International Trade: David and Goliath
Trade under oligopolistic competition in the presence of a monopolistically competitive fringe

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Motivation

- Export and import flows are driven by a small group of happy-few, long-lasting, large firms.
  - 1% of French exporters account for 60% of total exports
  - 3.3% of French firms account for more than half of import flows.
- Same “dichotomy” observed in the US, in Belgium, France, Germany and China...


- Holds for services: Crozet Milet Mirza (2011)
This paper

Tackles heterogeneity from a different angle:

- The happy few, superstar firms impact directly competition toughness
- They make net positive profits at equilibrium
- Small firms behave non-strategically, they compete monopolistically
- Differences in firm behavior provides a “natural” explanation to firm differences in pricing.
- The distribution of the gains from trade under a mixed market structure depart from either pure monopolistic competition / pure oligopoly.
Literature

- Monopolistic Competition (Melitz 2003; MO 2008; MMO 2011; Antoniadès 2008; Kugler Verhoogen 2010; BRS 2009, 2010; Bustos 2011, Bas 2012)
  - *all* firms are negligible to the market: “Price-index takers”
  - have the same pricing behavior
- (Necessary) ingredients
  1. Horizontal differentiation
  2. Chamberlin’s “Large-group assumption”: Strategic interactions are second-order terms (Yang-Heijdra, 1993)
  3. Free-entry
Literature

- Trade under oligopoly
  - G.O.L.E., Neary.P: “Large in the small but small in the large”

- Mixed market structures:
  - Neary (2010)
  - Shimomura Thisse (2012) : Presumption against the entry of very large firms may be not warranted
Roadmap

- Closed Economy
- Free trade
- Bilateral trade liberalization (symmetric countries)
A (parsimonious) model

- One homogeneous good, one differentiated good and one factor of production: labor.
- Love for variety and endogeneous elasticity of demand.
- An endogeneous mass $[0, M]$ of SP (single-product).
- Exogeneous number $\Omega$ of MP (multi-product) firms that behave strategically.
  - More specifically: $\Omega$ firms have the *ability* to become big
  - The Multi-product feature allows firms to choose how they weight in the economy.
- Simultaneous game: Cournot-Nash competition.
- Emphasize behavioural differences: rule out productivity heterogeneity.
Preferences

Continuum quasi linear quadratic utility function (Bowley, 1924; Dixit, 1979; OTT, 2002)

\[ U(A, x) = A + U(x) \]

where

\[ U(x) = \int \left( \alpha x_{\nu} d\nu - \frac{\beta}{2} x_{\nu}^2 \right) d\nu - \frac{\gamma}{2} \left( \int x_{\nu} d\nu \right)^2 \]

with

\[ \int_{\nu} x_{\nu} d\nu = \sum_{\omega=1}^{\Omega} \int_{0}^{N_\omega} x_{\omega k} dk + \int_{0}^{M} x_i di \]

\[ X = X_o + X_m \]

One-to-one relation between \( X \) and average price \( \mathbb{E}[p] \)
Preferences

- Budget constraint

\[ A + \int_0^\gamma p_\nu x_\nu \, d\nu \leq R := 1 + \frac{1}{L} \sum_{\omega=1}^\Omega \Pi_\omega + \frac{1}{L} \int_0^M \pi_i \, di \] (1)

- The Hicksian composite good A absorbs any income effect (partial equilibrium)

- 2 important features:
  - Price-elasticity of demand increases with price
  - One-dimension aggregate statistic X
Production

- Downward-sloping demand curve
  \[ p(x, X) = \alpha - \beta x - \gamma X \]

- Firms maximize their operational profits:
  \[ \pi_m = (p(x_i, X) - c)Lx_i \quad \Pi_\omega = \int_0^{N_\omega} (p(x_\omega, X) - c) Lx_{\omega k} dk \]

- MP-firm “true” demand curve:
  \[ p(x, X) = \alpha - \beta x - \gamma \left( \int_0^{N_\omega} x_{\omega k} dk \right) - \gamma X_{-\omega} \]

\( N_\omega \) is endogeneous
Cross-section comparisons (given $X$)

Output:

$Q_\omega := N_\omega q_\omega$

$Q^*_\omega(X) = L \frac{N_\omega (\alpha - c - \gamma X)}{2\beta + \gamma N_\omega}$ with density $q^*_\omega(X) = L \frac{\alpha - c - \gamma X}{2\beta + \gamma N_\omega}$

$Q_m := M q_m$

$Q^*_m(X) = L \frac{M (\alpha - c - \gamma X)}{2\beta}$

- MP-firm profits are a concave function of $N_\omega$
- Impact of demand linkages: $\gamma = 0 : \frac{Q^*_m(X)}{M} = \frac{Q^*_\omega(X)}{N_\omega}$
Big and small firms

- From an aggregative-game perspective $p_i(x_i, X)$
- Two kinds of market power
  \[ \frac{p - c}{p} = E_{x_i}(p) + E_{x_i}(X)E_X(p) \]
- Monopolistic Competition
  \[ \frac{p - c}{p} = E_{x_i}(p) + 0 \]
- Cournot oligopoly
  \[ \frac{p - c}{p} = 0 + E_{x_i}(X)E_X(p) \]
Cross-section comparisons (given $X$)

Markups:

$$p_m - c = \frac{1}{2}(\alpha - \gamma X - c)$$

$$p^*_\omega - c = \frac{1}{2}(\alpha + \frac{\gamma}{L} Q^*_\omega - \gamma X - c) \quad \text{with} \quad Q_\omega = N_\omega q_\omega$$

Controlling for productivity, firm size is positively correlated with firms’ markups.

- Different from the heterogeneous quality interpretation
- Elasticity of demand is a function of a firm’s market share
- Internalize consumers’ love of variety to charge higher prices.
- Firm pass-through decreases with firm size (Berman Martin Mayer 2011)
Cross-section comparisons (given $X^*$)

- Absolute and relative markups charged by MP-firms increase with $N_\omega$
- MP-firms charge higher markups than SP-firms
- This difference in their pricing relies only on the difference in nature of firms
Optimal choice of $N_\omega$

- Cost function:

$$C(q_m) = f_p + f \quad C(q_\omega) = \int_0^{N_\omega} (c \cdot q_{\omega k} + f_{p\omega} + 1_{k=0} f) \, dk$$

- Rule out within MP-firm heterogeneity: $f_{p\omega} = f_p$

- MP-firms face a trade-off between cannibalization and economies of scope:

$$\Pi_\omega(N_\omega) = \int_0^{N_\omega} (c \cdot q_{\omega k} + f_p + 1_{k=0} f) \, dk$$
Market Outcome under free entry

- $M^*$ endogenously determined by free entry.
- Solve for the conditions of coexistence.

The effect of an increase in $\Omega$ on market outcome.
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Conditions for a mixed market structure

Figure: Evolution of the market structure according to \((f, \Omega)\)
f=0; David, Goliath and free-riding

- *Ceteris paribus*, MP-firms choose to be negligible.
- Common demand shifter(s)
- Analogy: merger paradox
f > 0; Comparative statics

Under a mixed-market structure an increase in $\Omega$ does not change MP-firms’ profits (resp. prices and product scopes)
Decompose short and long run effects for intuition.
   ▶ Pro-competitive effect in the short run
   ▶ Selection among SP-firms
   ▶ Demand shift (inter-firm reallocation of resources)

Emphasize the importance of entry and exit flows. Small firms act as a buffer (heterogeneous SP-firms).

Under a mixed-market structure an increase in $\Omega$ increases the overall number of varieties.
Welfare and market structure

Welfare:

\[ U(R, \mathcal{V}, \mathbb{E}[p], \mathbb{V}[p]) = R + \frac{1}{2} \left[ \frac{(\alpha - \mathbb{E}[p])^2}{\eta + \frac{\gamma}{\mathbb{V}}} \right] + \frac{1}{2} \frac{\mathcal{V}}{\gamma} \mathbb{V}[p] \]

When \( \Omega \uparrow \):

- \( \mathcal{V} \) increases

- New varieties are sold with a higher markup:
  \( \mathbb{E}[p] \uparrow \) (composition effect)

- \( \mathbb{V}[p] \) decreases as the majority of varieties are provided by MP-firms.
Welfare and market structure

Consumer surplus $U - R$ decreases unambiguously

- Opposite effects of within-firm and across-firm extensive margins.
- A new variety means more competition (entry of a new firm) or more market power (increase in incumbent’s market share).
- Producer’s surplus increases.
- Social welfare increases.

Do consumers gain from trade liberalization?

- Free trade
- Costly trade
Free Trade

- Market size and the number of MP firms increase by a factor $k$ (number of trading partners)
- Equilibrium mass of the competitive fringe:

$$M^* = \frac{2\gamma}{\eta k} \left[ F(kL) - \left(1 - \sqrt{\frac{f_p}{f + f_p}}\right) k\Omega \right]$$

- Benchmark: $\Omega = 0$ (Krugman 1979)
Free trade

Figure: The effects of openness on the across-firm extensive margin under free trade
Free trade

- Free trade adds a new effect on welfare: pro-competitive effect.
- The monopolistically competitive fringe is more aggressive (economies of scale).
- Consumer surplus increases.
Costly trade with variable and fixed costs

- At the margin, big firms incur $f_p$, small firms incur $f + f_p$. Only MP firms find it profitable to export.
- Intra-firm reallocation in the short-run: MP firms drop some products on the domestic market but export new varieties (BRS 2010, EIJN 2010)
- Comparative statics in the long-run:
  - Selection effect: SP firms exit. Leads to pure oligopoly.
  - fob price is lower than domestic price (dumping).
  - MP firms increase their markup as trade costs decrease. Average price increases.
- Prices do not depend on $\tau$.

*The intensification of competition through import penetration falls only on small firms.*
Trade liberalization:

- leads to the exit of SP firms
- Increases $\mathcal{V}$ (new imported products), average price, total income.

$$U(R, \mathcal{V}, \mathbb{E}[p], \mathbb{V}[p])$$

- Monotonic decrease (increase) in consumer (firm) surplus with a fall in trade costs.
- Departs from pure oligopoly/monopolistic competition.
Trade liberalization and market structure

Figure: Evolution of market structure with trade liberalization
Discussion: market power versus efficiency

- In a model with negligible firms, more profitable firms have always lower prices/higher quality.
- Productivity gains are always passed-on, to some extent, to consumers...
- .. through cheaper varieties (Melitz), less-substitutable varieties (Melitz-Ottaviano)
- Firms’ market power which stems from strategic interactions decreases consumer surplus.
- Consumers gain from trade liberalization only if large firms are significantly more productive
Conclusion

- Mixed market structure offers an alternative to take into account firm heterogeneity.
- Departs from the new new trade theory predictions on the distribution of the gains of trade.
- Concentration on the supply side withholds the gains from trade that could be passed-on to consumers.
- Limits:
  - small/non productive firms may still export
  - how does a firm become a superstar?
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- Thank you!