

“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:

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

- Problems: aggregation (Finger, 1975), static nature of index (Brühlhart, 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:**
 - **Krugman (1979;1980) → Dixit and Stiglitz (1977)**
 - **Helpman (1981) → Lancaster (1977)**
- **General equilibrium model developed by Helpman and Krugman (1985)**

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:

$$(2) \quad GL^{jk} = \alpha + \beta_1 \log \left[\frac{Y^j}{N^j} \right] - \left[\frac{Y^k}{N^k} \right] + \beta_2 \min(\log Y^j, \log Y^k) \\ + \beta_3 \max(\log Y^j, \log Y^k) + \mu^{jk}, \quad \beta_1 < 0, \beta_2 > 0, \beta_3 < 0$$

- 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:

$$(3) \quad \frac{V^A}{Y^A} = e_A \left[1 - \sum_{j \in A} (e_A^j)^2 \right]$$

- 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:

$$(4) \quad M_v^{jk} = \alpha_v \frac{Y_v^j Y_v^k}{Y_w} + \mu_v^{jk}, \quad \alpha_v = 1$$

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:

$$(5) \quad M_v^{jk} = (1 - \psi_v^j) \frac{Y_v^j Y_v^k}{Y^w} + \mu_v^{jk}, \quad (1 - \psi_v^j) < 1$$

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

- Imperfect specialization with homogeneous goods:

$$(6) \quad M_v^{jk} = (\psi_v^j - \psi_v^k) \frac{Y_v^j Y_v^k}{Y^w} + \mu_v^{jk}, \quad (\psi_v^j - \psi_v^k) < 1$$

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

- Feenstra *et al.* test for ‘home-market’ effect in 110 country data set for 1970, 1975, 1985, 1990, splitting 4-digit SITC data into differentiated and homogeneous goods based on Rauch (1999) classification

$$(7) \quad \ln M^{jk} = -\beta_0 Y^w + \beta_1 \ln Y^j + \beta_2 \ln Y^k$$

- $\beta_1 > \beta_2$ 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 β_1 and β_2