An Analysis in Comparative Advantage in Manufacturing Sector as a Determinant of Trade Expansion; the Indonesian and Mexican Case 1989-2011

Article · August 2013

1 author:

Miguel Angel Padilla Esquivias
Airlangga University
56 PUBLICATIONS   **368** CITATIONS

Some of the authors of this publication are also working on these related projects:

Project   Research Grant Bank Indonesia (RGBI) 2020 View project

Project   MP3I. Masterplan for Acceleration and Expansion of Indonesia's Economic Development View project

AN ANALYSIS IN COMPARATIVE ADVANTAGE IN MANUFACTURING SECTOR AS A DETERMINANT OF TRADE EXPANSION: THE INDONESIAN AND MEXICAN CASE 1989-2011

MIGUEL ANGEL ESQUIVIAS
Researcher Economic in South East Asia and Amerika Latin
UNGGUL HERIQBALDI
Fakultas Ekonomi dan Bisnis Universitas Airlangga

ABSTRAK

Pengalaman perubahan dinamis pada perdagangan internasional dalam hal volume, varietas dan tujuan barang manufaktur menunjukkan bahwa perubahan keunggulan komparatif telah terjadi untuk negara-negara industri dan berkembang. Penelitian ini menganalisis dampak dari dinamika dalam perdagangan internasional pada perubahan keunggulan komparatif di sektor manufaktur untuk kasus Meksiko dan Indonesia untuk periode 1989-2011.

Ditemukan bahwa pola perdagangan Meksiko telah berubah secara signifikan dalam 23 tahun terakhir berubah menjadi kegiatan industri baru, yang berarti perubahan yang mendalam dalam berbagai produk, sumber daya manusia dan intensitas teknologi di tingkat struktural. Adapun Indonesia perubahan itu ditemukan juga signifikan meskipun pada tingkat yang kurang dari Meksiko tetapi dengan kekhususan menjaga industri tradisional sebagai tulang punggung ekspor sementara mengembangkan beberapa industri baru.

Sejumlah peluang untuk ekspansi perdagangan yang ditemukan untuk Meksiko dan Indonesia sejak kedua negara mengkhususkan dalam berbagai produk dibawah perbedaan faktor intensitas.

Kata kunci: *Revealed Comparative Advantage, Manufaktur, Neraca Perdagangan, Faktor Intensitas, dan Produk Pemetaan, Perdagangan Internasional.*

ABSTRACT

The dynamic changes experienced in international trade in terms of volumes, varieties and destinations in manufacturing goods suggests that a change in comparative advantage has occurred for industrial and developing countries. The present study analyzes the impact of the dynamism in international trade in the change of comparative advantage in manufacturing sector for the case of Mexico and Indonesia for the period of 1989-2011.

It was found that the trade pattern of Mexico has change significantly in the last 23 years turning into new industrial activities, meaning a deep change in variety of products, human capital and technology intensity at structural level. As for Indonesia the change was found to be also significant even though at less degree than Mexico but with the particularity of keeping the traditional industries as the backbone of exports while developing some new industries.

A good number of opportunities for trade expansion were found for Mexico and Indonesia since both countries specialized in different variety of products under different factors intensities.

Keywords: *Revealed Comparative Advantage, Manufacturing, Trade Balance, Factor Intensities, and Products Mapping, International Trade.*

I. INTRODUCTION

From 1990 to 2009 the growth of world trade has averaged 10 percent per year, almost three times faster than the output growth of the world. The World trade as percentage of GDP has improved from 23 percent in 1961 to almost 56 percent on 2010[1] meaning a more relevant role of foreign economic activities on economic growth.

For developing economies those figures appears more significant in part due to the new industrialization phenomena, and the improvement on trade south to south, that has reach almost 40 percent of total global trade with manufactures accounting for almost 80%.

It is then that in the last 20 years an important shift in patterns of merchandise trade has taken place as a new path for industrialization supported by international openness and integration, deep technological change, the reduction of transportation costs, the digital revolution, the technological and capital transfers, etc. All these phenomena has foster the integration of small and big players on the global supply chain allowingimprovements on value and volume of exports, both to North and to South economies (Baldwin 2011).

This industrial development has redirected the economy into new industries, new trade partners or changing the pattern of available factors into a higher value added activities. Both Mexico and Indonesia had change their composition of goods and services previously focus on primary activities intosecondary and tertiary ones.

An important contribution to the growth in exports for Mexico and Indonesia is due to the interrelation with developed economies. However due to the current economic and financial situation in developed countries, both countries are in need to find alternative trade partners among developing countries and to redesign industrial and trade strategies to continue with the positive performance.

As supported by the evidence from Amoroso, Chiquiar, Ramos-Francia (2011), developing countries tend to follow similar specializations patterns makingchallenging to trade between them. Even though Mexico and Indonesia were able to reach international competitiveness in some industries, now face pressures due to unskilled-labor abundant in other countries, the volatility of international prices, and stagnation of traditional markets.

Mexico and Indonesia are experiencing a faster economic and exports growth than developed economies, as well as significant improvement in industrialization, trade expansion and diversification, economic stability, business climate, global integration, investment environment and capital flow, suggesting a change in the trade pattern and in comparative advantage in the last decades.

The aim of this empirical study isto find the main changes in comparative advantage on the Mexican and Indonesian manufacturing industries; the dynamism on the pattern of trade followed by both nations;and to find some specialization or diversification, concentration or dispersion patterns. A second aim is to find if there is complementarity or similarity in the patterns that may indicate opportunities for trade expansion. Finally, the study aims to analyze structural changes in factor endowments and resource intensities.

II. INTERNATIONAL TRADE THEORY AND EMPIRICAL RESUTS

To relate the facts of trade dynamism experienced by Mexico and Indonesia it is advisable to analyze the main trade theories so to understand the trade performance and the trade pattern that both countries are shaping. The different contributions of each theory may help to identify factors that impact the comparative advantage and the trade pattern. Since nations experienced changes in resource endowments, technological possibilities, consumer preferences, changes in income distributions, foreign investment, industrial policy, etc. the study of trade pattern cannot be limited to certain theories.

Classical Approach: Ricardian Model

Ricardian theory explains how countries tend to specialize and assign resources in the production of particular goods which show lower marginal and opportunity cost over another, where there is a "comparative advantage". As a consequence capital flow from activities that are in disadvantage to those commodities with foreign demand, allowing specialization, the creation of new products, the

development of techniques as countries seekfor differences in relative commodity prices, which is what reflexes the comparative advantage and the benefits in trade (Salvatore).

Trade expansion does not necessarily result on economic growth, but it can elevate the rate of profits and contribute to capital accumulation throughout savings, diminished consumption, and expanding production possibility frontier. It may also increase the amount and variety of cheaper commodities, give access to technology, to new production processes and techniques. It is then the capital accumulation, the most efficaciously use of resources, the effective distribution of labor and the improvement of production that supports growth (Ricardo).

Neoclassical approach: Resources endowment (Heckscher-Ohlin)

The Heckscher-Ohlin (H-O) model explains that each country will produce a variety of commodities using different rations of labor and capital according to the demand for them determined by factor abundance and relative factor prices. As explained by Salvatore, under the H-O theorem "a nation will export the commodity intensive in its relatively abundant and cheap factor and import the commodity intensive in its relatively scarce and expensive factor".

It is the difference in relative factor abundance and consumer preference the cause of the pre-trade difference in relative commodity prices, the demand for resources that determines the mutualgains of trade on market prices. As explained by Sen (2010) *free trade theory moved away from comparative cost base on differences in skillsto an endowment-based explanation where nations have similar access to technology*.

A good number of empirical approaches emerge as a consequence of neoclassical theories and the unanswered facts from the classic theory. New approaches develop the factor-intensity index, the technological gap and product cycle models, economies of scale, complete specialization, role on tastes, product differentiation, imperfect market, factor mobility, and transportation cost.

New Trade Theories (NTT) and New International economics

New international economics appear as the fusion of Classic-Neoclassic trade wheretheory and models were apply at industrial level to discover the impacts on market structure, product differentiation, technology, regional development, etc.with three main

deviants; scale economies, product differentiation, and imperfect markets.

Krugman (1979, 1981) introduced economies of scale and monopolistic competition explaining the impact of increasing returns to scale on the pattern of trade and the mutual benefits from international trade even for two identical nations. Specialization, main determinant of economies of scale, allows nations to reach higher levels of production and consumption, and more efficacious resource relocation.

As commented by Clark (2010) economies of scale "are limited for monopolistically competitive firms that produce differentiated products", meaning many firms coexisting and producing at low output levels leading to more firms producing a wider variety of products. According to Sen (2010) "Scale economies force firms in each country to specialize in a limited subset of products in order to realize efficient scale operations". Under monopolistic competition, "products are likely to be differentiated"

As described by Helpman (1987) the new trade models does not intend to deny the old theory but to explain the existence other forces driving trade; "economies of scale and noncompetitive market structures". There is another equilibrium in which "specialization in the production of the increasing returns goods, and in which this specialization leads to the emergence of foreign trade".

The assumptions on imperfect market structures, and specialization will lead as explained by Linder to intra-industry trade, "differentiated products of the same industry", contrary to inter-industry trade based on comparative advantage and completely different products. It is demand and not supply that explains trade between nations, overriding the earlier emphasis on supply-based explanations. Salvatore noted that comparative advantage seems to identify the pattern of inter-industry trade but not the one of intra-industry trade.

Various Theoretical approaches of International Trading

Apart from differences in the relative availability of labor and capital, and the postulates of neoclassical theory, changes in technology can also determine trade.

According to the technological gap model Posner (1961), a good deal of trade among industrialize economies is based on "new products and new production processes". Traditionally, advanced

nations export a number of new high technological products. However with the time, less developed countries acquire the new technology (technological transfer, imitation, FDI) and with the low local labor costs will attractthe production revealing advantage over developing countries. This "technological gap" is reflected on the different technological lags; "demand-lag", "reaction-lag", "imitation-lag" Sen (2010).

Vernon (1966) complemented the theory with the product cycle model that explains the process in which products are developed by most advanced nations, standardized and transferred from advanced nations to LAN.Comparative advantage shifts from being high technological product and high skill labor (advanced nations) to LAN, where labor is r cheaper and whit enough capability to absorb new technology and new processes.

The different theoretical approaches show different paths in which the comparative advantage can switch from between countries, sectors, and industries and then to affect the trade pattern of a country. More than find out which model appears to be more relevant for Mexican and Indonesian case it is intended to understand the possible reasons that has promoted the change in volumes and variety of exports and the determinants of the Mexican and Indonesian change of trade pattern.

Various Empirical Approaches on Comparative Advantage

A good number of empirical approaches have been developed in trying to identify main determinants of shifts in trade pattern. Carolan, Singh, Talati found that the improvement in comparative advantage,the increasing levels of human capital and the upgrading of technology, together with other economic forces[2] can explain the shifts in the U.S.–East Asia trade. Yuea, Hua (2002), found that growth in exports in China was mainly due to China's shift from a heavy industry-oriented strategy tocomparative advantage strategybased on factor endowments(only labor-intensive products). Krause (1987) concluded that Asian Pacific countriesexperienced fast-growing trade due to changes in the composition of trade and in comparative advantage. Lee (1995) found that Korean dynamic comparative advantage was based on transferring efforts from zero marginal labor productivity to a highly productive sector, using technologies to support specialization, diversifying

industries, and supporting the new strategies through solid institutions.

Some evidences of change in comparative advantage were found under factor endowments analysis. Amoroso, Chiquiar and Ramos-Francia (2011) concluded that developing countries with similar country's comparative advantages appear to have twice much power in the determination of export patterns under Heckscher–Ohlin view than Ricardian productivity differentials. Balassa and Noland (1988) showed that due to changes in human capital the USA and Japan after fifteen years of significant differencesmatched in terms of factor endowments even though with different fields of specialization. Chenery and Keesing (1981) observed that the pattern of developing economies played a more active role not just in primary industries but also into more capital-intensive and skill intensive goods.

In analyzing technological capability and specialization and the impact in trade, Uchida and Cook (2005) observed that the country's technological capability and specialization reflect its trade specialization, influencing competitiveness.

When analyzing the determinants of trade expansion through intra-industry trade Balassa (1986) found that intra-industry trade is positively correlated with economic development, the size of domestic markets, and the openness of national economics. Gouranga G. (2007) observed that trade integration; share of manufacturing exports in total exports; technology intensiveness; as well as variety-seeking demand patterns may also foster intra-industry trade.

Some other scholars have analyzed the interactions of FDI, trade and economic growth. Borenszteina , Gregoriob, and Leec (1998) found out that FDI might support the expansion of domestic firms by complementarity in production or by increasing productivity through the spillover of advanced technology. Zhang, H (1999) found that there are different causals relationships among Asian countries, unidirectional from FDI to GDP, unidirectional from GDP to exports, and bilateral causal relationship between FDI and GDP, meaning no common pattern.Dan Ben-David (2002) explains that trade serves as a conduit for knowledge flows between countries, which serves to increase the productivity of capital and labor. Dussel (2003) found that FDI has an overall positive effect on exports, output, wages and employment but mainly on industries with high tech

---

[2] Transport costs; tariffs or quantitative trade restrictions; greater specialization due to economies of scale; or "a successful combination of import substitution followed by export promotion"

intensity. Cuadros (2000) found complementarity between trade and FDI.

Liberalization, integration, industrialization is widely discussed as a channel for export expansion. Vasquez G and Olajide S (2009) noted "structural changes that occurred due to trade liberalization were conducive to improve the positive effect of exports on growth in Mexico".Baldwin (2011) address the rapid economic growth of developing countries as the result of joining a supply chain which made industrialization less complex and faster (new industrialization path) through the offshoring from rich-nation technology

and the low-wage labor of LAE.De Hoyos and Lacovone (2011) found that liberalization in NAFTA helps to enlarge knowledge by increasing their contacts with foreign buyers, decrease learning externalities, improve productivity, economies of scale, and givesincentives to innovate.

Even though there are no standard patterns of trade development among scholars it supports the idea that changes in the trade pattern are promoted through improvements in productivity, human capital, technology, specialization, FDI, etc.

III. THEORETICAL AND EMPIRICAL FRAMEWORK

Empirical analysis as well as the theory presented allows to assume different effects from supply and demand side on exports and imports in terms of volume, variety, and of the way resources are allocated, determining the comparative advantage developed by a country and expressed in its trade pattern. The conceptual framework is shown in Appendix A.

Improvements in capital, labor, and technology can affect the level of specialization, productivity and

better resource relocation leading the country to reach higher levels of scale that will result in larger output and lower costs. The reduction on costs will allow the creation of price differentials that increases the volumes of exports and then supports economic growth through balance of trade, and accumulation in the quality and intensity of the factors of production. It is expected that under this positive changes investment and business environment will attract more resources and support capital, labor and technology.

IV. METODOLOGY

To address the problematic and the assumptions on the change of comparative advantage, the present study uses two variables expressed as Revealed Comparative Advantage (RCA) indexes and Trade Balance Index (TBI) on the basis of exports to the whole world for 1989 - 2011 to identify trends in Mexico´s and Indonesian´s Manufacturing Industry at the industry (2 digit) and commodity level (4 digit). The computation of the RCA base on Balassa (1965) will show "the relative export performance of a country in particular commodities" expressing the advantages of the trading countries due to relative costs and other non-price factors. RCA indexes are obtained by dividing a country's share in the exports of a given commodity category by the share in the world exports.

$$RCA_{i,j} = \frac{E_{i,j}/E_C}{E_{i,word}/E_{tot,word}} \quad ....(1)$$

RCA_{ij} : country's *j* revealed comparative advantage index for commodity group *i*; E_{ij} stands for exports of commodity *i* by exporter *j*; E_{tot} means the total exports of manufactured goods. The values of the index vary from 0 to infinity ($RCA_{ij} \geq 0$). RCA_{ij} greater than one means that country *i* has comparative advantage in group of products *j* and vice verse.

Revealed Symmetric Comparative Advantage (RSCA) index developed by Dalum and Laursen (1998)[3] will be used so as to facilitate comparison analysis. RSCA is base on RCA with a "simple decreasing monotonic transformation" (Tri Widodo) formulated as:

$$RSCA_{ij} = (RCA_{ij} - 1) / (RCA_{ij} + 1)..............(2)$$

With this adjustment, the values of $RSCA_{ij}$ index will take values in the range of minus one to one (-1 $\leq$ $RSCA_{ij} \leq$ 1). Values of $RSCA_{ij}$ above zero implies a comparative advantage of country *i* in group of

[3] Dalum, B., K. Laursen, G. Villumsen, (1998), "Structural change in OECD export specialization patterns: despecialization and stickiness", International Review of Applied Economics

Laursen, K, (1998), "Revealed comparative advantage and the alternatives as measures of international specialization", Danish Research Unit for Industrial Dynamics Working Paper, No. 98-30.

commodities **j**. RSCA$_{ij}$ below zero implies a comparative disadvantage of country **i** in group of commodities **j**.

Trade Balance Index (TBI) helps to identify the export position of a country for a group of products, showing if the country has specialization in export (as net-exporter) or in import (as net-importer). The assumptions of this index are taken from the empirical research of Lafay (1992)[4]. The Index obtained from TBI may indicate if a specific commodity contributes to the domestic economy (surplus), or if is a negative (deficit). TBI is formulated as:

$$TBI_{ij} = (X_{ij} - m_{ij}) / (x_{ij} + m_{ij}) \quad................................(3)$$

TBI$_{ij}$ Trade Balance Index of country **i** for group of products **j** ; **X$_{ij}$** Exports of group of products **j** by country **i** ; **m$_{ij}$** Imports of group of products **j** by country **I**

The values of the TBI index will range from -1 to 1. The TBI will equals -1 if a country only imports (net-importer) and 1 if only exports (net-exporter).

Once the RCA are calculated for industry and commodity level different arrangement of data are undertaking according to ranking, performance, tendencies, so to facilitate analysis of diversification and specialization, correlation, and inter-temporal variations. Finally the factor intensity analysis is undertaking to identify the structural changes in endowments.

Complementing the analysis of indexes, the "Product Mapping" developed by Tri Widodo it is used to examine comparative advantage from the point of view of the domestic trade balance and the international competitiveness. With RSCA and TBI indexes, products are categorized into four groups A, B, C and D as depicted:

	TBI < 0	TBI > 0
RSCA > 0	**Group B:** Comparative Advantage Net-importer (RSCA>0 and TBI < 0)	**Group A:** Comparative Advantage Net-exporter (RSCA>0 and TBI > 0)
RSCA < 0	**Group D:** Comparative Disadvantage Net-importer (RSCA<0 and TBI < 0)	**Group C:** Comparative Disadvantage Net-exporter (RSCA<0 and TBI > 0)
	TBI < 0	**TBI > 0**

Figure 1
Product Mapping Chart

Group A are those products that enjoy both comparative advantage and export-specialization; **group B** products with comparative advantage but no export-specialization; **Group C** products with export-specialization but no comparative advantage; and **group D** products with neither comparative advantage nor export-specialization.

Data

Data of Exports and Imports of Mexico, Indonesia and the World are collected from the United Nations Commodity Trade Statistics Database (UNCOMTRADE) under the Standard International Trade Classification (SITC, Rev.3) which classifies commodities according to their stage of production. Two and four digit data are used.

❧

V.   EMPIRICAL RESULTS

For a more systematic analysis this section is divided into four parts. The first part focuses on the analysis of the revealed comparative advantage indexes, the second part analyzes inter-temporal variations, the third corresponds to the product mapping analysis, and the forth one to the factor intensity analysis. The data is aggregated at sector level (6 main sectors), industry level (34 categories) and commodity level (692 products).

Revealed Comparative Advantage 2011

(I) Mexico

The analysis at sector level reveals that Machinery and transportation equipment (M&T), Chemicals, and Manufactured articles (M&M) are the sectors with higher comparative advantage whether in RCA index or in number of products.

[4] Lafay, G., (1992), "The measurement of revealed comparative advantages", International Trade Modeling, Chapman & Hill, London.
[5] Chemicals, Iron and steel, Machinery and transport equipment, Manufactured goods, Miscellaneous manufactured articles, and Textile fibres, yarn, fabrics and clothing.

Chart 2
Mexican sector Composition and Industry composition (% Products RCA>1) 2011

A total of 125 products revealed comparative advantage for Mexico. When analyzing the top 20 RCA products it was found that 13 groups belong Machinery and transportation equipment, with fifteen among the top 20 started year 1989 with disadvantage but rapidly improve in the RCA index. Correlation between periods was found low indicating important disruptive changes along the 23 years with fast and high improvement in new industries and products from 1989 to 1995 (70% of new products).

The top RCA Indexes of industries correspond to Telecommunications and equipment, Road vehicles, Office data processor, Furniture, Power generation equipment, Electrical equipment, Scientific instruments and Building fixtures.

The industrial pattern of Mexico experienced a significant change since switched to new industries. It appears to be more market oriented and integrated with main trade partners from NAFTA. A goods number of industries developed in a short periods of time, reaching indexes of RCA that do not correspond to a simply industry maturation, but to deep FDI inflows, technological changes, structural resource endowments changes, and global integration. In other hand, a good number of commodities lose comparative advantage in short periods of time as a possible consequence of the market liberalization policy in which products from abroad excerpted pressures on some Mexican industries.

(ii) Indonesia

At sector level Indonesia reveals that Manufacturing goods (MG) and Manufacturing miscellaneous articles (M&M) are the only sectors with RCA index revealing comparative advantage. However Textile appears as the sector with largest number of products enjoying RCA (38%), followed by M&T (20%).

Chart 2
Indonesian sector Composition and Industry composition (% Products RCA>1) 2011

The top industries corresponds to Articles of apparel & clothing accessories, Textile, Paper manufactures, Cork and wood manufactures, Electrical machinery, appart and applianc, Miscellaneous manufactured articles, Organic chemicals and Rubber manufactures.

There are three industries with large proportion of products enjoying comparative advantage in the world; Articles of apparel & clothing accessories (70%), Footwear (57%), Paper and paper manufactures (46%).

When analyzing the top 20 ranking of products it was found that nineteen commodities revealed an RCA index above 4 points what is consider as strong, and most of them stayed in the ranking for the whole period of 23 years.

At sector level correlation was found at middle level indicating the presence of certain disruptive changes (especially M&T) but also a strong permanence of traditional industries.
Indonesia appears more specialize in low cost competition industries as textile, clothing, footwear, as well as natural resource related products (cork, furniture, paper, plywood, rubber, organic chemicals), etc.

(iii) Comparative

Both Mexico and Indonesia revealed advantage in different industries and products meaning diverse pattern of export specialization that can be complementary. None of their main industries were found common.

Among the 237 commodities in which Mexico or Indonesia enjoyed comparative advantage on 2011 (Indonesia 112, Mexico 125) there are only 16 commodities in which both compete in the world market.

Table 1
Main Industries Indonesia and Mexico 2011

Industry INDONESIA	%	Industry MEXICO	%
Articles of apparel & clothing accessories	23%	Electrical machinery, apparatus& applianc	12%
Textile yarn and related products	15%	Other industrial machinery and parts	10%
Paper and paper manufactures	5%	Telecommunication and sound recording apparatus	7%
Cork and wood manufactures	4%	Power generating machinery and equipment	7%
Organic chemicals	4%	Manufactures of metal, n.e.s.	7%
Chemical materials and products	4%	Professional and scientific instruments,	6%
Footwear	4%	Road vehicles	5%

Inter-Temporal Variation In Revealed Comparative Advantage: 1989-2011

(I) Mexico

The analysis shows that the period of 2000 to 2005 was the highest in RCA indexes and in number of commodities with RCA above 1. Sectors as M&T together with M&M increased significantly, but a number of commodities from Textile and Miscellaneous sector lose comparative advantage after 2005.

Nine out of ten most competitive industries in which Mexico reveals comparative advantage in 2011 appear after 1989 pushing 99 new products to the list of competitive commodities. NAFTA, market liberalization, human capital improvement and FDI are assumed to be the cause of improvement.

While Chemical sector is the one suffering the highest decreases in number of commodities with comparative advantage (from ranking 1 to 4), M&T registered the strongest disruptive change. It is assumed thatthe overall M&T sector enjoyed advantages due to spillovers, business environment, technological transfers, human resource improvement, specialization, and capital deepening.

At industry level, only Power generating machinery and Inorganic chemicals keep advantage from 1989 to 2011. The slowdown in other industries can be explained by relocation of resources into booming industries, the loss of comparative advantage of some cost efficient industries, increase in wages, industries technologically left behind, and economic slowdown of trade partners (USA).

Manufacturing sector in Mexico was found to follow diversification during the first years (1989-2000 from 90 to 153 products) and finally specializing into top 10 large industries that agglomerate 65% of competitive commodities.

(ii) Indonesia

For Indonesia, Manufactured goods (MG) and Miscellaneous manufactured articles (M&M) are the sectors that enjoy the best performance in new products. The top ten products of 1989 remained in the top twenty ranking until 2011, meaning strong revealed advantage on backbone traditional industries.

Indonesia increased from 54 to 112 products enjoying comparative advantage from 1989 to 1995 with Textile products remained as the largest group since 1989 (45% of total), but losing inertia from 2000 to 2005.

The two most competitive Indonesian industries are Articles of apparel and clothing (70% of the productsenjoy RCA > 1) and Footwear (57%). None of the industries has diminished their percentage of products enjoying comparative advantage indicating tendency towards specialization. It is assume that resource relocation and liberalization has not affected significantly the main industries.

Some industries from M&T and Manufactured goods developed relatively fast, while other industries did not change much (Textile).

Product Mapping

(i) Mexico

In 1989 Mexico was a Net importer of 92% of the total products and enjoyed comparative advantage in only 13% of the products mostly from Chemicals, Manufacturing goods, and Machinery and transportation (M&T). In 2000 switched from Chemical to Textile and M&T, reducing net imports to 69%. However by year 2011 Mexico lost export specialization and become net imported of 74%, while diminishing products with advantage and specialization to 8%. The improvement experienced on the 1990's by Mexico was not supported during the 2000's in terms of proportion, however in terms of volume of trade and number of products improved. See Appendix B

Mexico revealed comparative advantage and export specialization on thirty-nine groups of products where Indonesia shows disadvantage and is net importer. Most of these products are under M&T, miscellaneous, and manufactured goods.

(ii) Indonesia

On 1989 Indonesia enjoyed 12% of the products under comparative advantage and export specialization (group A) mainly from Textile (50%), manufactured goods, and miscellaneous, and was net importer of 76% oftotal products.On year 2000 Indonesia improve group A to 21% with significant improvement on new sectors, while reducing net imports to 56%.However an overall slowdown in number of products with comparative advantage and export specialization was experienced in the decade 2000-2011.

It can be assume that Indonesia experienced a significant openness starting on 1990's with some industries expanding to global markets and local firms opened for foreign integration. From 1990's to 2007 Indonesia change significantly the pattern of exported, however from 2007 to 2011 the pattern returns to a similar situation as on 1989.

In 2011 Indonesia reveals advantage in 54 commodities in which Mexico reveals disadvantage; a good number of them under Textile sector, Manufactured goods and Chemicals. If Mexico is consider as net importer and Indonesia as net exporter there are 73 group categories offering opportunities for trade expansion.

(iii) Comparative Mexico and Indonesia

There are only nine products where both enjoy comparative advantage and are net exporters, and thirty in which neither Mexico or Indonesia are Net-Exporters and enjoy competitive advantage.

There are more than two hundredcommodities (108 Mexico and 117 Indonesia), in which one country is Net exporter and the other is Net importer.

There is a common improvement in Machinery and transportation equipment, and both countries show similar industrialization path towards it, even though Mexico is ahead in number of products with comparative advantage. It may harden competition in the future or to allow complementation in production.

Both countries export huge percentage of products with non-RCA (differentiated goods), which can be considered as Intra-Industry trade. Is then that group B appears relevant with Indonesia experiencing faster growth but Mexico with larger number of products.

Chart 1
Product Mapping Figures Mexico and Indonesia 2010

RCA According to factor intensity

(I) Mexico

On 1989, 34% of the commodities enjoying comparative advantage in Mexico were high skill and technology intensive (HS-TI), and 29 % Labor intensive and resource based (LI-RB). Starting on 1995 Medium skill (MS-TI)

manufactures begun growing up reaching almost 40% of total products enjoying RCA > 1. In year 2010 almost 70% of total manufacturing of Mexico was composed by HS-TI and MS-TI manufactures, with less LI-RB products.

Industrial upgrade and the change in the pattern of Mexican exports tend towards higher technology and higher level of human capital (skills) meaning higher value added products and an overall industrial upgrade and improvement in technological absorption capability. Resource relocation from capital (technological industries), labor (higher skills) and less dependence on natural resources can be assumed during the 23 years.

Seven out of the top ten new industries and 80 % of total products are under HS-TI or MS-TI,while LI-RB and LS-TI registered a significant reduction from 50% to 27%.MS-TI registered the fastest growth in number of products, all under M&T.

(ii) Indonesia

Since 1989 the advantage of Indonesia was predominantly under Labor-Intensive and resource base manufactures. On 2010, 56% of their products enjoying high RCA were under this categorywith some of the top products as Textile, Paper, Cork and wood, Footwear, etc.

HS-TI together MS-TI are the factors that registered the largest growth in terms of proportion of new products for Indonesia (HS-TI more than triplicate from 7 to 24 products).

The Industrial change was in two lines: keep traditional sectors (LI-RB) in a competitive way, and include new sectors with higher technology and skills degree. Capital deepening and improvement on technological absorption capability is assumed.However the three main Indonesian sectors are under LI-RB meaning high relevance for Indonesia.

(iii) Comparative Mexico and Indonesia

Even though both countries registered important improvements in Machinery and transportation (M&T), and Miscellaneous manufacturing articles the direction of industrial efforts was towards different commodities. While in Mexico M&T is mostly MS-TI, in Indonesia it is a mix of HS-TI, LS-TI, and MS-TI. Manufactured goods in Mexico are 100% HS-TI while in Indonesia reveals mostly LI-RB. In Miscellaneous articles

Indonesia focuses on LI-RB products while Mexico on HS-TI products. As for Mexico, 70% of products are under MS-HS and HS-TI while for Indonesia 70% are under LI-RB and HS-TI.

Both have changed the pattern however; Mexico appears more radical switching to new industries and factors, while Indonesia keeping traditional factors while expanding to new factors. Both show specialization towards same sectors but different use of intensities so allowing complementation in pattern

As it can be observed the different sectors offered distinct trajectories and targets giving good possibilities for trade expansion, and confirming the assumption that manufacturing sector has change in the last 23 years both in Mexico and in Indonesia.

VI. CONCLUSIONS

Significant changes in their pattern of exports at sector, industry and commodity level were observed both in Mexico and Indonesia from 1989 to 2011. Disruptive changes, reshape the industrial sector and reorient export composition of Mexico specially under the NAFTA demand for higher technological and skill products, fostering changes in the creation of industries, reorientation of exports composition, integration, and overall improvement in Tech and human capital.

Indonesian manufacturing sector appears highly supported by traditional industries as the backbone of export sector while some structural changes were found with new products and new industries. Endowments remainstrongly as labor intensive and resource-based manufacturer but with certain degree of improvement of higher value added products.

The pattern of trade was found to be complementary allowing trade expansion between both economies with more than 200 products.

BIBLIOGRAPHY

Amoroso, N., Chiquiar, D., Ramos-Francia, M., Technology and endowments as determinants of comparative advantage: Evidence from Mexico, 2011, Vol 22, pp. 164-196. North American Journal of Economics and Finance

Balassa, B., Intra-Industry Speacialization a Cross-Country Analysis, 1986, Vol 30, p.p 27-42. European Economic Review. North-Holland.

--------------------, Noland, M., The Changing Comparative Advantage of Japan and the United States, (1988) Institute for International Economics.

Baldwin, R., Trade and Industrialisation after globalization´s 2nd Unbundling: How building and joining a supply chain are different and why it matters". 2011, NBER Working Paper Series No 17716.

Batra, A., Khan, Z., Revealed Comparative Advantage: An analysis for India and China. 2005 Working Paper No. 168, Indian Council for Research on International Economic Relations.

Borenszteina E., De Gregoriob J. , Leec J-W., How does foreign direct investment affect economic growth?. 1998, Vol 45, pp. 115-135. Journal of International Economics.

Carolan Terrie, Singh Nirvikar, Talati Cyrus (1998), The composition of U.S.-East Asia trade and changing comparative advantage. 1998, Vol. 57 1998,pp. 361-389. Journal of Development Economics.

Clark, Don P., Scale economies and intra-industry trade. 2010, Vol. 108, pp. 190-192. Economics Letters.

Dan Ben-David, Trade and the Neo-classical growth model. 2002.

Das, Gouranga G., Intra-Industry Trade and Development: Revisiting Theory, Measurement and New Evidences, 2007, Paper No. 37260, MPRA.

De Hoyos R., Lacovone, L., "Economic Performance under NAFTA; A Firm-Level Analysis of the Trade-Productivity Linkages". 2011, Policy Research Working Paper 5661, The World Bank.

Dominick Salvatore., International Economics, Ninth edition. Wiley.

Dussel Peters, E., Ser maquila, o no ser maquila. Esa es la pregunta?. 2008.

Helpman, Elhanan., Imperfect Competition and International Trade. 1987, European Economic Review 31,pp. 77-81. North-Holland.

*Krugman, P., Technology, trade and factor prices. 2005, Vol 50,pp. 51-71. Journal of International Economics

Lee, J., Comparative Advantage in Manufacturing as a Determinant of Industrialization: The Korean Case.1995, Vol. 23 (7), pp. 1195-1214. World Development

Sen, S., International Trade Theory and Policy: A Review of the Literature. 2010, Working Paper No. 635. Levy Economics Institute of Bard College.

Uchida, Y, Cook, P., The Transformation of Competitive Advantage in East Asia: An Analysis of Technological and Trade Specialization. 2005, Vol. 33(5), pp. 701-728. World Development.

Yuea Changjun, Hua Ping, Does comparative advantage explains export patterns in China?. 2002, Vol 13, pp. 276-296.

Zhang, H., FDI and economic growth: evidence from ten East Asian Economies, 1999, Vol 7(4), pp. 517-535. Economia Internationale.