THE EFFECTS OF LATIN AMERICAN ECONOMIC INTEGRATION ON INTENSIVE AND EXTENSIVE MARGINS

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Objectives

- To analyze the effects of economic integration in Latin America on the extensive and intensive margins of trade
- To distinguish
  - The effects of different levels of integration
  - Short versus long run effects
  - The effects on different sectors
    - primary goods and manufactures of agricultural origin
    - manufactures of industrial origin
    - mineral fuels, lubricants and related materials

Background

- A number of studies use the gravity equation to analyze the effect of PTA on international trade (Carrère, 2006; Magee; 2008 and Martinez-Zarzoso et al. 2009)
- Recalde and Florensa (2009), and Recalde et al. (2010) also use the gravity equation for the case of the Mercosur
- The dependent variable is the total value of exports (or imports) between two countries and the existence of PTA is modeled by including a dichotomous variable among the explanatory variables

Background

- New trade theory is based on the heterogeneity of firms (only the most productive export) and the existence of fixed costs of exporting (Melitz, 2003)
  - Extensive margin (EM) -- appearance of new products and participation in new markets
  - Intensive margins (IM) -- maintenance and enhancement of trade relations
- Hummels and Klenow (2005): the extensive margin accounts for 60% of export growth in larger economies
- Hillberry and McDaniel (2003): both margins coexist in the US after the creation of NAFTA

Background

- Bensassi et al. (2011): North African countries have enjoyed a significant increase in exports associated with Euro-Med agreements, operating through the intensive margin for Algeria and Tunisia, and through both the extensive and intensive margins for Egypt and Morocco. Diverse trade patterns could be at the origin of these differences
- Baier et al. (2011): Short-term effects are reflected mainly in the intensive margin, while in the long-term the most important effect is reflected on the extensive margin. BBF did not perform an analysis considering/comparing particular integration agreements or regions

Methodology

- Aspects to consider:
  - Endogeneity of the PTA variables
    - Use of panel econometric techniques to avoid endogeneity biases
  - “Multilateral resistance” terms
    - Inclusion of bilateral FE, importer-time and exporter-time FE
  - Length of the period
    - Use of panel econometric techniques to capture short versus long-term effects (1962-2005)
  - Distinguish between EM and IM
    - Use of the methodology developed in Hummels and Klenow (2005)

Methodology

$$ln\left(\frac{X_{ijt}}{Y_{it}Y_{jt}}\right) = \beta_0 + \beta_1\left(lnDIST_{ij}\right) + \beta_2\left(CONTIG_{ij}\right) + \beta_3\left(COMLANG_{ij}\right) + \beta_4\left(EIA_{ijt}\right) - ln\Pi_{it}^{1-\delta} - lnP_{ji}^{1-\delta} + \varepsilon_{ijt}$$

- X_{ijt} -- value of the aggregate trade flow from country i to country j in year t,
- $Y_{it(jt)}$ -- GDP in country i (j) in year t,
- $DIST_{ij}$ -- bilateral distance between the economic centers of i and j
- $CONTIG_{ij}$ --dummy variable assuming the value 1 if the two countries share a common land border
- $COMLANG_{ij}$ -- dummy variable assuming the value 1 if the two countries share a common language
- EIA_{ijt}-- dummy variable assuming the value 1 if the two countries have an EIA

Methodology

- Extensive Margin: measure of the fraction of all products that are exported from i to j in year t, where each product is weighted by the importance of that product in world exports to j in year t

$$EM_{ijt} = \frac{\sum_{m \in M_{ijt}} X^{m}_{wjt}}{\sum_{m \in M_{wjt}} X^{m}_{wjt}}$$

- X^{m}_{Wjt} -- value of world´s exports to country j in product m in year t
- M_{Wjt} -- set of all products exported by the world to country j in year t
- M_{ijt} -- set of all products exported from i to j in year t

Methodology

- Intensive Margin: the market share of country i in country j´s imports from the world within the set of products that i exports to j in year t

$$IM_{ijt} = \frac{\sum_{m \in M_{ijt}} X^{m}_{ijt}}{\sum_{m \in M_{ijt}} X^{m}_{wjt}}$$

- X^{m}_{ijt} -- value of exports from i to j in product m in year t

Methodology

- Property 1: the product of the two margins equals the ratio of exports from i to j relative to country j total imports

$$EM_{ijt}IM_{ijt} = \frac{\sum_{m \in M_{ijt}} X_{ijt}^{m}}{\sum_{m \in M_{wjt}} X_{wjt}^{m}} = X_{ijt} / X_{jt}$$

Where denotes j´s imports from the world.

- Property 2: Taking the natural logs…

$$lnX_{ijt} = lnEM_{ijt} + lnIM_{ijt} + lnX_{jt}$$

The log of the value of trade flows from i to j in the year t can be decomposed linearly into logs of the extensive margin, the intensive margin and the value of j´s imports from the world

The process of LA integration

- Some important dates for the regional integration in Latin America:
  - *LAIA (Montevideo Treaty, 1980) aims to establish an economic preferential system within the LA region.*
    - Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Mexico, Paraguay, Peru, Uruguay and Venezuela.
  - *Mercosur (Asuncion Treaty, 1991) signed by Argentina, Brazil, Paraguay and Uruguay.*
  - *CAN (Andean Community, 1988)*
    - Bolivia, Colombia, Ecuador and Peru

The process of LA integration

- Chile and Mexico have signed the highest number of bilateral agreements in the region

- Chile has undergone the most far-reaching liberalization process in the Latin American region over the period 1994-2008, and together with Mexico seems to have liberalized relatively more within other integration agreements such as the NAFTA and the EU, than within LAIA (Florensa et al, 2011)

- An important number of developed countries had signed non reciprocal agreements with developing countries (Generalised System of Preferences)

Main Hypotheses

- H1: Effect of EIAs on trade margins

  – BBF explored the effects on the margins of trade of alternative types of EIAs and found that deeper integration agreements have a larger impact on trade flows than shallower agreements

Main Hypotheses

- H2: Relative effect of EIAs on trade margins
  - BBF found that the intensive margin is affected by EIAs sooner than the extensive margin of trade as changes in volumes do not require startup costs that, however, delay the entry of new firms as exporters

Main Hypotheses

- H3: Differential “timing” effect of EIAs on trade margins

  – BBF find that short-term effects are reflected mainly in the IM, while in the long-term the most important effect is reflected on the EM

Main Hypotheses

- H4: The effect of trade agreements differs for different sectors
  - Chaney (2008) shows that the EM and the IM are affected in different directions by the elasticity of substitution. The impact of trade barriers is strong in the intensive margin for high elasticities of substitution (homogeneous products), whereas the impact is mild on the EM

Main Hypotheses

- H5: Differential "timing" effect of EIAs on trade margins differs by type of product
  - Effect 1: Trade margins are more time-sensitive to changes in trade liberalization in the sector of primary goods and manufactures of agricultural origin, as LAIA countries present comparative advantages in agriculture
  - Effect 2: Trade liberalization fosters to a higher extent the development of the sector of manufactures of industrial origin in the region, and then trade margins would be more time-sensitive to changes in trade liberalization in this sector

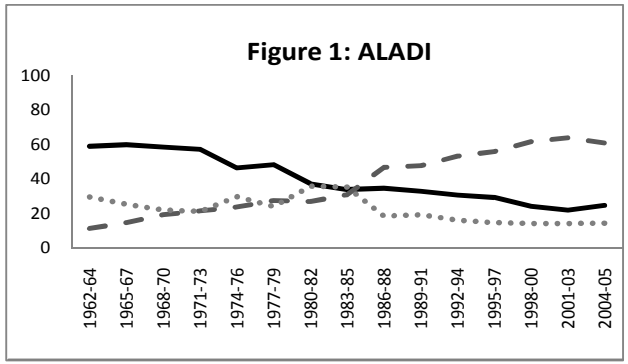
Data

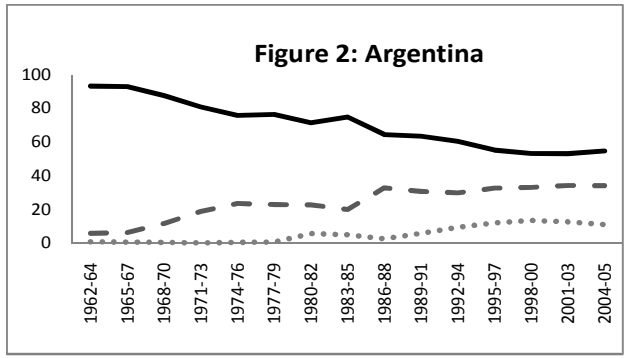
- Exporting countries: Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Mexico, Paraguay, Peru, Uruguay and Venezuela
- Importing countries: 161
- Period: 1962-2005
- Bilateral trade flows
  - Trade data for the period 1962-2000 -- NBER- United Nations trade data set (http://cid.econ.ucdavis.edu/data/undata/undata.html)
  - Trade data for the period 2001-2005 -- WITS (COMTRADE) (https://wits.worldbank.org/)
  - 4-digit Standard Industrial Trade Classification (SITC)
- Gravity variables are obtained from CEPII (http://www.cepii.fr)
- Variable of interest –the level of economic integration agreement (source: BB (http://www.nd.edu/~jbergstr/) and WTO :
  - (0) there is no EIA
  - (1) agreement is asymmetrical or one-way (NRPTA)
  - (2) two-way preferential trade agreements (PTA)
  - (3) free trade agreements (FTA)
  - (4) customs unions (CU)

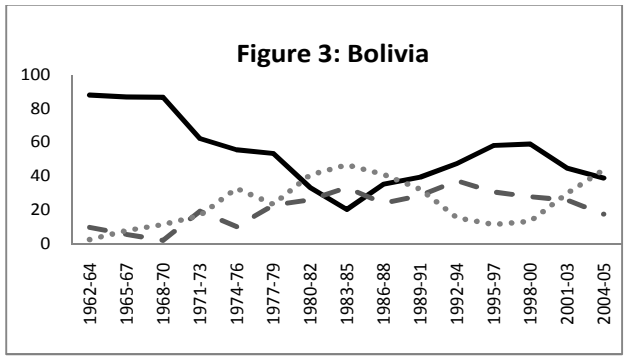
Descriptive analysis

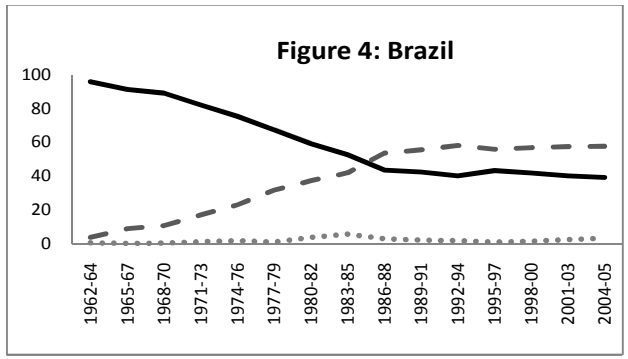
- Regional exports performance is analyzed:
  - Change in exports share by sector
  - Export structure by destination
- Important differences between countries:
  - LA countries do not show the same changes in trade structures
  - LA countries present different destination trade patterns

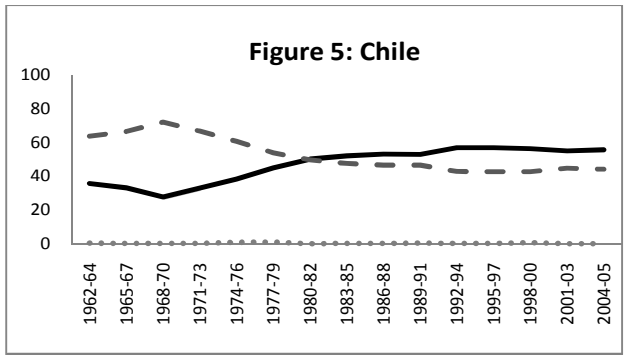
Exports Share by Sector

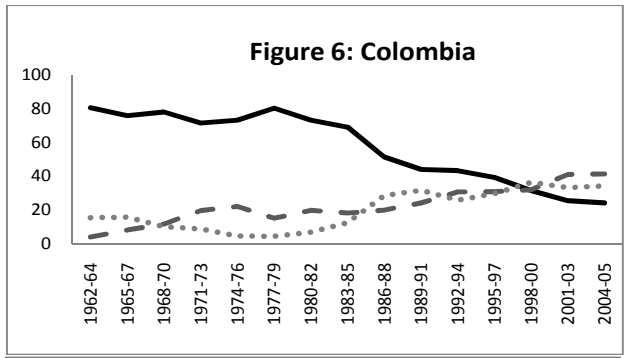


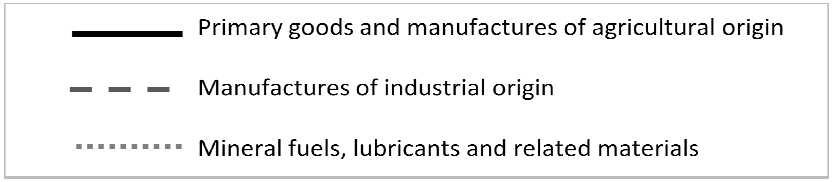










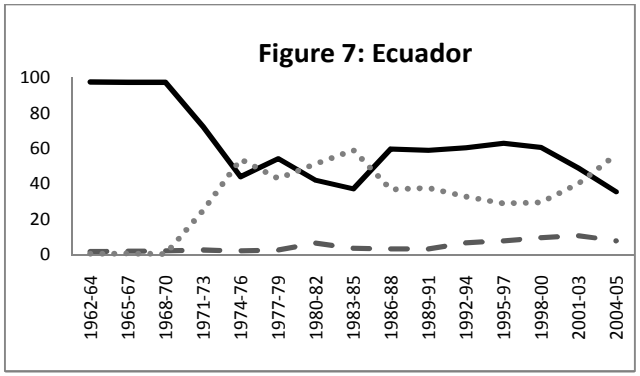


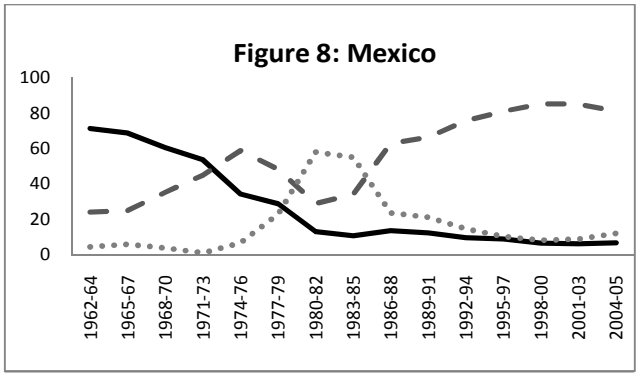
Brazil and Argentina -- increase in the exports share of MIO and a decrease of MAO **(trend to export diversification)**

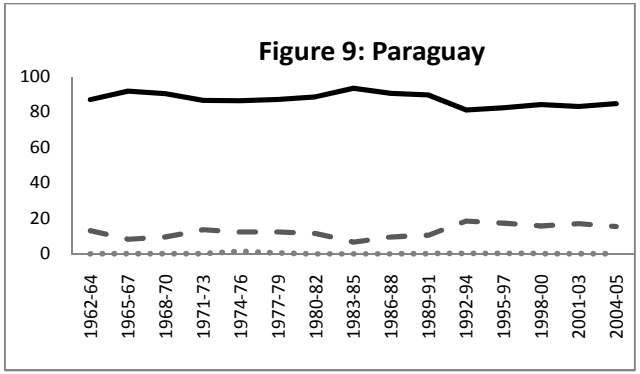
Chile --greater relative share of MAO and declining importance of MIO

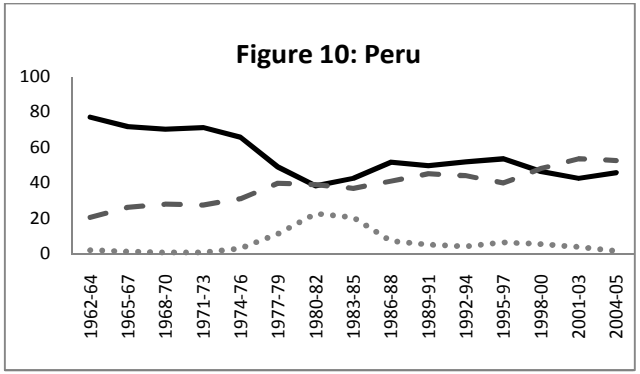
Colombia and Ecuador -- increase in the participation of the MIO and mineral fuels, lubricants and related materials **(trend to export diversification)**

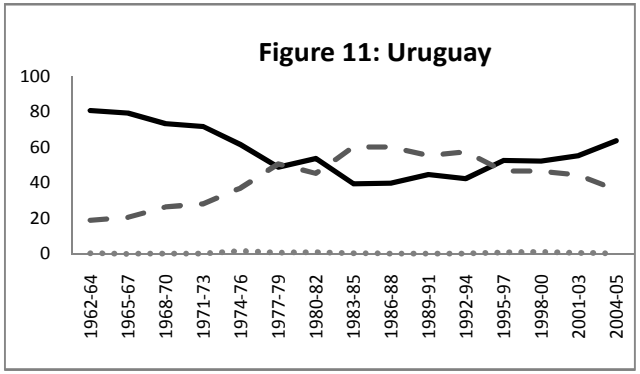
Bolivia --increase in mineral fuels, lubricants and related materials and a decrease in the other two sectors **(change in export concentration)**

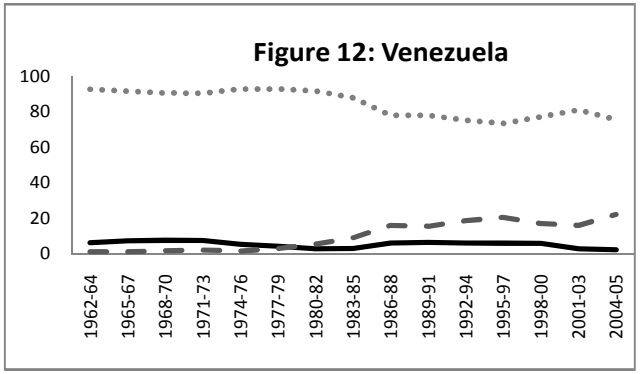


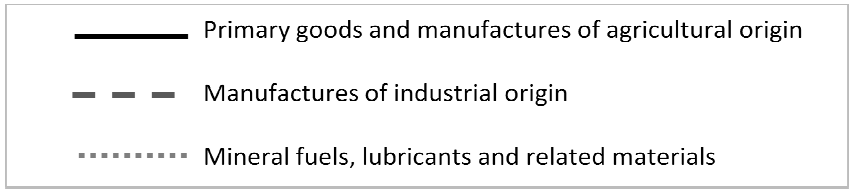












Peru --exports are concentrated in MAO and MIO

Paraguay --exports 80-90% of MAO

Mexico -- 80% are MIO (at the beginning of the period were only 20%) and MAO does not reach 10%; mineral fuels, lubricants and related materials that were 60% in the 80s, have dropped to only 12% in recent years **(the most important change in the structure of exports)**

Uruguay -- increase in the exports share of MIO and a decrease of MAO until the 80s, and greater relative share of MAO and declining importance of MIO onwards

Venezuela has concentrated its exports in the mineral fuels, lubricants and related materials (80%) and shows a slight increase in MIO share

Figure 13: ALADI

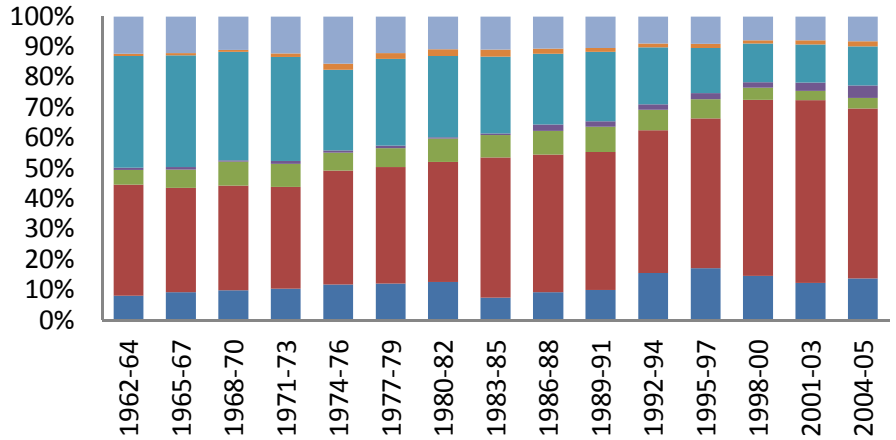


Figure 14: Argentina

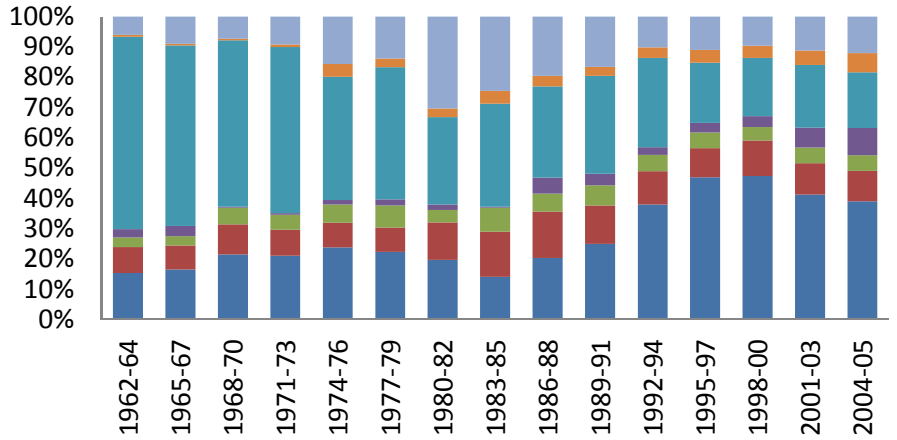


Figure 15: Bolivia

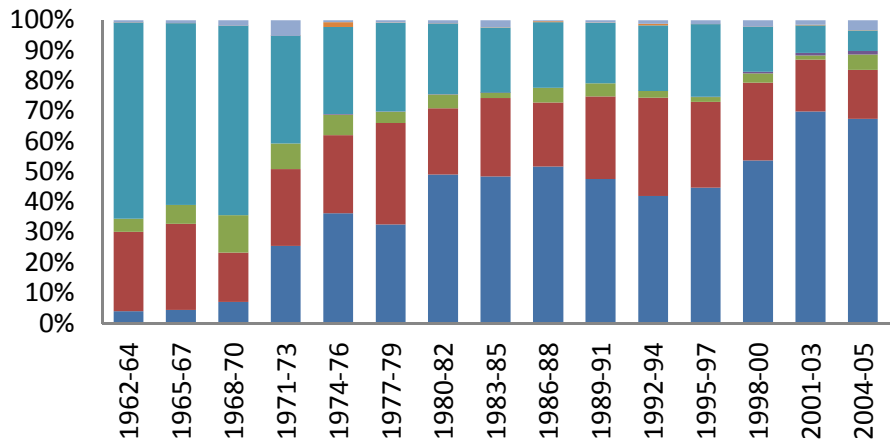


Figure 16: Brazil

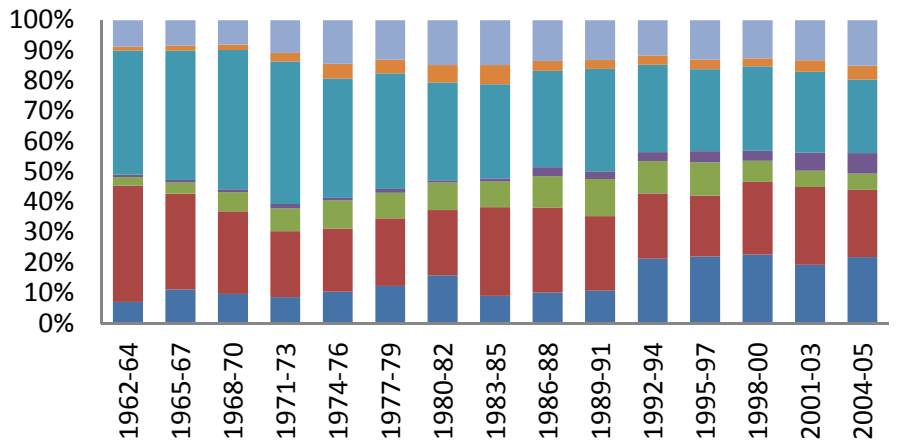


Figure 17: Chile

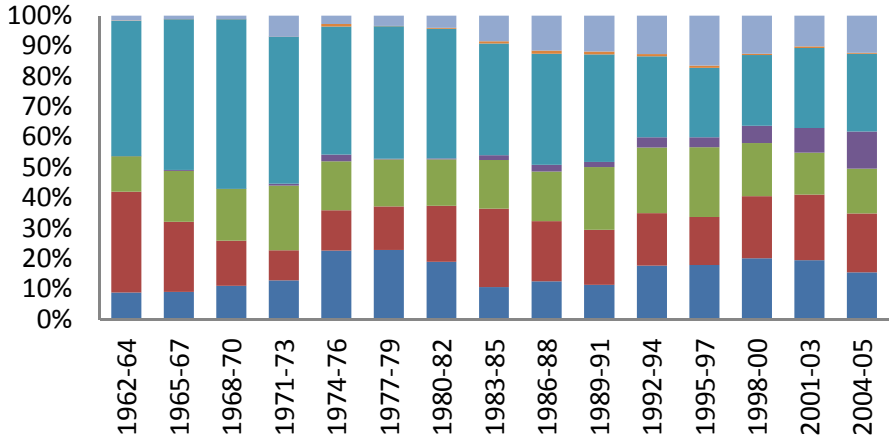


Figure 18: Colombia

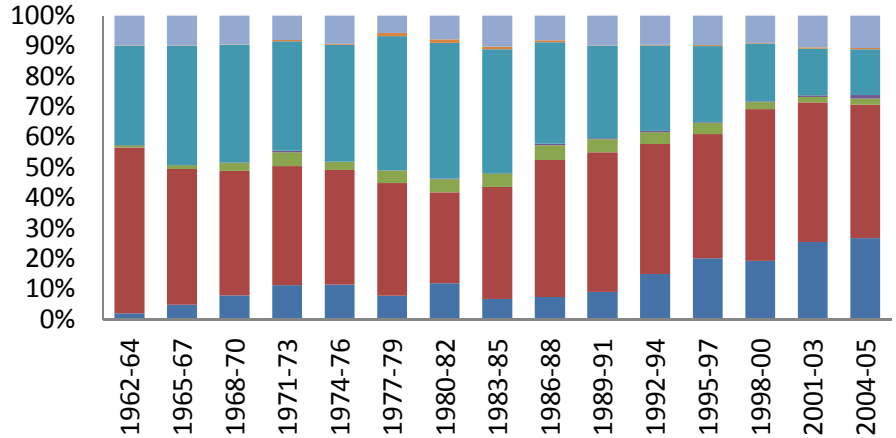


Figure 19: Ecuador

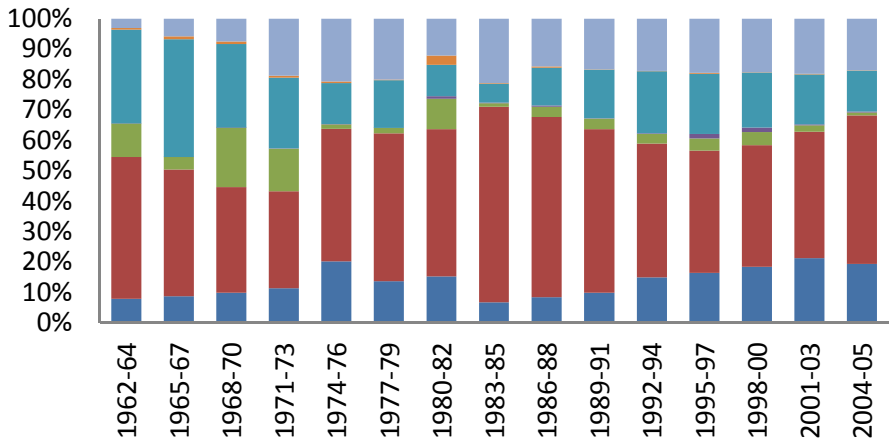


Figure 20: Mexico

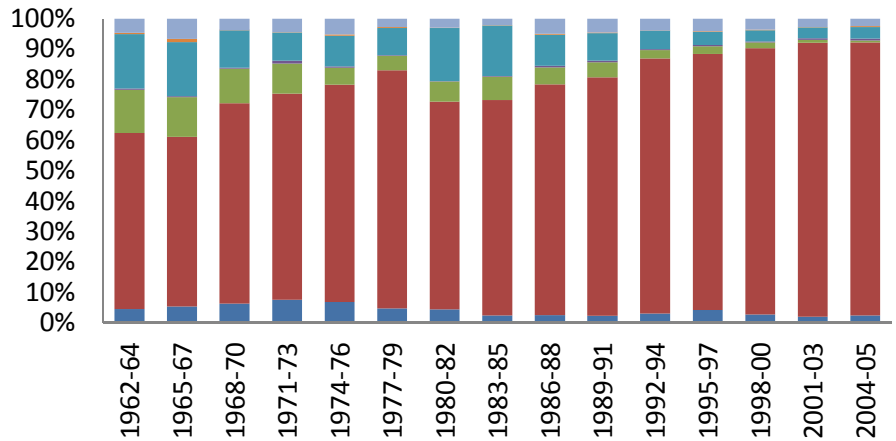


Figure 21: Paraguay

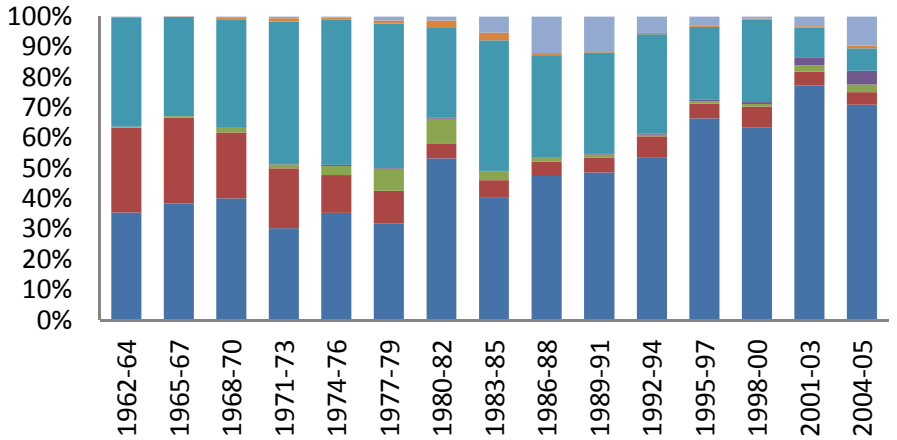


Figure 22: Peru

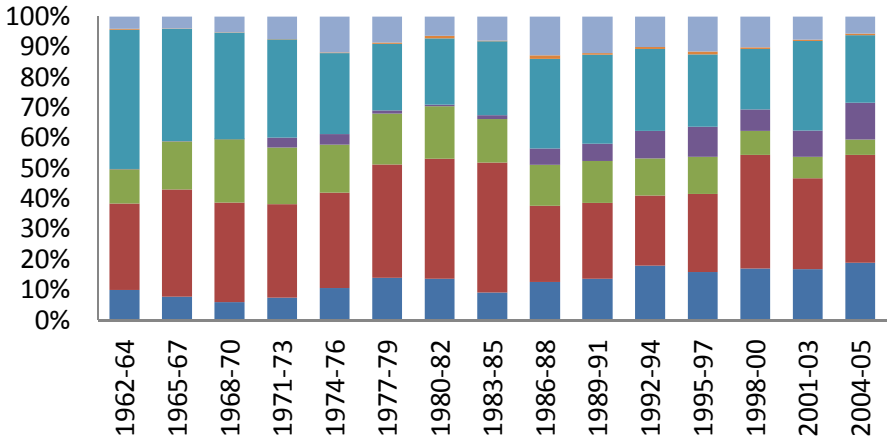


Figure 23: Uruguay

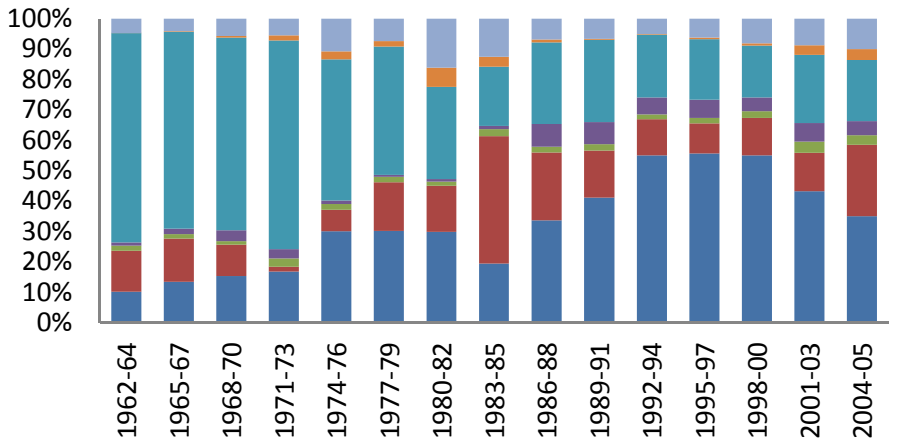
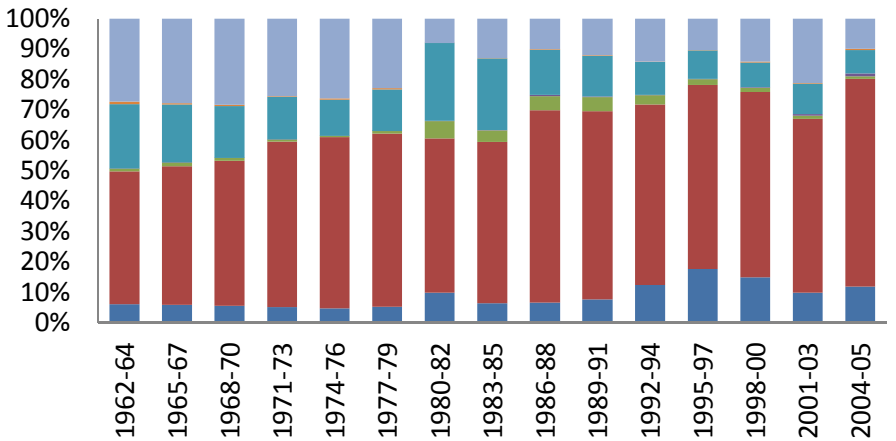


Figure 24: Venezuela



Model specification

Specification 1

$$lnX_{ijt} = \beta_0 + \beta_1 EIA_{ijt} + \eta_{ij} + \delta_{it} + \psi_{jt} + \varepsilon_{ijt}$$

Specification 2

$$lnX_{ijt} = \alpha_0 + \alpha_1 EIA_{ijt} + \alpha_2 EIA_{ijt-5} + \alpha_3 EIA_{ijt-10} + \delta_{it} + \psi_{jt} + \varepsilon_{ijt}$$

Specification 3

$$\Delta lnX_{ij,t-(t-5)} = \gamma_0 + \gamma_1 \Delta EIA_{ij,t-(t-5)} + \gamma_2 \Delta EIA_{ij,(t-5)-(t-10)} + \delta_{it} + \psi_{jt} + \varepsilon_{ij,t-(t-5)}$$

Results

Table 1. Main results for Specification 1 and 2. All goods.

	Specification 1: All goods			Specification 2: All goods		
	TRADE(1)	EM(2)	IM(3)	TRADE (4)	EM (5)	IM (6)
NRPTA	-0.503***	-0.175*	-0.299***	-0.350***	-0.298***	-0.034
L5.NRPTA				-0.198	-0.056	-0.144
PTA	0.007	0.189***	-0.171**	-0.13	-0.096	-0.031
L5.PTA				0.15	0.154**	-0.006
FTA	0.133	0.09	0.059	-0.033	-0.072	0.05
L5.FTA				0.214	-0.142	0.359***
CU	0.863***	0.354***	0.554***	0.583***	0.330***	0.312**
L5.CU				0.370**	-0.154	0.492***
Obs	39596	39308	39465	28645	28443	28575
R2	0.68	0.45	0.45	0.69	0.52	0.51

Results

Table 2. Main results for specification 3. All goods.

	TRADE(1)	EM(2)	IM(3)
Difnrpta	-0.085	0.001	-0.049
Difnrptalong	-0.223	-0.094	-0.127
Difpta	0.072	0.11	-0.019
Difptalong	0.063	-0.042	0.113
Diffta	-0.006	-0.019	0.044
Difftalong	0.12	-0.252*	0.396**
Difcu	0.146	0.179	0.032
Difculong	0.06	-0.345**	0.412**
Observations	21790	21503	21717
R2	0.41	0.49	0.46

H3 not robust to the specification

Results

Table 3. Main results for specification 1. Sectors 1, 2 and 3.

	Primary goods and manufactures of agricultural origin			Manufactures of industrial origin			Mineral fuels, lubricants and related materials		
	Trade(1)	EM (2)	IM(3)	Trade(4)	EM (5)	IM(6)	Trade(7)	EM (8)	IM(9)
NRPTA	0.121	0.125	0.023	-0.463***	-0.155	-0.306**	1.069***	0.521**	0.553*
PTA	0.331***	0.159**	0.201**	-0.275***	0.095	-0.371***	-0.069	0.178	-0.245
FTA	0.420***	0.080	0.357***	-0.001	0.037	-0.038	0.640**	0.536***	0.108
CU	1.145***	0.547***	0.660***	0.464***	0.051	0.411***	1.027***	0.890***	0.139
Obs	33367	33052	33190	32990	32879	32963	8728	8720	8720
R^2	0.6687	0.4557	0.3886	0.7669	0.5312	0.5350	0.6559	0.5445	0.5525

Results

Table 4. Main results for specification 2. Sectors 1, 2 and 3.

	Primary goods and manufactures of agricultural origin			Manufactures of industrial origin			Mineral fuels, lubricants and related materials		
	Trade(1)	EM (2)	IM(3)	Trade(4)	EM (5)	IM(6)	Trade(7)	EM (8)	IM(9)
NRPTA	0.136	-0.125	0.273**	-0.417***	-0.287***	-0.142	0.948*	0.376	0.572
L5.NRPTA	-0.130	0.176	-0.246*	-0.365**	-0.079	-0.289*	0.143	0.615	-0.472
PTA	0.119	-0.264***	0.402***	-0.450***	-0.187**	-0.265**	-0.013	0.038	-0.051
L5.PTA	0.248**	0.285***	-0.027	-0.032	0.183**	-0.216**	-0.138	0.260	-0.398
FTA	0.194	-0.239***	0.431***	-0.113	-0.152*	0.032	0.431	0.234	0.196
L5.FTA	0.230	0.266**	0.016	-0.103	-0.184	0.083	0.356	0.676**	-0.320
CU	0.728***	0.233*	0.528***	0.262*	0.150	0.110	0.884	0.670*	0.214
L5.CU	0.473**	0.201	0.331*	0.014	-0.289**	0.286	0.165	0.139	0.025
Obs	23465	23254	23372	23159	23081	23152	4945	4944	4944
R^2	0.67	0.52	0.41	0.77	0.60	0.59	0.69	0.61	0.55

- H1: Effect of EIAs on trade margins

  - EIAs have positively affected the intensive and extensive margins of trade
  - The deepest integration agreements have a larger impact on trade margins

- H2: Relative effect of EIAs on trade margins
    - The effect of EIAs on the intensive margin is higher in magnitude than the effect on the extensive margin (in the current period)

- H3: Differential “timing” effect of EIAs on trade margins

  - The positive effects are more persistent over time in both the intensive and extensive margins among countries involved in deeper economic integration
  - Other integration agreements in which developed countries are involved are beneficial for trade margins in the “long-run”

- H4: The effect of trade agreements differs for different sectors
    - The effect of regional trade liberalization is higher in the intensive margin for primary goods and manufactures of agricultural origin than for manufactures of industrial origin

Results

Table 5. Main results for specification 3. Sectors 1, 2 and 3

	Primary goods and manufactures of agricultural origin			Manufactures of industrial origin			Mineral fuels, lubricants and related materials		
	Trade(1)	EM (2)	IM(3)	Trade(4)	EM (5)	IM(6)	Trade(7)	EM (8)	IM(9)
DIFNRPTA	0.035	-0.007	0.163	-0.429***	-0.037	-0.416***	-0.558	0.037	-0.594
DIFNRPTALONG	-0.335*	0.045	-0.351**	-0.184	-0.104	-0.105	-0.121	0.190	-0.312
DIFPTA	-0.148	-0.169	0.082	-0.125	0.036	-0.172	-0.791	-0.515	-0.276
DIFPTALONG	-0.242*	-0.175	-0.057	0.199*	0.201*	-0.023	-0.332	-0.395	0.062
DIFFTA	-0.092	-0.140	0.114	-0.162	-0.163	-0.016	0.513	0.018	0.495
DIFFTALONG	-0.129	-0.094	0.001	0.188	-0.179	0.347**	0.898	0.094	0.804
DIFCU	-0.155	-0.388**	0.390*	0.135	0.116	0.035	0.286	0.109	0.177
DIFCULONG	-0.120	-0.228	0.182	0.119	-0.250	0.352*	-0.219	-0.206	-0.013
Observations	17500	17214	17401	17463	17331	17454	3217	3217	3217
R^2	0.43	0.43	0.40	0.49	0.58	0.54	0.65	0.61	0.58

- H5: Differential “timing” effect of EIAs on trade margins differs by type of product
  - Effect 1: Trade margins are more time-sensitive to changes in trade liberalization in the sector of primary goods and manufactures of agricultural origin, as LAIA countries present comparative advantages in agriculture
  - Effect 2: Trade liberalization fosters to a higher extent the development of the sector of manufactures of industrial origin in the region, and then trade margins would be more time-sensitive to changes in trade liberalization in this sector

Conclusions

- This paper analyzes the consequences of LA integration on trade margins over the period 1962-2005 and for different sectors
- Obtained results show that the signed EIAs have positively affected the intensive and extensive margins of trade
- The deepest integration agreements have a larger impact on trade margins than shallower ones
- The effect of EIAs on the intensive margin is higher in magnitude than the effect on the extensive margin
- Positive effects are more persistent over time in the intensive margin than in the extensive margin among deeper integration agreements
- The effect of EIAs is significant in the intensive margin only for primary goods and manufactures of agricultural origin (in the current period)
- Trade margins are more time-sensitive to regional trade liberalization in the sector of manufactures of industrial origin in the long-run
- Importance of analyzing the effect of different types of EIAs, on different sectors and distinguishing between short and long-run

Further research

- To analyze the effects of the different types of EIAs on other types of products and different time periods (for example, before and after the Latin American crises)
- To measure whether the results are sensitive to the estimation methodology, the method of Poisson Pseudo Maximum Likelihood (PPML) could be also used