Sticky Prices, Endogenous Export Participation, and Real Exchange Rate Fluctuations

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Discussion by Fabio Ghironi

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1’ Summary

- Very interesting paper.

- Lie combines elements of the Ghironi-Melitz (2005) model (heterogeneous productivity, fixed export costs) with new assumptions (*random* fixed export costs and sticky prices) to study the role of the extensive margin of trade in real exchange rate fluctuations in response to money supply shocks.

- Lie’s model generates endogenous entry into export markets in response to shocks and the result that, on average, exporters are larger and more productive than non exporters.

- The assumption of random fixed costs allows the model to reproduce the evidence that the probability of exporting increases with firm productivity without precluding export by low productivity firms.

- The extensive margin of trade contributes positively to real exchange rate volatility under producer currency pricing, but it reduces volatility under local currency pricing.

- This result is driven by changes in the relative availability of traded variety in response to shocks under different assumptions about pricing behavior.

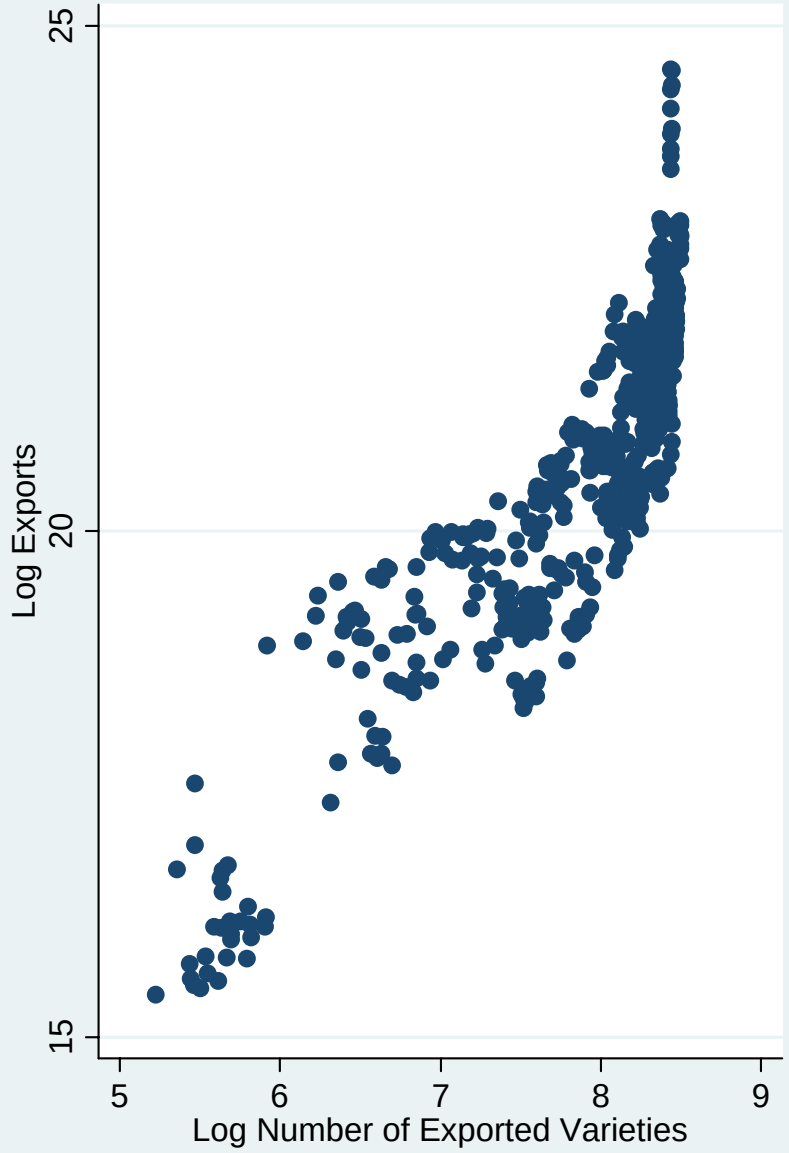
The Extensive Margin of Trade

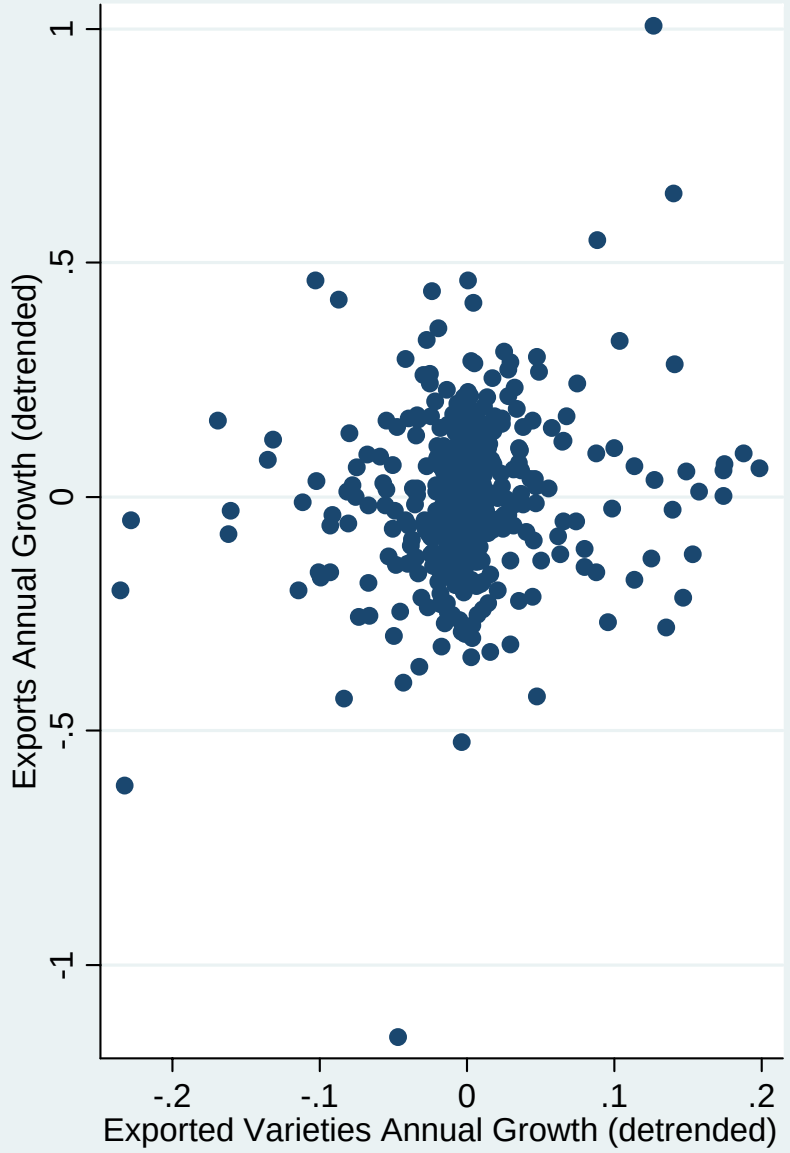
- Empirical evidence: When trade flows vary, either across countries or within a country over time, so does the number of goods embodied in those trade flows (as well as the number of firms engaging in those international transactions).

- The next two figures show the relationship between the number of traded varieties and aggregate trade flows for both exports (and exported varieties) and imports (and imported varieties) for a large sample of countries over the years 1994-2003.
  - Source: Broda, Greenfield, and Weinstein (2006), courtesy of C. Broda.

- The left-hand side panel portrays the full panel relationship between varieties and trade (both expressed in logs), while the right-hand side panel focuses on the within-country growth variation:
  - For each country, the year to year growth rate (log difference) is expressed as a deviation from the country-level mean growth rate (and thus is purged of any country-level secular growth trend).
    - The left-hand side panel for exports clearly illustrates that the number of exported varieties is censored at a maximum level for the largest exporters.

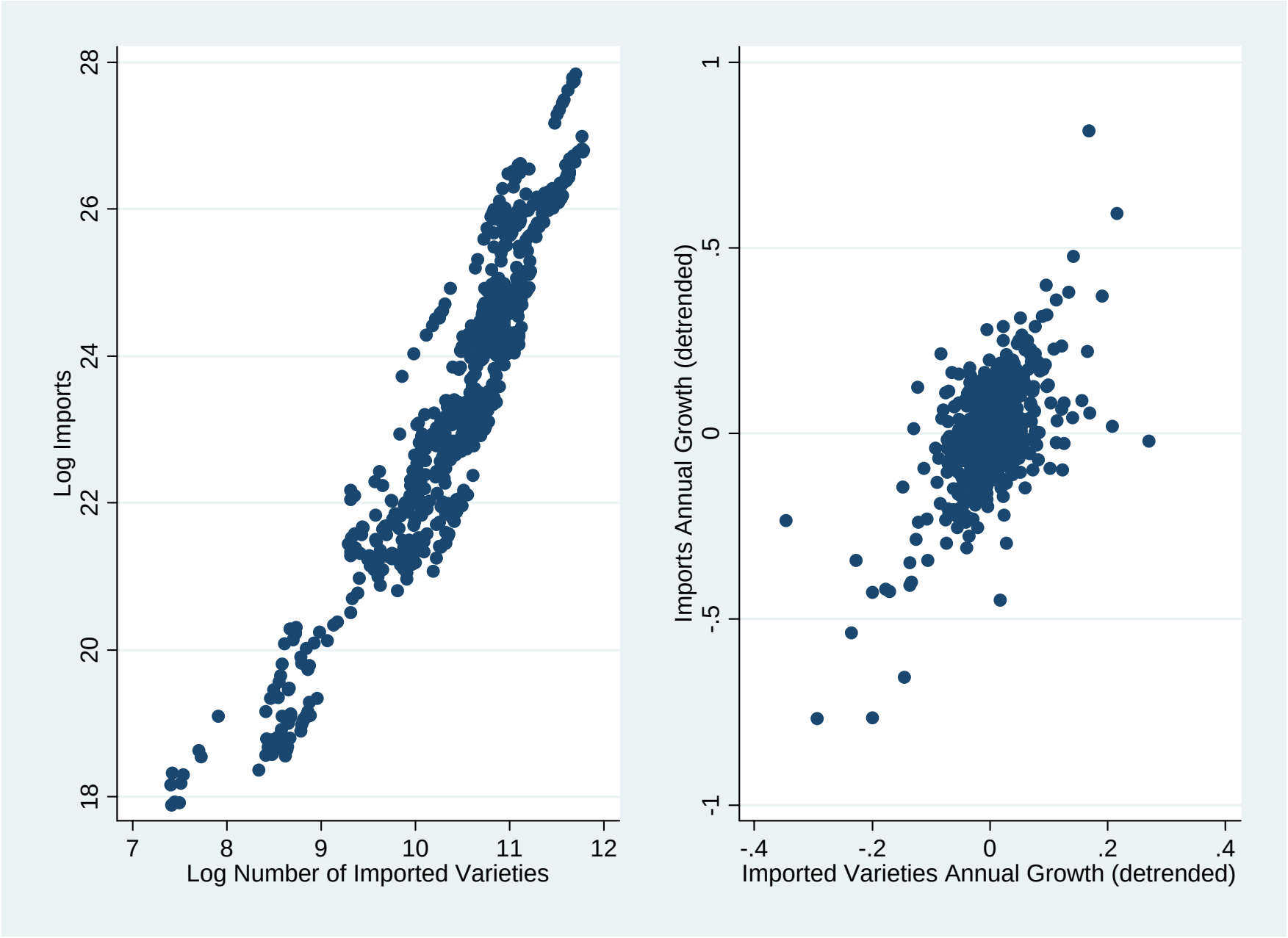
Evidence on the Extensive Margin of Exports





Source: Broda, Greenfield & Weinstein (2006)

Evidence on the Extensive Margin of Imports



Source: Broda, Greenfield & Weinstein (2006)

The Extensive Margin of Trade, Continued

- The figures document the comovement between trade flows and the extensive margin of trade, both across countries and within countries over time.

- They complement evidence from other studies:

  – Bernard and Jensen (2004) show that 38 percent of U.S. export increase between 1987 and 1992 was driven by entry of new exporters.

  – Bernard and Jensen (2001) study a panel of U.S. manufacturing plants between 1987-1997 and find that roughly 13 percent of plants switch their export status in any given year.

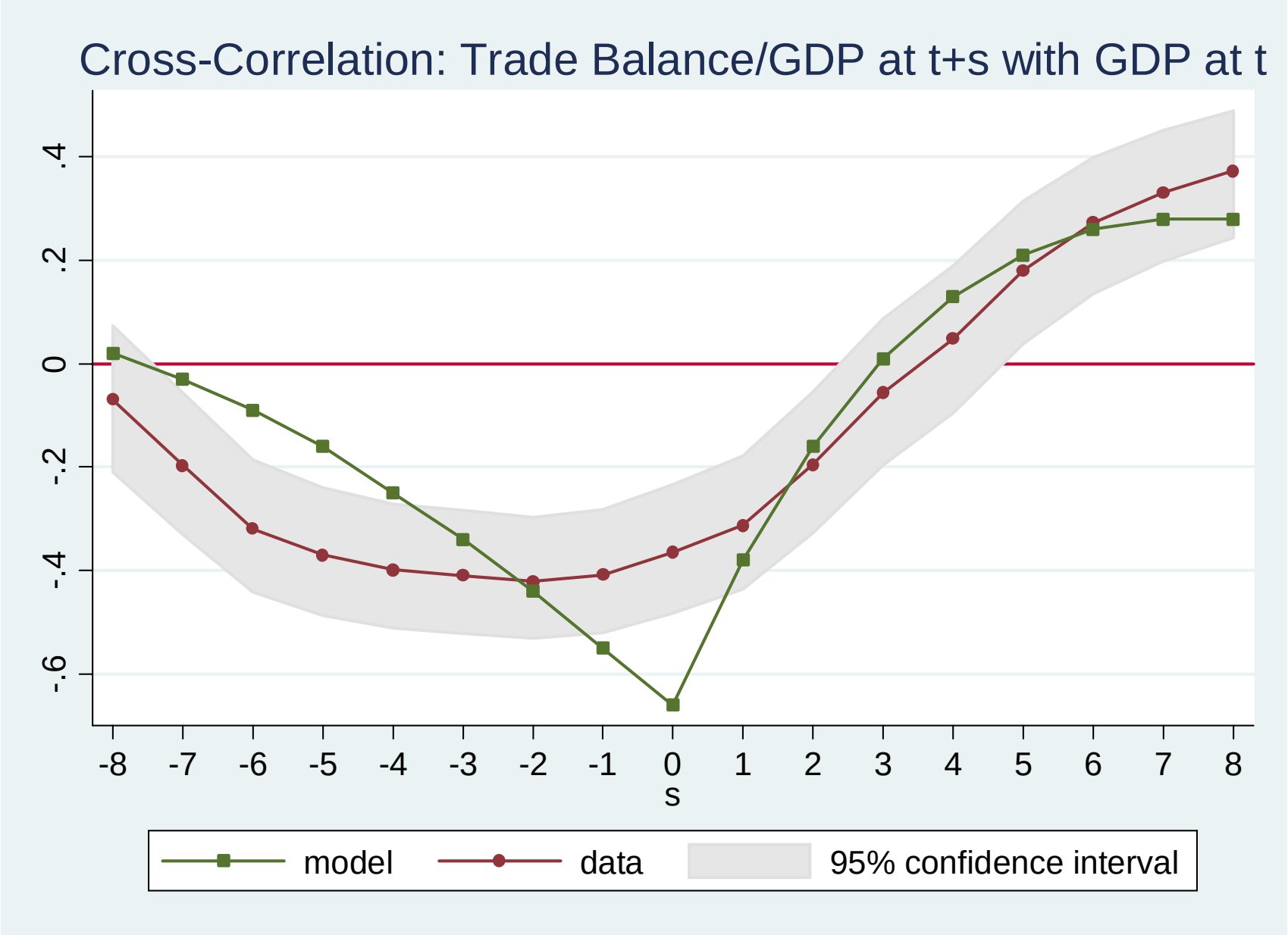
- In addition, Bernard, Eaton, Jensen, and Kortum (2003) show that, on average, only 21 percent of U.S. manufacturing plants export, i.e., a large fraction of the tradable sector is actually not traded on average.

- Thus, there is much support for the key mechanisms in Lie's model.

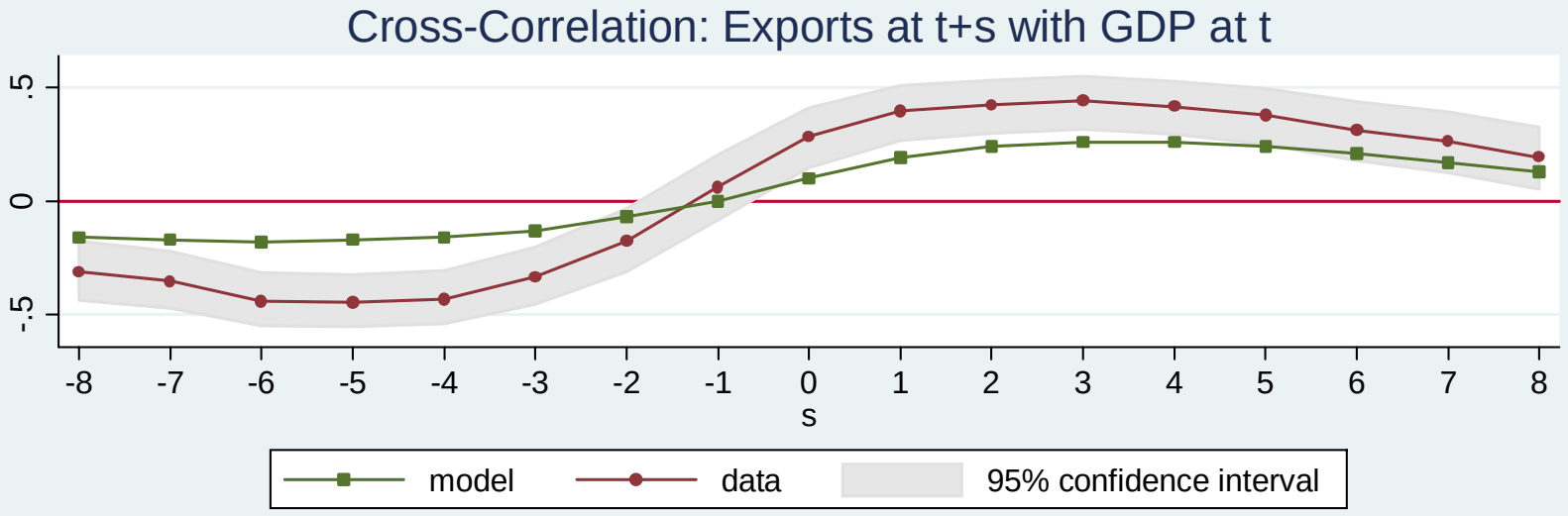
The Cyclicality of Trade

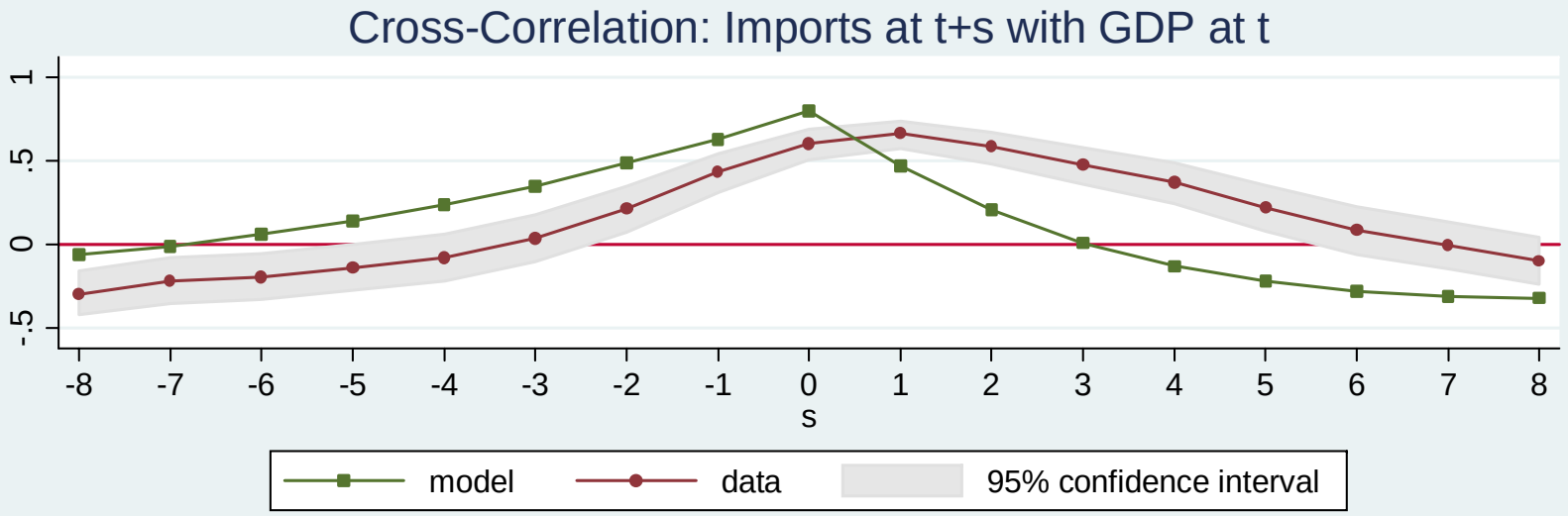
- The next figures illustrate the cyclicality of U.S. trade and variety and the performance of the Ghironi-Melitz (2005) model at replicating it.
  - Source: Ghironi and Melitz (2007).
- Several facts emerge:
  - The correlation between trade balance and GDP at various leads and lags exhibits the familiar S-shaped pattern highlighted by Backus, Kehoe, and Kydland (1994).
  - This pattern is due to an S-shaped pattern for exports, combined with a tent-shaped pattern for imports.
  - The contemporaneous correlation between the number of U.S. establishments and GDP is positive.
  - The correlation between the number of exported varieties and GDP is mildly tent-shaped, with positive contemporaneous correlation.
  - The correlation between the number of imported varieties and GDP is mildly S-shaped, with zero contemporaneous correlation.
- Based on a calibration that was not picked to replicate any of these facts, the model does surprisingly well – imported variety is the only clear failure.

Trade Flows and Product Variety Over the Business Cycle



Trade Flows and Product Variety Over the Business Cycle





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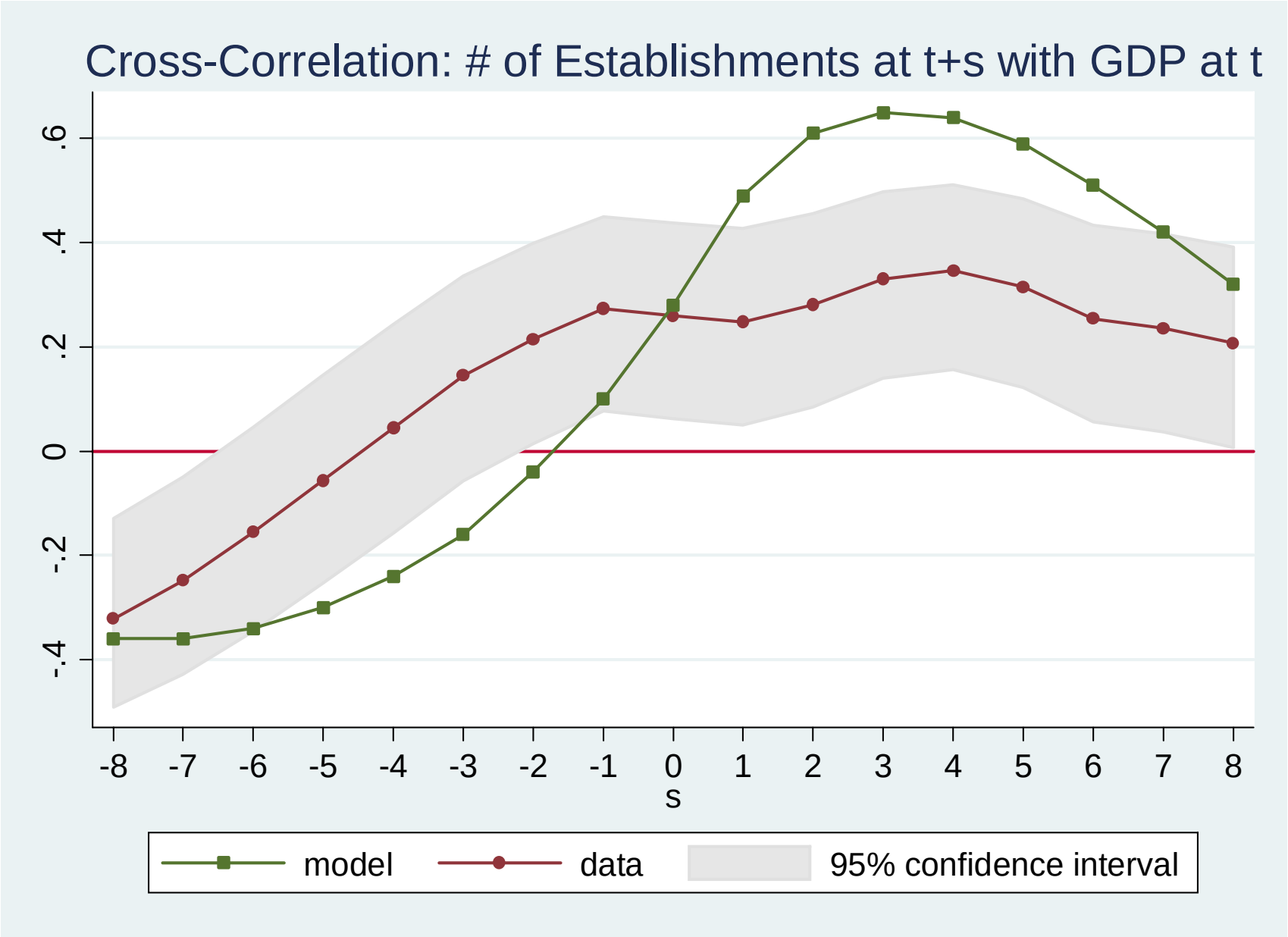

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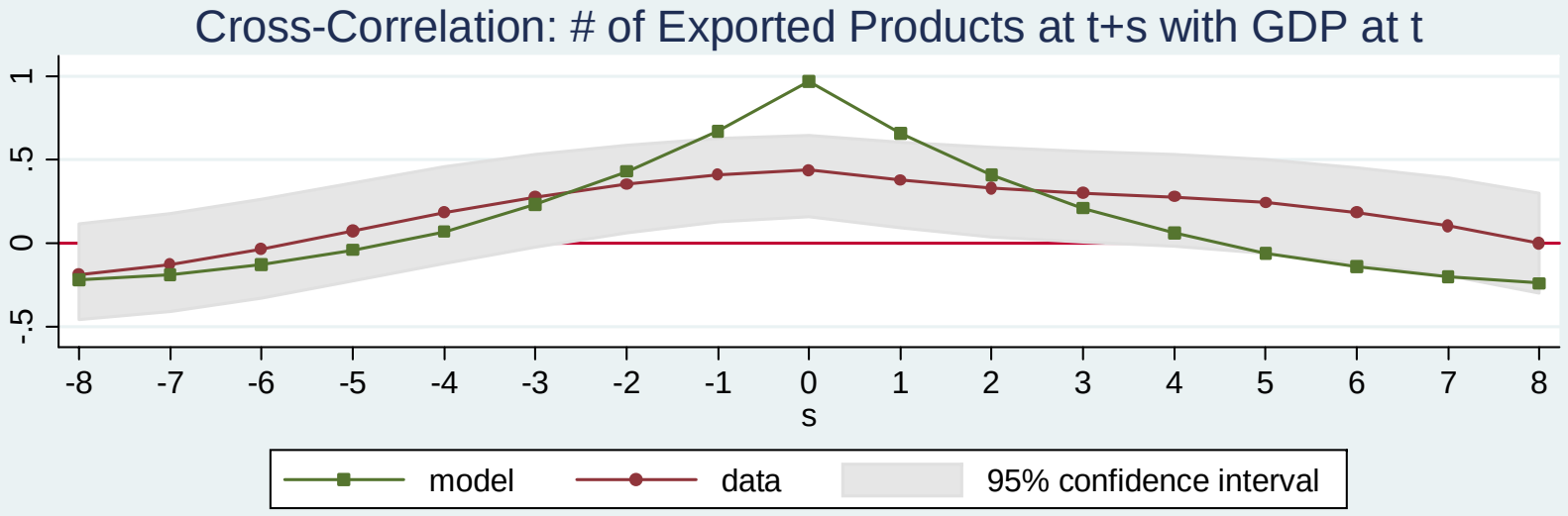

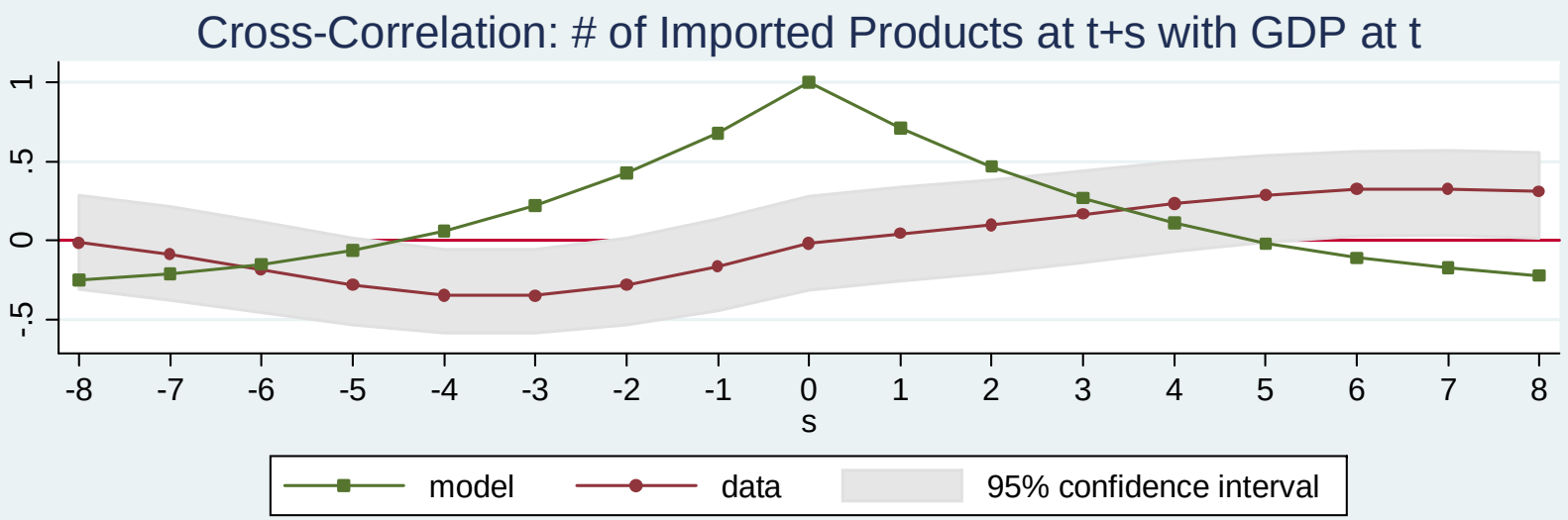

Intuition: The Role of Domestic Market Entry

- The Ghironi-Melitz model features entry into domestic markets, subject to sunk costs and risk of "death," in addition to entry into export markets by relatively more productive exporters.
- A favorable productivity shock in the home country induces increased entry and a gradual expansion in the number of home producers.
  - This is the capital stock of the economy, and it does not respond on impact.
- At the time of the shock, home households spread their increased income between home and imported products:
- Imports increase immediately, and so does the number of imported products.
- Over time, the number of home producers rises, and so does the number of home exporters.
- Even if exports of each individual product decline over time, due to pressure on prices from higher domestic labor costs, total home exports rise.
- This delivers the S-shaped pattern of gross trade flows which, in turn, generates the S-shaped pattern of net trade.

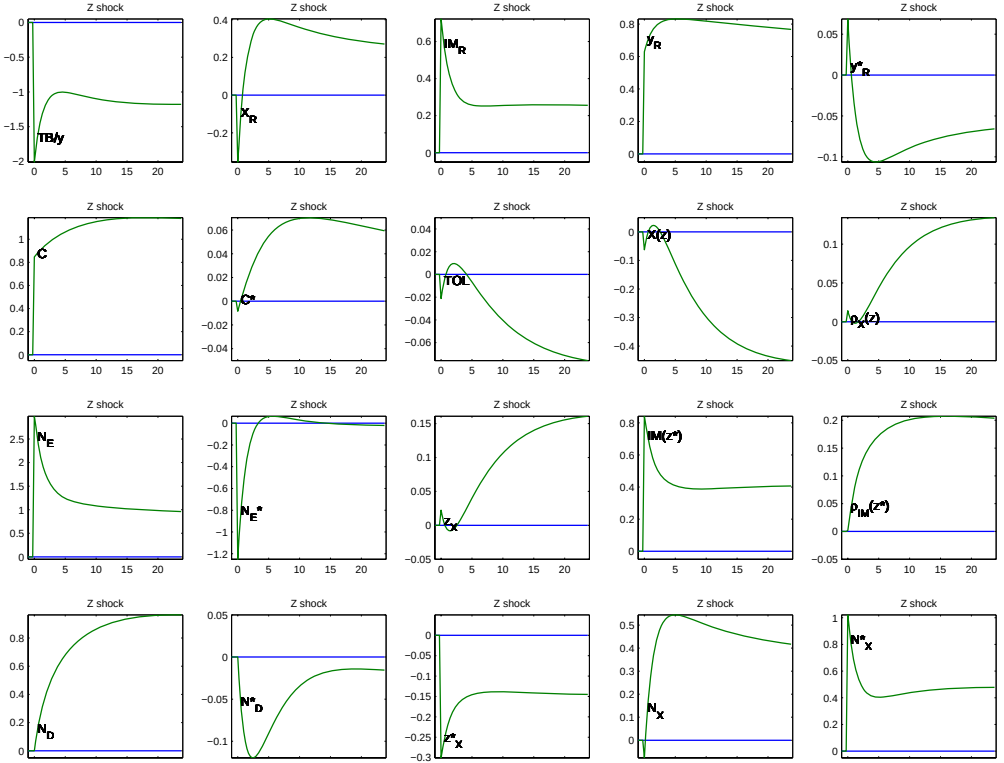

Figure 5. Impulse Responses

Domestic Market Entry

- Domestic market entry is crucial for the results of the Ghironi-Melitz model.
  - It is also consistent with allowing for entry in an environment in which monopoly profits exist and with evidence in favor of the relevance of business creation and endogenous product variety over the business cycle.
    - Bernard, Redding, and Schott (2006) document that approximately $\pm$30% of U.S. manufacturing output originates in product addition/destruction over the length we typically associate to a business cycle.
    - See also the data and cycle correlations on business creation (incorporations – failures in the U.S.) in Bilbiie, Ghironi, and Melitz (2007).
- But domestic market entry is absent from Lie's model.
- This is the first extension that I would encourage Lie to pursue for his model to be able to replicate stylized facts on the cyclicality of trade and variety.
- It may also help him address what I see as a relatively odd result – that the number of home exported varieties falls in response to an expansionary monetary policy shock.

Monetary Policy Shocks and the Cyclicality of Variety and Trade

- The correlations above suggest that the correlation between the number of exported varieties and GDP is positive (contemporaneous and number of exporters with GDP at 2 leads and lags).

- Ideally, we would like a business cycle model with endogenous variety to generate GDP expansion and expansion in exports and exported varieties in response to a monetary policy expansion, while Lie's model generates a reduction in the number of exported varieties throughout the transition.

- I expect that having increased domestic entry in response to monetary expansion would induce the number of exported products to expand gradually and solve this issue.

Monetary Policy Shocks and the Cyclicality of Entry

- Bergin and Corsetti (2005) and Lewis (2006) document evidence of positive response of (domestic) entry to monetary policy expansion.
- Bergin and Corsetti (2005), Lewis (2006), and Elkhoury and Mancini Griffoli (2006) all develop (closed economy) models that generate this.
- Lewis (2006) and Elkhoury and Mancini Griffoli (2006) are the closest to Ghironi-Melitz in terms of modeling strategy, building on Bilbiie, Ghironi, and Melitz (2007) (closed economy version of Ghironi-Melitz without heterogenous productivity, BGM below).
- But Lewis (2006) and Elkhoury and Mancini Griffoli (2006) introduce nominal stickiness in wages or entry costs rather than prices.
- What about sticky prices and entry?

Monetary Policy Shocks and the Cyclicality of Entry, Continued

- Bilbiie, Ghironi, and Melitz (2008) introduce sticky prices in BGM (using Rotemberg, 1982, adjustment costs) and study the consequences of monetary policy shocks.
- Monetary policy is conducted by setting the interest rate, so exogenous shocks are exogenous changes in the interest rate (and other shocks).
- The entry mechanism is the same as in Ghironi-Melitz, with the entry cost requiring hiring labor.
- Monetary expansion causes entry to fall in this framework.
- Intuition:
  - The shock causes a countercyclical response of the markup and procyclical response of the real wage.
  - The latter causes the cost of business creation to rise, thus inducing the drop in producer entry.
- But the problem is easily solved by assuming that entry costs require purchases of the consumption basket rather than labor.
  - In this case, monetary expansion results in increased entry.

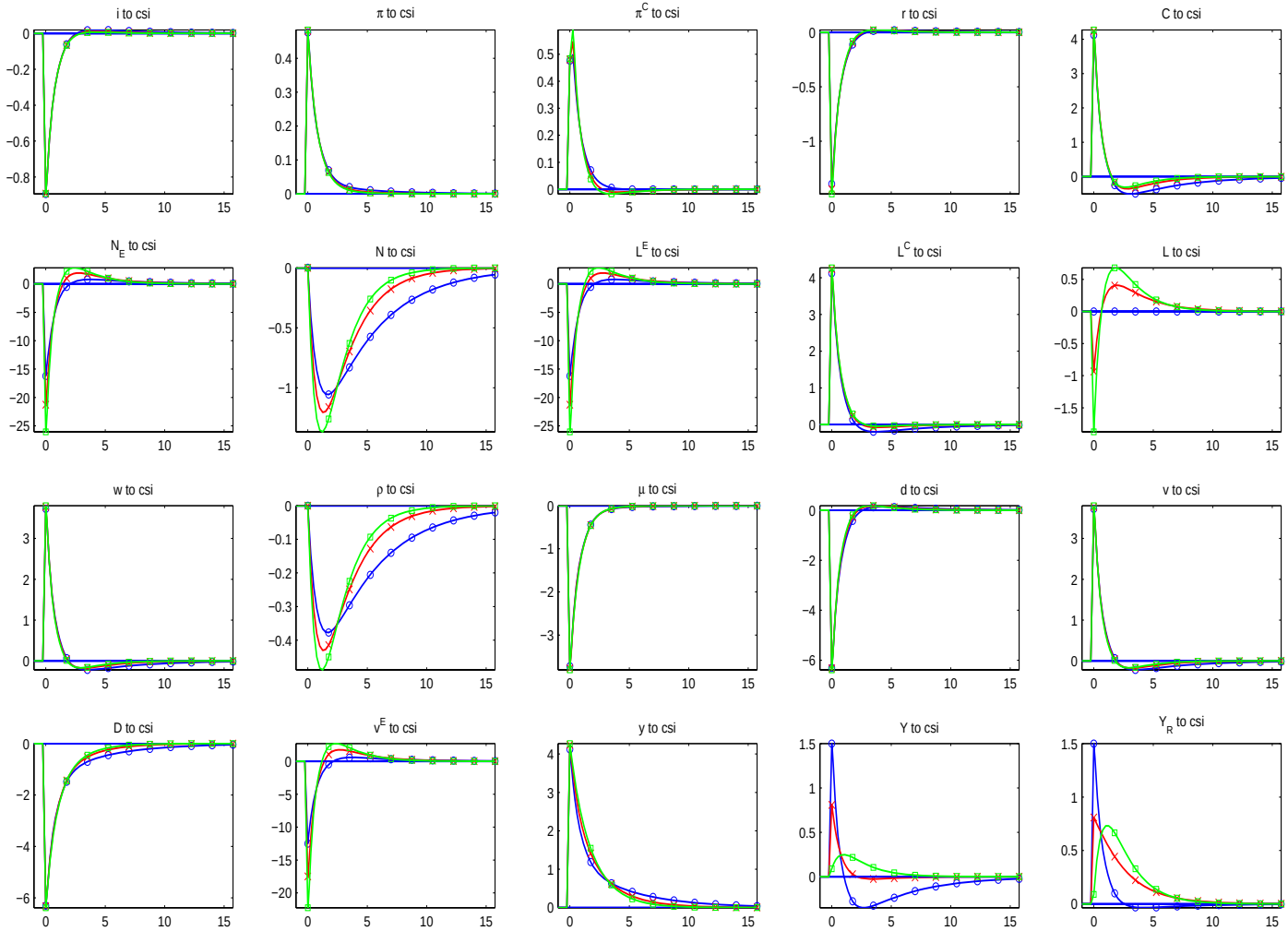

Figure 3. Impulse Responses: Interest Rate Shock, Persistence 0*

*Round markers (blue): Inelastic labor; Cross markers (red): Labor supply elasticity = 2; Square markers (green): Labor supply elasticity = 4.

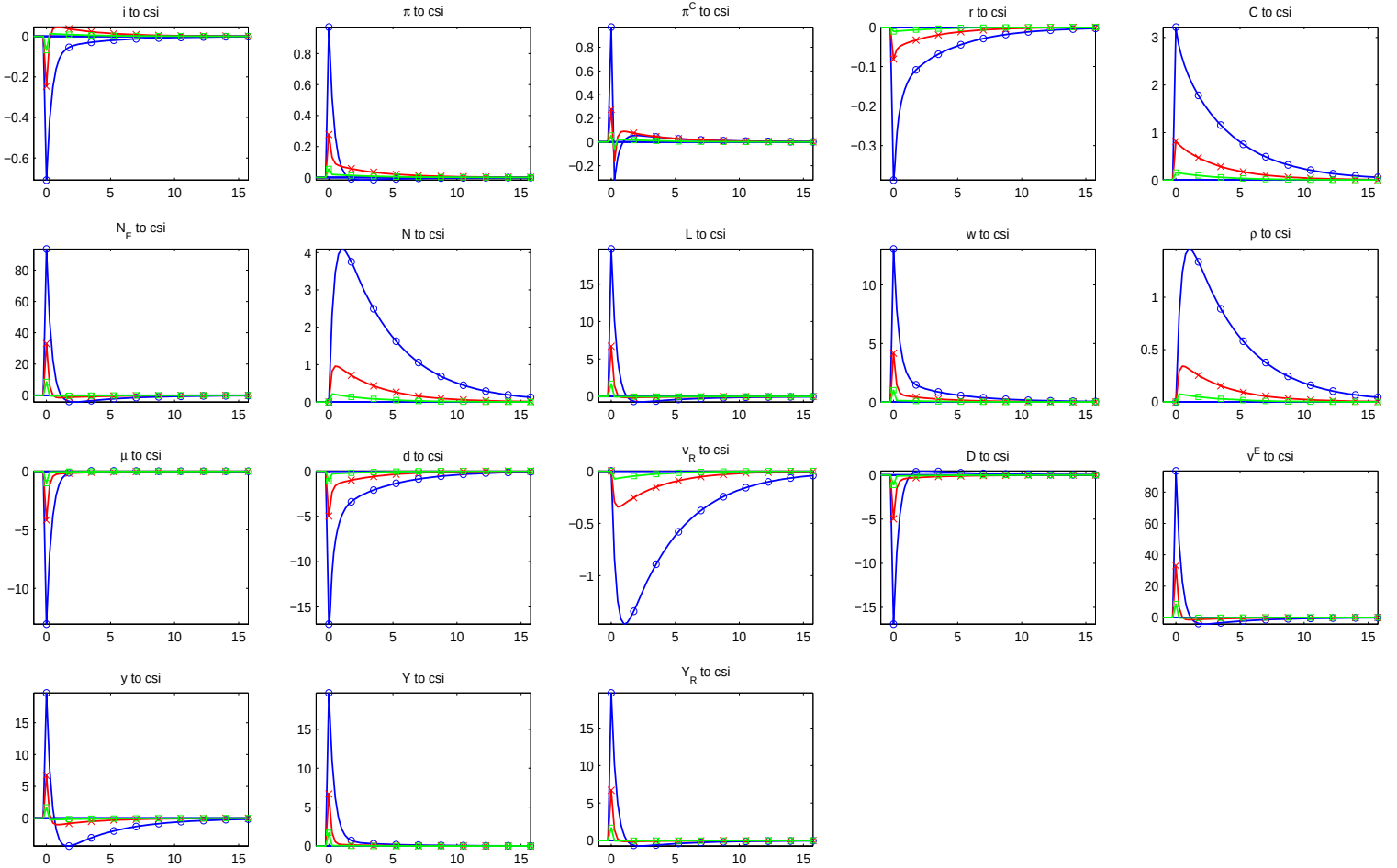

Figure 5. Impulse Responses: Interest Rate Shock, Persistence 0, Entry Cost in Units of Consumption*

*Round markers (blue): $i_t = .8i_{t-1}+.3\pi_t$; Cross markers (red): $i_t = .8i_{t-1}+.3\pi_t+.1Y_{R,t}$; Square markers (green): $i_t = 1.5\pi_t+.5Y_{R,t}$.

Monetary Policy Shocks and the Cyclicality of Entry, Continued

- The Ghironi-Melitz and Lie models assume entry costs (domestic in GM and export entry in both papers) in terms of labor.

- My hunch is that a sticky-price version of GM with entry costs in units of consumption would generate the desired properties.

- Lie could verify this hunch by considering a version of his model with domestic entry, subject to sunk costs, and entry costs in units of consumption.

Other Comments

Variety and the Real Exchange Rate – An Expositional Comment

- Lie successfully focuses on an equation for relative exported variety as a function of the consumption differential and the real exchange rate as the main tool for interpreting his results.

- The equation follows from log-linearization of the expressions for exported variety as function of export probabilities.

- I wonder if it would be helpful to complement this with the real exchange rate equation implied by the price index expressions, which Melitz and I found particularly helpful to explain the mechanisms at work in our model (and the crucial role of domestic market entry for our results on real exchange rate dynamics).

Other Comments, Continued

Monetary Policy and the Sources of Cycles

- Following a time-honored tradition, Lie assumes exogenous monetary policy as the sole source of fluctuations.

- But the literature of the past 15 years has highlighted the role of endogenous monetary policy as propagation mechanism for other shocks rather than exogenous monetary policy shocks as the source of the cycle.

- I would encourage Lie to pursue also this extension.

Other Comments, Continued

Optimal Monetary Policy

- Moving away from monetary policy as the source of exogenous shocks will lead naturally to the question of optimal monetary policy, which will also be fascinating to explore in this type of models.

- A 1990 *JIE* article by Basevi, Delbono, and Denicolo' is the only paper I am aware of that studies the interdependence between monetary and trade policies in open economies, although in a non-microfounded model.

- This is a very important topic: Europe's choice to adopt a single currency was largely driven by the interdependence between monetary policy and the Single Market (i.e., trade policy).

- The class of models that Melitz, Lie, and I have been working on naturally lends itself to re-examining these issues in the context of dynamic, microfounded, general equilibrium analysis, as trade costs can be naturally thought of as (at least partly) reflecting changes in trade policy instruments.

- Exploring these topics has been on my agenda with Melitz for a long time.

- I encourage also Lie to think also about these issues.

Conclusions

- I finish where I started: A very interesting paper!
- It was fun to read it and learn from it.
- It was even more fun to think about the many promising directions in which Lie can take his research.
- I look forward to seeing more of his work!