustained* level can be persistent, and that is learned later
- Re-filter through 2025–26 → 2025 S-TPU lifts: rescues the channel

# What kind of object is a tariff?

## Rule-based regime

- GATT/WTO, bound tariffs, MFN
- FTAs (NAFTA/USMCA, ...)
- Customs unions, common external tariffs
- Congress, ratification, dispute settlement

- Hard to set, hard to reverse.
- Prior: **high persistence**.

- Calibration ( $\rho_T = .2$ ) built for the right-hand world
- “By whim”  $\neq$  “short-lived”: 2025 tariffs discretionary *and* persist ( $\sim 17\%$ )

## The “tariff” regime



*“the most beautiful word in the dictionary is tariff.  
It’s my favorite word.”*

Executive action: Liberation Day, reciprocal,  
pause, deals. Sharp, jumpy.

## Comment 5: the nature of tariffs

- Tariffs sticky by construction  $\rightarrow$  prior: high persistence
- Calibration ( $\rho_T=0.2$  + jumpy vol)  $\rightarrow$  a sharp move defaults to “transitory”, suppressing S-TPU *at the jumps*
- How does  $\tau_{T,t}$  look?:  $\tau_{S,t} \geq \tau_t$  until 2025  $\rightarrow$  transitory  $\approx 0$ /negative, then fires once, at the edge
- Caveat: some real noise (exemptions, lags), but small
- Suggestion: estimate  $\rho_T, \eta_T$ ; plot  $\tau_{T,t}$ ; validate vs institutional record

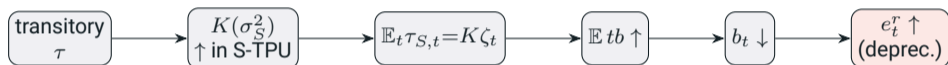
## Comment 6: the model delivers the flip

- Model: flex prices, PPI target, output  $10^{-3}$ , CPI *rises* on impact, short half-life
- Data high state: GDP↓, infl↓, Fed cuts, deprec. builds 6q
- Matches the FX *sign*, but not the high-state *comovement*.
- Suggestion: a weak-CPI Taylor rule would deliver the accommodative-Fed comovement
- (Threshold mechanics  $K^* = -\Xi/\Phi^{GE}$  on the next slide)

# Theory: a belief channel through the modified UIP

Incomplete markets ( $\psi$  portfolio cost) break UIP; iterate forward:

$$e_t^r = \sum_{j \geq 0} \mathbb{E}_t(r_{t+j}^* - r_{t+j}) - \psi \sum_{j \geq 0} \mathbb{E}_t b_{t+j}, \quad b_t = - \sum_{j \geq 1} \beta^j \mathbb{E}_t t b_{t+j}, \quad t b_t = \Lambda \tau_t$$



$$\frac{de_t^r}{d\varepsilon_{T,t}} = \underbrace{\Xi}_{<0 \text{ (apprec.)}} + \underbrace{\Phi^{GE} K(\sigma_S^2)}_{>0 \text{ (deprec.)}}, \quad \text{flip at } K^* = -\Xi / \Phi^{GE}$$

- $K = W/(1 + W)$ ,  $W = \rho_S^2 W/(1 + W) + \sigma_S^2$ ;  $\Phi^{GE} \propto \Gamma(\rho_S) \rightarrow \infty$  as  $\rho_S \rightarrow 1$
- At the calibrated  $\rho_S=0.975$ ,  $\Gamma \approx 1100$ , so  $K^*$  is pushed toward zero  $\rightarrow$  the flip leans on the near-unit-root  $\rho_S$  as much as on S-TPU volatility
- **Suggestion: a frontier in  $(\sigma_S^2, \rho_S)$  with the filtered gain and calibrated  $\rho_S$  marked  $\rightarrow$  separates the belief channel from the persistence calibration**

## Comment 6b: theory freezes the measured state

- **Empirics:** S-TPU<sub>t</sub> = e<sup>2σ<sub>S,t</sub></sup> is a stochastic-volatility process (ρ<sub>σ<sub>S</sub></sub>, η<sub>S</sub>); the LP state *moves*
- **Theory:** σ<sub>S</sub> enters only as a **constant** in the Riccati fixed point:

$$W = \rho_S^2 \frac{W}{1+W} + \sigma_S^2 \quad \implies \quad K = \frac{W}{1+W}$$

- Same parameter, not the same process → a cross-regime comparative static, with no path across the threshold (no 2025-transition counterpart)
- σ<sub>S</sub><sup>2</sup> enters through the conditional *mean* only → 2nd moment shut off by construction; restore SV → a precautionary (KSY) wedge returns
- **Suggestion:** make σ<sub>S,t</sub> a state (time-varying K); else KSY-distinctness is assumed, not derived

## Comment 7: a complementary channel

- Both models learn; they learn *different* objects
- **This paper:** relearn the persistent stance  $\tau_S$  (1st moment),  $\sigma_S$  frozen; wedge  $-\psi b_t$
- **KSY (2026):** relearn  $\sigma$  itself (2nd moment) as new announcements arrive; wedge  $\chi \text{Var}_t(\mathcal{E}_{t+1}/\mathcal{E}_t)$
- Distinct, complementary: '18-19 persistence; '25 relearned-vol risk premium + convenience yield
- One figure: the wedges over both trade wars

# A formal second-moment channel

Related work: KSY (2026)

## 5-Equation Global Representation (flex price)

**Euler (H):** 
$$(\mathbb{E}_t \hat{C}_{H,t+1} - \hat{C}_{H,t}) = \hat{i}_{H,t} + \underbrace{\frac{1}{2} \text{Var}_t(\hat{C}_{H,t+1})}_{\eta\sigma_t^2}$$

**Euler (F):** 
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**CPI (H):** 
$$\hat{P}_{H,t}^C = 0 = (1 - \gamma) \hat{p}_{H,t} + \gamma(\hat{\mathcal{E}}_t + \hat{p}_{F,t} + \hat{\tau}_t)$$

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**Goods Mkt (H):** 
$$0 = (1 - \gamma)(\hat{C}_{H,t} - \hat{p}_{H,t}) + \gamma(\hat{C}_{F,t} + \hat{\mathcal{E}}_t - \hat{p}_{H,t})$$

**Goods Mkt (F):** 
$$0 = \gamma(\hat{C}_{H,t} - \hat{\mathcal{E}}_t - \hat{p}_{F,t} - \hat{\tau}_t) + (1 - \gamma)(\hat{C}_{F,t} - \hat{p}_{F,t})$$

## 5-Equation Global Representation (flex price)

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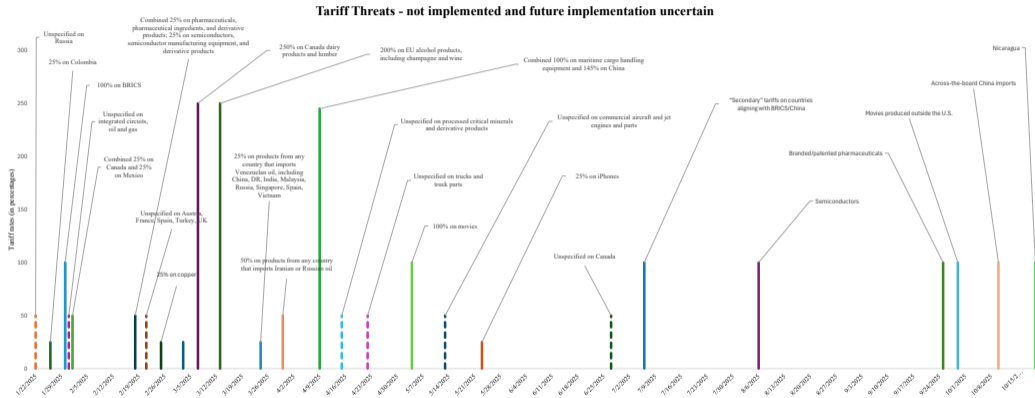
**BoP:** 
$$\beta \hat{V}_t = \hat{V}_{t-1} + \gamma(\hat{C}_{H,t} - \hat{C}_{F,t}) - \gamma \hat{\mathcal{E}}_t - \gamma \hat{\tau}_t$$

# Tariff vs Tariff Volatility Impact on Exchange Rate

$$\hat{\mathcal{E}}_t = \underbrace{\left( (R_H^{-1} - \frac{1}{2}) (1 - 2\gamma)^2 - \frac{1}{2} \right)}_{<0} \hat{\tau}_t + \underbrace{R_H^{-1} (1 - 2\gamma)^2 (\eta + \kappa)}_{>0} \sigma_t^2 + \underbrace{\frac{(1 - R_H^{-1}) (1 - 2\gamma)^2}{\gamma}}_{>0} \hat{V}_{H,t-1}$$

- Both HH and financial inter-mediation are sensitive to risk.
- Higher uncertainty means precautionary saving, lower demand for goods/dollar, higher expected excess returns to dollars.

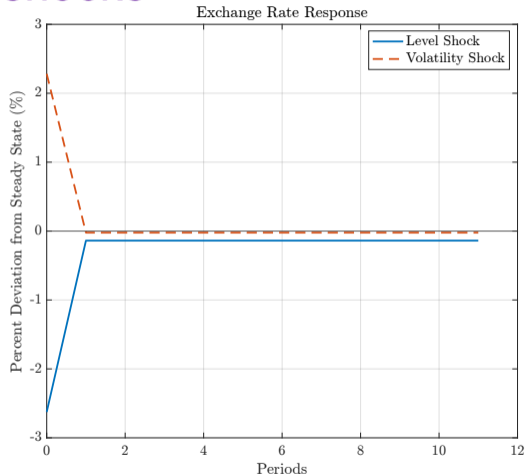
# Tariff threats: not implemented, future implementation uncertain



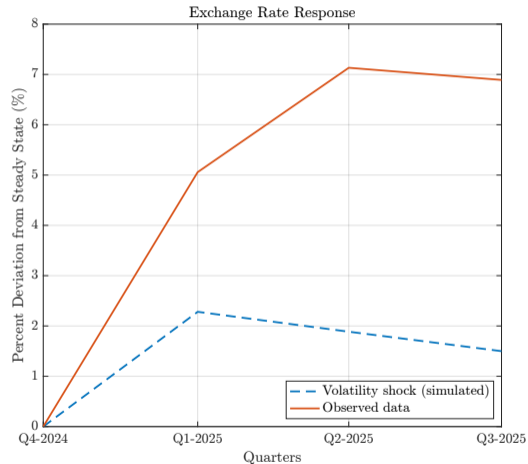
Source: Trade Compliance Resource Hub, Trump 2.0 Tariff Tracker.

**Our volatility measure:** for each day  $t$ , the standard deviation of all announced and threatened tariff rates observed up to day  $t$ . (Mean 43%; 72, 60, 49 across 2025.)

# Exchange rate responses to tariff level and volatility shocks



(a) Model IRFs: 18% level, 72% volatility



(b) Model vs data, one-time volatility shocks

# Some suggested additional tests for the authors

1. **Re-estimate ending 2024Q4** + out-of-sample 2025 forecast
2. **Plot the background VAR shocks** for 2018–20 (check the decomposition against the realized appreciation)
3. **Extend S-TPU** through 2025–26; estimate  $\rho_T, \eta_T$  rather than calibrate
4. **Make  $\sigma_S$  a state** (time-varying  $K$ ); nests KSY
5. **Robustness:**  $t$ -innovations; size scaling;  $H_{t-1}$ ; a separating asset price (10y, equities, Treasury basis, VIX)

# Taking stock

- Contribution real; the framework stands
- Distinctive 2025 results → one terminal, high-leverage, mid-correction obs + un-sticky calibration
- **Not tariffs but tariff regimes**; which one: trade policy or safe-asset status?

Thank you

# Backup: smaller comments

- **SOE for the U.S.:** the channel lives in the UIP wedge, where dollar-specific forces operate; the Itskhoki-Mukhin valuation channel needs negative NFA with currency mismatch, absent here with  $\bar{B} = 0$ .
- **Euro area:** EA responses conflate the demand shock with euro appreciation; add USD-EUR. Clarify the pre-1999 EURIBOR splice.
- **Data provenance:** unstated real-investment identifier, an EA HICP code that needs correcting, EURIBOR splice. Pin down for publication.
- **Generated regressor** handled by pooling LPs across BVAR draws; the generated *state* (S-TPU threshold) is not.

# A genuinely overhauled paper

## March draft

Cholesky timing restrictions, 2002–2024

Liberation Day as out-of-sample motivation

S-TPU projected on earnings-call attention

Complete markets, certainty, Taylor rule: depreciation needs low  $\eta$  and weak  $\phi_\pi$

Unconditional depreciation claim

## Conference draft

Narrative dominance + import sign restriction, 1990–2025Q2

2025Q2 inside the sample as an anchor date

S-TPU filtered from a stochastic-volatility state-space model

Incomplete markets + Bayesian learning: depreciation via the persistence/NFA channel

State-dependent claim, honestly reframed

- All first-round comments addressed: uncertainty is now formal, the 2018–19 historical decomposition is in, and the Euro area block goes beyond what was asked.
- A small marker of the reframing: “systematic monetary policy” is no longer among the keywords.

# The system: ten variables, one asset price

Baseline U.S. BVAR, 1990Q1-2025Q2, 4 lags, constant.

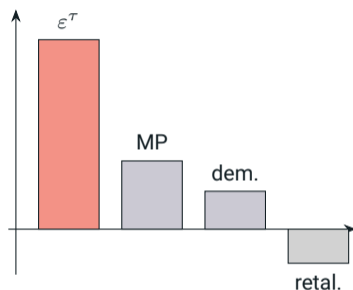
1. Real private investment (log)
2. Real exports (log)
3. Real imports (log)
4. Trade balance / nominal GDP (level)
5. Real GDP (log)
6. CPI inflation, y-o-y (level)
7. Macro uncertainty, Jurado et al. (level)
8. Effective exchange rate, NEER/REER (log)
9. Weighted import tariff, WIT1 (level)
10. Federal funds rate (level)
  - The only asset price in the system is the exchange rate. No long yield, no equity, no convenience-yield or CIP basis.
  - So a “tariff shock” and a “tariff + loss of safe-asset status” bundle are observationally

**International block (Sec 2.5):** swaps in EA real GDP, EA HICP, and the 3m EURIBOR alongside the U.S. variables, tariff, and imports.

**Uncertainty in-system** is the *broad* Jurado-Ludvigson-Ng index. S-TPU is not a VAR variable; it enters only as the LP state.

# Identification: narrative dominance, weakened

Structural shocks from  $B = \text{chol}(\Sigma_u) Q$ ,  $Q$  orthogonal. The forecast error of the tariff rate splits as  $u_{\tau,t} = \sum_j b_{\tau j} \varepsilon_{j,t}$ . Discipline the rotation at anchor dates  $t^*$  (2018Q4, 2025Q2):



$C_{\tau,t^*}$  by shock

$$\text{ADRR (2018): } |C_{\tau,t^*}| > \max_k |C_{\tau,t^*}^{(k)}|.$$

Weakened (De Santis-Van der Veken, 2026): dominate only among same-sign contributors. A same-direction offset (retaliation, FX) cannot disqualify the label, but it **enlarges the identified set** (wide bands). Plus  $\text{IRF}_h^m < 0$ ,  $h=1, 2$ . The FX sign stays **free**.

- Dominance constrains the *tariff* row only; the FX impact vector is inherited from  $\Sigma_u$ , shaped by the same two episodes.
- ADRR prescribe **importance weights** for narrative restrictions; plain rejection sampling overweights easy-to-satisfy draws. Are weights applied?

# S-TPU: volatility of the persistent tariff component

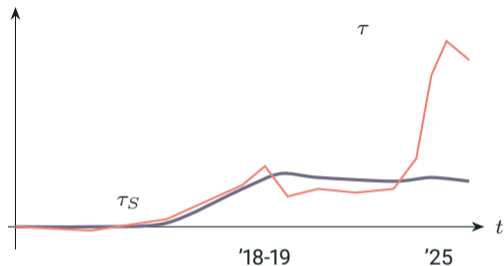
$$\tau_t = \tau_{S,t} + \tau_{T,t}$$

$$\tau_{j,t} = \rho_j \tau_{j,t-1} + e^{\sigma_{j,t}} \varepsilon_{j,t}, \quad j \in \{S, T\}$$

$$\sigma_{j,t} = (1 - \rho_{\sigma_j}) \bar{\sigma}_j + \rho_{\sigma_j} \sigma_{j,t-1} + \eta_j u_{j,t}$$

$$\text{S-TPU}_t \equiv e^{2\sigma_{S,t}}$$

Three latent states. Multiplicative vol is nonlinear, so no closed-form Kalman: particle filter (Born-Pfeifer),  $\tau_{T,t} = \tau_t - \tau_{S,t}$ .



- S-TPU high in 2018-20, muted in 2025; newspaper TPU the mirror.
- **Split is calibrated:**  $\rho_S = .975$  vs  $\rho_T = .2$ . “2025 is transitory” is partly assumed; robustness perturbs only the transitory block.

# State-dependent LPs: one fix delivered, one not

$$H_t = \mathbf{1}\{S\text{-TPU}_t > p_{70}\}:$$

$$y_{t+h} = \alpha_h + \beta_h \varepsilon_t^\tau + \beta_h^H H_t \varepsilon_t^\tau + \delta_h H_t + \sum_j \gamma_j y_{t-j} + u_{t+h}$$

Low state  $\beta_h$ , high state  $\beta_h + \beta_h^H$ .

**Generated regressor (handled).**  $\varepsilon_t^\tau$  is estimated upstream (Pagan 1984). They re-run the LP on every admissible BVAR draw and pool by the law of total variance:

$$\underbrace{\text{Var}}_{\text{total}} = \underbrace{\text{Var}_d \mathbb{E}[\cdot | d]}_{\text{identification}} + \underbrace{\mathbb{E}_d \text{Var}[\cdot | d]}_{\text{LP sampling}}$$

Hall-centered bands. Good practice.

**Generated state (not handled).**  $H_t$  is the thresholded particle-filter output; its construction uncertainty enters nowhere, and it is built from the *same* tariff series. Both anchors sit in the high state, so state exogeneity (Gonçalves et al. 2024) is maintained, not tested. Cheap check:  $H_{t-1}$ .

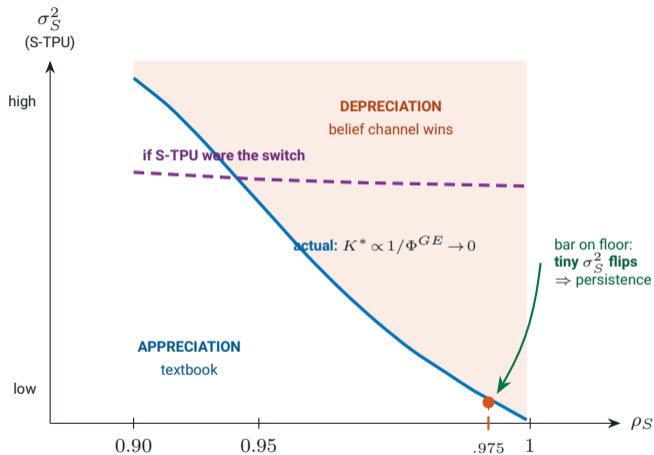
## Backup: the gain $K$ and the Riccati equation

Agents see  $\tau_t = \tau_{S,t} + \tau_{T,t}$ , not the split, and filter the persistent part  $\tau_{S,t} = \rho_S \tau_{S,t-1} + e^{\sigma_{S,t}} \varepsilon_{S,t}$ . The update is

$$\hat{\tau}_{S,t} = \hat{\tau}_{S,t|t-1} + K(\tau_t - \hat{\tau}_{t|t-1}), \quad K = \frac{W}{1+W} = \frac{\text{signal var.}}{\text{signal} + \text{noise var.}}$$

- $K$  is the **Kalman gain**, the optimal weight on the surprise. High  $\sigma_S^2$  (high S-TPU)  $\Rightarrow$  high  $K \Rightarrow$  a transitory tariff read as durable  $\Rightarrow$  depreciation; low  $K \Rightarrow$  textbook appreciation.
- The forecast-error variance  $W$  solves the **Riccati equation**, the quadratic fixed point  $W = \rho_S^2 W / (1+W) + \sigma_S^2$  (the boxed line above). A *single* root exists only because  $\sigma_S^2$  is constant.
- Let  $\sigma_{S,t}$  vary (the estimated SV): the “ $Q$ ” term moves, the recursion never settles,  $K_t$  becomes a state. The constant gain *is* the constant- $\sigma_S$  assumption.

# Backup: does S-TPU flip the sign, or does $\rho_S$ ?



The flip needs  $K > K^* = \frac{|\Xi|}{\Phi^{GE}}$ .

$\Phi^{GE} \propto \Gamma(\rho_S) \rightarrow \infty$  as  $\rho_S \rightarrow 1$ , and  $\Gamma(.975) \approx 1100$ .

So  $K^*$  collapses toward 0: at the calibrated  $\rho_S$ , **almost any**  $\sigma_S^2$  clears the bar.

**The ask:** plot this frontier with the filtered gain and calibrated  $\rho_S$  marked.

- boundary *vertical*  $\Rightarrow$  persistence story
- boundary *horizontal*  $\Rightarrow$  S-TPU is the switch