Discussion of Balistreri, Hillberry, and Rutherford (2007): “Structural Estimation and Solution of International Trade Models with Heterogeneous Firms”

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Overview and contributions

- Structural estimation of a multi-region Melitz model with heterogeneous firm industries

Propose a solution method for computing the world trading equilibrium:

- **PE module**: Solve for industry equilibrium taking general equilibrium variables (aggregate incomes, factor prices) as given
- **GE module**: Solve for general equilibrium taking industry equilibrium variables (average industry productivity, prices, measure of firms) as given

Iterate between PE and GE modules until convergence.

Calibration strategy: Pin down some parameters based on the literature. Estimate the remaining structural parameters ($\theta$, $a$, fixed costs of exporting) by NLLS to fit bilateral manufacturing trade flows in the GTAP database.
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Overview and contributions (cont.)

- **Implementation**: Relatively aggregate observational units
  - 9 regions (CHN, NAF, LAM, EUR, EER, JKT, ROA, ANZ, ROW)
  - 7 sectors (only aggregate manufacturing with firm heterogeneity)
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- **Counterfactuals**: Reduction of ad valorem tariff barriers versus fixed cost barriers to trade in manufactures
  - Welfare gains much larger (4 times) with reduction of fixed costs of trade
  - Complementarity of reducing both fixed and variable trade costs
  - Interesting point: Biggest gainers appear to be developing regions as opposed to developed regions (presumably because of higher initial barriers)
General comments

▶ An important research agenda: Quantifying the welfare gains from trade liberalization in a setting with heterogeneous firms.

Theoretical set-up is a natural extension of Melitz (2003)

▶ Numerical computation of general equilibrium is conceptually neat.

Facilitated by neat aggregation in the Melitz model

▶ Plausible that gains from reducing fixed exporting costs are larger given relatively low level of recorded tariff barriers in GTAP (9.3%)

Consistent with prior evidence that the extensive margin (number of exporting firms) matters more than the intensive margin (exports per firm) in accounting for the magnitude of trade flows (Eg Eaton, Kortum and Kramarz (2004))
Specification choices

- Fixed costs: \( f_{rs} = f_r^p + f_s^x + f_{rs}^r \)

\( f_{rs}^r \) computed as a residual to fit bilateral trade exactly.
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- Does this parsimonious specification provide a good fit to the data?

Would like to see plots of predicted trade flows when setting \( f_{rs}^r = 0 \) against actual trade flows.

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- For eg: \( f_{rs}^r \) much larger in magnitude for EER and ROW (Table 5), so a lot more residual variance in trade flows unexplained for these regions.

  Is it all due to fixed exporting costs, or is there something else systematically different about these regions?
Specification choices (cont.)

- One possibility: Differences in technological capabilities
  Minimum productivity in Pareto distribution: $b$ could be allowed to vary by exporting country (ie $b_r$)
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Two side points:

- Presentation of fixed cost barriers: prefer if convert to monetary units ($f_{rs}c_r$ instead of $f_{rs}$).

- Some parameters already calibrated. Why not also calibrate $\theta$ and $a$ from the literature, and leave only the fixed cost parameters to estimation?
Specification choices (cont.)

▶ Aggregation of regions: A limitation, as authors acknowledge.

May be the reason for the low distance elasticity obtained ($\theta = 0.139$), when both $\theta$ and $a$ are estimated as free parameters.
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▶ Problems with working with individual countries:
  ▶ Could run into computational time issues
  ▶ The problem of zeros could emerge

When trying to fit a zero, could end up with a lower bound instead of true value of fixed cost parameters.
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- Less keen on disaggregating sectors: Would have to worry about how parameters such as fixed costs might differ systematically across sectors.
Additional exercises

A petri dish with a lot of variables to look at.

- Decomposing the trade expansion to compute how much is explained by growth on the extensive margin vs the intensive margin.

- Can unilateral reduction of barriers to trade actually worsen welfare for that country?
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  - Sensitivity of the welfare results to heterogeneity parameter (vary $a$)
  - Comparison with Lai-Trefler (2002), Lai-Zhu (2004): $a \to \infty$ and $f_{rs} \to 0$
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  - Would like to see welfare gains in a hypothetical zero-gravity exercise (reducing $\tau_{rs}(1 + t_{rs})$ to 1, and $f_{rs} \to 0$)

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Minor comments

1. Mention non-convexities: Natural question is uniqueness. Experimenting with different initial values in the algorithm should ease this concern.

2. A little more description of the variables taken from GTAP