Importers, Market Power and Optimal Tariffs

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Motivation

- Tariffs are back at the center of trade policy
- Canonical terms-of-trade argument calls for positive tariffs
  - Foreign exporters lower prices when a country restricts import demand
  - These gains must be weighed against the costs of restricting imports
- In the data, importers are few, large and charge higher markups
  - Suggests imports are already too low, even absent tariffs
  - So tariffs may amplify existing distortions and are potentially costly

What is the optimal tariff in an economy that matches these facts?

This Paper

- International trade model with two key features
  1. Heterogeneous firms pay fixed cost to import intermediate inputs
  2. Markups that increase with firm size
- Derive optimal tariff formula in static economy
  - Intuition about how distortions shape cost of restricting imports
- Quantify gains from trade and optimal tariff
  - Both simple static model and richer dynamic model with transition dynamics

Findings

- The planner wants **more trade, concentrated in productive firms**

  Importer mass rises only 5.5% $\rightarrow$ 8.7%, but importer employment rises 50% $\rightarrow$ 96%

- Tariffs **exacerbate** this pre-existing distortion

  10% tariff: consumption -0.75% versus $+0.33\%$ under CES

- **Same** trade elasticity, roughly **twice** the gains from trade

  Moving to autarky lowers consumption $\sim 10\%$ versus $\sim 5\%$ under CES

- **Optimal policy flips sign:**

  12% Kimball import subsidy versus **10.3% CES tariff**

Outline

- Motivating Facts
- Static Model
- Calibration and Trade Margins
- Distortions and Gains from Trade
- Optimal Tariffs
- Dynamics

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Imported Inputs are Used by a Few Large Producers

- Most trade is in intermediate goods (Jones, Shikher, Yotov, 2025)

- Only 5.55% of firms import directly, yet account for $\sim$ 50% of employment

Heterogeneous firms pay fixed cost to import intermediate inputs

Markups and Pass-Through

- Importers have higher labor productivity

  Bernard–Jensen–Redding–Schott: value added per worker is 25% higher

- Markups vary systematically with firm size

  Amiti–Itskhoki–Konings: larger firms adjust markups more strongly

- Cost pass-through is incomplete

  Amiti–Itskhoki–Konings: firms pass through about 62% of cost shocks

Kimball for size-dependent markups and incomplete pass-through

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Static Economy

- Two symmetric countries: Home and Foreign
- Representative household supplies labor and owns domestic firms

  Budget constraint: $C = WL + \Pi + T$
- Heterogeneous firms produce differentiated varieties

  Use labor $l(z)$ and intermediates $x(z)$, choose importer status $\{n, m\}$
- Final good is used for consumption and inputs

Endogenously Variable Markups

- Final output aggregates firm varieties through Kimball demand

$$\int_0^1 \Upsilon(q_i)\,\mathrm{d}i = 1, \qquad q_i \equiv \frac{y_i}{Y}$$

- Inverse demand is

$$p_i = D\,\Upsilon'(q_i), \qquad D = \left(\int_0^1 \Upsilon'(q_i) q_i \,\mathrm{d}i\right)^{-1}$$

- Klenow-Willis demand implies size-dependent markups

$$\mu_i = \frac{\sigma}{\sigma - q_i^{\varepsilon/\sigma}}$$

Production and Firm Heterogeneity

- Firms differ in productivity, which is Pareto distributed

$$F(z) = 1 - z^{-\eta}, \qquad z \geq 1, \qquad \eta > 1$$

- Each firm produces a differentiated variety using labor and intermediates

$$y_j(z) = z\, l_j(z)^{\nu} x_j(z)^{1-\nu}$$

- Firms choose whether to operate as a non-importer or an importer

$$j \in \{n, m\}$$

Importer status determines how the firm sources its intermediate inputs

Input Sourcing

- Non-importers source all intermediate inputs domestically $P_n = 1$

- Importers combine Home and Foreign inputs

$$x_m(z) = \left[x_m^h(z)^{\frac{\gamma-1}{\gamma}} + x_m^f(z)^{\frac{\gamma-1}{\gamma}}\right]^{\frac{\gamma}{\gamma-1}}$$

- Foreign inputs cost $\tau = (1+\xi)(1+\kappa)E$ and cost minimization implies

$$P_m = \left[1 + \tau^{1-\gamma}\right]^{\frac{1}{1-\gamma}} < 1 = P_n$$

Here ξ is the tariff, κ is the iceberg cost, and E is the real exchange rate

Costs and Pricing

- The composite unit cost under status j is

$$\Omega_j = \left(\frac{W}{\nu}\right)^{\nu}\left(\frac{P_j}{1-\nu}\right)^{1-\nu}$$

- Firms charge a markup over marginal cost

$$p_j(z) = \mu_j(z)\frac{\Omega_j}{z}$$

Importing lowers cost, expands scale, and raises markups

The Importing Decision

- Importing requires a fixed cost f_m in units of final output

- Operating profits under status $j \in \{n, m\}$ are

$$\pi_j(z) = p_j(z)\, y_j(z) \left(1 - \frac{1}{\mu_j(z)}\right)$$

- The marginal importer is indifferent

$$f_m = \pi_m(\bar{z}) - \pi_n(\bar{z}), \qquad \lambda_m = 1 - F(\bar{z}) = \bar{z}^{-\eta}$$

Here $\bar{z}$ is the importing cutoff and λ_m is the fraction of importers

Equilibrium

- Labor market clearing

$$L = \int_1^{\bar{z}} l_n(z)\,\mathrm{d}F(z) + \int_{\bar{z}}^{\infty} l_m(z)\,\mathrm{d}F(z)$$

- Balanced trade pins down the real exchange rate

$$(1+\kappa)\int_{\bar{z}^*}^{\infty} x_m^{*h}(z)\,\mathrm{d}F(z) = (1+\kappa)E\int_{\bar{z}}^{\infty} x_m^{f}(z)\,\mathrm{d}F(z)$$

- Resource constraint

$$Y = C + X + \lambda_m f_m$$

Aggregate Markup

- The aggregate markup is a harmonic sales-weighted average

$$\frac{1}{\mathcal{M}} = D\left[\int_1^{\bar{z}} \frac{\Upsilon'(q_n(z))q_n(z)}{\mu_n(z)}\,\mathrm{d}F(z) + \int_{\bar{z}}^{\infty} \frac{\Upsilon'(q_m(z))q_m(z)}{\mu_m(z)}\,\mathrm{d}F(z)\right]$$

- $\mathcal{M}$ acts like a wedge on variable inputs

$$\frac{WL}{Y} = \frac{\nu}{\mathcal{M}} \qquad \text{and} \qquad \frac{X}{Y} = \frac{1-\nu}{\mathcal{M}}$$

Aggregate Productivity

- Aggregate output can be written as $Y = ZL$ such that

$$Z = \left(\frac{1-\nu}{\mathcal{M}}\right)^{\frac{1-\nu}{\nu}} \mathcal{Q}^{-\frac{1}{\nu}}$$

- The allocation index $\mathcal{Q}$ is

$$\mathcal{Q} = \int_1^{\bar{z}} \frac{q_n(z)}{z} \, \mathrm{d}F(z) + P_m^{1-\nu} \int_{\bar{z}}^{\infty} \frac{q_m(z)}{z} \, \mathrm{d}F(z)$$

Productivity falls when production shifts away from efficient importers

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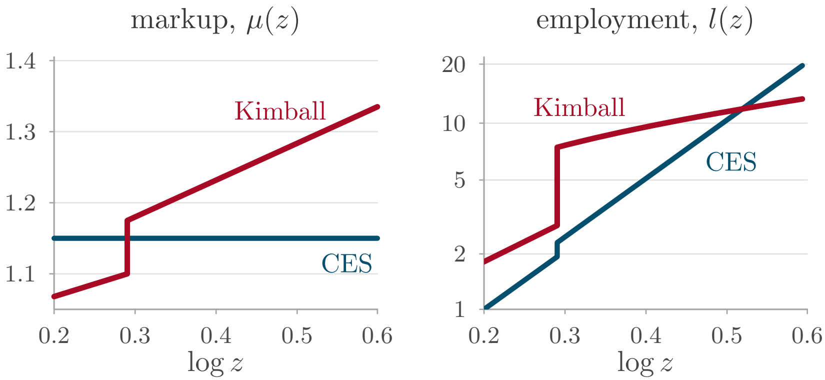
Calibration Targets

	Data	Kimball	CES
Aggregate markup	1.15	1.15	1.15
Pass-through	0.62	0.62	1.00
Input share	0.42	0.42	0.42
Trade elasticity	4.00	4.00	4.00
Import share	0.08	0.08	0.08
Importer mass	0.06	0.06	0.06
Importer employment share	0.50	0.50	0.50

- **Key Difference:** how the trade elasticity of 4 is generated

The Marginal Importer Is Large



Employment of marginal importer: 7.0 Kimball vs **3.2 CES**

Same Trade Elasticity, Different Margins

- Decompose the response of Foreign relative to Home input spending

$$\mathcal{A} \equiv -\frac{\mathrm{d}\log\left((1-\lambda)/\lambda\right)}{\mathrm{d}\log\tau} = \underbrace{-\left.\frac{\partial\log\left((1-\lambda)/\lambda\right)}{\partial\log\tau}\right|_{\bar{z}}}_{\mathcal{A}^{\mathrm{int}}} + \underbrace{-\left.\frac{\partial\log\left((1-\lambda)/\lambda\right)}{\partial\log\bar{z}}\right|_{\tau}\frac{\mathrm{d}\log\bar{z}}{\mathrm{d}\log\tau}}_{\mathcal{A}^{\mathrm{ext}}}$$

  - **Intensive:** substitution and contraction of continuing importers
  - **Extensive:** firms switch out of importing

Same aggregate elasticity, but Kimball is much more selection-heavy

Why Kimball Implies Lower γ

- The extensive margin depends on the size of firms around the cutoff

$$\mathcal{A}^{\text{ext}} = \frac{1-\omega}{\lambda}\left[\frac{l_m(\bar{z})}{L_m} + \frac{l_n(\bar{z})}{L_n}\right]\eta\lambda_m \frac{\mathrm{d}\log\bar{z}}{\mathrm{d}\log\tau} + \text{ reallocation}$$

- Marginal firms are much larger under Kimball $\implies$ $\mathcal{A}^{\text{ext}} = \mathbf{2.4}$ vs $\mathbf{1.1}$
- Since $\mathcal{A} = 4$ in both economies $\implies$ $\mathcal{A}^{\text{int}} = \mathbf{1.6}$ vs $\mathbf{2.9}$
- The intensive margin is $\mathcal{A}^{\text{int}} = (1-\mathcal{V})(\gamma-1) + \mathcal{V}\left[-\frac{1}{\vartheta}\left.\frac{\partial\log(L_m/L_n)}{\partial\log\tau}\right|_{\bar{z}}\right]$

Substitution Foreign-Domestic Inputs (γ): 2.3 Kimball vs **3.8 CES**

Lower γ Makes Importing More Valuable

- Let ϑ be the imported share of an importer's input spending

$$\vartheta \equiv \frac{\tau\, x_m^f(z)}{P_m\, x_m(z)} = \frac{\tau^{1-\gamma}}{1+\tau^{1-\gamma}}, \quad \text{such that} \quad P_m = \left(1-\vartheta\right)^{\frac{1}{\gamma-1}}$$

- ϑ is pinned down directly by the data $\rightsquigarrow$ identical across models

- Lower γ therefore implies lower P_m and a larger gain from importing

Importer cost advantage: 16.1% Kimball vs **8.0% CES**

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Distortions

Distortions in the economy

$$Z = \left(\frac{1-\nu}{\mathcal{M}}\right)^{\frac{1-\nu}{\nu}} \left(\int_1^{\bar{z}} \frac{q_n(z)}{z} \mathrm{d}F(z) + P_m^{1-\nu} \int_{\bar{z}}^{\infty} \frac{q_m(z)}{z} \mathrm{d}F(z)\right)^{-\frac{1}{\nu}}.$$

- **Intermediate inputs:** markups act like an input tax
- **Firm scale:** high-markup firms produce too little
- **Importer selection:** too few firms use the low-cost import technology

The novel distortion is the importing cutoff

Why Too Few Importers?

- The **planner** values the change in social surplus from switching

$$\frac{f_m}{DY} = \big(\epsilon_m(\bar{z}) - 1\big)\Upsilon'(q_m(\bar{z}))\, q_m(\bar{z}) \; - \; \big(\epsilon_n(\bar{z}) - 1\big)\Upsilon'(q_n(\bar{z}))\, q_n(\bar{z})$$

- The **market** values the change in variable profits

$$\frac{f_m}{DY} = \frac{\mu_m(\bar{z}) - 1}{\mu_m(\bar{z})}\,\Upsilon'(q_m(\bar{z}))\, q_m(\bar{z}) \; - \; \frac{\mu_n(\bar{z}) - 1}{\mu_n(\bar{z})}\,\Upsilon'(q_n(\bar{z}))\, q_n(\bar{z})$$

- The common term $\Upsilon'(q_j)q_j$ makes both valuations scale-dependent

  If high-markup firms are too small, the private gain is evaluated at too small a scale

How Distorted Is the Economy?

	Baseline	Kimball	CES
Consumption gains from removing distortions (%)			
Overall		**10.05**	1.71
Intermediate inputs only		1.70	1.60
Misallocation only		**6.63**	0.00
Fraction of importers only		**2.00**	0.10
Efficient allocations			
Importer mass	0.055	0.087	0.081
Importer employment	0.500	**0.963**	0.556
Import share	0.081	**0.180**	0.104

- **Kimball:** main correction is a reallocation of activity toward importers

How Do Trade Costs Affect Productivity?

$$\frac{\mathrm{d}\log Z}{\mathrm{d}\log \tau} = \underbrace{\text{ACR}}_{\text{direct}} + \underbrace{\text{markup}}_{\mathcal{M}} + \underbrace{\text{reallocation}}_{q(z)} + \underbrace{\text{exit}}_{\bar{z}}$$

- **ACR:** direct effect of higher imported-input costs $\propto \dfrac{1}{\mathcal{A}} \dfrac{\mathrm{d}\log \lambda}{\mathrm{d}\log \tau}$
- **Markup response:** changes in aggregate markup wedge $\propto \dfrac{\mathrm{d}\log \mathcal{M}}{\mathrm{d}\log \tau}$
- **Quantity reallocation:** shifts in relative quantities
- **Importer exit:** firms losing access to the lower-cost importing technology

A 10% Increase in Trade Cost τ

Effect on log Z	Kimball	CES
ACR	**−1.72**	**−1.72**
Aggregate markup	**1.32**	0.00
Quantity reallocation	−0.12	0.26
Importer exit	**−5.28**	−0.99
Total	**−5.81**	−2.45

- **ACR:** same trade exposure and trade elasticity
- **Markups:** falling Kimball markups cushion the shock
- **Importer exit:** the dominant force is loss of importing technology

Why Is Importer Exit So Costly?

TFP loss due to importer exit

$$\underbrace{\left(-\frac{\mathrm{d}\lambda_m}{\mathrm{d}\log\tau}\right)}_{\text{firms exiting}} \times \underbrace{\left(\frac{l_m(\bar{z})}{L}\right)}_{\text{marginal size}} \times \underbrace{\left(\frac{1}{P_m^{1-\nu}} - 1\right)}_{\text{cost advantage}}$$

	Kimball	CES
Decline of importer mass, p.p.	2.1	1.9
Employment of marginal importer	**7.0**	3.1
Cost advantage, %	**16.1**	8.0
Productivity contribution, p.p.	**−5.3**	−1.0

- **Kimball:** marginal firms are larger and lose a more valuable technology

Distortions Amplify Trade-Cost Shocks

- Consumption net of tariff revenue as a function of allocations and trade costs

$$C - T = \hat{C}(a, \tau), \quad a = \text{allocations}$$

- An increase in trade costs has a **direct effect** and an **allocation effect**

$$\frac{\mathrm{d}\hat{C}}{\mathrm{d}\tau} = -\mathbf{IM} + \boldsymbol{\nabla_a \hat{C}(a, \tau) \frac{\mathrm{d}a}{\mathrm{d}\tau}}$$

- Define Δ as the **amplification due to distortions**

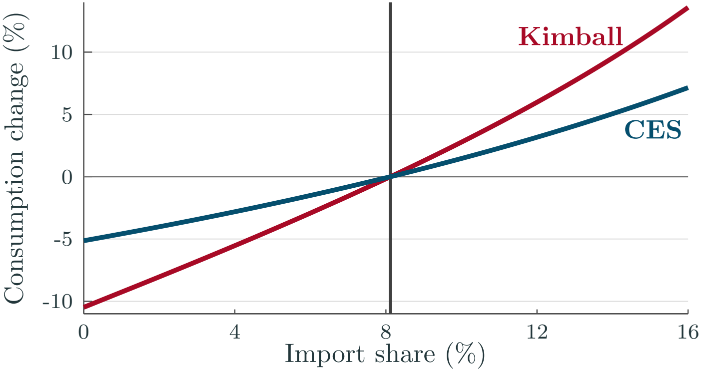
$$\frac{\mathrm{d}(C - T)}{\mathrm{d}\tau} \equiv -\big(1 + \Delta\big)\,\mathrm{IM} \quad \text{such that} \quad \Delta \equiv -\frac{1}{\mathrm{IM}} \nabla_a \hat{C}(a, \tau) \frac{\mathrm{d}a}{\mathrm{d}\tau}$$

Where Does Amplification Come From?

	Kimball		CES	
	moving $\bar{z}$	fixed $\bar{z}$	moving $\bar{z}$	fixed $\bar{z}$
Overall amplification, Δ	**2.05**	0.79	**0.41**	0.29
Markup level	0.29	0.29	0.29	0.29
Markup response	-0.22	-0.09	0.00	0.00
Quantity reallocation	0.09	0.59	-0.20	0.00
Net loss from importer exit	**1.89**	0.00	0.32	0.00

$1 + \Delta$ is **3.05 Kimball** versus **1.41 CES**

Same Trade Elasticity, Different Gains



- **Kimball:** trade reallocates toward distorted importers $\rightsquigarrow$ larger gains

$\mathcal{A}$ alone misses **who** gains access to importing and **how valuable** access is

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A Tariff Does Not Raise τ One-for-One

- The effective cost of Foreign inputs is $\tau = (1+\xi)(1+\kappa)E$
- Home import demand elasticity $\mathcal{D} = -\dfrac{\mathrm{d}\log \mathrm{IM}}{\mathrm{d}\log \tau}$
- Foreign export supply elasticity $\mathcal{E} = -\dfrac{\mathrm{d}\log(\mathrm{EX}/E)}{\mathrm{d}\log \tau^*}$
- Home tariff reduces import demand $\rightsquigarrow$ appreciates Home currency

$$\frac{\mathrm{d}\log E}{\mathrm{d}\log(1+\xi)} = -\frac{\mathcal{D}}{\mathcal{D}+\mathcal{E}}, \qquad \frac{\mathrm{d}\log \tau}{\mathrm{d}\log(1+\xi)} = \frac{\mathcal{E}}{\mathcal{D}+\mathcal{E}}.$$

A 10% Home Tariff

	Kimball	CES
Exchange rate change, %	−5.07	−5.19
Import share change, p.p.	−1.91	−1.74
Importer mass change, p.p.	−0.89	−0.77
Importer employment change, p.p.	**−7.41**	−3.02
Productivity change, %	**−2.49**	−1.00
Consumption change, %	**−0.75**	0.33

- **Consumption difference:** domestic productivity, **not** terms of trade

The Tariff Tradeoff

How does domestic consumption respond to a unilateral tariff?

$$\frac{\mathrm{d}\log C}{\mathrm{d}\log(1+\xi)} = (1+\kappa)\,\frac{E\,\mathrm{IM}}{C}\left(\underbrace{-\frac{\mathrm{d}\log E}{\mathrm{d}\log(1+\xi)}}_{\textbf{terms of trade}} + \underbrace{\xi\frac{\mathrm{d}\log \mathrm{IM}}{\mathrm{d}\log(1+\xi)}}_{\textbf{tariff wedge}} - \underbrace{\Delta(1+\xi)\frac{\mathrm{d}\log \tau}{\mathrm{d}\log(1+\xi)}}_{\textbf{distortions}}\right)$$

- **Terms of trade:** tariff lowers the relative price of imports
- **Tariff wedge:** existing tariffs distort import demand
- **Domestic distortions:** tariff raises τ and worsens misallocation

Optimal Tariff Formula

Simple **optimal tariff** formula

$$\xi = \frac{1}{\mathcal{E}} \frac{\mathcal{D} - \mathcal{E}\Delta}{\mathcal{D} + \Delta}$$

- If $\Delta = 0$, the formula collapses to the standard $\xi = \mathcal{E}^{-1}$
- Higher $\mathcal{E}$ lowers the terms-of-trade motive: Foreign supply is more elastic
- Higher $\mathcal{D}$ lowers the distortion cost: the tariff is absorbed less by Home τ
- Higher Δ lowers the tariff because domestic distortions become more costly

A subsidy is optimal when $\mathcal{E}\Delta > \mathcal{D}$

Static Optimal Tariffs

	Kimball		CES	
	moving $\bar{z}$	fixed $\bar{z}$	moving $\bar{z}$	fixed $\bar{z}$
Optimal tariff	**-8.1%**	29.6%	**16.2%**	27.7%
Home consumption change	0.25	0.61	0.37	0.71
Foreign consumption change	2.29	-3.93	-1.46	-2.18
Exchange rate change	4.78	-15.1	-8.04	-13.2

- Selection lowers the optimal tariff in both economies
- Only selection plus variable markups reverses the sign

The static optimal policy is an import subsidy

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Dynamic Model

- Add four macro margins

  Elastic labor supply, capital, firm entry and trade imbalances

- Firms exit at rate ϕ and entrants draw productivity

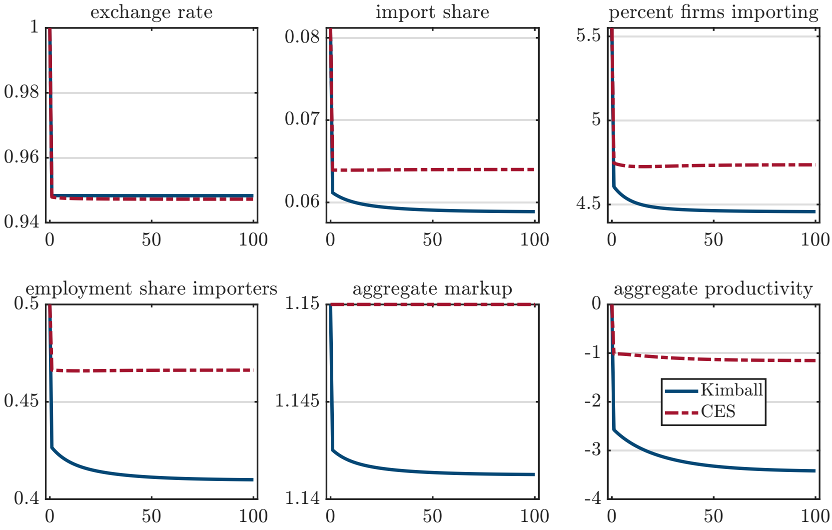
$$N_{t+1} = (1 - \phi)N_t + \widetilde{N}_t$$

- Entry responds to firm value through $\Phi_t \geq Q_t$

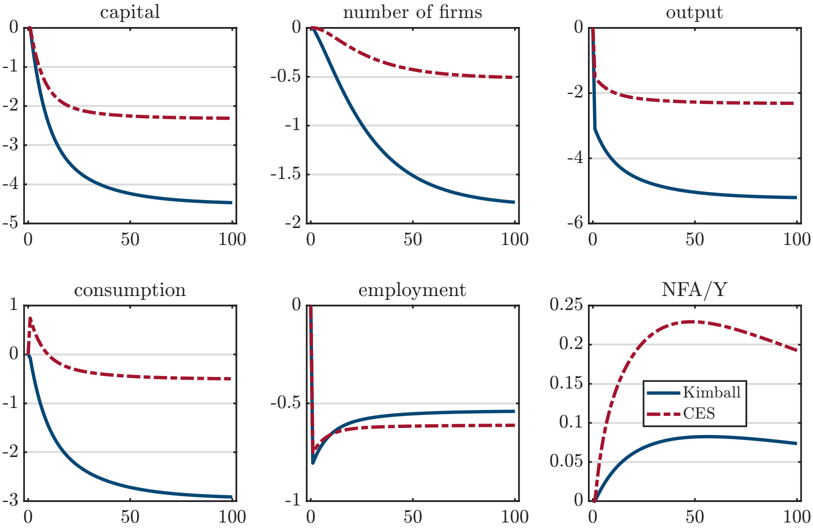
  Positive entry drives the marginal entry cost Φ_t to the value of a firm Q_t

- Evaluate permanent tariff changes along the transition

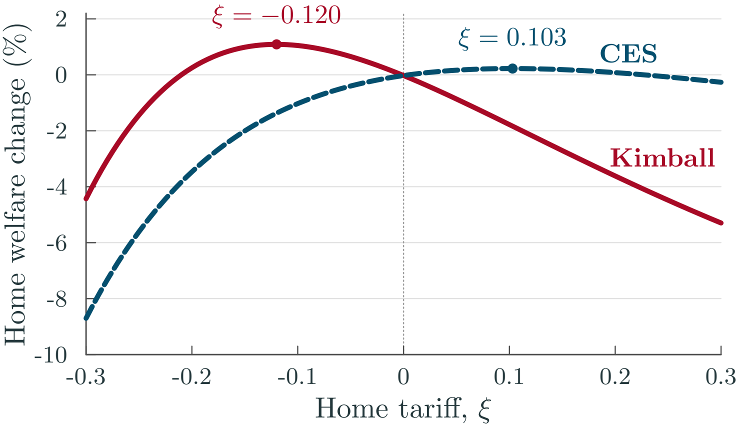
Dynamic Mechanism



Aggregate Dynamics



Dynamic Optimal Tariffs



Kimball: $\boldsymbol{\xi = -12.0\%}$ versus **CES: $\boldsymbol{\xi = 10.3\%}$**

Country Size and Optimal Tariffs

- Extend the model to S symmetric Foreign economies

$$x_{mt}(z) = \left[x_{mt}^h(z)^{\frac{\gamma-1}{\gamma}} + S x_{mt}^f(z)^{\frac{\gamma-1}{\gamma}} \right]^{\frac{\gamma}{\gamma-1}}$$

Home accounts for $1/(1+S)$ of world trade; κ adjusts to keep import share fixed

	Kimball		CES	
	moving $\bar{z}$	fixed $\bar{z}$	moving $\bar{z}$	fixed $\bar{z}$
$S = 1$	-0.120	0.212	0.103	0.243
$S = 3$	-0.033	0.294	0.158	0.233
$S = 100$	0.199	0.341	0.185	0.228

Why Larger Countries Want Lower Tariffs

- Foreign exposure to Home is larger when Home is large

$$P^*_{mt} = \left[1 + (S-1)(1+\kappa)^{1-\gamma} + \left(\frac{1+\kappa}{E_t}\right)^{1-\gamma}\right]^{\frac{1}{1-\gamma}}.$$

Small S means Home is large: the Home term matters more for Foreign costs

- A Home tariff then lowers Foreign consumption and Home exports

- Less appreciation means the tariff raises Home import costs more

$$\mathrm{d}\ \log \tau_t = \mathrm{d}\ \log(1+\xi_t) + \mathrm{d}\ \log E_t$$

Conclusions

- Key importer characteristics in the data
  1. Few firms import, yet importers account for large share of employment
  2. Charge markups that increase with size
- Model consistent with evidence implies importers are too small and too few
- Tariffs are costly because they further shrink importers along both margins
- This loss dominates the terms-of-trade motive for tariff
- Optimal policy is an import subsidy, even without retaliation