Discussion of

How Firms Accumulate Inputs: Evidence from Import Switching

by

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November 2015
Standard Static Model of Imported Intermediates

• Firm $i$ Production Cobb-Douglas:

$$Y_i = A_i K_i^{\alpha_K} L_i^{\alpha_L} X_i^{\alpha_X},$$

where $\alpha_K + \alpha_L + \alpha_X = 1$.

• Intermediate bundle $X$ is CES in domestic input $H$ and imported input $M$.

• For now, ignore quality $b$. 
Standard Static Model of Imported Intermediates

- We either have Halpern, Koren, Szeidl (AER 2015):
  \[ \ln X_i = \int_{j=0}^{1} \ln \left[ H_{i,j}^{\sigma-1} + M_{i,j}^{\sigma-1} \right] \frac{\sigma}{\sigma-1} \, dj, \]

- or Gopinath and Neiman (AER 2014):
  \[ X_i = \left[ H_{i,j}^{\sigma-1} + \int_{j_i=0}^{1} M_{i,j}^{\sigma-1} \, dj \right]^{\frac{\sigma}{\sigma-1}} \]

- In either setup, role of imports is simple – given love-of-variety in aggregation, reduce unit cost of input bundle.
Standard Static Model of Imported Intermediates

- To what extent is unit cost of $X$ reduced by importing?

- In HKS style:

\[
\ln \left( \frac{P^{I=1}}{P^{I=0}} \right) = \int_{j=0}^{1} \mathcal{I}_{i,j} \ln \left[ 1 + \left( \frac{P_{M}}{P_{H}} \right)^{1-\sigma} \right]^{\frac{1}{1-\sigma}} dj
\]

\[
= \int_{j=0}^{1} \ln \left[ \frac{p_{H}H_{i,j}}{p_{H}H_{i,j} + p_{M}M_{i,j}} \right]^{\frac{1}{\sigma-1}} dj
\]

\[
= \frac{1}{\sigma - 1} \int_{j=0}^{1} \ln \gamma_{i,j} dj
\]

- In GN style:

\[
\ln \left( \frac{P^{I=1}}{P^{I=0}} \right) = \frac{1}{1 - \sigma} \ln \left( 1 + \int_{j=0}^{1} \mathcal{I}_{i,j} \left( \frac{P_{M}}{P_{H}} \right)^{1-\sigma} dj \right)
\]

\[
= \frac{1}{\sigma - 1} \ln \gamma_{i}
\]
Standard Static Model of Imported Intermediates

- So key matrix is what’s sometimes called “home share” $\gamma$, coupled with an elasticity $\sigma$

- Arkolakis, Costinot, Rodriguez-Clare (AER 2012): at country level $\gamma$ is key for welfare gains in gravity model

- Costinot, Donaldson, and Komunjer (ReStud 2012): at sector level $\gamma$ gap in “observed” vs. “fundamental” productivity
Standard Static Model of Imported Intermediates

• Fixing $w$, $p_H$, and $A$ (continue to ignore $b$), log unit cost in Lu, Mariscal, and Mejia is:

$$\ln \lambda \propto \int_{j=0}^{1} \ln \gamma_{i,j} dj$$

so very much in same spirit (suggestion: replace $B$ with $\gamma$).

• Static work on joint distribution of size and $\gamma_{i,j}$:

  • HKS (2015): Structural estimation and counterfactuals
  • GN (2014), Ramanarayanan (2015): Response to shocks; Mismeasurement from add/drop
  • Blaum, Peters, Lelarge (2015): Much richer I/O, disciplined with French data
Dynamic Model of Imported Intermediates

- But Lu, Mariscal, and Mejia is dynamic.

- Firms state is productivity $A$ and measure of “searched” suppliers is $n$

- Firms decide if want to spend resources looking for new foreign suppliers, with convex cost of search

- Cool, intuitive, realistic features this generates:
  - Firms grow imports slowly (convex cost)
  - Add and drop inputs simultaneously (find better exporter)
  - Eventually can’t find better suppliers ($n$ is state variable)
Dynamic Model of Imported Intermediates

- Good news: Model is very nice! Real step forward. Clean analytical expressions, good intuitions, etc.

- Bad news: What do we need it for? The authors stop far too soon and never really put it to use.

- Model is used only to generate relatively subtle comparative statics such as:
  - “Switching” increases with size conditional on age
  - “Switching” decreases with age conditional on size
  - etc.
Were Sourcing Dynamics Important To Understand 2007-2014?

- If we care about aggregate imports and productivity, when do we need to think about these dynamic considerations?
- 2007-2014 were relatively normal times for Colombian RER

Note: Increase is a Dollar Appreciation

![Graph showing Real Exchange Rate (in logs) from 2007 to 2014](image)
Were Sourcing Dynamics Important To Understand 2007-2014?

- Put together annual imports data from DANE for 2007-2014. Not as good as authors’, but firm-level

- Combined with firm-level data from Colombia’s corporate regulator. Used two variables:
  1. Operating Revenues
  2. Cost of Sales and Services (COGS)

- Match roughly 2,000-3,000 importing firms

- Are dynamics essential to understanding $\gamma$?
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- So, in “normal” times, distribution of $\gamma$’s looks largely stable, including its joint distribution with size.

- My analysis was quite cursory, but it suggested relatively constant distribution of size/age/imports.

- Authors should focus on situations where dynamics are key to understanding distribution of $\gamma$ or its change.
For What Issues Are Dynamics First Order?

- Key benefit of dynamic model should be to teach us about:
  1. Evolution of $\gamma$ in big shock episodes/crises,
  2. Growth of firms from small to big
  3. Relevance of expectations for firm investment in suppliers
  4. Cross-country differences in stable $\gamma$ distribution
  5. Short- vs. Long-run trade elasticities

- Really exciting things the authors can and should do with this

- Next steps, I believe, is to add birth/death/productivity processes and try to solve for ergodic distribution (on computer). See how system responds to shocks.
Conclusion

- Authors have cool data, do a great job writing innovative new dynamic sourcing model

- New mechanisms in model strike me as reasonable and interesting, and I agree their empirics go some way toward corroborating the model

- The exciting part will be to show what dynamic sourcing can deliver that our static models haven’t yet been able to ... I hope this is what the authors turn to next