

TRADE FRAGMENTATION, INFLATIONARY PRESSURES AND MONETARY POLICY

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The views expressed in this paper are those of the authors, and not necessarily those of the Bank of England.

GLOBALISATION HAS STALLED...

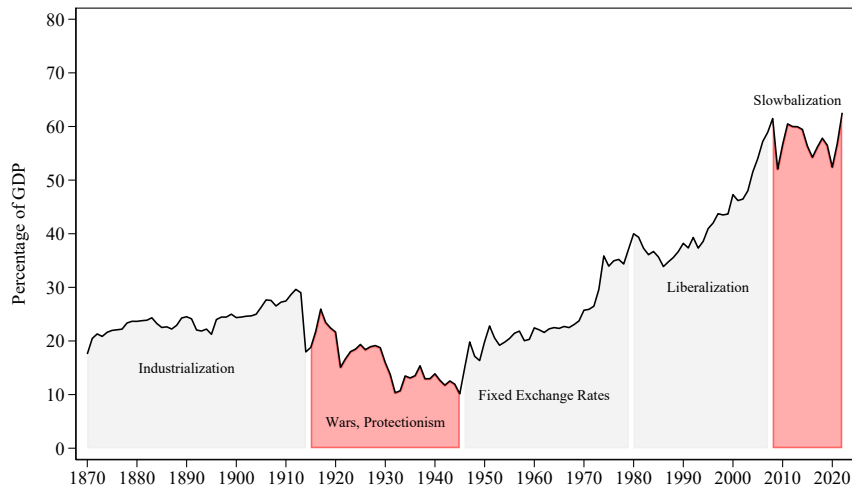


FIGURE: Sum of exports and imports, percentage of GDP

... AND TRADE IS INCREASINGLY INFLUENCED BY GEOPOLITICS

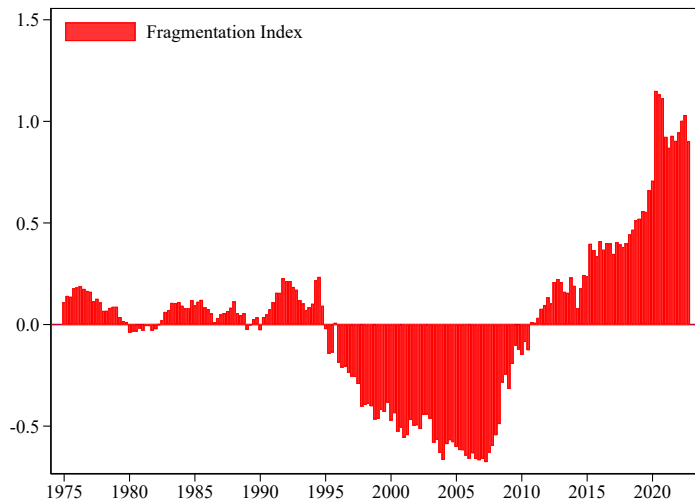


FIGURE: Fragmentation Index - Fernández-Villaverde, Mineyama, and Song (2024)

BACKGROUND AND TWO QUESTIONS

- ▶ Trade fragmentation driven by geopolitics will in all likelihood lead to:
 - ▶ Higher imported goods prices
 - ▶ Lower real incomes
1. Will fragmentation lead to a high-inflation environment?
 2. What would be the monetary policy response needed to keep inflation at target?

PREVIEW OF ANSWERS

1. Will fragmentation lead to a high-inflation environment?

- ▶ Fragmentation does not imply central banks should change their remits
- ▶ Rephrase: will it lead to higher inflationary pressures? **It depends**
 - ▶ **Front-loaded** fragmentation might create short-term **inflationary** pressure
 - ▶ **Gradual** fragmentation might lead to **stagnation**, with lower demand and domestic **disinflationary** pressures

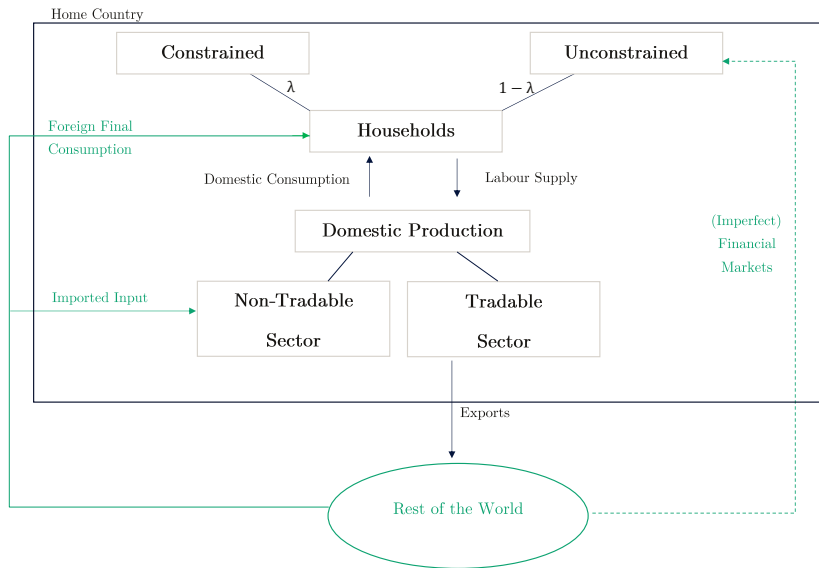
2. What is the monetary policy response needed to keep inflation at target? (How will the equilibrium r^* respond?) **It depends**

- ▶ On how demand responds to (permanently) lower real incomes
 - ▶ Fragmentation might increase or lower r^*

LITERATURE REVIEW

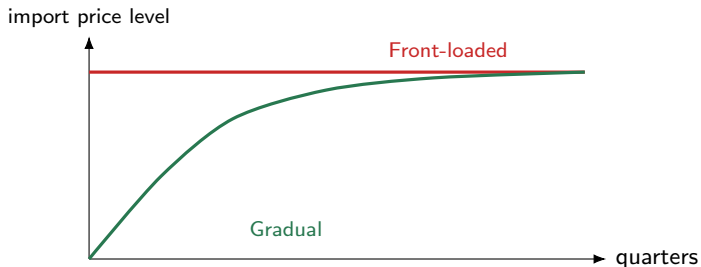
- ▶ **Monetary policy & small open economies:** Gruen, Chandra, and Romalis (1999); Benigno and Benigno (2003); Schmitt-Grohe and Uribe (2003); Corsetti et al. (2003); Gali and Monacelli (2005); Santacreu et al. (2005); De Paoli (2009); etc.
- ▶ **External shocks on macroeconomic outcomes using structural models:** Romero et al. (2008); Catao and Chang (2013); Hevia and Nicolini (2013); Wills (2013); Bergholt (2014); Eaton, Kortum, Neiman, and Romalis (2016); Ferrero and Seneca (2019); Drechsel, McLeay, and Tenreyro (2019); Auclert, Rognlie, Souchier, and Straub (2021); Siena (2021); Broadbent, Di Pace, Drechsel, Harrison, and Tenreyro (2023); Auclert, Monnery, Rognlie, and Straub (2023); Chan, Diz, and Kanngiesser (2024); Guerrieri, Marcussen, Reichlin, and Tenreyro (2024); etc.
- ▶ **Globalisation & Macroeconomy:** Rogoff et al. (2003); Rogoff et al. (2006); Roberts (2006); Romalis (2007); Sbordon (2008); Chen, Imbs, and Scott (2009); Feenstra and Romalis (2014); Lewis and Saleheen (2014); Comin and Johnson (2020); Attinasi and Balatti (2021); Carluccio, Gautier, and Guilloux-Nefussi (2022); Ascari and Fosso (2024); etc.
- ▶ **Macroeconomic impact of tariffs:** Meng, Russ, and Singh (2023); Bergin and Corsetti (2023); Auclert, Rognlie, and Straub (2025); Bianchi and Coulibaly (2025); Cuba-Borda, Queralto, Reyes-Heroles, and Scaramucci (2025); Gnocato, Montes-Galdon, and Stamato (2025); Kalemli-Özcan, Soylu, and Yildirim (2025); Mehrotra and Waugh (2025); Mix and Hoang (2025); Werning, Lorenzoni, and Guerrieri (2025); Nispi-Landi and Moro (2025); etc.

STRUCTURE OF THE ECONOMY



THREE FRAGMENTATION SCENARIOS

1. **Gradual Fragmentation:** import prices rise slowly to a permanently higher level.
2. **Front-loaded Fragmentation:** import prices jump immediately (tariffs, export bans, war).
3. **Fall in Tradable Sector Productivity:** loss of efficient suppliers/technology.

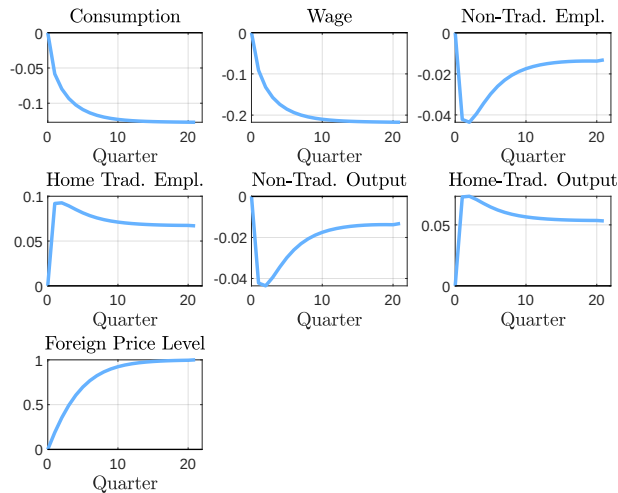


- Same eventual import price increase, the only difference is the **path** it takes to get there.

INTUITION

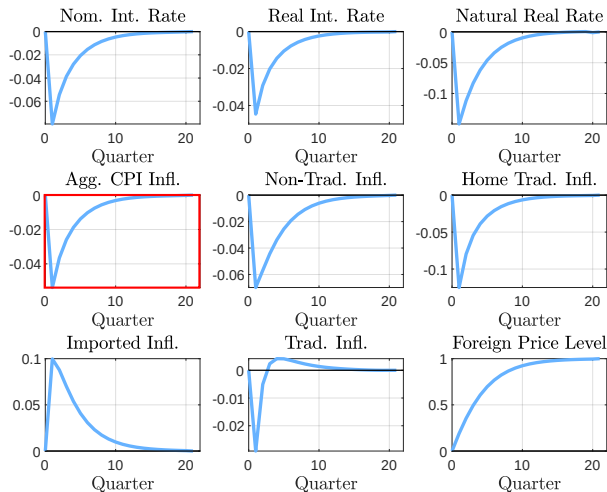
- ▶ **Prevailing narrative:** trade fragmentation raises import prices, and thereby CPI inflation.
- ▶ **General equilibrium:** a permanent rise in import prices is also an income shock. Forward-looking households don't just pay more, they also reducing spending (including on domestic goods). Since domestic inflation is demand-determined, this places downward pressure on domestic inflation, just as import prices push it up.

GRADUAL IMPORT PRICE INCREASE I - RANK



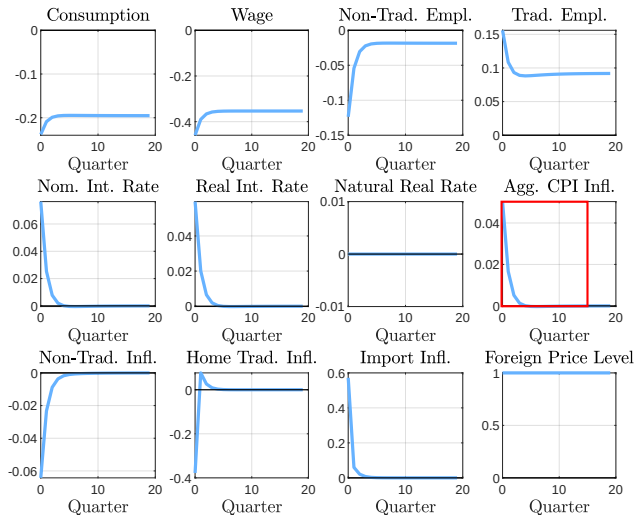
- ▶ The increase in foreign prices is anticipated
- ▶ Consumption falls, in anticipation of lower real incomes
- ▶ Labour demand falls while labour supply increases (wealth effect)
- ▶ Wages fall
- ▶ Less consumption and more labour effort given worse terms of trade

GRADUAL IMPORT PRICE INCREASE II - RANK



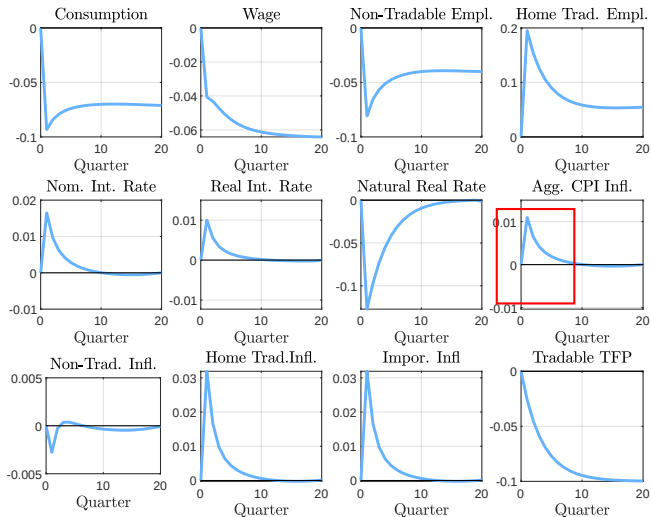
- ▶ Natural rate of interest falls
- ▶ Inflation falls as domestic components of inflation fall by more than the increase in imported components
- ▶ Monetary policy loosens to bring CPI inflation back to target

FRONT-LOADED INCREASE IN IMPORT PRICES - RANK



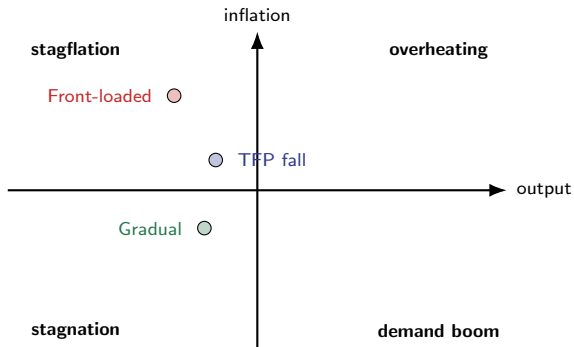
- ▶ Foreign price level suddenly and permanently higher
- ▶ Consumption and wages fall
- ▶ The natural rate of interest doesn't change
- ▶ CPI inflation increases (even though domestic components of inflation fall)
- ▶ Monetary policy ends up tightening in response to CPI inflation

GRADUAL TRADABLE TFP SHOCK - RANK

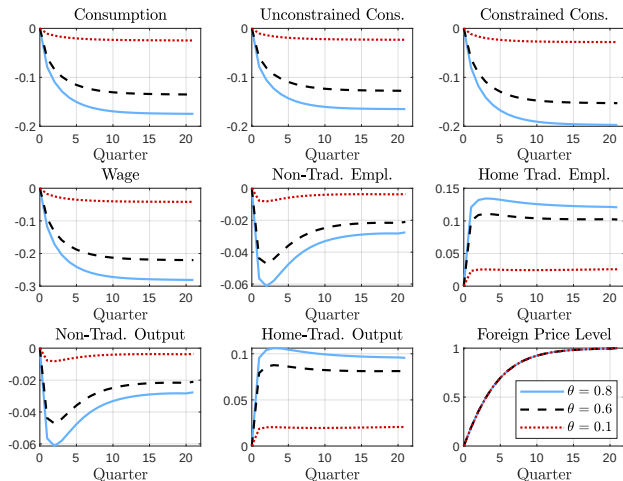


- ▶ Gradual fall in tradable sector TFP
- ▶ Consumption falls
- ▶ Natural rate of interest falls
- ▶ Aggregate CPI inflation increases moderately

MAPPING THE THREE SCENARIOS ONTO THE TRADE-OFF SPACE

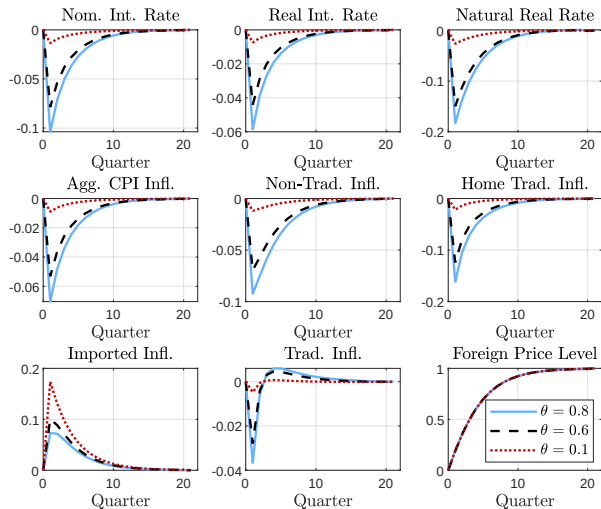


VARYING OPENNESS: GRADUAL IMPORT PRICE INCREASE I



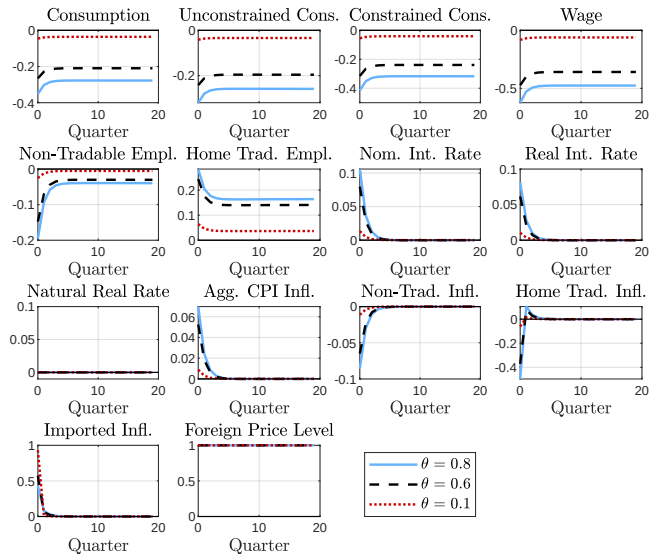
- Higher exposure to foreign shock as trade openness increases
- Less home-bias (more trade openness) leads to larger falls in consumption and wages
- Greater reallocation towards the home-tradable sectors

VARYING OPENNESS: GRADUAL IMPORT PRICE INCREASE II



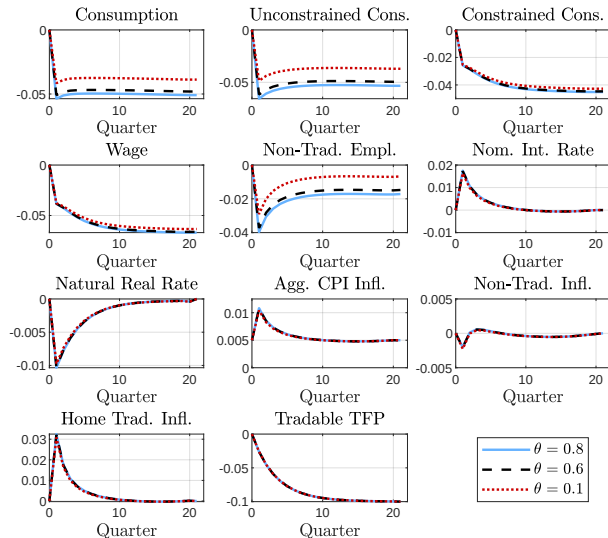
- Higher exposure causes larger domestic adjustment in prices
- Larger fall in domestic components of inflation and the natural rate of interest

VARYING OPENNESS: FRONT-LOADED INCREASE IN IMPORT PRICES



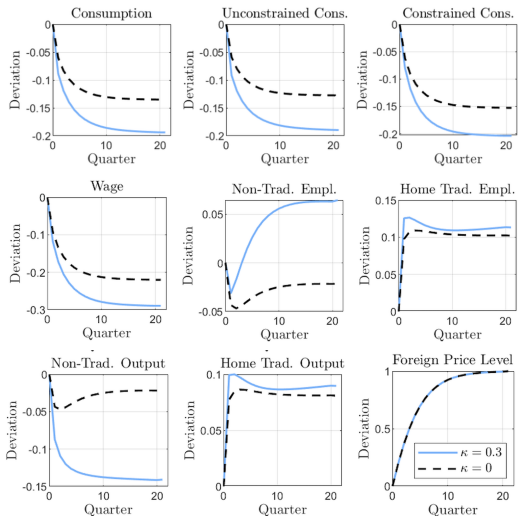
- Higher exposure leads to a more difficult tradeoff: lower demand and wages, and higher CPI inflation.
- The natural real rate does not change

VARYING OPENNESS: GRADUAL TRADABLE TFP SHOCK



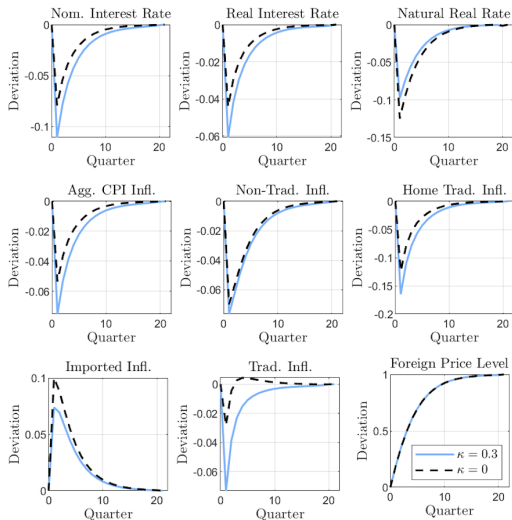
- When the shock is to domestic production, openness matters less

HIGHER κ : GRADUAL IMPORT PRICE INCREASE I



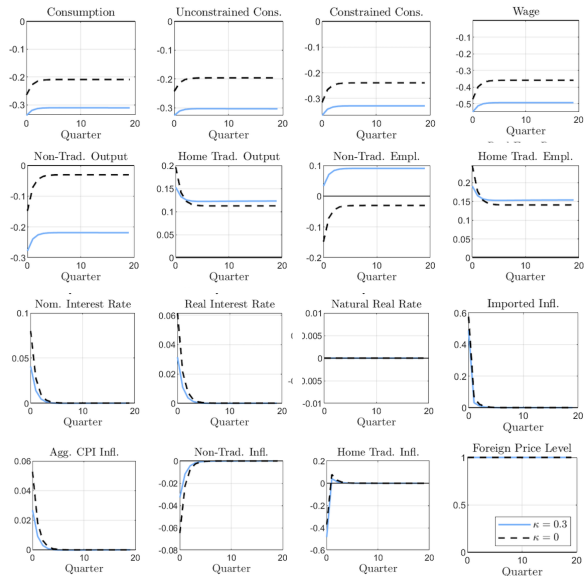
- ▶ Non-tradable production more dependent on imported inputs.
- ▶ Tighter constraint on domestic supply capacity when import prices rise.
- ▶ Exacerbates fall in consumption and real wages.
- ▶ Limited factor substitution towards labor.
- ▶ Larger and permanent decline in non-tradable output.
- ▶ Stronger reallocation into tradables.

HIGHER κ : GRADUAL IMPORT PRICE INCREASE II



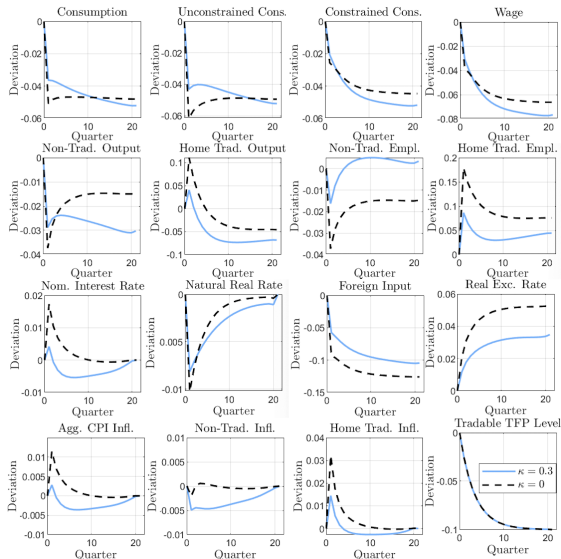
- ▶ Higher share of foreign inputs in production.
- ▶ Non-tradables inflation falls more despite higher import intensity; lower labour costs and weaker demand dominate.
- ▶ Aggregate CPI inflation falls by more.

HIGHER κ : FRONTLOADED IMPORT PRICE INCREASE



- Larger fall in consumption, more moderate rise in CPI inflation (relative to baseline).
- Non-tradables output falls by more. Non-tradables employment increases and remains higher.
- Tradables output and employment rise only moderately.
- Real wages fall more; labour supply rises; consumption falls.
- Non-tradables inflation falls less (higher import costs only slightly offset by lower real wages).
- Large spike in tradables inflation contributes to upward pressure on aggregate CPI inflation.

HIGHER κ : GRADUAL TRADABLE TFP SHOCK



- ▶ Real exchange rate depreciates.
- ▶ Non-tradables output and employment fall initially.
- ▶ Production becomes more labour intensive.
- ▶ Non-tradables sector absorb less labour, larger fall in real wages and consumption.
- ▶ Home-tradables inflation weaker (lower demand and labour costs despite lower TFP).
- ▶ More moderate increase in CPI inflation.

WHAT MAKES THE TRADE-OFF LARGER OR SMALLER

- ▶ **Openness (θ):** greater exposure to import-price shocks leads to r^* falling further in the gradual case, and a larger increase in CPI in the front-loaded case.
- ▶ **Imported-input share (κ):** tighter domestic supply constraint exacerbates relative-price movements, leaves the demand-side effect unchanged.
- ▶ **Wage rigidity:** stickier wages moderate the fall in real wages but deepen the fall in employment. Gradual scenario is less disinflationary, given the fall in output. Policy tradeoff is worse in the front-loaded case, with higher and more persistent inflation.
- ▶ **Price flexibility:** More flexible prices do the opposite: more disinflationary pressure in the gradual case. Smaller trade-off in the front-loaded case.
- ▶ **Elasticities of substitution:** higher substitutability between home and foreign goods leads to less stagnation in the gradual scenario.
- ▶ **Future work:** lags in the transmission of monetary policy, fiscal policy response, expectations

CONCLUSIONS

- ▶ Fragmentation may lead to higher import prices and lower supply, lowering real incomes
- ▶ The impact on domestic and aggregate CPI inflation depends on how demand adjusts to lower incomes, which in turn depends on the nature of fragmentation
 - ▶ **Gradual** fragmentation: could lead to stagnation with lower real incomes and low inflationary pressures. No trade-off, monetary policy may need to loosen.
 - ▶ **Front-loaded** fragmentation: could create a short-term trade-off or temporary stagflation, calling for a temporary tightening in CPI-targeting central banks
 - ▶ **Persistent fall in TFP**: can also lead to stagnation and lower natural interest rates.
- ▶ How monetary policy should respond depends on the balance of demand and supply: policy direction is a priori ambiguous.

OUTSIDE OF THE MODEL

- ▶ Other policies suitable to tackle geopolitical trends and shocks
- ▶ Need for a “real-side” policy strategy to prevent, mitigate and/or cope with the economic impact of geopolitical developments:
 1. Investment on technological diversification, focused on low-substitutability inputs or technologies ([Koren and Tenreyro, 2010](#))
 2. Deeper trade integration with low geopolitical-risk countries to lower exposure to shocks to specific suppliers/buyers (domestic or foreign), reducing volatility ([Caselli, Koren, Lisicky, and Tenreyro, 2020](#)). Reshoring *raises* risk exposure and volatility, reducing resilience.
 3. Strategic inventories to prepare for shortages in critical inputs (energy, water, etc.)

Thank you!

APPENDIX: MODEL DETAILS

HOUSEHOLDS: UNCONSTRAINED $(1 - \lambda)$

- ▶ Unconstrained (U) households have access to international and domestic financial markets.
- ▶ Their budget constraint (in real variables)

$$C_t^U + b_t + S_t b_t^* = b_{t-1} \frac{(1 + i_{t-1})}{(1 + \pi_t)} + S_t b_{t-1}^* \frac{(1 + i_{t-1}^*)}{(1 + \pi_t^*)} + \Psi + w_t N_t^U - \frac{\chi}{2} S_t (b_t^* - \bar{b}^*)^2$$

- ▶ b_{t-1} : risk-free one-period bond, paying nominal interest rate i_t (deflated by inflation rate π_t)
- ▶ b_{t-1}^* : risk-free one-period bond in foreign currency; i_t^* : foreign interest rate
- ▶ S_t : exchange rate (in domestic relative to foreign currency terms)
- ▶ Ψ : real profits from the firms
- ▶ w_t : wage rate
- ▶ χ : cost of deviating from the real steady-state value of foreign bonds $\bar{b}^*$

OPTIMALITY CONDITIONS: UNCONSTRAINED HOUSEHOLDS

- ▶ Labor supply relation

$$\kappa_l(N_t^U)^\phi = (C_t^U)^{-\sigma} w_t$$

- ▶ Euler equation

$$\frac{1}{(1+i_t)} = \beta \mathbb{E}_t \left[\left(\frac{C_{t+1}^U}{C_t^U} \right)^{-\sigma} \frac{1}{(1+\pi_{t+1})} \right]$$

where $\Pi_{t+1} = (1 + \pi_{t+1}) = \frac{P_{t+1}}{P_t}$ denotes gross CPI inflation.

- ▶ Uncovered interest parity (UIP) condition

$$\chi(b_t^* - \bar{b}^*) = \mathbb{E}_t \left[\Lambda_{t,t+1}^U \left(\frac{(1+i_t^*)}{(1+\pi_{t+1}^*)} \frac{\mathcal{S}_{t+1}}{\mathcal{S}_t} - \frac{(1+i_t)}{(1+\pi_{t+1})} \right) \right]$$

where $\Lambda_{t,t+1}^U = \beta \left(\frac{C_{t+1}^U}{C_t^U} \right)^{-\sigma}$ is the stochastic discount factor.

HOUSEHOLDS: CONSTRAINED (λ)

- ▶ Constrained (C) households: no access to financial markets.
- ▶ They consume their labour income each period:

$$C_t^C = \frac{W_t}{P_t} N_t^C$$

NON-TRADABLE SECTOR

- Firm production technology is given by

$$Y_{N,t}(i) = A_{N,t} M_{F,t}^{\kappa}(i) N_{N,t}^{1-\kappa}(i)$$

- $N_{N,t}(i)$: labor, with wage rate W_t
 - $M_{F,t}(i)$: imported input, with foreign price $P_{F,t}$
- Firms take W_t and $P_{F,t}$ as given; there is monopolistic competition in the market, with sticky pricing à la Rotemberg.
- The aggregate production function is given by

$$Y_{N,t} = \frac{A_{N,t} M_{F,t}^{\kappa} N_{N,t}^{1-\kappa}}{\Delta_t}$$

where $\Delta_t = \left(1 - \frac{\xi}{2}(\Pi_N - \bar{\Pi})^2\right)$ captures the price adjustment cost.

TRADABLE SECTOR

- ▶ Firms in the tradable sector produce using $N_{H,t}$, taking W_t as given

$$Y_{H,t} = A_{H,t} N_{H,t}^{1-\zeta}, \quad \zeta \in (0, 1)$$

- ▶ Profit maximization yields the demand

$$W_t N_{H,t} = (1 - \zeta) Y_{H,t} P_{H,t}$$

- ▶ The tradable sector is internationally competitive, taking prices $P_{H,t}^*$ as given

! Note that labour is used in both sectors $N_t = N_{H,t} + N_{N,t} = N_t^C \lambda + N_t^U (1 - \lambda)$

CALIBRATION

Parameter	Benchmark Model	Description
β	0.9877	Discount factor ($r_{ss} \approx 5\%$)
χ	0.01	Portfolio adjustment cost
θ	0.6	Share of Foreign Tradables
μ	1	Elasticity of substitution between F & H
ι	1	Elasticity of substitution between T & NT
σ	2	Household risk aversion
κ	$\approx 0; 0.3$	Cobb–Douglas share of foreign input
ϕ_π	1.5	Taylor rule response to inflation
ϕ_y	0	Taylor rule response to output
ϵ	11	Elasticity of substitution (NT)
ϕ	1	Inverse Frisch elasticity
λ	0.3	Share of constrained HH
$1 - \zeta$	0.8	Labour share in T production