Industrial Policy Wars and Inequality: Who Loses and When?

PRELIMINARY!!!!!

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Roadmap

1. Introduction
2. Model Environment
3. Model Equilibrium
4. Calibration
5. Industrial Policy Wars
6. Concluding Remarks

Motivation

I will immediately begin the overhaul of our trade system to protect American workers and families.

- President Trump, Inaugural Address, January 20^{th} 2025

Question

- How does this supply chain decoupling affect worker inequality and does this effect vary over time?

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  - Tariffs on targeted sectors,
  - Bans on manufacturing targeted goods in China,
  - Subsidy incentives for reshoring.

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  - Tariffs on targeted sectors,
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  - Subsidy incentives for reshoring.
- 2^{nd} Trump Administration (2025–)
  - General untargeted tariffs on everyone.
  - Especially China.

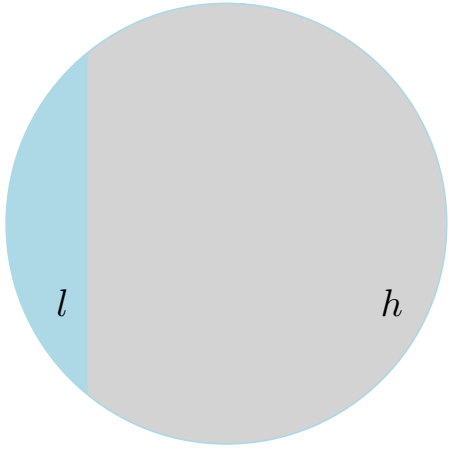
What We Do

- Develop a dynamic $2x2x2$ quantitative trade model
  - 2 countries: North $\mathcal{N}$ and South $\mathcal{S}$,
  - 2 skill classes: high h and low l,
  - 2 sectors: h-intensive $\boldsymbol{H}$ and l-intensive $\boldsymbol{L}$.

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  - 2 sectors: h-intensive $\boldsymbol{H}$ and l-intensive $\boldsymbol{L}$.
- Firm and household heterogeneity
  - Firm-level policy instruments,
  - Two way offshoring of tasks,
  - 4 types of households in each country.

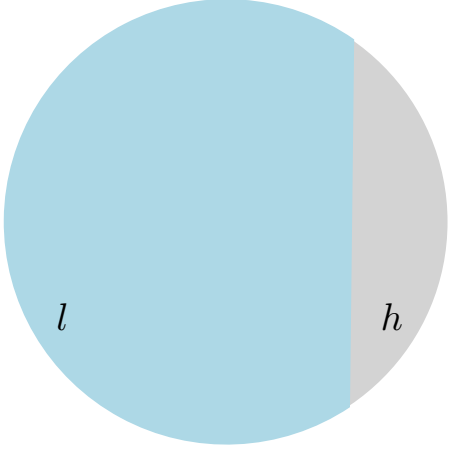
What We Do



$\mathcal{N}$

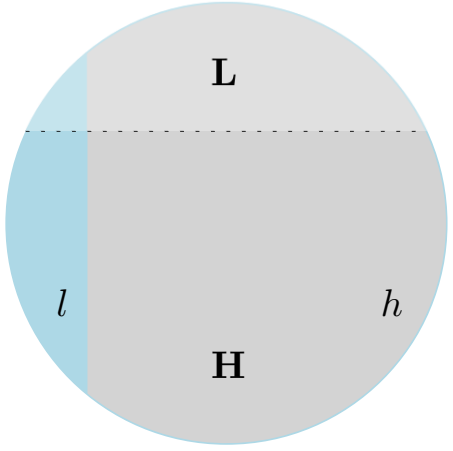
Country $\in \{\mathcal{N}, \mathcal{S}\}$

Skill $\in \{l, h\}$

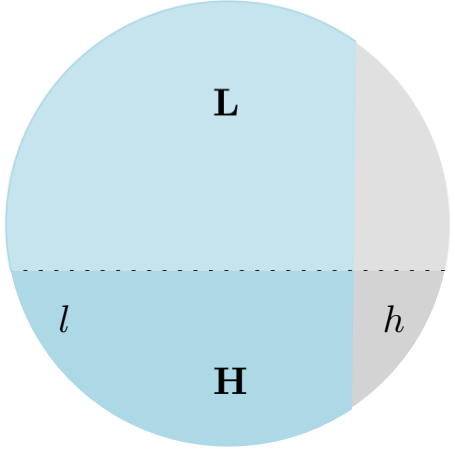


$\mathcal{S}$

What We Do



$\mathcal{N}$



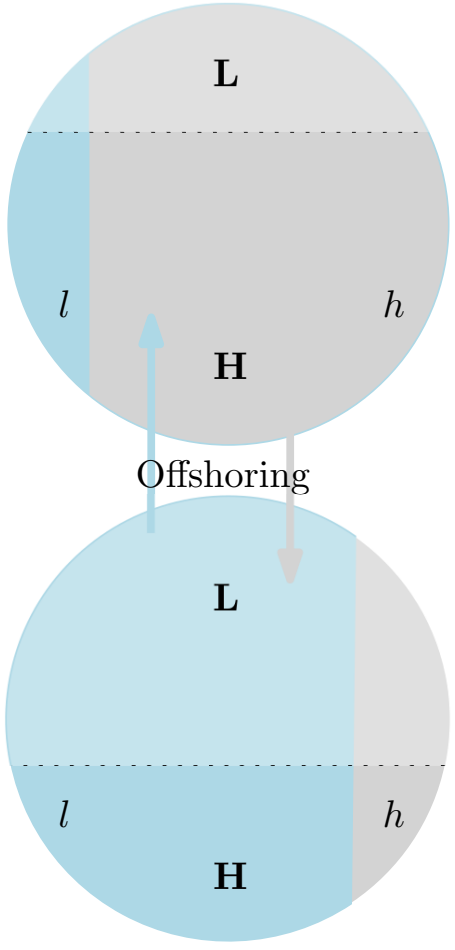
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What We Do



$\mathcal{N}$

$\mathcal{S}$

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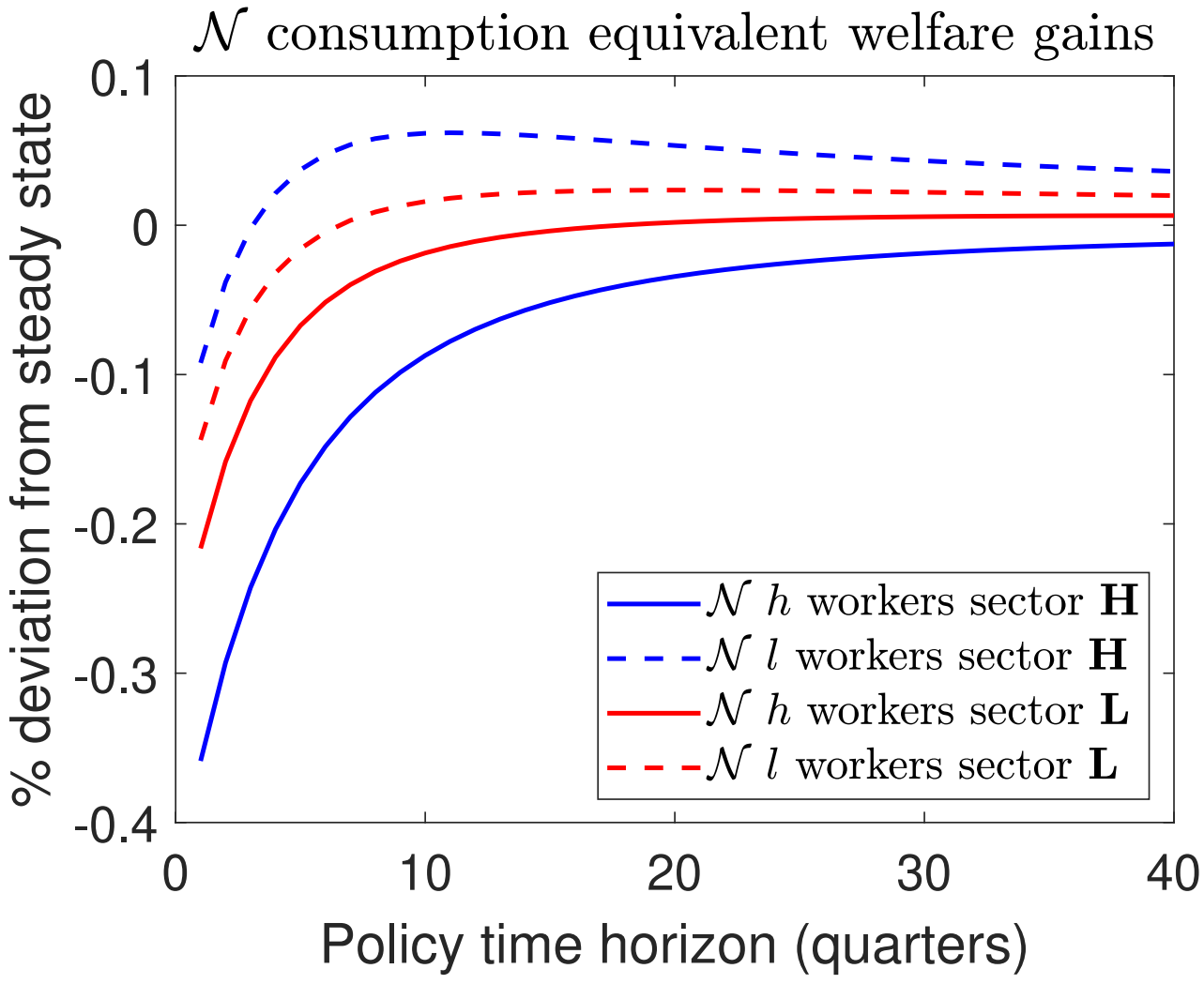
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What We Do

- Calibrate model to U.S. ($\mathcal{N}$) and China ($\mathcal{S}$).
- Implement untargeted and temporary shocks to policy instruments.
- Solve for joint dynamics of firm and worker distribution.

Preview of Results: $\mathcal{N}$ Tariff Final/Offshored Goods



Intuition

- Speed of adjustment affected by interacting forces:
  - Slow movement of the firm cross-section,
  - Gradual re-allocation of workers across sectors.

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Setup

- Discrete time $t \in \{0, 1, 2...\}$.
- Three sets of agents in each country
  - Households,
  - Firms,
  - Government.
- Focus on discussion of North $\mathcal{N}$.

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  - Households,
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- Focus on discussion of North $\mathcal{N}$.
- Four types of households divided along two dimensions (2x2)
  - Skill class $k \in \{l, h\}$
  - Sector of employment $s \in \{\boldsymbol{H}, \boldsymbol{L}\}$.

Households

- Endogenous worker distribution along sector $s \in \{\boldsymbol{L}, \boldsymbol{H}\}$.

		Skill class	
Sector		h	l
	$\boldsymbol{H}$	$\omega_t(H,h)$	$\omega_t(H,l)$
	$\boldsymbol{L}$	$\omega_t(L,h)$	$\omega_t(L,l)$

$\omega_t(s,k)$ mass workers sector s, skill class k at t.

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- Total skill endowments fixed

$$\bar{h} = \sum_{s \in \{\boldsymbol{H},\boldsymbol{L}\}} \omega_t(s,h)$$

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where

$$\left(C_t^{sk}(s')\right)^{\frac{\theta-1}{\theta}} = \underbrace{\int_{\omega_D} c_{D,t}^{s'}(\omega)^{\frac{\theta-1}{\theta}} d\omega}_{\mathcal{N} \text{ domestic firms}} + \underbrace{\int_{\omega_V} c_{V,t}^{s'}(\omega)^{\frac{\theta-1}{\theta}} d\omega}_{\mathcal{N} \text{ offshoring firms}} + \underbrace{\int_{\omega_X^*} c_{X,t}^{s'*}(\omega)^{\frac{\theta-1}{\theta}} d\omega}_{\mathcal{S} \text{ exporting firms}}$$

Households

- Budget constraint

$$\overbrace{C_t^{sk}}^{\text{Consumption}} + \overbrace{B_{t+1}^{sk}}^{\text{Domestic bonds}} + \overbrace{\frac{\eta}{2}\left(B_{t+1}^{sk}\right)^2}^{\text{Adjustment cost}}$$

$$= \underbrace{(1+r_t)B_t^{sk}}_{\text{Bond earnings}} + \underbrace{w_t^{sk}}_{\text{Labour earnings}} + \underbrace{T_t}_{\text{Government distributions}}$$

$$+ \underbrace{\Pi_t}_{\text{Profits net of fixed costs}} + \underbrace{T_t^{sk}}_{\text{Rebated adjustment costs}}$$

Households

- Workers retire at rate $r \in [0, 1]$.
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- Newly-born worker of same skill replaces & makes sector choice.
  - Stays until retirement.
- Newborn at t with skill $k \in \{l, h\}$ chooses sector $\boldsymbol{H}$ when

$$\underbrace{V_t^{Hk}}_{\text{PV of consumption } \boldsymbol{H}} + \overbrace{\epsilon_t^k}^{\text{Non-pecuniary benefit to } \boldsymbol{H}} > \underbrace{V_t^{Lk}}_{\text{PV of consumption } \boldsymbol{L}}$$

where $\epsilon_t^k \sim J(\epsilon_t^k)$.

Firms

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- Two discrete choices
  1. Service $\mathcal{N}$ as a domestic (D) or offshorer (V, fixed cost f_V^s)?
  2. Service $\mathcal{S}$ through exporting (X, fixed cost f_X^s) or not?

- Exogenous death rate $\delta \in [0, 1]$.

Firms

- Production requires two tasks

$$y_t^s = \underbrace{[y_{h,t}^s]^{\alpha_s}}_{\text{High skilled}} \overbrace{[y_{l,t}^s]^{1-\alpha_s}}^{\text{Low skilled}}$$

where intensity α_s varies by sector $\alpha_H > \alpha_L$.

Firms

- $\mathcal{N}$ firms always hire local h labour

$$y^s_{h,t} = \overbrace{z}^{\text{Idiosyncratic productivity}} \underbrace{Z_t}_{\mathcal{N} \text{ aggregate TFP}} \overbrace{h^s_t}^{\text{Hired skill } h \text{ labour}}$$

Firms

- Domestic (D) firms hire l labour

$$y^s_{l,t} = z \underbrace{Z_t}_{\mathcal{N} \text{ aggregate TFP}} \overbrace{l^s_t}^{\text{From } \mathcal{N} \text{ pool}}$$

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- Offshoring (V) firms hire l labour

$$y^s_{l,t} = z \underbrace{Z^*_t}_{\mathcal{S} \text{ aggregate TFP}} \overbrace{l^{s*}_t}^{\text{From } \mathcal{S} \text{ pool}}$$

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Firms

- Firms' choices functions of their state vector

$$(z, A_t)$$

where A_t is the aggregate state:

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$$(z, A_t)$$

where A_t is the aggregate state:

  - Household problem variables,
  - Policy instruments,
  - TFP processes.

Firms

- Discrete choices of status (x_t^s, x_t^{s*}) contingent on state (z, A_t)

1. Service $\mathcal{N}$ as domestic (D) or offshorer (V)?

$$\max_{x_t^s \in \{D,V\}} \overbrace{\{d_{D,t}^s(z, A_t),\ d_{V,t}^s(z, A_t)\}}$$

where $d_{\hat{x},t}^s(z, A_t)$ is dividends for status $\hat{x} \in \{D, V, X\}$.

Firms

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$$\max_{x_t^s \in \{D,V\}} \overbrace{\{d_{D,t}^s(z, A_t),\ d_{V,t}^s(z, A_t)\}}^{\text{1. Service } \mathcal{N} \text{ as domestic } (D) \text{ or offshorer } (V)?} + \underbrace{\max_{x_t^{s*} \in \{0,1\}} \{d_{X,t}^s(z, A_t),\ 0\}}_{\text{2. Export to } \mathcal{S} \text{ or not?}}$$

where $d_{\hat{x},t}^s(z, A_t)$ is dividends for status $\hat{x} \in \{D, V, X\}$.

Firms

- General form of dividends for $\hat{x} \in \{D, V, X\}$

$$d^s_{\hat{x},t}(z, A_t) = \Big[\underbrace{\rho^s_{\hat{x},t}(z, A_t)}_{\text{Real price}} - \underbrace{c^s_{\hat{x},t}(z, A_t)}_{\text{Marginal cost}}\Big] \underbrace{y^s_{\hat{x},t}(z, A_t)}_{\text{Demand}} - \underbrace{f^s_{\hat{x}}(z, A_t)}_{\text{Fixed cost}}$$

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- Where do the policy instruments feature?
  - Offshoring friction: $c_{V,t}(z, A_t)$.
  - Import tariff: $y_{X,t}(z, A_t)$.

Show

Equilibrium Definition

- Equilibrium is defined such that
  - All agents are optimising,
  - All markets are clearing,
  - Free entry condition holds, Show
  - Government budget constraint holds, Show
  - Balance of payments condition holds. Show

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Moments

Moment			Data	Model
$\mathcal{N}$	L	Fraction V	0.54	0.82
		Fraction X	9.00	7.29
	H	Fraction V	0.54	1.17
		Fraction X	9.00	9.85
$\mathcal{S}$	L	Fraction V	0.54	1.29
		Fraction X	9.00	9.91
	H	Fraction V	0.54	0.56
		Fraction X	9.00	6.09

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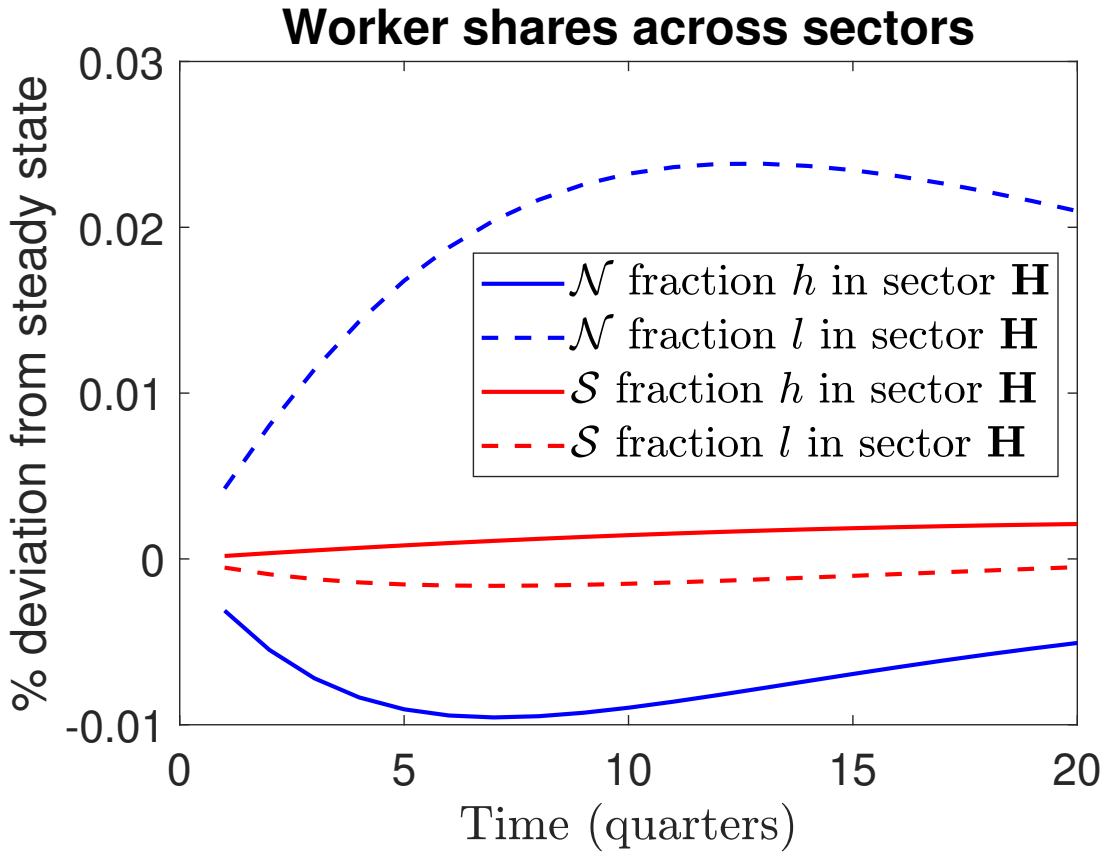
Design

- 1% temporary shocks to policy instruments: AR(1) process.
- $\mathcal{N}$ tariff and offshoring friction: implemented simultaneously.

Design

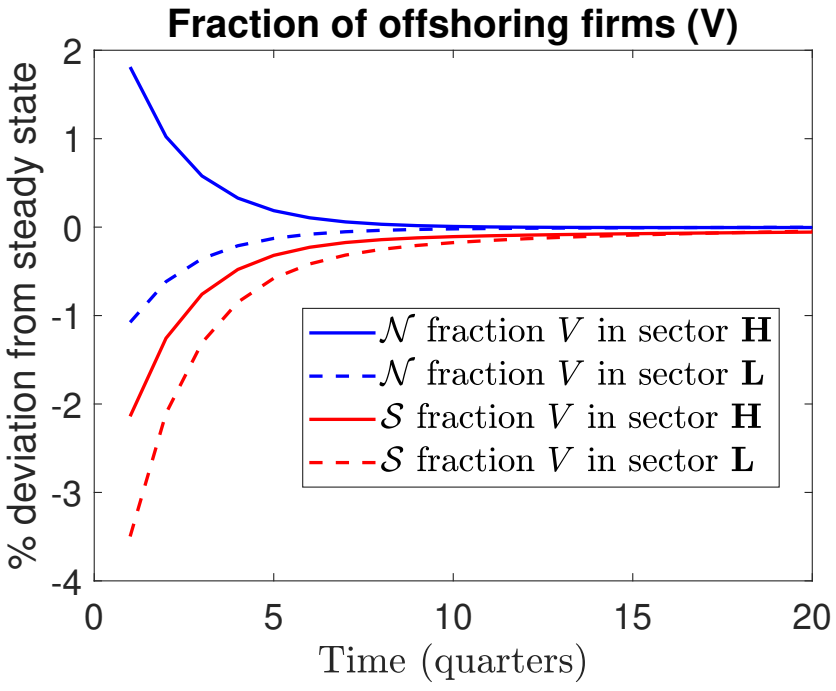
- 1% temporary shocks to policy instruments: AR(1) process.
- $\mathcal{N}$ tariff and offshoring friction: implemented simultaneously.
- How does it affect firm profitability and foreign engagement?
- What does that then mean for workers?

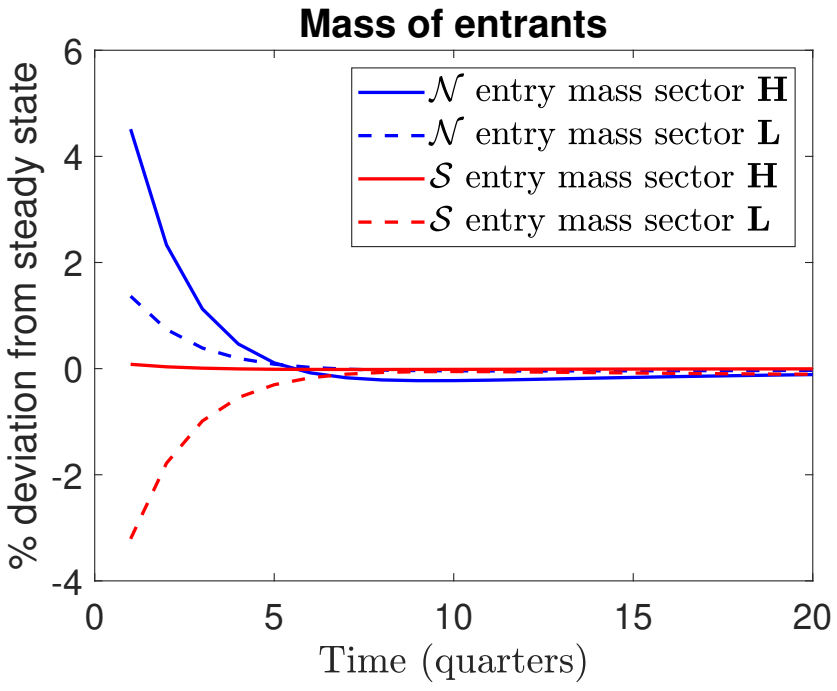
Transition Dynamics



- $\mathcal{N}$ h workers **H**$\rightarrow$ **L**.
- $\mathcal{N}$ l workers **L**$\rightarrow$ **H**.
- Opposite in $\mathcal{S}$.
- Reversing patterns of comparative advantage.

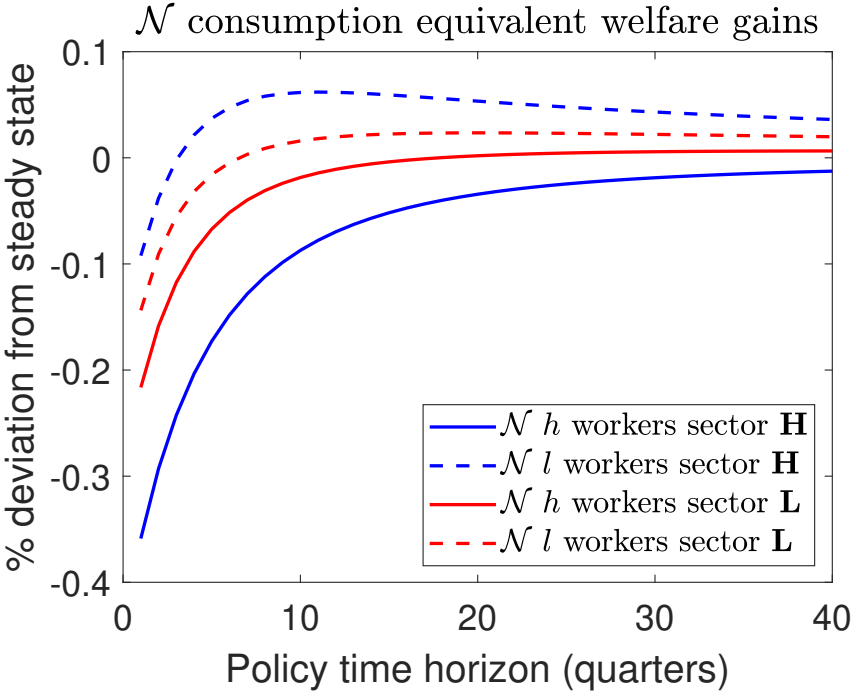
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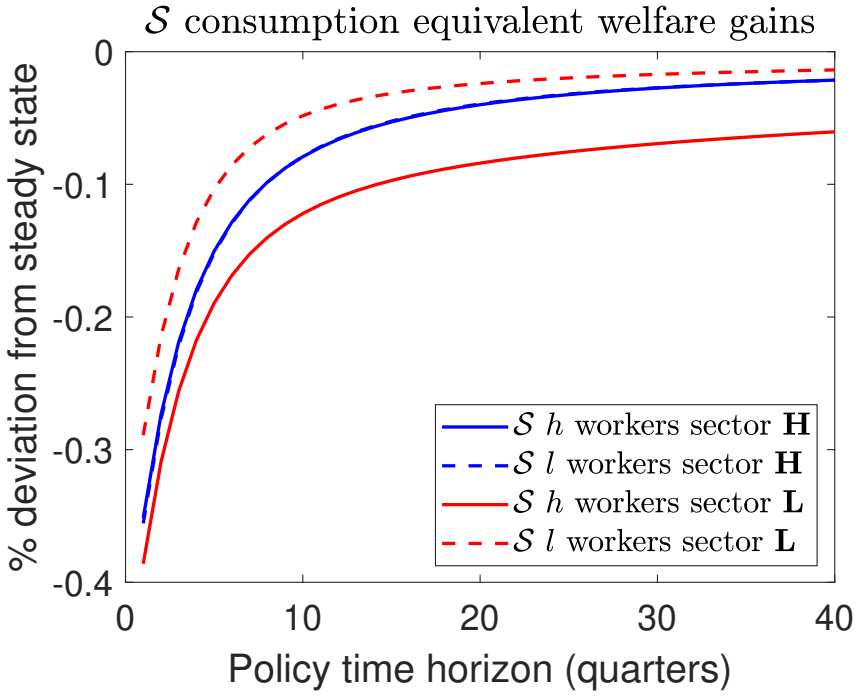




- Most productive firms offshore more.
- More firm creation in $\mathcal{N}$ to fill the shortfall from decreased imports.
- Reverse in $\mathcal{S}$ due to lower firm value.

Transition Dynamics





- Largest differential effect within comparative advantage sector.

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Summary

- Can use these instruments to address inequality.
- Biggest divergence of effects in comparative advantage sector.
- Gains can be slow to be realised.
- Losses to non-protected class are larger in the short-run.