

Market Access and GATT/WTO: An Indirect Empirical Assessment

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Outline

1 Introduction

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- 2 Theoretical Model

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- 3 Empirical Analysis

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Motivation



- What are the costs of crossing an international border?

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- How do we measure them?
Direct costs? or indirect costs?
- What can we learn from an indirect empirical assessment?

What factors influence the height of trade costs?

Measurable costs	Costs difficult to measure
transportation(geography)	home preferences
tariffs	cultural differences
quotas	information barriers
variable levies	trade facilitation issues
	time spent in transit
	product standards

Literature Review

- McCallum(1995): Canadian provinces 22 times more likely to trade with each other than with a US state.
- Anderson& Van Wincoop
 - 2003: Re-estimated McCallum's model and found \Rightarrow border effect=10(still large)
 - 2004: Surveyed trade costs and found that they are large \Rightarrow 170% ad valorem equivalents
 - "Direct measures are remarkably sparse and inaccurate."
- Novy(2009)—a method to impute over all trade costs indirectly,
 - U.S. trade costs with partners declined by 40% on average (1970 – 2000).

Key Concept

- **Border Effect**(or height of trade costs):
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- **Gravity Equation**
 - Widely accepted model in international economics.

$$x_{ijt} = f(GDP_{it}, GDP_{jt}, t_{ijt})$$

Summary of Findings

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- Ag. is affected by a much higher border effect relative to manufactures.
- Membership in WTO and RTAs reduces the border effect in nontrivial ways.
- Tariffs are a relatively small component of the border effect: even in agriculture.

What We Did



- Assemble industry level trade flow and production data at ISIC 3-digit categories.

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- Impute border effect for two industries: agriculture and manufactures.
- Identify econometrically whether, observable trade policies influence border effect.

An Indirect empirical assessment

- Using Anderson and van Wincoop's gravity equation with trade cost:

$$x_{ij} = \frac{y_i y_j}{y^W} \left(\frac{t_{ij}}{\Pi_i P_j} \right)^{1-\sigma} \quad (1)$$

Notation	
x_{ij}	bilateral trade volume
$y_i & y_j$ y^W	GDP of country i & j the world
t_{ij}	trade cost
Π_i, P_j	multilateral price terms
σ	elasticity of substitution

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- For domestic trade:

$$x_{ii} = \frac{y_i y_i}{y^W} \left(\frac{t_{ii}}{\Pi_i P_i} \right)^{1-\sigma} \quad (2)$$

- Multiply x_{ij} by x_{ji}

$$x_{ij}x_{ji} = \left(\frac{y_i y_j}{y^W}\right)^2 \left(\frac{t_{ij} t_{ji}}{\Pi_i P_i \Pi_j P_j}\right)^{1-\sigma} \quad (3)$$

-

$$\tau_{ij} = \left(\frac{t_{ij} t_{ji}}{t_{ii} t_{jj}}\right)^{\frac{1}{2}} - 1 = \left(\frac{x_{ii} x_{jj}}{x_{ij} x_{ji}}\right)^{\frac{1}{2(\sigma-1)}} - 1 \quad (4)$$

where τ_{ijt} denotes the border effect of between i and j .

Explaining the border effect

- Baseline Model

$$\tau_{ijt} = (gdp_i * gdp_j)^{\beta_1} dist_{ij}^{\beta_2} e^{\beta_3 tt + \lambda_m Z_{mt}}$$

-

$$\ln(\tau_{ijt}) = \beta_1 \ln(gdp_i * gdp_j) + \beta_2 \ln(dist_{ij}) + \beta_3 tt + \lambda_m Z_{mt} + \varepsilon_{ijt}$$

Data Source

- Trade, Production and Protection(TPP) database by Alessandro Nicita and Marcelo Olarreaga at World Bank¹
 - industry level trade data over the period 1976-2004.
 - bilateral tariff data since 1992.
 - MACMAPS tariff data used when TPP is incomplete or missing.
- Recent versions of the UNIDO database with OECD STAN data for OECD members.
- Gravity variables from CEPII research center²

¹http://siteresources.worldbank.org/INTRES/Resources/469232-1107449512766/Nicita-Ollarreaga_TPP_DATABASE.pdf

²All the trade flow, GDP values are in dollar value.

Data Manipulation

- Calculation of intranational trade:

$$x_{iit} = prod_{it} - exp_{it}^3$$

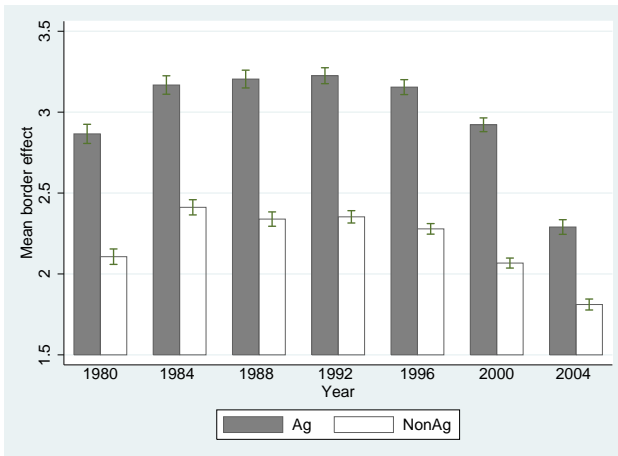
- Summation of trade flow: For each country pair, year, sum trade flows for each of the two industries.

$$\begin{cases} x_{ijat} = \sum_k x_{ijkt}, & k \in a \\ x_{ijmt} = \sum_k x_{ijkt}, & k \in m \end{cases}$$

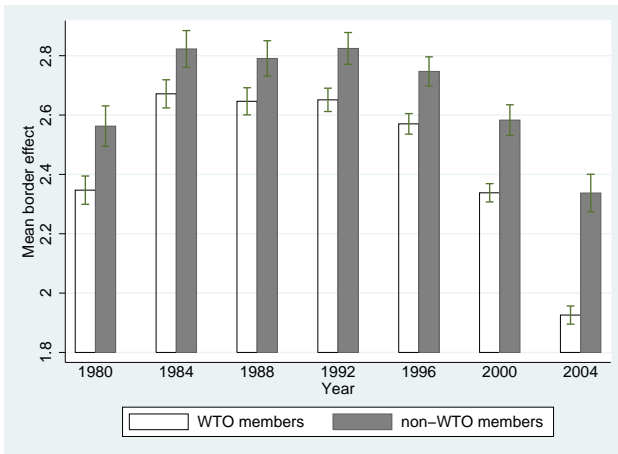
- a for ag. and m for mnf., k =industries(istic: from 311 – 390)
- 4 year period average taken for each x_{ijlt} .

³Shang-Jin Wei(1996)

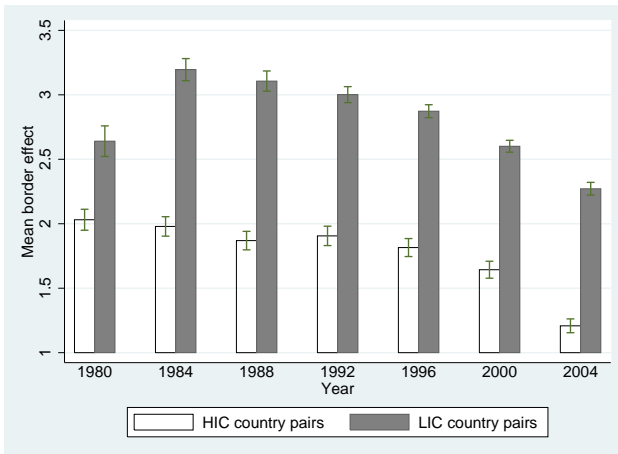
Average border effect for Ag. and MnF.



Average border effect for WTO and non-WTO members



Average border effect for HIC and LIC



Econometric Results

Variable	(1)basic	(2)tariff	(3)WTO	(4)RTA	(5)pair FE
lgdp	-0.148** (0.001)	-0.152** (0.001)	-0.151** (0.001)	-0.132** (0.001)	-0.021* (0.009)
ldist	0.414** (0.004)	0.403** (0.004)	0.411** (0.004)	0.370** (0.004)	
contig	-0.293** (0.023)	-0.330** (0.024)	-0.338** (0.025)	-0.320** (0.024)	
lang	-0.404** (0.010)	-0.409** (0.010)	-0.400** (0.010)	-0.387** (0.010)	
yr	-0.036** (0.002)	-0.063** (0.002)	-0.063** (0.002)	-0.059** (0.002)	-0.124** (0.005)
ag	0.763** (0.007)	0.749** (0.010)	0.744** (0.012)	0.807** (0.007)	0.889** (0.009)
Intarif		0.037** (0.004)	0.042** (0.003)	0.041** (0.003)	0.009** (0.003)
agt		0.005 (0.005)			
bothin_wto			-0.086** (0.009)	-0.098** (0.008)	-0.060** (0.013)
agb			0.021 (0.015)		
rtadum				-0.462** (0.025)	-0.317** (0.025)
agr				0.101** (0.035)	
N	44398	41374	41374	37937	37937
R ²	0.469	0.466	0.467	0.492	0.804

Table 1: Border effect determinant

Variable	(1)Income		(2)WTO		(3)WTO join time		(4)WTO&IC	
	Ag	non Ag	Ag	non Ag	Ag	non Ag	Ag	non Ag
Intarif	0.017**	0.005	0.030**	0.042**	0.030**	0.043**	0.020**	0.016**
rtadum	-0.356**	-0.250**	-0.462**	-0.380**	-0.460**	-0.376**	-0.474**	-0.419**
HIC	-0.122**	-0.302**						
LIC	0.089**	0.193**						
bothin_wto			-0.114**	-0.083**				
bothnew					-0.223**	-0.123*		
bothold					-0.120**	-0.093**		
oldnew					-0.065**	-0.014		
bhic							-0.250**	-0.380**
blic							0.005	0.089**
bhl							-0.125**	-0.097**
(1)HIC=LIC	133.82**	967.57**						
(2)WTO=RTA			165.57**	129.42**				
(3)new=old					2.40 [†]	0.31		
(4)bhic=blic							144.07**	691.51**
(5)bhic=bhl							61.00**	401.24**
N	16896	21041	16896	21041	16896	21041	16896	21041
R ²	0.319	0.474	0.318	0.454	0.318	0.454	0.324	0.468

Table 2: Agricultural and non Agricultural

Preliminary Conclusions

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- Future work:
 - Estimating σ .
 - Add more explanatory factors: NTMs; World facilitation data.

Thank You!

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Suggestions? Questions?