Precautionary Sourcing and the Macroeconomics of De-Risking

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Motivation

Global supply chains are being repositioned: since 2018, US firms have been retreating from China.

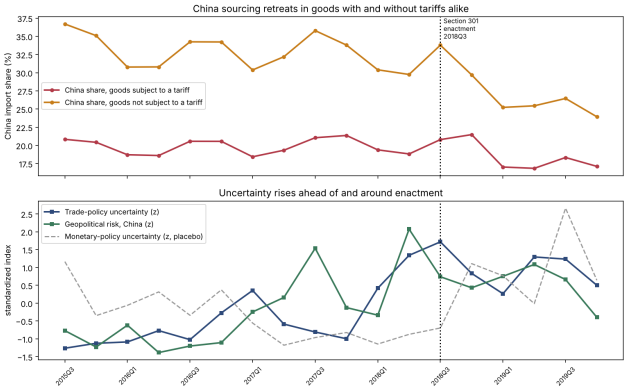
- China's share of US goods imports: about 24% in 2017, about 19% by end-2019.
- The retreat continued through the 2025 tariff escalation.

The common reading: a response to the level of tariffs.

But: the retreat extends to goods not subject to any tariff, and it starts before the tariffs are enacted, when trade-policy uncertainty rises.

Open question: is the repositioning a precautionary response to uncertainty, and is it efficient?

Tariff Level or Uncertainty?



- China's share falls for goods with and without tariffs: a withdrawal from an origin, not from a product.
- It coincides with the rise of trade-policy uncertainty and China geopolitical risk, ahead of and around the 2018 enactment.
- Monetary-policy uncertainty (placebo) does not track it.

Two Departures from Production-Network Theory

Precaution in sourcing needs two ingredients that standard network models switch off:

	Complete markets	Incomplete markets
Fixed network	Baqaee and Farhi (2019, 2020): Hulten and Domar	no misallocation: kernel irrelevant
Endogenous network	Kopytov et al. (2024): efficient reorganization	this paper: risk-misallocation wedge

- Endogenous links: firms choose suppliers before shocks are realized.
- Uninsurable risk: firms value states with their own kernel, which loads on risk that is diversifiable for the economy.

Neither distorts on its own; together they create a wedge.

What We Do

1. Evidence: sector and firm-level event studies around the 2018 and 2025 tariffs (Census, Comtrade, Panjiva), and an anticipation design separating uncertainty from the tariff level.
2. Theory: endogenous production network with uninsurable risk; derive the risk-misallocation wedge, precautionary retrenchment, and a network-corrected Hulten loss.
3. Quantitative model: 8 sectors, 3 origins (home, China, rest of world), tariffs by product and origin, capital, sticky sourcing.
4. General equilibrium: the kernel is derived from workers who bear firm risk through a limited-commitment wage; two-asset households; small open economy.
5. Counterfactuals: 2026 tariffs; surprises in trade-policy uncertainty, through measured costs and owners' beliefs about trade risk; impulse responses and welfare by group.

Preview of Results

Evidence

- After a surprise in trade-policy uncertainty, firms cut sourcing from the origins they rely on; the retreat builds over two years, with no pre-trend. Geopolitical risk: no robust effect.

Model

- Matches the retreat from China in years 1 and 2 (-7.6 and -7.4 pp) and, untargeted, the long-run event-study slope (-0.24 vs -0.23 to -0.31).
- Driver: owners' beliefs about trade risk; measured tariffs account for a tenth of the response and barely move China's share relative to other foreign suppliers.
- Consumer prices $+0.33\%$, halved by a 4% dollar appreciation; NFA $+1\%$ of GDP.

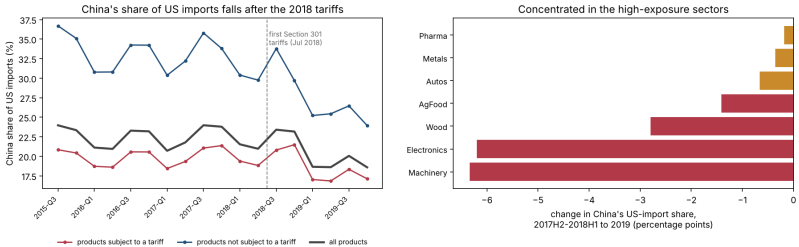
Welfare

- Workers gain about 0.5% of consumption, less if their employer relies on Chinese inputs (0.20% vs 0.55% in metals and autos).

Literature and Contribution

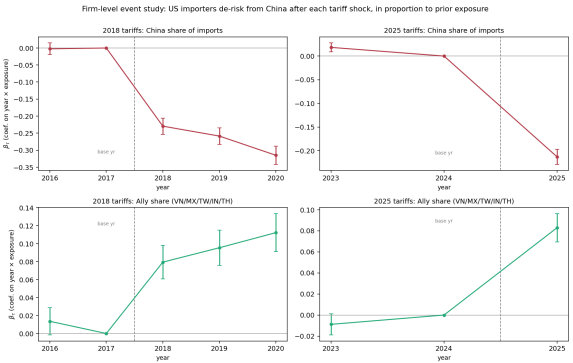
- Network misallocation: Baqaee and Farhi (2019, 2020), Hulten (1978).
  $\Rightarrow$ wedges are primitives there; ours is the equilibrium price of uninsurable risk.
- Endogenous networks: Kopytov et al. (2024), Acemoglu and Azar (2020), Oberfield (2018).
  $\Rightarrow$ complete markets, efficient; we nest them as the complete-market benchmark.
- Trade under uncertainty: Helpman and Razin (1978), Newbery and Stiglitz (1984), Kleinman, Liu, Redding and Xu (2026).
  $\Rightarrow$ country-level portfolio under aggregate risk; ours is firm-level link choice under uninsurable risk.
- Resilience and de-risking: Grossman, Helpman and Lhuillier (2024), Lashkaripour and Simonovska (2026).
  $\Rightarrow$ strategic externalities; relative to them role for precautionary resourcing
- Tariffs in macro: Baqaee and Farhi (2024), Itskhoki and Mukhin (2025), Kalemli-Ozcan, Soylu and Yldirim (2025), Auclert et al. (2025), Werning et al. (2025).
  $\Rightarrow$ mostly focusing on monetary policy.

Sector Level: the Retreat and its Concentration



- Data: quarterly US goods imports by origin country and product, 2015Q3 to 2020Q2, from ITC Trade Map (UNCTAD and WTO; republishes US Census Bureau and UN Comtrade customs). Products: HS4, the 4-digit, each flagged if on the Section 301 lists 1 to 4A at quarterly frequency
- Diff-in-diff: $s_{pt} = \alpha_p + \delta_t + \beta\,(\text{Tariff}_p \times \text{Post}_t) + \varepsilon_{pt}$, s_{pt}, the value imported from China over total US imports of p in quarter t, with product and quarter fixed effects and Post_t from 2018Q3.
- Results: concentrated in electronics/machinery (-6 pp each); gains for Mexico and Vietnam.

Firm Level: Exposure-Weighted Event Study



Panjiva US waterborne imports, importer by year, around 2018 and 2025:

$$y_{it} = \alpha_i + \delta_t + \sum_{\tau \neq \bar{t}} \beta_\tau \, \mathbf{1}[t = \tau] \times \text{Exposure}_i + \varepsilon_{it}$$

where y_{it} is importer's China share and its ally share (Vietnam, Mexico, Taiwan, India, Thailand) and Exposure is pre-shock China share.

- β_τ change relative to base year of an exposed importer against an unexposed one
- On longer windows pre-trends appear: anticipation, which motivates the next design.

Pre-trends

- Reallocation: the same importers lose China share (-0.23 in 2018, -0.32 by 2020; -0.21 in 2025) and gain ally share ($+0.08$, $+0.11$; $+0.08$). Both are shares of the importer's own imports.

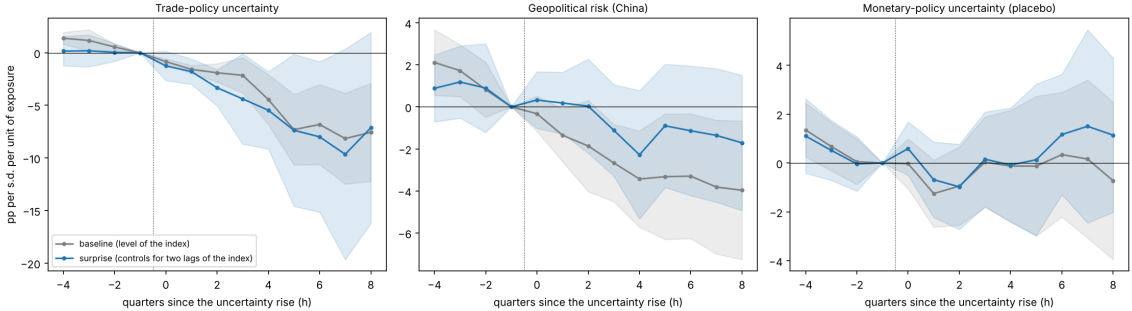
The Anticipation Design

Local projection of a firm's origin share on exposure times the surprise in an uncertainty index:

$$s^o_{i,t+h} - s^o_{i,t-1} = \alpha^h_{io} + \delta^h_t + \beta_h \left(\text{Exposure}^o_i \times U^o_t\right) + \sum_{\ell=1}^{2} \gamma_{h\ell} \left(\text{Exposure}^o_i \times U^o_{t-\ell}\right) + \varepsilon^h_{iot}$$

- U^o_t: trade-policy uncertainty, geopolitical risk of the origin (Caldara et al.), monetary-policy uncertainty as placebo.
- Lags of the index as controls: β_h is the response to the part of U^o_t its past does not predict (the shock fed to the model).
- Quarter fixed effects absorb the tariff level: β_h is identified only from exposure.
- Exposure: firm's 2015 to 2017 share from the origin; Bartik shift-share, identification from the shares (Goldsmith-Pinkham).
- Panjiva, firm by origin by quarter, 2013Q4 to 2026Q1; two-way clustered.
- Joint test of $\beta_{-4} = \beta_{-3} = \beta_{-2} = 0$ for pre-trends.

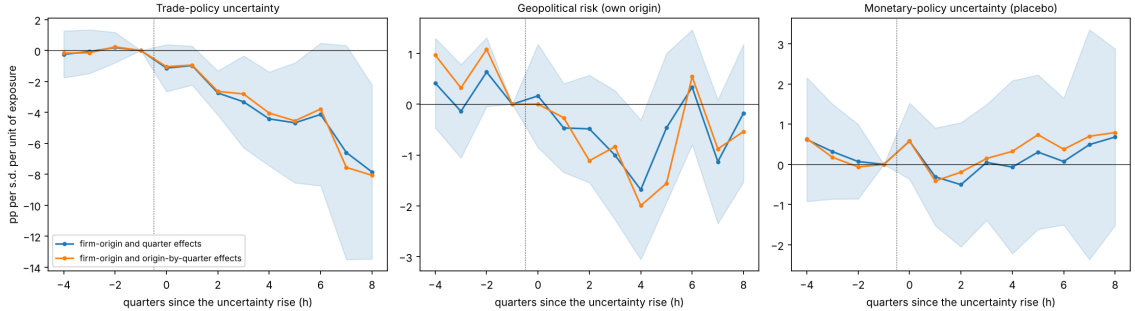
Trade-Policy News Drives the Retreat from China



- Surprise (blue): no pre-trend (joint $p = 0.99$; levels, grey: $p < 0.001$). Annual averages -2.7, -7.6, -7.4 pp per s.d. and unit of exposure in years 0, 1, 2: the moments the model targets.
- Geopolitical risk: small and never significant once its persistence is controlled for. Placebo flat.

Tables

The Effect is General: Pooled Across Origins



- 7,000 firm-origin pairs with exposure $\geq 5\%$, about 5,000 firms, eight origins; each origin with its own geopolitical-risk index.
- Trade-policy uncertainty: firms retreat from any origin they rely on, also with origin-by-quarter effects. Own-origin geopolitical risk: not robust.

Sales side: Compustat

Environment

- n sectors; Cobb-Douglas technology with input shares α_i chosen by the firm:

$$F = e^{\varepsilon_i + u_{if}} A_i(\alpha_i)\, \zeta(\alpha_i)\, L^{1-\sum_j \alpha_{ij}} \prod_j X_j^{\alpha_{ij}}, \qquad a_i = \log A_i \text{ strictly concave}$$

- Shocks: sector $\varepsilon \sim N(\mu, \Sigma)$, idiosyncratic u_{if}; neither insurable.
- Two stages:
  1. before the shocks, the firm commits its network α_i;
  2. after the shocks, it chooses input quantities at realized prices.
- Kernel: each firm values states with its own $\lambda_i = \lambda^c + \xi_i$
  - λ^c: kernel of a diversified owner;
  - ξ_i: uninsurable component, zero under complete markets.

Stage 2: the Price System

Unit cost $\theta_i = -\varepsilon_i - a_i(\alpha_i) + \sum_j \alpha_{ij} p_j$; prices equal unit costs.

Lemma (price system). For any network,

$$p = -\mathcal{L}(\alpha)\big(\varepsilon + a(\alpha)\big), \qquad \mathcal{L} = (I - \alpha)^{-1},$$

so $\mathbb{E}[p] = -\mathcal{L}(\mu + a)$ and $\mathrm{Var}(p) = \mathcal{L}\Sigma\mathcal{L}'$. Sales are the Domar weights $\omega' = \beta'\mathcal{L}$, nonstochastic, and $y = \omega'(\varepsilon + a)$.

- The Leontief inverse propagates both shocks and their covariances through the network.
- Equilibrium network: a fixed point between committed shares and the price distribution they generate (exists by Brouwer).

Stage 1: Risk-Adjusted Prices

Lemma (risk-adjusted prices). The network choice is equivalent to

$$\alpha_i^* \in \arg\max_{\alpha_i \in \mathcal{A}_i} \; a_i(\alpha_i) - \sum_j \alpha_{ij} \mathcal{R}_{ij}, \qquad \mathcal{R}_{ij} \equiv \mathbb{E}[p_j] + \mathrm{Cov}(p_j, \lambda_i).$$

- Exact, not an approximation: sales are nonstochastic, so the only risk left is how input prices covary with the kernel.
- The same supplier is valued differently by buyers with different kernels.
- At an interior optimum $\partial a_i / \partial \alpha_{ij} = \mathcal{R}_{ij}$; a higher $\mathcal{R}_{ij}$ lowers α_{ij}, and the link is severed at the boundary.

Proof

The Two Benchmarks

Complete markets ($\lambda_i = \lambda^c$, Kopytov et al. 2024)

- $\mathcal{R}_{ij} = \mathcal{R}_j^c \equiv \mathbb{E}[p_j] + \mathrm{Cov}(p_j, \lambda^c)$ is common to all buyers.
- The network coincides with the planner's: efficient, although it still responds to aggregate risk.

Fixed network (Baqaee and Farhi 2019, 2020)
Proposition (no risk misallocation). With the network fixed at any $\bar{\alpha}$, the allocation under firm-specific kernels coincides state by state with the one under λ^c.

- The kernel enters only through the network choice; Domar weights are sufficient statistics.

$\Rightarrow$ Risk matters for allocation only when links can respond to it.

The Risk-Misallocation Wedge

Kernel split: $\lambda_i = \lambda^c + \xi_i$, with λ^c diversified kernel, $\xi_i \equiv \lambda_i - \lambda^c$ the uninsurable component,

Definition. $\tau_{ij} \equiv \mathcal{R}_{ij} - \mathcal{R}^c_j = \big(\mathbb{E}[p_j] + \mathrm{Cov}(p_j, \lambda_i)\big) - \big(\mathbb{E}[p_j] + \mathrm{Cov}(p_j, \lambda^c)\big) = \mathrm{Cov}(p_j, \xi_i)$.

Proposition (decomposition of precaution).

$$\underbrace{\mathrm{Cov}(p_j, \lambda_i)}_{\text{total precaution}} = \underbrace{\mathrm{Cov}(p_j, \lambda^c)}_{\text{efficient: aggregate risk}} + \underbrace{\tau_{ij}}_{\text{excess: diversifiable risk}}$$

Closed form. If $\xi_i = -\phi_i \varepsilon_i$ (ϕ_i: degree of uninsurability), $\tau_{ij} = \phi_i \, [\mathcal{L}\Sigma]_{ji}$: uninsurability $\times$ own risk $\times$ the supplier's network exposure to the buyer's shock.

- The firm tilts away from suppliers whose prices are high in its own bad states.

Retrenchment and Aggregate Misallocation

Proposition (retrenchment). At partial equilibrium (effect through firm's kernel)

$$\alpha_i^{IM} - \alpha_i^* = H_i^{-1}\tau_i + o(\|\tau_i\|), \qquad H_i = \nabla^2 a_i \text{ negative definite.}$$

$H_i = \nabla^2 a_i$ describes how the productivity gain from reorganizing changes as the firm moves its shares.

Proposition (misallocation). In Domar weights, with $\mathcal{W}(\omega) = \omega'\mu + \bar{a}(\omega) - \frac{1}{2}(\rho - 1)\,\omega'\Sigma\omega$,

$$\omega^{IM} - \omega^* = -\mathcal{H}^{-1}\mathcal{T}, \qquad \mathcal{W}(\omega^*) - \mathcal{W}(\omega^{IM}) = \tfrac{1}{2}\,\mathcal{T}'\big(-\mathcal{H}^{-1}\big)\mathcal{T} + \Delta^{\text{ext}}$$

- Intensive margin: a positive-definite quadratic form in the wedges. Extensive margin: $\Delta^{\text{ext}} \geq 0$ from severed links.
- $\mathcal{H}^{-1}$ spreads a wedge at i to the sales of other sectors: a network-corrected Hulten loss.
- Zero iff $\tau = 0$ (complete markets) or the network is fixed.

Proof

Foreign Suppliers: the Currency Wedge

Foreign inputs cost $p_j + e$; let the uninsurable kernel load on the exchange rate,

$$\xi_i = -\phi_i \varepsilon_i + \psi_i (e - \mathbb{E}e).$$

Proposition (foreign currency wedge).

$$\tau_{ij}^F = \underbrace{\mathrm{Cov}(p_j, \xi_i)}_{\text{node risk}} + \underbrace{\mathrm{Cov}(e, \xi_i)}_{\text{currency wedge}}$$

Corollary (retrenchment toward home). If owners are diversified but workers are not, $\mathrm{Cov}(e, \xi_i) > 0$: a depreciation raises input costs and lowers workers' real income together.

$\Rightarrow$ Home bias in sourcing as an inefficiency, not a preference.

Origins, Tariffs and the Logit Network

- Input shares split into fixed category shares and chosen origin shares: $\alpha_{ico} = \gamma_{ic}\, s_{ico}$, $o \in \{\text{home}, \text{China}, \text{rest of world}\}$.
- Delivered price: $p_{co} = p^*_{co} + e_o + t_{co}$, with tariff levels from customs data and a stochastic tariff factor T with origin loadings.
- The sector's problem becomes:

$$\max_{s_i} \sum_c \gamma_{ic} \Big[\sum_o s_{ico}(z_{ico} - \mathcal{R}_{ico}) - \nu_i \sum_o s_{ico} \log s_{ico} \Big] \tag{1}$$

subject to the shares of each category summing to one, leads to

$$s_{ico} = \frac{\exp\left((z_{ico} - \mathcal{R}_{ico})/\nu_i\right)}{\sum_{o' \in \mathcal{O}_c} \exp\left((z_{ico'} - \mathcal{R}_{ico'})/\nu_i\right)}, \tag{2}$$

probability of choosing origin o.

- Wedge splits into productivity, currency and tariff-risk components:

$$\tau_{ico} = \mathrm{Cov}(p^*_{co}, \xi_i) + \mathrm{Cov}(e_o, \xi_i) + \iota_{co}\vartheta_{co}\mathrm{Cov}(T, \xi_i).$$

Capital, Sticky Sourcing and the Tariff Cascade

Capital. The firm's discount factor loads on its own productivity innovation, $\log M_{f,t+1} = \log M^{c}_{t+1} - \phi_i \eta_{f,t+1} - \frac{1}{2}\phi_i^2 \sigma_\eta^2$.

Proposition (precautionary underinvestment). $\log K_f - \log K_f^{CM} = -(\sigma - 1)\,\phi_i\,\sigma_\eta^2$: the same ϕ_i distorts the network and investment.

Sticky sourcing. Each year a firm re-optimizes its origin shares with probability $\lambda_c = 0.4$; resetting firms choose a forward-looking target. Supported by long-lived supplier relationships (Cajal-Grossi et al. 2023; Monarch 2022).

Proposition (tariff cascade).

$$\frac{\partial \log P^C}{\partial t_{co}} = \sum_i v_i\,\gamma_{ic} s_{ico} + \beta_c\, s^F_{co}, \qquad v' = \beta' \mathcal{L}$$

Buyers not subject to a tariff pay it on their inputs, and the Leontief inverse passes it on.

Partial adjustment

Extension to GE: Workers, Capitalists and the Wage Contract

Workers: CRRA, inelastic labor, two assets (liquid and illiquid, Kaplan, Moll and Violante 2018), two discount factors; they bear employer risk through the wage.

Limited-commitment contract (Kocherlakota 1996), signed before the shocks:

$$\max_{\{w_f(s)\}} \mathbb{E}[\Lambda^c \Pi_f] \text{ s.t. } \mathbb{E}[u(c_f^w)] \geq \bar{U}_f, \quad u(c_f^w(s)) \geq \Omega_f^w(s), \quad \Pi_f(s) \geq \Omega_f^f(s)$$

- Slack constraints: wage insured. When the firm's constraint binds (profitability below $\underline{\omega}$), the shortfall passes into the wage:

$$w_{f,t} = \bar{w}_t \exp\left(-\varsigma \max\{0, \underline{\omega} - \omega_{f,t}\} \right)$$

- Uninsurability is endogenous and countercyclical.

Capitalists: risk neutral, perpetual youth, own the firms.

The Endogenous Kernel and the Open Economy

Kernel. The network solves the contract Lagrangian, so the firm's kernel is $\Lambda^c + \mu_f^f$:

$$\Lambda_f^{\text{eff}} \propto u'(\hat{c}_f), \qquad \hat{c}_f = \begin{cases} \bar{c}_f & \varpi_f \geq \underline{\varpi} \\ c_f^w & \varpi_f < \underline{\varpi} \end{cases} \qquad \xi_f \approx -\rho_w \, \mathbf{1}\{\varpi_f < \underline{\varpi}\} \, \mathbb{E}\left[\text{MPC} \cdot \tfrac{y}{c}\right] \Delta \log y_f$$

The wedge $\tau_{ico} = \text{Cov}(p_{co}, \xi_f)$ is positive for inputs that are expensive when workers' real income is low.

Small open economy.

- Real interest parity, $1 + r_t = (1 + r^*)\, \mathcal{Q}_{t+1} / \mathcal{Q}_t$; home-goods market clearing pins the level of $\mathcal{Q}$.
- Net foreign assets: household wealth minus the value of home equity.
- Tariff revenue rebated to workers.

Contract FOC

Data and Calibration

- Network: OECD ICIO 2017, aggregated to 8 sectors (metals, autos, electronics, pharma, wood, machinery, agriculture and food, services); match qualities inverted to reproduce origin shares.
- Tariffs: USITC DataWeb, calculated duties over customs value by HS4 and origin; 2024 vs March to July 2026.
- Shocks: first stage of monthly tariffs and import charges on the uncertainty indices; productivity covariance from NBER-CES, STAN, WIOD; exchange rate from BIS.
- Kernel: $\phi_i = 0.10$ (Guiso et al. 2005; Blundell et al. 2008); in GE derived from workers.
- Households: wealth 1.2 times GDP, 30% hand-to-mouth; firm productivity from Compustat; wage pass-through 0.07.
- Trade-risk belief: owners' robust concern about the tariff process, $\theta_t = \kappa\rho^t$ on the risk-adjusted price of Chinese inputs ($0.184\,\theta_t$ on the rest of the world); κ, ρ are the only parameters fitted to the anticipation design (years 1 and 2).

Tariffs Parameters Shocks

Solution Methods

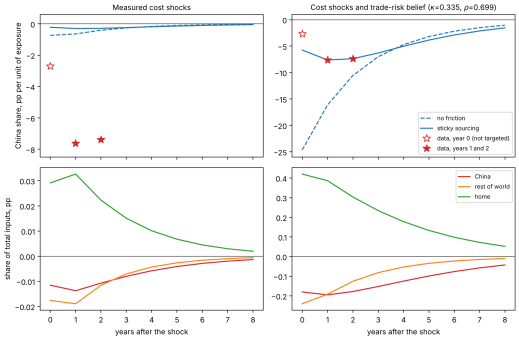
- Network: fixed point of shares and price moments; logit update, damped, tolerance 10^{-9}; outer loop on retailers and final demand.
- Capital model, IRFs: perfect foresight; capital from the closed-form Euler equation, iterated with the network until the shadow rental converges; κ, ρ jointly; labor supply fixed, nominal spending clears the labor market.
- GE steady states: damped iteration over the real exchange rate, demand scale, rentals and kernel loadings; workers solved by EGM in 48 cells (sequence-jacobian two-asset block); own heterogeneous-firm block.
- GE IRFs: first order in sequence space; household and firm Jacobians combined with the network responses; unknowns Q and demand, targets current account and labor market.
- Welfare: nonlinear transition of each worker group from its pre-2025 distribution.

Steady States: Capital Model

	(1) pre-2025	(2) 2026 tariffs	(3) + tariff vol.	(4) + GPR cost	(5) + trade-risk belief
Consumer prices, $\Delta \log P^C$ (%)	0.000	0.328	0.328	0.301	0.344
China share of inputs (%)	0.607	0.471	0.473	0.488	0.146
Rest-of-world share of inputs (%)	2.00	1.68	1.68	1.70	1.47
Home share of inputs (%)	97.39	97.85	97.85	97.81	98.38
Event-study slope	0.000	−0.006	−0.006	−0.004	−0.236

- Tariffs raise prices by 0.33%: 0.18 pp through final goods, 0.15 pp through the cascade; sourcing moves home from every foreign origin (home share +0.46 pp).
- Tariffs rose for every origin, so China's relative share barely moves.
- Belief in the long run: one s.d. of trade-policy news persists ($\theta = \kappa$). Slope −0.236 against −0.23 to −0.31, untargeted; China loses more than two thirds of its share, the rest of the world one seventh.

Impulse Responses: Capital Model



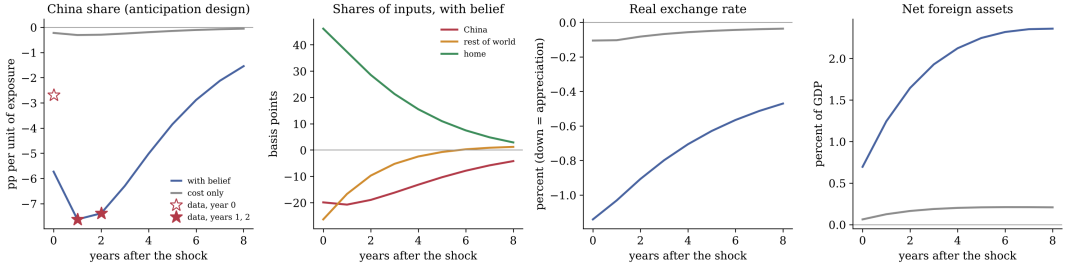
- Belief ($\kappa = 0.335$, $\rho = 0.70$) with sticky sourcing: -7.6 and -7.4 in years 1 and 2, as estimated; year 0 too fast (-5.7 vs -2.7).
- Measured cost shocks alone: a tenth of the response (-0.7, -0.6, -0.4 without friction).
- Bottom row: cost shocks move inputs home from China and the rest of the world; the belief moves them mostly away from China.

Steady States: General Equilibrium

	(1) pre-2025	(2) 2026 tariffs	(3) + tariff vol.	(4) + GPR cost	(5) + trade-risk belief
Consumer price index (%)	0.000	0.160	0.160	0.147	0.013
China share of inputs (%)	0.632	0.541	0.541	0.554	0.188
Event-study slope	0.000	−0.010	−0.010	−0.007	−0.244
Real exchange rate $\mathcal{Q}$	1.000	0.961	0.961	0.964	0.925
Net foreign assets ($\times$ GDP)	0.000	0.011	0.011	0.011	0.009
Worker consumption	0.6228	0.6262	0.6262	0.6259	0.6261
Capitalist consumption	0.4566	0.4559	0.4559	0.4560	0.4566

- The dollar appreciates by about 4%: consumer prices rise by 0.16% instead of 0.33%; with the belief, the dollar appreciates about 4% more.
- Long-run slope -0.244, within the range of the estimates; κ in GE equal to the capital model.
- NFA $+1$% of GDP: a saving effect (workers' wealth up, equity value down), not valuation.

Impulse Responses: General Equilibrium



- Trade-policy surprise with the belief and sticky sourcing: -7.6 and -7.4 in years 1 and 2, as estimated.
- Firms shift from foreign to home suppliers: imports fall and the dollar appreciates 1.1% on impact.
- Expected depreciation raises the real rate: households save, NFA $+1.7\%$ of GDP after two years.

All responses

Welfare of Workers

Consumption equivalent along the transition to the 2026 economy, $\lambda^g = (W^g / W^g_{\text{pre}})^{1/(1-\rho_w)} - 1$:

	Share of workers (%)	Revenue rebated		Revenue wasted	
		No friction	Sticky	No friction	Sticky
All workers	100.0	+0.490	+0.488	+0.179	+0.167
Employers with low China exposure	49.8	+0.496	+0.495	+0.185	+0.173
Employers with high China exposure	14.7	+0.462	+0.461	+0.151	+0.139
Metals and autos					
low China exposure	0.5	+0.551	+0.549	+0.239	+0.227
high China exposure	0.1	+0.201	+0.200	−0.109	−0.121

- Workers of exposed employers gain less: wages rise less (0.37% vs 0.56%), the contract binds more often (14.0 to 14.5%), wage CV 0.123 to 0.126.
- They build precautionary savings (wealth +5.7%) and give up consumption to do so: tariffs shift income risk onto them.

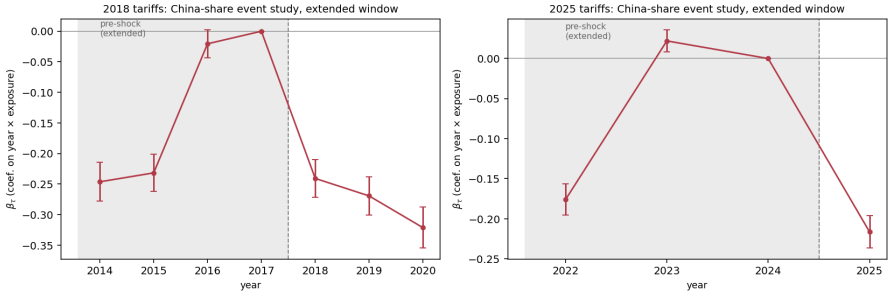
Conclusions

- The repositioning of supply chains away from China is a precautionary response to trade-policy news, not to the tariff level: it builds before the tariffs and extends to goods without tariffs.
- Endogenous links and uninsurable risk together create a risk-misallocation wedge, absent in Baqaee and Farhi and in Kopytov et al.
- The quantitative model reproduces the gradual retreat and, untargeted, the long-run retreat; the driver is owners' beliefs about trade risk, not measured tariffs.
- Tariffs redistribute more than they destroy: workers gain about 0.5% of consumption, less where employers rely on Chinese inputs.
- These results rely on export market power and no retaliation. Next: gross external positions and valuation.

Appendix

Firm Event Study: Pre-Trends

Extended windows reveal a U-shape around the exposure window: firm-level China shares mean-revert



- On extended windows the pre-trend test rejects, and the break does not survive an exposure-specific trend: firm China shares mean-revert.
- Reading: the level effect of the tariff is modest; much of the retreat is anticipation, which the anticipation design isolates.

Back

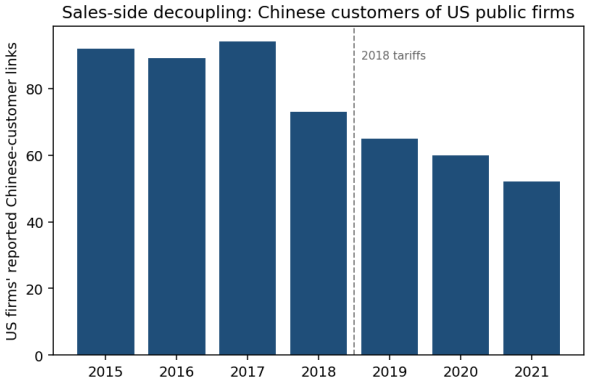
Anticipation Design: Coefficients

	China, firm level			Pooled, firm-origin pairs		
h (quarters)	TPU	GPR China	MPU (placebo)	TPU	GPR own origin	MPU (placebo)
-4	$+0.002$	$+0.009$	$+0.011$	-0.003	$+0.004$	$+0.006$
-2	$+0.000$	$+0.009$	-0.000	$+0.002$	$+0.006$	$+0.001$
0	-0.013	$+0.003$	$+0.006$	-0.011	$+0.002$	$+0.006$
$+2$	-0.033^{**}	$+0.000$	-0.010	-0.028^{**}	-0.005	-0.005
$+4$	-0.055^{**}	-0.023	-0.001	-0.044^{**}	-0.017^{*}	-0.001
$+8$	-0.071	-0.017	$+0.011$	-0.079^{**}	-0.002	$+0.007$
Pre-trend p	0.99	0.57	0.43	0.92	0.15	0.86
levels	0.000	0.03	0.06	0.007	0.006	0.57

- Surprise specification: controls for two lags of the index interacted with exposure.
- Cumulative change in the origin share from $t-1$ to $t+h$, per s.d. of the index and per unit of pre-period exposure.

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Sales Side: Chinese Customers of US Public Firms



- Data: Compustat customer-segment disclosures (WRDS), 2015 to 2021. US public firms must report customers that account for at least 10% of their sales.
- Measure: number of reported relationships with a Chinese company customer (by name: Huawei, Lenovo, Xiaomi, China Mobile, Foxconn, ...).
- Result: from 94 in 2017 to 52 in 2021, about -45%, starting in 2018. All reported customer links fall only about 3% over the same years.
- A descriptive complement: the retreat from China also appears on the sales side, not only in sourcing.

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Proof: Risk-Adjusted Prices

1. Only unit cost depends on α_i, so the firm minimizes $\mathbb{E}\left[\Lambda_i Q_i \Theta_i\right] = \mathbb{E}\left[e^{\lambda_i + q_i + \theta_i}\right]$.
2. $\lambda_i + q_i + \theta_i$ is jointly normal, so
$$\log \mathbb{E}\left[e^{\lambda_i + q_i + \theta_i}\right] = \mathbb{E}[\lambda_i + q_i + \theta_i] + \tfrac{1}{2}\mathrm{Var}(\lambda_i + q_i + \theta_i).$$
3. Differentiating in α_{ij}:
$$-\frac{\partial a_i}{\partial \alpha_{ij}} + \mathbb{E}[p_j] + \mathrm{Cov}(p_j, \lambda_i) + \mathrm{Cov}(p_j, q_i + \theta_i).$$
4. Sales are nonstochastic and $\theta_i = p_i$ state by state, so $q_i + \theta_i = \log \omega_i$ is constant: the last covariance is exactly zero.
5. The remaining conditions are the FOCs of max $a_i(\alpha_i) - \sum_j \alpha_{ij} \mathcal{R}_{ij}$; strict concavity of a_i gives a unique solution.

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Proof: Misallocation

1. $\bar{a}(\omega)$: the best aggregate productivity attainable for given Domar weights. With $x_{ij} = \omega_i \alpha_{ij}$, the constraint $\omega' = \beta' \mathcal{L}(\alpha)$ is linear in (x, ω), and each $\omega_i a_i(x_i/\omega_i)$ is jointly concave, so $\bar{a}$ is concave in ω.

2. $\nabla \mathcal{W}(\omega^*) = 0$ and $\mathcal{H} = \nabla^2 \bar{a} - (\rho - 1)\Sigma$ is negative definite ($\rho > 1$).

3. Wedges leave a residual gradient, $\nabla \mathcal{W}(\omega^{IM}) = -\mathcal{T}$; linearizing, $\omega^{IM} - \omega^* = -\mathcal{H}^{-1}\mathcal{T}$.

4. Second-order expansion around ω^*, where the gradient is zero:

$$\mathcal{W}(\omega^*) - \mathcal{W}(\omega^{IM}) = -\tfrac{1}{2}\, d'\mathcal{H}d = \tfrac{1}{2}\,\mathcal{T}'\big(-\mathcal{H}^{-1}\big)\mathcal{T}, \qquad d = \omega^{IM} - \omega^*.$$

5. Severed links: the expansion fails at the boundary; each adds a non-negative discrete loss, $\Delta^{\text{ext}} \geq 0$.

6. Block-diagonal case (prices and Domar weights fixed): loss $\frac{1}{2}\sum_i \omega_i\, \tau_i'(-H_i^{-1})\tau_i$.

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Sticky Sourcing: Partial Adjustment

- Logit target: holding shares s instead of s^* costs exactly $\nu_i \, \mathrm{KL}(s \,\|\, s^*)$; to second order in the log-odds y, a flow loss $\frac{1}{2}k(y - y^*)^2$.
- A firm that resets at t keeps x_t until the next reset (probability λ_c per year):

$$x_t = \big(1 - \beta(1-\lambda_c)\big) \sum_{j \geq 0} \big(\beta(1-\lambda_c)\big)^j \, \mathbb{E}_t[y^*_{t+j}]$$

- A fraction λ_c resets each year, so average log-odds follow

$$\bar{y}_t = (1 - \lambda_c) \, \bar{y}_{t-1} + \lambda_c \, x_t.$$

- $\lambda_c = 0.4$: contracts of 2.5 years; below the 54% annual rate at which US importers change their primary Chinese supplier (Monarch 2022), an upper bound.

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The Contract and the Firm's Kernel

Wage FOC in state s, with multipliers ν_f (signing), $\mu_f^w(s)$ (worker), $\mu_f^f(s)$ (firm):

$$\Lambda^c(s) + \mu_f^f(s) = \left(\nu_f + \mu_f^w(s)\right) u'\left(c_f^w(s)\right)$$

Network FOC from the Lagrangian

$$\mathcal{L} = \mathbb{E}\left[(\Lambda^c + \mu_f^f)\Pi_f + (\nu_f + \mu_f^w)V_f^w\right] - \nu_f \bar{V}_f - \mathbb{E}\left[\mu_f^w \Omega_f^w + \mu_f^f \Omega_f^f\right]$$

gives $\mathbb{E}\left[(\Lambda^c + \mu_f^f)\,\partial\Pi_f/\partial s_f\right] = 0$ (envelope theorem for the wage).

- Firm's kernel: the capitalists' where its constraint is slack; proportional to the worker's marginal utility where it binds.
- Under full commitment the wedge is zero.

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Effective Tariff Rates

Category	China			Rest of world		
	2024 (%)	2026 (%)	imports 2024 (bn USD)	2024 (%)	2026 (%)	imports 2024 (bn USD)
Metals	16.3	50.1	5	1.3	20.5	112
Autos	25.9	47.9	14	1.0	12.0	366
Electronics	6.2	13.3	172	0.4	3.8	620
Pharma	8.1	11.9	23	0.3	2.0	341
Wood	14.6	22.0	7	0.3	5.6	46
Machinery	13.6	26.8	146	1.0	10.3	600
AgFood	17.9	26.7	53	2.4	5.7	607

Calculated duties over customs value, fixed 2024 import weights by origin. 2026: March to July. Source: USITC DataWeb.

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Parameters

Parameter	Symbol	Value	Source or target
Entropy weight	ν_i	0.25	trade elasticity of 4
Demand elasticity	σ	4.98	markup 1.25
Capital elasticity	α_K	0.12	
Uninsurable and currency loadings	ϕ_i, ψ_i	0.10	Guiso et al.; Blundell et al.
Tariff factor s.d., pre-2025 and 2026	σ_T	0.0183, 0.0947	DataWeb, first stage
Reset probability	λ_c	0.4	contracts of 2.5 years
Trade-risk belief, size and persistence	κ, ρ	0.335, 0.70	anticipation design, years 1, 2
Workers' risk aversion	ρ_w	3	
Discount factors	β_L, β_H	0.945, 0.9745	wealth 1.2 GDP, 30% HtM
Liquidity spread	Δ^L	0.0075	
Productivity persistence, s.d.	ρ_u, σ_η	0.887, 0.262	Compustat
Wage elasticity below threshold	ς	0.5	pass-through 0.07
World interest rate, export elasticity	r^*, ϵ_X	0.02, 4	

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Shocks Fed to the Model

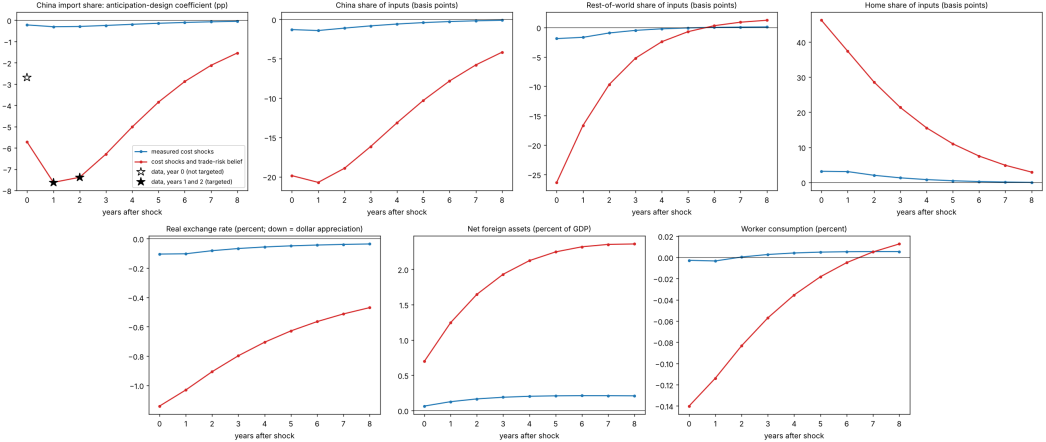
Per one s.d. of each index, percentage points

	Tariff level		Tariff vol. (s.d.)		Import charges	
	yr 1	yr 2	yr 1	yr 2	yr 1	yr 2
TPU, China	+2.39	+1.98	+1.85	−0.25	+0.05	+0.22
TPU, rest of world	+0.54	+0.47	+0.34	−0.04	+0.04	+0.07
GPR, China	−0.09	−0.11	−0.09	+0.09	−0.24	−0.50
GPR, rest of world	+0.01	−0.08	−0.03	−0.04	−0.07	−0.19

- Local projections of monthly effective tariffs and import charges on each index (USITC, 2017 to 2026), averaged over each model year.
- Measured costs move little: trade-policy surprises also shift owners' beliefs about trade risk; geopolitical risk enters through its cost part only.

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General Equilibrium: All Responses



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