Asian Journal of Latin American Studies (2016) Vol. 29 No. 2: 1-28

The Potential Impact of the Trans-Pacific Partnership on the Mexican Trade with China and Korea

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Mendoza, Jorge E. (2016), "The Potential Impact of the Trans-Pacific Partnership on the Mexican Trade with China and Korea"

ABSTRACT

In 2015, Mexico became a member of the Trans-Pacific Partnership (TPP) agreement which includes twelve countries. The objective for the Mexican government was to have greater access to markets in Asia and to increase supply chains in the Asia-Pacific region. However, the exclusion of China and Korea, important trading partners of Mexico particularly in the telecommunications goods and inputs required for the production of Mexican manufacturing exports and the domestic market consumption, could bring about limitations for the Mexican diversification of trade. Additionally, the Mexican-Chinese trade has shown increasing intra-industry trade (IIT) in the automotive, electronics and mining industries. The rules of origin of the TPP will impose restrictions on input imports from non-members of the TPP such as China and Korea, and therefore, could potentially slow down the IIT between Mexico and those economies. As a result, there would be a high probability that Mexican imports from China and Korea could be substituted by imports from TPP members, possibly at a higher cost. The comparative analysis of the Mexican tariff structure indicates that the number of high value Mexican imports from China and Korea that are subject to tariffs is very significant. Therefore, it is likely that the establishment of the TPP could increase the competition for China and Korea, which already encompass an important share of the Mexican imports, potentially creating trade diversion. Additionally, the likely positive effects of the TPP are related to the size of the economies and possible trade expansion, which could be limited by the low GDP of several economies included in the TPP.

Key Words: Trans-Pacific Partnership, preferential trade agreements, international trade, intra-industry trade, Mexican economy

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INTRODUCTION

The international trade of the Mexican economy is characterized by an important share of intra-industry trade (IIT) with the USA, which was encouraged by the establishment of the North American Free Trade Agreement (NAFTA). Additionally, Mexican trade has been affected by the emergence of Asian economies such as China, Japan and Korea that have become important trading partners of Mexico. Those countries have had a major impact on the changes that Mexican trade has experienced since the beginning of the decade of the 2000s. After twenty years of the North American Free Trade Agreement (NAFTA), the possibilities of sustained economic growth in the North American region based on the expansion of trade between Canada, United States (USA) and Mexico seemed to have reached their limit (Mendoza 2015). With the aim of redefining the objectives and the legal structure that regulate the trade of the region and the Asian-Pacific region, these three economies have participated in the negotiations and establishment of the Trans-Pacific Partnership Agreement (TPP), which includes twelve economies from four regions: North America, South America, Oceania and Asia and is oriented toward generating greater access to markets, particularly in Asia and Oceania.

The Asian economies are viewed as central for the trade and security interests of the USA. Since China has become a more influential economic force for both the Asian and Latin American economies, with the potential of shifting the economic relations of the US in those regions, the trade policy of the USA has been focused on increasing both bilateral and multilateral agreements. From the Mexican point of view, the TPP represents the possibility of expanding trade by providing potential access to new markets in Asia and Oceania and Latin America. However, there is also a potential risk of trade diversion resulting from the exclusion of China and Korea, which are two of the most important Asian economies and trading partners of Mexico.

The effects of preferential trade agreements (PTA) are related to trade creation and trade diversion (Viner 1950), and the welfare effect changes that result from the changes in the trade structure of the members. It has been demonstrated that the lack of trade expansion of PTA members will determine a welfare decline (Bhagwati 1971). Therefore, the potential benefits of trade are associated with the economic structures and trade dynamics of the trading partners (Burfisher, Robinson and Thierfelder 2001). Additionally, Krueger (1993) pointed out that one of the negative

effects of PTA has to do with the differential between external tariffs and the internal tariffs imposed by the PTA members. As a result, the rules of origin can intensify the protection of the rest of the members of the PTA against trading partners not included in the agreement, and can therefore generate trade diversion.

In order to analyze the potential effects of the TPP, this study will estimate the structure and trends of Mexican trade with the USA, China and Korea and the effect of the rules of origin of the TPP on the Mexican trade with China and Korea. The rules of origin are useful to determine the degree of preferential treatment for the parties included in the agreement (particularly in the case of Customs Unions). Additionally, in the case of PTAs, the rules of origin are used to control the import of commodities destined to be re-exported by a party of the PTA that has the lowest tariff (Krishna 2006). For these reason, the rules of origin of the TPP have the potential to develop a protectionist environment in Mexico that could limit further trading activities with important Asian economies not included in the agreement.

Additionally, the paper will focus on estimating the intra-industry trade (IIT) and horizontal and vertical trade between Mexico and the USA, China and Korea. This aspect of Mexican trade with the Asian countries is important to consider, because of the predominance of intra-industry trade within the Mexican economy and the increasing IIT with China. Regarding this aspect of Mexican trade, it is worth mentioning that Mexican IIT has been studied by different authors. Esquivel (1992) pointed out that, beginning in the early eighties, Mexican IIT increased steadily; Buitelaar and Padilla (1996) estimated the intra-industry trade of Mexico with its most important trade partners for the period 1990-1995, and concluded that more than 40% of Mexican foreign trade was IIT, and that there was a reduction of IIT in the Mexican non-manufacturing activities, and an increase of IIT in manufacturing sectors. González and Dussel (1999) studied the period 1995-1999 and pointed out that industries that exhibited IIT showed positive trade balances, while the inter-industrial trade exhibited a negative trade balance, Clark, Fullerton and Burdorf (2001) and López, Rodil and Valdez (2014) pointed out that after the establishment of NAFTA, Mexico increased its trade integration with the US economy and also continued to increase IIT.

The structure of the article is as follows: the first section describes the characteristics of the Mexican trade with China and Korea and the evolution of IIT, vertical and horizontal trade between Mexico, China and Korea; the second section presents relevant theoretical policy aspects of regional trade agreements and their effect on trade expansion; in the

third section the TPP objectives and their potential effect on Mexican trade are described; the fourth section explains the TPP agreement scope and structure and the potential trade diversion that could be created by the product-specific rules of origin and macroeconomic factors; finally, in the last section, the conclusions of the paper are presented.

MEXICAN TRADE WITH CHINA AND KOREA

The economies that have the highest volume of trade with Mexico are the USA, China, Canada, Japan and Korea. In 2014, the first economy accounted for 77.7% of the total Mexican trade with the TPP economies; China represented 10.9% and was followed by Canada with 3.1%, Japan with 3.0% and Korea with 2.4% (Table 1). Therefore, the establishment of the TPP could potentially negatively affect the significant trade between Mexico and two of its most important trading partners: China and Korea. In particular, those economies are very important for the Mexican economy because of the significant quantity of imports that Mexico receives from those countries.

Table 1. Mexican trade with the Trans-Pacific Partnership members and China and Korea, 2014 (Dollars)

Country	Exports	Imports	Total trade*	Balance	% of total trade
Australia	1,009,286,609	553,533,695	1,562,820,304	455,752,914	0.2
Brunei	2,564,365	31,257	2,595,622	2,533,108	0.0
Canada	10,714,113,957	10,044,921,381	20,759,035,338	669,192,576	3.1
Chile	2,148,010,046	1,397,604,224	3,545,614,270	750,405,822	0.5
China	5,964,132,804	66,255,965,394	72,220,098,198	-60,291,832,590	10.9
Korea	2,027,369,466	13,771,521,588	15,798,891,054	-11,744,152,122	2.4
Japan	2,608,463,090	17,544,577,199	20,153,040,289	-14,936,114,109	3.0
Malaysia	195,400,213	6,560,586,909	6,755,987,122	-6,365,186,696	1.0
New Zealand	99,154,866	348,535,410	447,690,276	-249,380,544	0.1
Peru	1,730,179,986	1,106,269,182	2,836,449,168	623,910,804	0.4
Singapore	529,069,903	1,199,909,809	1,728,979,712	-670,839,906	0.3
USA	318,681,254,930	195,857,558,394	514,538,813,324	122,823,696,536	77.7
Vietnam	92,580,402	1,923,113,955	2,015,694,357	-1,830,533,553	0.3
Total	345,801,580,637	316,564,128,397	662,365,709,034	29,237,452,240	100.0

Source: Own elaboration based on data from United Nations, COMTRADE, consulted December 1, 2015. (*Exports plus imports)

Additionally, it is worth mentioning that the rate of growth of the total trade of Mexico with the Chinese and Korean economies has increased at a faster rate than the Mexican trade with the USA. The annual average rate of growth of trade between Mexico and China and Korea for the period 2000-2014 was 21% and 8.3%, respectively, while it was only 4.2% with the USA (Table 2). The accumulated FDI in Mexico from China and Korea is lagging far behind the investment of Japan, USA and Canada. However, the growth of FDI from China and particularly Korea has increased very rapidly, encouraging vertical trade between of these economies with Mexico (Table 3).

Table 2. Mexican trade with the US, Japan, China and Korea, 2000-2014 (Billion dollars)

	USA		Japan		China		Korea	
Year	Total trade	Trade balance	Total trade	Trade balance	Total trade	Trade balance	Total trade	Trade balance
2000	275,000	19,000	4,804	-5,349	3,188	-2,568	3,984	-3,396
2001	250,000	22,000	4,798	-6,819	4,412	-3,642	3,740	-3,323
2002	245,000	31,000	5,102	-8,155	6,927	-5,620	4,071	-3,747
2003	251,000	39,000	5,285	-6,422	10,374	-8,426	4,294	-3,931
2004	278,000	56,000	5,772	-10,039	14,847	-13,900	5,338	-5,117
2005	302,424	64,670	7,966	-11,605	18,832	-16,561	6,738	-6,254
2006	341,778	80,442	12,215	-13,698	26,126	-22,750	11,079	-10,164
2007	362,351	82,765	14,526	-14,428	31,639	-27,849	13,294	-11,933
2008	383,871	80,639	15,572	-14,234	36,735	-32,646	14,063	-12,988
2009	295,119	69,765	12,541	-9,794	34,737	-30,321	11,440	-10,442
2010	384,000	94,000	14,654	-13,092	49,803	-41,412	13,659	-11,802
2011	450,000	100,000	15,916	-14,241	58,212	-46,284	15,186	-12,142
2012	474,000	102,000	15,952	-15,045	62,657	-51,215	15,068	-11,614
2013	488,000	112,000	15,737	-14,832	67,790	-54,853	15,018	-11,968
2014	515,000	123,000	16,380	-14,936	72,220	-60,292	15,799	-11,744
	4.19% *	12.50%	8.20%	6.80%	20.80%	21.00%	9.20%	8.30%

Source: Own elaboration with data from United Nations, COMTRADE.
(*Annual average rate of growth)

Table 3. Evolution of the Foreign Direct Investment in Mexico from NAFTA countries Japan, China and Korea, 2000-2014 (Millions of dollars)

	Canada	China	Korea	USA	Japan	Total
2000	670.59	10.72	30.16	13,194.31	442.80	18,312.27
2001	1,047.96	2.39	50.53	21,569.91	187.32	30,053.35
2002	283.39	- 1.73	31.91	13,208.88	203.74	24,039.75
2003	408.14	25.64	57.08	8,953.08	188.91	18,891.90
2004	804.78	11.96	67.07	9,133.68	476.61	25,138.92
2005	691.46	15.31	96.81	11,820.82	198.82	24,879.95
2006	977.14	24.85	72.19	13,425.71	-1,442.86	21,006.88
2007	871.82	14.52	90.83	13,101.93	458.41	32,400.98
2008	3,439.22	13.15	480.04	11,674.23	543.97	28,796.74
2009	1,833.46	33.75	75.65	7,453.10	393.32	17,763.47
2010	1,972.73	14.48	- 2.69	6,973.52	576.45	26,200.24
2011	1,425.19	22.44	100.40	12,010.17	962.29	23,361.79
2012	1,848.81	82.83	129.07	9,505.32	1,810.03	19,731.26
2013	4,520.89	19.10	416.46	13,333.91	1,908.51	45,170.11
2014	2,994.45	70.03	523.45	7,444.49	1,320.15	25,140.63
Accumulated	23,790.03	359.45	2,218.97	172,803.07	8,228.48	380,888.24
% accumulated	6.2	0.1	0.6	45.4	2.2	100.0

Source: Own elaboration based on data from Secretaria de Economia, Mexico, consulted November 14, 2015. http://busca.datos.gob.mx/#/conjuntos/inversion-extranjera-directa

The major Mexican imports from China and Korea are telecommunications equipment and parts. The value of those imports represented 4.3% of the total Mexican imports (Table 4). This amount of trade indicates that Mexico has increased its trade in telecommunications equipment and also in parts that are required for the production of Mexican manufacturing exports. Other significant Mexican imports from China and Korea are automatic data-processing machines, photo-cathode valves and transistors. Mexican imports of parts for vehicles and electrical machinery also relate to the firms requirement for equipment and manufacturing inputs. Therefore, the structure of Mexican trade with China and Korea suggests that Mexican imports from China and Korea, although relatively less important in volume than those from the United States, represent a significant volume of inputs required by the Mexican manufacturing industry and also the domestic market.

Table 4. Major Mexican imports from China and Korea, 2014 (Current dollars)

China				Korea			
Commodity code	Commodity	Trade Value (US)	% total imports	Commodity code	Commodity	Trade Value (US)	% total imports
764	Telecommunicationss equipment and parts	14,167,347,402	3.57	764	Telecommunicationss equipment and parts	3,047,631,527	0.77
752	Automatic data-processing machines and units	5,135,534,731	1.29	776	Thermionic, cold cathode or photo-cathode valves, tubes transistors	1,630,120,731	0.41
759	Parts and accessories for use with machines falling within groups 751 and 752	4,604,655,395	1.16	931	Special transactions and commodities not classified	781,385,243	0.20
776	Thermionic, cold cathode or photo-cathode valves and tubes, transistors	3,390,154,307	0.85	784	Parts and accessories of the motor vehicles	648,946,886	0.16
772	Electrical apparatus for switching or protecting electrical circuits	2,887,062,416	0.73	871	Optical instruments and apparatus	634,504,195	0.16
778	Electrical machinery and apparatus	2,278,474,221	0.57	781	Motor cars and other motor vehicles	513,957,949	0.13
931	Special transactions and commodities	2,108,149,026	0.53	772	Electrical apparatus for switching or protecting elec. circuits	505,232,555	0.13
771	Electric power machinery other than rotating electric plant	1,630,858,328	0.41	778	Electrical machinery and apparatus	383,210,392	0.10
894	Baby carriages, toys, games and sporting goods	1,596,733,547	0.40	582	Plates, sheets, film, foil and strip of plastics	382,435,415	0.10
784	Motor parts and accessories	1,519,892,334	0.38	674	Flat-rolled products of iron or non-alloy steel	294,422,112	0.07
	Total		9.90				2.22

Source: Own elaboration based on data from United Nations, COMTRADE, consulted December 1, 2015.

The Mexican exports to China and Korea are relatively small compared to the total exports of Mexico. In 2014, within the Mexican exports to China and Korea, the exports of automobiles stand out. The automobile

exports were the highest value exports to China and the third highest to Korea. Other Mexican exports to China consist of primary goods, such as copper, petroleum oils, non-ferrous base metal waste, scrap and ores and concentrates of base metals. In the same way, the principal Mexican exports to Korea were ores and concentrates of base metals, petroleum oils and oils from bituminous minerals, ores and concentrates and copper ores and concentrates (Table 5). Hence, Mexican exports to both Asian economies are based on the expansionary strategy of the automobile firms producing in Mexico and the comparative advantages of Mexico's mineral resources endowment.

Table 5. Major Mexican exports to China and Korea, 2014 (Current dollars)

China				Korea			
Commodity code	Commodity	Trade Value (US)	% total exports	Commodity code	Commodity	Trade Value (US)	% total exports
781	Motor cars and other motor vehicles	1,640,665,380	0.41	287	Ores and concentrates of base metals	916,400,672	0.23
283	Copper ores and concentrates	1,032,430,372	0.26	334	Petroleum oils and oils from bituminous minerals	174,997,189	0.04
784	Parts and accessories of the motor	541,222,679	0.14	781	Motor cars and other motor vehicles	129,198,894	0.03
333	Petroleum oils and oils from bituminous minerals, crude	441,285,818	0.11	289	Ores and concentrates (other than of gold)	122,274,586	0.03
288	Non-ferrous base metal waste and scrap	304,167,655	0.08	752	Automatic data-processing machines and units	82,053,304	0.02
764	Telecommunications equipment and parts	260,926,567	0.07	784	Parts and accessories of the motor vehicles	72,988,791	0.02
287	Ores and concentrates of base metals	211,590,776	0.05	764	Telecommunications equipment and parts	59,375,053	0.01
682	Copper	130,208,573	0.03	283	Copper ores and concentrates	57,309,596	0.01
289	Ores and concentrates (other than of gold)	115,756,955	0.03	625	Rubber tyres, tyre treads, tyre flaps	56,398,513	0.01
579	Waste, parings and scrap of plastics	107,925,571	0.03	12	Other meat and edible meat offal, fresh or frozen	35,604,619	0.01
	Total	4,786,180,346	1.20			1,706,601,217	0.43

Source: Own elaboration based on data from United Nations, COMTRADE, consulted December 1, 2015.

Is There Intra-industry Trade between Mexico, China and Korea?

The estimations of IIT and revealed comparative advantages have become important instruments for understanding the changes within international trade patterns. In this study it is considered that the characteristics of Mexican trade with China and Korea can be better analyzed by associating the degree of IIT and the horizontal and vertical structure of the Mexican trade with those two economies. This comparison could be useful to explain the changes and challenges that Mexican trade has been experiencing in recent years, in addition to the obstacles and potential effects of multilateral agreements such as the Trans-Pacific Partnership negotiated in 2015.

The new developments within international trade theory provided by Romer (1991), among others, have generated endogenous growth models which emphasize that an important part of international trade is related to the specialization of the production of intermediate inputs. Additionally, Grossman and Helpman (1991) and Krugman (1981) developed the "new theory of international trade" based on models of monopolistic competition and increasing returns. These theoretical approaches propose that an important share of international trade is based on economies of scale and intra-industry trade.

Additionally, in order to understand intra-industry trade as a major component of international trade, it is necessary to take into consideration the product differentiation concept developed by Lancaster (1979), who modeled horizontal differentiation based on variety preferences. This theoretical approach was later applied, at the aggregate level, by Krugman (1979) who demonstrated a correlation between preference diversity and decreasing costs. Likewise, Stiglitz (1987) stated that the quality of commodities is determined by their characteristics, and therefore it is possible to use prices to separate IIT into vertical or horizontal components. By extending this approach to international trade and using differences in quality and unit costs of exports, it is possible to define vertical and horizontal trade and also to understand the different types of trade that are engaged in by both developed and underdeveloped economies.

Intra-industrial Trade between Mexico, China and Korea

In order to analyze Mexican trade with China and Korea, this paper

estimates intra-industry trade based on the so-called Grubel-Lloyd index. IIT can be divided into horizontal intra-industry trade (HIIT), which consists of the international trade of goods that are differentiated by their technical and specific characteristics and vertical intra-industry trade (VIIT) which involves the exchange of commodities that differ in quality and unit costs. HIIT relates to trade between similar partners, such as the case of developed economies with comparable per capita income; whereas VIIT is significant in trading partners that differ in income levels, which is related to the theory of comparative advantages.

In order to estimate the HIIT and VIIT, the unit value of specific commodity groups for both exports and imports must be obtained. The unit values are calculated by dividing the value of exports (imports) by the amount of exports (imports). Subsequently, by estimating the ratio of export value units to import value units, it is possible to determine the type of IIT. When the ratio lies within the range of 15%, it is considered that HIIT exits; values exceeding that range indicate the existence of VIIT (Greenaway, Hine and Milner 1995). The 15% of the unit cost included in the estimations corresponds to the transportation and insurance expenditures added to the unit price of commodities. Formally, the division of IIT into HIIT and VIIT can be expressed as follows:

For Horizontal IIT, $1-\alpha \leq \frac{UV_i^x}{M_i^M} \leq 1+\alpha$, and for VIIT, $\frac{UV_i^x}{M_i^M} \leq 1-\alpha$, or $\frac{UV_i^x}{M_i^M} > 1+\alpha$, where:

UV = unit value per kilo
i = differentiated product traded
α = unit value dispersion criterion, used to distinguish between vertical and horizontal trade. Normally, α = 0.15 (or 0.25)
M = Imports
X = exports

In order to construct the IIT and determine whether this index is related to vertical or horizontal trade, trade information was obtained from United Nations COMTRADE Database. The data set consisted of exports and imports of Mexico, China and Korea at three digits of the Standard International Trade Classification (SITC). The calculations of the vertical and horizontal trade used information of the unit (kilos) dollar price obtained from the same source.

The estimation of the trade between Mexico and China indicates that, to a large extent, the international trade between China and Mexico is characterized by inter-industrial trade. However, there is a trade share of 17.4% that can be considered IIT which is mainly concentrated in the manufacturing industries. Not surprisingly, there is IIT in industries such as motor vehicles, parts, engines and motors and textiles. However, there is also IIT in mining activities such as copper, hydrocarbons and other crude minerals (Table 6).

Table 6. Mexican intra-industry and vertical trade with China 2014

Code	Commodity	IIT	Exports	Trade balance	Vertical
593	Explosives	0.94	1,634,415	(197,192)	NA
265	Vegetable textile fibers	0.92	62,873	(10,746)	0.11
784	Tractors	0.87	1,042,980	(978,669,655)	0.184
533	Pigments, paints	0.81	26,842,230	(12,656,687)	0.09
714	Engines, motors non- elect	0.78	1,332,419	(768,231)	NA
511	Hydrocarbons	0.76	16,428,187	(10,656,288)	0.132
283	Cooper	0.72	1,032,430,372	1,032,429,579	0.133
278	Other crude minerals	0.68	8,784,455	(8,142,593)	0.228
572	Polymers of styrene	0.66	5,851,123	2,960,947	0.163
611	Leather	0.57	24,345,547	14,645,820	0.006
882	Photo	0.54	538,778	(102,142,229)	NA
784	Parts, tractors, motor vehicles	0.53	541,222,679	(978,669,655)	0.160
	% Total exports to China		27.95%		

Source: Own elaboration with data from United Nations, COMTRADE, consulted September 15, 2015. http://comtrade.un.org/data/

It can be concluded that the total value of IIT between Mexico and China is still not very significant. In addition to mineral and primary exports, the specialization of the Mexican manufacturing sector in the production and exportation of cars, automotive engines and auto parts also has become a relevant component of the Mexican exports to China.

Hence, the estimates suggest that, although not predominant, the trade between China and Mexico shows increasing intra-industry trade in the mining industries and some manufacturing activities like automobile, auto parts, leather and textiles. The results support the argument regarding the existence of IIT between underdeveloped economies based on comparative advantages and also on economies of scale. Finally, the IIT between these economies suggests that both economies are trading commodities from the same industries with similar quality features. As

pointed out by Greenaway, Hine and Milner (1995), vertical trade could be better explained by the classical theory of comparative advantages, while horizontal trade could be explained by more modern theories of trade.

Regarding the Mexican-Korean trade, the commodities that exhibit intra-industry trade only represented around 2% of total Mexican exports to that country. The intra-industry trade was concentrated on metal containers for storage and transport, animal food, and edible products. Other manufacturing intra-industry traded commodities were manufactures of leather, medical instruments and glassware (Table 7). In addition, primary goods, particularly in mineral production, also showed intra-industry trade. This is the case of miscellaneous non-ferrous base metals, zinc and nitrogen-function compounds. Therefore, it can be concluded that the IIT between these economies is based on assorted manufactures and principally mineral activities.

Table 7. Mexican intra-industry and vertical trade with Korea, 2014

Code	Commodity	IIT	Exports	Trade balance	Vertical
692	Metal containers for storage and transport	0.995	1,005,520	10723	NA
81	Feeding stuff for animals (not including un-milled cereals)	0.989	490,701	10,531	0.244
46	Meal and flour of wheat and flour	0.918	12,980	(2,321)	0.678
98	Edible products and preparations	0.889	643,750	(160,626)	NA
612	Manufactures of leather or of composition leather, nes; etc.	0.792	71,302	(37,477)	0.466
872	Medical instruments and appliances	0.788	7,436,462	(4,007,545)	NA
665	Glassware	0.773	461,672	(270,763)	0.379
73	Chocolate and other preparations containing cocoa	0.766	516,065	(314,832)	1.418
689	Miscellaneous non-ferrous base metals, employed in metallurgy	0.764	558,508	(345,059)	0.341
873	Meters and counters.	0.695	8,668,147	(7,597,643)	NA
515	Organo-inorganic and heterocyclic compounds	0.679	14,079,932	6,838,864	0.117
686	Zinc	0.647	146,707	76,504	0.453
514	Nitrogen-function compounds	0.635	4,948,690	(5,686,444)	0.275
	% total exports		1.9%		

Source: Own elaboration with data from United Nations, COMTRADE, consulted September 15, 2016. http://comtrade.un.org/data/

Mexican vertical trade with China and Korea

Also, the estimations of vertical and horizontal trade indicated that the intra-industry trade between Mexico and the economies of China and Korea is based on vertical trade. The low values of the index shows that in activities where intra-industry trade is found, the unit value of Mexican exports is lower than that of Korea. Consequently, the intra-industry trade with Korea shows that technology and quality is higher in Korean commodities.

Therefore, it can be concluded that trade between Mexico and China is based on increasing outsourcing or vertical specialization. The estimations suggests that trade between Mexico with these Asian economies is mainly driven by trade in intermediate inputs required by multinational firms. It has been argued that the disintegration of the manufacturing process of production of firms allows increasing trade at the international level (Feenstra 1998). In the case of China, there is a clearly vertical trade in tractor and motor vehicle parts and in engines and motors (Table 6). The estimations appear to follow the international trend of trading intermediate inputs and the strategies of multinational corporations.

With respect to the trade with Korea, it is important to underline that trade in light manufacturing is also characterized as vertical trade. Such is the case of trade in leather, medical instruments and appliances, glassware, metallurgy and meters and counters (Table 7). This trade is very likely related to the fragmentation of production of Korean firms and their need to obtain intermediate inputs by outsourcing different segments of the production process. Given the low volume of intra-industry trade between the two countries, it can be concluded that trade between Mexico and these Asian economies is still not very significant in the trading, however it is likely that this type of trade could continue to expand.

REGIONAL TRADE AGREEMENTS AND TRADE EXPANSION: THEORY AND POLICY ASPECTS

The initial contributions to the static analysis of PTAs were developed by Viner (1950) and Meade (1955) and have evolved over the years. From the theoretical perspective, the most important arguments pointing out the limitations of PTAs are related to the following issues: the possibility of tariff revenue redistribution that can reduce the income of PTA members

outweighing the welfare gains, trade diversion as a leading motive of politicians for creating PTAs (Grossman and Helpman 1995); trade barriers are still high in some commodities (such as anti-dumping actions) and preferences that could create trade diversion. Additionally, increases in protection against countries not included in the PTAs have been observed in practice.

Another topic that has been subject to debate has to do with the concept of "natural trading partners", used by some authors, which assumes that a PTA between these economies creates greater welfare for its members (Wonnacott and Lutz 1989) and (Summers 1991). This concept is based on the initial volume of trade and the distance between PTA members. However, it has been argued that the effect of the elasticities of substitution on prices must also be considered when the welfare benefits of PTAs are estimated (Bhagwati and Panagariya 1996).

Also, the increasing establishment of PTAs has generated "systemic implications" which consists of the management and control of trade liberalization using the content rule to consider if the commodity is produced in one country (Bhagwati and Krueger 1995). Therefore, the positive benefits that are created by PTAs are related to the degree of restrictions being imposed by the rules of origin. If they are very restrictive, they can become another instrument of protection against non-members, by increasing the costs of trade (Nielsen 2003).

In the international economy there are many value-added chains derived from intra-industry trade that reflect the several stages of production involved in the modern manufacturing industry. As a result, it is difficult to quantify the shares of imported inputs of final products and the rules of origin are, for that reason, arbitrary in nature (Bhagwati, Greenaway and Panagariya 1998). Additionally, the PTA members may have different tariff structures and the agreements generally require rules of origin for the majority of products; as a consequence, there is the possibility that non-members could export goods to members of the PTA with low tariffs. Finally, the numerous PTAs developed recently can generate a "spaghetti bowl", where there are a number of tariff rates depending on overlapped rules of origin that are arbitrarily determined and can create increasing transaction costs.

Therefore, according to the rules of origin, when economies agree to participate in a PTA they are extending trade protection to the economic agents of other countries in the agreement, creating a bias towards inefficiency (Krueger 1993). Hence, the incorporation of the Mexican economy into the TPP, in addition to its membership in NAFTA, implies

potential protectionist measures against two of its principal trading partners: China and Korea.

THE TPP OBJECTIVES AND THE POTENTIAL EFFECT ON MEXICAN TRADE

The origin of the TPP was the Pacific Three-Closer Economic Partnership (PO3-CEP), a negotiation that started in 2002. Initially, it only included Chile, New Zealand and Singapore. However, after the USA was invited in 2008, the original agreement evolved, including new economies such as Mexico and Japan. Currently, the TPP is integrated by 12 countries: Australia, Brunei, Canada, Chile, Japan, Malaysia, Mexico, New Zealand, Peru, Singapore, USA and Vietnam, and encompasses four geographical regions: North America, South America, Oceania and Asia. Given the number of countries involved in the agreement, the Mexican government considered that by joining the TPP, Mexico would be able to have more access to markets, particularly in Asia and Oceania, increase supply chains in the Asia-Pacific region, encourage productivity and access to small and medium enterprises, and increase trade with the economies of North America, Peru and Chile (Secretaria de Economia, Mexico, 2016).

Although initially the TPP was only a PTA between the USA and eight medium-sized Asian economies, the entry of Japan, Canada and Mexico increased the potential effects of the agreement. In addition to the expansion in exports and imports that these three economies provide to the TPP, the entry of Japan reshaped the possibilities of the agreement. The size of the Japanese economy, as well as the lack of comprehensive PTAs with other members of the TPP, and Japan's relatively high tariffs and non-tariff barriers could generate important trading gains as a result of Japan becoming a member of the TPP (Mercurio 2014).

Although the Asia-Pacific area encompasses around 40% of the population and 50% of the world's economic production, there are important challenges derived from the diversity of economies included in the TPP and the high standard rules of trade of the agreement. It has been argued that the agreement is a priority for the USA. The main goals pursued by that economy are the elimination if trade barriers to investment in the Asia-Pacific region and also to establish new rules for topics such as supply chain organization, state-owned enterprises and services trade (Williams 2013).

In addition, it has been stated that another important objective of

the USA is the management of the Pacific Basin, including the Latin American economies, expanding markets for its exports and creating a coalition around China in order to set the trade and economic guidelines that could limit China from influencing the TPP members according to its own interests (Backer 2014). Also, the Japanese economy, which is the second largest within the TPP, is seeking to remain an important actor influencing trade, investment, intellectual property rules and standards in the Pacific region.

THE TRANS-PACIFIC PARTNERSHIP AGREEMENT SCOPE AND STRUCTURE

The TPP consists of thirty chapters incorporating the following themes: trade, trade facilitation, technical barriers to trade, trade remedies, investment, services, electronic commerce, government procurement, intellectual property, labor, environment, dispute settlement and institutional provisions. It is worth mentioning that, in addition to issues included in previous PTAs, the TPP also seeks to address emerging topics such as the Internet and digital economy, state-owned enterprises and international trade and investment, among others.

In particular, the chapter about electronic commerce prohibits the imposition of custom duties and tariffs on electronic transmissions and ensures that the TPP parties will allow the flow of Internet data and information based on data centers built by companies interested in operating in a TPP market. Also the chapter on state-owned enterprises (SOEs) and designated monopolies establishes rules for both purchases and sales of the SOEs consistent with commercial considerations, except when they are required to provide public services. It also ensures that SOEs do not discriminate against enterprises of the other parties of the TPP. Finally, another important theme that is introduced in the agreement is the commitment to support small and medium enterprises by creating user-friendly websites to provide information about regulations, procedures, intellectual property rights, tax information and other provisions of the TPP for small firms.[1]

1 Summary of the Trans-Pacific Partnership Agreement, http://www.gob.mx/cms/uploads/attachment/file/36492/Capitulado_completo_del_Tratado_de_Asociaci_n_Transpac_fico_en_ingl_s.pdf

Product-specific Rules of Origin and Potential Trade Diversion

The agreement also has implications that can divert trade from important Mexican trading partners in Asia. In particular, the chapter dealing with rules of origin and origin procedures has imposed restrictions on non-members of the TPP, such as China and Korea. That chapter stipulates that country members should specify if the exported goods are originating goods (goods that are produced entirely in the territory) or if they are goods produced using non-originating materials, providing that they meet the requirements specified. Under the regulation, once the originating status of the materials is determined and complies with the product-specific rules of origin, the goods that are produced using non-originating materials would meet the regional value content requirement.

The regional value content of a good (RVC)[2] is expressed as a percentage and is based on the value of the goods and the value of non-originating materials indicated in the applicable product-specified-rule (FVNM). Also, for the particular case of the automotive industry, the estimation of the rules of origin requirements is based on the net cost method calculation, which is based on the net cost of production (total cost minus sales promotion) minus the non-originating[3] (TPP, Chapter 3, Rules of origin and origin procedures).

The effect of the TPP on the Mexican trade with China and Korea is mainly related to the product-specific rules of origin that determine whether the exports are goods produced entirely within the TPP countries (originating goods) or whether the exports are produced using non-originating materials that satisfy regional value content requirements. Therefore, a good is an originating good if it is produced in the country or countries that are members of the treaty. Additionally, a good can be considered an originating good if it is produced in one or more member countries with non-originating materials only if it satisfies the applicable production process requirement, regional value content requirement, or any other requirement specified in Chapter 3 of the TPP.

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2 $RVC = \frac{\text{Value of the Good} - FVNM \times 100}{\text{Value of the Good}}$

3 $RVC = \frac{NC - VNM \times 100}{NC}$

VNM = is the value of non-originating materials, including materials of undetermined origin, used in the production of the good, NC= net cost.

For the majority of traded commodities included in the tariff classification number of the Harmonized System, the product-specific rule of origin of the TPP indicates that regional value content must be 30% under the build-up method or 40% under the build-down method. As a result, producers from economies like China and Korea, which are not part of the TPP will not benefit from the tariff elimination that members of the treaty will experience. Once the rules of origin are established, the positive or negative impacts on the Mexican trade with China and Korea will be determined by the possibility that Mexican imports from these economies could be substituted by imports from TPP countries, possibly at a higher cost.

Table 8 includes information about the highest value Mexican imports from China, according to the Harmonized System used to classify the tariff system imposed in Mexico. Those commodities represent 59.1% of total Chinese exports to Mexico. All the imports considered are related to the manufacturing sector, particularly televisions, cameras and video cameras, electronic circuits and cars and the intermediate inputs that are used in their manufacturing. Also, optical instruments, electrical machinery, vehicles parts, iron, steel and rubber imports exhibited a higher relative value. It is important to point out that the value of the twenty highest value Mexican imports from China that are traded under a tariff structure accounts for 41.6% of that group.

Table 8. Mexico: The twenty most important commodities imported from China and their tariff structure*, 2014

Code	Commodity	Trade Value (US$)	Trade (%)	Tariff (%)
852990	Parts suitable for use solely or principally with transmission apparatus for radio-broadcasting or television; television cameras, digital cameras and video camera recorders.	2,648,229,486	19.23	10
999999	Commodities not specified according to kind.	781,385,243	5.67	10
854232	Electronic integrated circuits.	704,899,631	5.12	EX
901380	Liquid crystal device, lasers, other than laser diodes; other optical appliances and instruments.	633,859,234	4.60	10
870322	Other vehicles, with spark-ignition internal combustion reciprocating piston engine.	455,332,394	3.31	50
854239	Electronic integrated circuits. Others.	392,543,001	2.85	EX
854231	Processors and controllers, whether or not combined with memories, converters, logic circuits, amplifiers, clock and timing circuits, or other circuits.	285,475,413	2.07	EX

851712	Telephone sets, including telephones for cellular networks or for other wireless networks.	265,555,778	1.93	15
853400	Printed circuits	254,914,721	1.85	EX
854140	Diodes, transistors and similar semiconductor devices, photosensitive semiconductor devices, including photovoltaic.	215,544,681	1.57	EX
847330	Parts and accessories suitable for use solely or principally with office machines.	206,166,629	1.50	EX
392099	Other plates, sheets, film, foil and strip, of plastics, non-cellular and not reinforced, laminated, supported or similarly combined with other materials.	202,862,986	1.47	10
847170	Automatic data processing machines and units, magnetic or optical readers, machines for transcribing data onto data media.	177,469,359	1.29	EX
401110	Rubber and articles thereof. New pneumatic tires of rubber used in motor cars.	174,811,846	1.27	20
721049	Flat-rolled products of iron or non-alloy steel, of a width of 600 mm or more, clad, plated or coated. Otherwise plated or coated with zinc.	163,201,007	1.19	7
841430	Compressors of a kind used in refrigerating equipment.	140,405,072	1.02	20
848071	Moulds for rubber or plastics, injection or compression types	131,962,765	0.96	10
390330	Acrylonitrile-butadiene-styrene copolymers.	128,421,387	0.93	7
870829	Vehicles other than railway or tramway rolling-stock, and parts and accessories.	116,302,771	0.84	10
870899	Vehicles other than railway or tramway rolling-stock, and parts and accessories. Parts and accessories of the motor vehicles.	116,063,330	0.84	10
% commodities considered to total trade			59.51	
% of commodities considered with tariffs			41.58	

Source: Own elaboration with data from United Nations, COMTRADE. (*Harmonized System). http://comtrade.un.org/data/, General Imports and Export Tariffs Law, published in the Diario Oficial de la Federación, June 18, 2007, http://www.diputados.gob.mx/LeyesBiblio/pdf/LIGIE.pdf, HS classification according to the International Trade Statistics, United Nations, Trade Statistics Knowledgebase.

Therefore, it can be concluded that the main imports from China are related to the intra-industry trade dynamics of the Mexican economy and that they also are an important source of electric and electronic manufacturing goods. The establishment of the TPP is likely to increase the competition for the Chinese economy, which already provides an important share of Mexican imports. All TPP members with similar or slightly higher costs would then be in a position to compete with all the Chinese commodities that are subject to Mexican tariffs[4], potentially creating trade diversion.

In the same way, the twenty highest-value Mexican imports from Korea represented 49.3% of total Mexican imports (Table 9). The higher-value imports were parts for televisions, digital cameras and video camera recorders, telephones for cellular networks or for other wireless networks, parts and accessories for automatic data processing machines and magnetic or optical readers, among others of this kind. The percentage of these commodities that was subject to tariffs was 30.4%. In all probability, increasing competition from the TPP members could be expected for this type of electronic goods and components.

Table 9. Mexico: Twenty most important commodities imported from Korea and their tariff structure, 2014

Code	Commodity	Trade Value (US$)	% of total imports	Tariff (%)
852990	Parts suitable for use solely or principally with transmission apparatus for radio-broadcasting or television; television cameras, digital cameras and video camera recorders.	4,984,029,012	7.522	10
851712	Telephone sets, including telephones for cellular networks or for other wireless networks.	4,803,264,740	7.250	15
847330	Parts and accessories suitable for use solely or principally with office machines.	4,594,077,164	6.934	EX
847130	Portable digital automatic data processing machines, weighing not more than 10kg, consisting of at least a central processing unit, a keyboard and a display.	2,456,983,974	3.708	EX
999999	Commodities not specified according to kind	2,108,149,026	3.182	EX
851762	Telephone sets, including telephones for cellular networks or for other wireless networks.	1,543,787,360	2.330	EX

4 General Imports and Exports Tariff Law, published in the Diario Oficial de la Federacion, June 18, 2007. www.diputados.gob.mx/LeyesBiblio/ref/ligie/LIGIE_tarifa24_26dic13.doc

847170	Automatic data processing machines and units, magnetic or optical readers, machines for transcribing data onto data media.	1,515,246,452	2.287	EX
901380	Optical, photographic, cinematographic, measuring, checking, precision, medical or surgical instruments and apparatus.	1,377,025,054	2.078	10
851770	Telephone sets, including telephones for cellular networks.	1,326,861,205	2.003	EX
854232	Electronic integrated circuits.	1,269,158,980	1.916	EX
853400	Printed circuits.	1,141,546,999	1.723	EX
850440	Electrical transformers, static converters.	931,320,825	1.406	10
854239	Sound recorders and reproducers electronic integrated circuits.	725,822,850	1.095	EX
854442	Insulated wire, cable (including co-axial cable) and other insulated electric conductors, optical fiber cables.	715,302,062	1.080	10
950300	Tricycles, scooters, pedal cars and similar wheeled toys, dolls* carriages, dolls, other toys.	619,513,097	0.935	15
844399	Printing machinery used for printing by means of plates, cylinders and other printing components, other printers, copying machines and facsimile machines, whether or not combined.	583,783,694	0.881	EX
392690	Other articles of plastics and articles.	537,787,721	0.812	20
854140	Diodes, transistors and similar semiconductor devices, photosensitive semiconductor devices, including photovoltaic.	488,065,283	0.737	EX
950450	Video game consoles and machines, articles for funfair, table or parlor games, including pintables, billiards, special tables for casino games and automatic bowling alley equipment.	456,769,744	0.689	15
854231	Processors and controllers, whether or not combined with memories, converters, logic circuits, amplifiers, clock and timing.	449,881,203	0.679	EX
% commodities considered to total trade			49.25	
% of commodities with tariffs			30.40	

Source: Own elaboration with data from United Nations, COMTRADE. (*Harmonized System). http://comtrade.un.org/data/, and General Imports and Export Tariffs Law, published in the Diario Oficial de la Federación, June 18, 2007. http://www.diputados.gob.mx/LeyesBiblio/pdf/LIGIE.pdf

The Economic Activity of the TPP Members and the Impact on Trade Creation

Initially some authors argued that the establishment of the TPP would have slow but increasing benefits (Petri, Plummer and Zhai 2012). According to those initial estimations, the signing of the TPP and the trade agreement between China and Korea would create an income gain of three billion dollars on the TPP agreement and 18 billion on the Asian agreement. They considered that for the case of Mexico and Korea, already with a free trade agreement with the USA, the gains from trade would come from new markets covered in the TPP. However, the calculations did not considered the possibility of trade diversion for economies already trading with the USA, China and Korea, as is the case of the Mexican economy.

Therefore, the potential for trade diversion resulting from the TPP for the Mexican economy derives from the volume of trade that Mexico already has with China and Korea. Although the USA is the most important trading partner for Mexico, the Asian countries, particularly China, are also very important and have shown rapid growth in both imports and exports. Between 2000 and 2014, the total trade of Mexico with the USA increased at an annual average rate of growth of 8.2%, whereas for China and Korea it increased 20.8% and 9.2% respectively.[5] The imposition of a preferential trade agreement such as the TPP could slow down the expansion of trade with those countries.

The impact on the expansion of trade that the TPP could generate, as a result of the inclusion of new trading partners for Mexico, relies on the economic characteristics of the members of the TPP. In general, the positive effect of the TPP for Mexico has to be the number of trading partners that will have preferential treatment. The trade indicators of Table 10 show that Asian economies such as Singapore, Malaysia and Vietnam have a high share of total trade to GDP compared with China or Korea. This could be an indicator that the TPP could encourage increased Mexican trade with these two economies. Additionally, both Singapore and Vietnam are trading an important share of high technology exports and information and communication technology goods, such as aerospace, computers, pharmaceuticals, scientific instruments, and electrical machinery, telecommunications, audio and video, computer and equipment and electronic components. Mexico also has an important share of exports

5 Own estimations based on data from United Nations, COMTRADE.

related to high technology industries, in particular producing assembled manufacturing intermediate and final goods. Therefore, there is an opportunity for expanding trade among those economies and Mexico.

Table 10. Trade indicators of the TPP members, China and Korea

Country	Merchandise trade (% of GDP), 2014*	High-technology exports (% of manufactured exports), 2013**	ICT goods exports (% of total goods exports), 2014***
Australia	32.85	12.9	0.92
Brunei Darussalam	81.26	13.7	0.13
Canada	53.16	15.2	0.40
Chile	57.74	14.1	27.42
China	41.56	4.9	0.15
Japan	38.55	16.8	8.64
Korea, Rep.	77.86	7.4	16.27
Mexico	62.50	16.8	28.18
Malaysia	131.03	15.9	0.98
New Zealand	45****	43.6	0.12
Peru	40.31	3.6	NA
Singapore	252.07	47.0	29.9
United States	23.15	17.8	8.9
Vietnam	160.97	28.2	24.5

Source: Own elaboration with data from the World Bank Open Data, http://data.worldbank.org/indicator. *Merchandise trade as a share of GDP is the sum of merchandise exports and imports divided by the value of GDP, all in current U.S. dollars. **High-technology exports are products with high R&D intensity, such as in aerospace, computers, pharmaceuticals, scientific instruments, and electrical machinery. ***Information and communication technology goods exports include telecommunications, audio and video, computer and related equipment; electronic components; and other information and communication technology goods. Software is excluded. ****2013.

However, one of the determinants of international trade is the size of the economies involved in that economic activity. Regarding this aspect, it is worth noting that, on the one hand, the economies that exhibited the lowest GDP value of the twelve members of the TPP and China and Korea, were the following: Brunei, Viet Nam, Peru, Chile and Malaysia (Table 11). On the other hand, the countries that showed the highest GDP value were the USA, China, Japan, Canada and Korea. Considering that the level of economic activities is a major determinant in the amount

of trade that can be generated by the preferential trade agreement, the relatively low GDP of the majority of the TPP members for the Mexican economy generates doubts about the positive impact of the agreement on trade.

Table 11. Current GDP of TPP members and China and Korea, 2014

Country	2014	% of total countries GDP
Australia	1,453,770,210,672	3.65
Brunei	17,256,754,269	0.04
Canada	1,786,655,064,510	4.49
Chile	258,061,522,887	0.65
China	10,360,105,247,908	26.03
Japan	4,601,461,206,885	11.56
Korea	1,410,382,943,973	3.54
Malaysia	326,933,043,801	0.82
Mexico	1,282,719,954,862	3.22
New Zealand*	188,384,859,627	0.47
Peru	202,902,760,293	0.51
Singapore	307,871,907,186	0.77
United States	17,419,000,000,000	43.76
Vietnam	186,204,652,922	0.47
Total	39,801,710,129,795	
Total of TPP members without USA, Canada, Mexico and Japan	14,711,873,903,538	36.96

Source: Own elaboration with data from The World Development Indicators, World Bank, (*2013). http://data.un.org/Data.aspx?d=WDI&f=Indicator_Code%3aNY.GDP.MKTP.CD

The size of the economies of the USA and Canada, together with geographical proximity, will probably determine that the Mexican economy will continue its trade and economic integration with the USA and Canada. The possibility of the expansion of trade with the South American economies of Peru and Chile will depend on the development of communication infrastructure and the economic growth of those economies and Mexico. With respect to the Asian economies, the trade with Japan, which is already an important trading partner of Mexico, will probably experience a positive impact as a result of the establishment of the TPP. However, the absence of China and Korea and the resulting potential trade diversion would be unlikely to be surpassed by the creation of trade with the other Asian economies.

CONCLUSIONS

The Trans-Pacific Partnership does not include the economies of China and Korea. Those economies are important trading partners of Mexico, following the USA, Canada and Japan. Hence, for Mexico to enter the TPP in order to maintain the US market and trading relationship brings about the possibility of constraining its increasing trade with China and Korea. The principal Mexican imports from China and Korea are related to telecommunications and parts, which are goods and inputs required for the production of Mexican manufacturing exports. Although relatively low, the trade with those economies is important for both Mexican consumers and the Mexican manufacturing industry. Moreover, the Mexican trade with China and Korea suggests the existence of a small but increasing IIT based on vertical trade as well as trade based on the existence of comparative advantages such as the case of mineral commodities. Therefore, it can be concluded that any expansion of trade based on preferential trade agreements such as the TPP should take into consideration the increasing trade based on outsourcing and vertical specialization that has created and expansion of the internal trade of inputs.

The TPP incudes twelve countries; given the number of countries involved in the agreement, the Mexican government considered that by joining the TPP, Mexico would be able to have greater access to markets, particularly in Asia and Oceania and increase supply chains in the Asia-Pacific region, among other benefits. The agreement also includes the Japanese economy; given the economic activity of that country and its relatively high tariffs and non-tariff barriers, its entry into the TPP could generate important gains for TPP parties, expanding the possible benefits of the agreement. However, the exclusion of China and Korea could indicate that the USA is seeking to control the rules of trade in the Pacific basin, as well as in the Latin American region.

In addition, the TPP includes rules of origin that will impose restrictions on non-members of the TPP such as China and Korea. Therefore, producers from China and Korea will not benefit from the tariff elimination that members of the treaty will experience. Because of this, there would be a high probability that Mexican imports from China and Korea could be substituted by imports from TPP member countries, which could be at a higher cost.

The comparative analysis of the Mexican tariff structure indicates that the number of high value Mexican imports from China and Korea that are subject to tariffs is very significant. Hence, it can be concluded that

the establishment of the TPP is likely to increase the competition for China and Korea, which already encompass an important share of the Mexican imports, thus potentially creating trade diversion. Additionally, the potential positive effects of the TPP are related to the size of the economies of the member countries. Therefore, the potential trade expansion could be constrained because several members included in the TPP exhibit a low GDP.

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Article Received: 2016. 01. 25.
Revised: 2016. 04. 27.
Accepted: 2016. 04. 27.