

How Does WTO/GATT Affect Extensive and Intensive Trade Margins? -A Panel Gravity Model

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The Purpose of This Study: Identify the channel (extensive or intensive trade margins) through which WTO/GATT promotes international bilateral trade.

INTRODUCTION

Recent empirical research highlights that the differences in trade flows across countries, products and years are governed by two margins: the intensive margin and the extensive margin.

Intensive Margin: measures rising trade volume from the previous traded products.

Extensive Margin: measures newly created trading products that were not traded before between the two countries.

If the trade between two counties experiences an increase, we can decompose trade volume into the two margins and see whether this increase comes from rising trade volume from the previous traded products (intensive margin) or from newly created trading products that were not traded before between the two countries (extensive margin).

THEORETICAL FRAMEWORK – An Extended Panel Gravity Model

Gravity Variables – GDP & Distance

$$VOT_{ij} = \alpha \frac{Y_i Y_j}{(d_{ij})^b}$$

- Gravity model first introduced by Tinbergen in 1962
- Bilateral trade volume is positively associated with GDP, and negatively correlated with the distance between the two trading countries (Helpman, 1987)

Other Trade Determinants:

- **Rose (2003):** common language, common border, landlocked country, island, land area, and common colonized indicator are all found to have significant impact on trade flow.
- **Hemkamon (2007):** ASEAN creates new trade. While the classic gravity variables remain significant on trade, Foreign Direct Investment (FDI) is also a complementary to trade.
- **Coughlin (2011):** the impact of the communications infrastructure in the importing country affects the extensive margin positively and the intensive margin negatively.

The Model:

$$\begin{aligned} EM_{ijt}(IM_{ijt}) \\ = \beta_0 + \beta_1 \ln Distance_{ij} + \beta_2 \ln(Y_i Y_j)_t + \beta_3 landlocked_{ij} + \beta_4 island_{ij} \\ + \beta_5 language_{ij} + \beta_6 border_{ij} + \beta_7 currency_{ijt} + \beta_8 WTO_{ijt} + \beta_9 GSP_{ijt} + \varepsilon_{ijt} \end{aligned}$$

- $EM_{ijt}(IM_{ijt})$: extensive (intensive) margin of exports from country i to country j at time t
- Distance: the distance between country i and country j
- Landlocked: the number of landlocked countries in the country-pair (0,1, or 2)
- Island: the number of island nations in the pair (0,1, or 2)
- Language: equals 1 if the two countries speak the same language border: a binary variable which is unity if i and j shares a land border
- currency: a binary variable which is 1 if i and j use the same currency at time t
- WTO: a dummy indicator which equals 1 if only one country in the pair is a WTO/GATT member
- GSP: a dummy variable which equals 1 if i is a GSP beneficiary of j or vice versa at t

DATA

Use United Nation Trade Flow data to derive EM and IM

- Bilateral trade data
- 4-digit SITC
- 1990-1999
- Follow Hummels & Klenow (2005)

The extensive margin of exports from county j to county m is constructed as

$$EM_{ni} = \frac{\sum_{j \in J^{ni}} X_{nj}^j}{\sum_{j \in J^{nW}} X_{nj}^j}$$

where W denotes the World, X_{nj}^j denotes the value of world exports of good j to country n, J^{ni} is the set of products where country i has strictly positive exports to country n, and J^{nW} is the set of products exported by the World as a whole to n. The extensive margin can be thought of as a weighted count of country i's categories relative to the world's categories. More generally, categories are weighted by their importance in the world's exports to n.

The intensive margin compares trade volumes in a common set of goods for country n and i. It is given by

$$IM_{ni} = \frac{\sum_{j \in J^{ni}} X_{nj}^j}{\sum_{j \in J^{ni}} X_{nj}^j}$$

where X_{nj}^j is the value of exports from country i to country n of good j. The intensive margin equals i's nominal exports relative to world's nominal exports in those categories in which i exports to n (J^{ni}). Thus, it measures the overall market share country i has within the set of categories in which it exports to n.

$$0 < EM_{ni}(IM_{ni}) < 1$$

Table.1 Summary Statistics

Variable	Mean	Std. Dev.	Min	Max	Obs
EM	0.258	0.265	0.00001	0.99998	20000
IM	0.111	0.149	0.00003	1	20000

A Mix of Econometric Techniques

- OLS
- Fixed Effect Model
- Random Effect Model

RESULTS

Extensive Margin Equation

- WTO/GATT has a significant positive effect on EM in RE and FE models
- GSP increases EM in OLS and RE models

Intensive Margin Equation

- WTO/GATT has no significant effect on IM in RE and FE models
- GSP increases IM in OLS and RE models

Table.2 Results for Extensive Margin Equation

	OLS	FE	RE
Log(DISTANCE)	-0.144*** (0.00202)	.	-0.123*** (0.00614)
Log(GDP)	0.080*** (0.00065)	0.0105*** (0.00125)	0.0314*** (0.00108)
LANDLOCKED	-0.0082* (0.00362)	.	-0.0561*** (0.0109)
ISLAND	0.0728*** (0.00273)	.	0.0450*** (0.00827)
CURRENCY	0.5032*** (0.0589)	.	0.553** (0.180)
WTO/GATT	-0.0356*** (0.00348)	0.0304*** (0.00286)	0.0256*** (0.00285)
GSP	0.0725*** (0.00272)	-0.0116 (0.0260)	0.0640*** (0.00793)
Year Dummies	YES	YES	YES
N	20000	20000	20000
R-sq	0.509	0.139	

Table.3 Results for Intensive Margin Equation

	OLS	FE	RE
Log(DISTANCE)	0.0051*** (0.0016)	.	0.00273 (0.00409)
Log(GDP)	-0.0131*** (0.0005)	0.00433* (0.00172)	-0.00693*** (0.00105)
LANDLOCKED	0.0307*** (0.0028)	.	0.0375*** (0.00730)
ISLAND	0.0242*** (0.0021)	.	0.0274*** (0.00551)
WTO/GATT	0.0210*** (0.0027)	-0.00122 (0.00394)	0.00434 (0.00351)
GSP	0.0259*** (0.0021)	-0.0301 (0.0357)	0.0247*** (0.00545)
Year Dummies	YES	YES	YES
N	20000	20000	20000
R-sq	0.086	0.030	

CONCLUSIONS

In this paper, I use an extended Gravity model with a panel dataset. Extensive and intensive margins are calculated from the United Nation Trade Flow data from 1990 to 1999.

WTO/GATT promotes international bilateral trade only through extensive margin, which is by creation of new trading varieties. The WTO/GATT membership increases extensive margin by 0.0304, when we consider within variation only. On the other hand, it has no significant impact on intensive margin.

Consistent with Rose (2003), GSP is an important driver of bilateral international trade. When we consider both between and within variations, GSP increases extensive and intensive margins by 0.064 and 0.025, respectively. That is to say, GSP creates both new varieties and higher volume of "old" varieties.