Discussion of Laura Alfaro, Alejandro Cunat, Harald Fadinger, and Yanping Liu's paper, "The Real Exchange Rate, Innovation, and Productivity"

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- A pleasure to discuss Laura and her coauthor's paper

Structure of the paper

- Data patterns and verbal hypothesis
- Theory
- Structural estimation
- Counterfactual experiments (calibrations)

- Data:
  - Firm level R&D expenditure, sales, material , capital stock, and cash flows for 500,000 firms in 70 developing and 23 developed countries during 2001-2010 (Orbis)
  - Plant level export/import status, sales, employment in 2000, 2005, 2007, and 2009 (Dunn and Brad Street)
  - Administrative plant level data for China, Colombia, Hungary, and France
  - Export dynamics (World Bank)
  - Real exchange rate: PPP combined with bilateral sectoral export/import shares (PWT 8.0 + UN Comtrade)

Data patterns

- RER depreciation appears to promote TFP and R&D in Emerging Asia (China), but hurt innovation in Latin America (Colombia) and Central Europe (Hungary), and does nothing in developed countries(France)

The Hypothesis

- Composition of firm characteristics (export status, import status, foreign currency debt) explains the difference across regions.

- Suggestion 1: If true, then conditioning on these variables included as regressors, the coefficients on the regional dummies should become insignificant.

- In other words, heterogeneity within each sub-region

- Regional labels are just one of many possible ways to group countries

- If not feasible for all countries, why not for the countries with the relevant data

Suggestion 2: Which firms are exposed to RER movement and how?

- The paper classifies all firms into three groups: (a) exporters, (b) importers, and © firms with no international trade (most firms)

  - Different exposure to RER shocks

- But the non-trading firms can be broken down into (c1) indirect exporters and importers via trading firms, (c2) indirect exporters and importers via supply chains, and (c3) firms with no exposure to RER

Two types of indirect traders (a)

- Indirect exporters/importers via trading firms
  - JaeBin Ahn, Amit Khandelwal, and Shang-Jin Wei, 2011. "The role of intermediaries in facilitating trade," Journal of International Economics
    - Indirect exporters/importers are modeled as having avoided a fixed cost associated with direct trading in turn to paying an extra variable cost.
    - Perhaps there are as many indirect traders as direct ones. (In terms of value, 20% of Chinese export value is via trading firms)
    - Relative importance varies systematically across country pairs (as a function of distance, country size, regulatory barriers, etc)

Two types of indirect traders (b)

- Indirect participants in international trade via supply chains
  - Felix Tintelnot, Ayumu Kikkawa, Magne Mogstad, and Emmanuel Dhyne, 2017, "Trade and Domestic Production Networks"
  - Domestic firms selling to direct (or indirect) exporters
  - Domestic firms buying from direct (or indirect) importers (97% of Belgium firms import indirectly vs. 15% directly; 40% of inputs are imported on average)

  - The relative importance is also likely to vary by countries

Suggestion 3: What is the real exchange rate?

Patel, Wang, and Wei: Global Value Chains and Effective Exchange Rate at the Country-Sector Level, NBER wp 20236

Due to the structure of cross-border supply chains, trade volume weighted average of bilateral exchange rate would not be correct conceptually

- First, one has to take into account the structure of supply chains as revealed in the inter-country input-output tables.

- Consider a 3-country example

- Japan exports intermediate good to China, and China exports finished good to the US

    - Country and sector fixed effects would not be right in this example

    - Input-output relations can respond to (large and persistent) RER movement

- Second, for a given pair of countries, different sectors may participate in supply chains in different ways.

- Consider China's exports of textile and electronics to the US. The former uses mostly domestic value added, whereas the latter has a high share of foreign value added, including FVA from the US itself.

Suggestion 4: Taking hysteresis seriously

- Not just asymmetry between appreciation and depreciation.

- More important, between large and small RER movement
  - Precisely because of the fixed costs in innovation, one would expect to see hysteresis

Summary of the suggestions

- The paper addresses important questions

- Including the firm characteristics in the main regressions and see if the regional effects disappear

- Broadening the set of RER-exposed firms to include two types of firms that engage in trade indirectly

- Re-defining the RER measure that incorporates supply chain relations in the data

- Taking hysteresis seriously

13