Discussion of: Productivity and Trade Dynamics in Sudden Stops

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Main Idea

- Sudden stops characterized by a big drop in productivity
  ... and a slow-down in productivity growth afterwards, dragging the recovery (trend shocks)

- Also, these episodes show an improvement in the trade balance
  ... exchange rate mechanism

- The authors analyze these episodes through the lens of an endogenous growth model with innovation and a rich trade structure

- Key mechanism: innovation in new products falls during sudden stops and switches to export lines

- Some predictions of the model validated using Chilean firm level data around the 1998 sudden stop episode

The Model

Very nice model combining

- RBC model for small open economy with occasionally binding collateral constraints (sudden stops) - Mendoza (2010)

- Production structure with differentiated intermediate goods, innovation and endogenous growth - Kettle and Kortum (2004), Ates and Saffie (2021)

- Ricardian trade structure: exports, imports of intermediate goods by lowest cost producer - Eaton and Kortum (2002)

The interaction of the last two features enriches the analysis of the economy's response to Macro shocks, especially sudden stops

The Model: Macro Block

Small open economy with one final tradable good

- Aggregate shocks to technology and international interest rates

- Final good production under perfect competition, requires intermediate goods (also tradable)

- Working capital requirement (external finance dependence)

- Productive asset (land?) serves as collateral; constraint on leverage

A sequence of negative shocks triggers the collateral constraint in a sudden stop, reducing the demand for intermediate goods in the domestic market

The Model: Firm/Product Dynamics

Firms produce a portfolio of intermediate goods (product lines)

- Fixed set of product lines in $[0,1]$, each manufactured by only one firm (lowest cost producer)

- Continuum of firms with mass varying over time (entry, exit); each firm manufactures a discrete number of product lines

- Bertrand competition: leading firm charges a price equal the second lowest marginal cost

- Through factor-saving innovation, a firm can poach a product line from another firm, becoming the lowest cost producer

Remark: Text a bit confusing distinguishing firm and product dynamics

The Model: Trade in Intermediate Goods

Intermediate goods can be produced by domestic and foreign firms, and sold in domestic and foreign markets

- Set of product lines in $[0,1]$ divided in domestic lines, export lines (sold both domestically and abroad) and import lines

- Division depends on who is the lowest cost producer in each market, net of a trade cost

- Two types of innovation: domestic innovation allows a firm (new or existing) to poach a domestic or import line, replacing a domestic or foreign producer in the domestic market

- Export innovation allows an existing firm to transform a domestic line into an export line, replacing a foreign producer in the foreign market

The Model: Trade in Intermediate Goods

Remark: It is not obvious who the second lowest cost producer in each market is

- *The authors <u>assume</u> that the second lowest cost producer in the domestic (foreign) market is a domestic (foreign) firm*

- *This depends on factor prices and the trade cost, not on technology (available for all)*

- *In the initial <u>steady state</u>, parameters are calibrated so that the assumption holds, but this is not guaranteed outside the steady state (only locally)*

Maybe a minor point, but worth clarifying in the text

The Model: The Innovation Decision

The only decision made by intermediate-good firms is how much to invest in domestic and/or export innovation

- The probability of success of innovation depends on the resources invested (final good)

- If their own innovation is successful, firms expand their portfolio of product lines becoming the lowest cost producer and increasing the economy-wide productivity

- If other firms innovate successfully, incumbent firms might lose product lines (<u>risk of replacement</u>); firms with no lines exit

- Innovation effort is <u>undirected</u>; does not apply to own products

The Model: Presentation

Two additional remarks about the presentation of the model

- *A formal definition of an equilibrium for this economy could be useful, at least in an appendix; also a formal definition of a steady state (balanced growth path)*

- *The motivation mentions several times the exchange rate adjustment mechanism. What is in the model the (real) exchange rate?*
  - *Using the final good it should be constant and equal to one*
  - *The authors seem to be referring to the relative marginal cost (domestic / foreign) for intermediate goods (as in Figure 6b)*

  This could be further clarified in the text, to improve upon the consistency between the story and the model

Main Mechanisms

A sudden stop triggers

- A decrease in demand for intermediate goods in domestic market

  ... also reducing factors' demand and factors' prices, hence marginal cost for domestic firms

- Firms respond by cutting innovation, as profits decline

  ... slowing-down productivity growth and the speed of the recovery

- Firms also switch innovation efforts towards export lines, where profits are higher

  ... partially mitigating the productivity slow-down

  ... and contributing to the trade balance improvement

- Notice that exports grow in the extensive margin (number of product lines), while imports fall -a lot- in the intensive margin (lower demand for each intermediate). *Is that right (Figure 9 in appendix)?*

Model Validation

Using data from Chile manufacturing survey, the authors show

- The calibrated model generates a distribution of firms across domestic and exports markets and across number of products consistent with data (partly due to calibration)
- The model generates a positive relation across firms between the existing number of products and the probability of introducing new product lines, as observed in the data

Remarks:

- *What is the data equivalent of a product line?*
- *Is there a replacement effect? (Table 8 appendix)*
- *Size vs number of products?*
- *Could the authors use additional firm-level data to proxy for productivity and innovation effort (R&D)?*

The Quantitative Experiment

Feed the model with ad-hoc negative productivity shock and interest rate increase (stylized sudden stop) and simulate response over time

- The model generates a slow recovery of TFP and output, a decline in innovation (larger for domestic innovation) and an improvement in the trade balance lead by the drop in imports

Remarks:

- *What is the data counterpart of these aggregate responses (Chile, 1998)?*
- *Why not filtering the shocks that produce exactly the drop in output and the increase in interest rates observed in this episode?*

The Quantitative Experiment

The data also shows for the sudden stop episode (Chile, 1998)

- A drop in the probability of adding <u>new products</u>, more so in the domestic market

- An increase in revenues and profits for exporters relative to non-exporters ... more so for industries with higher <u>financial dependence</u>

  These are two key predictions of the model consistent with the data!

Remarks:
- *Not so convinced with the financial dependence exercise (working capital constraint in the model applies to final good, not to intermediates)*
- *More transitions, measuring intensive vs extensive margin (appendix 7)*
- *Again, it would be great to see link to innovation spending and productivity outcome in data*

Counterfactual Experiments

Finally, the authors perform in the model a counterfactual experiment with <u>no-change</u> in innovation due to sudden stop

- Large amplification effect on productivity (and welfare) losses of <u>domestic</u> innovation

- Smaller attenuation effect on productivity (and welfare) losses of <u>export</u> innovation

Remark: Other possible counterfactuals
- *No collateral constraint (to quantify Fisherian deflation mechanism)*
- *Constant factor prices (to quantify exchange rate mechanism)*

To Conclude

Very nice paper

- Provides a clear contribution to the literature

- Gets a lot of things right

- May discuss (and dig deeper into) the things that it doesn't get so right
  … as a way to signal a path for future research

Thanks a lot for the opportunity to read it