

LATIN AMERICA AND THE CARIBBEAN IN VALUE CHAINS

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Purpose: Analysis of intra-regional value chains in Latin America and the Caribbean

- International trade is increasingly centered around several types of value chains: national and regional – those that have recently leaned toward the creation of “mega-regions” such as the North America Factory, Asia Factory and Europe Factory
- Between 1980 and 2012, global trade grew at an average annual rate that doubled the average rate of GDP growth
- In the last few decades, Latin America and the Caribbean also experienced an increase in this correlation. Notwithstanding the levels reached, it is still a far reach from the European Union or Asia Factory

Main Objective

- Present empirical evidence related to the research conducted by ECLAC and ITID regarding:
 - Latin America and the Caribbean's participation in global value chains
 - Presence of regional value chains in Latin America and the Caribbean
- Results based on analyzing trade information available on the United Nations' COMTRADE database.

Topics to be covered in the presentation

- Identify the presence of LAC countries in value chains:
 - Methodology
 - Insertion in Global Value Chains: Mexico and Costa Rica with the US
 - Insertion in regional chains: a) Guatemala – Central America; b) Argentina – Brazil; c) Colombia – Andean Community
- Conclusions

¿How do we measure LAC's participation in global and regional value chains?

- The most adequate methodology to measure the participation of Latin American countries in regional value chains is to utilize an interconnected input-output matrix.
- However, there are only updated I-Os for few countries in the region (Brazil, Chile, Colombia and Uruguay)
- Therefore, a manner - albeit in estimates and indirectly - of determining the existence of productive chains is through trade in intermediate goods as parts and pieces:
 - The greater this type of trade between 2 or more countries, the more indications of productive integration (joint production networks)
 - This was the methodology used.

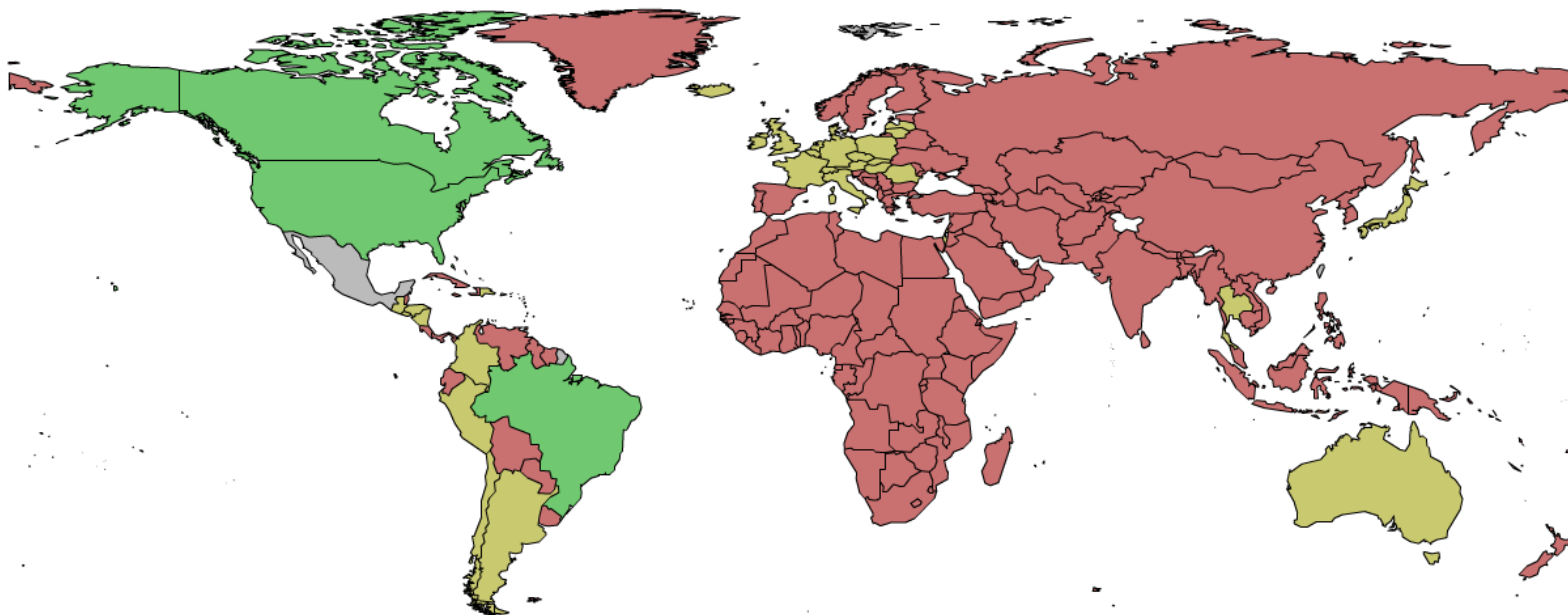
Methodology employed

- **Calculation of Grubel-Lloyd (intra-industrial trade)**

$$\textit{ForIndustries} = 1 - \frac{|X_{ij}^k - M_{ij}^k|}{X_{ij}^k + M_{ij}^k} \quad \textit{BetweenPartners} = 1 - \frac{\sum |X_{ij}^k - M_{ij}^k|}{\sum (X_{ij}^k + M_{ij}^k)}$$

- **There are three levels: greater than 0.33 (evidence of intra-industrial trade), greater than 0.10 and less than 0.33 (potential for intra-industrial trade), and less than 0.10 (inter-industrial relations)**
- **Identify intermediate goods as they are mostly linked to value chains**
- **The SITC and BEC classifications were used. To identify the quality of exports, the Lall classification of technological intensity was used:**
 - Intermediate industrial (Products which include low, medium and high-technology) (Parts and pieces of multiple industries)
 - Intermediate semi-elabroated (Natural resource-based manufactures)
 - Consumer goods were also analyzed (textile and clothing industry) and some final goods (motor vehicles and machinery).

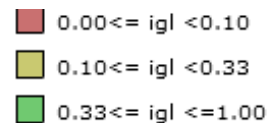
The main industries in Mexico are tied to the value chains of the North American Factory and are electric and electronics, automotive and steel



Mexico: Presence of main industries in value chains of North American Factory

% of exports of intermediate goods

Industries	Mexico
Electric and electronics	25
Automotive (and auto parts)	21
Aerospace	1
Steel and metal industry	18
Machinery and equipment	13
Chemical and petrochemical	11
Medical Equipment	7
7 main industries	95



■ Interindustrial trade
■ With intraindustrial potential
■ Intraindustrial trade

Generally, it involves industries that produce medium- and high-technology products, such as parts and pieces for motor vehicles and telecommunication equipment and parts, among others

95% of this trade is intra-industrial

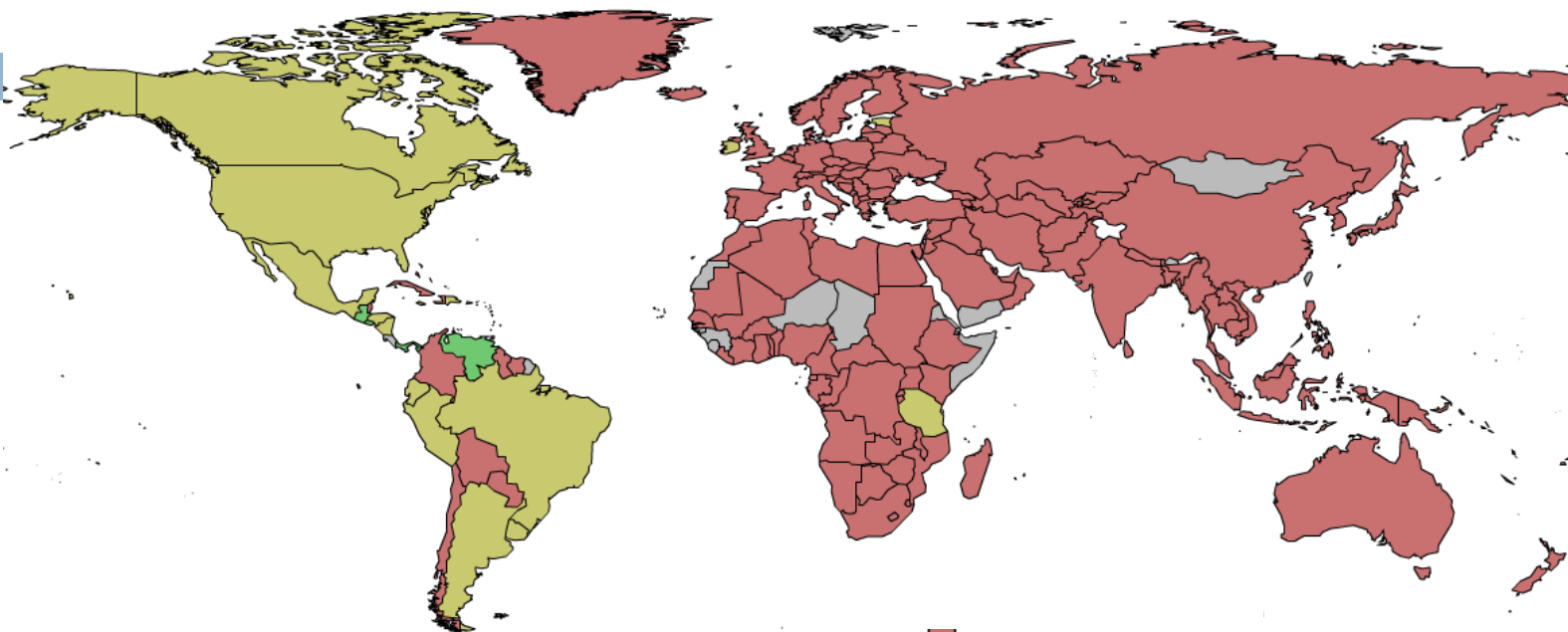
Mexico's presence in the following chains should be highlighted: automotive and auto parts, electric equipment and electronics

Mexico-United States: Main product groups with a high intra-industrial relations and presence of intermediate goods, 2011-2012

(Percentage of intermediate products in the group total)

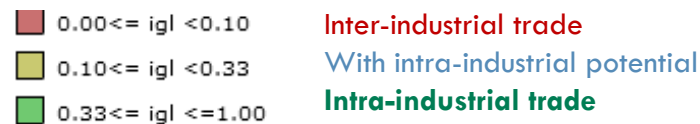
Order	SITC Groups Rev. 2 and share in total exported	Type of intermediate good included	% of intermediate
1	Parts and accessories for motor vehicles (19%)	Industrial (MTM)	100 %
2	Distribution materials and electric apparatus (9%)	Industrial (MTM)	100 %
3	Electric apparatus (eg., switches)empalme (8%)	Industrial (MTM)	27 %
4	Internal combustion motors (7%)	Industrial (MTM)	79 %
5	Telecommunication equipment (6%)	Industrial (MTA)	27 %
6	Machinery and electric apparatus (5%)	Industrial (MTA)	54%
7	Furniture and parts (4%)	Industrial (MBT)	14%
8	Manufactures of common metals (3%)	Industrial (MBT)	96%
9	Non-electric parts and accessories for machinery (3%)	Industrial (MTM)	76%
10	Lamps, tubes and electronic valves (3%)	Industrial (MTA)	100%
	10 main product groups (67%)	Industrial	73%

Costa Rica's industries which are most tied to the North America Factory are: Medical equipment, electronics, electric and parts and pieces for motor vehicles



Costa Rica: Presence of main industries in value chains linked to the North America Factory
% of exports of intermediate goods

Industries	Costa Rica
Electric and electronic	40
Automotive (and auto parts)	2
Aerospace	0.2
Steel and metal industry	3
Machinery and equipment	1
Chemical and petrochemical	13
Medical equipment	39
7 main industries	98



Costa Rica has increased the sophistication of the products it exports to the United States and is now involved in the automotive and aerospace sectors

85% of those exports are intra-industrial

Costa Rica's industries most integrated in the North American Factory include: medical instruments and apparatus, electronic apparatus, motor vehicle parts and pieces

Costa Rica – United States: Main product groups with an elevated intra-industrial relationship and presence of intermediate goods, 2011-2012

(Percentage of intermediate products in the group total)

Order	SITC Groups Rev. 2 and share in total exported	Type of intermediate good exported	% of intermediate
1	Medical instruments and apparatus (18%)	Industrial (MTM)	50 %
2	Lamps, tubes and electronic valves (15%)	Industrial (MAT)	100 %
3	Electronic apparatus (eg., switches) (3%)	Industrial (MTM)	100 % %
4	Fruit and preparations (2%)	Semi-elaborated (NRBM)	10 %
5	Articles of plastic materials(1%)	Industrial (MTM)	77 %
6	Electric distributors (1%)	Industrial (MTA)	100 %
7	Glass (1%)	Semi-elaborated (MBT)	100 %
8	Parts and accessories for vehicles (1%)	Industrial (MTM)	100 %
9	Machinery and electric apparatus (1%)	Industrial (MTM)	58%
10	Electric apparatus for domestic use(1%)	Industrial (MTA)	33%
	10 Main product groups (45%)	Industrial	73%

On an intra-regional level, bilateral relations that are the most intra-industrial intensive are very specific

Latin America: Index of Intra-industrial bilateral trade, 2010-2011

(Grubel Lloyd Index)

Destination \ Origin	Argentina	Brazil	Paraguay	Uruguay	Venezuela, Bol. Rep. Of	Bolivia, Pl. St. of	Colombia	Ecuador	Peru	Chile	Dominican Rep	Mexico	Costa Rica	El Salvador	Guatemala	Honduras	Nicaragua	Panama	
Brasil	0.52	Argentina, Brazil and Uruguay																	
Paraguay	0.16	0.15																	
Uruguay	0.37	0.26	0.08																
Venezuela	0.04	0.19	0.00	0.04															
Bolivia	0.03	0.03	0.16	0.03	0.00														
Colombia	0.17	0.31	0.02	0.14	0.28	0.01													
Ecuador	0.02	0.06	0.01	0.03	0.03	0.01	0.26	Colombia, Ecuador and Peru											
Peru	0.06	0.06	0.06	0.18	0.15	0.07	0.31	0.27											
Chile	0.41	0.16	0.02	0.34	0.02	0.04	0.29	0.15	0.27										
Dominican Rep.	0.00	0.02	0.01	0.01	0.15	0.00	0.04	0.03	0.01	0.11									
Mexico	0.34	0.35	0.00	0.11	0.08	0.07	0.31	0.04	0.13	0.26	0.22	Central America							
Costa Rica	0.12	0.07	0.00	0.07	0.46	0.04	0.12	0.11	0.22	0.03	0.17	0.13							
El Salvador	0.09	0.01	0.04	0.00	0.03	0.00	0.01	0.00	0.04	0.11	0.06	0.07	0.44						
Guatemala	0.00	0.01	0.00	0.00	0.01	0.00	0.03	0.12	0.02	0.02	0.17	0.12	0.57	0.52					
Honduras	0.00	0.05	0.00	0.03	0.03	0.00	0.03	0.03	0.03	0.08	0.28	0.15	0.30	0.43	0.32				
Nicaragua	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.02	0.02	0.01	0.00	0.01	0.34	0.10	0.13	0.17			
Panama	0.11	0.14	0.01	0.22	0.11	0.03	0.31	0.11	0.17	0.13	0.17	0.12	0.25	0.25	0.20	0.24	0.11		
Cuba	0.12	0.01	0.00	0.00	0.08	0.00	0.06	0.03	0.00	0.06	0.01	0.05	0.01	0.02	0.01	...	0.02	0.06	

At a regional level, the main productive chains are between countries that are geographically close

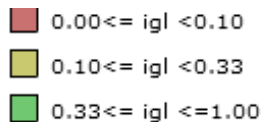
Brazil with Argentina



Colombia with Ecuador and Peru



Central America



Inter-industrial trade
Potentially intra-industrial
Intra-industrial trade

Mexico with Central America



On a regional level, supply chains are partial in those industries with a low technological component

SELECTED CASES: MAIN INDUSTRIES IN INTRA-REGIONAL BILATERAL TRADE IN INTERMEDIATE GOODS

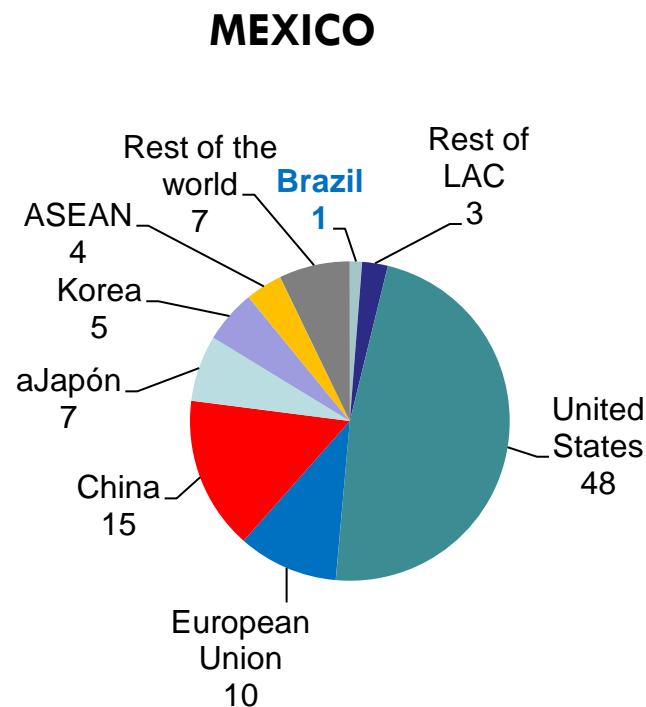
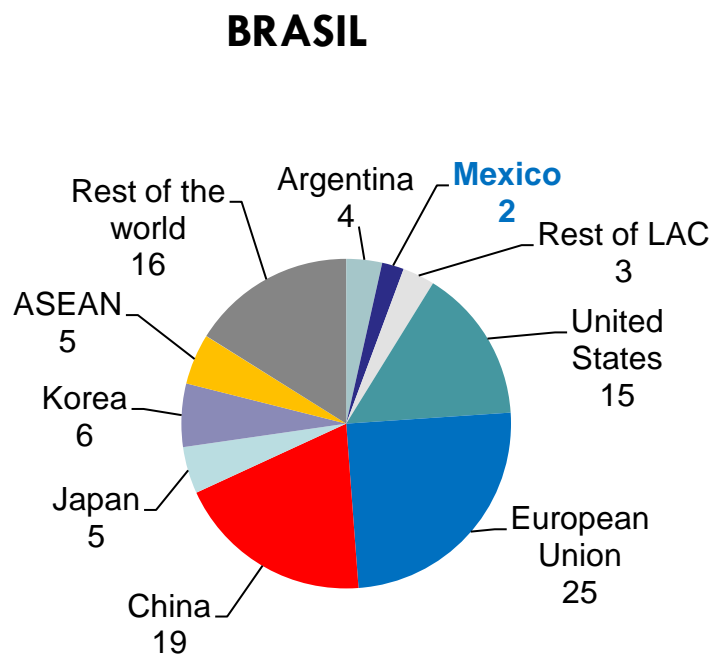
IndustriEs		MERCOSUR	CACM	CAN
		Argentina – Brazil	Guatemala – Rest	Colombia - Rest
Agroindustry	Light Industries	3%	10%	3%
Paper and cardboard		5%	3%	8%
Textile and clothing		2%	9%	9%
Pharmaceutical		3%	12%	7%
Chemical and Petrochemical		33%	33%	37%
Steel and Metal Industry		16%	22%	23%
Automotive (and auto parts)		24%	0%	2%
Electric and electronics		3%	4%	3%
Machinery and equipment		8%	1%	1%

Source: ECLAC based on United Nations COMTRADE

With a greater presence

Brazil and Mexico import more industrial intermediate goods from the rest of the world than the rest of the region

BRASIL AND MEXICO: DISTRIBUTION BY ORIGIN OF IMPORTS OF INDUSTRIAL INTERMEDIATE GOODS, 2012
(In percentages)



Fuente: CEPAL, sobre la base de información de la base de datos COMTRADE de Naciones Unidas

Main Results

- Mexico and Central America are more integrated in regional value chains that are strongly linked to the North American Factory, centered mostly around the large market of the United States
 - United States is the country that leads
 - The main chains: Automotive and auto parts, electronics, aeronautics, clothing, among others
- In South America, the presence of countries in integrated production chains is more limited and refers to relationships between few countries: Argentina – Brazil, Colombia – Ecuador – Peru, Brazil – Uruguay
 - The main chains: Automotive and auto parts, electronic, aeronautics, and clothing, among others.
 - Brazil does not play the role in the region that the United States plays in North America.
- In Central America , GVCs are centered around all countries and to a lesser extent on Nicaragua
 - The main chains: chemical and petrochemical, steel and metal industry, pharmaceutical industry
 - A second group of light industries: agroindustry, textiles, paper and cardboard

GVC indicators based on input-output tables

- The emergence of global value chains (GVC) has posed challenges for international trade statistics: since they capture the gross flows of goods and services each time that they cross national borders along the production process, traditional measures of trade result in double-counting.
- This has led to the use of GVC indicators based on international input-output tables, which take more accurately fragmentation of production into account and enable to measure the net contribution of each country (**‘trade in value-added’**).

International input-output tables

- International input-output tables integrate national accounts and bilateral trade statistics, capturing both direct and indirect linkages and exchanges between countries and sectors.
 - Asian International Input-Output Tables (by IDE-JETRO): 9 Asian countries + USA, years 1975, 1985, 2000
 - World Input-Output Database (WIOD): 40 countries (2 Latin-American countries: **Brazil and Mexico**), period 1995-2009
 - OECD Input-Output Tables: 48 countries (4 Latin-American countries: **Argentina, Brazil, Chile and Mexico**), years 1995, 2000 and 2005
 - Using non-official or ad-hoc data: GTAP and EORA databases



An application for Brazil and Mexico based on WIOD

(1) Share of intermediate exports in total exports

Share of intermediate exports in total exports by destination region
(1995 and 2008)

(In percentages of total exports to each destination)



The share of intermediate goods in Brazil's exports to Mexico and in Mexico's exports to Brazil is lower than the share of intermediates in these countries' exports to other destination regions

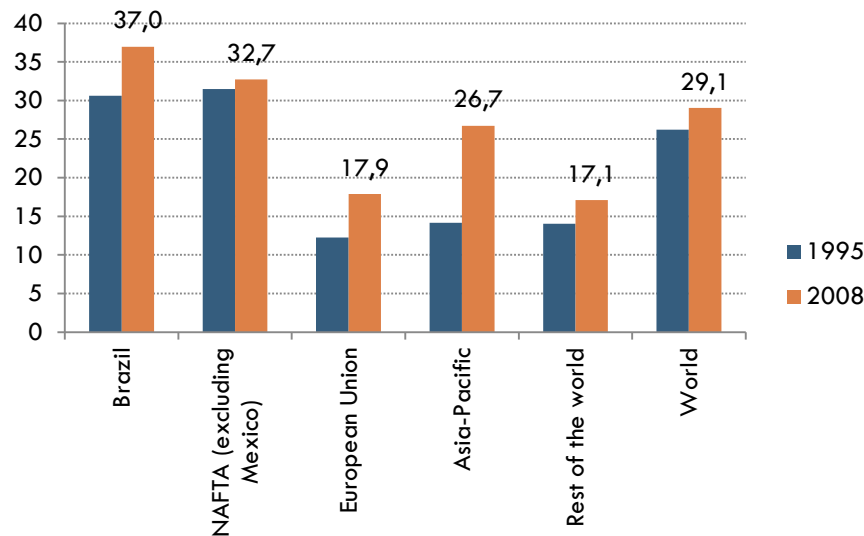
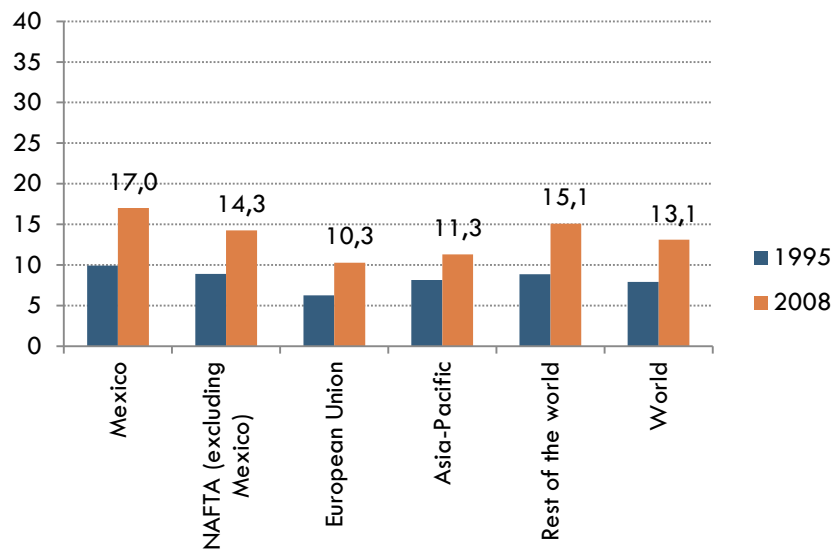
(2) Vertical specialization (VS): imported inputs embodied in exports (Hummels, Ishii and Yi, 2001)

Share of foreign intermediates required for exports by destination region
(direct and indirect effects) (1995 and 2008)

(In percentages of total exports to each destination)

Brazil

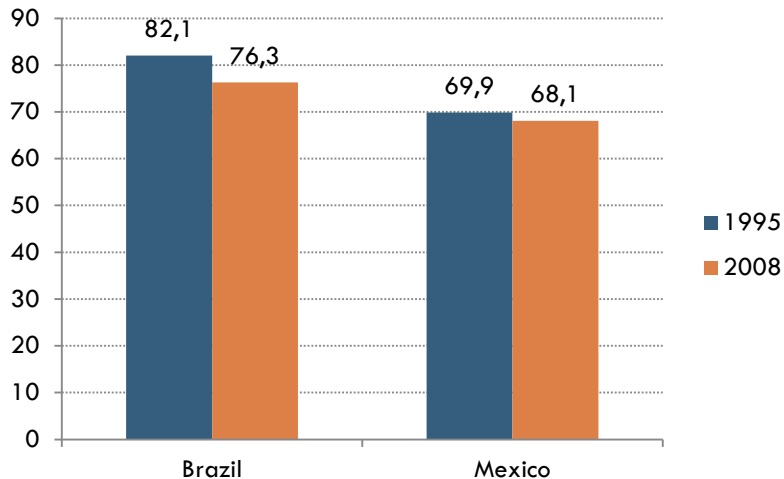
Mexico



While Brazil rely little on direct and indirect imported inputs for its exports, Mexico displays relatively high values of vertical specialization, which could be tied to its trade relations with the United States.

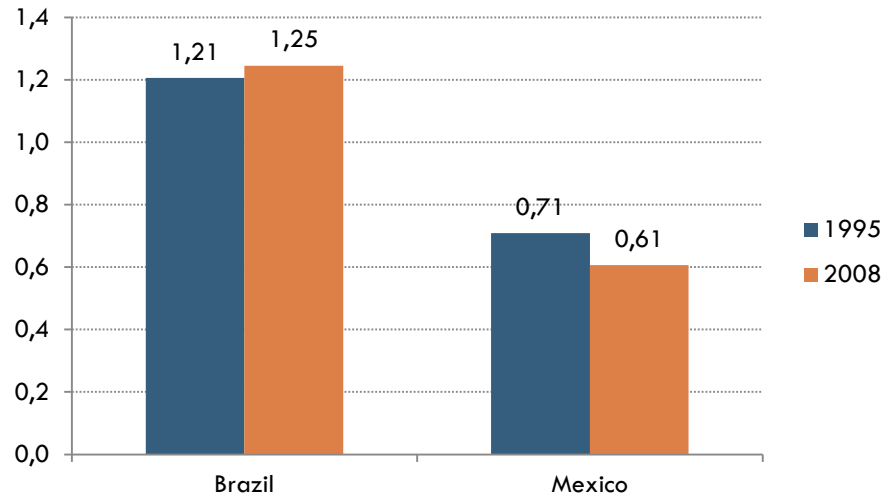
(3) Value added content of exports

Domestic value added embodied in gross exports (1995 and 2008)
(In percentages of total exports)



Domestic value added embodied in exports is higher in the case of Brazil, but has declined over time.

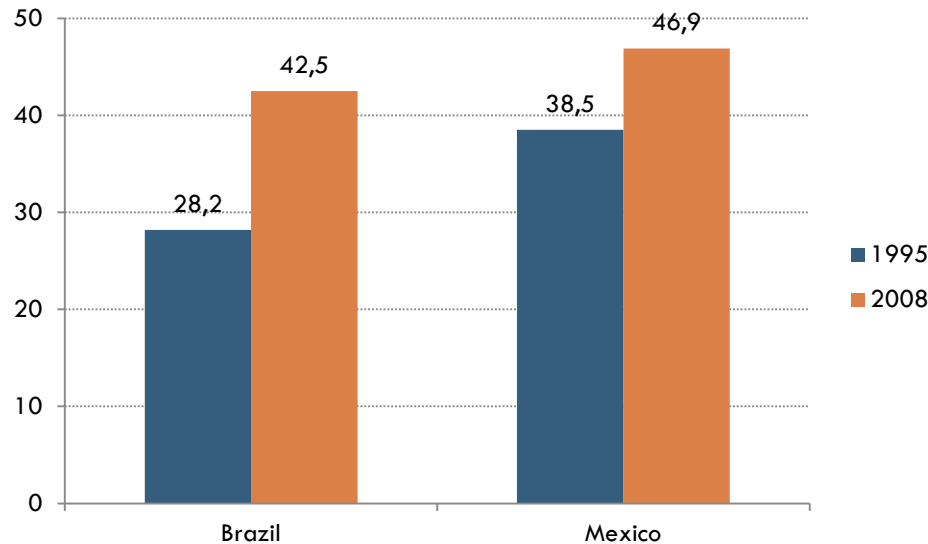
Ratio indirect value added to direct value added embodied in gross exports (1995 and 2008)



In Brazil, indirect domestic value added (created in upstream industries) is more significant than direct domestic value added (created in the exporting sector itself). In the case of Mexico is the opposite.

(5) GVC participation (Miroudot and De Backer, 2013)

Total participation rate of countries in global value chains (1995 and 2008)
(In percentages of total exports)



The participation of both countries in GVC increased significantly between 1995 and 2008 (particularly in the case of Brazil).

In spite of their very different integration in GVC, both countries had a similar rate of participation in 2008.

Main Results

- **Brazil and Mexico present different patterns of integration in GVC:**
 - Brazil displays significantly lower levels of vertical specialization (measured as the share of direct and indirect imports required for exports) than Mexico.
 - Domestic value added embodied in exports is higher in the case of Brazil, but has declined over time (indicating an increasing participation in production chains).
 - In the case of Brazil indirect domestic value added is more significant than direct domestic value added (created in the exporting sector itself), in Mexico it is the opposite.

- **However, both countries have a similar rate of participation in GVC given by:**
 - Higher participation in forward linkages in the case of Brazil
 - Higher participation in backward linkages in the case of Mexico

Factors that promote greater insertion of countries in global value chains and value networks

- **Geographic proximity for manufacturing potential.**
 - Case of Mexico, Costa Rica and the rest of Central America
 - Geographic proximity facilitates coordination of operations
- **Tax incentives for companies**
 - Central American duty free zones are an example.
 - Exemption from tariffs for imported inputs
- **Availability of infrastructure, logistics and telecommunications**
 - Adequate infrastructure has an impact on the cost and time to transport and affects competitiveness
- **Abundance of human labor (abilities, productivity and cost)**
 - With less skills and qualifications, the chain will have less value
 - If labor is highly qualified then it is possible for a country to upgrade to more integrated chains

Factors that promote greater insertion of countries in global value chains and value networks (cont.)

- **Abundance of natural resources and price cycles**
 - Fertile soil, reserves, petroleum, minerals
 - With good prices, there is investment in these activities. Example: Cycles of favorable prices, 2003-2012
- **Favorable domestic policies**
 - Good macroeconomic, political and social environment
- **Regional integration that is functional and favorable to GVC**
 - Developing Asia as an example (ASEAN, China, Japan, Korea)
 - Agreements that facilitate integration in services and investment which are functional and foster GVCs.

Conclusions

- **There are few value chains in the region; rather, it is mostly centered in regional value chains:**
 - In the case of Mexico and Central America, centered around the United States (North America Factory)
 - FTAs can function around the value chains: NAFTA, DR-CAFTA, Mexico-Central America FTA, Central American Common Market, MERCOSUR
 - There are two types of insertion in the sub-region:
 - Value chains with the United States that are more competitive and have greater value added (Electronic, auto parts, automotive, medical equipment, among others)
 - Insertion of Central American enterprises in subregional chains of little value, such as the beginning stages of textile and clothing
- **At a regional level, there is a need for leadership to create production networks**
 - Brazil and Mexico could take the lead.
 - Public policies should take into consideration productive chains

Value Chains and Productive Integration

- **Plurinational Industrial Policies**
 - Clusters in sectors with the most intra-industrial potential
 - Regulatory convergence
 - Joint programs to promote SMEs
 - Training
 - Quality certifications
 - Traceability and carbon footprint
- **Address deficits in infrastructure**
- **Coordinated progress in trade facilitation**
 - Single window; document becoming digital
- **Incorporate Trans-Latins in the effort**
- **Support from the regional development banks for these programs**

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