A Longitudinal Analysis of the Comparative Advantage of Three Key Industries in Mexico, Vietnam, and Japan Under Frameworks for Trans-Pacific Partnership

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We conducted an analysis for the historical strengths and trends of three key economic sectors – agricultural, automotive, and pharmaceutical - in terms of domestic production and international trade for Mexico, Japan, and Vietnam following the conclusion of the Pacific Alliance in 2011, which enabled Mexico to trade freely with other large countries in Latin America and further free trade initiatives such as the Trans-Pacific Partnership (2015) and the Comprehensive and Progressive Agreement for Trans-Pacific Partnership in 2018 that included countries in Asia. We used Revealed Comparative Advantage as the empirical framework. The findings indicate that the conclusion of these trade agreements caused certain sectors to gain and certain sectors to lose relative comparative advantage. Vietnam lost comparative advantage in its agricultural sector relative to Mexico's, which means Mexico could develop its agricultural sector further to support trade with Vietnam. Vietnam's pharmaceutical industry remained little changed relative to Mexico's, which means Vietnam should continue focusing resources on the pharmaceutical industry relative to the bilateral trade volume between the two countries.

Keywords: emerging markets, Pacific Alliance, Trans-Pacific Partnership, global value chains, productivity, revealed comparative advantage

INTRODUCTION

In April 2011, Chile, Peru, Colombia and México agreed to launch the Pacific Alliance (PA) with the Lima Declaration (La Nación, 2011), which came into force in 2012. According to the Declaration of Lima, the intention of the alliance is "to encourage regional integration, as well as greater growth, development and competitiveness" of the economies of their countries, while committing themselves to "progress towards the goal of achieving the free circulation of goods, services, capital and people." (La Nación, 2011).

The distinctive features of the Pacific Alliance are that member states all have a Pacific shore and are interested in trading with Asia-Pacific. Countries in the Pacific Alliance include Mexico, Colombia, Peru, and Chile. These countries are also members of the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP), which originated from the Trans-Pacific Partnership (TPP) incepted in 2016. The CPTPP includes several countries in Asia-Pacific as well as New Zealand and Australia. A small

predecessor to the CPTPP was the Mexico-Japan Economic Partnership Agreement, which came into force in 2012, one year after the Pacific Alliance. The original Pacific Alliance did not include Japan or any Asian country, and this agreement established the necessary link through the creation of a free trade area between Mexico and Japan benefitting the automotive, pharmaceutical, agricultural, and electronics sectos of both countries.

The Pacific Alliance is a free trade area for goods, with approximately 93% of all goods exempted from tariffs. In its current state, the level of liberalisation of the Pacific Alliance is limited to the trade of goods. Some attempts at greater liberalisation in the areas of financial markets have been made to ease the flow of capital through the integration of stock exchanges and common services in some embassies abroad, but not to the extent of the free movement of capital or other factors of production including services and labour. Due to its limited geographical area (four countries in Latin America), the Pacific Alliance has potential to be flexible and responsive to changing economic conditions. In addition, the presence of pre-existing free trade and economic partnership agreements among individual member countries and outside regions (e.g. Mexico-EU-Japan, Peru-EU-Japan-China, Chile-Japan-Singapore FTAs) provide the Pacific Alliance with significant reach in international trade. However, economic integration also results in structural changes as exogenous factors resulting in market distortions (tariff and non-tariff barriers and other rules) are removed or harmonised. As several countries are likely to compete in similar industries, an analysis of relative competitiveness becomes necessary. The reduction of trade barriers alters supply and demand conditions for affected industries resulting in the necessity to analyse comparative advantage. Such analysis can have implications on the future deployment of industry value chains. Our study analyses the comparative advantage of three major industrial sectors of Japan, Mexico, and Vietnam. The inclusion criteria were share of contribution to the GDP and share of contribution to employment. We identified the automotive, agricultural, and pharmaceutical sectors to be three main contributing sectors in these countries and therefore included them in a longitudinal study spanning 2008 to 2018.

In addition, Japan and Vietnam have long been close trade partners both under bilateral agreements and the ASEAN+3 framework. Mexico has also had a long history of significant trade with Japan even before the EPA. Japan is Mexico's second largest trading partner in Asia-Pacific. By virtue of the intertwinement of established value chains with Japan, trade between Vietnam and Mexico is likely to increase as result of the CPTPP. It is therefore imperative that relative competitiveness of key industries in both countries be examined. This is significant because both countries have similarly high populations and compete on similar levels on the value chain; in other words, both countries have a high percentage of manufacturing that is both export-oriented but also caters to strong internal market demand and both countries employ a large percentage of their workforce in the agricultural sector. Therefore, in this study we examine the comparative advantage of three key sectors – agriculture, automotive, and pharmaceutical sectors specifically between Mexico and Vietnam and use Japan as a reference point of a developed economy within the CPTPP.

LITERATURE REVIEW

Several authors stress that competitiveness does not have a definition in economic theory (*e.g.* Sharples, 1990; Ahearn *et al*., 1990). Competitiveness can be defined as the ability to face competition and to be successful when facing competition. Competitiveness would then be the ability to sell products that meet demand requirements (price, quality, quantity) and, at the same time, ensure profits over time that enable the firm to thrive. Competition may be within domestic markets (in which case firms, or sectors, in the same country are compared with each other) or international (in this case, comparisons are made between countries). Competitiveness is therefore a relative measure.

Several measures have been used to assess competitiveness. Measurement can be made according to two disciplines: i) the neoclassical economics which focuses on trade success and which measures competitiveness with the real exchange rate, comparative advantage indices, and export or import indices; and ii) the strategic management school which places emphasis on the firm's structure and strategy. In the latter, competitiveness is defined as cost leadership and non-price supremacy, with cost competitiveness measured according to various cost indicators, as well as productivity and efficiency. The latter can be

separated into factors that are controlled by firms (e.g. size, structure, and social capital) and factors for which firms have no control (national factor endowments and demand conditions, policies, including free trade agreements and various levels of economic and political integration.

Extending competitiveness, Comparative Advantage (CA) theory has been fundamental in explaining international trade and has long been an underlying foundation for various measures of productivity including Revealed Comparative Advantage (RCA). The use of Comparative Advantage indices to explain international flow of goods and services has been extensively used. In its most basic definition, the principle of comparative advantage postulates that a nation will export those goods or services in which it has its greatest comparative advantage and import those in which it has the least comparative advantage (Ricardo, 1817).

In the theories of international trade, comparative advantage is an important concept for explaining patterns of trade. David Ricardo (1817) first introduced the concept of comparative advantage with very strict assumptions. It has been well recognised as the Ricardian model. In modern theories of international trade, such strict assumptions are replaced with more realistic ones. Heckscher (1919) and Ohlin (1933) examined the effect of different factor endowments on international trade. Their model, which is well known as the Heckscher-Ohlin (HO) model, concludes that a country will export the abundant factor of production, while it will import the commodity which uses the scarce factor of production. Other new models also relaxed several assumptions that have since emerged, such as the imitation lag hypothesis (Posner, 1961), the Linder model (Linder, 1961), the flying geese model (Akamatsu, 1961, 1962), the gravity model (Tinbergen, 1962), the product cycle theory (Vernon, 1966), the Krugman model (Krugman, 1979), and the reciprocal dumping model (Brander, 1981; Brander and Krugman, 1983). Other models followed, including the neoclassical theory of comparative advantage and the dynamic view of comparative advantage. Unlike the Ricardian theory of comparative advantage, the latter two account for changes in cost structures, e.g. marginal cost, while the dynamic view specifically takes into account changes in cost structures due to changes in demand and supply conditions that could be a result of changing market conditions from e.g. the conclusion of free trade agreements (FTAs) (Widodo, 2009).

The dynamics of comparative advantage could also be caused by the role of input trade (Jones, 2000), the friction in international trade and investment flows due to geography, institutions, transport, and information cost (Venables, 2001), the transmission of knowledge across borders (Grossman and Helpman, 1991), the technological differences across border (Trefler, 1995), and the monopolistic competition in differentiated products with increasing returns to scale (e.g. Krugman, 1979). Redding (2004) finds that comparative advantage is endogenously determined by past technological changes and innovation. Other applied economists, e.g. Liesner (1958), Kanamori (1964), Balassa (1965), Donges and Riedel (1977), Bowen (1983), Vollrath (1991), Dalum et al. (1998) and Laursen (1998), have made various empirical measures to quantify countries' comparative advantage.

Indices constructed from post-trade variables such as Trade, Production and Consumption are referred as Revealed Comparative Indices (RCA). Ballance et al (1985) concluded that indices based on real world post-trade observations may "reveal" much about the pattern of comparative advantage. According to Ballance et al. (1985), there are two types of RCA indices: 1) Those using data on trade as well as domestic consumption and production and 2) Those using only Trade, which has been proved to be positively correlated with CA.

Balassa (1965) proposed various theoretical explanations of international trade to determine patterns of comparative advantage. Bowen (1983) examined indices of trade intensity as measures of comparative advantage. More recently, Yu (2008) proposed the normalized revealed comparative advantage (NRCA) index as an alternative measure of comparative advantage. According to Yu: "The NRCA index is demonstrated capable of revealing the extent of comparative advantage that a country has in a commodity more precisely and consistently than other alternative RCA indices in the literature. As a result, the NRCA index is comparable across commodity, country, and time. Therefore, the NRCA index provides a useful tool for quantitative regional research, especially for studies on regional comparative advantage"

Laursen (2005) proposed that "when using RCA, it should be adjusted such that it becomes symmetric around its neutral value. The proposed adjusted index is called 'revealed symmetric comparative advantage' (RSCA)."

All these proposals have been post-trade. In other words, indexes are calculated based on historical information to explain why the trade happened that way.

In some cases, indices have been applied to identify future potential opportunities as a result of new free trade agreements. Here are some examples:

Serin (2008) applied RCA to a case study for Turkey towards the EU to measure the extent to which Turkey has a comparative advantage in the tomato, olive oil, and fruit juice industries and how this has changed over the period 1995-2005 in the EU market. His findings indicate that Turkey has a strikingly high comparative advantage in the fruit juice and olive oil markets in the EU but this is not the case in the tomato market. According to Serin (2008): "Although pros and cons of the Balassa index are still debated in the literature, it stands as the most widely used revealed comparative advantage index"

Clark et al (2005) applied RCA to identify the pattern of comparative advantage for U.S. regions from actual trade performance as indicated by the industry composition of exports.

Widodo (2009) applied RCA and concluded that "there is a positive relationship between comparative advantage and trade balance. The higher the comparative advantage of a specific product, the higher the possibility of a country as a net exporter becomes. This strongly supports the theory of comparative advantage".

Das (1998) applied RCA to understand the relationship between changing comparative advantage and the changing composition of Asian exports. This provided evidence of a shift of RCA of Asian economies with time which confirms the dynamic nature of the index.

A country's comparative advantage could change due to changes in supply and demand conditions in both domestic and international markets following the implementation of free trade agreements, as they directly impact costs of finished and intermediate products. The supply side is related to the PPF, while the demand side is related to consumer preferences. On this matter, Echevarria (2008) finds that in the long run, comparative advantage is driven by a total factor productivity (TFP) differential. This explains the fact that less developed countries are likely to export primary commodities even though they are not less capital-intensive, and which may explain why member countries of the TPP engage in trade in capital-intensive sectors (e.g. automotive, pharmaceutical, agricultural).

RESEARCH DESIGN

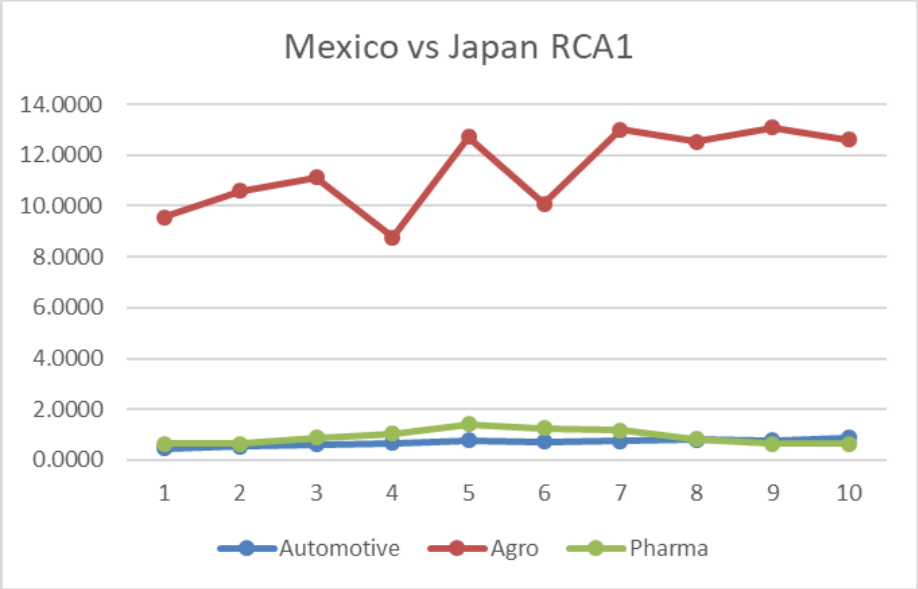
In line with the proposed method of RCA discussed in the Literature Review, we collected data of the automotive, pharmaceutical, and agricultural sectors in Mexico and Japan over a period of 11 years (from 2008 to 2018, both years inclusive). The dataset was obtained from the Oxford Economics database, without any missing data. Industry-specific import-export data and employment (labour) data were collected, and corresponding indices for labour intensity for industries and years were calculated. The calculation for the indices of revealed comparative advantage followed the equation proposed by Ballassa (1979), UNIDO (1982), Marchese and De Simone (1989), and Bender et al. (2002), as follows:

$$RCA2_{ij} = RXA_{ij} - RMA_{ij} = \frac{x_{ij}}{\sum_j x_i} / \frac{x_{wj}}{\sum_j x_w} - \frac{m_{ij}}{\sum_j m_i} / \frac{m_{wj}}{\sum_j m_w}$$

where RCA2 represents revealed comparative advantage. *x* represents the volume of exports, *m* the value of imports, *i* the nation and *j* the industry, and *w* represents the pair of countries under comparison (e.g. Mexico-Vietnam). RXA (Relative Export Advantage) and RMA (Relative Import Advantage) refer to relative export advantage and relative import advantage, respectively. If $RCA2_{ij}>0$, nation *i* would have an explicit CA in industry *j*.

RESULTS

FIGURE 1
RCA BETWEEN MEXICO AND VIETNAM

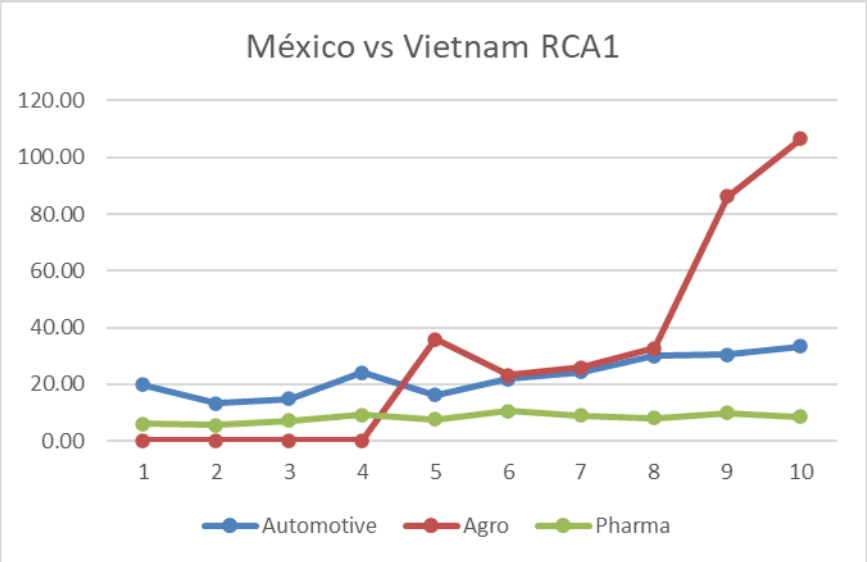


Source: *Authors' own data analysis*

Compared to highly industrialised countries, such as Japan, Mexico's strongest sector is the agricultural sector, showing a high RCA (Figure 1). The agricultural sector in Mexico has always had a comparative advantage over Japan's agricultural sector, and this has not diminished until present. The chart shows a dip in the red graph (agricultural) around years 4 and 6. The temporary decreases in CA could be attributed to the combined effects of the ratification of the Mexico-Japan EPA in 2011 and the almost simultaneous launch Pacific Alliance in 2011 requiring structural adjustments. The agricultural sector rebounded quickly. The repeated temporary decrease in CA two years later could be attributable to a stark decrease in global commodity prices, especially wheat and maize (Grupo Consultor de Mercados Agrícolas, 2018). As one of Mexico's strongest sectors, the Mexican agriculture had to undergo another round of structural adjustments, but rebounded quickly. Meat, barley, and fruit exports increased to compensate for decreased revenues that resulted from falling commodity prices (SAGARPA, 2018). There is inconclusive evidence to suggest that the second temporary decline in CA of the agricultural sector between Mexico and Japan was a result of ongoing TPP negotiations at the time (Oxford Business Group, 2019).

The scenario for the automotive and pharmaceutical sectors, both highly capital and research intensive, remained little changed since the launch of closer economic cooperation between Mexico and Japan. Under the Mexico-Japan EPA, the value of Japan's exports in the automotive sector has far exceeded Japan's agricultural imports from Mexico, which confirms Japan's comparative advantage in the sector. Japan's CA extends to related sectors along the automotive value chain, including metal, precision, and electric components (UN Comtrade, 2018; Ministry of Finance Japan, 2017). The trade value of chemical and pharmaceutical goods as a share of Japan's total exports has declined in relation to the share of Japan's export in automotive goods to Mexico, which explains the inverse development of the CA curve between automotive and pharmaceutical industries in Japan. Nonetheless, both industries maintain a CA to Mexico.

FIGURE 2
RCA BETWEEN MEXICO AND VIETNAM



Source: *Authors' own data analysis*

Relative to a developing country, however, the situation is different. Figure 2 shows a comparison of a developing economy, Vietnam, in comparison to Mexico. Both countries are members of the TPP. The situation is different in this case. Mexico being overall more industrialised compared to Vietnam (Source) historically had a higher RCA in the higher value-added industries, such as in the automotive and pharmaceutical sectors. Following the implementation of the TPP, however, a clear reversal can be seen, where the agricultural sector in Mexico gains comparative advantage relative to Vietnam. In other words, under conditions of liberalised trade, Vietnam's agricultural sector is not competitive. The relation of the other two sectors of this study have not changed with Mexico continuing to retain RCA in the automotive sector and Vietnam in the pharmaceutical sector. One explanation of the reversal of RCA in agriculture could be the heavy involvement by the Vietnamese state in agriculture as discussed in the relevant section.

The following sections discuss the three different sectors in Vietnam in more detail.

AGRICULTURE IN VIETNAM

Background

Agriculture in Vietnam is the most important sector as it contributes about 21.8 percent to gross domestic product (World Bank, 2006) and supports jobs for 67.3 percent of the population (IRRI, 2005). In agriculture, rice is the most important crop in Vietnam. It is planted on 84 percent of cultivated area and constitutes more than 85 percent of Vietnam's total grain output. Since the reforms of the Doi Moi policy launched in December, 1986, the government has liberalised the rice market as well as the markets for agricultural inputs. The government has also promoted the cultivation of high-yielding rice varieties. As a result, rice production and exports have increased steadily. Rice production increased from 15.1 million tons in 1987 to 32.6 million tons in 2000, a growth of 6.1 percent per year, while rice yields increased from 2.70 tons/ha in 1987 to 4.25 tons/ha in 2000, a growth of 3.3 percent per year (IRRI, 2006; Marsh and MacAulay, 2002). Since the launch of the Doi Moi policy, rice production, rice area and rice yield have increased significantly although recently, the growth of rice area has slowed down and even become slightly negative. Vietnam has been a major rice exporter since 1989, and is currently the second largest rice exporter, exporting 7 million tons in 2019, which is equivalent to 18.2 percent of total world rice trade (FAO, 2020). Modern rice technologies have been widely applied in the past decade. The adoption rate of

fertiliser-responsive, high-yielding modern rice varieties increased from 17 percent in 1980 to nearly 90 percent in 2006 (Tran and Kajisa, 2006).

In macroeconomic terms, Vietnam enjoyed annual growth in gross domestic product (GDP) of 6 percent and in labour productivity of 3.7 percent between 2006 and 2016 (Ayerst et al., 2018). This growth was accompanied by higher growth in industry and services and a substantial shift of labour out of agriculture. Agricultural output has been growing at more than 4 percent per annum. Most of this growth has arisen from productivity improvements as increases in farm use of intermediate inputs such as fertiliser have been more than offset by a reduction in land, labour and capital. These productivity gains are accompanied by a shift to higher valued crops, notably perennials, expanding average farm plot size, and a slight shift to larger farms.

Although aggregate productivity has been rising, widening dispersion of farm productivity and frictions in input markets have been a source of rising misallocation. In addition, significant differences exist between the north and south of Vietnam. All of the growth in farm output has occurred in the south (FAO 2020; Ayerst et. al. 2018). Differences also emerge with respect to productivity growth, which is almost two times higher in the south than in the north, partially due to higher resource misallocation in the north (Ayerst et. al., 2018).

Despite the importance of rice production in Vietnam, inefficiency is due to continued high involvement by the government in agriculture as it is considered a national strategic industry (FAO 2020; Ayerst et. al., 2018; Vu, 2012; Tran and Kajisa, 2006).

As a result, the sector continues to be handicapped by a combination of government-imposed restrictions on farm size and the uses of agricultural land, as well as extensive centralised land-use planning, including restrictions on crop choice, which is largely motivated by rice production and national food security motives (World Bank, 2017). In addition, state involvement in agricultural value chains is also heavy (Markussen, 2017). For example, access to water for agriculture remains controlled by the government through irrigation SOEs (State-owned enterprises) resulting in low water productivity and skewed pricing in irrigation (World Bank, 2017). In addition, the risk of land expropriation is high (Markussen and Tarp, 2014).

Tables 1 and 2 provide a breakdown of GDP and employment by sector between 2006-2016. By 2006, agriculture's share of GDP had fallen to 20 percent. Its share of employment also declined, but much less so, and in 2006 more than half of the labour force, or nearly 24 million individuals, was still working agriculture. Over the next ten years, Vietnam enjoyed aggregate growth in real GDP of about 6 percent per year, and significantly more rapid growth in industry and service of 5.0 and 5.4 percent per year compared to growth in the agricultural sector of 2.8 percent. As a result, agriculture's share of GDP fell further to about 15 percent. Agriculture's share of employment also fell as the non-agricultural sector absorbed all of the increases in the labour force between 2006 and 2016.

TABLE 1
REAL GDP IN VIETNAM, 2006–2016

Year	Total	Agriculture	Industry	Services
2006	1,699,501	355,831	649,657	694,013
2007	1,820,667	369,905	697,499	753,263
2008	1,923,749	387,262	726,329	810,158
2009	2,027,591	394,658	769,733	863,200
2010	2,157,828	396,576	693,351	797,155
2011	2,292,483	413,368	746,069	856,691
2012	2,412,778	425,446	801,217	914,177
2013	2,543,596	436,642	841,953	975,592
2014	2,695,796	451,659	896,042	1,035,726
2015	2,875,856	462,536	982,411	1,101,236
2016	3,054,470	468,813	1,056,808	1,178,143
Annual Growth	6.04%	2.80%	4.99%	5.43%

Notes: Data from the General Statistics Office. GDP in constant prices (Billion 2010 VND). Sector GDP numbers do not add to total after 2009. The differences are production taxes and subsidies, which are reported separately.
Source: Angelino et al. (2017)

TABLE 2
EMPLOYMENT BY SECTOR

Year	Number of Workers				Share of Employment		
	Agriculture	Industry	Services	Total	Agriculture	Industry	Services
2005	23,563.2	7,524.0	11,687.7	42,774.9	55.1%	17.6%	27.3%
2006	23,747.4	8,044.6	12,199.5	43,991.4	54.0%	18.3%	27.7%
2007	23,931.5	8,565.2	12,711.2	45,207.9	52.9%	18.9%	28.1%
2008	24,303.4	8,985.5	13,171.9	46,460.8	52.3%	19.3%	28.4%
2009	24,606.0	9,561.6	13,576.1	47,743.7	51.5%	20.0%	28.4%
2010	24,279.0	10,277.0	14,492.5	49,048.5	49.5%	21.0%	29.5%
2011	24,362.9	10,718.8	15,270.2	50,351.9	48.4%	21.3%	30.3%
2012	24,357.2	10,896.5	16,168.7	51,422.4	47.4%	21.2%	31.4%
2013	24,399.3	11,086.0	16,722.5	52,207.8	46.7%	21.2%	32.0%
2014	24,408.7	11,229.0	17,106.8	52,744.5	46.3%	21.3%	32.4%
2015	23,259.1	12,018.0	17,562.9	52,840.0	44.0%	22.7%	33.2%
2016	22,315.2	13,199.0	17,788.6	83,302.8	41.9%	24.8%	33.4%

Notes: Data from the General Statistics Office. Estimates for 2006 are interpolated using 2005 and 2007. Estimates for 2016 are preliminary.
Source: Angelino et al. (2017)

Challenges

Due to the issues discussed, Vietnam's market efficiency comparatively lags behind major regional countries of similar population size and reliance on agriculture as a contributor to the GDP. In terms of comparative advantage, Vietnam's agricultural sector is less efficient compared to Cambodia, Pakistan, and Myanmar. Farmers are abandoning their farms for industrial jobs in cities, leading to a gap in labour in farmlands, which cannot yet be compensated for by automation and other agricultural production methods.

Current Developments

The Asian Development Bank approved $100 million to help finance new irrigation systems (ADB, 2019). The upgraded irrigation systems will bring water on demand with pressurised pipe systems,

predicted to improve agricultural productivity and provide access to grow more high-end crops such as dragonfruits, grapes, and mangoes. The irrigation systems should improve the quality of Vietnam's coffee beans and the variety of peppers grown in the country. This system will also improve the quality of groundwater and minimize management services, thereby increasing productivity of the agricultural sector, and by extension, its comparative advantage, in the growth of crops, but not farming technologies higher up on the value chain, such as fertilisers, in which Japan is more advanced.

Summary

In summary, Vietnam excels in growing rice and a diversity of crops, making full use of its geographic location and favourable climatic conditions. However, growing crops is comparatively low on the value chain, and therefore, it remains a low-income industry with commodity-based character. Inefficiencies are particularly detrimental because they increase the average unit cost, and commodity-based industries compete on price, which therefore puts Vietnam at a disadvantage. However, the creation of the TPP removes tariffs, and was expected to mitigate inefficiencies, giving Vietnam significant export advantages compared to competing countries that are not part of the TPP.

However, for trade with TPP partners, a different scenario emerges. Following the launch of the TPP, Vietnam has lost its comparative advantage compared to Mexico in the agricultural sector completely. As both countries rely on similar crops and being on similar levels of the value chain, it is clear that the agricultural sector in Mexico has revealed comparative advantage under the conditions of the TPP. Therefore, Vietnam's model of agricultural development characterised by high state involvement seems to have put the agricultural sector under a comparative disadvantage with trade partner Mexico. Given the high rate of employment in the agricultural sector in Vietnam, the TPP may ultimately lead to loss of employment in the sector causing surplus in the labour market.

AUTOMOTIVE INDUSTRY IN VIETNAM

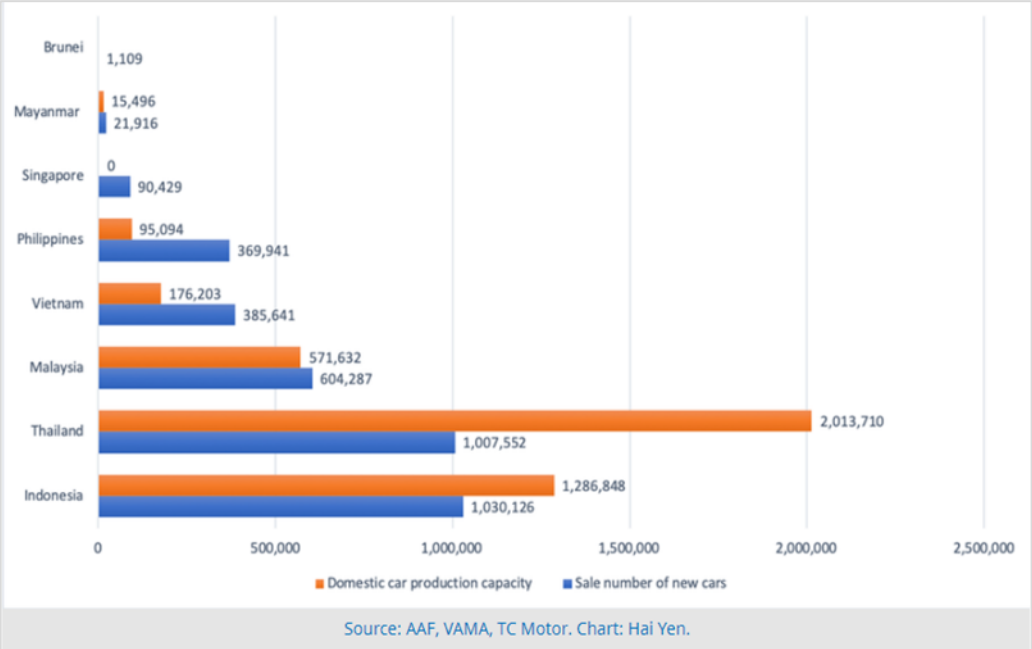
Background

Even Vietnam is a country of motorbikes, the car is taking the streets as per an increase in affluent population. Although late, Vietnam also has joined the club of Asian automobile manufacturers, trying to supply the rising demand with domestically produced vehicles.

Dzung et al. (2018), estimates that the automotive market in Vietnam is still undersized with over a 20% growth pattern and more Vietnamese clients expecting to buy a car. This context is very attractive for foreign investment and assembling operations to face the barriers for Vietnamese market penetration. According to Schröder (2017), the market has not fulfilled car makers' expectations and the sales volume of individual brands is very limited by international comparison.

As seen in Figure 3, in 2019 Vietnam produced domestically roughly 46% of the new cars local sale which is far below vs. same indicator for Thailand and Indonesia.

FIGURE 3
CAR MARKETS IN SOUTHEAST ASIA 2019



Source: Thoi Dai Vietnam Times (2020)

Even in car sales Vietnam showed an annual increase of 9.4%, after 20 years of setting target for localization rate of 35 – 45% for the automobile industry, Vietnam is still way below, with a present rate range of 7 – 10% for passenger cars under nine seats, according to Thoi Dai Vietnam Times (2020).

According to Hansen (2016), Vietnam's government has targeted the domestic automobile industry as a "spearhead industry" to achieve industrial upgrading as part of the called Doi Moi economic reforms launched in 1986. Prior to Doi Moi, the automobile industry was almost non-existent, except for the state-owned production of military vehicles. The Soviet Union was the supplier of the few passenger cars available at Vietnam. At the early stages of the Doi Moi reform, the goal was to develop a Vietnamese brand successfully for the truck and bus segment. For the private vehicles segment, the strategy turned to attracting foreign direct investment to establish joint ventures. Japanese, Korean, Taiwanese, American and European companies are involved to different degrees.

According to Schröder (2017): "it may be stated that Vietnam's automotive supplier industry is a mixture of producers that produce motorcycle components for local assembly operations and others that utilize the country as an export platform for labor-intensive automobile components."

Challenges

Inconsistent and Highly Opaque Policies

On one hand, the Vietnamese government has declared the automotive industry as a key strategy to develop the national economy and on the other hand, the same government is simultaneously restraining the market for this industry by imposing high taxes and fees on cars (Hansen 2016, Nguyen, 2019). Although the automobile industry is recognized for raising taxes and creating jobs (Nguyen, 2019), it is widely regarded as a failure in terms of translating the benefits to the rest of the economy (Hiep, 2019).

Low Capacity-Low Technology

According to World Bank (2017), Vietnam has about 200–300 auto part manufacturing companies, mainly small and medium enterprises (SMEs) with low production capacity and low technology. This is

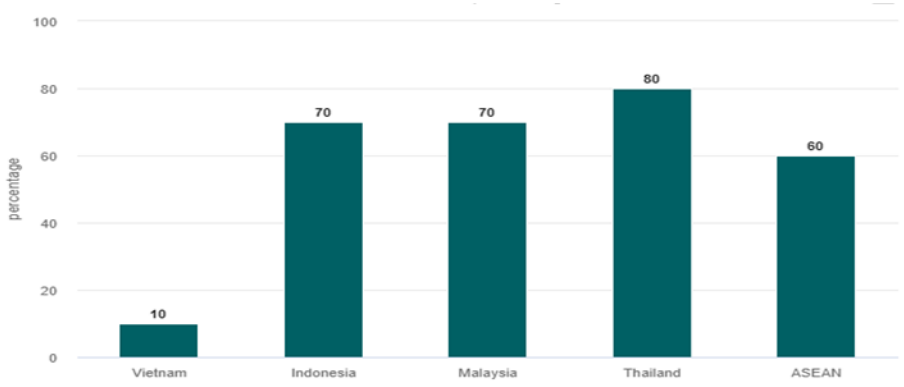
just a small fraction vs. Indonesia´s and Thailand´s. Although some low technology and labor-intensive parts have been localized, original equipment manufacturers still depend on importing the majority of their supplies. Because of that, Vietnamese operations are in a weaker position in an industry where economies of scale are critical. This explains that the production cost per unit is significantly higher in Vietnam than in other ASEAN members according to Schroeder (2017). Local sourcing is the main way to become cost-competitive vs. other ASEAN members.

High Dependency on Imports

Although automotive multinational companies entered the market nearly two decades ago, the most important parts, are still imported. With an underdeveloped local supply base, localization levels are very low (Nguyen, 2019). In comparison, other countries in the region, such as Thailand, uses local parts in the following average proportions: light pickup 80 percent, passenger cars 45 percent, and motorcycles 90 percent. Without a major parts industry, car production costs are higher than elsewhere in the region because of a higher proportion of imported components and correspondent duties.

According to Nahn (2020), in Vietnam the import tax for parts used in car assembly is higher than those for importing a completely-built unit. Car parts have an import tax of 7-9 percent, while completely-built units imported from Thailand and Indonesia are tax free under the ASEAN Trade in Goods Agreement (ATIGA) that started in 2018. As previously mentioned, Auto makers have to import parts because local suppliers are not capable of supplying them. Vietnam had targeted to reach 60 percent localization rate for passenger cars in 2010, but until now it remains at 7-10 percent, compared to the ASEAN average of 55-60 percent, as shown in chart 2.

FIGURE 4
LOCALIZATION RATE OF PASSENGER CARS



Source: Nahn (2020)

Tariffs Elimination Due to Free Trade Agreements (FTA)

According to Schröder (2017), Vietnam will be required to eliminate tariffs on most products made in ASEAN region, including automobiles. In addition, the country has negotiated various other trade agreements that lower tariff barriers. Therefore, the currently protected Vietnamese automotive industry will face higher competition vs. other vehicle manufacturing countries that might lead to automobile production plant closures.

As an instance, Ford and Mitsubishi have considered closing down their Vietnamese plants and shifting to imports from regional production hubs, especially Thailand. Without tariff protection, production in Vietnam is more expensive than imports of finished vehicles so that manufacturers have strong financial incentives to relocate production.

For TPP, Vietnam agreed to gradually decrease the tariffs for newly manufactured vehicles to achieve a zero rate after 12 years as seen in Table 2.

TABLE 3
VIETNAM'S TARIFF REDUCTION SCHEDULE FOR VEHICLES

Year(s) after TPP becomes effective	Tariff rate (%)
1	70
2	70
3	70
4	63
5	56
6	49
7	42
8	35
9	28
10	21
11	14
12	7
13	0

(CP)TPP = (Comprehensive and Progressive Agreement for) Trans-Pacific Partnership.
Source: Schröder (2017)

All previously mentioned challenges are reflected in the high prices of passenger cars in Vietnam vs. other countries in the region as noted by Hansen (2016): "a new Toyota Yaris in Thailand starts at 469,000 Baht (approximately 290 million Dong), while in Vietnam starts at 638 million Dong (according to the official websites of Toyota Thailand and Toyota Vietnam on 1 February 2016)".

Next Steps

Demand-Supply Approach

According to the World Bank (2017): Automobile Market upgrading in Vietnam requires demand- and supply-side approaches. On the demand side, Vietnam needs to shift from mobility of vehicles to mobility of people. The government should invest in roads and public transport to create a networked, multimodal urban mobility system. On the supply side, efforts should be concentrated on producing two-wheelers for the domestic and regional markets while the rest of the car industry continues their expansion.

Trade Policy

Since the FTAs discussed indicate that existing tariff barriers will be reduced further, Vietnam can become an export base for some of the world's main automotive producing countries and markets. However, this strategy may only be viable if Vietnamese products are sufficiently localized to satisfy the correspondent Rules of Origin. If the Vietnamese government can successfully promote the development of the automotive industry, the country may leverage tariff reductions through FTAs.

Industry Associations

In order to facilitate policy formulation towards the auto parts industry, the government should encourage the foundation of an industry association in Vietnam. So far, there is no entity that represents the interest of auto parts makers, meaning that policy drafts do not consider auto parts industry input. Vietnamese government needs to consider policies that enable local enterprises to respond to requirements concerning product quality, timely delivery, and production scale.

PHARMACEUTICAL INDUSTRY IN VIETNAM

Background

According to IQVIA Institute, Vietnam is currently classified as a group of "pharmerging" (group of countries having low position on the pharmaceutical market, but having a speed pace of growth). This is reinforced by the Pharmaceuticals & Healthcare Report, Q3 2020 by Fitch Solutions (2020, pp 5):

"Vietnam is forecast to be one of the fastest-growing economies in Southeast Asia, despite the impact of Covid-19. Vietnam offers considerable longer-term commercial opportunities for a range of pharmaceutical players. Its large population number, government's drive to achieve universal health coverage through subsidized health insurance schemes, and authorities' support for pharmaceutical investment are just some of the factors that would provide a fertile ground for substantial volume and value growth. However, this potential will mostly attract generic drug companies, given the low pharmaceutical spending and regulatory regime risks."

In addition to a relevant size, Vietnam´s population is aging. In fact, according to World Bank, Vietnam is experiencing the fastest population aging rate ever. The proportion of population aged 65 and older will go from 6.5 % in 2017 to expected 21% by 2050. As a consequence, demand for health care will be increasing.

Due to changes in government policies and regulations of imported drugs, Vietnam's pharmaceutical sector has grown significantly in the last ten years and offers important opportunities for prospective suppliers.

According to the 2020 Fitch Solutions report, the Vietnam healthcare Pharmaceutical sales had a value of USD6.703 billion in 2019 representing a 2.54% of GDP. Spending per capita is expected to double from USD170 in 2017 to USD400 in 2027. As per Business Monitor International report (2017), the country's pharmaceutical market had an estimated revenue of USD5.9 billion in 2018, an 11.7% increase from the previous year, which makes Vietnam the second largest pharmaceutical market in the South East Asia.

The demand for pharmaceutical products rapidly increased as a consequence of high GDP growth, rising income per capita, higher urban population as well as aging population. However, as of 2013, it is estimated that 90% of national drug expenditure depends on imported sources as per Hoang et al (2014).

The rapid increase of pharmaceutical demand in Vietnam can be explained by different economic and social factors. According to Angelino et al (2017) there are three key drivers: (1) high economic growth and increasing personal income; (2) rising population and rapid urbanization; and (3) rapid aging, which all contribute to a higher consumption of pharmaceutical products. In addition, several negative effects such as pollution, insufficient food safety or unsafe living and working conditions also impact demand as well. These three factors can be explained as follows:

(1) High economic growth and increasing income per capita.
During the last 20 years, Vietnam's economy rapidly expanded at an average yearly rate of 7%. At the same time, GDP per capita increased from 288 USD in 1995 to 2110 USD in 2015. Strong income growth and increasing health awareness are increasing expenditure in healthcare and pharmaceutical products.

(2) Rising population and urbanization.
During the last two decades, Vietnam has experienced a dramatic increase in the population, passing from 72 million people in 1995 to 97 million in 2018. At the same time, urbanization triggered a spatial and demographic expansion. According to the World Bank, urban areas in Vietnam have developed spatially at 2.8% per year, which is among the fastest rates in the Asian region. As of 2015, the urban population is about 33.5% and it is expected to reach 40% by 2020 and 50% by 2030. In these contexts, the emergence of new urban middle-classes is likely to be associated positively with an increased demand for healthcare and pharmaceutical products.

(3) Rapid aging.

According to the Ministry of Health, Vietnam is experiencing the initial stage of aging process. People above the age of 60 reached 10.2% in 2014 in comparison to 7.1% in 1989. At the same time, people under the age of 15 quickly decreased from 39.2% to 23.5%. As a result, the aging index, i.e., the ratio between the number of people over 60 years old and the population under 15 years old, increased from 18.2% (1989) to 43.3% (2014). According to the United Nations (2015), by 2040, the number of people older than 65 is projected to almost triple to 18.4 million, and to account for 17% of the population. The speed of aging in Vietnam is among the fastest worldwide. The improvement in life expectancy and chronic diseases related to old age will increase the demand for pharmaceutical products.

Challenges

The next section will identify the major problems that are currently obstructing the development of domestic pharmaceutical industry as per Angelino et al (2017).

1. No Long Term Strategy.
   Even the Government of Vietnam has promulgated policies for the development of the national pharmaceutical industry, there is not a specific master plan devoted to the development of this sector for the long-term.
2. Low Value Added Production.
   Pharmaceuticals produced in Vietnam struggle to compete on international markets because they mainly treat common diseases or are sold as generic drugs that have not yet achieved bioequivalence standards, thus not suitable for exports.
3. Dependence of Raw Materials imports.
   Vietnam needs to import the majority of raw materials for pharmaceutical production. According to Pharma Report, the biggest import partners are China and India, respectively accounting for 57% and 18% of total import value in 2013. This dependence makes the industry vulnerable to exchange rate fluctuations or supply shortages.
4. Distorted Distribution Network.
   The pharmaceutical distribution network is fragmented and inefficient. The uncontrolled involvement of small local distributors and the lack of a clear legislative policies increase the inefficiency of the distribution market and raise the final price of drugs.
5. Price Distortion
   Vietnam's current pharmaceutical procurement system is highly decentralized and complex. Hospitals in Vietnam mostly purchase pharmaceuticals through bidding, which is subject to an upper price limit per medicament set by the regional health department. Those limits might greatly vary between areas, resulting in wide differentials in prices of medicines across facilities and regions of the country. Since sale of drugs is still the major source of income for the State health care system, some provinces have decided to use the sale of pharmaceuticals as their primary source of income vs. service charges. As a consequence, local people tend to pay a higher price for medication.
6. Intellectual property protection. Counterfeit drugs represent a significant amount of market consumption. The lack of aligning patent law fully with international standards could also impact multinational sector expansion.

Summary

Vietnam is a fast growing economy in South East Asia with a significantly high population (over 97 million in 2018). The Vietnamese population is aging at a very high rate, which along with the rapid expansion of the middle-income urban class, have dramatically increased the demand for healthcare and pharmaceutical products. Even the government has formulated policies aimed at promoting the development of the pharmaceutical industry, their implementation does not seem to be successful given that the country still needs to import up to 90% of its pharmaceutical consumption.

CONCLUSION

In conclusion, it can be seen that the Trans-Pacific Partnership (TPP) has shifted the comparative advantage of member countries in the respective industries studied in this article (Automotive, Agricultural, and Pharmaceutical).

The agricultural sector in Mexico experienced a gain in its revealed comparative advantage relative to Japan and Vietnam following the conclusion of the Pacific Alliance in 2011 (year 4) and experienced another impetus between years 8 and 9, which coincided with the launch of the Trans-Pacific Partnership. Although Japan is not a member of the Pacific Alliance, it has an Economic Partnership Agreement with Mexico which came into effect in 2012. Trade structures had already adjusted as a result of tariff removal within existing member countries of the Pacific Alliance, with which Mexico has close trade relationships, therefore affecting trade with other countries such as Japan and Vietnam. With the removal of tariffs under the Trans-Pacific Partnership, Japanese agricultural products became cheaper, therefore altering demand conditions. The temporary negative effect on the agricultural RCA was to be expected as the removal of tariff barriers creates new supply and demand conditions as a direct result of the Mexico-Japan EPA and indirectly from the launch of the Pacific Alliance requiring structural adjustments. The recovery of the Revealed Comparative Advantage testifies to Mexico's continued resilience and prowess in the agricultural sector. The agricultural industry continues to be Mexico's only competitive industry vis-à-vis Japan. However, Mexico is has competitive advantage in the automotive, agricultural, and to some extent, the pharmaceutical sector compared to Vietnam. Mexico's strong growth in the revealed comparative advantage in the agricultural sector vis-à-vis Vietnam directly coincided with the ratification of the Trans-Pacific Partnership. As a result, Mexico has gained from its Asia-focused free trade agreements (Mexico-Japan EPA and TPP), while Vietnam has not necessarily benefited from the TPP in relation to Mexico in agriculture. However, since the TPP includes other countries, Vietnam could thus either divert its agricultural trade away from international markets and more towards domestic or divert it to other export markets which have a smaller revealed comparative advantage (RCA) than Vietnam itself.

The scenario for the automotive and pharmaceutical sectors, both highly capital and research intensive, remained little changed since the launch of the TPP. In fact, Mexico's pharmaceutical sector has lost Relative Comparative Advantage and is now less competitive than its automotive industry. In theory, this means Mexico should export fewer pharmaceutical products to Japan now and instead import more. Recent trade statistics support this view, where exports of pharmaceutical products declined by almost one-third of its trade volume compared to the period before the TPP. As the relative values of intra-country RCAs have changed, the volume of automotive exports has increased compensating for a fall in pharmaceutical exports.

In absolute terms, however, the automotive industry in Mexico remained little changed in terms of revealed comparative advantage, suffering slightly in the years immediately following the launch of the TPP but regained its revealed comparative advantage to become more competitive than the pharmaceutical industry. Overall, gains in revealed comparative advantage for the automotive sector have been moderate, however.

In terms of ratios of revealed comparative advantage among all three sectors, the agricultural sector has maintained its ratio of being approximately 12 times more competitive than the pharmaceutical and automotive sectors. The latter sectors have not narrowed the gap with the agricultural industry, which suggests the TPP has had little impact on the revealed comparative advantage of automotive and pharmaceutical sectors vis-à-vis Japan. Therefore, the effect on trade patterns among the two countries can be expected to remain unchanged. The TPP has not shaken up any of the industries under study in either country showing no disruptive effects in neither negative nor positive sense on industrial structures in either country, with the status quo maintained.

The results partially confirm what trade theory suggests in that free trade agreements do not have a detrimental impacts on the structure of domestic industries in a given country, and therefore weaken any argument for trade protectionism. However, in examining the trade volumes between Japan and Mexico before and after the launch of the Mexico-Japan EPA, no particular changes in average trade volumes in the three industries occurred over a span of 10 years, either. This weakens the argument that free trade

agreements automatically lead to more trade and leaving everyone better off. The third unexpected result has been that the conclusion of the TPP has not necessarily been a catalyst for the development of advanced sectors such as the pharmaceutical sector maintaining Mexico's strong dependence on agricultural exports and automotive industry versus less developed countries such as Vietnam, but not compared to Japan. Vietnam has even lost competitiveness in the agricultural sector and not compensated for it by competitive gains in the other two industries (automotive and pharmaceutical). As mentioned previously, strong government interference by the Vietnamese government in the agricultural sector may play a role.

The limitation in this conclusion and paper in general is that we have only focused on three sectors and a larger cross section of industries could yield different results. In addition, a larger cross section of other member countries in the TPP could have led to different results. However, the study focused on Japan, Mexico, and Vietnam first as these countries are the largest members of the TPP by population with Mexico and Vietnam being emerging economies.

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