Triple Shock, One Global Economy [1]

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[1] Charles Goodhart Lecture - Money, Macro, Finance Society Conference, University of Reading

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  First triggered by **COVID-19**, then magnified by rising **geopolitical** risk. → Disrupts capacity, generates congestion.

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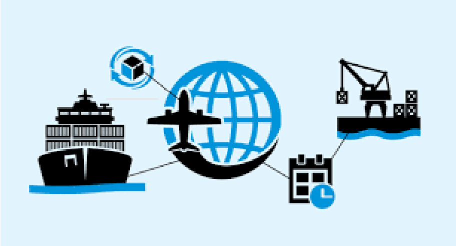
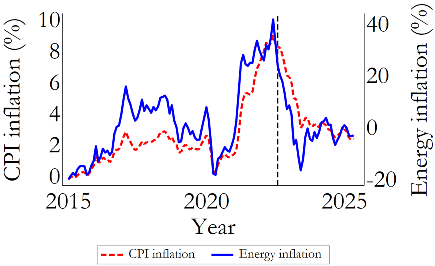
→ **Implications for inflation, monetary policy, global capital flows, exchange rate dynamics?**

Supply Chain Uncertainty and Inflation Dynamics

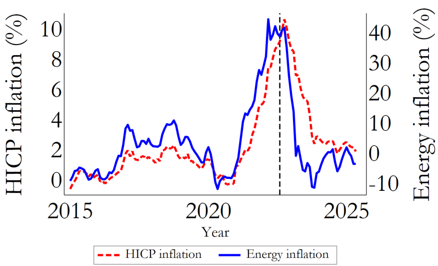


(*based on joint work with Alfonso Merendino)

Energy and CPI Inflation in the US and EZ



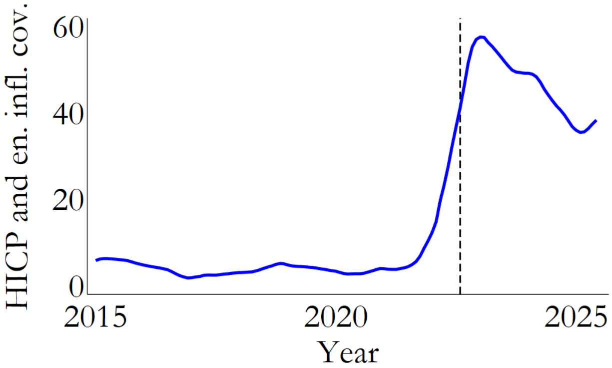
U.S.



Eurozone

In 2021 energy and CPI inflation accelerate in tandem

Rising Covariance btw. Energy and CPI Inflation



After 2021 energy and CPI inflation co-move much more strongly

Heightened Uncertainty in Global Supply Chains

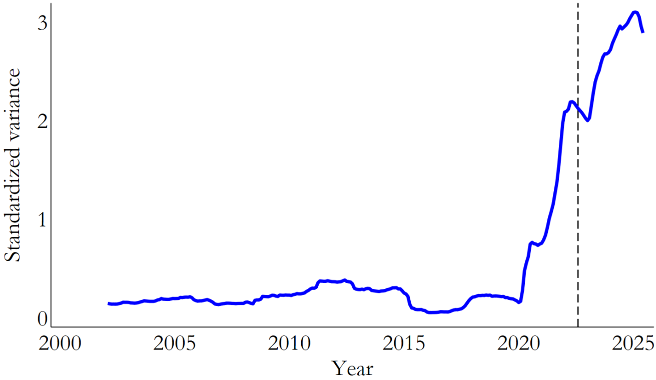


Figure: Rolling variance of GSCPI index

Heightened uncertainty in global supply chains after 2020

Local Projections: Oil News Shocks

- Low and high **supply chain uncertainty** regimes.

$$D_t = \mathbf{1}\{\mathrm{Var}(GSCPI_t) > p_{80}\},$$

where $D_t = 1$ when supply chain uncertainty is in the top 20% of its distribution (Feb. 2002–Dec. 2024).

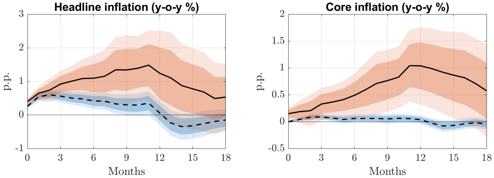
- Estimate **local projections**:

$$\pi_{t+h} = \alpha_h + \beta_h \varepsilon_t^{\text{oil}} + \beta_h^H \left(D_t \cdot \varepsilon_t^{\text{oil}}\right) + \sum_{j=1}^{J} \gamma_{j,h} \pi_{t-j} + \nu_{t+h}$$

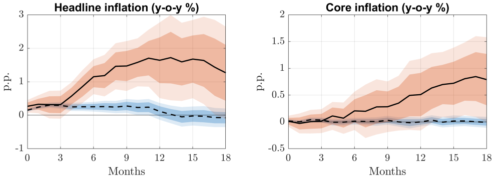
- The dummy D_t is interacted with high-frequency **oil supply news** surprises $\varepsilon_t^{\text{oil}}$ (Känzig, 2021).

Local Projections: Oil News Shocks and Inflation

United States



Europe



High supply-chain uncertainty

Low supply-chain uncertainty

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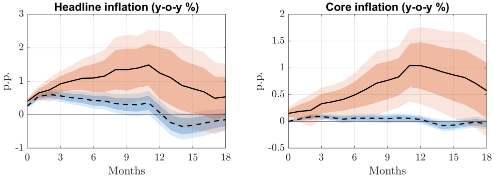

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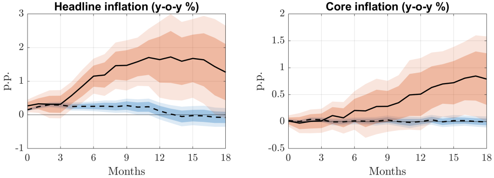

High supply-chain uncertainty — Low supply-chain uncertainty

Pass-through of oil news shocks much larger conditional on high supply-chain uncertainty

A Theory of Supply Shocks Pass-Through

- Between 2021–2023, inflation reacted **much more strongly and persistently** to energy shocks than in the past.
- Pass-through of energy prices to inflation is **state-dependent**.

Our theory

Supply-chain uncertainty amplifies the **inflationary** effect of energy price shocks.

Case Study: Strait of Hormuz, June 2025

Shipping

Oil tanker owners reluctant to brave Strait of Hormuz, Frontline chief says

Israel's strike on Iran raises questions about waterway handling quarter of world crude oil supplies

About a quarter of global oil supplies and a third of liquefied natural gas production move through the Strait of Hormuz © Scanpix/Reuters

Financial Times, June 13, 2025: "Oil tanker owners reluctant to brave Strait of Hormuz, Frontline chief says."

Case Study: Strait of Hormuz, June 2025

- **Shock:** Security risk spiked after Israel's attack on Iran.
- **Shipping response:** *Frontline* (largest listed tanker firm) halted new charters via the Strait of Hormuz.
- **Shared corridor:** Same chokepoint serves oil tankers *and* container ships $\Rightarrow$ network-wide exposure.
- **Immediate effect: Oil prices jumped**.
- **Supply-chain effect: Uncertainty** over delivery times for containerized goods (e.g., semiconductors) rose.
- **Inference channel:** Firms read the oil spike as a *signal* of broader transport risk $\Rightarrow$ higher expected delay costs for specialized inputs.

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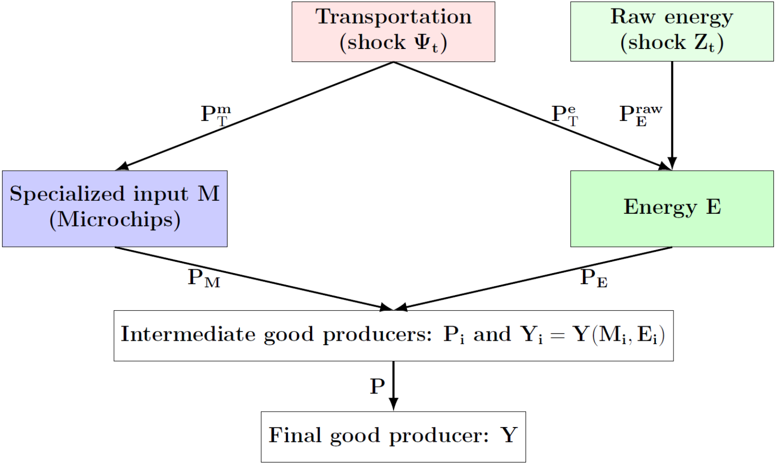
A Stylized Model of the Supply Chain



Transportation shock Ψ_t hits both inputs: Microchips and Energy

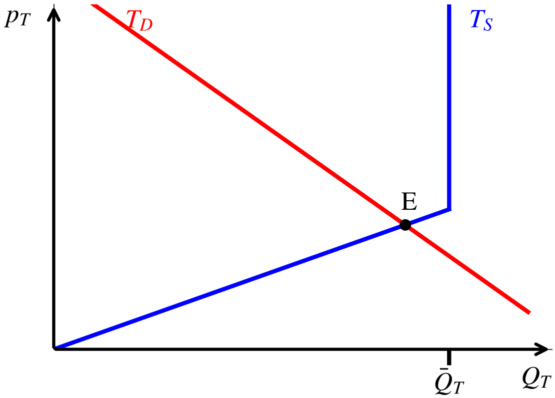
Three Facts about Maritime Transportation

1. **Maritime dominance.** Over 80% of global merchandise trade moves by sea
2. **Finite capacity.** Supply is a fixed fleet ($\sim$5,589 container ships) $\Rightarrow$ *vertical kink*: once fully deployed, quantity cannot rise even if demand increases.
3. **Choke points.** Shipments concentrate on a few hub ports and fixed routes (network concentration Gini > 0.85) $\Rightarrow$ disruptions at hubs propagate widely.

Transportation Shocks & Input Substitutability

1. **Common transportation shocks (network-wide).** A shared maritime market with fixed routes/choke points means shocks raise the *effective* delivery cost/time across routes; **both energy and specialized inputs are exposed**—even if shipped separately.
2. **Asymmetric impact by input type.** *Energy* (commoditized) is substitutable and available in local spot markets at a known premium; *specialized inputs* (e.g., microchips) lack substitutes and face stochastic delivery lags

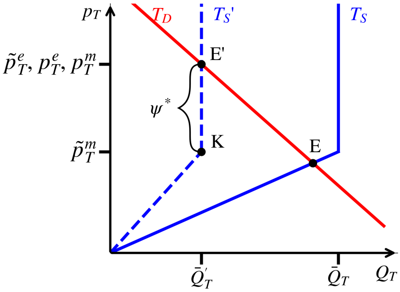
Transportation Market



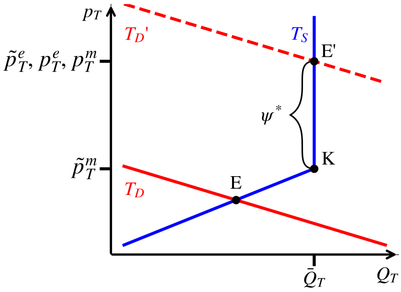
← *capacity constraint*

Unconstrained equilibrium in the transportation market

Shocks in Transportation Market



"Strait of Hormuz" congestion supply shock



"Covid" demand shock

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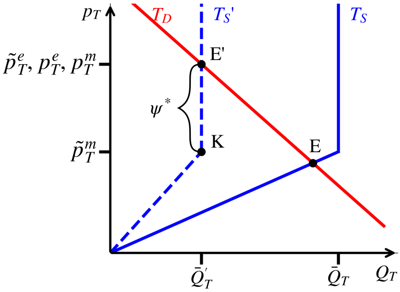

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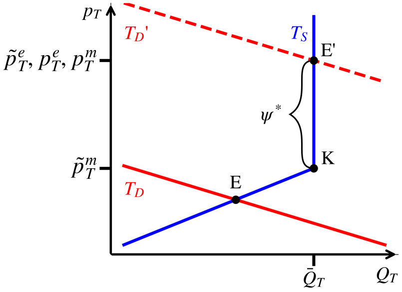

"Covid" demand shock

$$\underbrace{p^m_{T,t}}_{\text{effective price}} = \underbrace{\tilde{p}^m_{T,t}}_{\text{market price}} + \underbrace{\psi^*_t}_{\text{unobserved delay}}$$

Wedge between effective and market price of microchips

Asymmetric Effects of Congestion

- **Market price** of transportation naturally increases.
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- Remains accessible through **highly liquid local spot markets**, but at a **premium**.
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Microchips

- Depend on tightly coordinated "just-in-time" supply chains.
- Lack immediate substitutes and cannot be easily stocked.
- $\Rightarrow$ Delays in delivery generate a **stochastic, unobserved cost component** not captured by **market** prices.

Inference Problem

- Asymmetry generates an **inference problem**.

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Observed energy prices

- Reflect **2 components**:
  1. Raw **energy fundamentals** (true shocks)
  2. **Transportation disruptions** (congestion effects)

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Signal extraction by firms

- Firms treat energy prices as a **noisy signal**.
- Use them to form Bayesian estimates of delivery delays for **specialized inputs** (e.g., microchips).

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Inference Challenge

When energy prices rise, is it:

Energy shock	**Supply chain disruption**
temporary, input-specific	persistent, affects both inputs

Kalman Filter: Recursive Learning

- Firms form a **Bayesian estimate** of the **transportation shock** ψ_t from observed energy prices.
- Update is **recursive**: *prior* + (*gain* × *innovation*).

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Update (prior + gain × innovation)

$$\underbrace{\psi_t^*}_{\text{posterior}} = \underbrace{\mathbb{E}_{t-1}\{\psi_t\}}_{\text{prior}} + \underbrace{\mathbb{K}(\mathcal{S})}_{\text{Kalman gain}} \cdot \underbrace{\left(p_{E,t} - \mathbb{E}_{t-1}\{p_{E,t}\}\right)}_{\text{innovation } v_t}$$

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$$\mathcal{S} \equiv \frac{\sigma_\psi^2}{\sigma_Z^2} \quad \text{(signal-to-noise ratio)}$$

Uncertainty Effect: Impact Pass-Through of Energy on Prices

- Larger **variance** of transportation shocks $\Rightarrow$ firms rely more on energy price as a signal ($\uparrow \mathbb{K}(\mathcal{S})$).

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Pass-through decomposition

$$\frac{dp_t}{dp_{E,t}} = \underbrace{\alpha_E}_{\text{direct}} + \underbrace{\alpha_M \, \nu \, (1-\delta) \, \mathbb{K}(\mathcal{S})}_{\text{uncertainty effect}}$$

Direct effect $=$ energy cost share α_E Uncertainty effect $\propto \alpha_M \, \nu \, (1-\delta) \, \mathbb{K}(\mathcal{S})$

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Intuition

Firms use observed energy price as a *noisy signal* of delivery delays for specialized inputs. Under **incomplete information** ($\mathbb{K} \neq 0$), marginal costs rise **beyond** the direct energy-cost share α_E.

Uncertainty Effect: Dynamic Pass-Through

$$\underbrace{\frac{d\,\mathbb{E}_t\{p_{t+k}\}}{dp_{E,t}}}_{\text{dynamic pass-through}} = \underbrace{\alpha_M\,\nu\,(1-\delta)\,\mathbb{K}}_{\text{impact under uncertainty}} \cdot \underbrace{\left[\rho_\psi\left(1-\mathbb{K}\,\nu\,(1-\delta)\right)\right]^k}_{\text{learning-driven persistence}}$$

- **Intuition**: under uncertainty some of the **persistence** in the transportation shock "contaminates" (iid) energy price shock

Endogenous cost-push effect in the Phillips curve

NK Phillips curve with uncertainty

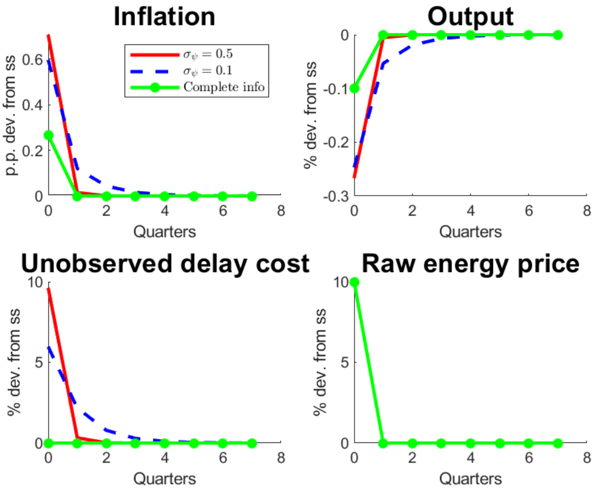
$$\pi_t \;=\; \beta\,\mathbb{E}_t\{\pi_{t+1}\} \;+\; \frac{(1-\theta)(1-\theta\beta)}{\theta}\,mc_t \;+\; \underbrace{G\,u_t}_{\text{uncertainty cost-push}}$$

$$u_t \;=\; L\,u_{t-1} \;+\; \mathbb{K}(\mathcal{S})\,\nu\;\underbrace{FE(p_{E,t})}_{\text{forecast error}}, \qquad L \equiv \big[1-\mathbb{K}(\mathcal{S})\,\nu\,(1-\delta)\big]\,\rho_\psi$$

Comparative statics: larger $\mathbb{K}$ or $|FE(p_{E,t})| \Rightarrow$ stronger amplification; higher $\mathbb{K}$ $\Rightarrow$ lower L (faster learning, less persistence).

Benchmark: if $\mathbb{K}=0$ then $u_t=0 \rightarrow$ NKPC reverts to **standard** form.

IRFs to a raw energy price shock



- **Incomplete information**
  1. **Amplifies** the effect of energy price shock on inflation
  2. Morph energy price shock into **cost-push**

Takeaways

- **Key insight:** volatility of supply chain shocks powerful amplifier of energy price shocks.
- Explains why 2021–23 inflation so sensitive to energy price spike.
- Policy implication: Central banks must condition responses on **supply-chain uncertainty**, not just shock size.

Liberation Day

The Tariff Shock

Motivation: Rising **protectionism** has renewed interest in trade policy shocks.

Question

What are the **macroeconomic effects** of tariff shocks?

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What we do

- Revisit **Krugman (1982)**: key role of exchange-rate regime.
- Embed in a modern, canonical **open-economy NK** framework.
- Emphasize role of **systematic** monetary-policy response.

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Policy analysis

- **Optimal monetary** policy.
- **Exchange-rate** policy.

Results in a nutshell (I)

1. **Analytical characterization**: **direct effects** + endogenous **monetary policy**.
   $\Rightarrow$ **Tariffs can be expansionary** under flexible prices if **trade elasticity** is sufficiently high.

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1. **Analytical characterization**: **direct effects** + endogenous **monetary policy**.
   ⇒ **Tariffs can be expansionary** under flexible prices if **trade elasticity** is sufficiently high.
2. **Inflation-targeting regime matters**:
   PPI-targeting ⇒ tariffs shift demand domestically ⇒ **boost output**.
   CPI-targeting ⇒ higher consumer prices ⇒ rate hikes that neutralize **any** expansion.

Results in a nutshell (II)

3. **Exchange-rate peg amplifies protectionist effects**: prevents tariff-driven **appreciation** $\Rightarrow$ maximizes output gain.
   Cost: higher CPI and PPI inflation.

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4. **Tariff shocks create a time-varying wedge (efficient vs. flex-price)**: Optimal monetary policy is **more expansionary** than the **flex-price** allocation.
   CPI-targeting generates large deviations from **constrained efficiency** (cost-push nature).
   ⇒ **Contractionary bias of CPI targeting**.

Related literature: recent boom

- **Krugman (1982)** early analysis under floating exchange rates.
- **Bergin and Corsetti (2023)** Tariffs and optimal **cooperative** policy
- **Bianchi and Coulibaly (2025)** optimal mon. policy response to tariffs: **fiscal externality** channel
- **Kalemli-Özcan et al. (2025)** Rich global economy model with **value chains**.
- **Auclert et al. (2025**). General **positive** analysis of macro effects of tariffs
- **Guerrieri-Lorenzoni-Werning (2025)**: open-closed economy setup, no ex. rates, **tariffs cost-push**

Outline I

Model ingredients

1. A baseline NK open economy model with nominal rigidities on **domestic goods prices**
2. Complete intl. financial markets → Perfect **risk-sharing**
3. **Law of one price** on imported consumption goods → Perfect **ex. rate pass-through**
4. Baseline: **tariffs** on **consumer** imports and exports → Extend to imported inputs

Tariffs and prices

- *Cum-tariff* import price of foreign goods

$$\widetilde{P}_{F,t} \equiv (1 + \tau_{M,t}) P_{F,t}$$

where $\tau_{M,t}$ is an import tariff.

- *Cum-tariff* price of exported goods is

$$\widetilde{P}_{H,t} = P_{H,t}(1 + \tau_{X,t})$$

where $\tau_{X,t}$ is a tariff on export prices imposed by rest of the world.

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- Home economy (utility-based) CPI level

$$P_t \equiv \left[(1-\upsilon)P_{H,t}^{1-\eta} + \upsilon\left((1+\tau_{M,t})P_{F,t}\right)^{1-\eta}\right]^{\frac{1}{1-\eta}} \tag{1}$$

  where η **is the trade elasticity of substitution**.

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- *Effective cum-tariff* relative price of imported goods $\widetilde{S}_t$:

$$\widetilde{S}_t \equiv \frac{\widetilde{P}_{F,t}}{P_{H,t}} = \frac{(1+\tau_{M,t}) P_{F,t}}{P_{H,t}} = (1+\tau_{M,t}) S_t, \text{ where } S_t = \frac{P_{F,t}}{P_{H,t}}$$

Demand of home and foreign goods

- Let $\mathcal{G}\left(\underbrace{S_t}_{+}, \underbrace{\tau_{M,t}}_{+}\right)$ be the **CPI-PPI ratio** $\frac{P_t}{P_{H,t}}$, and υ be the degree of openness (to imports)

- Optimal domestic demand for **foreign imported goods**

$$C_{F,t} = \upsilon \left(\frac{(1 + \tau_{M,t}) S_t}{\mathcal{G}(S_t, \tau_{M,t})} \right)^{-\eta} C_t$$

- Optimal domestic demand for Home-produced goods

$$C_{H,t} = (1 - \upsilon) \left(\mathcal{G}(S_t, \tau_{M,t}) \right)^{\eta} C_t$$

Firms

- Each monopolistic firm i in Home produces **differentiated** good according to the *CRS* production function:

$$Y_t(i) = A_t F\left(N_t(i)\right) = A_t N_t(i)$$

Real marginal cost MC_t^r reads

$$MC_t^r = \frac{W_t/P_t}{A_t}\mathcal{G}(S_t, \tau_{M,t})$$

- Domestic goods inflation $\Pi_{H,t}$ and optimal relative price:

$$1 = \theta(\Pi_{H,t})^{\varepsilon-1} + (1-\theta)\left(\frac{\overline{P}_{H,t}}{P_{H,t}}\right)^{1-\varepsilon}.$$

Households and risk sharing

- Consumption/saving:

$$(1+i_t) \equiv \mathbb{E}_t \left\{\xi_{t,t+1}\right\}^{-1} = \left[\beta \mathbb{E}_t \left\{ \frac{P_t(\tau_{M,t})}{P_{t+1}(\tau_{M,t+1})} \frac{U_{c,t+1}}{U_{c,t}} \right\}\right]^{-1} \tag{2}$$

- Complete markets $\rightarrow$ *Risk-sharing* relationship between domestic and foreign consumption:

$$U^*_{c,t}(C^*_t) = U_{c,t}(C_t)\mathcal{E}^r_t$$

where $\mathcal{E}^r_t \equiv \frac{\mathcal{E}_t P^*_t}{P_t}$ is the CPI real exchange rate and C^*_t is foreign consumption.

Goods market clearing and monetary policy

- Market clearing for Home produced goods:

$$Y_t = \underbrace{(1-\upsilon)\left(\mathcal{G}(S_t, \tau_{M,t})\right)^{\eta} C_t}_{\substack{\text{domestic demand} \\ \text{for Home goods} \equiv C_{H,t}}} + \underbrace{\gamma \left(\frac{S_t}{(1+\tau_{X,t})}\right)^{\eta} Y_t^*}_{\text{export demand}}$$

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- Three alternative rules for **monetary policy**:
  - **PPI-targeting**: $\Pi_{H,t} = 1$ for all t
  - **CPI-targeting**: $\Pi_t = 1$ for all t
  - **Exchange rate peg**: $\frac{\mathcal{E}_t}{\mathcal{E}_{t-1}} = 1$ for all t

Outline I

Effect of tariffs under flexible prices

- Let Ω_s be, for given tariffs, the sensitivity of output to movements in the ex-tariff relative price of imports

$$\Omega_s \equiv (1-\upsilon)^2 + \eta((1-\upsilon)\upsilon + \gamma) > 0$$

- Let Ω_{τ_M} be the **elasticity of domestic output to import tariffs** conditional on a given relative price of imports

$$\Omega_{\tau_M} \equiv (\eta - 1)(1-\upsilon)\upsilon$$

where $\Omega_{\tau_M} > 0 \iff \eta > 1$

- **Natural** level of output:

$$y_t^n = \left(\frac{1}{\Omega_s} + \varphi\right)^{-1} \left[(1+\varphi)a_t + \underbrace{\frac{\Omega_{\tau_M}}{\Omega_s}\tau_{M,t} - \frac{\gamma\eta}{\Omega_s}\tau_{X,t}}_{\substack{\text{effects of tariffs} \\ \text{on the natural level} \\ \text{of output}}} \right]$$

Effect of tariffs under flexible prices

Proposition. *Under flexible domestic prices,* **import tariffs increase** *(decrease) the natural level of output if* $\Omega_{\tau_M} > (<)\ 0$*, i.e., if* $\eta > (<)\ 1$*. Since* $\gamma\eta > 0$ *and* $\Omega_s > 0$*, export tariffs always decrease the natural level of output.*

- Under **flexible** prices, import tariffs increase the cum-tariff relative price of foreign goods
  - $\rightarrow$ lower consumption for any given output level (*income effect*);
  - $\rightarrow$ substitution from imported towards domestic goods (*substitution effect*).
- If **trade elasticity** of substitution is large enough ($\eta > 1$) $\rightarrow$ *substitution effect* $>$ *income effect* $\rightarrow$ expansionary effect of **import tariffs** on output.

Tariffs and Monetary Policy under Sticky Prices

- Summarize the **output effect** of tariffs in one equilibrium equation

$$y_t = \underbrace{-\Omega_y \mathbb{E}_t \sum_{j=0}^{\infty} \left(i_{t+j} - \mathbb{E}_t \pi_{H,t+j+1} \right)}_{\text{endogenous monetary policy effect}} + \underbrace{\Omega_M \tau_{M,t}}_{\text{import tariffs}} - \underbrace{\eta \gamma \tau_{X,t}}_{\text{export tariffs}}$$

$$\Omega_M > 0$$

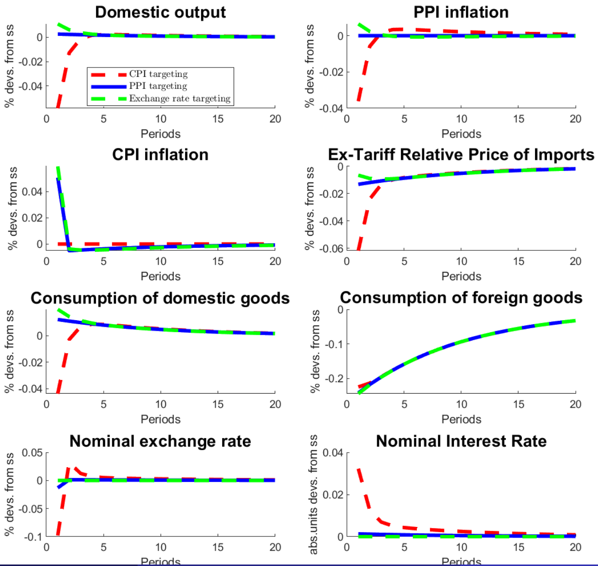
if trade elasticity of substitution sufficiently high

Outline I

Baseline Calibration

Parameter	Symbol	Value
Discount	β	0.99
Calvo parameter	θ	0.80
Markup	$\mathcal{M}$	1.35
Openness (imports)	υ	0.30
Openness (exports)	γ	0.30
Trade elasticity	η	1.5 (high) / 0.8 (low)

Import tariff shock under alternative monetary policy regimes (high trade elasticity)



Outline I

Efficient allocation

Efficient allocation SOE social planner - **taking tariffs as given**

$$Max_{\{C_t, S_t,\ N_t\}}\ \mathbb{E}_0 \sum_{t=0}^{\infty} \beta^t \left\{ \log C_t - \frac{N_t^{1+\varphi}}{1+\varphi} \right\}$$

$$+ \mathbb{E}_0 \sum_{t=0}^{\infty} \beta^t \zeta_t \left(N_t - (1-\upsilon)\left(\mathcal{G}(S_t, \tau_{M,t})\right)^{\eta} C_t - \upsilon \left(\frac{S_t}{(1+\tau_{X,t})} \right)^{\eta} \right)$$

$$+ \mathbb{E}_0 \sum_{t=0}^{\infty} \beta^t \chi_t \left(C_t - \frac{S_t}{\mathcal{G}(S_t, \tau_{M,t})} \right)$$

where ζ_t and χ_t are Lagrange multipliers.

Efficient allocation

(Inverse) **Markup** ("labor wedge") under the efficient allocation:

$$\Phi_t = \left\{ \frac{1-\upsilon}{H(S_t, \tau_{M,t}, \tau_{X,t})} \right\} \equiv \Phi_t^e$$

$$H(S_t, \tau_{M,t}, \tau_{X,t}) \equiv 1 - \upsilon \left\{ 1 - \left[\begin{array}{c} \eta q(S_t, \tau_{M,t})^{\eta-1} (1+\tau_{X,t})^{-\eta} + \\ (1-\upsilon)(\eta-1)(1+\tau_{M,t})^{1-\eta} q(S_t, \tau_{M,t})^{1-\eta} \end{array} \right. \right.$$

- Optimal markup must be **time-varying** and responsive to **tariffs**
- **Closed** economy ($\upsilon = 0$)$\rightarrow$ $H(S_t, \tau_M, \tau_X) = 1 \rightarrow \Phi_t^e = \Phi = 1$.

Flexible Prices

(Inverse) Equilibrium **markup** under flexible prices:

$$\Phi_t \equiv C_t N_t^{\varphi} \mathcal{G}(S_t, \tau_{M,t}) = \mathcal{M}^{-1} \equiv \Phi^{flex}$$

where $\mathcal{M} \equiv \varepsilon/(\varepsilon - 1) > 1$.

- **Constant** markup under **flexible prices**
- Tariffs drive a time-varying wedge between efficient and flex-price allocation

Constrained-efficient policy

Ramsey optimal policy solves:

$$Max_{\{C_t, S_t,\ N_t, \Pi_{H,t},\ \widetilde{p}_{H,t}\}} \mathbb{E}_0 \sum_{t=0}^{\infty} \beta^t \left\{ \log C_t - \frac{N_t^{1+\varphi}}{1+\varphi} \right\}$$

s.t. *goods market clearing*, *risk sharing* , *optimal pricing of domestic firms*:

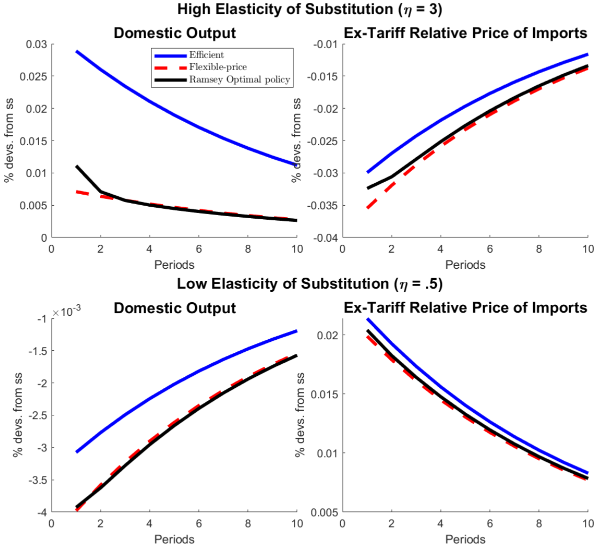
$$\widetilde{p}_{H,t} \equiv \left(\frac{\overline{P}_{H,t}}{P_{H,t}} \right) = \mathcal{M} \frac{\mathcal{Z}_{p,t}}{\mathcal{K}_{p,t}}$$

where

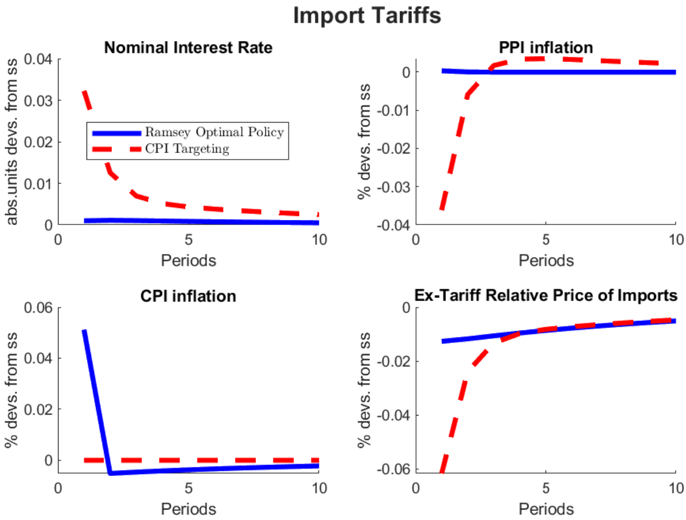
$$\mathcal{K}_{p,t} \equiv \mathbb{E}_t \sum_{k=0}^{\infty} \theta^k \nu_{t,t+k} N_{t+k} \left(\prod_{s=1}^{k} \Pi_{H,t+s} \right)^{\varepsilon}$$

$$\mathcal{Z}_{p,t} \equiv \mathbb{E}_t \sum_{k=0}^{\infty} \theta^k \left\{ \nu_{t,t+k} N_{t+k} MC^r_{t+k}(C_{t+k}, N_{t+k}, S_{t+k}, \tau_{M,t+k}) \left(\prod_{s=1}^{k} \Pi_{H,t+s} \right. \right.$$

Optimal Policy vs Efficient vs Natural Allocation Import Tariff Shock



"CPI-targeting bias": Ramsey optimal vs CPI-targeting



Outline I

Conclusions

- Sufficient statistics logic for the pro-tariff **"protectionist"** argument
- Key role of **endogenous monetary policy**
- Tariff shocks generate **time-varying wedge** between efficient and natural allocation (**endogenously** "cost-push")
- Stabilizing **CPI inflation** entails large deviations from **constrained-efficiency**

Managing Flight From Quality

Flight From Quality (FFQ)

- FFQ: Persistent reduction in the **safety/liquidity premium** of US Dollar $\Rightarrow$ Reduction in convenience yield of US assets
- Implications for **capital flows?**
- Implications for **optimal monetary policy**?

Modeling FFQ

- Foreign (USD) bonds provide utility

$$U = \mathbb{E}_0 \sum_{t=0}^{\infty} \beta^t \left[U(C_t, N_t) + \underbrace{\theta_t \, V(\mathcal{B}_t)}_{\text{convenience yield}} \right] \tag{3}$$

- $\mathcal{B}_t \equiv \frac{\mathcal{E}_t B_t^*}{P_t}$ is the real value of the holdings of foreign-currency denominated assets B_t^*
- Analogy to **MIU models**

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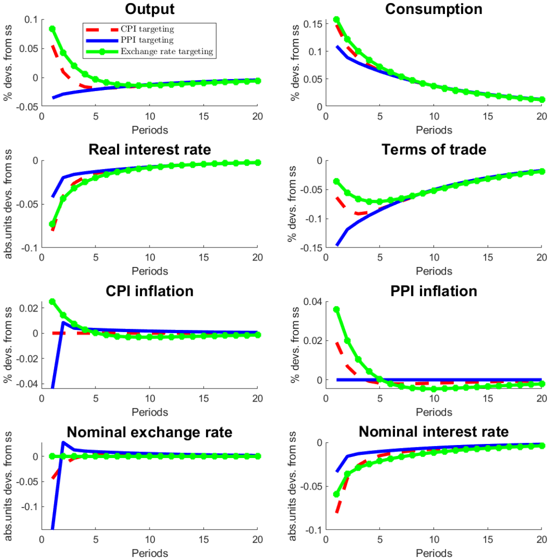
- Analogy to **MIU models**
- **FFQ shocks**
  1. break conventional **UIP condition** for ex. rates
  2. generate inefficiency wedge between competitive equilibrium and efficient allocation $\Rightarrow$ Cost-push shocks

Breaking UIP condition

$$e_t^r = \mathbb{E}_t e_{t+1}^r + r_t^* - \frac{1}{\delta} r_t + \frac{1-\delta}{\delta} \underbrace{(\hat{\theta}_t + v_{b,t} - \mathbb{E}_t u_{c,t+1})}_{\text{convenience yield component}} - \frac{\psi \bar{B}}{\delta} b_t$$

- A FFQ shock (fall in θ_t) $\Rightarrow$ RER **appreciation**
- But also a **fall** in the domestic **real interest rate** r_t

Are Capital Inflows Contractionary or Expansionary?



FFQ shock: the role of monetary policy

Efficiency and FFQ as cost-push shocks

- Bond in the utility ⇒ Social planner wishes to achieve **satiation**

$$-\frac{U_N(N_t)}{U_C(C_t)} = \frac{F_{N,t}}{\mathcal{G}(S_t)}$$

$$V'(\mathcal{B}_t) = 0$$

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- ⇒ FFQ shocks **do not affect** the efficient allocation
- FFQ shocks generate time-varying wedge between efficient an competitive-equilibrium allocation ⇒ FFQ shocks **cost-push**