Globalization, Trade Imbalances and Labor Market Adjustment

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Labor Markets and Trade Imbalances

"In the long run we are all dead, and rapid changes in trade balances can cause serious problems of adjustment" - Paul Krugman, 2019

- Trade deficits have, for decades and across the political spectrum, occupied a key role in policy markers' concerns with globalization
  - Crowds out domestic production and jobs (manufacturing)
  - Public believes trade deficits define winners and losers

- In a disconnect with current policy concerns, trade economists ignore changes in imbalances in studying the labor market adjustment process.

  → **But does it matter? What do we lose by doing so?**

  → Balanced trade in textbook model dictates reallocation of resources across sectors following trade shocks

Globalization, Imbalances, and Labor Market Adjustment

This paper:

- We develop a framework to understand the role of trade imbalances in the labor market adjustment process in response to globalization shocks.
- We endogenize trade imbalances in an international trade model with unemployment and costly labor market adjustment.

Approach

We build a quantitative, GE, multi-country, multi-sector model with 3 key ingredients:

i. Representative household in each country makes consumption-saving decisions $\Rightarrow$ trade imbalances
   - Obstfeld & Rogoff (1995)

ii. Labor market frictions across and within sectors $\Rightarrow$ unemployment dynamics
   - Across sectors: Artuç, Chaudhuri & McLaren (2010)
   - Within sectors: Mortensen & Pissarides (1994)

iii. Ricardian comparative advantage + Costly trade
   - Eaton & Kortum (2002), Caliendo & Parro (2015)

How do we fit these together?

Technology

- K sectors each producing a continuum, $j \in [0,1]$ of tradable varieties
  - Sector-specific composites (CES)
  - Final non-tradable good w/ expenditure shares $\mu_{k,i}$
- Firms in sector k have access to variety j productivity $z_{k,i}^t(j)$ and are price takers in product, and input markets.
- Firm-worker pair can produce tradable variety j accor. to

$$Y_{k,i}^t(j,x) = z_{k,i}^t(j)\, x^{\gamma_{k,i}} \prod_{\ell=1}^{K} \left(M_{\ell,i}^t\right)^{(1-\gamma_{k,i})\nu_{k\ell,i}}$$

Household Problem

- Household head in country i maximizes the objective function:

$$\max E_0 \left\{ \sum_{t=0}^{\infty} (\delta)^t \phi_i^t \int_0^{\overline{L}} \mathcal{U}_\ell^t \, d\ell \right\}$$

- $\mathcal{U}_\ell^t$ is individual level utility
  - Includes utility from consumption: $u(c_\ell^t)$
  - Includes switching costs and unemployment value: C, ω, b, η
- ϕ_i^t is family-wide intertemporal preference shock

- Budget constraint pools income, W^t, and receives profits from firms Π^t:

$$P^t \int_0^{\overline{L}} c_\ell^t \, d\ell + B^{t+1} \leq \Pi^t + W^t + R^t B^t$$

▸ Earnings Process Details ▸ Utility Function Details

Euler Equation

- Full risk sharing within countries: $c_\ell^t = c^t$

  Merz (1995), Andolfatto (1996), Kehoe et al. (2019)

  - Only able to address inequality in income, not in consumption
  - Extension of the current model to two-types of workers in Dix-Carneiro and Traiberman (2023).

- Family buys and sells one-period riskless bonds
  - Euler Equation:

$$R^{t+1} = \frac{\phi_i^t}{\delta \phi_i^{t+1}} \times \frac{u'(c_i^t)/P_i^t}{u'(c_i^{t+1})/P_i^{t+1}}$$

- Assumption: $u(c) = \log(c)$

Euler Equation and Trade Imbalances

- With log utility and no inter-temporal preference shocks, the Euler Equation implies: $\frac{E_i^{C,t+1}}{E_i^{C,t}} = \delta R^{t+1}$
- Normalizing $\sum_i E_i^{C,t} = 1$ for all t, we get: $E_i^{C,t+1} = E_i^{C,t}$
  - Perfect expenditure smoothing!
- If China gradually becomes more productive, it will run trade deficits in the short run and trade surpluses in the long run.

▸ Trade Imbalances in SS

Worker's Bellman Equations

- Unemployed workers:

$$\widetilde{U}_{k,i}^{t}(\boldsymbol{\omega}^{t}) = \max_{k'} \left(\begin{array}{c} -C_{kk',i} + \omega_{k',\ell}^{t} + b_{k',i} + \delta \widehat{\phi}_{i}^{t+1} \times \\ \left[p_{k',i}^{t} \int_{0}^{\infty} \max \left\{ W_{k',i}^{t+1}(x), U_{k',i}^{t+1} \right\} dG_{k',i}(x) \right. \\ \left. + \left(1 - p_{k',i}^{t}\right) U_{k',i}^{t+1} \right] \end{array} \right)$$

- Employed workers (match productivity x):

$$\begin{aligned} W_{k,i}^{t}(x) = & \widetilde{\lambda}_{i}^{t} w_{k,i}^{t}(x) + \eta_{k,i} \\ & + \delta \widehat{\phi}_{i}^{t+1} (1 - \chi_{k,i}) \left(\max \left\{ W_{k,i}^{t+1}(x), U_{k,i}^{t+1} \right\} \right) \\ & + \delta \widehat{\phi}_{i}^{t+1} \chi_{k,i} U_{k,i}^{t+1} \end{aligned}$$

  - Wages valued using multiplier, $\widetilde{\lambda}_{i}^{t}$, on budget constraint
  - ▸ Timing Details

Worker's Bellman Equations

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  - Wages valued using multiplier, $\widetilde{\lambda}_{i}^{t}$, on budget constraint
  - ▸ Timing Details

Firm's Problem

- Given a firm-worker match, firm solves

$$S_{k,i}^{t}(j,x) = \max_{\{M_{\ell,i}^{t}\}} p_{k,i}^{t}(j)\, Y_{k,i}^{t}(j,x) - \sum_{\ell=1}^{K} P_{\ell,i}^{I,t} M_{\ell,i}^{t}$$

  and costless variety switching $\Rightarrow S_{k,i}^{t}(j,x) = S_{k,i}^{t}(x) \equiv \widetilde{w}_{k,i}^{t} x$ where $\widetilde{w}_{k,i}^{t}$ defines sector k's "surplus". ▸ Sectoral surplus

- Standard value function and Nash Bargaining ▸ $J_{k,i}^{t}(x)$

Entry and Cutoffs

- Potential entrants: Unlimited mass, must pay $\kappa_{k,i} \times P_{k,i}^{F,t}$ to operate in sector k in country i. Value:

$$V_{k,i}^{t} = -\widetilde{\lambda}_{i}^{t} \kappa_{k,i} P_{k,i}^{F,t} + \delta \widehat{\phi}_{i}^{t+1} \left[\begin{array}{c} q_{ki}^{t} \int_{\underline{x}_{k,i}^{t+1}}^{\infty} J_{k,i}^{t+1}(s)\, dG_{k,i}(s) \\ + (1 - q_{ki}^{t}) \max \left\{ V_{k,i}^{t+1}, 0 \right\} \end{array} \right]$$

- **Free Entry Condition:** Entry pushes *ex-ante* profits to 0
- Cutoff rule is optimal: firm produces if $x \geq \underline{x}_{k,i}^{t} \Rightarrow$ endogenous job destruction and creation

Trade and Market Structure

- Perfect competition + costless variety switching imply:

$$p_{k,i}^{t}(j) = \frac{c_{k,i}^{t}}{z_{k,i}^{t}(j)}$$

- Sector specific unit cost given by:

$$c_{k,i}^{t} \equiv \left(\frac{\widetilde{w}_{k,i}^{t}}{\gamma_{k,i}}\right)^{\gamma_{k,i}} \left(\frac{P_{k,i}^{M,t}}{1-\gamma_{k,i}}\right)^{1-\gamma_{k,i}}$$

Trade and Market Structure

- Trade costs: $d^t_{k,oi}$, iceberg costs of shipping sector-k goods from o to i.
- $p^t_{k,oi}(j) = \frac{c^t_{k,o}}{z^t_{k,o}(j)} d^t_{k,oi}$
- Observed prices $p^t_{k,i}(j) = \min_o \left\{ \frac{c^t_{k,o}}{z^t_{k,o}(j)} d^t_{k,oi} \right\}$
- Efficiency is realization of r.v. $z^t_{k,i} \sim Frechet(A^t_{k,i}, \lambda)$
- ▸ SS Equilibrium Defn.

Data + Estimation

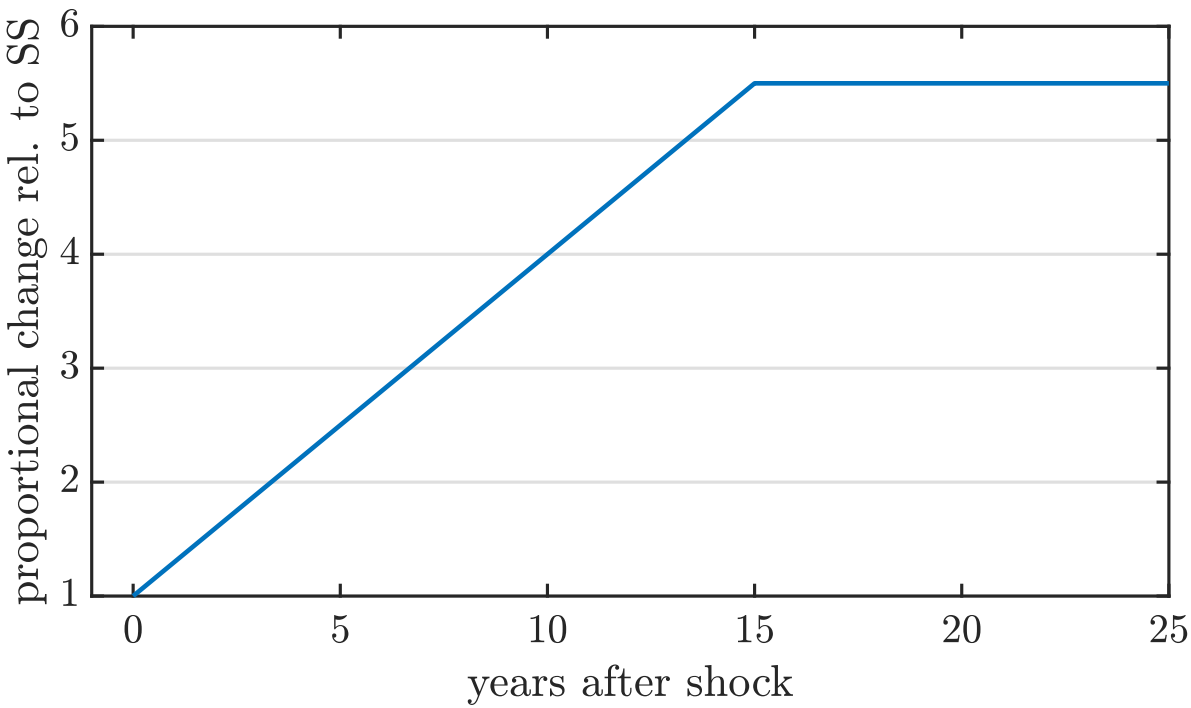
- Consider six countries and six sectors in 2000 ▸ Countries & Sectors
- Data: WIOD, ILOSTAT, country-specific labor force data to estimate transition matrices *by* country-group
- Estimation: Method of Simulated Moments
  - Assume 2000 is steady state, Θ set of parameters to estimate
  - Conditioning on $\pi_{k,oi}^{data}$, NX_i^{data}
    - Estimation can be done country-by-country ($Y_{k,i}$ indep. of Θ)
    - No need to estimate $A_{k,i}$ nor $d_{k,oi}$ (rely on hat algebra for CFs)

Targeted Moment	Source
Employment allocations across sectors and countries	WIOD
Average wages across sectors and countries	WIOD
National unemployment rates	ILOSTAT
Labor market tightness	FRED
Coefficient of variation of log-wages	various
Yearly transition rates	various

- Moments fit well ▸ Model fit ▸ Additional Data

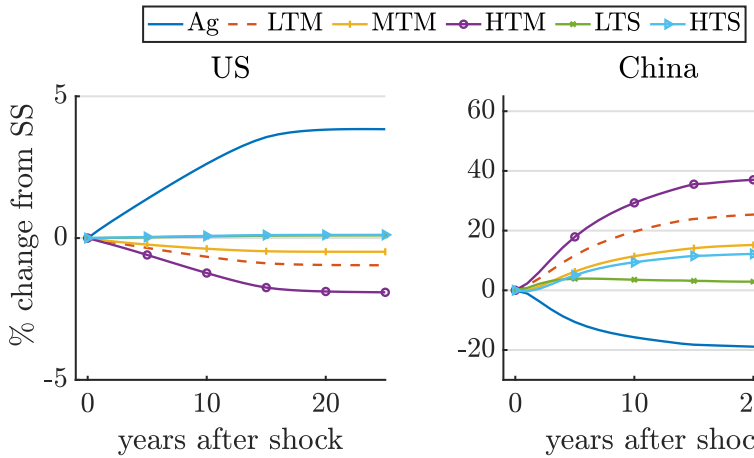
Mechanisms

- Shed light on main forces shaping model's outcomes
- Slow productivity growth in China
  - Balanced trade vs. our model with trade imbalances

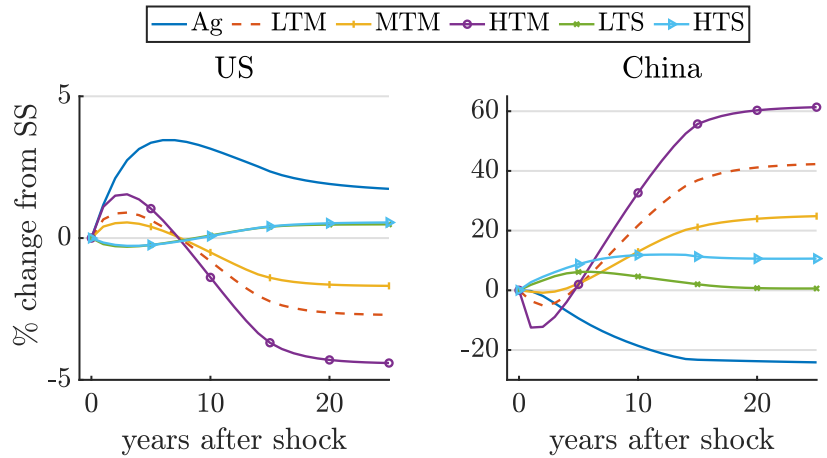


Mechanisms: Slow Productivity Growth in China

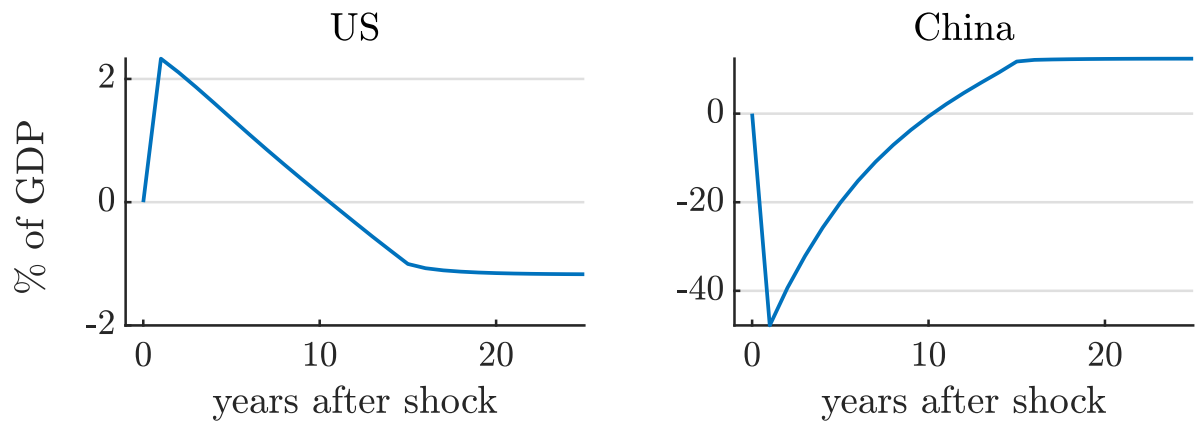
(a) Labor Allocations - Balanced Trade



(b) Labor Allocations - Full Model

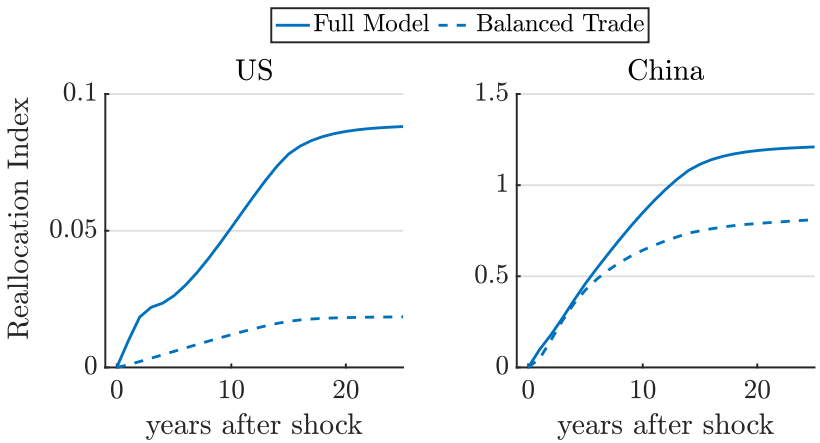


(c) Net Exports - Full Model

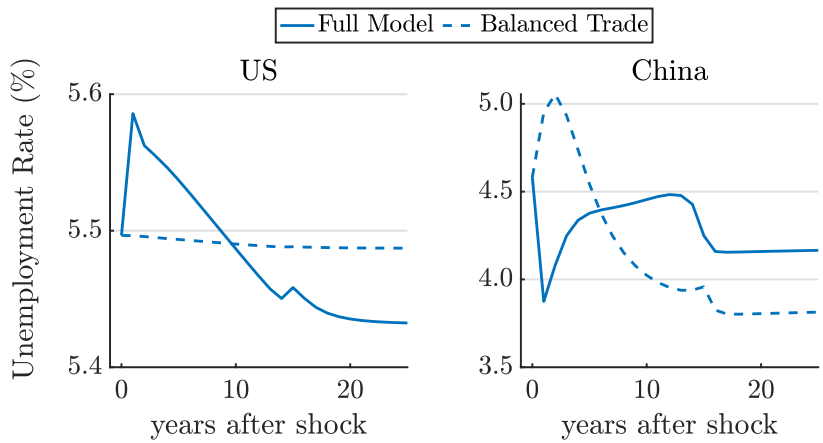


Mechanisms: Slow Productivity Growth in China

(a) Reallocation Index



(b) Unemployment



▸ Unemployment Details

Shocks Extraction

- Exploit gravity structure of our model to back out various shocks accrued to the global economy.
  - Shocks to productivity $\widehat{A}^t_{k,i}$
  - Shocks to trade costs $\widehat{d}^t_{k,oi}$
  - Shocks to inter-temporal shocks $\widehat{\phi}^t_i$

▸ $\widehat{A}$ Shocks ▸ $\widehat{d}$ Shocks ▸ $\widehat{\phi}$ Shocks

▸ NX Data vs Model ▸ Y Data vs Model ▸ L Data vs Model

China Shock

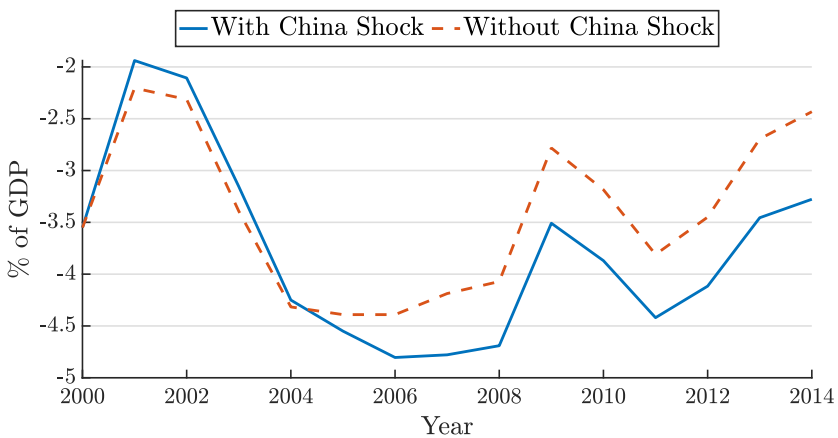
- Revisit the China Shock.
- What if the behavior of Chinese fundamentals was "ordinary"?
  - Counterfactual sets Chinese productivity growth, inwards and outwards trade cost changes and inter-temporal preference shocks to those of "**average country**".

▸ China Shock

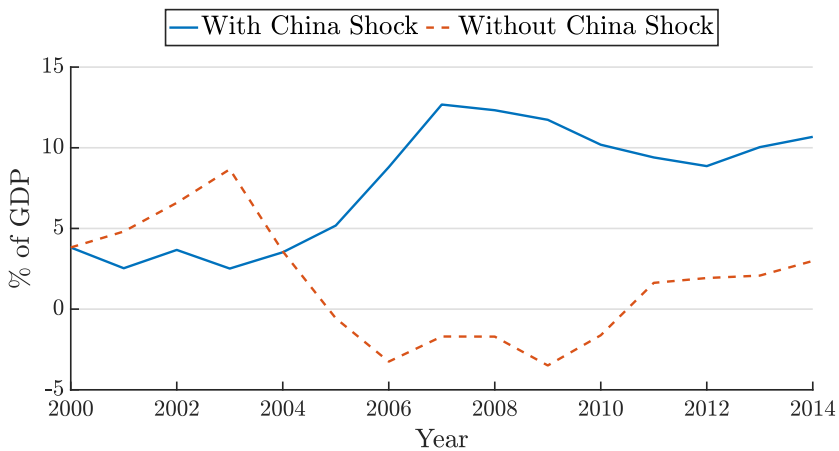
China Shock

Figure: The China Shock: Net Exports

(a) US



(b) China



- Without China Shock
  - US trade deficit 2.5% vs. 3.3 % of GDP. China Shock led to 32% deterioration of US deficit.
  - China trade surplus 3% vs 11% of GDP.

China Shock

Table: Effect of the China Shock on Employment in the US (2000-2014)

Employment Change in '000s	Agric.	Manuf.	Services
Full Model	36.8	-529.9	522.1
Balanced Trade	94.3	-341.2	264.8

- Full Model: China Shock explains 28% of the decline in US manufacturing over 2000-2014.
  - Sizable reallocation towards Services.
- Balanced trade: China Shock leads explains 17% of the decline in US manufacturing.
  - Less reallocation towards Services, more reallocation towards Agriculture.
- Virtually zero impact on unemployment

Comparison with Existing Approaches: ACR Formula, Static

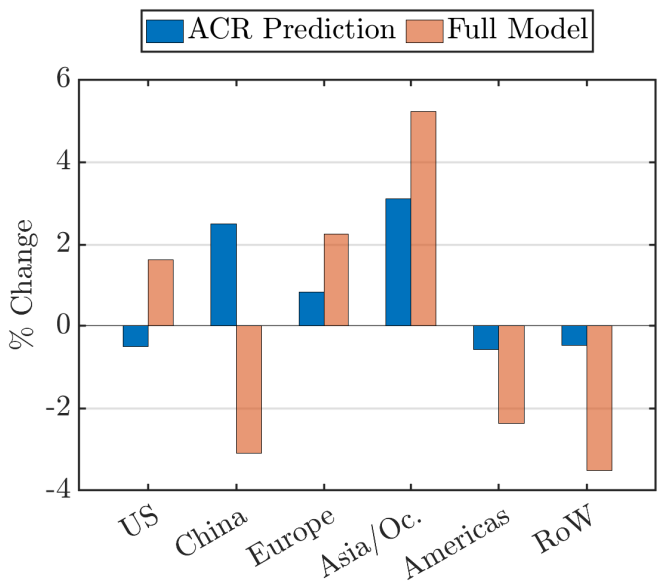
- ACR formula: (a) no trade imbalances; (b) no labor market frictions.
- Feed in trade cost shocks accrued to the global economy between 2000 and 2014.
- Obtain $\widehat{\pi}_{k,ii}$ according to our model

$$\widehat{W}_i^{\text{ACR, Static}} = \prod_{j=1}^{K} \prod_{k=1}^{K} \widehat{\pi}_{k,ii}^{-\mu_{j,i}\aleph_{jk,i}/\lambda}$$

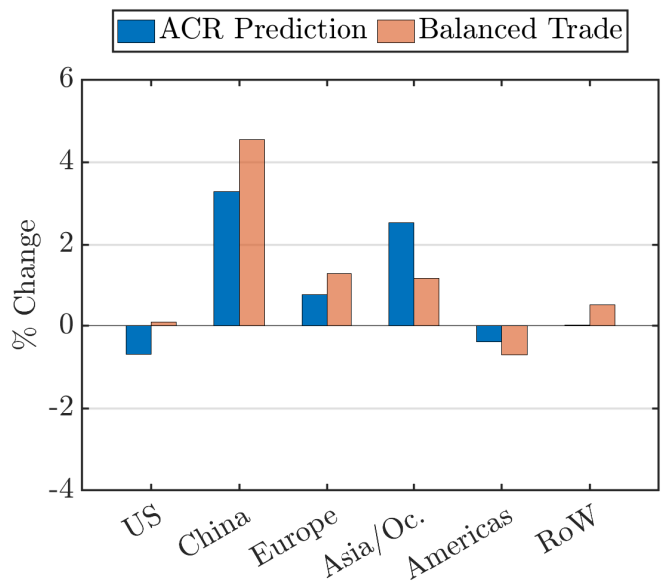
Comparison with Existing Approaches: ACR Formula, Static

Figure: Shocks in Trade Costs and the Long-Run Cons. Gains from Trade

(a) Full Model

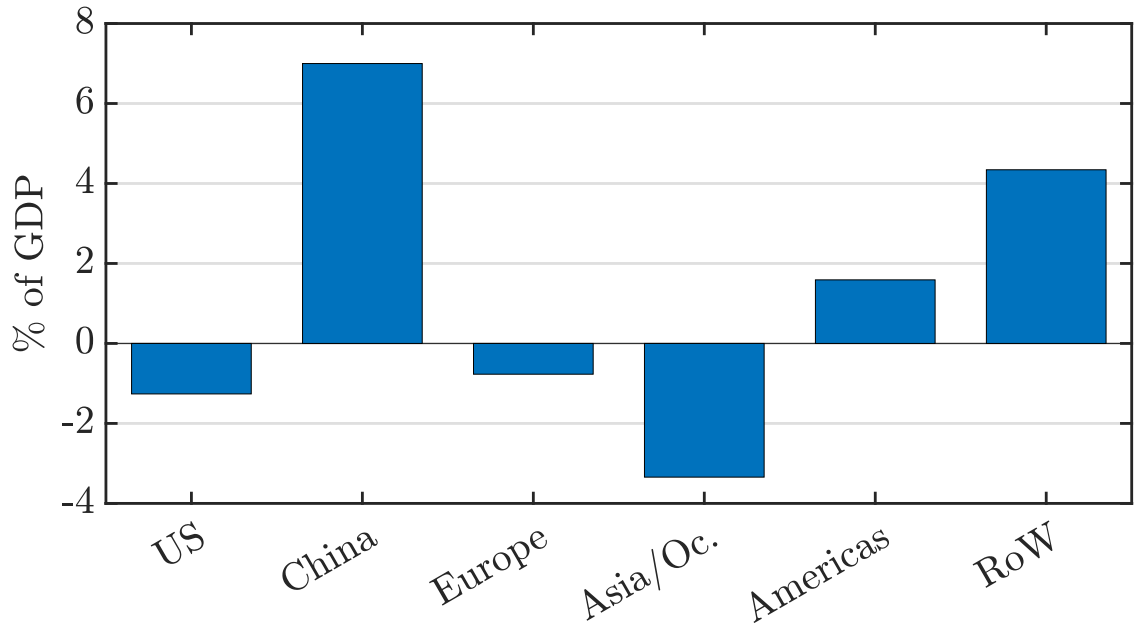


(b) Balanced Trade



Comparison with Existing Approaches: ACR Formula, Static

Figure: Steady-State Changes in Net Exports in Response to Shocks in Trade Costs



Comparison with Existing Approaches: ACR Formula, Dynamics

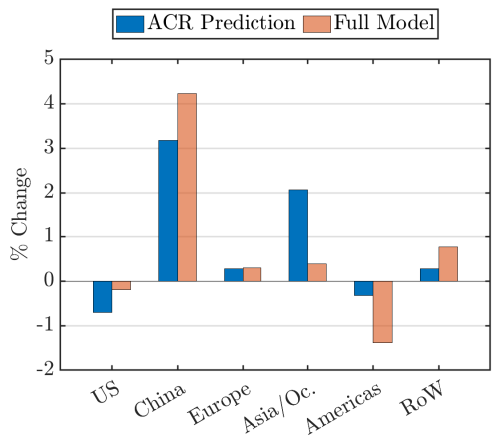
$$\frac{C_i^t}{C_i^{SS_0}} = \prod_{j=1}^{K}\prod_{k=1}^{K}(\widehat{\pi}_{k,ii}^t)^{-\mu_{j,i}\aleph_{jk,i}/\lambda}$$

$$\widehat{W}_i^{\text{ACR, Dynamic}} = \exp\left\{(1-\delta)\sum_{t=0}^{\infty}\delta^t \log\left(\prod_{j=1}^{K}\prod_{k=1}^{K}(\widehat{\pi}_{k,ii}^t)^{-\mu_{j,i}\aleph_{jk,i}/\lambda}\right)\right\}$$

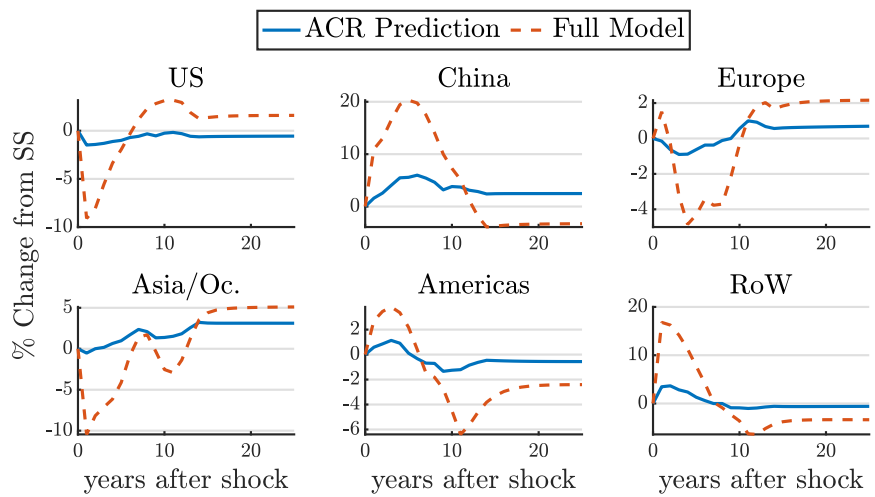
Comparison with Existing Approaches: ACR Formula, Dynamics

Figure: Shocks in Trade Costs and Dynamics Consumption Gains from Trade

(a) Dynamic Gains



(b) Evolution of Consumption



Conclusion

- Quantitatively important to model imbalances to characterize the adjustment process.
- Full path of shocks is key for the behavior of trade imbalances and long-run outcomes.
- Endogenous trade imbalances amplify the extent of reallocation.
- Unemployment responses are not systematically related to the sign of imbalances.
- China shock accounted for 28% of the decline in manufacturing employment over 2000-2014.
  - But important role of services in absorbing these workers.
  - Model with balanced trade under-estimates the role of China in the decline of US manufacturing, and over-estimates reallocation to Agriculture.
- Incorporating trade imbalances and labor market frictions can lead to quantitatively important discrepancies with respect to the ACR formula.

Future Work

- Incorporating heterogeneous workers and capital.
- Decentralizing savings decisions to the worker level.
- Allowing for aggregate uncertainty.

Mechanisms: Main Findings

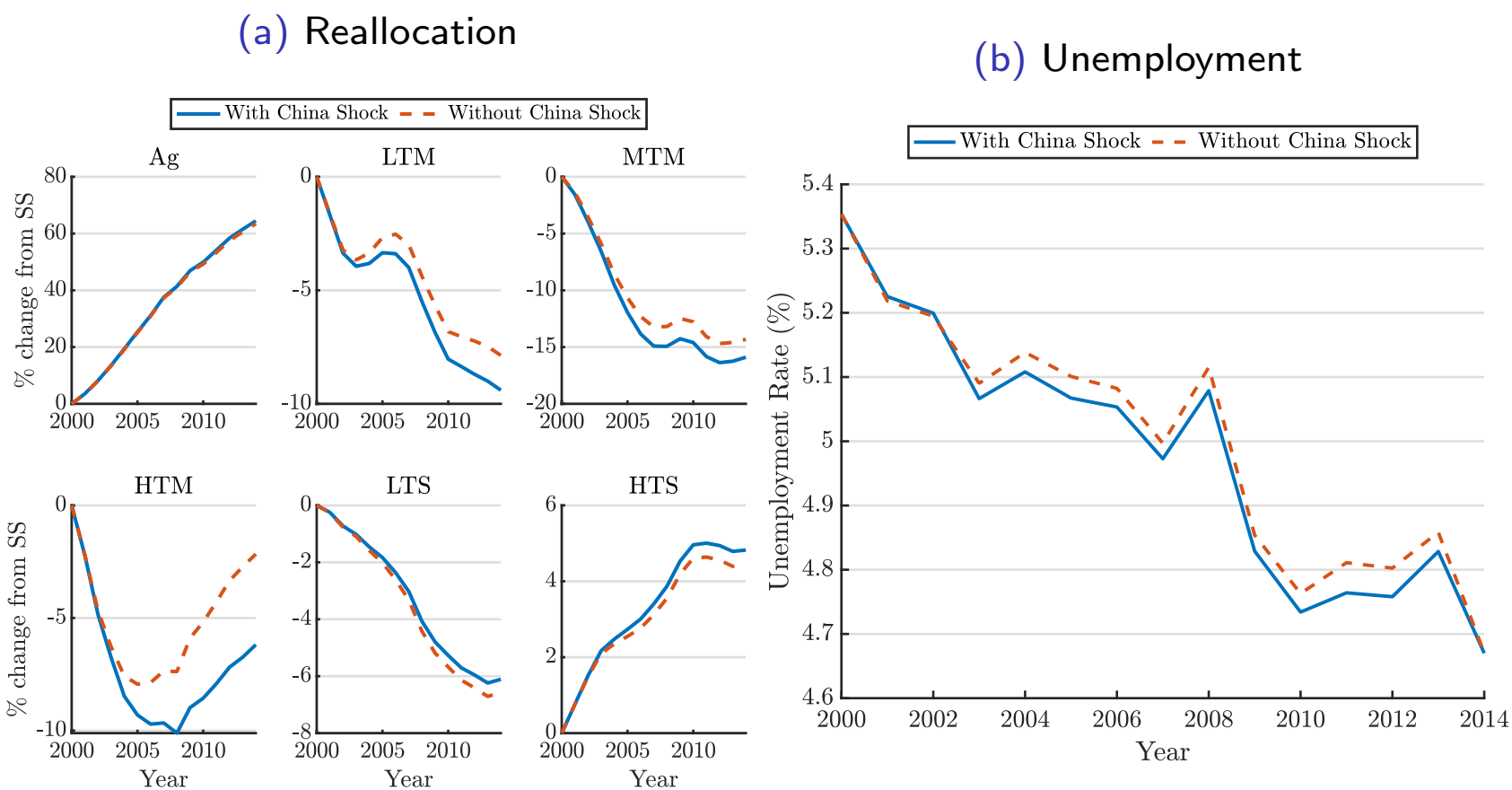
1. Trade imbalances dictate patterns of reallocation and magnify the extent of reallocation.

2. Exact path of shocks matters for the behavior of trade imbalances and for long-run outcomes.

3. Trade surpluses or deficits are not systematically related to unemployment.
   - Simulations feature countries running permanent deficits and lower unemployment, or large transitional surpluses and larger unemployment.

China Shock

Figure: The China Shock: Labor Allocations and Unemployment in the US



China Shock

Table: Effect of the China Shock on Manufacturing Employment in the US (2000-2014): Contribution of Different Shocks

	Change in Employment in '000s			
	LTM	MTM	HTM	Total
Without China Shock	-88.3	-75.2	-366.4	-529.9
Without $\widehat{A}_{China}$	-124.8	-66.2	-366.6	-557.6
Without $\widehat{d}_{China}$	-2.4	-45.7	-225.5	-273.6
Without $\widehat{\phi}_{China}$	19.5	8.7	37.0	65.2

China Shock

$$\widehat{W}_i \equiv \exp\left\{(1-\delta)\sum_{t=0}^{\infty}\delta^t \log(C_i^t) - \log(C_i^{SS_0})\right\}$$

Table: Cons. Gains of the China Shock (2000-2014) in % $\widehat{W}_i^{\text{With CH Shock}} / \widehat{W}_i^{\text{Without CH Shock}}$

US	Europe	Asia/Oceania	Americas	RoW
0.183	0.087	0.411	0.207	0.652

Notes: Consumption gains computed as $100 \times \left(\frac{\widehat{W}_i^{\text{With China Shock}}}{\widehat{W}_i^{\text{Without China Shock}}} - 1\right)\%$.

- Caliendo and Parro (2015): NAFTA ↑ consumption in the US by 0.08%
- Caliendo and Parro (2022): US-China Trade War ↓ consumption in the US by 0.01%

Worker's Earnings

- Workers matching with firm get match productivity, x
  - Workers choose whether to keep match, $\widetilde{e}_k^t(x)$
  - Probability of exogenous breakup, χ
  - Employment is a controlled process
- Workers and firms free to choose variety $\Rightarrow$ wages are sector specific
- Workers who meet firm get wage $w_k(x)$
  - Nash bargaining over match surplus later
- Evolution of state:

$$\Pr\left(k^{t+1}=k, e^{t+1}=1 | x^{t+1}, k^t, e^t\right) = \mathcal{I}\left(k^t=k\right) e^t \left(1-\chi_k\right) \widetilde{e}_k^t\left(x^{t+1}\right) + \left(1-e^t\right) \mathcal{I}\left(k^{t+1}=k\right) \theta_k^t q\left(\theta_k^t\right) \left(1-\chi_k\right) \times \widetilde{e}_k^t\left(x^{t+1}\right)$$

Back

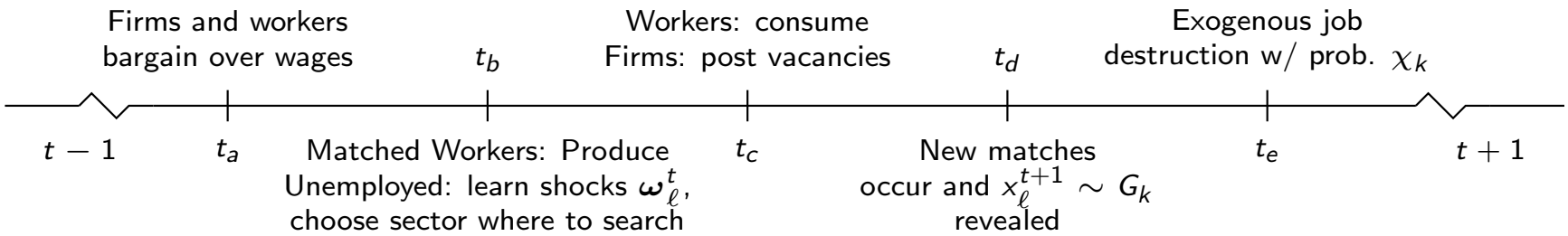
Worker's Individual Utility

- Worker state:
  - Employment status: e^t
  - Current sector: k^t
  - Moving cost shocks: ω_k^t
- Payoffs:
  - Consumption: c^t
  - Employment value: η_k
  - Unemployment value: b_k
  - Switching costs: C
- Individual utility:

$$\mathcal{U}^t\left(e^t, k^{t+1}, k^t, \omega^t, c^t\right) = \left(1 - e^t\right)\left(-C_{k^t,k^{t+1}} + b_{k^{t+1}} + \omega^t_{k^{t+1},}\right) + e^t\eta_{k^t} + u\left(c^t\right)$$

Back

Timing in the Labor Market



- At the beginning of the period: previously matched firm-workers produce
- Unemployed workers draws sector-specific preference shocks ω and choose where to search (after incurring switching costs)
- Matching occurs
- Death shocks χ realized

Back

Sectoral Surpluses

- Conditional on entry, switching varieties is costless
  - idiosyncratic match productivity x can be carried with worker and firm to different j

- No arbitrage $\Rightarrow p_{k,i}^t(j) z_{k,i}(j) = p_{k,i}^t(j') z_{k,i}(j')$

- Define *sectoral surplus*:

$$\widetilde{w}_{k,i}^t \equiv \gamma_{k,i} \left(1 - \gamma_{k,i}\right)^{\frac{1-\gamma_{k,i}}{\gamma_{k,i}}} \left(P_{k,i}^{M,t}\right)^{\frac{\gamma_{k,i}-1}{\gamma_{k,i}}} \left(p_{k,i}^t\left(j\right) z_{k,i}^t\left(j\right)\right)^{\frac{1}{\gamma_{k,i}}}$$

  where

$$P_{k,i}^{M,t} \equiv \prod_{l=1}^{K} \left(\frac{P_{k,i}^{l,t}}{\nu_{kl,1}}\right)^{\nu_{kl,i}}$$

  - Firms and workers in sector k only care about $\widetilde{w}_{k,i}^t$

Back

Firms' Value Functions and Nash Bargaining

- Firms' Value Functions

$$J_{k,i}^{t}(x) = \widetilde{\lambda}_{i}^{t}\left(\widetilde{w}_{k,i}^{t}x - w_{k,i}^{t}(x)\right) + (1-\chi_{k,i})\,\delta \max\left\{J_{k,i}^{t+1}(x), 0\right\}$$

- Wages $w_{k,i}^{t}(x)$

$$W_{k,i}^{t}(x) - U_{k,i}^{t} = \beta_{k,i}\left(J_{k,i}^{t}(x) + W_{k,i}^{t}(x) - U_{k,i}^{t}\right)$$

Back

Steady-State Equilibrium

A steady-state equilibrium is a vector of prices, $\{\widetilde{w}_k^i\}$, labor allocations, $\{L_k^i, u_k^i\}$, outputs, $\{Y_k^i\}$, transition rates across sectors, $\mathbf{S}^i$, wage policies, $\{w_k^i(x)\}$ and policy rules for firms and workers, $\{\underline{x}_k^i\}$ such that:

1. The policy rules solve workers and firms' Bellman equations
   - Free Entry Condition $V_{k,i} = 0$
2. Net zero job creation: $JC_{k,i} = JD_{k,i}$
3. Wages solve the Nash Bargaining problem
4. Labor Markets Clear: $Y_{k,i} = L_{k,i}(1 - u_{k,i}) \int_{\underline{x}_{k,i}}^{\infty} x dG_{k,i}(x)$
5. Goods Markets Clear: Standard Eaton-Kortum market clearing
6. Bonds Markets Clear: $\sum_i B_i = 0$

Back

Trade Imbalances in Steady State after Transition

- T_{SS} time required for steady state to be achieved

$$\frac{\delta^{T_{SS}}}{1-\delta} NX_i^{T_{SS}} = -\sum_{t=0}^{T_{SS}-1} \delta^t NX_i^t - \frac{1}{\delta} B_i^0,$$

- Countries with high levels of initial wealth $R^0 B_i^0 = \frac{1}{\delta} B_i^0$ are able to sustain deficits in steady state, i.e., $NX_i^{T_{SS}} < 0$.

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Table: Country Definitions

1	USA
2	China
3	Europe
4	Asia/Oceania
5	Americas
6	Rest of the World (ROW)

Notes: Asia/Oceania = {Australia, Japan, South Korea, Taiwan}, Americas = {Brazil, Canada, Mexico}, Rest of the World ={Indonesia, India, Russia, Turkey, Rest of the World}. This partition of the world was dictated by data availability from the World Input Output Database.

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Table: Sector Definitions

1	Agr./Mining	Agriculture, Forestry and Fishing; Mining and quarrying
2	Low-Tech Manuf.	Wood products; Paper, printing and publishing; Coke and refined petroleum; Basic and fabricated metals; Other manufacturing
3	Mid-Tech Manuf.	Food, beverage and tobacco; Textiles; Leather and footwear; Rubber and plastics; Non-metallic mineral products
4	High-Tech Manuf.	Chemical products; Machinery; Electrical and optical equipment; Transport equipment
5	Low-Tech Services	Utilities; Construction; Wholesale and retail trade; Transportation; Accommodation and food service activities; Activities of households as employers
6	Hi-Tech Services	Publishing; Media; Telecommunications; Financial, real estate and business services; Government, education, health

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Additional Datasets

Table: Additional Datasets Used in the MSM Procedure

Yearly Worker Transition Rates and Coefficient of Variances of Wages		
Country Agg. (Rep. Country)	Source	Year
United States	Current Population Survey (CPS)	1999-2000
China	Urban Household Survey	2004
Europe (United Kingdom)	Labour Force Survey	1999-2001
Asia/Oceania (Korea, Australia)	Korean Labor and Income Panel Study	1999-2000
	Household, Income and Labour Dynamics in Australia	2001-2002
Americas (Brazil)	Relação Anual de Informações Sociais	1999-2000
Rest of World (Turkey)	Entrepreneur Information Survey	2014

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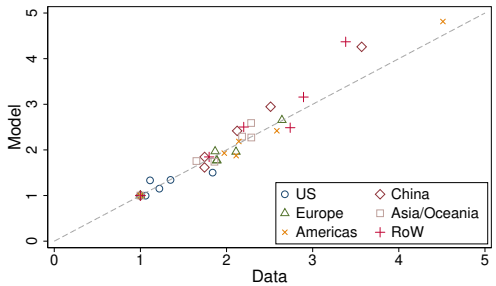
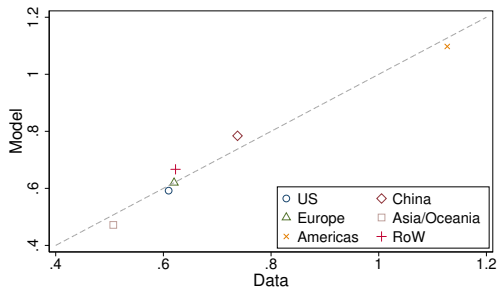
Model Fit

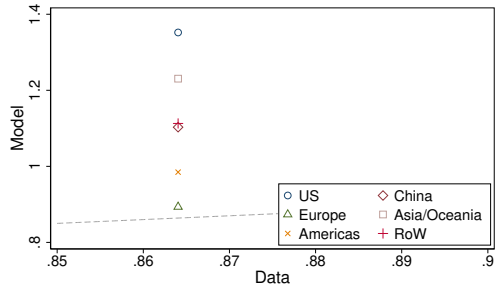
(a) Wages



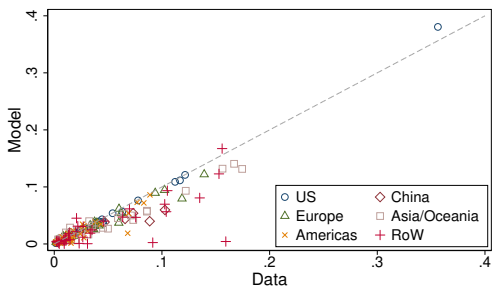
(b) Coefficient of Variation



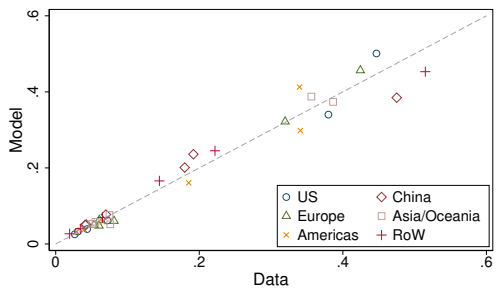
(c) Labor Market Tightness



(d) Transitions



(e) Employment Shares



(f) Unemployment

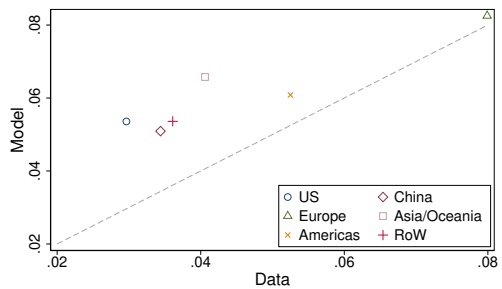


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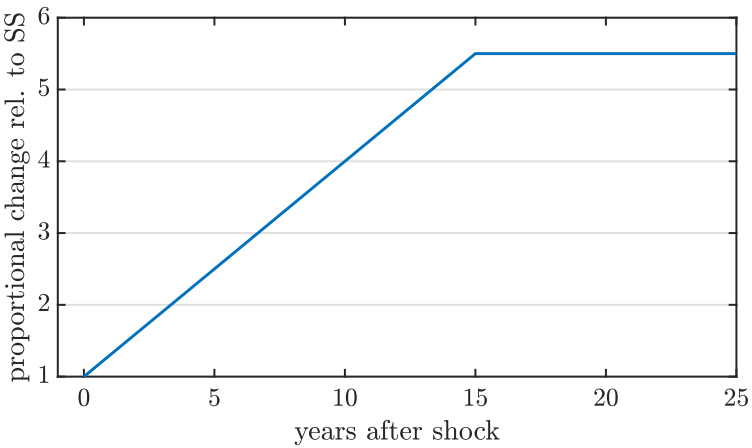
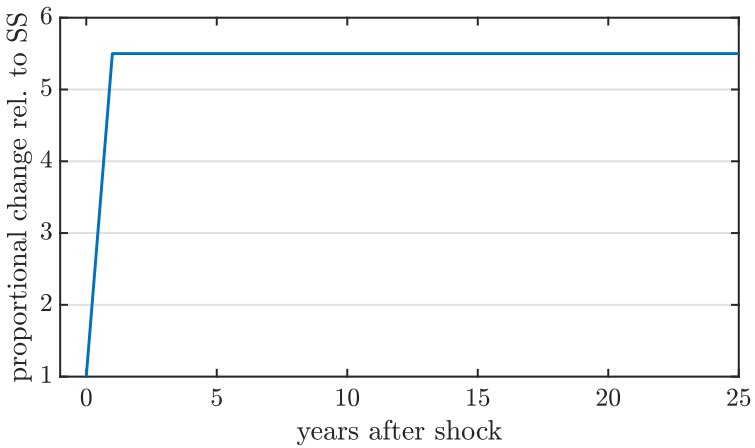
Figure: Shocks to Chinese Productivity $\widehat{A}^t_{k,China} \equiv \frac{A^t_{k,i}}{A^0_{k,i}}$ – Uniform Across Sectors

(a) Slow Growth



(b) Once-And-For-All



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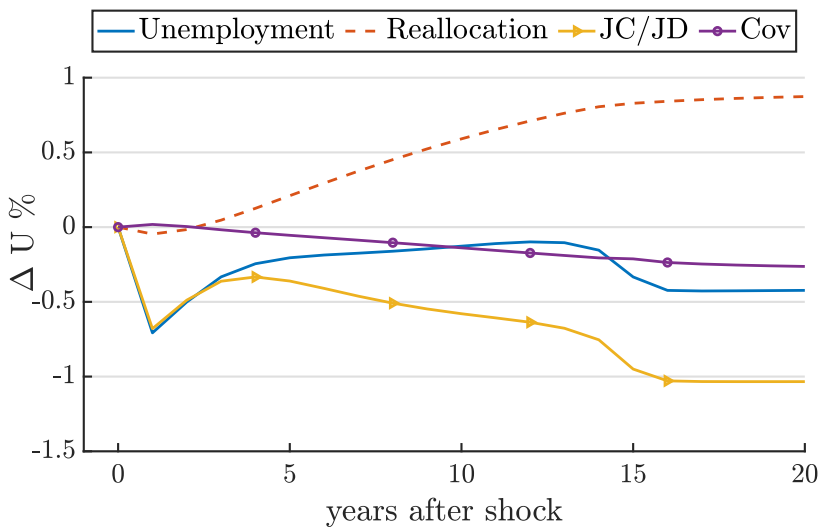
Mechanisms: Slow Productivity Growth in China

$$\Delta u_i^t = \underbrace{\sum_k u_{k,i}^0 \frac{\Delta L_{k,i}^t}{\overline{L}_i}}_{\text{Reallocation}} + \underbrace{\sum_k \frac{L_{k,i}^0}{\overline{L}_i} \Delta u_{k,i}^t}_{\text{Job Creation/Destruction}} + \underbrace{\sum_k \frac{\Delta L_{k,i}^t}{\overline{L}_i} \Delta u_{k,i}^t}_{\text{Covariance}},$$

Figure: Unemployment Decompositions for China

(a) Full Model



(b) Balanced Trade

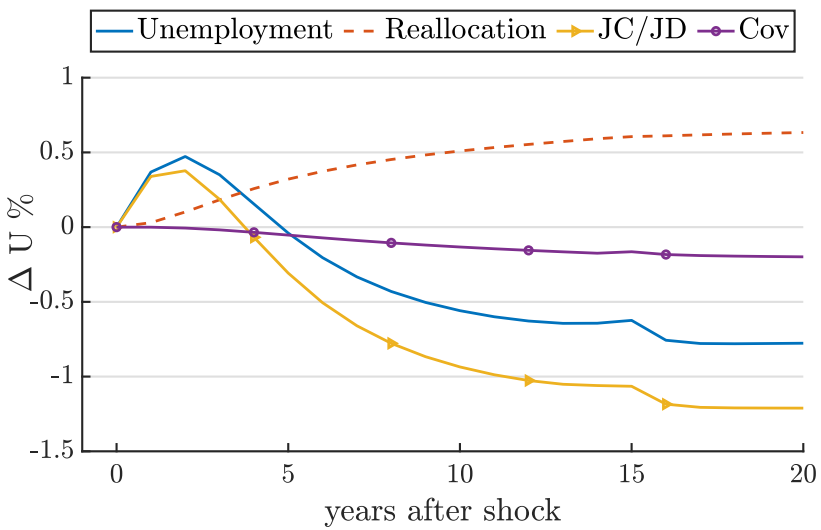


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Figure: Extracted Productivity Shocks $\left(\widehat{A}_{k,i}^{t}\right)^{1/\lambda}$

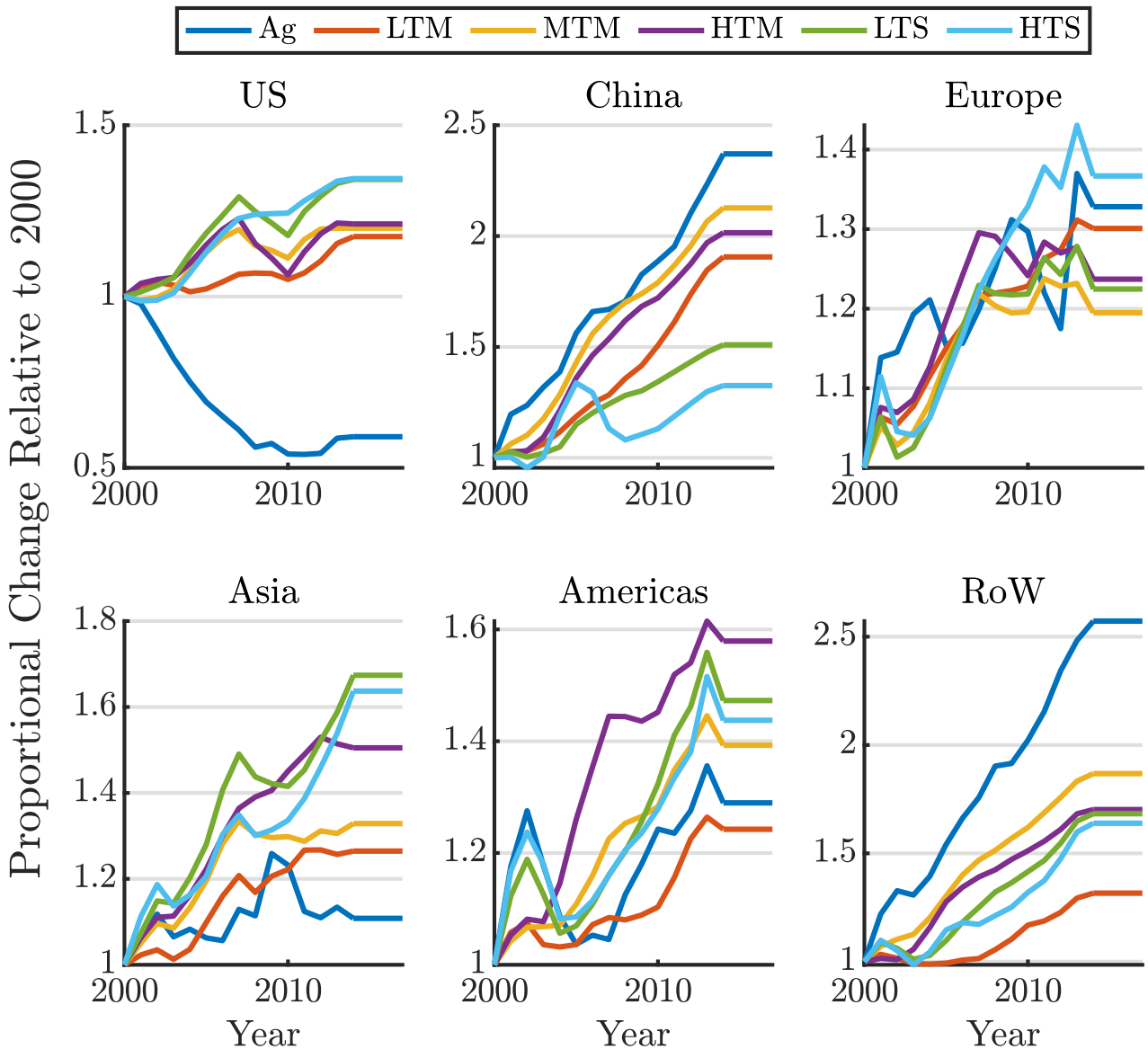

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Figure: Trade-Weighted Import Costs $\overline{d}^t_{k,i}$

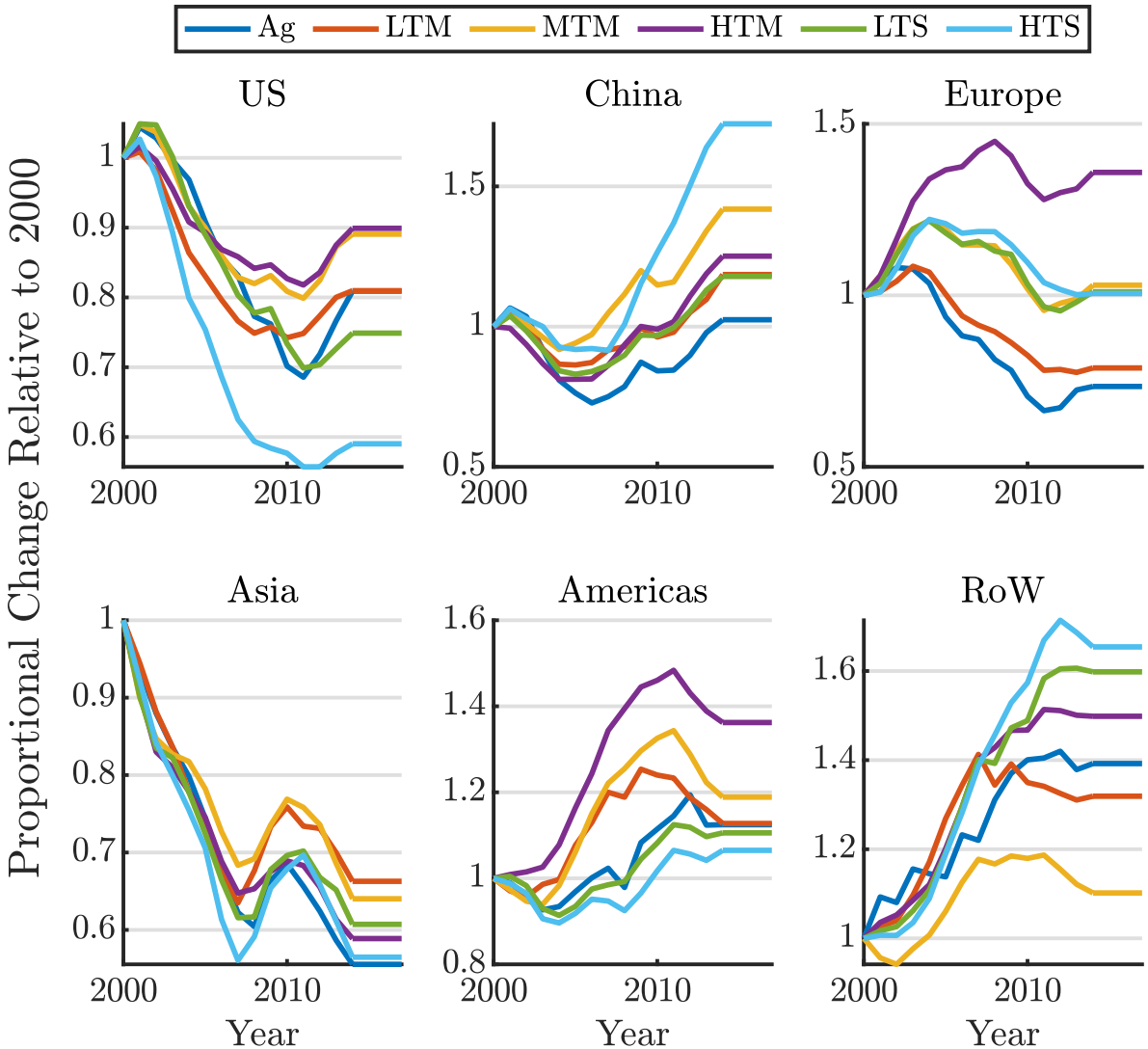

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Figure: Extracted Inter-Temporal Preference Shocks $\widehat{\phi}_i^t$

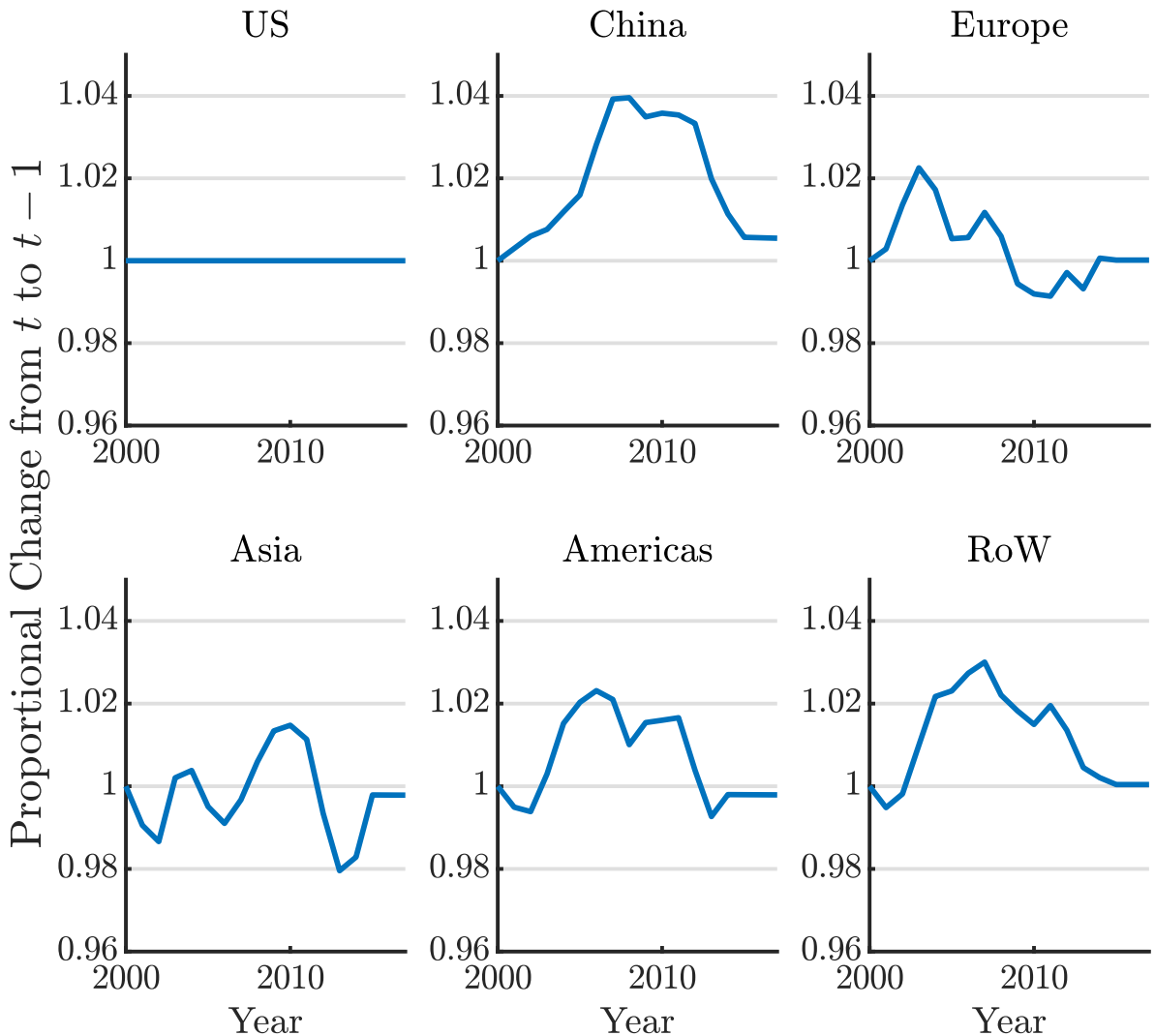

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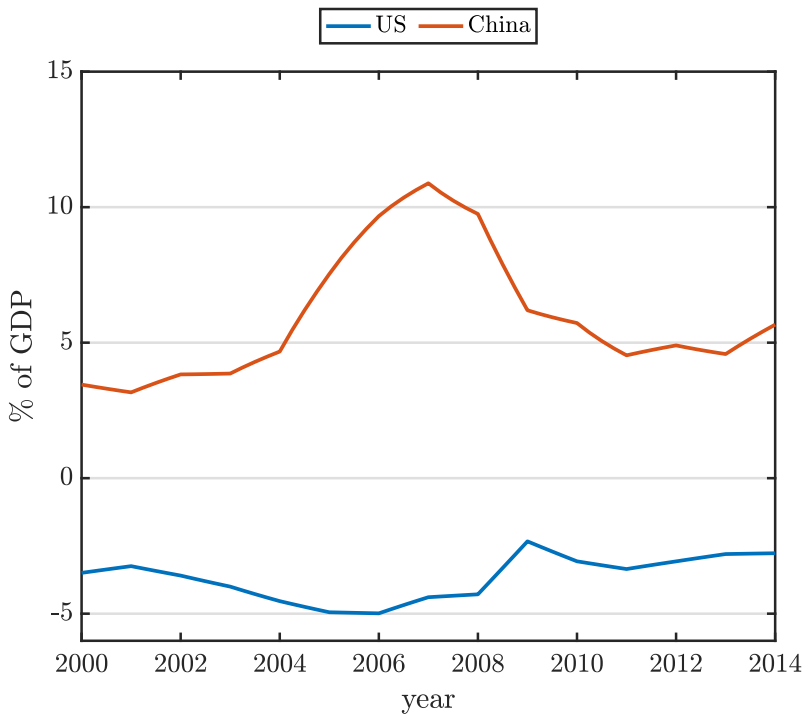
Figure: Evolution of Net Exports in the US and China over 2000-2014: Data and Model

(a) Data



(b) Model

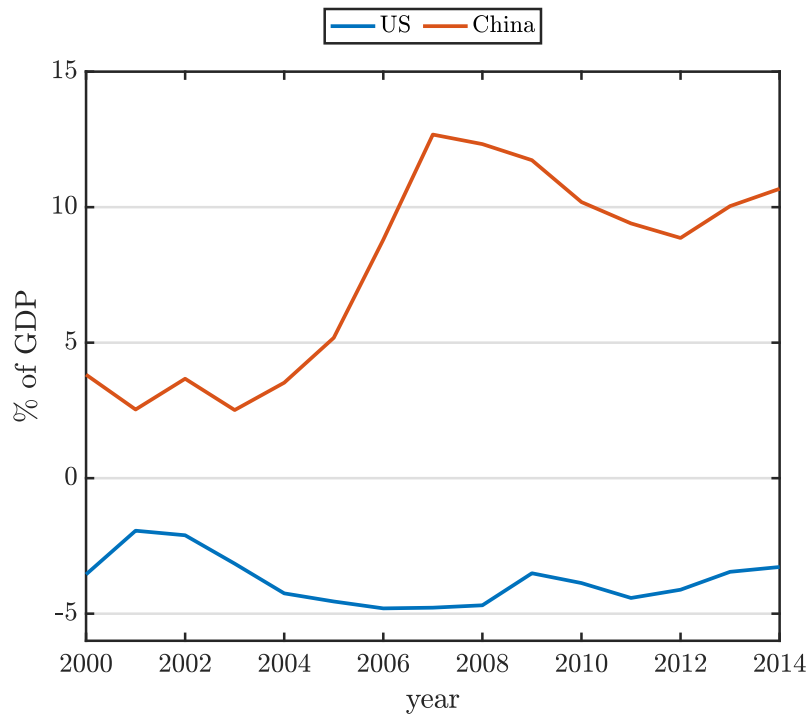


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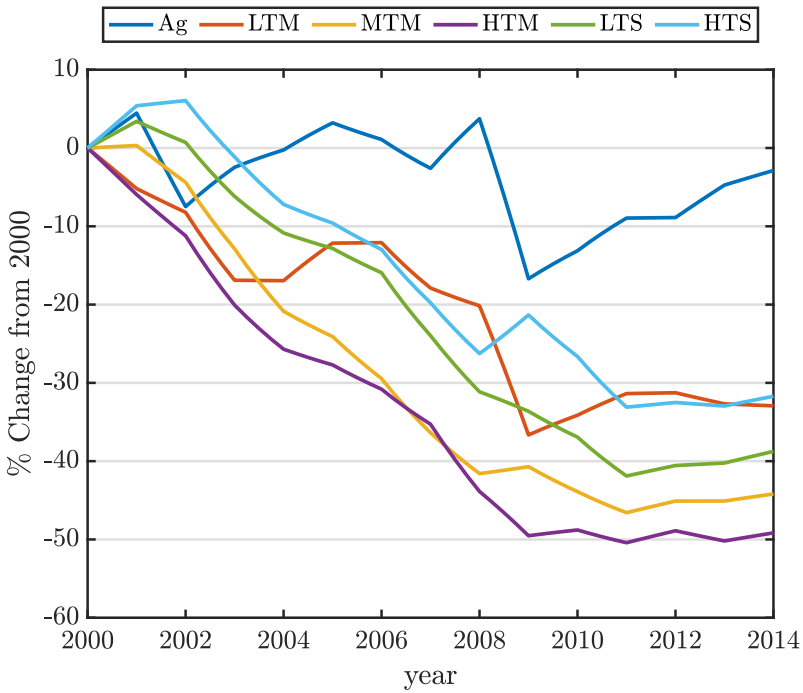
Figure: Evolution of Gross Output in the US over 2000-2014

(a) Data



(b) Model

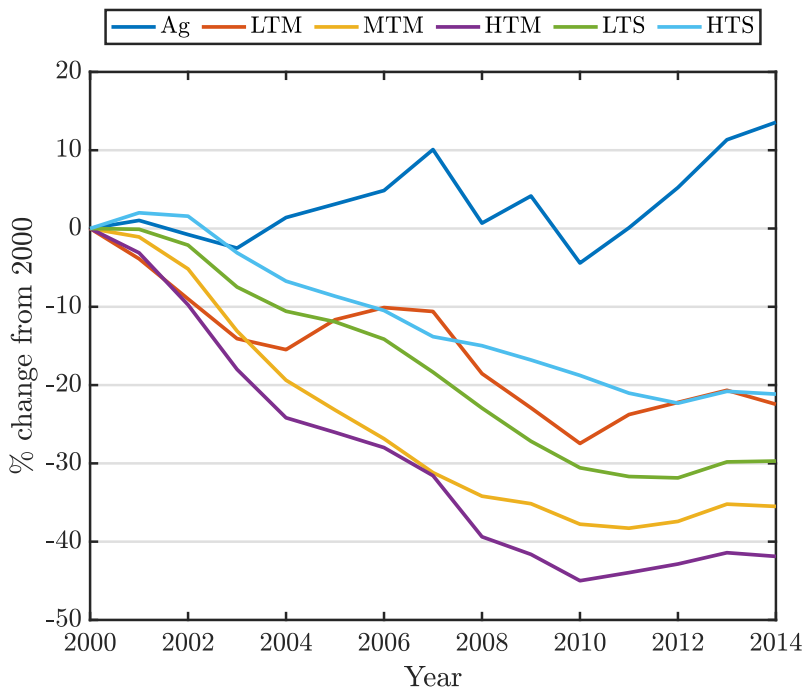


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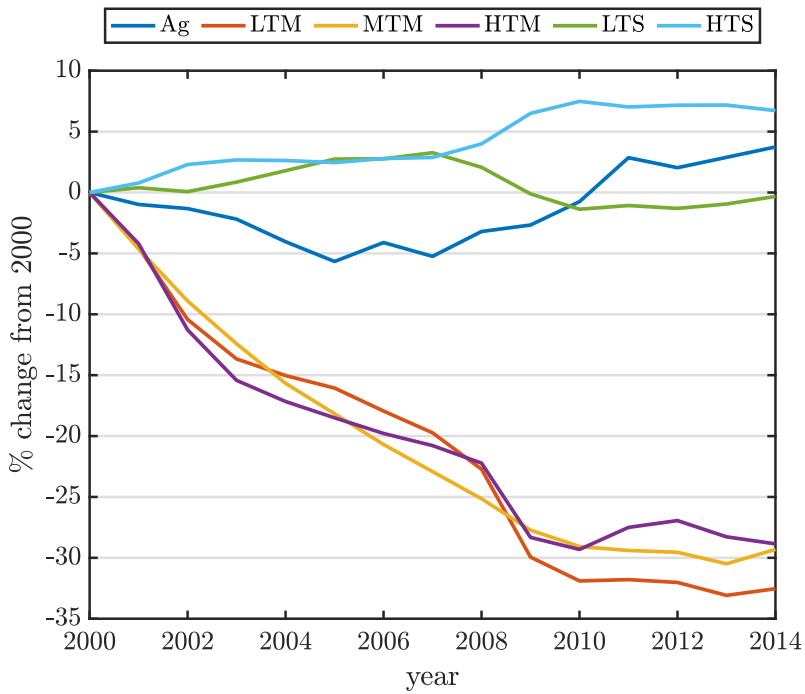
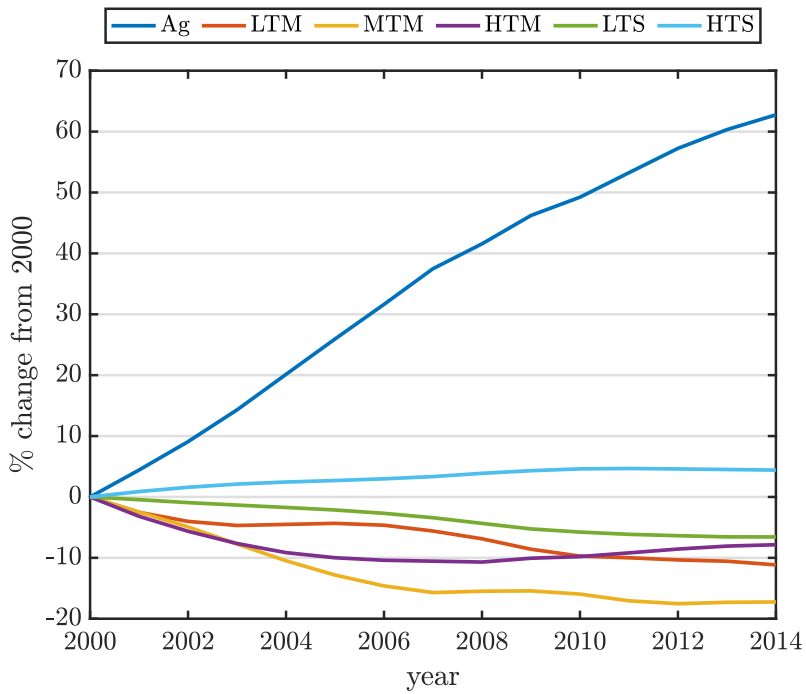
Figure: Evolution of Labor Allocations in the US over 2000-2014

(a) Data



(b) Model



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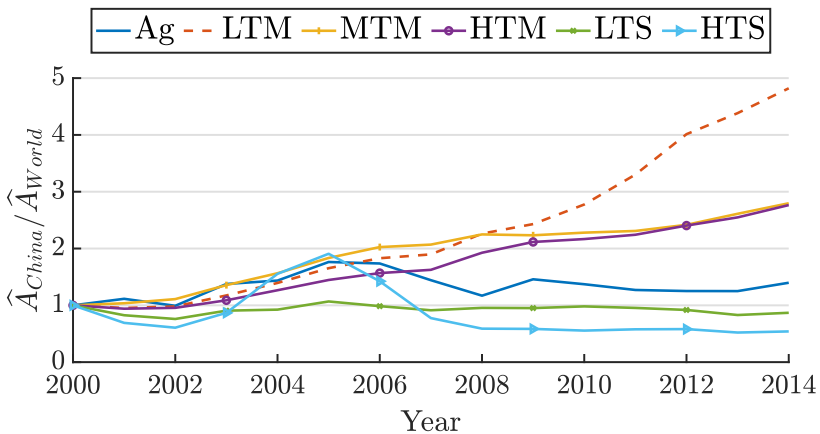
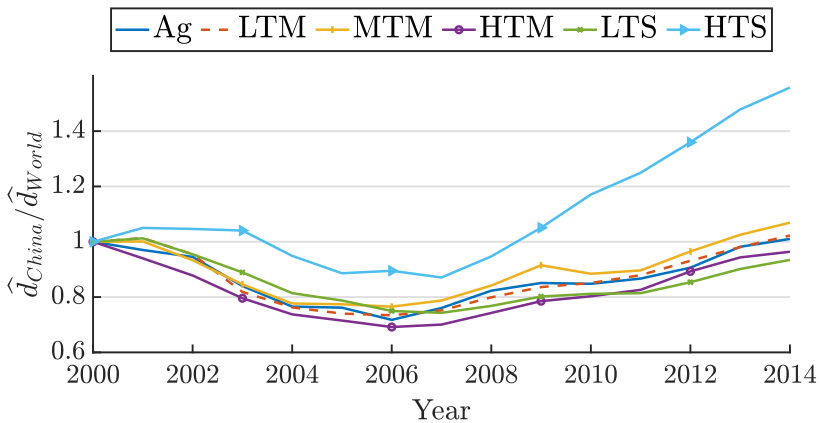
China Shock

Figure: China Shocks Relative to World Average Shocks

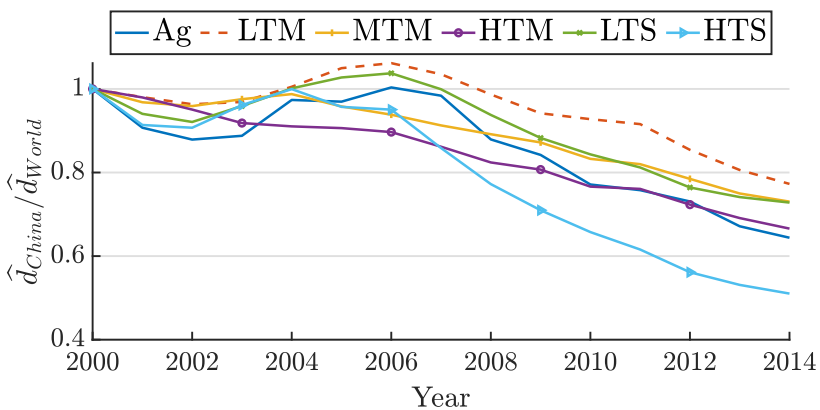
(a) Productivity Growth



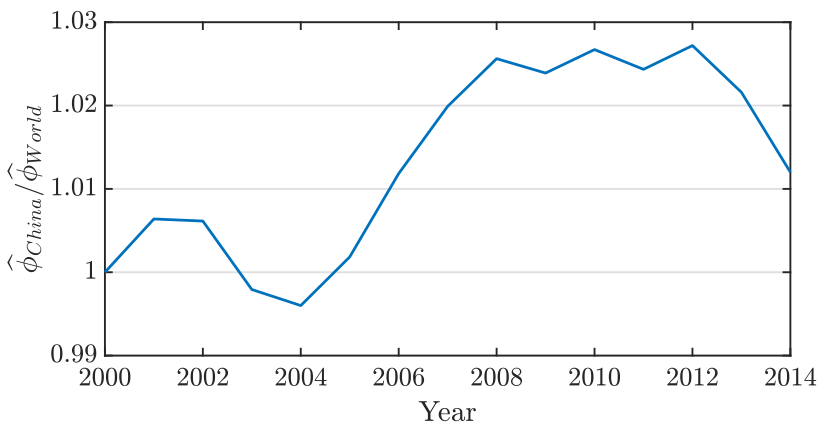
(b) Changes in Import Costs



(c) Export Costs



(d) Inter-Temporal Preference Shocks



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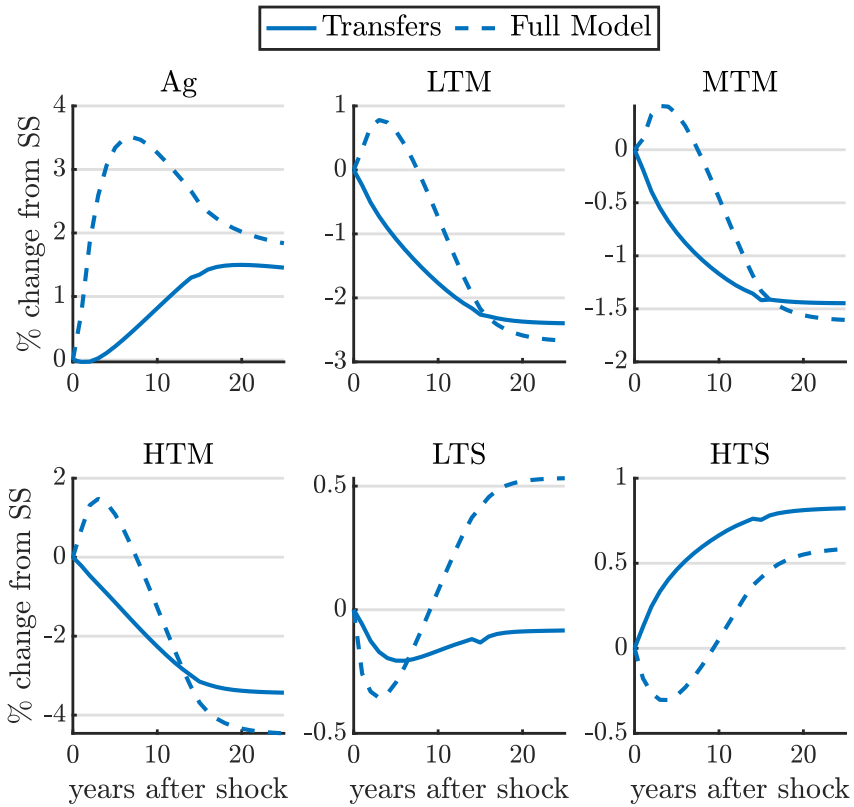
Comparison with Existing Approaches: System of Transfers

Figure: Reallocation Across Sectors in the US



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