Discussion of "The Real Exchange Rate, Innovation and Productivity: A Cross-Country Firm-Level Analysis" by Alfaro, Cunat, Fadinger, and Liu

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Overview

1. Provide "stylized facts," from regressions on huge data set, about the relation between RER and productivity, sales, cash flow, R&D, and export entry; and between cash flows and R&D
2. Construct a structural model of small open economies with exchange rates, R&D and borrowing constraints. The model is capturing the stylized facts uncovered.
3. Estimate (most of the parameters in) the structural model using Simulated Method of Moments (SMM).
4. Use the model for counterfactuals.

Reduced Form Analysis I

1. Large scale reduced form estimations using
   - ➢ Orbis database of balance sheets for firms (large and small, 70 developing, 20 developed countries)
   - ➢ Worldbase firm-level export/import status (match names to Orbis—algorithm)
   - ➢ World bank entry/exit into/from exporting (country-level)
   - ➢ OECD innovation score-board (country-level)
2. Fantastic dataset

Reduced Form Analysis II

1. Estimate TFP by state-of-the-art methods
2. Estimate effect of RER on TFP (etc.)
3. Many econometric issues:
4. Endogeneity of RER. Authors claim issue is less because of firm-level regressions. But
5. A regression of firm level observations on country (sector,...) regressors is a country-level regression. Consider demeaned y_i (i is firm) and demeaned x_c (c is country) and look at OLS-estimator:

$$\hat{\beta} = \frac{\sum_i y_i x_c}{\sum_i x_c^2} = \frac{\sum_c \sum_{i \in c} y_i x_c}{\sum_c \sum_{i \in c} x_c^2} = \frac{\sum_c y_c x_c}{\sum_c n_c x_c^2}$$

where n_c is number of firms in country.

Reduced Form Analysis III

1. Authors attempt "IV" (exogenous approx of RER)
   - ➢ Trade weighted world commodity prices (make sense for commodity exporters, but then does the regressions capture RER or relative prices)?
   - ➢ "RER exogenous because of autonomous component driving change in nominal rate" — true at the relevant horizon for R&D? Jars with model?
   - ➢ World financial flows $\times$ presample financial openness (Bartik-type instrument, but there seem to be a problem with direction—flows in or out?)
   - ➢ Sector specific RER from commodity prices and sector-country weights (country-time fixed effects).
2. A lot more information about the constructed exchange rates, fit (added-value plots), etc. would be good.

Reduced Form Analysis IV

1. Which controls to use? GDP (endogenous to RER) absorbs (part of) effect? Lower bound? If RER truly exogenous shocks, better with no controls
2. Hard to evaluate w/o more descrip stats (corr matrix)
3. "Winsorize at 5% and dropping"? Winsorize or truncate (drop). 5% very high. Kurtosis before after? Robust?
4. Regression on R&D cash flows. Surely cash flows are endogenous? Show only results with firm fixed effects.
5. Interactions: 0.015*cash flow-0.00004*(cash flow*credit/GDP). Credit to GDP is order around unity, so the interaction term has zero economic effect (or are the data scaled? Show descriptive)

Model. Briefly.

1. Structural quantitative model of small open economies (price takers)
2. Heterogenous firms decide whether to invest in R&D.
   R&D $\rightarrow$ increases FTP with a lag (no lag in regressions?)
   Constrained by credit.
3. Also random TFP shocks to firms
4. Exchange rate in model moved by exogenous shocks to numeraire good
   - ➢ Shocks to exchange rate/numeraire good is AR(1)
5. The core of the model is that a depreciation increases profits (=cash flows in model) and eases credit constraints

Model. Calibration/Estimation.

1. Authors "choose reasonable values for elasticity of demand and interest rate"
   - ➢ Does it makes sense to *estimate* structural model if central parameter "chosen"?
   - ➢ Real interest rate of 15% in emerging East Asia (data?) and 5% for industrialized economies. How sensitive are results to this?

Simulated Method of Moments Estimation I

1. Parameters minimize distance between moments calculated from model and data moments
2. Very few details given. More moments than parameters—weighting matrix?
3. AR(1) estimation of RER. No country dummies?
4. Standard errors (not done yet). Monte Carlo?

Simulated Model Estimation II

1. The fit of the model maybe not capturing RER effects very much. Only one moment involving RER in the SMM.
   - ➢ Include more moments involving RER.
   - ➢ Include more "non-mean" moments in general. "Mean" moments likely not the most efficient, correlation between firm profit and R&D would get at the core assumption of model.
   - ➢ How well can model match moments? (Not interesting when #mom $\approx$ #param, no d.f. $\Rightarrow$ perfect fit)

Simulated Model Estimation III

1. Maybe run the reduced form regression on the simulated data and the estimated parameters and compare to your reduced form regressions (tying the paper together)?
   - ➢ You could evaluate the robustness of reduced form regressions assuming the fitted model is true. For example, does the inclusion of GDP make exchange rate insignificant even if it is by design important?

Counterfactuals

1. Large unexpected devaluation
   - ➢ Large pos. effect for exporters (East Asia). Small negative effect of importers (other developing). No effect for advanced contries.
   - ➢ Could you look at out-of-sample "factual" such as U.S. "Volker" appreciation in early 1980s?
2. Decompose into effect from demand versus looser credit constraints
   - ➢ Very interesting: looser constraints explains 82% in East Asia and 60% for other developing.
   - ➢ Can help fine tune the model. Is there evidence that credit constraints are important in East Asia? China?

Overall

- Fantastic data
- Great approach: reduced form, model, SMM, counterfactual
- But, a lot more details and care with IV and SMM would improve the draft a lot
  - ➢ Might make reduced form regressions a separate paper
  - ➢ Currently, it is not too clear what is gained from SMM compared to calibration, no measures of fit, testing for overidentifying restrictions, confidence intervals, etc.
  - ➢ Or make it reeaaaly long and send it to Econometrica.
- Ambitious paper. Not quite WOW! yet. Likely to get there.