Discussion of “Fragmentation and Product Cycle” by Lai and Qi

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Research questions

- “What factors determine the degree of fragmentation of the global economy?”

- “What are the long-term repercussions of international fragmentation on the distribution of income between the ‘North’ (the more advanced countries) and ‘South’ (less developed countries)?”
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- “What are the long-term repercussions of international fragmentation on the distribution of income between the ‘North’ (the more advanced countries) and ‘South’ (less developed countries)?”

Approach of this paper:

- Lai and Qi write down a North-South product-cycle model
- Introduce cross-border sourcing of intermediate inputs into Krugman (1979).
- Use this model to explore the determinants of: (i) the extent of production fragmentation, and: (ii) the relative wage ($w_N/w_S$), in the long-run steady state.
Recapping the Model

- Innovation occurs in North only, expanding the range of final good varieties at an exogenous rate:

\[
\frac{\dot{n}}{n} = \delta H_N
\]

- Production of each final good combines: (i) a unit measure of intermediate inputs; (ii) labor inputs for final assembly.

- Cobb-Douglas, with the factor share of intermediate inputs being \( \mu \).
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- “New Product”: Production of all intermediates and final assembly take place entirely in North.
Recapping the Model (cont.)

▶ “Standardized products”: Standardization occurs at rate:

\[
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\]

after which final assembly shifts to the lower-wage South, *and* intermediates can be sourced from either North or South.

![Diagram of economic model showing North, South, Intermediate inputs, Final Assembly, and Final goods]
Recapping the Model (cont.)

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- Share of inputs sourced from North given by a familiar Eaton-Kortum expression:

\[
\beta_N = \frac{T_N(w_N)^{-\theta}}{T_N(w_N)^{-\theta} + T_S(w_S)^{-\theta}}
\]
Recapping the Model (cont.)

Close the model with labor-market clearing conditions in each country.

- This pins down $w_N/w_S$ in the long-run equilibrium.

For a standardized product, “fragmentation” given by:

$$1 - DVAR = \mu \beta_N = \mu \frac{(T_N/T_S)(w_N/w_S)^{-\theta}}{(T_N/T_S)(w_N/w_S)^{-\theta} + 1}$$

**Exercise:** Comparative statics to understand what changes in $1 - DVAR$ would be induced by shifts in:

- technology ($T_N/T_S$), or
- the rates of product innovation ($g$) or standardization ($\omega$), etc.

(Qn: If the export price of final goods reflects a markup, that accrues as profits to domestic entities, shouldn’t this enter in the expression for $1 - DVAR$?)
Overall thoughts

- LQ put on the table an interesting setting for thinking about the research questions posed.
- Some useful first steps to understand how the product cycle and the fragmentation of production would interact.
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- Some useful first steps to understand how the product cycle and the fragmentation of production would interact.

I have two (+ε) comments:

0. Model not really about MNCs *per se*.
1. Thinking more about different stages of the product cycle.
2. Incorporating an endogenous innovation margin (and possibly thinking about transition dynamics).

**Upshot:** A lot more scope to enrich the model, and to tease out more subtle implications.
1. Different stages of the product cycle

Some initial confusion on my part:

▶ As $T_N / T_S$ increases, fragmentation is predicted to rise.

▶ Seems counter-intuitive: One would think that higher productivity in North would reduce the incentive to offshore production of intermediates to South.

▶ Resolution to this: A standardized product is no longer seen as a “Northern” good.

Instead, it is a Southern firm that is offshoring production of intermediates to North. And if North gets more productive, this offshoring will increase.
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**But:** Above discussion points to an interim stage in product cycles that would be worth taking into account.

- Back to Vernon (1966):
  
  New $\rightarrow$ Maturing $\rightarrow$ Standardized
1. Different stages of the product cycle (cont.)

Consider an interim stage where final assembly still remains in the North, but sourcing of intermediate inputs occurs from both North and South:

This would make the model a lot richer:

- To speak to fragmentation from the perspective of both Northern and Southern firms
- $1 - DVAR$ for the North would no longer be trivially zero.
2. **Endogenizing the innovation margin(s)**

Really two dimensions of technological improvement here:

1. Raising the rate of product innovation (as in Helpman (1993))
2. Improvements in $T_N/T_S$ (as in Rodriguez-Clare (2010))

(From a modeling perspective: An endogenous labor allocation decision between innovation and production activities.)
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**Thought exercise:** Suppose the rate of product standardization ($\omega$) were to rise.

- This would reduce the incentives for product innovation, which would (intuitively) reinforce the decrease in $w_N/w_S$.

- However: Could also encourage improvements in $T_N/T_S$, to be more competitive in supplying intermediate inputs for standardized products, which would mitigate the decrease in $w_N/w_S$.

**Worth considering?** Taking such endogenous innovation decisions in account, and possibly also transition dynamics.
Smaller comments

- For a given product, the share of intermediates that are sourced across borders exhibits a discrete jump from 0 to $\beta_N$ when standardization occurs.

  Is this realistic? Or would firm-level data suggest that the increase is a smoother process over time?