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Vertical Specialization: a comparison between the economies of Mexico and China, from the perspective of Input-Output

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Abstract

The objective of this work is to perform a comparison between the economic structures of Mexico and China, stressing their Vertical Specialization (VS) i.e. the import content of its exports. The analysis is for years 1995, 2003 and 2011.

In order to do the comparison of the economic structures, we used the Le Masne coefficient (a distance measurement of similarity); on the other hand, we compared the VS matrices by means of Kendall and Spearman correlation coefficients. Finally, using concepts of graph theory, we obtained a clustered layout of the VS matrices and their centrality measurements (specifically the Nodal In- degree and Betweenness Centrality)

The results indicate a tendency through time that increases the difference of the economic structure between Mexico and China. In the same period of time, China undergoes more changes than Mexico.

The vertical specialization is greater for Mexico, that is to say, depends more on the imports in comparison with the economy of China. In 2011, by each dollar that Mexico exported, it required 30 cents of dollar, whereas China required 23 cents.

For the case of Mexico, the graphical representation shows that in 2011 the size of its economic clusters fell in comparison with 1995. In the case of China, the size of its clusters increased, its groups are clearer and do have a more dense economic network.

Introduction

In 1978, the Asian nation journeyed of a central planning system and self-sufficiency, to a market economy; it was gotten up to the dynamics of the global economy with a greater commercial opening. On the other hand, in the Eighties, after the exhaustion of the model of substitution of imports and the oil crisis, Mexico modified the axis of its economic policy towards a greater dynamism of the exporting activity.

Both countries applied mechanisms of economic deregulation and tariff liberalization to allow an exporting direction by means of competitive international prices of their products; the privatization of public companies and the application of mechanisms of macroeconomic stabilization. Nevertheless, the Chinese government added, previously, a series of elements: a favorable tributary reform to the foreign investment in high-priority sectors; creation of special economic zones for the production and export of technological development; and fiscal incentives for the investment and the development of infrastructure. By his side, the Mexican government left in the private sectors domestic and foreign the decision to invest, applied programs of promotion to the exports and drove a limited fiscal support. (Meza and Cuamea, 159-160: 2011)

The present position of China and Mexico, in the global economy, has generated diverse studies on the comparison of the results of the process of opening of its economies. This work was developed in that direction, using tools of the input-output analysis and the theory of networks, with the aim to point out important changes in the structures of both economies from 1995 to 2011, according to its patterns of vertical specialization at total and sectorial level.

1. The comparison of the economic structures of Mexico and China: Index of Le Masne

The index of Le Masne is a measurement of similarity through euclidian distances. It allows to compare two tables of input-output of a country between two years or to compare them for a same year between two countries. Mathematically, this index of similarity is expressed as it follows:

$$S^{R_1-R_2} = 100\left(1 - 0.5\sum_{i=1}^{n+1}\left|a_{ij}^{R_1} - a_{ij}^{R_2}\right|\right)$$

where R1 and R2, correspond to each one of the two compared tables.

If the value of the index is next to 100, indicates a high structural similarity between the two economies or both enters years that are compared, otherwise, it enters nearer it is to 0, it indicates a low similarity.

Table 1 shows the results of the calculation of the index of similarity of Le Masne for the productive structures of Mexico and China in 1995, 2003 and 2011. Also, it presents/displays the comparison between the three years for each one of the two economies.

Table 1
Le Masne Indexes China and Mexico 1995, 2003 and 2011

		Mexico		
	Año	**1995**	**2003**	**2011**
China	**1995**	**72.55**	94.54	93.81
	2003	89.03	**70.90**	96.38
	2011	85.07	91.34	**68.32**

Source: Author´s calculation from World Input Output Database (WIOD).

The main diagonal of table 1 shows the indices of Le Masne between Mexico and China in 1995, 2003 and 2011; the indices indicate a diminution of the degree of similarity between both economies through time. The economic structure between both nations, was more similar from 1995 to 2003, that from 2003 to 2011.

In the triangular section superior of table 1, are the indices of similarity of Mexico between years 1995 and 2003, 1995 and 2011 as well as 2003 and 2011. Given the greater time interval, the index of 1995 and 2011 is smaller, since for the other two indices the same difference in years exists. The results show that between 2003 and 2011 the structure of the Mexican economy was more similar, than between 1995 and 2003.

Likewise, the inferior triangular section of table 1, presents/displays the indices of similarity of China between the same years, like in the case of Mexico, is smaller the similarity between 1995 and 2011. Also, there is a greater similarity in the economic structure between 2003 and 2011 that the observed in 1995 and 2003.

Comparing the results between both economies for the three considered years, a greater similarity in the Mexican economy through time can notice; in the case of the Chinese economy, more changes occurred in its economic structure.

2. Vertical specialization

The productive process is segmented with the globalization, and the interconnection between the economies occurs with diverse phases of design, production, commercialization and distribution located in diverse countries, generating global chains of production and, consequently, global value added chains.

In the process of productive fragmentation, the transnational companies play a central role, thanks to their acquisition of inputs, parts, components and subassemblies, or made by its branches in other countries, constituting a network of companies tied to each other by property or mercantile relations. The delocalization of productive segments in branches or companies coupled to the global manufacture

is made possible by the mobility of certain factors, like knowhow and organizational ability that are combined with relatively immovable local resources (unqualified work). (Minian, 2012:33)

Under the vertical specialization the countries tie sequentially for the production of a good. The vertical specialization measures the requirement of imports associated to the exports.

In agreement with Hummels, Ishii and Yi (2001) the vertical specialization happens when:

1. A good or service is produced in two or the more consecutive stages
2. Two or more countries provide value added during the production with the good or service.
3. A country must at least use imported inputs concerned in its stage of the production process, and part of the resulting product must be exported

For the calculation of the vertical specialization, we used the propose expression by Cadarso, Gómez, López and Tobarra (2008) that includes the direct imports and indirect, that is to say the intermediate imports realized by inputs are included that uses the exporting branch in any other round of its production.

$$VE = \mathrm{m}(1 - \mathrm{A})^{-1}\hat{\mathrm{e}} \quad (1)$$

where:

A: matrix of technical coefficients

m: matrix of imported inputs coefficients

$\hat{e}$: diagonal matrix of the exports by sector.

According to this expression is possible to obtain VS for the whole economy and per branch. The first measure is obtained by making the sum of the matrix elements of VS divided by the total amount of exports, which is multiplied by 100. The VS per branch is obtained by summing each column of the matrix and dividing by total amount of exports of each sector, the result is also multiplied by 100.

Table 2 shows the results of the total EV for Mexico and China, years 1995, 2003 and 2011.

Table 2
Total Vertical Specialization. Mexico and China 1995, 2003 and 2011

EV	Mexico	China
1995	26.20	15.99
2003	30.58	21.69
2011	30.30	22.58

Source: Author´s calculation from World Input Output Database (WIOD).

Vertical specialization is higher for Mexico; its economy is more dependent on imports compared to the Chinese economy. As mentioned before, in 2011 for every dollar that Mexico exported, imported 30 cents, while China imported 23 cents. However, from 1995 to 2011, the gap has narrowed, which is associated with the entry of China into the World Trade Organization (WTO) in 2001.

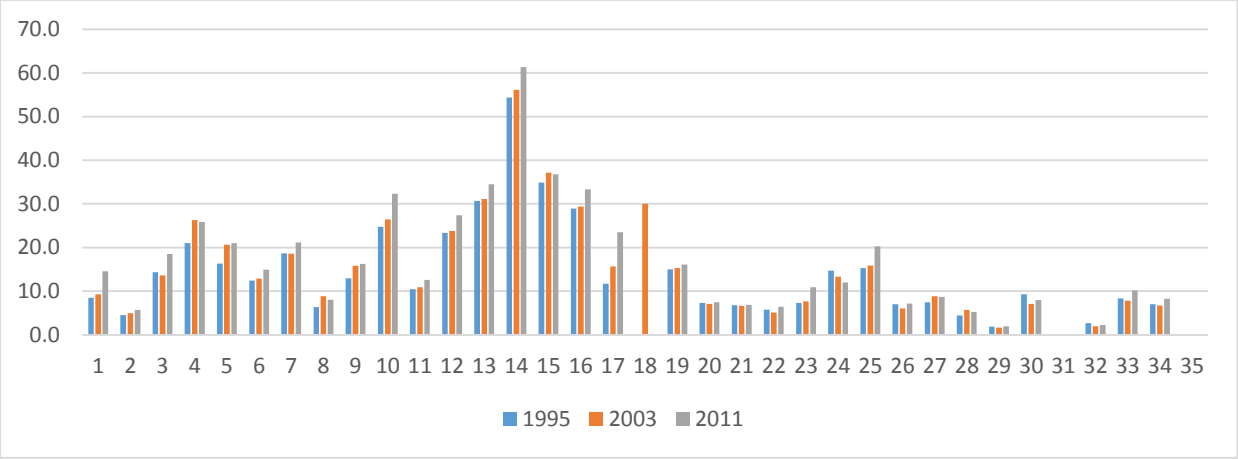
The evolution of trade liberalization in Mexico and China indicates that not only the growth of exports has been lifted; imports maintained a positive rate of growth in both countries, although the situation differs in the trade balance. From 1998 to 2011, the balance of trade balance has been in deficit Mexico, while China maintained a surplus for the same period.

2.1 Sectorial Vertical Specialization.

The sectorial vertical specialization for Mexico and China for the 1995, 2003 and 2011 years is shown in figures 1 and 2.

Figure 1

Mexico: Sectorial Vertical Specialization 1995, 2003 and 2011



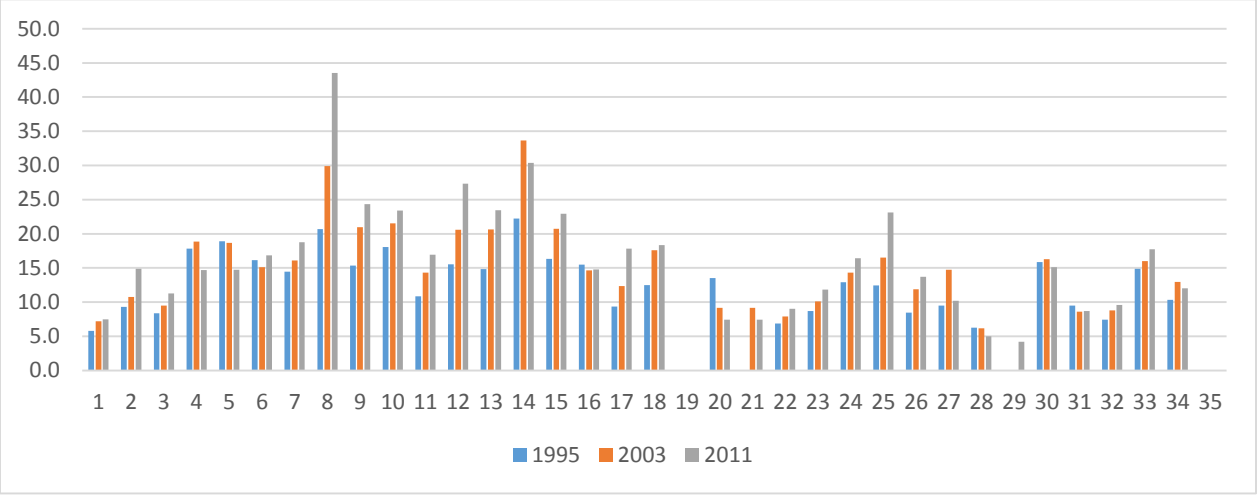
Source: Author´s calculation from World Input Output Database (WIOD).

In Mexico, the largest vertical specialization is in the areas of modern manufacturing, Electrical and Optical Equipment (14), Transport Equipment (15), Machinery (13), Manufacturing, Recycling (16) and Rubber and Plastics (10). The sector with the highest level of VS in the three year study was Electrical and Optical Equipment (14). In 1995, for every dollar exported required to import 54.4 cents, in 2003, 56.1 cents and in 2011 imported 61.3, so its requirements to export imports have gradually increased.

Transport Equipment (15), is the second sector with the highest level of VS. In 1995 for every dollar exported imported 34.8 cents, in 2003, 37.1 cents and in 2011 imported 36.8 cents. Although this sector has shown great dynamism in Mexican exports, VS results indicate that a high percentage is explained by the level of imports. Machinery (13), Manufacturing, Recycling (16) and Rubber and Plastics (10) have their highest levels of VS in 2011, in that year were imported 34.5, 33.3 and 32.3 cents for every dollar exported, respectively. The three sectors show a gradual increase in VS.

In general, the industries in the manufacturing sector have a greater increase in their levels of VS with respect to the branches of the primary sector and services.

Figure 2
China: Sectorial Vertical Specialization 1995, 2003 and 2011



Source: Author´s calculation from World Input Output Database (WIOD).

In China the sector with the highest VS in 2011 was Coke, Refined Petroleum and Nuclear Fuel (8), also the sector with the highest increase in its EV, compared to 2003. In 2011, this sector imported 43.6 cents for every dollar exported, while in 2003 their EV was equal to 30 cents.

Additionally, Basic Metals and Fabricated Metals (12), Chemical products (9) and Rubber and Plastics (10) also have high levels of EV in 2011. Sector (12) imported 27.3 cents for every dollar exported, sector (9), 24.3 cents and sector (10), 23.4. The three sectors have gradually increased their EV.

In 2003 in China, the sector with the highest VS was Electrical and optical equipment (14), level of VS was 33.7 cents, in 2011 decreased to 30.4 cents.

In general, both Mexico and China showed a gradual increase in the VS of all sectors of modern manufacturing, this behavior is also reflected in the primary sector. Regarding the services sector, the Chinese economy has higher level of VS than Mexico. However, in 2011, the Air Transport sector (25) is showing the greatest increase in VS both Mexico and China.

In order to make a comparison of the VS of Mexico and China by sector, we used the Kendall and Spearman coefficients that measure the degree of rank correlation between the variables used.

The Spearman's coefficient is defined as follows:

$$r_s = 1 - \frac{6\sum_{i=1}^{N} d_i^2}{N^3 - N}$$

Where N is the number of pairs (35 sectors) and di is the difference between the ranks of the observations.

The Kendall's coefficient is defined as:

$$\tau = \frac{S}{\frac{1}{2}N(N-1)}$$

Where N is the number of partners and S is a sum obtained as follows: a) The first set of observations in their natural order is classified; b) The second set of observations were classified in the same order as the first; c) For each pair of ranks of the second set of observations, it assigns a 1 if the order is natural and -1 if it is not; d) S is the sum of all such scores.

Tables 3 and 4 show the greatest Kendall's and Spearman'scoefficients for the Mexico and China economies.

Table 3
Kendall´s Coefficient Mexico-China

Sector	1995	2003	2011
5. Leather and Footwear	67.06	66.39	69.75
6. Wood and Products of Wood and Cork	62.69	67.39	64.71
12. Basic Metals and Fabricated Metal	62.02	69.75	59.66
13. Machinery	58.99	71.43	64.71
14. Electrical and Optical Equipment	58.66	69.08	64.37
15. Transport Equipment	62.02	66.39	60.34
16. Manufacturing, Recycling	61.01	65.04	66.72

Source: Author´s calculation from World Input Output Database (WIOD).

Table 4
Spearman´s Coefficient Mexico-China

Sector	1995	2003	2011
3. Food, Beverages and Tobacco	80.98	86.27	82.07
5. Leather and Footwear	85.13	85.41	86.83
6. Wood and Products of Wood and Cork	79.50	84.37	82.10
12. Basic Metals and Fabricated Metal	79.69	85.55	78.46
13. Machinery	77.28	87.34	82.24
14. Electrical and Optical Equipment	75.15	84.31	80.95
16. Manufacturing, Recycling	79.66	83.08	85.57

Source: Author´s calculation from World Input Output Database (WIOD).

According to Spearman and Kendall coefficients, the Leather and Footwear (5), Wood and Products of Wood and Cork (6), Basic Metals and Fabricated Metals (12), Machinery (13), Electrical and Optical equipment (14) and Manufacturing, Recycling (16) are the most similar sectors between the two nations. The products in which Mexico and China compete mainly on the U.S. market, are in the manufacturing sector, which may explain the similarity in these sectors of modern manufacturing.

3. Measures of centrality

The input-output tables can be approached as a Complex Network. In this work we use conventional tools of social networks theory to analyze them.

To construct a graph of the vertically specialized matrix (see expression 1), we constructed a binary adjacent matrix, and got clusters and measures of centrality. The clusters, sets of economic sectors with similar characteristics linked together through trade relations, were obtained using the Girvan-Newman method[1] and the centrality measures followed the classic Freeman approach.[2]

The graphical representation of matrices of vertical specialization of Mexico and China for the years 1995 and 2011 feature the size and number of clusters of each economy. Figures 3 and 4 show, in the case of the Mexican economy between 1995 and 2011, that the size of clusters and connections, decreased. On the other hand, China increased, during the same period, both clusters and connections (see figures 5 and 6).

Figure 3
Vertical Specialization and Clusters Mexico 1995

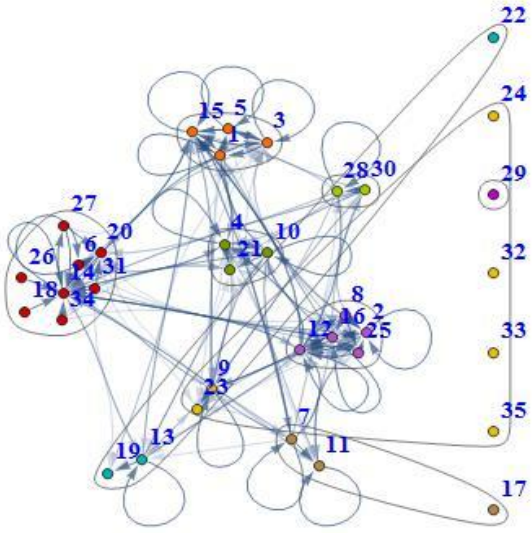
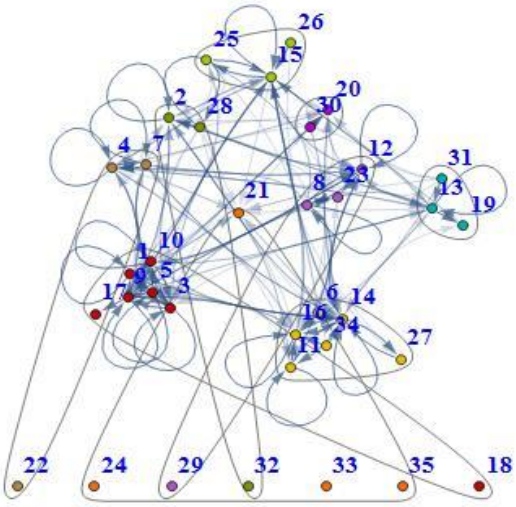


Figure 4
Vertical Specialization and Clusters Mexico 2011



Source: Author´s calculation from World Input Output Database (WIOD).

1 The Girvan-Newman (2002), determines groups of similar nodes generalizing the concept of betweenness centrality.

2 According to Freeman (1979), the proximity of a node on a network is the average separation of the node to each of the network nodes.

Figure 5
Vertical Specialization and Clusters China 1995

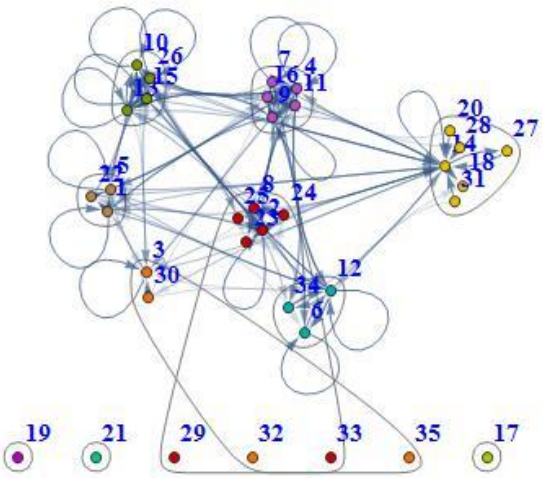
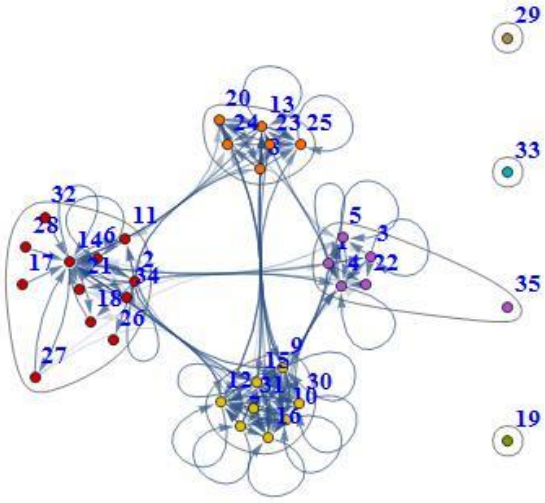


Figure 6
Vertical Specialization and Clusters China 2011



Source: Author´s calculation from World Input Output Database (WIOD).

In general, the comparison between the graphs of Mexico and China indicate a richer structure in the Asian economy. Table 5 shows that in 1995, the number and size of clusters in Mexico and China in 1995 were similar, however, in the year 2011 China had significant changes in its structure, presenting more defined clusters and greater integration among its sectors.

Table 5
Vertical Specialization and Clusters Mexico and China, 1995 and 2011

Clusters	1995	2011
M E X I C O	{6, 14, 18, 20, 26, 27, 31, 34} {9, 23, 24, 32, 33, 35} {2, 8, 12, 16, 25} {1, 3, 5, 15} {4, 10, 21} {13, 19, 22} {28,30} {29}	{6, 11, 14, 16, 27, 34} {1, 3, 5, 9, 10, 17, 18} {21, 24, 33, 35} {8, 12, 23, 29} {2, 28, 32} {13, 19, 31} {15, 25, 26} {4, 7, 22} {20, 30}
C H I N A	{2, 8, 23, 24, 25, 29, 33} {14, 18, 20, 27, 28, 31} {4, 7, 9, 11, 16} {3, 30, 32, 35} {10, 13, 15, 26} {1, 5, 22} {6, 12, 34} {17} {19} {21}	{2, 6, 11, 14, 17, 18, 21, 26, 27, 28, 32, 34} {7, 9, 10, 12, 15, 16, 30, 31} {1, 3, 4, 5, 22, 35} {8, 13, 20, 23, 24, 25} {19} {29} {33}

Source: Author´s calculation from World Input Output Database (WIOD).

Complementary to the above graphs, we used centrality measures developed in network theory, which determine the relative importance of each sector.

Degree centrality

Degree centrality is the number of sectors to whom a sector is directly attached. If a sector has many links (purchases and sales) it is said to be prominent. These linkages might be through acquisitions (in degree) or supplies (out degree); we evaluated specifically its linkage to its suppliers, i.e. *in degree*.

Betweenness

The centrality intermediation, betweenness, refers to the frequency with which a sector is located between other pairs of sectors by a geodesic, i.e. through the shortest path connecting them.

Closeness

The closeness centrality emphasizes the distance of a sector relative to others in the network by focusing on the geodesic distance of each sector with everyone else.

The centrality measures used to evaluate VS matrices are *in degree* and *betweenness* measures, both reflect the ability of communication in a network. The first measure indicates the extent to which sectors induce both direct and indirect imports for export. Meanwhile, the second indicates to what extent the export sectors to induce direct imports, to act as intermediaries in the economy.

The results of both, *in degree* and *betweenness* measures, for the economies of Mexico and China, are presented in Tables 6 and 7.

Overall table 6 indicates that Mexico has no great variation in the number of connections received by their economic sectors; six of the seven sectors with the highest degree of intermediation turn out to be the same in 1995 and 2011. For China observed changes in the sectors Machinery (13), Chemical Products (9) and Transport equipment (15), increased substantially it's in degree within 1995-2011, while Food, Beverages and Tobacco (3) and Leather and Footwear (5), decreased.

In Basic Metals and Fabricated Metal (12), Electrical and Optical Equipment (14), Transport Equipment (15) and Manufacturing and Recycling (16) manufacturing sectors both the Mexican economy and the Chinese have a relatively high in degree, which is associated with its export manufacturing profile.

Tabla 6
Sectorial In Degree for Mexico and China, 1995 and 2011

	Mexico		China	
Sector	**1995**	**2011**	**1995**	**2011**
1. Agriculture, Hunting, Forestry and Fishing	9	8	7	2
2. Mining and Quarrying	12	**15**	9	2
3. Food, Beverages and Tobacco	11	12	**13**	6
4. Textiles and Textile Products	**14**	12	**21**	**21**
5. Leather and Footwear	6	5	**15**	11
6. Wood and Products of Wood and Cork	1	0	7	3
7. Pulp, Paper, Paper , Printing and Publishing	6	6	5	2
8. Coke, Refined Petroleum and Nuclear Fuel	2	4	2	4
9. Chemicals and Chemical Products	11	11	9	**16**
10. Rubber and Plastics	9	10	**13**	13
11. Other Non-Metallic Mineral	7	7	9	6
12. Basic Metals and Fabricated Metal	**15**	**17**	**17**	**16**
13. Machinery	6	12	11	**16**
14. Electrical and Optical Equipment	**23**	**23**	**24**	**26**
15. Transport Equipment	**22**	**24**	7	**14**
16. Manufacturing, Recycling	**18**	**16**	**12**	**14**
17. Electricity, Gas and Water Supply	0	1	0	0
18. Construction	0	0	2	3
19. Sale, Maintenance and Repair of Motor Vehicles	4	4	0	0
20. Wholesale Trade and Commission Trade	**14**	**14**	0	10
21. Retail Trade	**13**	**13**	0	3
22. Hotels and Restaurants	0	0	7	4
23. Inland Transport	10	7	6	3
24. Water Transport	0	0	6	9
25. Air Transport	7	4	8	9
26. Other Supporting and Auxiliary Transport Activities	0	0	9	1
27. Post and Telecommunications	1	2	1	1
28. Financial Intermediation	3	0	0	0
29. Real Estate Activities	0	0	0	0
30. Renting of M&Eq and Other Business Activities	4	1	1	10
31. Public Admin and Defence; Compulsory Social Security	0	0	0	0
32. Education	0	0	0	0
33. Health and Social Work	0	0	0	0
34. Other Community, Social and Personal Services	0	0	9	3
35. Private Households with Employed Persons	0	0	0	0

Source: Author´s calculation from World Input Output Database (WIOD).

The average number of connections received by the sectors of Mexico and China as well as its variability is very similar in both years. Even both increase its statistical dispersion of 1995-2011, the coefficients of variation (the ratio of the standard deviation to the mean) are high, in 2011 were equal to 106 and 104 for Mexico and China, respectively; this is explained by the low in degree within service sectors in contrast to the high number of connections manufactures sector.

The network centralization indexes increased from 1995 to 2011 in both countries. On having presented a high indexes it can be noted that in Mexico and China positional advantages are unevenly distributed.

Statistics of the In Degree for Mexico and China, 1995 and 2011

	Mexico		China	
	1995	**2011**	**1995**	**2011**
Mean	6.51	6.51	6.57	6.51
Std Dev	6.63	6.94	6.31	6.78
Variance	43.96	48.14	39.84	45.91
Mínimum	0	0	0	0
Máximum	23	24	24	26
Sum	228	228	230	228
N of Obs	35	35	35	35
Network Centralization Index	53.12%	56.24%	56.24%	62.48%

Table 7 shows that five out of the seven sectors with the highest betweenness measure are the same in both countries: Textiles Products (4), Chemical Products (9), Basic Metals and Fabricated Metals (12), Machinery (13) and Electrical and Optical Equipment (14).

The results of the betweenness reaffirm that there is a major transformation in the structure of the Chinese economy surpassing the Mexican change. Mining and quarrying (2), Chemical products (9) Machinery (13) and Manufacturing and Recycling (16) dramatically increased their betweenness, while in the case of Mexico only sector (9) has a substantial increase in that measure.

A greater degree of intermediation is favorable in the economic structure of any country to have a larger number of sectors as intermediaries, allowing a linked economy. VS figures presented indicate more Chinese linkages compared with Mexico, result that is confirmed by the betweenness results of both economies.

Tabla 7

Betweenness for Mexico and China, 1995 and 2011

	Mexico		China	
Sector	**1995**	**2011**	**1995**	**2011**
1. Agriculture, Hunting, Forestry and Fishing	**27.42**	3.22	2.69	0.00
2. Mining and Quarrying	1.40	5.76	**10.07**	**49.32**
3. Food, Beverages and Tobacco	3.21	6.49	2.61	4.12
4. Textiles and Textile Products	**14.25**	**10.24**	**58.27**	**29.09**
5. Leather and Footwear	0.00	0.00	1.63	0.00
6. Wood and Products of Wood and Cork	0.00	0.00	0.00	0.00
7. Pulp, Paper, Paper , Printing and Publishing	**8.28**	0.91	0.43	0.00
8. Coke, Refined Petroleum and Nuclear Fuel	0.00	2.89	0.00	1.86
9. Chemicals and Chemical Products	**22.46**	**63.27**	**6.67**	**96.16**
10. Rubber and Plastics	5.69	**9.02**	**4.99**	0.99
11. Other Non-Metallic Mineral	0.00	0.00	0.00	0.00
12. Basic Metals and Fabricated Metal	**64.02**	**35.72**	**56.88**	**24.76**
13. Machinery	0.75	**8.13**	**5.09**	**31.40**
14. Electrical and Optical Equipment	**161.32**	**112.09**	**216.37**	**330.06**
15. Transport Equipment	**105.92**	**105.74**	2.29	4.51
16. Manufacturing, Recycling	1.81	0.53	0.00	**9.92**
17. Electricity, Gas and Water Supply	0.00	0.00	0.00	0.00
18. Construction	0.00	0.00	0.00	0.00

Tabla 7 (cont.)

Betweenness for Mexico and China, 1995 and 2011

	Mexico		China	
Sector	**1995**	**2011**	**1995**	**2011**
19. Sale, Maintenance and Repair of Motor Vehicles	0.00	0.00	0.00	0.00
20. Wholesale Trade and Commission Trade	0.00	0.00	0.00	4.85
21. Retail Trade	0.00	0.00	0.00	0.00
22. Hotels and Restaurants	0.00	0.00	1.70	0.00
23. Inland Transport	0.00	0.00	0.00	0.00
24. Water Transport	0.00	0.00	0.00	0.00
25. Air Transport	0.00	0.00	0.00	0.43
26. Other Supporting and Auxiliary Transport Activities	0.00	0.00	3.32	0.00
27. Post and Telecommunications	0.00	0.00	0.00	0.00
28. Financial Intermediation	0.00	0.00	0.00	0.00
29. Real Estate Activities	0.00	0.00	0.00	0.00
30. Renting of M&Eq and Other Business Activities	2.48	0.00	0.00	6.54
31. Public Admin and Defence; Compulsory Social Security	0.00	0.00	0.00	0.00
32. Education	0.00	0.00	0.00	0.00
33. Health and Social Work	0.00	0.00	0.00	0.00
34. Other Community, Social and Personal Services	0.00	0.00	0.00	0.00
35. Private Households with Employed Persons	0.00	0.00	0.00	0.00

Source: Author´s calculation from World Input Output Database (WIOD).

The variation in the betweenness is greater for the Chinese economy; its variance and range are higher compared to Mexico. Average also presents a greater increase for the Asian country in 2011 over 1995. Coefficient of variation is higher for China in both years, in 2011 was equal to 260 compared with that of Mexico, 335.

The network centralization index indicates a higher level of intermediation for China, compared to Mexico, even for the latter decreases the rate of 1995-2011. In China, the sectors with the highest level of intermediation have greater power in the communication of the network than in Mexico.

Statistics of Betweenness for Mexico and China, 1995 and 2011

	Mexico		China	
	1995	**2011**	**1995**	**2011**
Mean	11.97	10.40	10.66	16.97
Std Dev	32.91	27.04	37.68	56.87
Variance	1083.04	730.97	1420.08	3234.02
Mínimum	0	0	0	0
Máximum	161.32	112.09	216.37	330.06
Sum	419	364	373	594
N of Obs	35	35	35	35
Network Centralization Index	13.70%	9.33%	18.87%	28.73%

Thus, although most sectors with greater intermediation in Mexico and China are the same, there is a greater degree of intermediation in the sectors of China.

4. Final remarks.

According to the results obtained with the coefficient of Le Masne, the process of economic opening of China and Mexico, between 1995 and 2011, has generated more changes in the economic structure of the Asian nation than in Mexico.

The reasons for this difference are related to the changing economic and political model that both countries experienced in the late seventies and early eighties and the subsequent management of their economic policies. As a result, the Mexican economy has a higher level of vertical specialization, as their import requirements for export are higher than those of China.

In 2011, although the difference in levels of vertical specialization between the two countries was reduced, compared to 1995 and 2003, Mexico still has a higher level of VS for China. The results indicate that the main sectorial VS in both countries correspond to branches of the manufacturing sector, whose import requirements present a gradual increase through time.

In order to stress the profile export manufacturing in Mexico and China, we employed the Kendall's and Spearman's coefficients in their VS. Also, centrality measures indicate a high level of intermediation for both countries in the sectors Basic Metals and Fabricated metals (12), Electrical and Optical Equipment (14), Transport Equipment (15) and Manufacturing and Recycling (16). In turn, those branches have a high VS level, inducing direct and indirect imports.

However, the similarity observed in the analysis by sector of Mexican and Chinese economy, the greater intermediation in the Asian nation indicates a more connected and therefore more effective interaction between sectors, which we associated with a more competitive economic structure. In contrast, as I noted using network theory to represent the Mexican economy in 2011, the size of the clusters decreased with the level of economic links, which is associated with the highest level of VS and decreased domestic linkages.

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