A Theory of Entry into and Exit from Export Markets

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Introduction

- This is our nightmare paper!

Facts

- Significant hurdles in accessing the foreign market (e.g. Das et al. 2007).
- Large heterogeneity in export performance given entry (e.g. Eaton et al. 2008, Amador & Opromolla 2013).
- Firms' trade status is very persistent (e.g. Bernard & Jensen 2004a).
- Firms start and stop exporting at different productivity levels (Bernard & Jensen 2004b).
- Firm size distribution is Pareto in the upper tail (Axtell 2001).
- So it is the sales distribution of exporters (Eaton et al. 2011).
- Presence of "small" exporters (Arkolakis 2010).

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Theoretical Contribution

- A continuous time general equilibrium model of trade with heterogeneous firms, capable of explaining the above facts.

- In a nutshell: Melitz (2003) + Luttmer (2007).

- Crucial ingredients:

    - Idiosyncratic firm efficiency shocks.
    - Sunk export entry cost.

- Implications:

    - Firm dynamics (in the domestic and export market).
    - Uncertainty concerning the export market:

        - Difference between overhead (ongoing, per-period) and sunk (one time) export entry costs.
        - Hysteresis in export market participation → Firms start exporting once they achieve a size, reflecting their efficiency, but may keep exporting even after their efficiency has fallen below its entry level (band of inaction).

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The Option Value of Waiting

Example based on Dixit (1989)

- Exporting (or resuming to) requires an upfront sunk cost k and a per-period cost w.

- Let ρ be the rate of interest.

- Suppose that latent export profits currently are $w + \rho k$ (i.e. equal to the annualized full cost of starting and continuing to export).

- From next period on, profits can take equal steps up or down with equal probabilities (random walk).

- If a firm starts exporting today and continues forever its expected present value net of the investment cost is zero.

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Example based on Dixit (1989)

- Suppose instead that the firm waits one period.
    - If profits have gone up then the firm can start exporting and get positive expected present value.
    - If profits have gone down the firm needs not to invest and gets zero.
    - Overall, the expected present value of waiting is positive.

- At some profits level $\bar{\pi} > w + \rho k$ it is optimal to start exporting at once. Similarly, at some $\underline{\pi} < w$ it is optimal to stop exporting.

- The interval $[\underline{\pi}, \bar{\pi}]$ is a band of inaction.

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Our Model

- Melitz (2003).
- (Log) Efficiencies evolve, i.i.d across firms, according to

$$z_a = \bar{z} \exp\left(\mu a + \xi W_a\right)$$

  - $\bar{z}$ initial efficiency (can be generalized).
  - a age of the firm.
  - W_a a standard Brownian motion (continuous time equivalent of a random walk).

- Two types of export fixed costs.

  - Sunk: to be paid upfront every time a firm (re)starts exporting.
  - Overhead (ongoing, per-period): to be paid every period by an exporter.

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The Entry (and Exit) Problem of the Firm

- Dixit's example suggests that
  - a nonexporter will begin exporting when efficiency is high enough (z_H);
  - an exporter will stop exporting when efficiency is low enough (z_L);
  - a firm shuts down when efficiency is even lower (z_D).
- The three cutoffs $z_D < z_L < z_H$ are simultaneously and endogenously determined.
- Free entry pins down the cash flow level.
- Model closed through labor and goods market clearing.

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- It can be decomposed in two: one for exporters and one for nonexporters.

- Both the overall efficiency density and the one for exporters are Pareto in the upper tail...

- ....No matter what the entrants' efficiency density is.

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Equilibrium Efficiency Densities

Calibration to U.S. data

- Brownian motion parameters (efficiency trend and volatility): average growth rate of employment (U.S. Census 2004) and tail index of the firm size distribution (Luttmer 2007).
- Sunk cost to create a firm: regulatory entry cost as a % of GDP (Djankov et al. 2002)
- Domestic overhead cost: average death rate of small firms (U.S. Census 2004)
- Export overhead cost and sunk export entry cost:
  - share of stopping exporters (Bernard & Jensen 2004)
  - share of exporters (Bernard et al. 2003)
- Other parameters: standard (see paper)

Empirical Results

- A large band of inaction: exiting exporters lose about 29 percent of the efficiency they had at entry.
- The share of exporters that keep exporting is 87%.
- An estimate of the export sunk cost: $476,726 (1992 dollars). In the ballpark of Das et al. (2007).
- Trade liberalization via a reduction in
    1. sunk export costs reduces hysteresis,
    2. while the opposite happens through a reduction in overhead export costs.

Lower Sunk Cost
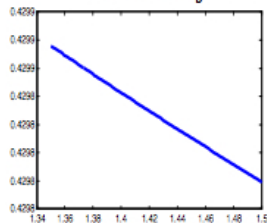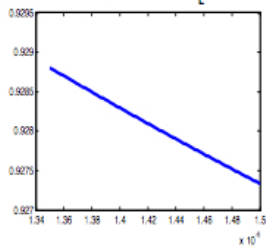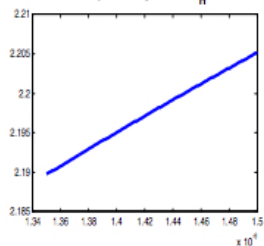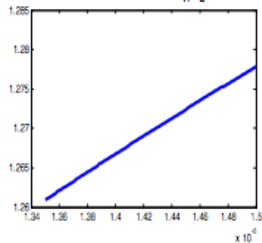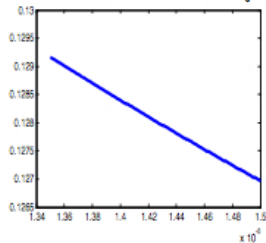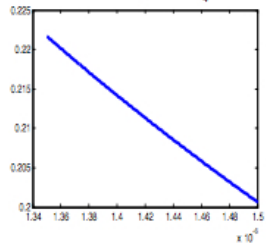
Lower Overhead Cost
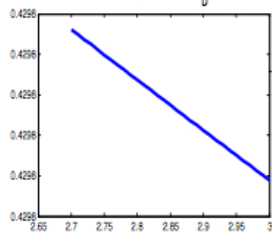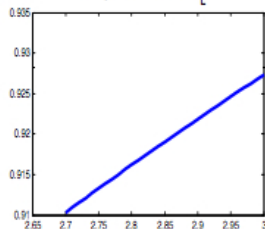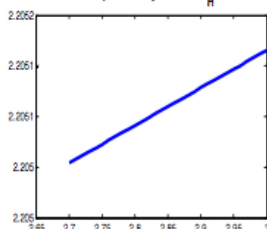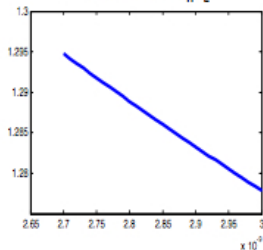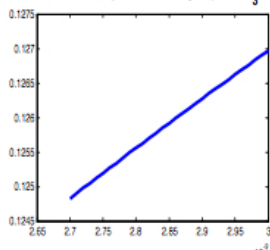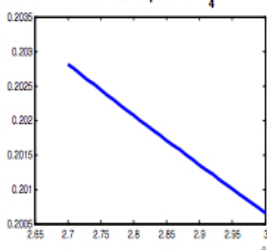
Conclusions etc.

- A general equilibrium model of trade with heterogeneous firms, capable of explaining a number of facts about firm dynamics in domestic and export markets.
- A number of extension in ongoing research (e.g. multiple asymmetric countries).