International Friends and Enemies

Kleinman, Liu, Redding

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Eaton Discussion

- Elegant paper on how to infer the effect of productivity and trade cost changes on relative GDP's and welfare across countries.

- Basic version (one sector with no intermediates):

  – Expenditure share and income share matrices $\mathbf{S}$ and $\mathbf{T}$ are sufficient, along with:

$$\mathbf{M} = \mathbf{TS} - \mathbf{I}$$

Framework

Armington Model with CES Demand (Anderson van Wincoop, 2003)

- Country output Q_i:

$$Q_i = z_i L_i$$

- Preferences U_n (special case here, wait a moment):

$$U_n = \left(\sum_{i=1}^{N} \alpha_i^{1/\sigma} Q_{ni}^{(\sigma-1)/\sigma} \right)^{\sigma/(\sigma-1)}$$

where α_i reflects the popularity of i's good.

- Iceberg costs τ_{ni}

- Parameters: $z_i, \alpha_i, L_i, \tau_{ni}, \sigma$

- Balanced trade (KLR show it's easy to relax with an exogenous deficit)

- Equilibrium: a vector $\mathbf{w}$ satisfying:

$$w_i L_i = \alpha_i \left(\frac{w_i}{z_i} \right)^{1-\sigma} \sum_{n=1}^{N} \frac{\tau_{ni}^{1-\sigma}}{\sum_{k=1}^{N} \alpha_k (w_k \tau_{nk}/z_k)^{1-\sigma}} w_n L_n$$

- Welfare:

$$U_n = \frac{w_n}{\left[\sum_{i=1}^{N} \alpha_i (w_i \tau_{ni}/z_i)^{1-\sigma} \right]^{1/(1-\sigma)}}$$

1. Armington versus Krugman versus Ricardo

- ACR: the welfare formula is the same

- But there are some subtle differences that are relevant here.

- Krugman:

$$\alpha_i = M_i^{1/(\sigma-1)}$$

  where M_i is i's number (measure) of varieties

- What if the efficiency gain is a new variety (higher M_i) (isomorphic to a proportional decline in d_{ni}'s, including home)?

  – Product versus process innovation

  – The terms-of-trade effect goes the other way!

  – No possibility of immiserising growth

- Ricardo (with Fréchet distribution of varietal efficiencies): aggregate or sectoral efficiency is

$$z_i = T_i \pi_{ii}^{-\theta}$$

  (endogenous)

- Measured efficiency doesn't mean the same thing in a Ricardian versus Armington model

  – Costinot, Donaldson, Komunjer (2012)

- So we wouldn't measure efficiency shocks the same way

2. Multiple Sectors and Input-Output Linkages

• Most interesting case

• Magically the same formula!

- (fine print) modified by defining:

$$\mathbf{S}_{ni} = \sum_{h=1}^{N} \sum_{k=1}^{K} \alpha_n^k s_{nh}^k \Lambda_{hi}^k$$

$$\mathbf{T}_{in} = \sum_{h=1}^{N} \sum_{k=1}^{K} \Pi_{ih}^k \vartheta_{hn}^k$$

$$\mathbf{M}_{in} = \sum_{h=1}^{N} \sum_{k=1}^{K} \Pi_{io}^k \left(\vartheta_{oh}^k + \sum_{j=1}^{N} \Theta_{oh}^{kj} \right) \Upsilon_{hon}^k$$

where:

- α_n^k "is market n's Cobb-Douglas expenditure share for industry k"

- Λ_{hi}^k "captures the share of revenue in industry k in country h that is spent on value added in country i"

- Π_n^k "is the network-adjusted income share that country i derives from selling to industry k in country h"

- ϑ_{hn}^k "is is the share of revenue that industry k in country h derives from selling to country n"

- Θ_{oh}^{kj} "captures the fraction of revenue in industry k in country o derived from selling to producers in industry j in country h"

– Υ_{hon}^{k} "captures the responsiveness of country h's expenditure on industry k in country o with respect to a shock to costs in country n"

- It's not clear to me what the data equivalent of some of these magnitudes is.

- More! please!

# 3. Multiple sectors versus Input-Output Linkages

- Multiple sectors: create a richer environment

- Input-output linkages: magnify the effects of a productivity shock (Hulten)

  - EK (2002) had I-O linkages with only one sector (all manufactures)

  - The elasticity is different and there is a role for geography in production costs

- Why not introduce I-O linkages from the beginning (easy to do), adding sectors and an interindustry I-O structure later?

Results

4. How big are the welfare effects?

- China → USA

Figure 9: Partial and General Equilibrium Effects of the Impact of Productivity Growth in China (Exporter) on Income in the United States (Importer) Over Time
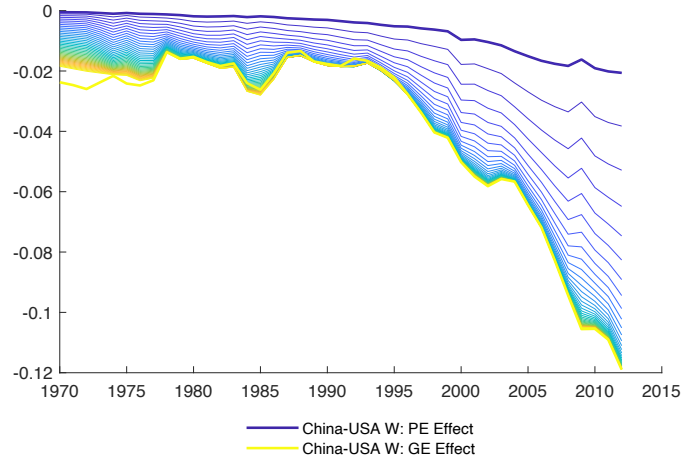
Source: NBER World Trade Database and authors' calculations using our baseline constant elasticity Armington model from Section 3.

Figure 10: Partial and General Equilibrium Effects of the Impact of Productivity Growth in China (Exporter) on Welfare in the United States (Importer) Over Time
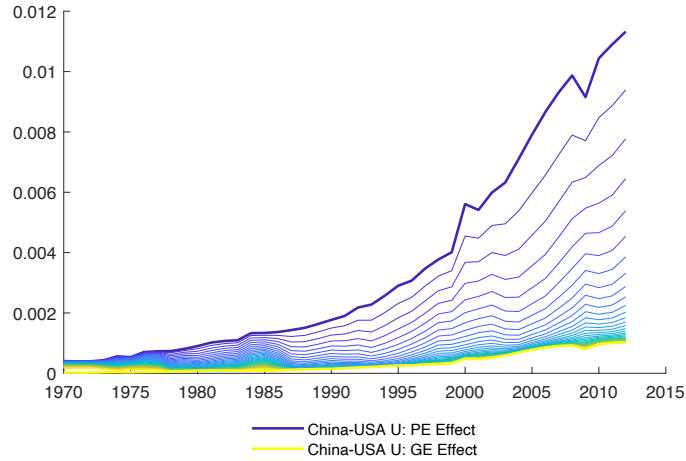
Source: NBER World Trade Database and authors' calculations using our baseline constant elasticity Armington model from Section 3.

In Figure 11, we illustrate these relationships for a Chinese productivity shock in 2010, where the circles correspond to each of the other countries in our sample (excluding China). In the top-left panel, we show the relationship between the cross-substitution effect ($\mathbf{W}^{\text{Sub}}$) and the market size effect ($\mathbf{W} - \mathbf{W}^{\text{Sub}}$). We find that the cross-substitution effect is always negative, as higher Chinese productivity reduces the competitiveness of other countries in all markets, which leads consumers in all markets to substitute away from these other countries' goods, and lowers their per capita income relative to China. In contrast, the market-size effect can be either positive or negative. On the one hand, higher productivity in China raises its per capita income, which increases the market demand for other countries' goods, and increases their income. On the other hand, the reduction in income in other markets from the cross-substitution effect lowers market demand for other countries' goods, which decreases their income. The overall income effect is the net outcome of these forces and hence can be either positive or negative. We find a strong relationship between the market-size and cross-substitution effects, because the gravity structure of international trade jointly determines the

- Are these percentages?

- If so, very tiny

- Aren't most relationships "friendly"?

- Delve more into the sources of enmity. It's not always clear to me what they are

5. Correlation between trade friendliness and bilateral political attitudes

- **heroic**

- identified off the time variation (feature or flaw?)

- What if we just used bilateral trade instead of the friendliness measure?

- Better relations may just lead to more trade

- Could we augment the regressions with some old-fashioned economic history?

6. A Welfare Interpretation Requires an Assumption of Exogenous Deficits

- Foreigners may share in a national productivity increase through overseas portfolio investment, multinational investment, etc.

  - Alviarez: multinational productivity shocks correlate with the home more than the host

Complete Financial Markets and the Planner's Solution

- The planner may want to "spread the wealth" from a productivity improvement in one country

  - although, depending on the nature of the technology shock (first point), the terms of trade effect does so to some extent already (immiserising growth→compensate back!)

- But trade frictions may inhibit the planner's desire to do so, so that financial autarky may not be that far from her solution (Obstfeld-Rogoff, EKN puzzles point)

A Simple Numerical Example

- Two Countries $L_1 = L_2 = 1$

- $\alpha_1 = \alpha_2 = 1$

- $\sigma = 5$

- $z_1 = z, z_2 = 1$

- $\tau = 1, 1.5;$

Frictionless Trade ($\tau = 1$)

$z = 1$	financial autarky	planner	$z = 1.5$	financial autarky	planner
Q_{11}	.5	.5	Q_{11}	.87	.75
Q_{22}	.5	.5	Q_{22}	.42	.75
Q_{21}	.5	.5	Q_{21}	.63	.5
Q_{12}	.5	.5	Q_{12}	.58	.5

Trade Frictions ($\tau = 1.5$)

$z = 1$	financial autarky	planner	$z = 1.5$	financial autarky	planner
Q_{11}	.83	.83	Q_{11}	1.29	1.18
Q_{22}	.83	.83	Q_{22}	.80	.88
Q_{21}	.11	.11	Q_{21}	.14	.22
Q_{12}	.11	.11	Q_{12}	.13	.08

Conclusion

- A great paper

- Important addition to the sufficient statistics literature

- I look forward to having students read it this fall