

REGIONAL INTEGRATION AGREEMENTS: IMPACT, GEOGRAPHY AND EFFICIENCY

Fazia Pusterla
ISLA-Università Bocconi, Milano

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RESEARCH QUESTIONS

- ❑ **IMPACT issue:** How do RIAs behave in the global context? Do they generate a non-contradictory impact? Is this impact trade-creating or trade-diverting)? Does trade creation or diversion only affect member countries or does it affect non-member countries as well? (*Viner, 1950*).
- ❑ **GEOGRAPHY issue:** Does geography matter in determining the impact of RIAs on trade? Is location on the same continent an important issue? (*Krugman, 1990; Frankel et al., 1997*).
- ❑ **EFFECTIVENESS issue:** Does the type of RIA matter in the generation of trade-creating/diverting effects? How does the intensity of integration influence the effectiveness of a RIA? Is it possible to detect a type of RIA that is more effective than others? (*Gosh and Yamarik, 2004*).

MOTIVATIONS:

Studying the impact of RIAs on trade flows, the role of geography and of the type of agreement...

- ❑ Implications of regionalism for multilateralism and viceversa? (*Panagariya, 1999; Bhagwati, 1993*)
- ❑ Are institutional and political motivations more influent than economic motivations? (*McMillan, 1993; Whalley, 1997*)
- ❑ Where do we stand? (*Crawford and Fiorentino, 2005; Ornelas, 2005*)

STRUCTURE OF THE PRESENTATION

1. Theoretical Framework;
2. Data Description;
3. The Gravity equation;
4. Empirical Methodology;
5. Econometric results;
6. Conclusions;
7. Further Research

THE GRAVITY MODEL:

THEORETICAL and EMPIRICAL FRAMEWORK

Theoretical foundations:

Anderson (1979); Bergstrand (1985, 1989); Baier and Bergstrand (2001); Evenett and Keller (2002); Deardoff (1998); Anderson and van Wincoop (2004); Feenstra (2004) .

Methodological foundations:

Linbergen (1962); Poyhonen (1963); Bergstrand (1990); **Matyàs (1997); Egger (2000); Egger et al. (2004); Cheng and Wall (2004).**

Empirical evidence on RIAs:

Vang and Winters (1991); Hamilton and Winters (1992); Baldwin (1994); Frankel et al. (1996); Brenton and Di Mauro (1999); Subbash et al. (2000); Soloaga and Winters (2001); **Martinez-Sarzos et al. (2002, 2005);** Carillo and Ali (2004); Gosh and Yamarik (2004); **Coulibaly (2004); Cheng et al. (2004, 2005);** Carrère (2005);

in bold: fixed effects are applied

DATA DESCRIPTION

108 countries

PERIOD: 1988-2003

UN-COMTRADE database

RIAs considered: APEC, ASEAN, CACM, CAN, CARICOM, MED, MERCOSUR, NAFTA, UEMOA, SACU, CER, COMESA, EU15, EU25, EU27.

THE GRAVITY EQUATION

(Tinbergen, 1962)

$$Y_{ijt} = \beta_t K_{ijt}^{\beta_{ij}} \varepsilon_{ijt} \quad t = 1, \dots, T \quad (1)$$

where i and j denote trading partners, t denotes time and K is the vector of all the explanatory variables (including dummy variables)

THE GRAVITY EQUATION/2

Dependent Variable:

EXPORTS

(Krueger, 1999; Cernat, 2001; Rose, 2003)

Traditional Gravity Regressors:

GDP, POPULATION, GDPpc, DISTANCE,
REMOTENESS

Traditional Dummy Variables:

ADJACENCY (ADJ_{ij}), LANGUAGE
(OFF_LANG_{ij} ; MIN_LANG_{ij}), COLONY
(COL_{ij} ; $PRES_COL_{ij}$; $COMM_COL_{ij}$)

Proxies for RTA Trade Effects:

RIA_{ijt} , RIA_{it-e} , RIA_{jt-i}

RIA^k_{ijt} , RIA^k_{it-e} , RIA^k_{jt-i}

*(Cernat, 2001; Martinez et al., 2004;
Carrère, 2005)*

THE GRAVITY EQUATION /3

IMPACT issue: Proxies for RTA Trade Effects

GEOGRAPHY issue: Geographic Dummy Variables:

Same continent ($COMM_CONT_{ij}$),

AFRICA-ASIA-EUROPE-OCEANIA-AMERICA

EFFECTIVENESS issue : Typology Dummy Variables:

1) Complete Integration (CI): EU, UEMOA

2) Customs Union (CU): MERCOSUR, CAN, CACM, CARICOM, SACU.

3) Free Trade Area (FTA): CER, CEFTA, NAFTA.

4) Preferential Trade Agreement (PTA): COMESA.

5) Organization for Economic Cooperation (OEC): APEC, ASEAN, MED

The impact of each Regional, geographic and typology dummy variable is considered on members and non-members (imports and exports side), so that all together there are 15 geographic dummy variables and 25 typology dummy variables.

EMPIRICAL METHODOLOGY/1

- Pooled-cross section

$$\ln X_{ijt} = \alpha_o + \alpha_t + \beta' K_{ijt} + \varepsilon_{ijt} \quad t = 1, \dots, T \quad (2)$$

- Country and country pair-specific effects

(Màtyàs, 1997; Egger, 2004; Cheng and Wall, 2004)

$$\ln X_{ijt} = \alpha_o + \alpha_t + \alpha_i + \alpha_j + \beta' K_{ijt} + \varepsilon_{ijt} \quad t = 1, \dots, T \quad (3)$$

$$\ln X_{ijt} = \alpha_o + \alpha_t + \alpha_{ij} + \beta' K_{ijt} + \varepsilon_{ijt} \quad t = 1, \dots, T \quad (4)$$

with $\alpha_{ij} \neq \alpha_{ji}$

EMPIRICAL METHODOLOGY/2

- First stage (Egger, 2004; Chang and Wall, 2004, Martinez et al. 2005)

$$\begin{aligned} \ln X_{ijt} = & \alpha_o + \alpha_t + \alpha_{ij} + \beta_1 \ln GDP_{it} + \beta_2 \ln GDP_{jt} + \beta_3 \ln GDPpc_{it} + \beta_4 \ln GDPpc_{jt} + \\ & + \beta_5 \ln REMOTENESS_{ijt} + \sum_k \gamma_k RIA_{ijt}^k + \sum_k \delta_k RIA_{it}^k - e + \sum_k \phi_k RIA_{jt}^k - i + \sum_w \lambda_w TYPE_{ijt}^w \\ & + \sum_w \mu_w TYPE_{jt}^w - e + \sum_w \nu_w TYPE_{it}^w - i + \sum_z \pi_z CONT_{zij} + \varepsilon_{ijt} \end{aligned} \quad (5)$$

- Second stage (Chang and Wall, 2004; Coulibaly, 2004)

$$\begin{aligned} \hat{\alpha}_{ij} = & b_0 + b_1 \ln GDP_{it} + b_2 \ln GDP_{jt} + b_3 \ln GDPpc_{it} + b_4 \ln GDPpc_{jt} + \\ & + b_5 \ln REMOTENESS_{ijt} + b_6 \ln DIST_{ij} + b_7 ADJ_{ij} + b_8 OFF_LANG + b_9 MIN_LANG \\ & + b_{10} COMM_COL + b_{11} PRES_COL + \sum_k g_k RIA_{ijt}^k + \sum_k d_k RIA_{jt}^k - e + \sum_k f_k RIA_{it}^k - i \\ & + \sum_w l_w TYPE_{ijt}^w + \sum_w m_w TYPE_{jt}^w - e + \sum_w n_w TYPE_{it}^w - i + \sum_z p_z CONT_{zij} + e_{ijt} \end{aligned} \quad (6)$$

Where $(\gamma_k + g_k)$ gives the total intra-regional trade effect, while $(\delta_k + d_k)$ and $(\phi_k + f_k)$ give the total extra-regional trade effect on the export and import side, respectively

RESULTS/1: The baseline model

Dep. Variable:	OLS						FE					
	[1]			[2]			[3]			[4]		
Exports	Coeff		std	Coeff		std	Coeff		std	Coeff		std
DP_e	0.536	***	0.003	0.538	***	0.003	0.517	***	0.003	0.011	***	0.001
DP_i	0.358	***	0.003	0.363	***	0.003	0.378	***	0.003	0.018	***	0.001
DPpc_e	0.118	***	0.004	0.135	***	0.004	0.123	***	0.005	0.029	***	0.002
DPpc_i	0.070	***	0.004	0.076	***	0.004	0.092	***	0.005	-0.009	***	0.002
Distance	-0.855	***	0.007	-0.762	***	0.007				-0.492	***	0.004
Remoteness	0.134	***	0.007	0.125	***	0.002	0.066	***	0.002	0.050	***	0.001
Adjacency				0.542	***	0.049				0.318	***	0.019
Dom_Col				0.236	***	0.019				0.199	***	0.011
Colony				1.150	***	0.043				0.826	***	0.021
Res_Col				0.106		0.272				-1.693	***	0.143
Lin_lang				0.273	***	0.025				0.099	***	0.012
Imm_lang				0.138	***	0.016				0.024	*	0.012
FA	0.177	***	0.021	0.170	***	0.025	0.282	****	0.029	-0.015		0.014
FA_i	0.358	***	0.020	0.343	***	0.020	0.178	***	0.024	0.053	***	0.012
FA_e	0.016		0.020	0.002		0.020	-0.149	***	0.025	0.043	***	0.038
WTO/GATT	0.345	**	0.002	0.335	**	0.002				0.022	**	0.001
Constant	-2.477	***	0.070	-3.101	***	0.075	-2.867	***	0.053	4.219	***	0.038
Observations	164378			164378			164378			164378		
sq	0.421			0.452			0.550			0.170		

Exports	OLS			FE				
	Coeff	std err	Transf (%)	Coeff [3]	std err	Coeff [4]	std err	TOTAL(%)
	1.433 ***	0.047	319.0	1.561 ***	0.050	0.300 ***	0.028	542.7
	-0.040	0.026	-3.9	-0.008	0.022	-0.080 ***	0.012	-8.5
	0.258 ***	0.024	29.4	0.229 ***	0.022	-0.029 *	0.012	22.1
e	1.303 ***	0.087	268.2	2.730 ***	0.148	-0.989 ***	0.035	470.5
i	-0.212 ***	0.024	-19.1	0.110 ***	0.027	-0.295 ***	0.011	-16.9
	-0.028	0.022	-2.8	0.240 ***	0.027	-0.249 ***	0.011	-0.9
A_e	0.036	0.042	3.6	1.186 ***	0.079	-0.756 ***	0.022	53.7
A_i	0.007	0.017	0.7	-0.021	0.024	-0.018 *	0.009	-3.8
	0.197 ***	0.018	21.8	0.140 ***	0.024	0.007	0.009	15.8
	0.095	0.095	10.0	0.700 ***	0.125	-0.182 **	0.065	67.8
	0.134 ***	0.029	14.3	0.319 ***	0.029	-0.179 ***	0.014	15.0
	-0.135 ***	0.030	-12.7	0.010	0.029	-0.146 ***	0.014	-12.7
	-0.974 ***	0.131	-62.3	0.497	0.306	-0.707 ***	0.059	-19.0
	-0.338 ***	0.022	-28.7	-0.640 ***	0.038	0.227 ***	0.012	-33.8
	-0.405 ***	0.022	-33.3	-0.586 ***	0.038	0.125 ***	0.012	-37.0
e	0.559 ***	0.082	74.9	2.016 ***	0.102	-0.871 ***	0.041	214.4
i	0.081 ***	0.023	8.4	-0.221 ***	0.026	0.300 ***	0.012	8.2
	0.239 ***	0.024	27.0	-0.051 *	0.026	0.290 ***	0.012	27.0
e	1.627 ***	0.186	408.9	0.818 **	0.308	1.163 ***	0.147	624.5
i	0.598 ***	0.048	81.8	0.517 ***	0.041	0.073 **	0.025	80.4
	0.711 ***	0.042	103.7	0.576 ***	0.041	0.119 ***	0.024	100.4
	0.184	0.148	20.2	2.590 ***	0.156	-1.402 ***	0.047	228.1
	0.136 ***	0.024	14.6	-0.345 ***	0.029	0.355 ***	0.012	1.0
	0.045 *	0.026	4.6	-0.419 ***	0.029	0.341 ***	0.012	-7.6
	1.715 ***	0.128	455.8	2.945 ***	0.212	-0.642 ***	0.062	900.8
	-0.175 ***	0.024	-16.1	-0.305 ***	0.031	0.040 *	0.012	-23.3
	-0.192 ***	0.026	-17.4	-0.356 ***	0.031	0.070 ***	0.012	-24.9
M	0.152 **	0.059	16.4	1.690 ***	0.090	-0.852 ***	0.030	131.1
M_e	0.028	0.021	2.8	-0.118 ***	0.028	0.057 ***	0.012	-5.9
M_i	0.137 ***	0.023	14.7	-0.011	0.028	0.060 ***	0.012	4.9
SUR	1.876 ***	0.168	552.5	4.408 ***	0.206	-1.716 ***	0.041	1376.1
SUR_e	-0.130 ***	0.029	-12.2	-0.339 ***	0.033	0.052 ***	0.014	-25.0
SUR_i	0.077 *	0.029	8.0	-0.153 ***	0.033	0.069 ***	0.014	-8.1
	1.460 ***	0.050	330.8	2.150 ***	0.061	-0.497 ***	0.023	422.3
	-0.155 ***	0.024	-14.4	-0.546 ***	0.026	0.218 ***	0.011	-27.9
	-0.039	0.025	-3.8	-0.429 ***	0.026	0.218 ***	0.011	-19.1
e	-0.023	0.120	-2.3	0.886 ***	0.203	-0.367 ***	0.070	68.0
i	0.242 ***	0.030	27.3	-0.171 ***	0.034	0.364 ***	0.015	21.2
	0.822 ***	0.029	127.4	0.347 ***	0.034	0.416 ***	0.015	114.4
	2.976 ***	0.144	1860.3	2.762 ***	0.064	3.565 ***	0.067	5569.2
	-0.202 ***	0.046	-18.3	-0.622 ***	0.054	0.261 ***	0.022	-30.3
	0.292 ***	0.044	33.9	-0.193 ***	0.054	0.315 ***	0.022	13.1
	-3.356 ***	0.098		-9.575 ***	0.078	3.585 ***	0.050	
itions	164378			164378		164378		
	0.472			0.613		0.150		

RESULTS/2: Impact of different RIAs (EU)

Transformation of
coefficients:
 $(\exp^{\beta} - 1) * 100$ or
 $(\exp^{\beta+b} - 1) * 100$

RESULTS/3: Role of the European integration process

Fixed effects trasformed coefficients

FE	EU15	EU25	EU27		EU15	EU25	EU27
EU	199.3	542.7	570.1	CACM	224.2	228.1	228.3
EU_e	34.6	-8.5	-11.6	CACM_e	4.7	1.0	1.2
EU_i	289.7	22.1	14.4	CACM_i	13.3	-7.6	-7.6
CEFTA	512.2	470.5	325.9	CAN	875.6	900.8	898.2
CEFTA_e	-2.0	-16.9	-18.7	CAN_e	-19.3	-23.3	-23.2
CEFTA_i	77.1	-0.9	-5.8	CAN_i	-5.7	-24.9	-25.0
COMESA	55.0	53.7	53.5	CARICOM	122.1	131.1	132.3
COMESA_e	-7.6	-3.8	-3.4	CARICOM_e	-6.1	-5.9	-5.7
COMESA_i	4.1	15.8	16.3	CARICOM_i	16.9	4.9	4.7
MED	84.1	67.8	66.7	MERCOSUR	1378.9	1376.1	1369.5
MED_e	23.7	15.0	15.7	MERCOSUR_e	-16.2	-25.0	-25.0
MED_i	31.6	-12.7	-12.6	MERCOSUR_i	52.7	-8.1	-8.5
SACU	-15.3	-19.0	-19.5	APEC	426.5	422.3	420.5
SACU_e	-30.1	-33.8	-33.9	APEC_e	-16.0	-27.9	-28.0
SACU_i	-18.8	-37.0	-37.1	APEC_i	57.8	-19.1	-19.5
UEMOA	205.9	214.4	212.9	ASEAN	65.8	68.0	68.6
UEMOA_e	3.1	8.2	8.8	ASEAN_e	13.7	21.2	21.4
UEMOA_i	9.1	27.0	27.8	ASEAN_i	67.4	114.4	115.1
NAFTA	621.2	624.5	621.1	CER	5996.4	5586.2	5588.7
NAFTA_e	90.6	80.4	80.8	CER_e	-29.4	-30.3	-30.5
NAFTA_i	169.0	100.4	100.1	CER_i	24.8	13.1	12.5

RESULTS/4: Role of the European integration process

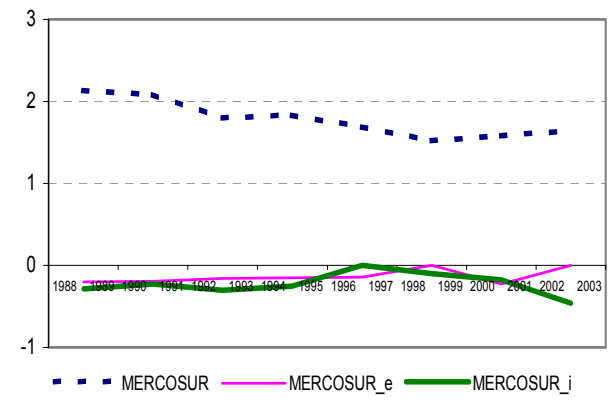
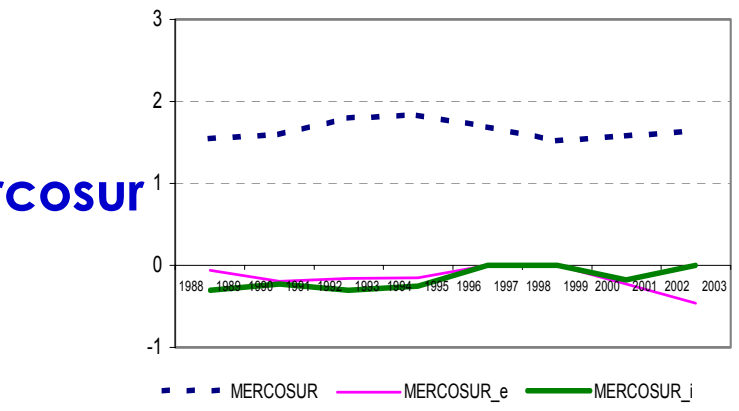
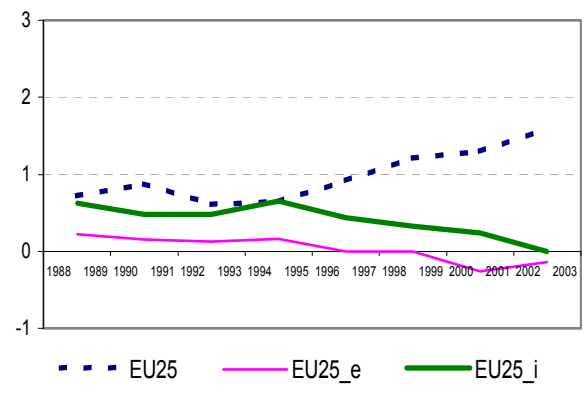
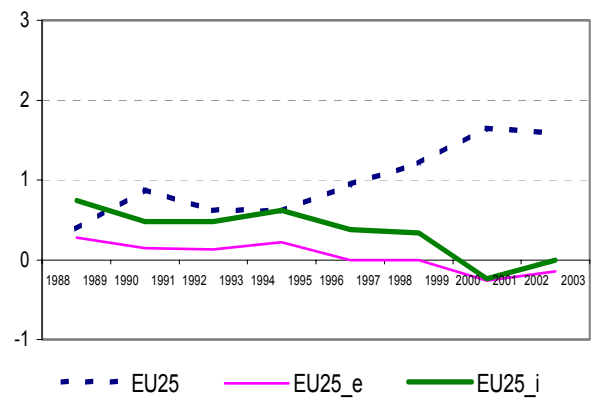
OLS transformed coefficients

OLS	EU15	EU25	EU27		EU15	EU25	EU27
EU	137.8	319.0	341.1	CACM	22.5	20.2	21.9
EU_e	36.1	-3.9	-6.8	CACM_e	19.2	14.6	14.6
EU_i	279.6	29.4	21.9	CACM_i	27.3	4.6	4.3
CEFTA	291.1	268.2	194.5	CAN	452.9	455.8	458.6
CEFTA_e	-5.1	-19.1	-20.7	CAN_e	-11.6	-16.1	-16.1
CEFTA_i	69.7	-2.8	-7.4	CAN_i	2.8	-17.4	-17.7
COMESA	5.7	3.6	4.0	CARICOM	11.3	16.4	18.1
COMESA_e	-3.1	0.7	1.0	CARICOM_e	2.6	2.8	2.8
COMESA_i	9.8	21.8	22.2	CARICOM_i	26.5	14.7	14.2
MED	21.3	10.0	10.0	MERCOSUR	569.4	552.5	554.7
MED_e	22.7	14.3	15.0	MERCOSUR_e	-2.0	-12.2	-12.3
MED_i	28.7	-12.7	-12.6	MERCOSUR_i	75.3	8.0	7.3
SACU	-58.4	-62.3	-62.3	APEC	336.0	330.8	330.7
SACU_e	-24.6	-28.7	-28.8	APEC_e	-1.3	-14.4	-14.6
SACU_i	-14.9	-33.3	-33.6	APEC_i	80.7	-3.8	-4.5
UEMOA	68.3	74.9	75.3	ASEAN	-2.3	-2.3	-1.3
UEMOA_e	4.2	8.4	8.9	ASEAN_e	19.6	27.3	27.4
UEMOA_i	10.5	27.0	27.7	ASEAN_i	79.1	127.4	127.9
NAFTA	403.7	408.9	407.8	CER	1853.5	1860.3	1893.1
NAFTA_e	92.6	81.8	82.2	CER_e	-16.9	-18.3	-18.6
NAFTA_i	170.5	103.7	103.3	CER_i	47.1	33.9	33.0

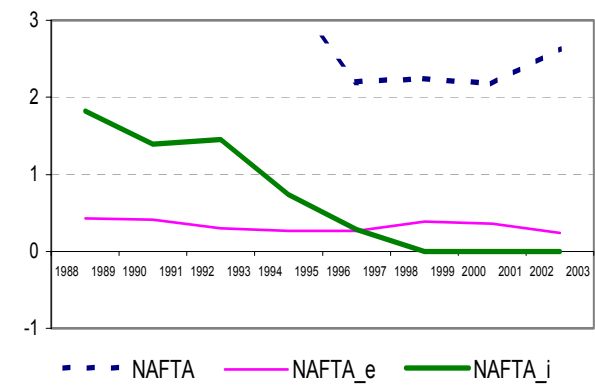
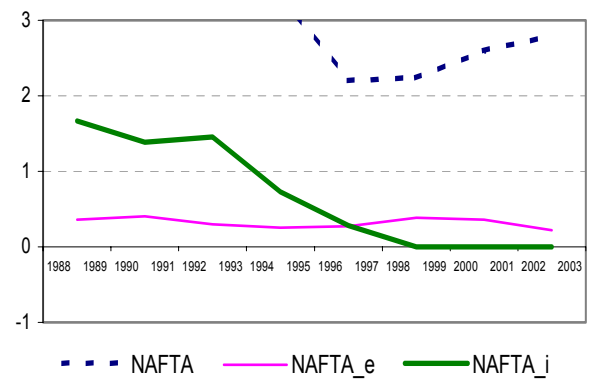
Panel

OLS

RESULTS/5: RIAs' EVOLUTION



NAFTA



RESULTS/6: The role of geography

Dep. Variable: Exports	[1]		[2]		
	Coeff	std	Coeff	std	Transf (%)
Same_continent	0.361 ***	0.016			
AFRICA			0.264 ***	0.024	30.2
AFRICA_e			-0.124 ***	0.029	-11.7
AFRICA_i			-0.349 **	0.026	-29.4
ASIA			-0.058 **	0.043	-5.7
ASIA_e			0.150	0.031	16.2
ASIA_i			-0.011 ***	0.028	-1.1
EUROPE			1.237 ***	0.031	244.7
EUROPE_e			-0.220 ***	0.031	-19.8
EUROPE_i			-0.222 ***	0.028	-19.9
AMERICA			0.118 ***	0.032	12.5
AMERICA_e			0.138 ***	0.030	14.8
AMERICA_i			-0.026	0.027	-2.5
OCEANIE			4.040 ***	0.141	5581.6
OCEANIE_e			-0.168 **	0.053	-15.5
OCEANIE_i			0.263 ***	0.049	30.1
_cons	-4.342 ***	0.090	-3.328 ***	0.105	
Observations	164378		164378		
Rsqr	0.448		0.440		

RESULTS/7: The role of the type of agreement

IMPACT ON TRADE			
OLS		FE	
Intra-regional trade			
<i>OEC</i>	274.14	<i>OEC</i>	344.23
<i>PTA</i>	116.68	<i>PTA</i>	218.05
<i>FTA</i>	102.37	<i>CU</i>	173.10
<i>CI</i>	64.19	<i>FTA</i>	122.70
<i>CU</i>	48.70	<i>CI</i>	120.94
Extra-regionale trade (Imports)			
<i>FTA_i</i>	10.54	<i>CI_i</i>	7.78
<i>CI_i</i>	7.88	<i>FTA_i</i>	5.49
<i>CU_i</i>	2.97	<i>CU_i</i>	-3.76
<i>PTA_i</i>	-10.86	<i>PTA_i</i>	-15.92
<i>OEC_i</i>	-11.33	<i>OEC_i</i>	-18.01
Extra-regionale trade (Exports)			
<i>OEC_e</i>	14.65	<i>OEC_e</i>	6.74
<i>CU_e</i>	-6.58	<i>FTA_e</i>	-11.98
<i>FTA_e</i>	-8.09	<i>CU_e</i>	-12.67
<i>CI_e</i>	-17.91	<i>CI_e</i>	-18.19
<i>PTA_e</i>	-25.70	<i>PTA_e</i>	-30.04

CONCLUSIONS

The results show that the **conventional gravity variables** have the expected signs and magnitudes.

IMPACT ISSUE: strong evidence of **growth in intra-regional trade**, often accompanied by negative effects for non-member countries.

GEOGRAPHY ISSUE: belonging to the same continent is a positive determinant of trade flows. However, because the results on trade diversion effects are very mixed, nothing more definite can be concluded on the role of natural blocs.

EFFECTIVENESS ISSUE: Complete integration agreements, in particular have not been found to be the most trade-creating ones, contrary to previous evidence. This result is not surprising, however, because as integration deepens, trade effects have already been exploited in previous stages of the integration process, creating space for other objectives.

FURTHER RESEARCH

1 DYNAMICS:

introduce in the gravity equation the lagged value of exports and the apply the Arellano and Bond generalized method of moments (GMM) estimator (Vandenbussche et al., 2005; Martinez et al, 2005).

1 DISAGGREGATION:

Focus on **OECs and RTAs** only in order to analyse very deeply the characteristics of this type of agreements

Distinction between **bilateral and multilateral agreements and networks of agreements**, *spanning within and across continents at the regional and sub regional level (Crawford and Fiorentino, 2005).*

Consider different levels of intensity of integration (i.e. OECs, PTAs, FTAs, CUs, CIs), at **sectoral level**, Cernat (2001).