How Does Trade Cause Growth? The Role of Growth Poles

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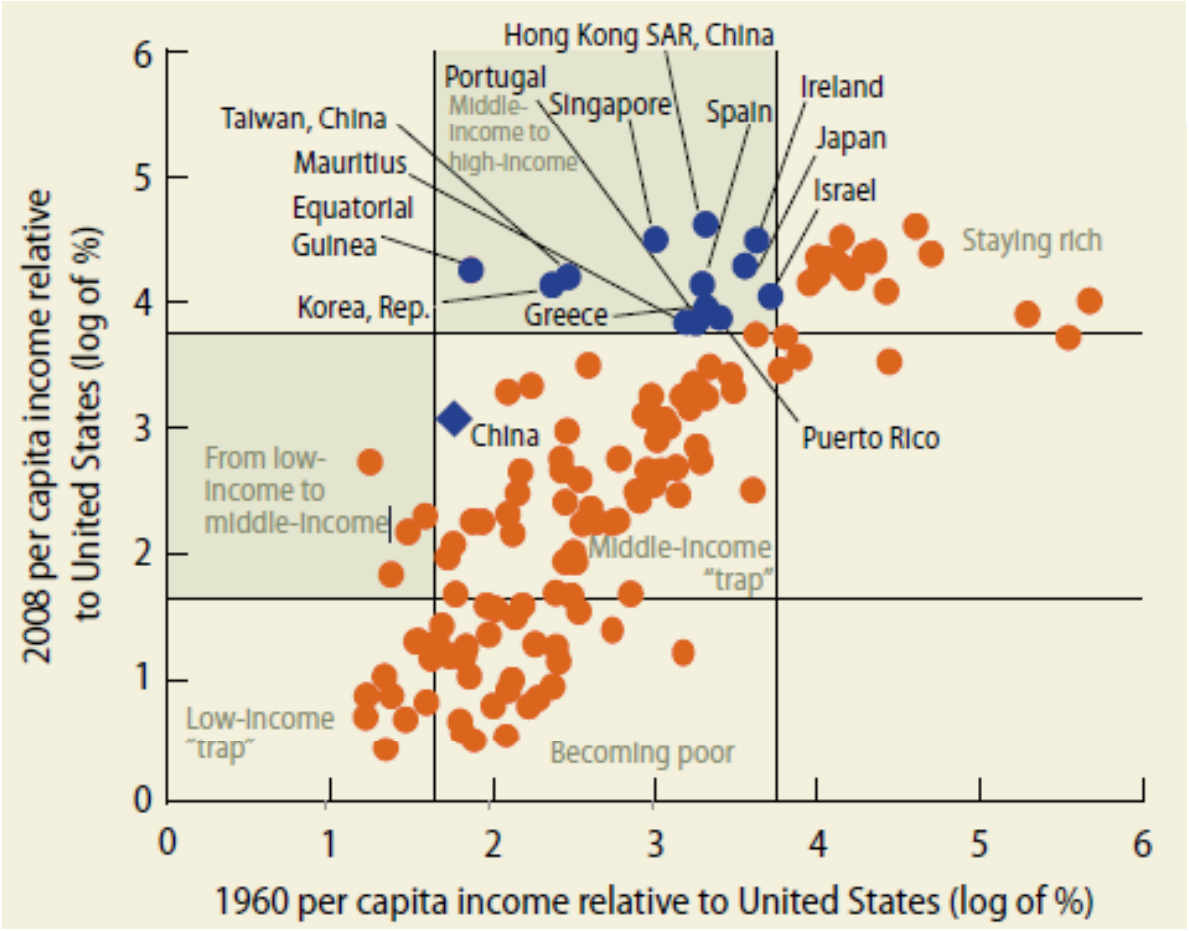
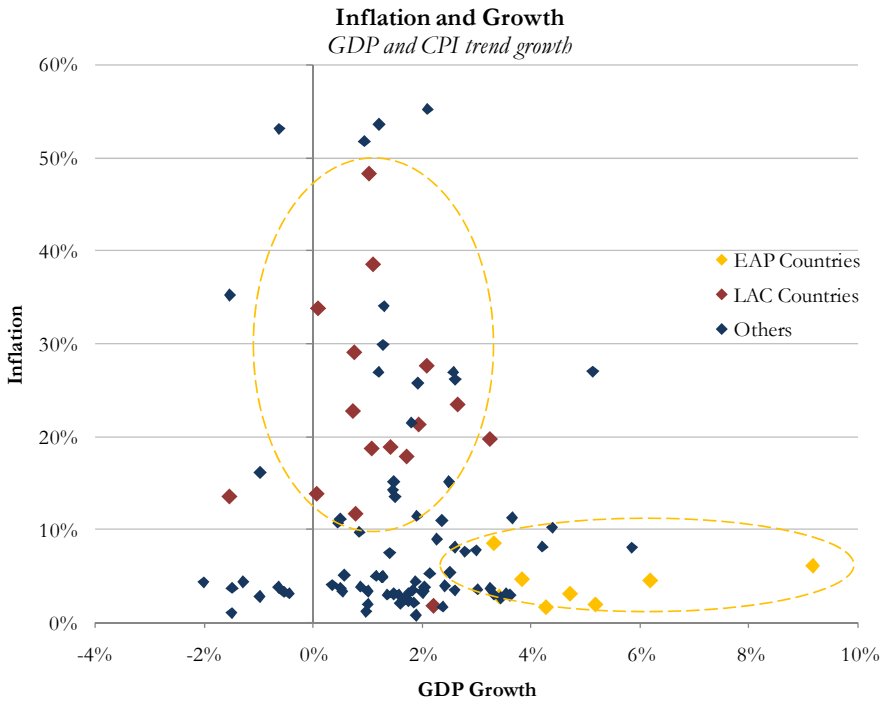
World Bank LAC
opportunities for all

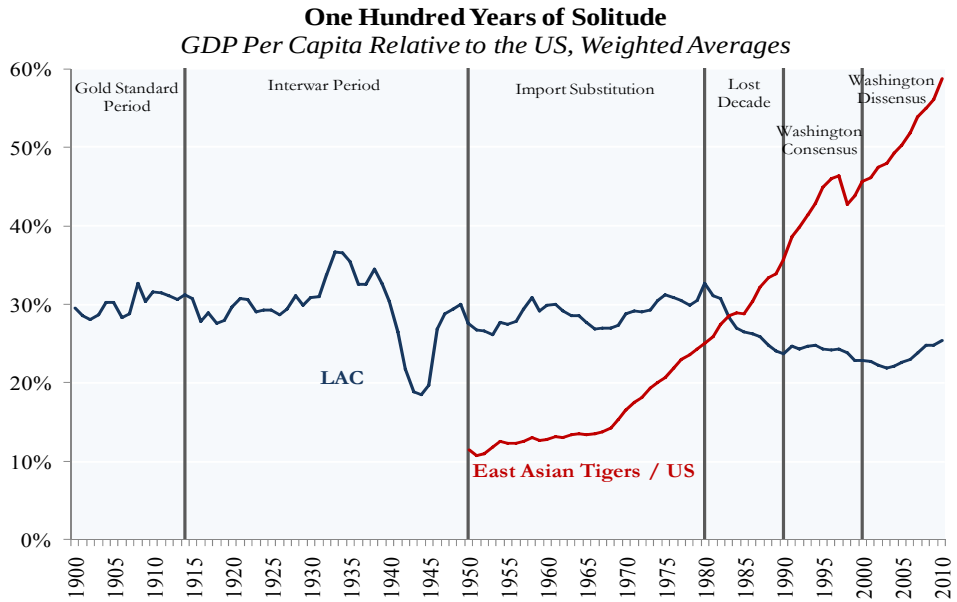
The Middle-Income Trap



Source: Maddison database - Graphic extracted from World Bank China 2030 (2012)

Structural Speed Limits to Growth in LAC

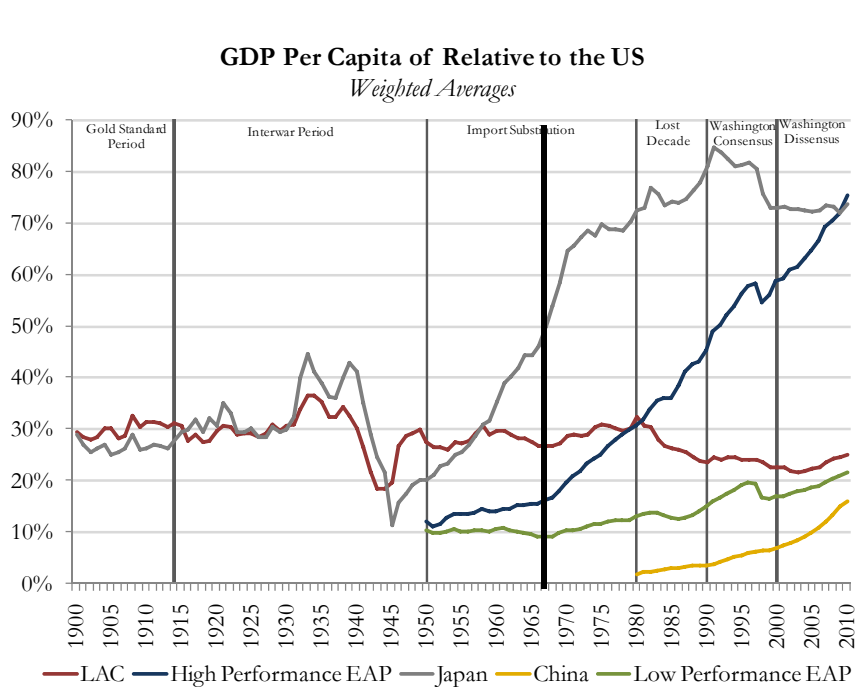


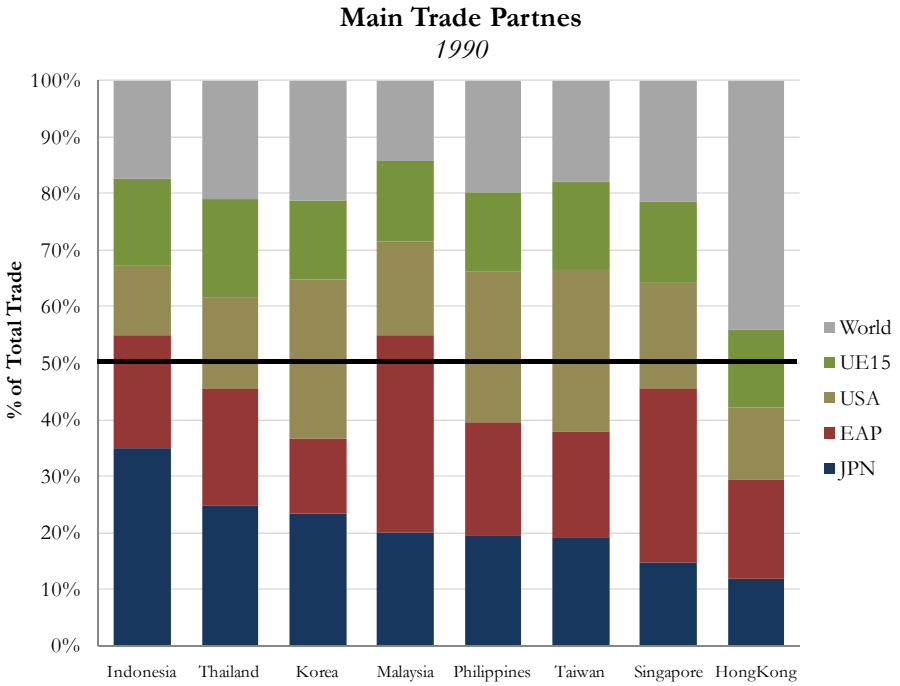


Note: The group of East Asian tigers includes Hong Kong (China), Indonesia, Malaysia, Republic of Korea, Singapore, Thailand, and Taiwan (China). Maddison (2007-2009) was used from 1900 to 2006. We used the Real Per Capita GDP growth from WDI to calculate the levels from 2006 to 2010.
Source: LCRCE Staff calculations based on Maddison (2007, 2009) and WDI

An Exploration of the Nature of the Trade-Growth Dynamics

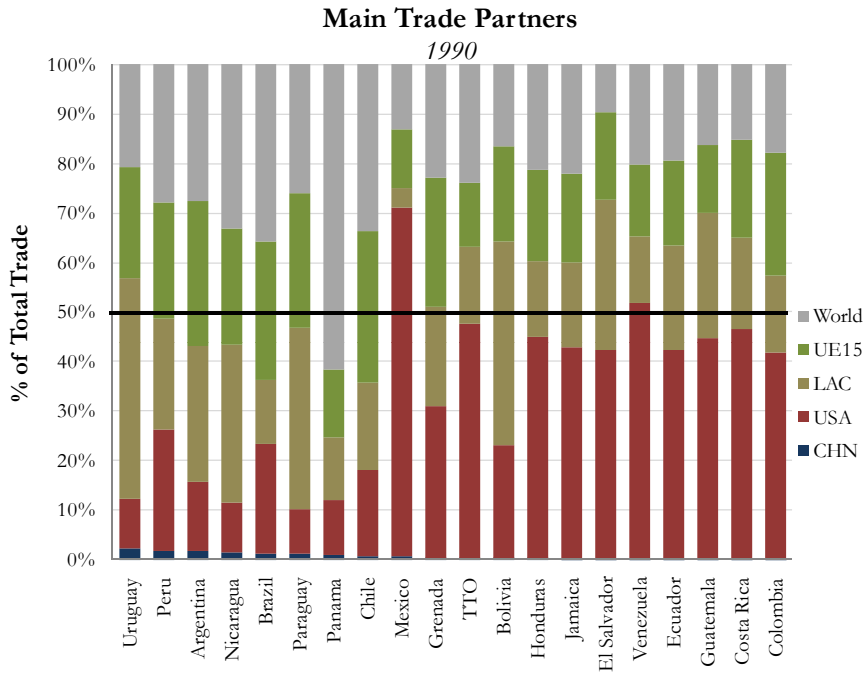
- *A particularly telling connection: East Asian Tigers and Japan*
- *We explore the connection to a "growth pole" and the potential for spillover effects*
  - *We focus on whether/how the connection to a "pole" through trade can lead to economic growth*

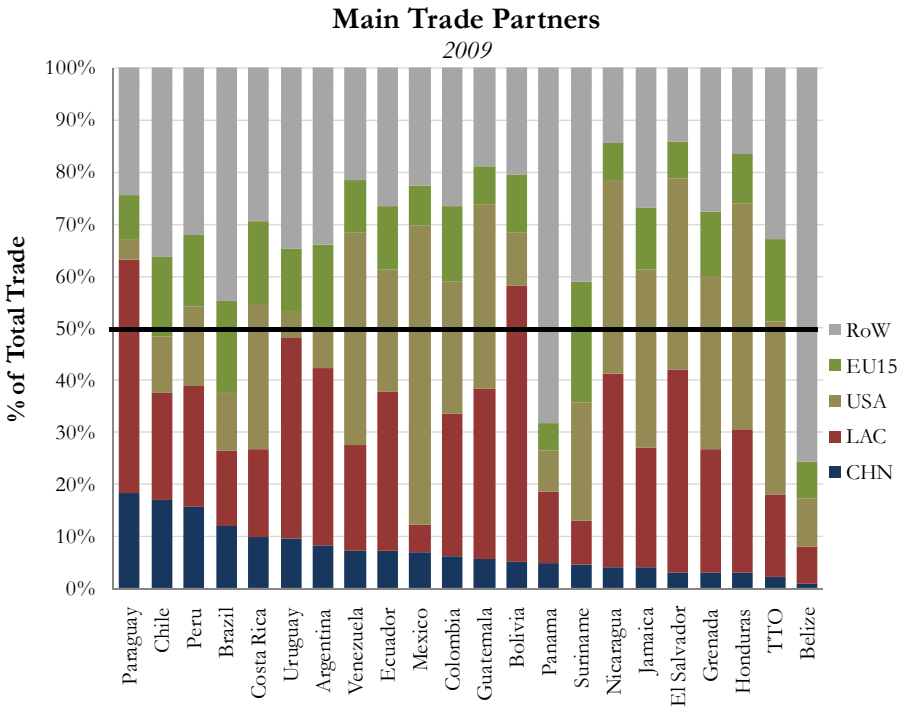




Notes: For Panel B, the sample of UE15 includes: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal , Spain, Sweden and the United Kingdom; the sample of EAP countries includes Hong Kong, Indonesia, Korea Rep., Malaysia, Philippines, Singapore, Taiwan and Thailand. Sources: WITS and WDI.

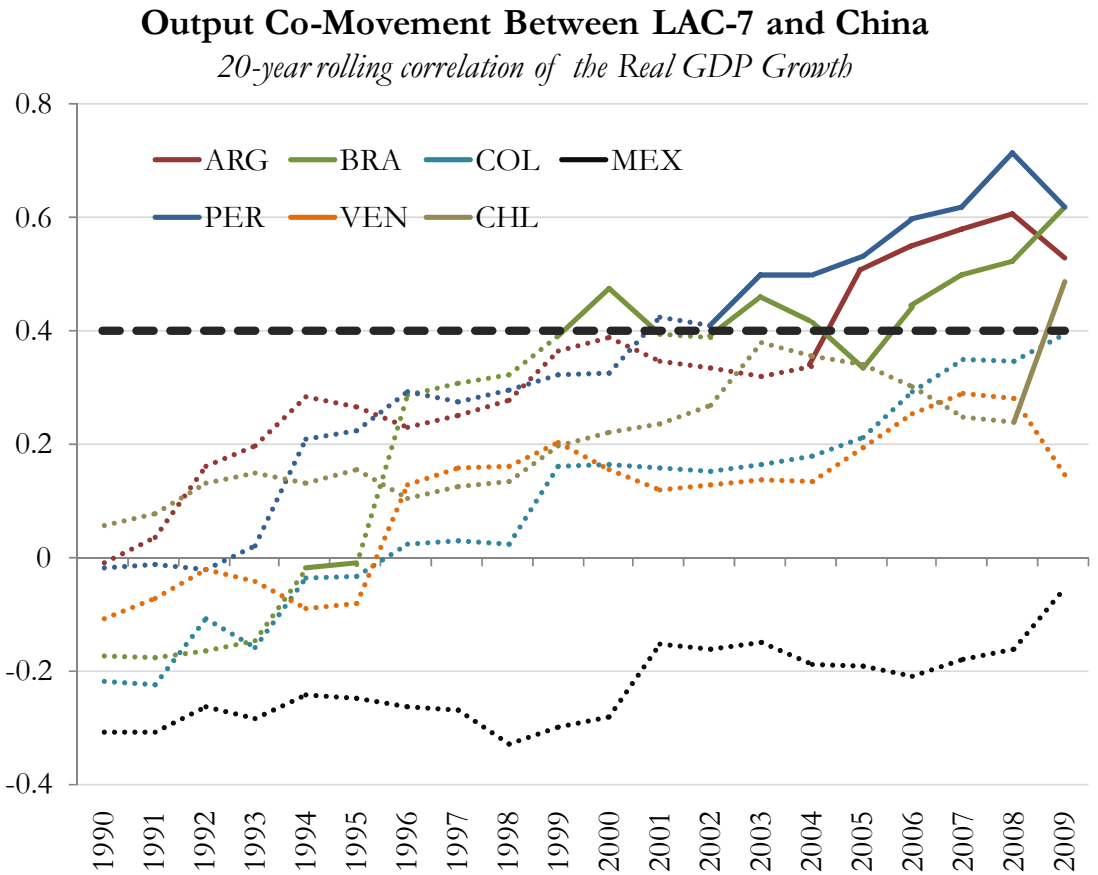
During the 2000s, The China Connection Developed for LAC Countries





Notes: The sample of UE15 includes: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal , Spain, Sweden, and the United Kingdom; the sample of LAC countries includes: Argentina, Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Grenada, Guatemala, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Suriname, Trinidad and Tobago, Uruguay, and Venezuela. Sources: WITS and World Bank World Development Indicators (WDI).

During the 2000s, The China Connection Developed for LAC Countries



Source: World Bank

This Paper

- The paper will dig deeper into the potential positive spillover effects from a country's main trading partner or world growth poles
  - Focus on whether these partners can indeed play any role on a country's long-term output growth
- The intensification of trade (and other economic linkages) to a growth pole matter for sustainable growth to the extent that they translate into factor accumulation and productivity increases, especially those associated with technological diffusion and positive learning spillovers:
    - Connection in terms of *industries* (similarity in trade flows)
    - Connection in terms of *products* (type of products)

Structure of this Talk

- Introduction
  - From trade to growth: a brief literature review
- Basic Model
  - A gravity model
  - Novelty of our specification and comparisons with the existing literature
- Main Results
  - The industry channel
  - The product channel
  - Decomposition of GDP
- A Case Study
  - The LAC-China connection

Trade and Output Growth

- A very large literature has emphasized the role of trade in fostering output growth…
  - Frankel and Romer *(AEA-1999)*: cross-country regressions for trade and income growth in 1985
  - Alcalá and Ciccione *(QJE-2002)*: cross-country regressions in PPP terms for trade and productivity in 1985
  - Irwin and Tervio *(JIE-2002)*: cross-country regressions with zero trade included for all decades between 1913-1990
  - Dollar and Kraay *(WB-2002)*: cross-country regressions for trade, institutions, and income in 1995
  - Noguer and Siscart *(JIE-2005)*: cross-country regressions for trade and income growth with institutional and geographical controls in 1985
- … but very few looked at the channels through which trade might affect growth

From Trade to Output Growth

- While the size of trade flows might matter for growth…
- … this paper highlights that the *nature of trade* relations matters as well.
- Our hypothesis is that trading (with a growth pole or the main trading partner) can be beneficial for a country to the extent that it leads to technological diffusion and learning spillovers, which in turn are key for productivity improvements
  - *Directly:* Technology embodied in physical and human capital
  - *Indirectly:* Knowledge dissemination
    - Trade flows
      - Imports may contain intermediate goods and technology unavailable to recipient nations
      - Feedback from importing nations (Blundell, Griffith &Van Reenen , 1995)
    - Capital flows
      - Major differences in first order growth effects in favor on FDI as opposed to non-FDI inflows (Aizenman, 2011)
    - Migration flows
      - Diffusion of tacit technological knowledge (Oettl & Agrawal, 2008)

From Trade to Output Growth

- This paper highlights that the *nature of trade* relations matters.
- In particular, we focus on:
- *The composition of **Industries*** involved
  - **Intra-Industry Trade**:
    - Proxy for technological diffusion and knowledge spillovers: Helpman & Krugman (1989); Bernstein, & Nadiri (1988); Melitz (2003); Badinger & Egger (2010); Bitzer & Geishecker (2005)
  - **Value Chains through the Upstreamness (or distance from final use) of trade flows**
    - Production often entails the sourcing of inputs from different suppliers in different countries … "With this measure, we are now equipped to describe a country's position in global production chains." (Antràs et al, 2012)
    - Local producers can learn a great deal from global buyers about how to improve their production processes, attain consistency and high quality, and increase the speed of their reaction to shocks (Keesing and lall, 1992; Piore and Ruiz Durán, 1998; Schmidtz and Knorringa, 2000)
- The type of ***Products*** traded
  - The **factor intensity** and the **level of technology** of products traded
    - Tech-content of imports (Grossman & Helpman, 1991; Eaton & Kortum, 2002; Rivera-Batiz & Romer, 1991)
    - Clustering effects : "Economies grow by upgrading the type of products they produce and export. The technology, capital, institutions and skills needed to make such new products are more easily adapted from some products than others."(Hausmann et.al., 2007; Helpman, 2008)

2. The Basic Model

The Basic Model for the Trade and Growth Dynamics

$$\ln\left(\frac{GDP_i}{Pop_i}\right) = \alpha_0 + \alpha_1 Trade_i + \alpha_2 \ln(Pop_i) + \alpha_3 \ln(Area_i) + \alpha_4 Institutional_i + u_i$$

- Explanatory variable + controls of a **geographical/structural** nature:
  - *Trade*: Exports plus Imports over GDP.
  - *Pop*: Active Population
  - Area: squared miles area of the country

- There is a control by **institutionalism** (Hall and Jones,1999; Acemoglu et al. 2001).
  - Institutionalism: whether one of the five main European languages (English, German, Italian, Spanish, or French) is the main language in a given country

The IV Approach

- There is an endogenous relation between trade and growth
  - Use of Instrumental Variables
- We will follow the literature with a gravity model for bilateral trade based on two-stage least square regressions
- Frankel and Romer (AER 1999)
  - Trade is instrumented by the fitted value of trade obtained after a bilateral regression based on geographical variables
    - Zero trade is included (Irwin and Tervio, 2002; Santos Silva and Tenreyro, 2006)

The IV Approach

- Focusing on the 00s: we will use more recent data than the literature generally does (majority of papers focuses on 1985)
  - We will estimate BE panel regressions as we focus on the cross-sectional aspects of the trade-growth relation
- Following Alcala and Ciccone (QJE 2002), we also introduced an alternative specification with the variables of GDP per capita and the openness in PPP terms:
  - "A distortion between current data and PPP arise because openness is decreasing in the relative price of nontradable goods, and nontradable goods are relatively more expensive in countries where production is more efficient (the Balassa-Samuelson effect)… Using real openness instead of openness as a measure of trade eliminates distortions due to cross-country differences in the relative price of nontradable goods."

Bilateral equation for trade	**in 1985**			**in 2005**	
	Frankel and Romer (AER 1999)	*Noguer and Siscart (JIE 2005)*			
	Without zeros included			With zeros included	
				Data in current	*Data in PPP*
ln(distance)	-0.85***	-1.14***	-1.185***	-2.173***	-2.208***
	(0.04)	(0.03)	(0.04)	(0.0484)	(0.0489)
ln (population)	-0.24	-0.14	-0.0884***	0.624***	0.602***
	(0.03)	0.02	(0.02)	(0.0301)	(0.0304)
ln(population_partner)	0.61**	0.96**	1.041***	1.729***	1.710***
	(0.03)	0.02	(0.02)	(0.0301)	(0.0304)
ln(area)	-0.12	-0.16	-0.143***	-0.276***	-0.281***
	(0.02)	(0.02)	(0.02)	(0.0241)	(0.0244)
ln(area_partner)	-0.19*	-0.23*	-0.235***	-0.460***	-0.451***
	(0.02)	(0.02)	(0.02)	(0.0241)	(0.0244)
Landlock	-0.36	-0.81*	-0.728***	-1.790***	-1.882***
	(0.08)	(0.06)	(0.06)	(0.0645)	(0.0653)
Border	5.10	0.39	0.72	7.390*	7.283*
	(1.78)	(1.37)	(2.56)	(4.067)	(4.113)
Border*ln(distance)	0.15	0.60	0.979**	2.033***	2.013***
	(0.30)	(0.29)	(0.43)	(0.568)	(0.574)
Borber*ln(population)	-0.29	-0.21	-0.17	-0.508**	-0.495**
	(0.18)	(0.15)	(0.15)	(0.241)	(0.244)
Borber*ln(population_partner)	-0.14	-0.22	-0.24	-0.639***	-0.629***
	(0.18)	(0.14)	(0.15)	(0.241)	(0.244)
Border*ln(area)	-0.06	-0.03	-0.05	-0.316	-0.333
	(0.15)	(0.15)	(0.18)	(0.261)	(0.263)
Border*ln(area_partner)	-0.07	0.00	-0.06	-0.0971	-0.125
	(0.15)	(0.16)	(0.18)	(0.261)	(0.263)
Border*Landlock	0.33	1.05	0.378	1.482***	1.440***
	(0.33)	(0.20)	(0.24)	(0.345)	(0.349)
Observations	3220	8906	9108	19,100	19,100
R-squared	0.36	0.35	0.384	0.295	0.291

Basic Gravity Model: Panel 2000-2007

	Data in Current Dollar		*Data in PPP*	
	OLS	IV	OLS	IV
Openness	1.091***	3.034**		
	(0.34)	(1.43)		
Openness in PPP			2.348***	2.728***
			(0.31)	(0.99)
ln(Population)	0.182*	0.213**	0.128*	0.124*
	(0.10)	(0.11)	(0.07)	(0.07)
ln(Area)	-0.147*	-0.03	-0.06	-0.04
	(0.08)	(0.12)	(0.06)	(0.08)
European Languages	1.580***	1.714***	1.045***	1.021***
	(0.28)	(0.33)	(0.20)	(0.21)
Constant	5.412***	3.19	6.530***	6.375***
	(1.29)	(2.12)	(0.89)	(0.97)
Observations	1145	1145	1145	1145
R-squared	0.245		0.419	
Number of c1	151	151	151	151

Notes: On the LHS the ln(GDP per captia). Source: DOT, PWT 7.0, McNally (1993) and Rose(2004)

3. Main Results

Our Specifications

- Two definitions of "Growth Poles":
  - Trade with a **growth pole**, defined as the USA, UE15, or China.
  - Trade with a country's **main partner**, defined as the country with the greatest share of bilateral trade (exports and imports)
- We explore two characteristics of trading relations:
  - Spillovers linked to the **industry structure** :
    - IIT
    - Value Chains
  - Spillovers linked to the **type of products** traded:
    - Human Capital Skill-intensity
    - Technology intensity

Intra-Industry Trade

	Benchmark	*Main Partner*			*Pole 3*		
Openness	3.034**	2.695*	2.374*	2.272	2.405**	1.932*	1.702
	(1.431)	(1.511)	(1.435)	(1.488)	(1.084)	(1.131)	(1.255)
ln(population)	0.213**	-0.0490	-0.0724	-0.0441	-0.0505	-0.0835	-0.0866
	(0.108)	(0.127)	(0.123)	(0.113)	(0.0764)	(0.0777)	(0.0783)
ln(area)	-0.0332	0.144	0.139	0.104	0.0966	0.101*	0.0928
	(0.119)	(0.0966)	(0.0926)	(0.101)	(0.0621)	(0.0602)	(0.0617)
European Languages	1.714***	1.680***	1.607***	1.637***	0.722***	0.663***	0.640***
	(0.326)	(0.389)	(0.373)	(0.361)	(0.197)	(0.195)	(0.194)
Share of Trade		-3.018**	-3.166***	-3.463***	0.489	0.395	0.395
		(1.185)	(1.147)	(1.049)	(0.616)	(0.598)	(0.596)
IIT - Overall		2.213**	1.321		1.534**	0.733	
		(0.913)	(1.061)		(0.668)	(0.744)	
IIT - with partner			1.239*	2.205***		1.159*	1.882***
			(0.686)	(0.672)		(0.678)	(0.701)
Constant	3.194	6.462***	7.016***	7.102***	7.876***	8.533***	8.793***
	(2.124)	(2.202)	(2.147)	(2.147)	(1.064)	(1.135)	(1.221)
Observations	1145	1043	1.038	1,038		1,036	1,036
Number of Countries	151	143	143	143	142	142	142

Intra-Industry Trade

With data in PPP

	Benchmark	*Main Partner*			*Pole3*		
Openness	2.728***	2.655*	2.627*	2.523*	2.405**	1.932*	1.702
	(0.99)	(1.392)	(1.487)	(1.529)	(1.084)	(1.131)	(1.255)
ln(population)	0.124*	-0.0401	-0.0394	-0.00789	-0.0505	-0.0835	-0.0866
	(0.07)	(0.0952)	(0.0986)	(0.0928)	(0.0764)	(0.0777)	(0.0783)
ln(area)	-0.04	0.0857	0.0847	0.0489	0.0966	0.101*	0.0928
	(0.08)	(0.0734)	(0.0738)	(0.0781)	(0.0621)	(0.0602)	(0.0617)
European Languages	1.021***	0.958***	0.959***	1.008***	0.722***	0.663***	0.640***
	(0.212)	(0.244)	(0.246)	(0.246)	(0.197)	(0.195)	(0.194)
Share of Trade		-1.297	-1.299	-1.662**	0.489	0.395	0.395
		(0.803)	(0.821)	(0.829)	(0.616)	(0.598)	(0.596)
IIT - Overall		1.461*	1.417*		1.534**	0.733	
		(0.841)	(0.805)		(0.668)	(0.744)	
IIT - with partner			0.0753	1.121		1.159*	1.882***
			(0.670)	(0.797)		(0.678)	(0.701)
Constant	6.375***	8.053***	8.046***	8.084***	7.876***	8.533***	8.793***
	(0.215)	(1.408)	(1.508)	(1.522)	(1.064)	(1.135)	(1.221)
Observations	1145	1,043	1,038	1,038	1,036	1,036	1,036
Number of Countries	151	143	143	143	142	142	142

Upstreamness of Trade Flows

- Antras et al. (AER 2012) measure:
  - Calculated for 426 industries in the US based on the 2002 benchmark I-O matrices from BEA
  - Range from 1 (final use output such as cars and footwear) to 4.65 (processing of raw materials, petrochemical)
  - US measures yield industry rankings that are consistent with those from European data: stable across countries

- We use the US data as a benchmark and calculate a weighted average of industry upstreamness for individual countries' overall exports and imports and on a bilateral basis, with its main trading partner or with a growth pole

Value Chains: Upstreamness in Exports

	Main Patner			Pole		
Openness	2.969**	4.436	4.329	2.920**	3.259	3.612
	(1.393)	(3.472)	(3.377)	(1.377)	(2.532)	(3.465)
ln(population)	-0.00496	-0.0612	-0.0508	0.0270	-0.0119	-0.0120
	(0.123)	(0.202)	(0.184)	(0.126)	(0.183)	(0.220)
ln(area)	0.109	0.175	0.169	0.0934	0.144	0.182
	(0.108)	(0.240)	(0.241)	(0.109)	(0.188)	(0.202)
Share of Trade	-3.099**	-2.134	-2.266	0.947	0.734	0.646
	(1.221)	(2.104)	(1.877)	(0.977)	(1.357)	(1.375)
European Languages	1.773***	1.180*	1.160*	1.345***	0.990*	1.025
	(0.379)	(0.697)	(0.636)	(0.351)	(0.529)	(0.644)
IIT - Overall	2.195**	0.480		2.254***	-1.276	
	(0.895)	(2.561)		(0.858)	(2.425)	
IIT - with partner		1.317	1.583		3.756**	2.451*
		(1.327)	(1.253)		(1.614)	(1.256)
Upstreamness in Exports - Overall	0.657*	0.296		0.809**	0.470	
	(0.396)	(0.758)		(0.400)	(0.627)	
Upstreamness in Exports - with partner		0.221	0.233*		0.312**	0.317**
		(0.158)	(0.135)		(0.137)	(0.131)
Constant	4.306**	4.176	4.892	2.629	3.033	3.562
	(1.995)	(3.571)	(3.951)	(2.104)	(3.235)	(5.429)
Observations	972	590	622	965	641	676
Number of Countries	143	91	91	142	98	98

Type of Products: High-Skill Products

	Main Partner			Pole		
Openness	3.606**	3.499***	3.393**	3.440**	3.264**	3.187**
	(1.449)	(1.344)	(1.342)	(1.457)	(1.339)	(1.328)
ln(population)	0.103	0.0920	0.108	0.142	0.150	0.160
	(0.109)	(0.108)	(0.106)	(0.112)	(0.108)	(0.106)
ln(area)	0.0729	0.0592	0.0305	0.0509	0.0350	0.0257
	(0.128)	(0.122)	(0.121)	(0.126)	(0.118)	(0.117)
Share of Trade	-3.820***	-3.602***	-3.375***	0.543	0.167	0.201
	(1.217)	(1.200)	(1.189)	(1.112)	(1.095)	(1.084)
European Languages	1.867***	1.825***	1.845***	1.398***	1.498***	1.541***
	(0.365)	(0.359)	(0.355)	(0.362)	(0.355)	(0.346)
High Skill product - Overall	7.162***	4.436		6.892***	2.274	
	(1.915)	(2.897)		(2.013)	(2.950)	
High Skill product - with partner		2.455	4.775***		4.712**	5.941***
		(1.928)	(1.174)		(2.098)	(1.333)
Constant	3.779*	4.026**	4.262**	2.445	2.547	2.662
	(1.996)	(1.899)	(1.892)	(2.081)	(1.962)	(1.943)
Observations	979	904	904	972	898	898
Number of Countries	144	144	144	143	143	143

Note: Dependant Variable: Ln(GDP per capita). The factor intensity classification of product of Hinloopen and Van Marrewijk is used.

Type of Products: High-Technological Products

	Main Partner			Pole3		
Openness	2.605	1.852	3.122*	2.494	1.724	2.696*
	(1.962)	(1.760)	(1.628)	(1.925)	(1.845)	(1.562)
ln(population)	0.0300	-0.0638	0.156	0.0555	-0.0124	0.123
	(0.179)	(0.165)	(0.136)	(0.185)	(0.177)	(0.144)
ln(area)	0.0627	0.0596	0.00178	0.0535	0.0388	0.0214
	(0.0956)	(0.0862)	(0.108)	(0.0961)	(0.0903)	(0.103)
Share of Trade	-3.454***	-3.668***	-3.840***	1.353	0.812	1.616
	(1.273)	(1.138)	(1.310)	(0.991)	(0.978)	(1.162)
European Languages	1.881***	1.711***	2.037***	1.360***	1.317***	1.391***
	(0.438)	(0.390)	(0.386)	(0.403)	(0.373)	(0.394)
High Technology - Overall	2.474	9.017***		2.491	7.227*	
	(3.413)	(3.416)		(3.328)	(4.202)	
High Technology - with partner		-5.104***	-0.709		-3.418*	0.803
		(1.466)	(1.895)		(2.037)	(1.928)
Constant	6.386**	8.244***	4.950**	5.010	6.645**	4.168*
	(3.233)	(2.971)	(2.447)	(3.366)	(3.301)	(2.507)
Observations	979	907	907	972	897	897
Number of Countries	144	144	144	143	143	143

High-Skill and High-Technological Products

	Main parnter			Pole3		
Openness	3.503*	2.825	3.627**	3.263	2.619	3.263**
	(2.119)	(1.881)	(1.629)	(2.073)	(1.972)	(1.567)
ln(population)	0.0826	0.00796	0.165	0.105	0.0721	0.170
	(0.191)	(0.174)	(0.135)	(0.196)	(0.187)	(0.143)
ln(area)	0.0810	0.0579	-0.00413	0.0656	0.0372	0.0203
	(0.101)	(0.0902)	(0.107)	(0.101)	(0.0921)	(0.101)
Share of Trade	-3.776***	-3.648***	-3.550***	0.532	-0.282	0.135
	(1.349)	(1.173)	(1.297)	(1.079)	(1.045)	(1.225)
European Languages	1.842***	1.673***	1.897***	1.364***	1.474***	1.563***
	(0.459)	(0.407)	(0.386)	(0.421)	(0.395)	(0.393)
High Skill product - Overall	7.085***	4.004		6.763***	1.100	
	(1.989)	(2.639)		(2.087)	(2.844)	
High Skill product - with partner		2.226	4.927***		5.098**	6.074***
		(1.847)	(1.218)		(2.021)	(1.381)
High Technology - Overall	0.501	6.037		0.885	4.653	
	(3.715)	(3.737)		(3.604)	(4.535)	
High Technology - with partner		-4.402***	-1.434		-2.908	-0.298
		(1.560)	(1.902)		(2.138)	(1.962)
Constant	4.053	5.702*	3.631	2.954	4.204	2.513
	(3.556)	(3.225)	(2.483)	(3.690)	(3.618)	(2.548)
Observations	979	900	900	972	892	892
Number of Countries	144	144	144	143	143	143

Summary of Main Findings

- A well-established fact in the literature is that trade leads to output growth. But the conditions under which a country can sustain growth though trade have still not been examined….
  - This paper is a step forward in this regard
- We provide evidence that not only the volume of trade is important, but also its nature: **which industries are involved** and **which products are traded**. A positive effect in income is observed when:
  - Trade in similar industries
  - Insertion in global value chains
  - Trade in skill-intensive goods
- We provide evidence on the importance of having linkages to one of the major world growth poles

Decomposition of the GDP

- The log of output per worker can be decomposed in

$$\ln\left(\frac{Y_i}{N_i}\right) = \frac{\alpha}{1-\alpha}\ln\left(\frac{K_i}{Y_i}\right) + \phi(S_i) + \ln(A_i)$$

  - The contribution of capital depth (reflecting such factors as investment and population growth) (Easterly and Levine, 2001)
  - The contribution of the human capital defined as a function of schooling (Hall and Jones, 1999; Daude and Fernández-Arias, 2010)
  - The contribution of productivity (TFP)

IIT with the Main Partner

	Main Partner								
Dependant Varaiable	*a/(1-a)(K/Y)*			*ln(H)*			*TFP*		
Openess	-0.0778	-0.0367	-0.0218	0.568*	0.539*	0.510	1.188	1.049	0.878
	(0.355)	(0.350)	(0.364)	(0.306)	(0.306)	(0.320)	(0.881)	(0.871)	(0.921)
ln(population)	-0.0225	-0.0189	-0.0235	-0.0363	-0.0381	-0.0333	-0.0615	-0.0679	-0.0388
	(0.0329)	(0.0327)	(0.0305)	(0.0245)	(0.0242)	(0.0222)	(0.0772)	(0.0753)	(0.0700)
ln(area)	0.00252	0.00298	0.00812	0.0545**	0.0535**	0.0473**	0.0653	0.0601	0.0259
	(0.0264)	(0.0264)	(0.0284)	(0.0216)	(0.0214)	(0.0235)	(0.0725)	(0.0708)	(0.0767)
Share of Trade	0.345	0.376	0.418	-0.485*	-0.504**	-0.555**	-1.506*	-1.575**	-1.762**
	(0.305)	(0.309)	(0.291)	(0.258)	(0.253)	(0.226)	(0.778)	(0.756)	(0.707)
European Languages	-0.0133	-0.00640	-0.0149	0.231***	0.226***	0.230***	0.790***	0.770***	0.800***
	(0.0987)	(0.0982)	(0.0939)	(0.0790)	(0.0781)	(0.0751)	(0.236)	(0.231)	(0.222)
IIT - Overall	-0.360	-0.199		0.291	0.196		1.523***	1.022	
	(0.227)	(0.299)		(0.186)	(0.205)		(0.552)	(0.655)	
IIT - with partner		-0.203	-0.346**		0.124	0.272*		0.612	1.369***
		(0.205)	(0.173)		(0.146)	(0.153)		(0.491)	(0.445)
Constant	1.729***	1.643***	1.638***	0.765*	0.817*	0.834**	4.565***	4.782***	4.808***
	(0.540)	(0.535)	(0.539)	(0.421)	(0.423)	(0.424)	(1.240)	(1.226)	(1.217)
Observations	848	845	845	887	887	887	736	736	736
Number of c1	117	117	117	116	116	116	97	97	97

IIT with a Growth Pole

				Pole3					
Dependant Varaiable	*a/(1-a)(K/Y)*			*ln(H)*			*TFP*		
Openess	-0.0281	0.154	0.153	0.537*	0.394	0.352	1.010	0.292	0.228
	(0.344)	(0.349)	(0.385)	(0.294)	(0.279)	(0.306)	(0.803)	(0.764)	(0.814)
ln(population)	-0.0223	-0.00791	-0.00792	-0.0378	-0.0513**	-0.0527**	-0.0676	-0.119*	-0.119*
	(0.0330)	(0.0337)	(0.0336)	(0.0243)	(0.0232)	(0.0232)	(0.0731)	(0.0660)	(0.0656)
ln(area)	0.00351	0.00543	0.00529	0.0541**	0.0522***	0.0497**	0.0657	0.0387	0.0332
	(0.0264)	(0.0266)	(0.0276)	(0.0216)	(0.0195)	(0.0203)	(0.0691)	(0.0613)	(0.0631)
Share of Trade	0.315	0.348	0.349	-0.228	-0.270	-0.270	0.147	0.0484	0.0555
	(0.254)	(0.257)	(0.256)	(0.187)	(0.169)	(0.165)	(0.586)	(0.508)	(0.506)
European Languages	0.00427	0.0415	0.0413	0.193***	0.169***	0.163**	0.539***	0.466***	0.462***
	(0.0910)	(0.0929)	(0.0943)	(0.0692)	(0.0659)	(0.0649)	(0.204)	(0.180)	(0.179)
IIT - Overall	-0.430**	0.00743		0.375**	0.109		1.651***	0.175	
	(0.217)	(0.323)		(0.168)	(0.201)		(0.482)	(0.600)	
IIT - with partner		-0.549**	-0.542***		0.363*	0.472***		1.893***	2.060***
		(0.277)	(0.205)		(0.190)	(0.157)		(0.608)	(0.438)
Constant	1.723***	1.357**	1.360**	0.716*	1.035**	1.109**	4.369***	5.769***	5.858***
	(0.547)	(0.567)	(0.608)	(0.432)	(0.431)	(0.464)	(1.189)	(1.163)	(1.204)
Observations	841	841	841	880	880	880	729	729	729
Number of c1	116	116	116	115	115	115	96	96	96

IIT with the Main Partner

With data in PPP

	Main Partner								
Dependant Variable	*a/(1-a)(K/Y)*			*ln(H)*			*TFP*		
open_ppp_i	-0.138	-0.0908	-0.0758	0.642*	0.644*	0.612	1.560	1.479	1.305
	(0.458)	(0.478)	(0.493)	(0.344)	(0.372)	(0.385)	(1.092)	(1.162)	(1.224)
lpopeco1	-0.0238	-0.0206	-0.0248	-0.0312	-0.0310	-0.0260	-0.0236	-0.0286	-0.00677
	(0.0329)	(0.0336)	(0.0311)	(0.0256)	(0.0267)	(0.0245)	(0.0881)	(0.0900)	(0.0813)
larea1	0.00279	0.00277	0.00722	0.0438**	0.0438**	0.0377*	0.0361	0.0354	0.00959
	(0.0246)	(0.0247)	(0.0260)	(0.0184)	(0.0186)	(0.0197)	(0.0605)	(0.0601)	(0.0633)
ShareOfTrade	0.324	0.363	0.406	-0.301	-0.299	-0.365*	-1.212*	-1.265*	-1.478**
	(0.280)	(0.283)	(0.282)	(0.212)	(0.212)	(0.201)	(0.688)	(0.676)	(0.640)
eurfrac1	-0.00605	-0.00378	-0.0130	0.166***	0.166**	0.174***	0.723***	0.717***	0.753***
	(0.0866)	(0.0868)	(0.0851)	(0.0641)	(0.0647)	(0.0626)	(0.218)	(0.217)	(0.208)
IIT1	-0.320	-0.182		0.208	0.214		1.128	0.898	
	(0.296)	(0.301)		(0.223)	(0.202)		(0.764)	(0.707)	
IIT_cp_with_pole		-0.184	-0.318		-0.00908	0.157		0.301	1.003
		(0.222)	(0.260)		(0.182)	(0.218)		(0.594)	(0.709)
Constant	1.737***	1.668***	1.667***	0.857**	0.854**	0.865**	4.362***	4.474***	4.507***
	(0.482)	(0.504)	(0.504)	(0.384)	(0.415)	(0.414)	(1.307)	(1.378)	(1.365)
Observations	848	845	845	887	887	887	736	736	736
Number of c1	117	117	117	116	116	116	97	97	97

IIT with a Growth Pole

With data in PPP

	Pole3								
Dependant Variable	*a/(1-a)(K/Y)*			*ln(H)*			*TFP*		
open_ppp_i	-0.0747	0.154	0.153	0.537*	0.394	0.352	1.270	0.476	0.420
	(0.425)	(0.451)	(0.516)	(0.294)	(0.279)	(0.306)	(0.796)	(0.926)	(1.044)
lpopeco1	-0.0233	-0.0101	-0.0101	-0.0378	-0.0513**	-0.0527**	-0.0452	-0.106	-0.107
	(0.0317)	(0.0330)	(0.0328)	(0.0243)	(0.0232)	(0.0232)	(0.0662)	(0.0717)	(0.0736)
larea1	0.00280	0.00347	0.00346	0.0541**	0.0522***	0.0497**	0.0461	0.0353	0.0325
	(0.0253)	(0.0258)	(0.0269)	(0.0216)	(0.0195)	(0.0203)	(0.0500)	(0.0494)	(0.0517)
ShareOfTrade	0.323	0.345	0.345	-0.228	-0.270	-0.270	0.160	0.0501	0.0531
	(0.258)	(0.262)	(0.263)	(0.187)	(0.169)	(0.165)	(0.489)	(0.473)	(0.474)
eurfrac1	0.00601	0.0281	0.0281	0.193***	0.169***	0.163**	0.484***	0.453***	0.453***
	(0.0833)	(0.0856)	(0.0854)	(0.0692)	(0.0639)	(0.0649)	(0.164)	(0.160)	(0.160)
IIT1	-0.400	0.000855		0.375**	0.109		1.297**	0.115	
	(0.282)	(0.349)		(0.168)	(0.201)		(0.569)	(0.587)	
IIT_cp_with_pole		-0.558*	-0.557*		0.363*	0.472***		1.776***	1.902***
		(0.286)	(0.290)		(0.190)	(0.157)		(0.668)	(0.683)
Constant	1.734***	1.449***	1.449***	0.716*	1.035**	1.109**	4.438***	5.666***	5.729***
	(0.437)	(0.470)	(0.505)	(0.432)	(0.431)	(0.464)	(0.949)	(1.119)	(1.213)
Observations	841	841	841	880	880	880	729	729	729
Number of c1	116	116	116	115	115	115	96	96	96

Upstreamness with the Main Partner

	Main Partner								
Dependant Variable	a/(1-a)(K/Y)			*ln(H)*			*TFP*		
Openess	-0.0401	0.0191	0.00505	0.566**	0.732	0.720	1.275	1.883	1.838
	(0.323)	(0.605)	(0.587)	(0.266)	(0.630)	(0.671)	(0.796)	(2.128)	(2.237)
ln(population)	-0.0187	-0.0937**	-0.0940**	-0.0353	-0.0154	-0.0151	-0.0468	-0.00951	0.0368
	(0.0316)	(0.0390)	(0.0381)	(0.0233)	(0.0416)	(0.0356)	(0.0774)	(0.138)	(0.127)
ln(area)	0.000334	0.0619	0.0610	0.0534**	0.0445	0.0435	0.0600	0.0524	0.0205
	(0.0280)	(0.0519)	(0.0541)	(0.0233)	(0.0462)	(0.0506)	(0.0768)	(0.196)	(0.225)
Share of Trade	0.365	0.985**	0.984**	-0.490*	-0.380	-0.362	-1.493*	-1.625	-1.909
	(0.309)	(0.409)	(0.384)	(0.260)	(0.443)	(0.357)	(0.804)	(1.482)	(1.293)
European Languages	-0.0104	-0.0706	-0.0698	0.233***	0.153	0.146	0.791***	0.706	0.790
	(0.0970)	(0.141)	(0.133)	(0.0749)	(0.138)	(0.127)	(0.238)	(0.491)	(0.483)
IIT - Overall	-0.372*	-0.0309		0.299*	-0.0167		1.550***	0.882	
	(0.219)	(0.441)		(0.179)	(0.513)		(0.544)	(1.621)	
IIT - with partner		-0.305	-0.316		0.173	0.157		0.311	0.893
		(0.278)	(0.214)		(0.230)	(0.334)		(0.914)	(1.134)
Upstreamness in Exports - Overall	0.0529	-0.0414		0.0242	0.00343		0.230	0.00768	
	(0.109)	(0.146)		(0.0792)	(0.143)		(0.267)	(0.489)	
Upstreamness in Exports - with partner		0.00728	0.00847		0.0351	0.0345		0.0759	0.105
		(0.0294)	(0.0262)		(0.0301)	(0.0236)		(0.0994)	(0.0819)
Constant	1.535***	2.405***	2.322***	0.699*	0.321	0.333	3.782***	3.357	2.963
	(0.517)	(0.642)	(0.585)	(0.377)	(0.715)	(0.850)	(1.268)	(2.380)	(2.158)
Observations	791	462	487	829	519	546	688	406	427
Number of c1	117	73	73	116	75	75	97	60	60

Upstreamness with a Growth Pole

	Pole3								
Dependant Variable	a/(1-a)(K/Y)			ln(H)			*TFP*		
Openess	0.00456	-0.0243	0.0268	0.536**	0.491	0.497	1.178	0.801	0.923
	(0.314)	(0.567)	(0.694)	(0.256)	(0.420)	(0.601)	(0.733)	(1.205)	(1.633)
ln(population)	-0.0194	-0.0833**	-0.0819**	-0.0361	-0.0182	-0.0179	-0.0383	-0.00458	-0.0251
	(0.0319)	(0.0397)	(0.0400)	(0.0234)	(0.0336)	(0.0405)	(0.0744)	(0.0917)	(0.0974)
ln(area)	0.00183	0.0546	0.0569	0.0525**	0.0323	0.0329	0.0549	-0.0268	0.000845
	(0.0279)	(0.0472)	(0.0518)	(0.0232)	(0.0351)	(0.0390)	(0.0732)	(0.115)	(0.141)
Share of Trade	0.319	0.234	0.259	-0.225	-0.294	-0.290	0.238	0.0636	-0.0269
	(0.258)	(0.317)	(0.309)	(0.197)	(0.226)	(0.216)	(0.618)	(0.660)	(0.664)
European Languages	0.00817	0.0755	0.0777	0.195***	0.178**	0.176*	0.538***	0.465*	0.463*
	(0.0900)	(0.118)	(0.120)	(0.0673)	(0.0869)	(0.101)	(0.208)	(0.239)	(0.248)
IIT - Overall	-0.443**	-0.189		0.382**	-0.0319		1.646***	-0.546	
	(0.210)	(0.533)		(0.160)	(0.400)		(0.475)	(1.096)	
IIT - with partner		-0.184	-0.342		0.423	0.388		2.464***	1.878**
		(0.372)	(0.253)		(0.270)	(0.256)		(0.823)	(0.744)
Upstreamness in Exports - Overall	0.0437	-0.0526		0.030	0.00927		0.386	0.434	
	(0.108)	(0.146)		(0.0787)	(0.110)		(0.251)	(0.322)	
Upstreamness in Exports - with partner		-0.00452	-0.00406		0.0448**	0.0446**		0.145**	0.139**
		(0.0336)	(0.0314)		(0.0218)	(0.0201)		(0.0679)	(0.0674)
Constant	1.568***	2.533***	2.320**	0.623	0.434	0.441	2.985**	2.705*	3.786*
	(0.526)	(0.719)	(0.943)	(0.387)	(0.579)	(0.997)	(1.231)	(1.624)	(2.289)
Observations	784	527	555	822	561	591	681	461	485
Number of c1	116	81	81	115	82	82	96	67	67

Type of Products Traded with a Growth Pole

				Pole3					
Dependant Variable	α/(1-α)(K/Y)			*ln(H)*			*TFP*		
Openess	0.0171	0.0951	-0.102	0.719*	0.668	0.632**	1.047	0.815	1.252
	(0.442)	(0.454)	(0.335)	(0.374)	(0.411)	(0.290)	(1.138)	(1.054)	(0.933)
ln(population)	-0.0222	-0.0226	-0.0497	-0.00738	-0.0133	-0.00947	0.0219	0.00395	0.0747
	(0.0433)	(0.0437)	(0.0332)	(0.0281)	(0.0301)	(0.0217)	(0.0911)	(0.0867)	(0.0768)
ln(area)	0.00945	0.0157	0.0193	0.0296*	0.0305*	0.0261	-0.00654	-0.0219	-0.0390
	(0.0241)	(0.0242)	(0.0239)	(0.0172)	(0.0180)	(0.0183)	(0.0619)	(0.0581)	(0.0626)
Share of Trade	0.327	0.423	0.287	-0.257	-0.244	-0.277	0.00950	-0.484	-0.346
	(0.277)	(0.282)	(0.303)	(0.190)	(0.201)	(0.217)	(0.723)	(0.815)	(0.933)
European Languages	0.00482	-0.0267	-0.0270	0.145**	0.142**	0.168***	0.481**	0.606***	0.724***
	(0.0871)	(0.0874)	(0.0878)	(0.0611)	(0.0624)	(0.0592)	(0.209)	(0.218)	(0.223)
High Skill product - Overall	-0.968	0.363		0.870**	0.926		5.686***	1.939	
	(0.767)	(1.018)		(0.405)	(0.587)		(1.807)	(2.123)	
High Skill product - with partner		-0.941*	-0.901**		-0.124	0.427		2.546*	4.007***
		(0.539)	(0.392)		(0.438)	(0.280)		(1.408)	(1.036)
High Technology - Overall	-0.886	-1.525		-0.228	-0.0830		1.287	3.187	
	(0.818)	(1.137)		(0.637)	(0.978)		(2.160)	(2.040)	
High Technology - with partner		0.578	-0.311		-0.0450	-0.135		-1.598	0.0441
		(0.556)	(0.452)		(0.449)	(0.345)		(1.246)	(1.443)
Constant	1.769**	1.610*	2.145***	0.509	0.602	0.655**	2.925*	3.698**	2.650**
	(0.831)	(0.866)	(0.568)	(0.403)	(0.462)	(0.301)	(1.776)	(1.616)	(1.276)
Observations	791	727	727	822	751	751	681	622	622
Number of Countries	117	117	117	115	115	115	96	96	96

Summary of the Main Findings

- We provide evidence that not only the volume of trade is important, but also its nature: **which industries are involved** and **which products are traded**.
  - In particular, the nature of trade linkages to one of the **major world growth poles** matter a great deal for income
    - Greater degree of IIT with a Pole
    - Insertion in Global Value Chains with a Pole
    - Skill-Intensity embeded in goods traded with a Pole

- The decomposition of GDP suggests that these factors work mostly through their effects on productivity (TFP)

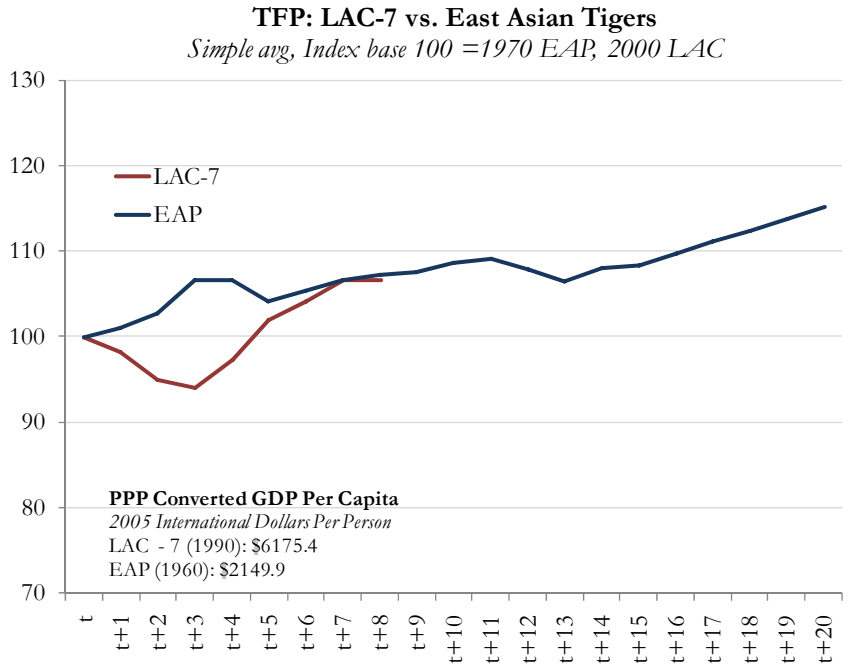
4. A Case Study:

LAC's connection with China

The LAC- China Connection: Channels of Growth Spillovers

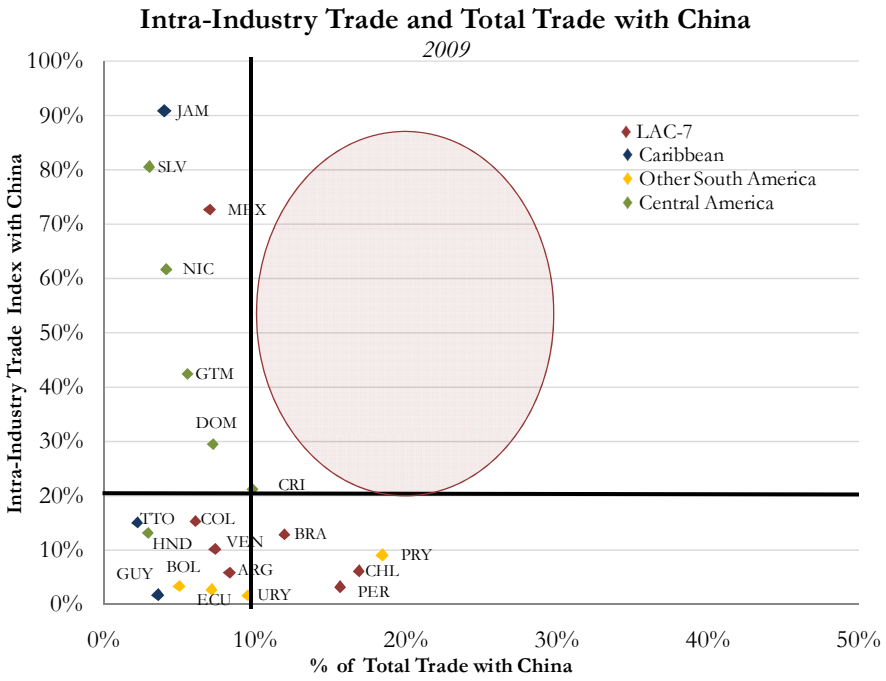
- Very important so far have been (of relatively short-lived nature):
  - China's demand for LAC's exports
  - Indirectly, China's role in driving commodity prices up

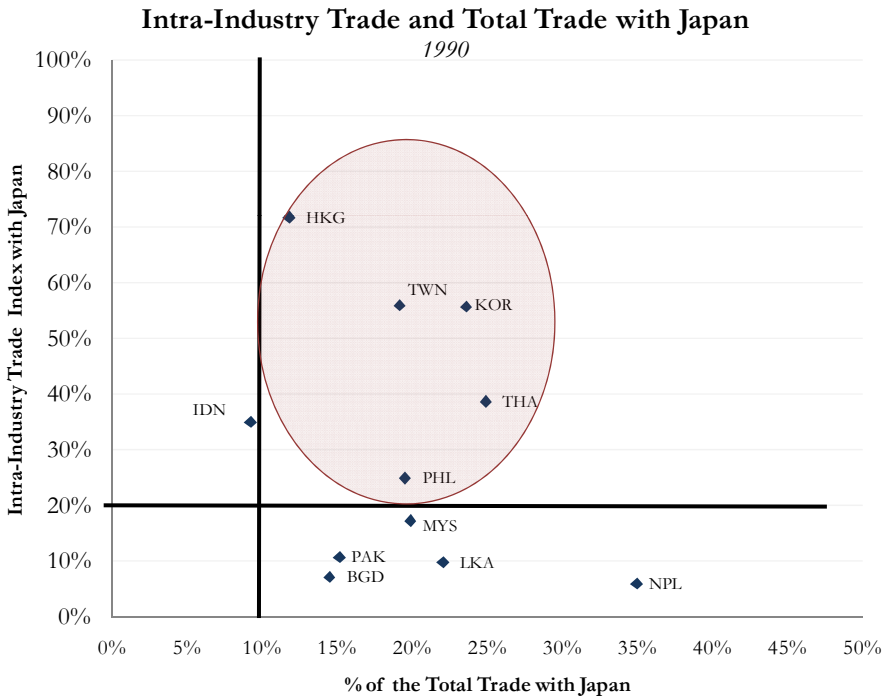
- Can LAC leverage this connection further?
  - China is one of the world major growth poles
  - What are the characteristics of LAC-China trade flows?



Growth poles and technology diffusion

The degree of intra-industry trade with growth poles



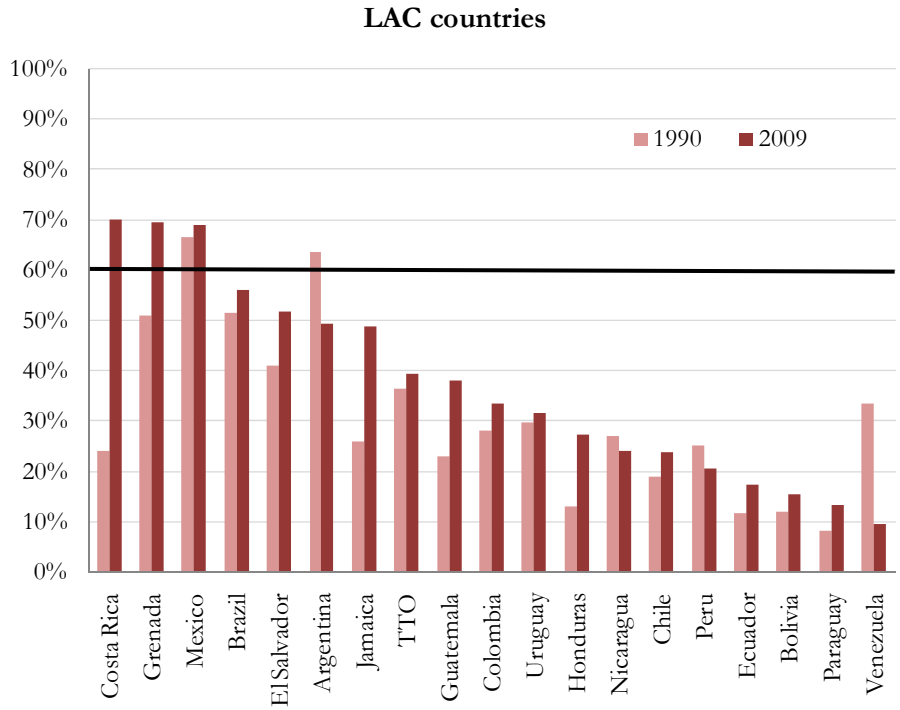


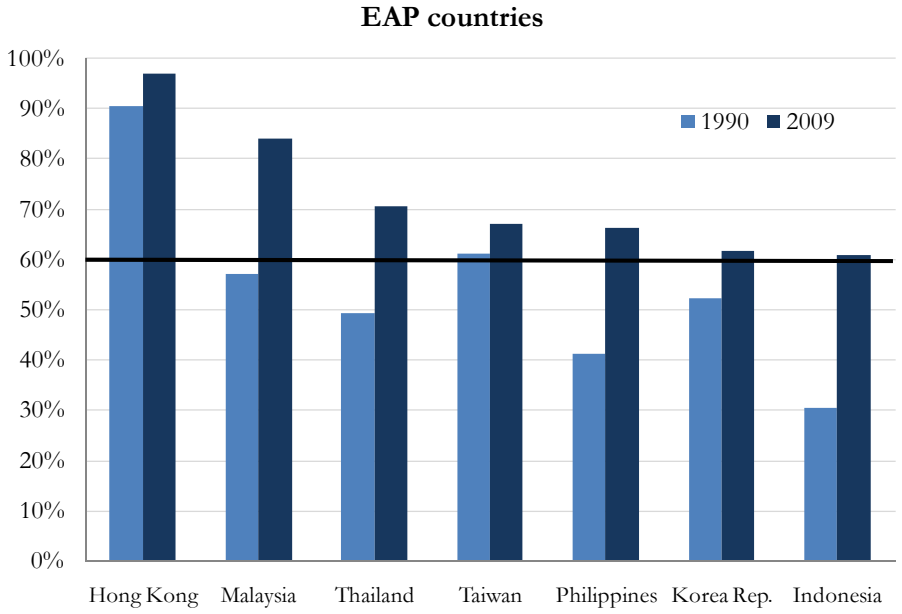
Source: WITS.

The overall degree of intra-industry trade

There is little evidence of technology diffusion through trade in the connection to LAC-China, which seems to rely extensively on comparative advantage forces…

… this is a broader pattern characterizing trade dynamics of many LAC countries.

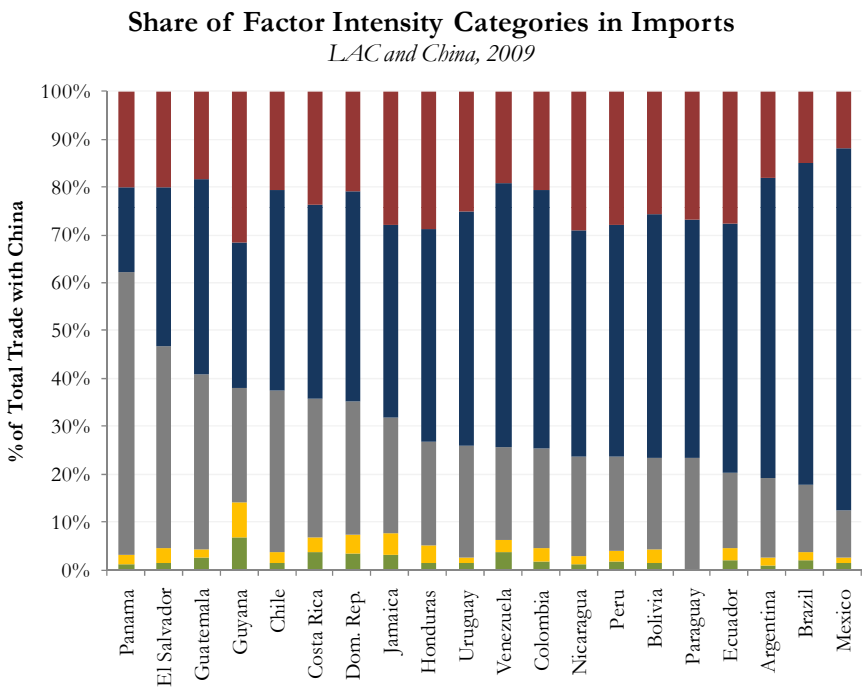


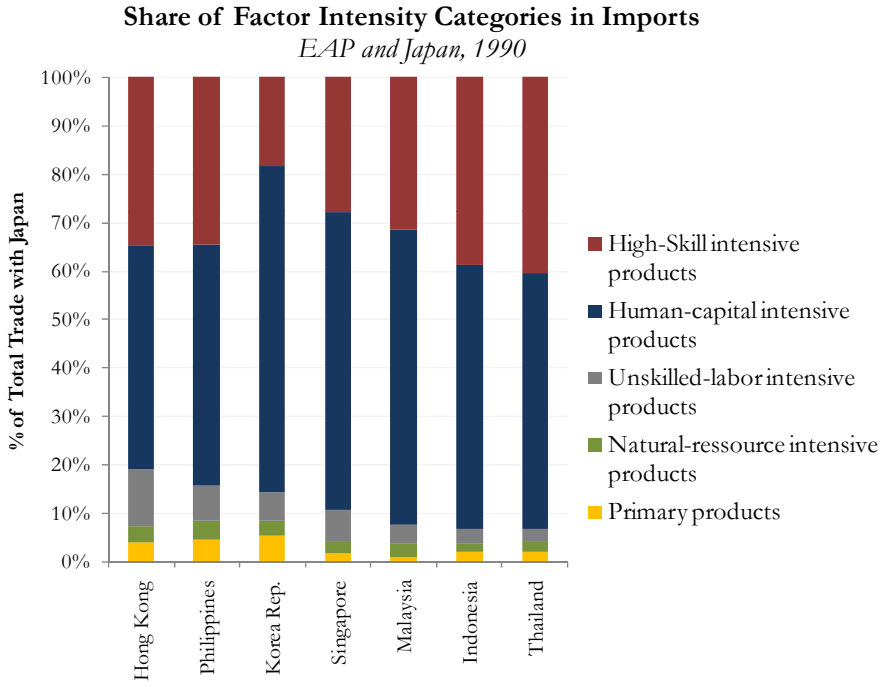


Sources: WITS

Growth poles and technology diffusion

Composition of imports from growth poles

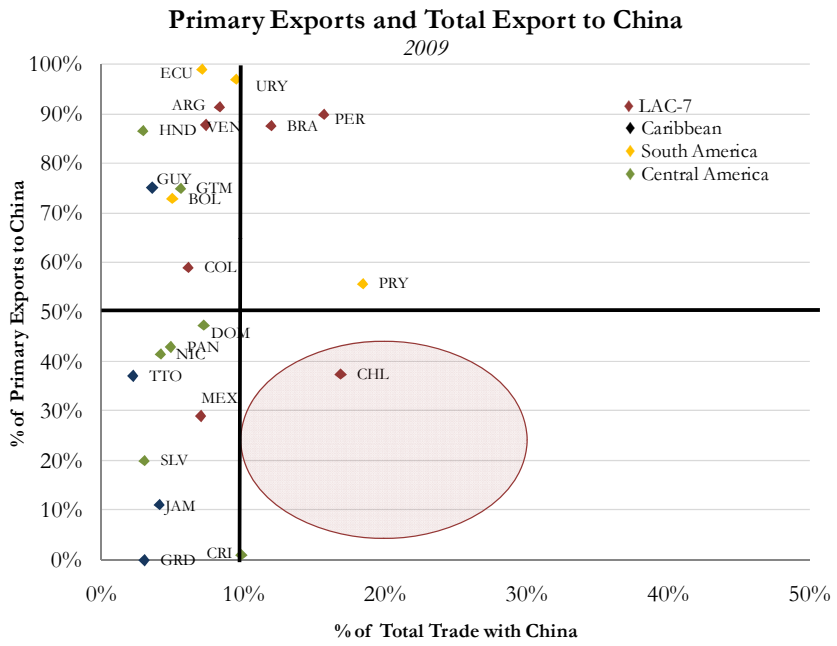


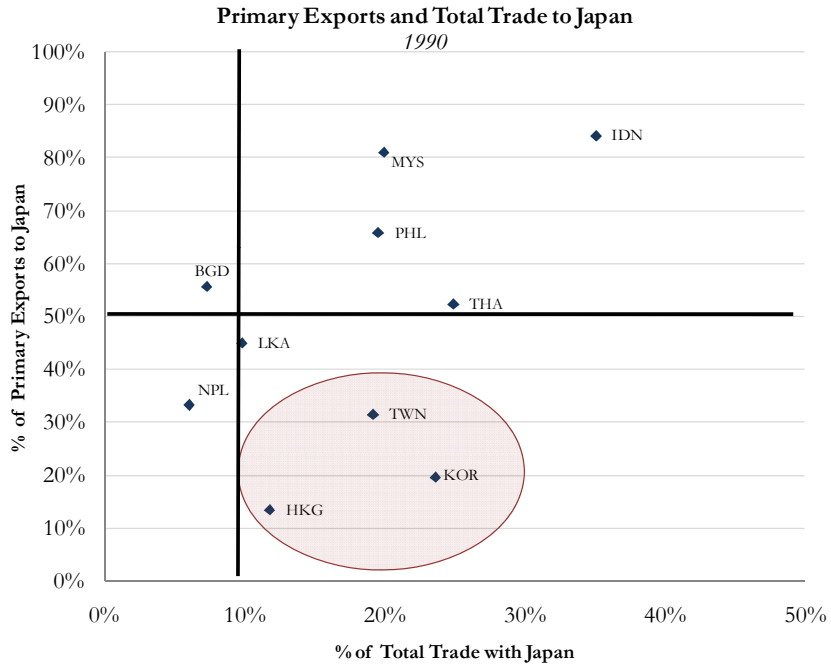


Notes: Only countries with more than 5% of total trade with China are reported. The factor intensity classification of product of Hinloopen and Van Marrewijk is used.

Growth poles and technology diffusion

Composition of exports to growth poles





Source: WITS.

Domestic policies can also play an important role in fostering spillover effects….

- East Asian Tigers put in place a wide set of policies to actively seek for foreign technology [World Bank (1993)]:
  - Fostering imports of capital goods
  - Incentives to foreign training
  - Incentives to FDI inflows

- In addition, East Asian Tigers followed an exchange rate policy geared at fostering export competitiveness:
  - Feasible with relatively closed capital accounts (*impossible trinity* concerns)

The LAC-China Connection

- Comparing the LAC-China and Tigers-Japan connections lead to a mixed evaluation
- So far, China has not been a conduit for technological diffusion and knowledge spillovers
  - There is no meaningful intra-industry trade between LAC and China
  - Exports are concentrated in natural resources
  - Imports from China are concentrated on unskilled-labor intensive goods

But there are some hopeful signs in LAC

- Commodity production per se is not "inferior" to others: it is not about the technology embedded in products, but the skill-intensity…
- …there is some spotty but robust evidence of some bright spots in LAC: some commodity sectors are benefiting from technological innovation, generating cross-sectoral linkages, value upgrading, and employment.
  - Biotechnological revolution and connectivity in Argentina, Brazil, and Uruguay
  - Climbing the quality ladder in metal production in the region
  - Clusters of activity (employment, SMEs) around copper production and salmon farming in Chile
- The central point is that it is not necessarily what you produce and trade but how it is being produced and whether it is generating positive spillovers to the rest of the economy.

Thank you