“Monopolistic competition and trade: does the theory carry any empirical ‘weight’?”

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Motivation

- Cho et al. (2002): in gravity-type model significance of income variable varied across sectors and sample of countries
- Feenstra et al. (2001): ‘home-market’ effect for differentiated goods, reverse ‘home-market’ effect for homogeneous goods
- Helpman (1987): volume of trade as share of GDP is larger, the more similar are income levels for sample of OECD countries
- Hummels and Levinsohn (1995): similar result for sample of non-OECD countries
- Identification problem: gravity model works well for differentiated and homogeneous goods (Evenett and Keller, 2002)
Outline

- Empirical phenomenon of intra-industry trade (IIT)
- Monopolistic competition and trade
- Resolution of contradiction in Helpman (1987)/Hummels and Levinsohn – theoretical foundations of gravity model
- Empirical strategies for testing the monopolistic competition story
- Possible application to food and agricultural trade
Empirical phenomenon of intra-industry trade

- Early work focused on measurement, Balassa (1965), Grubel and Lloyd (1975)
- Overlap in trade flows, i.e., Grubel and Lloyd index:

\[
GL^j = 1 - \frac{|X^j - M^j|}{(X^j + M^j)} \quad 0 \leq GL^j \leq 1
\]

- Problems: aggregation (Finger, 1975), static nature of index (Brülhart, 2000)
- Found in food industry trade data by McCorriston and Sheldon (1991), and Hirschberg et al. (1994)
Monopolistic competition and trade

- Observed IIT a key challenge to neoclassical orthodoxy (Leamer, 1992)

- Monopolistic competition has become standard model for rationalizing IIT

- Different models of monopolistic competition developed based on preference structure:

- General equilibrium model developed by Helpman and Krugman (1985)
Figure 1: Trade Equilibrium
Monopolistic competition and trade

- **Key empirical prediction**: share of IIT larger between countries that are similar in terms of factor endowments and relative size

- Helpman’s (1987) results support prediction using 4-digit SITC data for 14 OECD countries over period 1970-81:

\[
GL_{jk}^j = \alpha + \beta_1 \log \left( \frac{Y_j}{N_j} \right) - \left( \frac{Y_k}{N_k} \right) + \beta_2 \min(\log Y_j, \log Y_k) + \beta_3 \max(\log Y_j, \log Y_k) + \mu_{jk}, \quad \beta_1 < 0, \beta_2 > 0, \beta_3 < 0
\]

- Hummels and Levinsohn show results not robust when using country fixed-effects
Monopolistic competition and trade

- **Key empirical prediction**: volume of trade as share of GDP increases as countries become more similar in size – assuming structure of monopolistic competition

- Helpman’s (1987) results support prediction data for 14 OECD countries over period 1956-81:

\[
\frac{V_A}{Y_A} = e_A \left[ 1 - \sum_{j \in A} (e_j^i)^2 \right]
\]

- Hummels and Levinsohn found similar results for sample of 14 non-OECD countries over period 1962-77

- Debaere (2005) re-estimated (3) for 1970-89, confirming Helpman’s (1987) result for OECD sample, and finding a negative sign on income dispersion for non-OECD sample
Empirical evaluation of monopolistic competition story

- (3) is a form of gravity model – but it seems to fit trade in both differentiated and homogeneous goods
- Empirical issue becomes one of determining which theoretical model works best in a given data sample (Evenett and Keller, 1998; 2002)

- Evenett and Keller (2002) derive theoretical restrictions on country income parameters that form basis of hypothesis testing
- Feenstra et al. derive additional theoretical restrictions allowing broader test of trade theories
Empirical evaluation of monopolistic competition story

- Evenett and Keller tested 4 versions of the gravity model based on classifying 1985 4-digit SITC data for 58 countries into differentiated vs. homogeneous goods

- Perfect specialization:

  \[ M_{jk}^{v} = \alpha_{v} \frac{Y_{j}^{v}Y_{k}^{v}}{Y_{w}^{v}} + \mu_{jk}^{v}, \quad \alpha_{v} = 1 \]

Sample split into high and low IIT samples:

- high IIT sample, \( \alpha_{v} = 0.087 \)
- low IIT sample, \( \alpha_{v} = 0.052 \)

i.e., perfect specialization in either differentiated or homogeneous goods over-predicts bilateral trade
Empirical evaluation of monopolistic competition story

- Imperfect specialization with differentiated and homogeneous goods:

\[
M_{jk}^v = (1 - \psi_v^j) \frac{Y_v^j Y_v^k}{Y_w} + \mu_v^{jk}, \quad (1 - \psi_v^j) < 1
\]

Estimated for cases where \( j(k) \) is capital-abundant, median value of \( (1 - \psi_v^j) = 0.086 \)

- Imperfect specialization with homogeneous goods:

\[
M_{jk}^v = (\psi_v^j - \psi_v^k) \frac{Y_v^j Y_v^k}{Y_w} + \mu_v^{jk}, \quad (\psi_v^j - \psi_v^k) < 1
\]

Estimated for cases where \( j(k) \) is capital-abundant, median value of \( (\psi_v^j - \psi_v^k) = 0.04 \)
Empirical evaluation of monopolistic competition story


\begin{equation}
\ln M_{jk} = -\beta_0 Y^w + \beta_1 \ln Y^j + \beta_2 \ln Y^k
\end{equation}

- $\beta_1 > \beta_2$ monopolistic competition or ‘reciprocal dumping’ with entry (Brander and Krugman, 1983)
- $\beta_1 < \beta_2$ Armington (Head and Ries, 2001) or ‘reciprocal dumping’ with no entry
Empirical evaluation of monopolistic competition story

- (7) tested for complete sample of countries:
  - Differentiated goods, $\beta_1 = 1.09$ and $\beta_2 = 0.65$
  - Homogeneous goods, $\beta_1 = 0.51$ and $\beta_2 = 0.82$

- Results hold for sub-samples of countries, OECD and OPEC/non-OPEC

- Conclude that there is a ‘home-market’ effect in differentiated goods case (monopolistic competition) and reverse ‘home-market’ effect for homogeneous goods case (reciprocal dumping)

- “…theoretical foundations for gravity equation are actually quite general, but the empirical performance is quite specific…”
Application to food and agricultural trade

- With appropriate data and econometric methods, ought to be able to test which trade theory best explains bilateral food and agricultural trade

- Observed IIT differs substantially between commodities and processed foods, and by country (McCorriston and Sheldon)

- Rauch approach to classification is appealing

- Feenstra et al. model captures different theories, and Evenett and Keller (2002) approach can be nested by appropriate restrictions on $\beta_1$ and $\beta_2$