Chapter 10

FTAs and the Supply Chain in the Thai Automotive Industry

Archanun Kohpaiboon
Faculty of Economics, Thammasat University

Nobuaki Yamashita
School of Economics and Finance, La Trobe University

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CHAPTER 10

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ARCHANUN KOHPAIBOON

Faculty of Economics, Thammasat University, Bangkok

NOBUAKI YAMASHITA

School of Economics and Finance, La Trobe University, Melbourne

The impacts of FTAs on the supply chain is assessed in this paper using the Thai automotive industry as a case study. While there are numerous previous studies examining the effects of FTAs, there has been no systematic analysis of industry case studies that focuses on the effects of FTAs on the supply chain. An overview of policy development in the Thai automotive industry is provided, followed by the recent performance of the automotive industry in Thailand. The supply chain development and the impact of FTAs is then examined. Differences between trade in motor vehicles, where the FTA impact is significant, and trade in components, are discussed. Policy implications are then identified.

1. Introduction

The automotive industry in Thailand has grown rapidly over the past two decades. By 2008 annual exports approached US$28 billion from US$0.5 billion in 1995, making Thailand the 13th largest automotive exporter in the world, and the third largest in Asia, after Japan and South Korea. The marked success in the expansion of the automotive industry has transformed Thailand into the 'Detroit of the East' (Economists Intelligence Unit, 2008, p.21), with most of the major players in the international auto industry using the country as a production platform.

Despite the extensive policy framework relating to the automotive industry, insight about the industry's supply chain remains largely unknown. In particular, does becoming more export-oriented create more or fewer domestic linkages? How do multinational car makers make use of the growing importance of product fragmentation – the cross-border dispersion of component production/assembly within vertically integrated product processes in the past two decades (Athukorala and Kohpaiboon, 2010; Yamashita, 2010; Cattaneo et al., 2010)? The issue becomes more complicated in the case of the automotive industry where the manufacture of a vehicle involves a wide range of parts including rubber parts, plastics, electronics, metallic and engine components. Some of these parts are unlikely to be traded across borders due to their bulky nature and to the inventory management strategy popularly used, i.e. just-in-time. The combination might lie between fully global at one end of the spectrum with interlinked, specialized manufacturing clusters and fully local at the other, where manufacturing is tied to the narrow geography of specific location.

This issue is even more pertinent given the proliferation of free trade agreements (FTAs) observed over the past 15 years. As the number of FTAs is still growing, their presence is more likely to affect the operation of the multilateral trading system as well as the day-to-day conduct of cross-border trade. How the proliferation of FTAs affects trade opportunities and how firms respond to these opportunities has not been yet examined through in-depth industry case study analysis although it is central to the debate whether FTAs act as stumbling or building blocks and how FTAs should be designed to complement the existing WTO.

Against this backdrop, this paper assesses the impact of FTAs on the supply chain using the Thai automotive industry as a case study. The automotive industry is suitable for this analysis for two reasons. Firstly, Thailand is one of the major production platforms for the largest players in the international auto industry. Secondly, automotive products and vehicles in particular are still subject to high tariff because they were sensitive items in the WTO multilateral trade liberalization. By contrast, they are usually included in FTAs tariff liberalization program. Hence, it would be interesting to examine the actual liberalization effect on them. While there are numerous previous studies examining the effect of FTAs such as Magee (2003 and 2008); Soloaga and Winters (2001); Bayoumi and Eichengreen (1995); Athukorala and Yamashita, (2006); Wignaraja et al. (2010); Takahashi and Urata (2009); and Kohpaiboon (2010), they mostly undertook a sectoral analysis on a national basis. There has been no systematic analysis of industry case studies that focuses on the effects of FTAs on the supply chain.

The paper is organized as follows: Section 2 presents the research methodology used for the firm-level case study. An overview of policy development in the Thai automotive industry is provided in section 3, followed by the recent performance of the automotive industry in section 4. Section 5 presents the supply chain development and the impact of FTAs. Conclusion and policy inferences are presented in the final section.

2. Research Methodology

Both quantitative and qualitative analyses are undertaken. The former involves a careful analysis of production and trade data. Particularly, the list of auto parts used in this study was developed in Kohpaiboon (2007) and Athukorala and Kohpaiboon (2010). The list includes 84 items selected from the six-digit product classification according to the Harmonized System (HS) 2002 version based on the industry-specific knowledge as well as the firm interview information. It covers HS 39 (plastic parts), 40 (rubber parts), 70 (glass), 73 (metallic), 84 (engine), 85 (electronics) and 87 (auto body). Full details are provided in the Appendix.

In addition, to gain an insight into the nature of the supply chain in the Thai automotive industry, firm interviews were conducted. A flexible interview guide was used that allowed the respondents to relate their experiences in their own words, based on their own sequence of the topics asked in order to minimizes the likelihood of missing important aspects of the story. The interview guide begins by establishing a general company profile, i.e. size, past performance, ownership, production process, product destination, product covers, etc. This is followed by a series of opening probes into firms' supply chain behavior, starting with their general perception of the industry's development. This is followed by asking their opinions about the development of input procurement and recent changes in their procurement. Then questions were asked concerning opinions of the usefulness of FTAs and any potential obstacles such as rules of origin (ROO) constraints and opportunity costs of applying FTA preferential tariffs. Finally, general questions concerning current problems, the role of government and future prospects for the industry were addressed. Interviews were held with top-level managerial staff from five Thai enterprises and four government officers from the public sector during February 2011 to April 2011. All of the interviews were conducted by the author.

3. Policy Environment in the Automotive Industry in Thailand

3.1. Development of the Policy Environment

The Thai policy regime relating to the automotive industry has evolved, as an integral part of the overall industrialization strategy, through two distinct phases. During the period from the early 1960s until the late 1980s import substitution was the basis tenet of development strategy. During this period the Thai government enticed car makers to set up assembly plants in the country by providing tariff protection for vehicle manufacture and imposing local content requirements (LCRs) to promote local parts manufacture. Since the late 1980s there has been a clear shift in Thai automotive policy from domestic market orientation toward global integration, setting the stage for the country to emerge as a centre of automotive and auto parts manufacturing in the region.

As in many other developing countries, in Thailand the automotive industry was one of the first targets of industrial development through import substitution. In the early 1960s, tariffs of 60 percent, 40 percent and 20 percent were imposed on imports of completely built-up units (CBUs) of passenger cars, vans and pick-up trucks, respectively. Tariff rates applicable to imports of completely knocked down (CKD) kits and component parts for each of the three categories were set at half of the CBU rates. High end-product tariffs combined with lower tariffs on imported inputs naturally favored domestic assembly of hitherto imported vehicles. Motor vehicle tariffs were by far the highest in Thailand's overall import duty structure throughout the ensuing four decades.

From 1960 the government embarked on an investment promotion policy to complement the protectionist trade policy regime. The Board of Investment (BOI) was established to approve foreign investment projects and implement investment promotion measures under the Investment Promotion Act (1960). A range of investment promotion measures, including income tax breaks for approved investment projects were offered. Noticeably, unlike in many other developing countries, investment promotion policy in Thailand treated domestic and foreign investors equally. The only exception was the foreign ownership restriction for domestic-market oriented joint-venture firms (firms which sell more than 70 percent of their output in the domestic market). It was abolished in 1998 during the Asian financial crisis.

By the late 1960s, there was a growing concern in Thai policy circles that the nascent automotive industry had failed to set the stage for broad-based industrial growth through backward linkages with the local parts and components industry. In response, the government imposed LCR measures by 1975. Particularly, domestically assembled passenger vehicles had to use locally produced parts equivalent to at least to 25 percent of the total value of the vehicle in order to qualify for the importation of CKD kits and auto parts. The LCR requirement for commercial vehicles and pick-up trucks was set at 15 percent. The introduction of the LCR system was accompanied by an upward adjustment in import tariffs on CBU units of passenger vehicles, vans and pick-up trucks to 80 percent, 60 percent and 40 percent, combined with an increase of the

respective rates on CKD kits to 50, 40 and 30 percent.[1] As a further measure to promote local content, in 1978 an import ban was imposed on CBU passenger vehicles and import duties on CKD kits were increased to 80 per cent.

The new LCR system was introduced in 1983 to counter the implementation problems of the previous LCR system. Under the new system, which came into effect in 1983, every car part was assigned a point and auto assemblers were required to use locally produced parts up to a minimum mandatory total, initially set at 50 points. This was reduced to 45 points in the following year in response to requests by car makers. In addition, the LCR target for passenger cars was set at 54 points based on a two-way classification of auto parts – a mandatory list (Account A) and selective list (Account B) – with LCR points divided equally (27 each) between the two lists. Car makers were required to adhere strictly to Account A in procuring inputs and they were permitted to choose items freely from Account B. If any of the parts in list A were not available locally, car makers could select substitutes from the selective lists to fulfill the requirement. Account A consisted of several parts (e.g. radiator, battery, wiring harness, muffler, wheels and tire, glass doors and rear spring) which most car makers had already been procuring domestically. Thus there was little resistance from the car makers to the new system.

From about 1998 the Thai economy entered a period of rapid growth. The resulting increase in domestic demand caused a shortage of locally assembled vehicles and triggered the shifts toward more liberalized government policies. In 1991, the import ban on brand new cars was lifted. Since then the import trade regime for automotives has remained free of quantitative restrictions, with the sole exception of non-automatic licensing for the importation of certain types of diesel engines and a ban on motorcycle engines and used passenger cars (WTO, 2007, pp.115-16).

During 1998 to 2000, the Thai government honored its commitment under the WTO agreement on Trade Related Investment Measures (TRIMs), becoming the first developing-country WTO member to do so. Abolition of LCR (with effect from January 2000 was announced in 1998. In the area of FDI policy, all selective incentives

[1]As part of the new policy, the government also set limits on the number of models and the engine capacity of each model and minimum capacity of individual assembly plants with a vehicle to rationalizing the domestic auto industry. However, this rationalization policy lasted only six months.

granted to export-oriented activities and 49 percent equity ownership restriction on domestic-market oriented projects were abolished with immediate effect in 1999.

The automotive industry was further liberalized under FTA negotiation. Liberalization through FTAs for the automotive industry began in the mid-1990s through the ASEAN Industrial Cooperation Scheme (AICO) in November 1996.[2] The program aimed to promote trade in parts and components among auto companies operating in ASEAN member countries. It provided for a 50 percent reduction in prevailing import duties on parts and components trade among member countries, while treating these imports as part of the local content in estimating the minimum local content of the final products (40 percent) applicable to duty concessions under the ASEAN Free Trade Area (AFTA). This was used to accelerate the trade liberalization introduced in the ASEAN Free Trade Area in 1995 and expected to have a full effect by the end of 2010 for the original six member countries (Brunei, Indonesia, Malaysia, the Philippines, Singapore and Thailand).

Since 2002 Thailand has signed a number of bilateral free trade agreements. Of these, the Thai--Australia FTA (TAFTA) and the Thai—New Zealand FTA (TNZFTA) have been in operation since 2005. The FTA with Japan (JTEPA) came into effect in 2007. In general, there were substantial tariff cuts offered in these FTAs. It is especially true for CBUs whose most favored nation (MFN) applied tariff is the highest at 80 percent though its liberalization is selective, that is, tariff cuts for CBU vehicles were offered under AFTA, TAFTA and TNZFTA, not under JTEPA simply because Japan is the major vehicle exporter. Table 1 provides a chronology of key policy changes.

[2] The AICO scheme was the generalized version of ASEAN Brand-to-Brand Complementary (BBC) programme which was in effect between 1988 and 1995. Under the BBC programme, trade liberalization on parts was applied only to the same brand located in different ASEAN members.

Table 1. Chronology of Trade and Investment Policies Impacting on the Thai Automotive Industry, 1960-2008[1]

1961	1960 Industrial Investment Promotion Act provides incentives for the local assembly of automotives.
1962	1962 Industrial Investment Promotion Act announced 50% reduction in tariffs on CKD kits: new rates, passenger cars 30%; pick-ups 20%; and trucks 10%.
1969	Ministry of Industry (MOI) set up Automotive Development Committee (ADC). 20% increase in tariffs on CBU vehicles: new rates, passenger cars 50%; pick-ups 40%; and trucks 30%.
1971	MOI restricted the number of locally assembled passenger car, pick-ups and trucks models. Announced LCR measures to become effective in 1974: domestically assembled vehicles had to use locally produced parts to at least 25% of the total value of the vehicle.
1978	Banned CBU imports and increased import duty on CKD kits to 80%. Suspended approval of new assembly plants to reduce overcapacity. Tariffs of CBU passenger cars and CKD passenger cars were increased to 150% and 80% respectively.
1982	LCR requirement for all vehicles set at 45%.
1985	Mandatory local content list imposed. Ban on imported CBU vehicles with engine capacity over 2,300cc lifted.
1986	LCR for passenger cars lifted to 54%. List for compulsory and non-compulsory parts introduced.
1989	Ceiling on production capacity of existing assembly plans lifted.
1990	Abolished restrictions on domestic production of series and models. Replaced quantitative import restriction (including the ban on imports of CBUs under 2.3 litres) on passenger cars with tariff.
1991	Reduced tariffs on all types of CBUs and CKD kits: CBUs over 2.3 litres from 300% to 100% CBUs under 2.3 litres from 180% to 60% CKDs for cars, pick-ups and vans from112% to 20% Required use of locally produced diesel engines for 1-ton pick-up trucks.
1992	Exempted pick-up trucks from excise tax.
1993	Ban on new assembly plants lifted.
1995	Reduced CKD tariffs from 20% to 2%.
1997	Abolished local ownership requirement on foreign-invested projects (announced 1993; implemented 1997).

1999	Raised tariffs on CKD vehicles from 20% to 30-35% to cushion against the potential adverse impact of impending LCR abolition.
2000	Abolished LCR requirement.
2003	Tariff preferences under AFTA came into full effect: import duties applicable to intra-ASEAN trade down to 0-5%.

Source: Compiled from various government policy reports and press releases.
Note: [1]No significant policy changes after 2003.

3.2. Structure of Applied and Preferential Tariffs

Table 2 provides the structure of applied and preferential tariffs of auto parts in Thailand. Three observations are made. Firstly, auto parts tariff rates are in line with the country's average tariff rate at about 10 percent in 2010. The two digit figure was largely due to the few exceptions (nine out of 84 items) whose tariff rate is greater than or equal to 30 percent. When these exceptions were excluded, the average tariff rate dropped to 7.4 percent. The second observation is that the auto parts tariff in Thailand is close to the regional average. The corresponding figures of India and Malaysia are among the highest at 12.3 and 12.9 percent, respectively. For other countries (Indonesia, Philippines, China, Japan and Australia), their auto parts tariff rate is slightly lower than for Thailand (Table 2).

Table 2. Auto Parts Tariffs Across Countries

	Average	**Max.**	**Min.**
Thailand (2010)	10.4	80.0	0.0
China (2006)	9.0	17.0	0.0
India (2006)	12.3	12.5	0.0
Indonesia (2006)	7.7	20.0	0.0
Philippines (2007)	6.4	22.5	0.0
Korea (2006)	7.5	13.0	0.0
Japan (2005)	0.4	4.8	0.0
Australia (2006)	6.4	10.0	0.0
Malaysia (2006)	12.9	30.0	0.0
Preferential tariffs offered by Thailand			
AFTA	0.0	0.0	0.0
ASEAN--China	6.2	36.1	0.0
Thailand--Australia	0.0	0.0	0.0

	Average	Max.	Min.
Thailand--New Zealand	0.0	0.0	0.0
JTEPA (2011)	8.5	54.6	0.0
Preferential tariffs offered to Thai exporters			
Indonesia	2.8	15.0	0.0
Malaysia	3.4	5.0	0.0
Philippines	2.5	7.0	0.0
Australia	2.6	5.0	0.0
Japan	0.0	0.0	0.0
China (2011)	1.9	15.0	0.0

Sources: Author's calculation from WTO tariff database.
Notes: See details in Appendix Table A1.

Tariff liberalization on auto parts through FTAs occurs in a selective manner. Thailand, on the one hand, offers virtually tariff-free entry under AFTA and TAFTA. On the other hand, the preferential tariffs offered in ASEAN--China and JTEPA seem limited. Given the magnitude of the MFN applied rate, it seems that FTAs would have a limited effect on raw materials sourcing and trade. When restrictions resulting from ROOs is taken into consideration, the positive effect of FTAs on trade would be even lower.

Vehicle tariffs are reported in Table 3. Vehicle tariff rates are among the highest compared to the other countries listed. The average tariff on vehicles in Thailand was 44 percent in 2010. This is second only to India at 48 percent. The highest tariff in this category is passenger vehicles (HS 8703) with a tariff rate of 80 percent. Similar to auto parts, tariff liberalization on vehicles through FTAs is highly selective. Thailand reduced the vehicle tariffs to 5 percent under AFTA and TAFTA only. For JTEPA and the ASEAN--China FTA, tariff cuts are selective. The average preferential tariffs were 20.3 and 20.4 percent for JTEPA and the ASEAN—China FTA, respectively. In ASEAN—China, Thailand expressed reluctance to cut tariffs on passenger vehicles so that the highest tariff under the ASEAN--China FTA is still 80 percent. This is different from JTEPA where tariff cuts occur across items (Table 3).

Table 3. Vehicle Tariffs Across Countries

	Average	Max.	Min.
Thailand (2010)	44.1	80.0	5.0
China (2006)	20.9	28.0	6.0
India (2006)	48.3	100.0	12.5
Indonesia (2006)	28.5	60.0	5.0
Philippines (2007)	19.9	30.0	3.0
Korea (2006)	7.8	10.0	0.0
Japan (2005)	0.0	0.0	0.0
Australia (2006)	5.1	6.7	0.0
Malaysia (2006)	19.2	32.0	2.5
US (2006)	7.7	25.0	0.0
EU (2006)	9.9	16.0	0.0
Preferential tariffs offered by Thailand			
AFTA	4.4	5.0	0.0
ASEAN--China	20.4	80.0	0.0
Thailand--Australia	0.0	0.0	0.0
Thailand--New Zealand	0.0	0.0	0.0
JTEPA (2011)	20.3	58.2	0.0
Preferential tariffs offered to Thai exporters			
Indonesia	4.0	5.0	0.0
Malaysia	2.9	5.0	1.9
Philippines	3.6	5.0	0.0
Australia	3.6	5.0	0.0
Japan	0.0	0.0	0.0
China (2010)	11.1	28.0	0.0

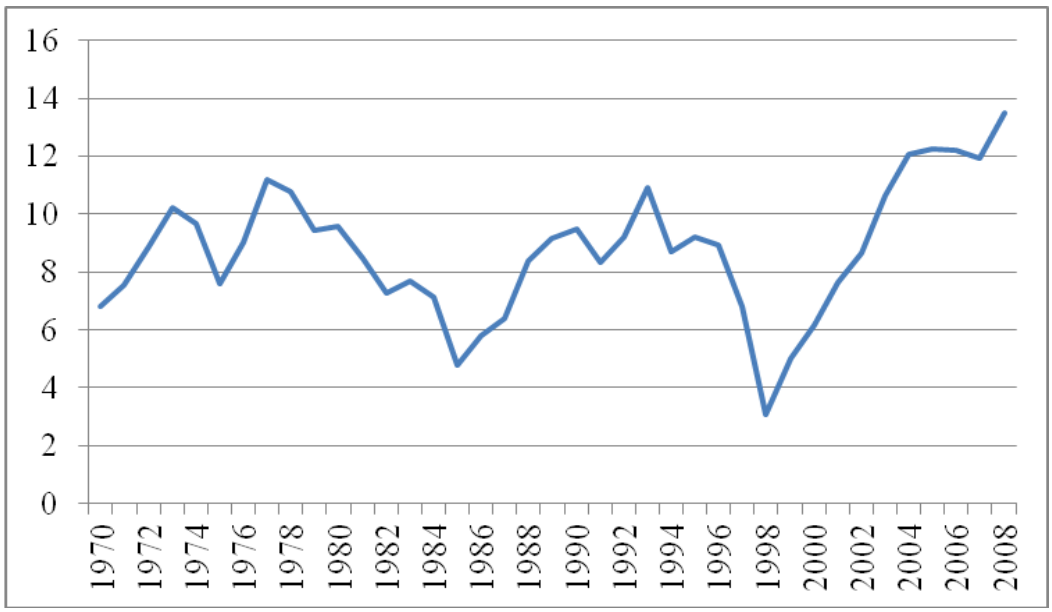
Sources: Author's calculation from WTO tariff database.
Notes: See details in Appendix.

4. Recent Performance of the Thai Automotive Industry

During the period from 1960 until about the late 1990s, the rate of growth of the automotive industry in Thailand was compatible with the overall growth of the manufacturing sector; the share in manufacturing output (i.e. value added) remained around 8 percent (about 2 percent of GDP). The ensuing years have seen much faster growth lifting its share of GDP to about 13.5 percent by 2008 (Figure 1). Employment

in the automotive industry too has grown over time, but at a much slower rate, from about 3.3 percent of total employment in the 1990s to 4.5 percent (around 350,000 workers) in 2008. The gap between output and employment shares reflects the relatively high capital intensity of the automotive industry compared to the average level of capital intensity for the manufacturing sector as a whole. The value added per worker (a rough indicator of capital intensity of production) in transport equipment manufacture is about three times that of total manufacturing (Kohpaiboon, 2006, p.174).

Figure 1. Value Added Share of the Automotive Sector in Total Manufacturing, 1970-2008 (million baht)

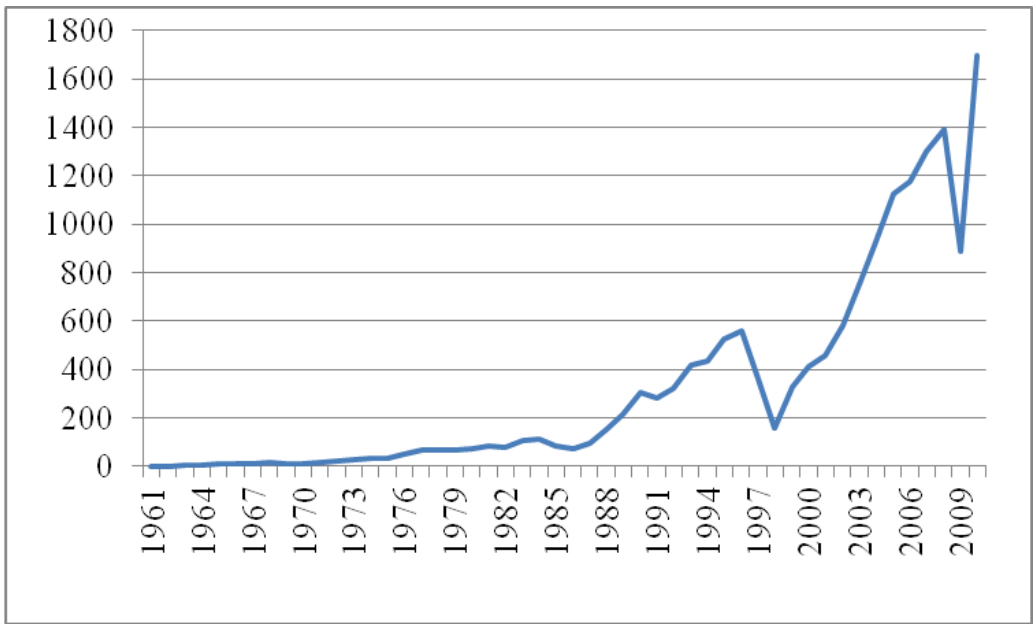


Source: National Economics and Social Development Board

Automotive production increased at an annual rate of over 10 percent from the mid-1980s, passing the half million mark by 1996 (Figure 2). This impressive growth trend was interrupted by the financial crisis during 1997 to 1999, but production recovered to the pre-crisis (1996) level by 2002. Output expansion during the ensuing years, when the industry became increasingly export-oriented, was much faster: between 2002 and 2008, total production increased by 800,000 units to about 1.4 million in 2008, recording an annual compound rate of over 20 percent. This made Thailand one of the world's major vehicle production hub. In 2008, Thailand was the 13th largest auto

producer in the world, accounting for 2.0 percent of total world output.[3] The country was the largest auto producer in ASEAN and ranked the fourth largest in Asia after Japan, South Korea and India. Due to the crisis in the developed countries, vehicle production dropped sharply to 0.9 million units or 63.7 percent of the 2008 figure. Nevertheless, vehicle production experienced quick recovery after the global recession and reached 1.7 million in 2010.

Figure 2. Vehicle Production, 1960-2010 (1,000 units)

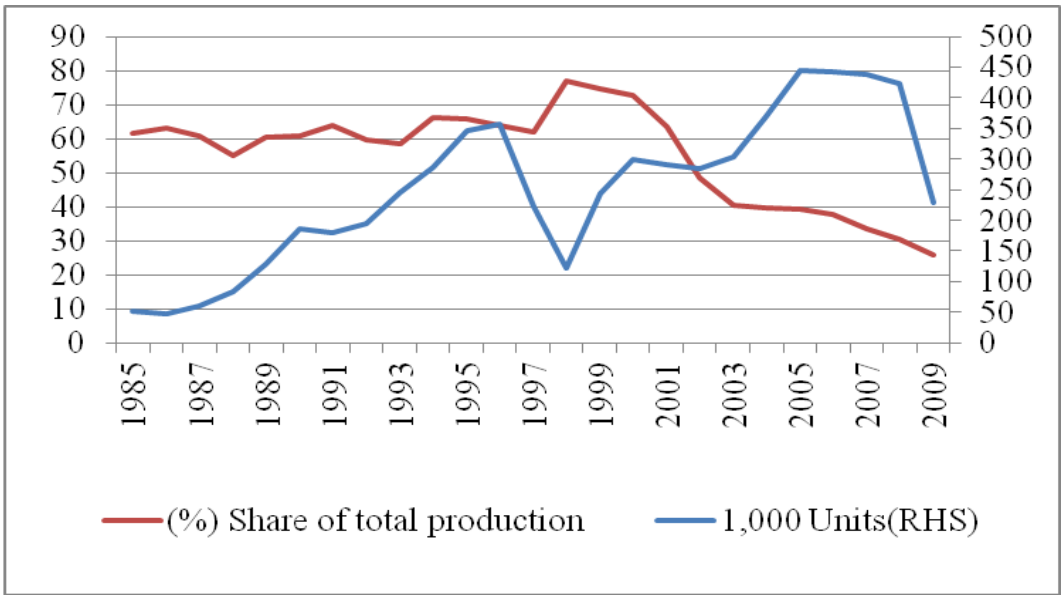


Sources: Automotive Association, Industrial Federation of Thailand

During the early 1980s, commercial vehicles dominated vehicle production in Thailand. Their relative importance has noticeably declined since 2002 due to diversification to passenger vehicles. Production volume of pick-ups increased from 47,000 in 1985 to over 400,000 in 2008. Pick-up production dropped to 200,000 in 2009 due to the global recession. From 2000 while their production continued to grow, the share has recorded a mild but persistent decline. The share increased between 1985 and 1998 and reached 77 percent of total vehicle production. From then on, the share declined persistently to 26 percent in 2009.

[3] Among countries in the periphery, Thailand ranks eighth in automotive production. Note that the term 'countries in the periphery' is used here to refer to countries other than the traditional automotive producers – UK, USA, Japan, Germany, France and Sweden.

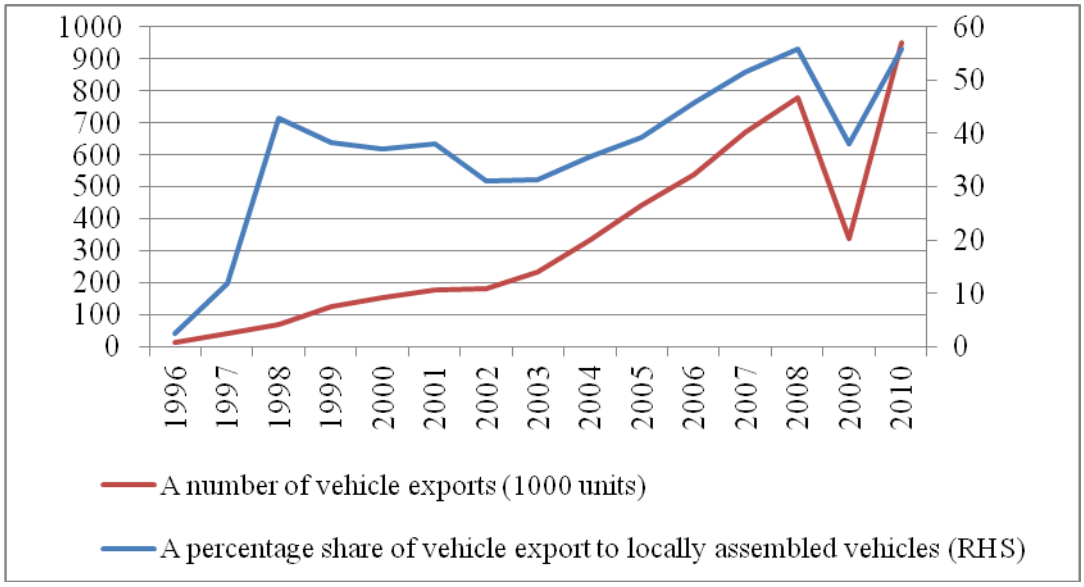
Figure 3. Commercial Vehicle Production and Their Share of Total Production, 1985-2009



Sources: Automotive Association, Industrial Federation of Thailand

The Thai automotive industry has become more export oriented since 1996. The number of vehicles exported increased from 14,000 units in 1996 to 152,800 in 2000. An increase in vehicle exports continued and reached 838,600 units in 2008 (Figure 3). As a result, vehicle exports accounted for around 41 percent of total locally assembled vehicles during the period 2000 to 2008. This is in contrast to the general presumption that the increased importance of vehicle exports would simply be a temporary response to the collapse of domestic demand for vehicles during the onset of the economic crisis. However, the increased importance of vehicle exports would be regarded as a structural change. During the global recession, vehicle exports from Thailand were adversely affected, dropping by around half in 2009 from the year before to 339,000 units, as shown in Figure 4. Correspondingly, the share of vehicle exports to the (parts and vehicles) industry exports fell to 38 percent in 2009. Nonetheless, vehicle exports recovered rapidly after the crisis. In 2010, vehicle exports were back up to 950,000 units, accounting for 56 percent of the industry exports. As a result, CBUs have become increasingly important to the industry's exports.

Figure 4. Vehicle Exports, 1996-2010



Sources: Automotive Association, Industrial Federation of Thailand

By contrast, this change in product composition was not observed for imports. Auto parts remained the industry's major import items and accounted for more than 80 percent of the industry's imports throughout the period from 1999 to 2009, as shown in Table 4. Another interesting trend is the increasing trade surplus of the automotive industry resulting from the rapid expansion of automotive exports. While the import value continued to grow at 13 percent per annum, export value growth averaged about 19.4 percent from 1999 to 2009.

Table 4. International Trade of the Thai Automotive Industry, 1999-2009

	Total exports ($m)	% of total exports		Total imports ($m)	% of total imports		Trade balance ($m)
		Vehicles	Auto parts		Vehicles	Auto parts	
1999	3,018	42.5	57.5	2,446	22.8	77.2	572
2000	3,744	44.1	55.9	3,378	15.4	84.6	366
2001	3,884	49.5	50.5	3,281	11.4	88.6	602
2002	4,325	45.5	54.5	3,741	11.0	89.0	584
2003	5,683	46.7	53.3	4,789	12.8	87.2	895
2004	7,732	47.6	52.4	5,516	12.0	88.0	2,216
2005	10,529	49.4	50.6	6,266	12.7	87.3	4,263
2006	13,118	50.7	49.3	6,458	12.0	88.0	6,660
2007	16,521	49.8	50.2	7,481	13.5	86.5	9,040

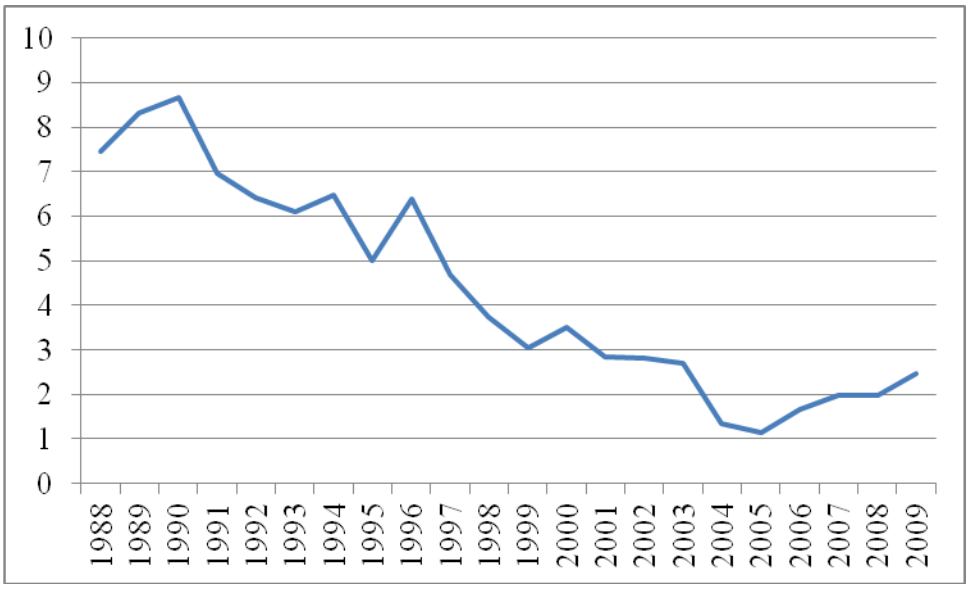
	Total exports ($m)	% of total exports		Total imports ($m)	% of total imports		Trade balance ($m)
		Vehicles	Auto parts		Vehicles	Auto parts	
2008	20,709	52.1	47.9	9,324	16.4	83.6	11,385
2009	15,639	49.3	50.7	7,490	15.9	84.1	8,149

Source: Author's compilation from UN Comtrade database.

A major concern in the debate on national gains from the expansion of the Thai auto industry relates to the extent of its value addition to the national economy. A number of studies conducted in the early 1990s have come up with estimates which suggest very low value added of less than 20 percent. However, the evidence we have collected through firm-level surveys suggests that value added would have significantly increased during the ensuing years as the local production of parts and components have rapidly increased in line with rapid output expansion. The bulk of parts and components embodied in locally assembled cars are now sourced locally, although the import content of some automotive components are admittedly still high.

Data needed for the precise estimation of domestic value added are hard to come by. However, some idea about the overall trends in domestic value-added and output expansion can be obtained by looking at the employment of imported parts and component in domestic automotive production. One way of doing this is to calculate the real value of parts and component imports (after adjusting the import value for changes in prices) per unit of local production (per locally assembled vehicle). Our calculations for the period from 1988 to 2009 are plotted in Figure 5. The real US dollar value of parts and components per vehicle (at 1985 prices) has declined sharply from about $8,500 in the early 1990s to around $2,000 in 2007/08. There was a reversed trend in 2009 where the share rose to about $2,500. This pattern is consistent with the findings from our firm-level survey, discussed below. Interestingly, the rate of decline is much sharper during the period after the abolition of LCR requirements in 2000 compared to the preceding period. This would suggest that the market-driven process of localization of the auto industry has yielded a much better outcome than the LCR regime.

Figure 5. Imported Auto Parts per Vehicle Production in Thailand, 1988-2009 ($1,000 per vehicle)



Thailand specializes in manufacturing and exporting commercial vehicles and one (metric) ton diesel pick-ups in particular (Table 5). The pick-ups alone accounted for more than 50 percent of total vehicle exports throughout the period 1999 to 2005. During the period 2006 to 2009, while the dollar value of one-ton diesel pick-ups continued to increase, the share of pick-up trucks declined to 51 percent from nearly 80 percent in 1999-2001 due to the higher growth rate of passenger car exports. Interestingly, the share of passenger vehicle exports increased from 21.6 percent between 1999 and 2001 to 33.5 and 48.2 percent during the periods 2002 to 2005 and 2006 to 2009, respectively. Thailand's market niche in the manufactured passenger vehicles sector was in small (1,000 to 1,499cc) and medium (1,500 to 3,000cc) gasoline passenger vehicles. To some extent the presence of intra-industry trade in these product lines is due to the nature of MNE production networks in South-East Asia, as discussed below in section 4.

Table 5. Export Item Composition and Destination, 1999-2009

	ASEAN-10	Indonesia	Philippines	Australia	Japan	US	EU-15	Value ($m)
1999-2001								
Passenger vehicles (HS 8703)	11.9	1.5	0.1	14.8	9.7	0.0	45.4	353
Commercial vehicles (HS 8704)	4.5	0.2	0.7	23.8	0.1	0.0	41.8	1,267
Others	73.6	3.1	1.1	1.5	0.3	5.3	3.1	14
All types of vehicles (HS 8701-8704)	6.7	0.5	0.6	21.7	2.2	0.1	42.2	1,634
2002-2005								
Passenger vehicles (HS 8703)	50.1	21.3	10.6	14.9	7.8	0.0	9.5	1,134
Commercial vehicles (HS 8704)	6.8	2.7	0.9	23.0	0.2	0.0	32.4	2,223
Others	77.4	1.0	0.4	1.4	0.5	1.0	2.0	26
All types of vehicles (HS 8701-8704)	21.8	8.9	4.1	20.1	2.7	0.0	24.5	3,384
2006-2009								
Passenger vehicles (HS 8703)	34.2	10.7	9.3	26.3	0.8	0.1	1.3	4,024
Commercial vehicles (HS 8704)	8.8	3.6	1.5	22.2	0.2	0.0	19.9	4,243
Others	87.9	1.7	0.1	6.7	0.3	0.1	0.6	75
All types of vehicles (HS 8701-8704)	21.8	7.0	5.3	24.0	0.5	0.1	10.7	8,341

Source: Author's compilation from UN Comtrade database

Table 6. Sources of CBU Vehicle Imports, 1999-2009

	% of total imports								Value
	Australia	India	China	ASEAN-10	Indonesia	Philippines	Malaysia	Japan	($m)
1999-2001									
Tractor (HS 8701)	0	0	2	1	0	0	0	47	67
Bus (HS 8702)	0	0	0	0	0	0	0	62	64
Passenger vehicles (HS 8703)	6	0	0	6	2	2	1	57	299
Commercial vehicles (HS 8704)	0	0	0	2	0	0	0	73	50
2002-2005									
Tractor (HS 8701)	0	1	2	1	0	0	0	53	126
Bus (HS 8702)	0	0	0	0	0	0	0	77	121
Passenger vehicles (HS 8703)	0	0	0	50	17	33	0	23	323
Commercial vehicles (HS 8704)	0	0	1	2	0	0	0	56	49
2006-2009									
Tractor (HS 8701)	0	2	3	1	0	0	0	78	380
Bus (HS 8702)	0	0	4	5	0	0	4	79	284
Passenger vehicles (HS 8703)	0	0	1	34	10	19	3	33	364
Commercial vehicles (HS 8704)	0	10	1	41	20	0	0	32	98

Source: Author's compilation from UN Comtrade database.

The geographic profile of automotive exports from Thailand has undergone notable changes since the early 1990s (Table 6). The most notable change is the sharp increase in the market share of ASEAN-10 countries – from 6.7 percent during 1999 to 2001 to about 21.8 percent in 2006 to 2009. This increase seems to reflect preferential access to markets in these countries under the CEPT tariff preferences. However, extra-regional exports still account for the lion's share of total motor vehicle exports, with a notable shift from EU-15 to other countries (countries in the Middle East, in particular).

Exports to Japan and the US have accounted for a tiny share in total exports throughout the period reviewed. Japan's smaller share is consistent with the export patterns observed for other manufactured good exports from Thailand (and other countries in the region), and reflects the well-known patterns of Japanese firms using production bases in the other countries in East Asia to export to third country markets (Athukorala, 2005). The smaller export share to the US is understandable because all major international car makers have set up production plants in the US and/or use production bases in Latin America, in particular those in Mexico, to serve the US market.

There are no significant differences in the trends in product mix over time among the major markets. A notable exception is the sharp increase in the share of passenger cars to Australia. The Australian share of total passenger car exports increased from 14.9 percent in 2002 to 2005 to 24 percent in 2006/07. This could well reflect the impact of TAFTA which came into effect in 2006.

On the import side, Japan was the most important source of vehicle imports from 1999 to 2009. The only noticeable change in import source is the increasing importance of ASEAN members particularly Indonesia and Philippines for passenger and commercial vehicles. This is due to the changes in supply chains from national specialization strategies discussed in detail below, and is related to the presence of AFTA.

The export and import structure for auto parts changed slightly between 2002 and 2008. On the export side, parts manufactured in Thailand were increasingly exported to ASEAN-10 so that their share increased from 14.7 percent in 2002 to 2004 to 18.6 percent in 2008, as shown in Table 7. This is associated with the decreasing importance of Japan, whose share dropped from 10.4 percent to 7.6 percent during the same period,

whereas other export destinations remained mostly unchanged. Note that the value of auto part exports to Japan did increase between 2002 and 2008. On the import side, there were notable changes – while Japan remained the most important source, its share steadily declined from 31.4 percent during the period 2002 to 2004 to 27.9 percent in 2008. By contrast, ASEAN-10 became an increasingly important source of auto parts supply for Thailand.

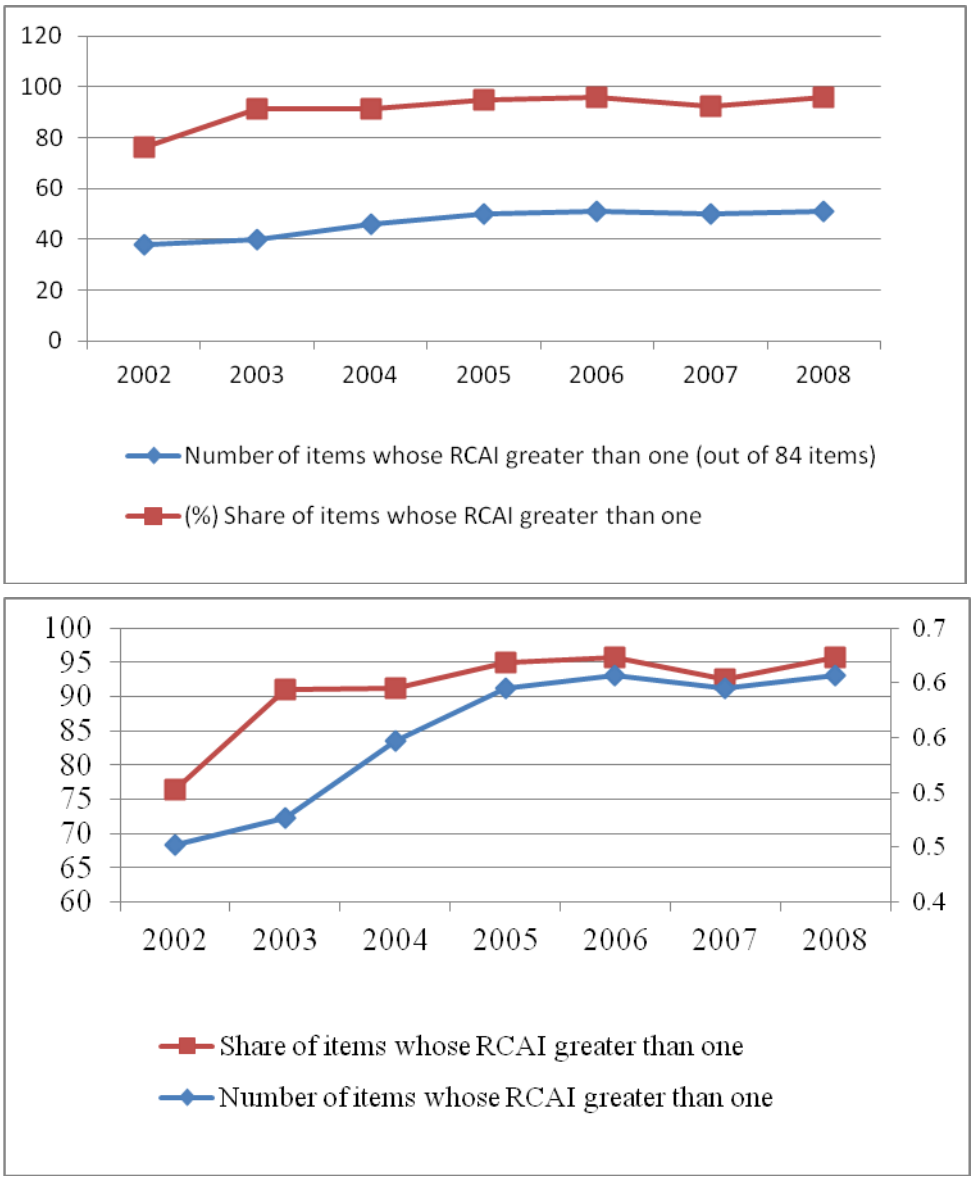
Thailand gained in terms of competitiveness for vehicle production, clearly reflected by its increasing global market share. With regard to auto parts, the widely used index of competitiveness, Revealed Comparative Advantage Index (RCAI), is constructed between 2002 and 2008. As shown in Figure 6, the number of auto part items whose RCAI is greater than one increased during this period. In 2002, 38 out of 84 items had an RCAI greater than one. By 2008, this figure had increased to 51 items. The export share of those items with an RCAI greater than one increased. Out of 84, there are only four items (HS 850300, 853190, 853630, and 870710) with an RCAI of greater than one during the period 2002 to 2003, becoming less than one by 2008. All in all, the RCAI pattern during the period 2002 to 2008 highlights the increasing competitiveness of the Thai automotive industry.

Table 7. Trade Pattern of Auto Parts

	2002-04	2005-07	2008
Export value ($m)	5,157	10,702	15,378
Export destination structure (% of total export)			
ASEAN-10	14.7	16.3	18.6
China	1.5	1.4	1.0
Hong Kong	1.6	0.7	0.5
Japan	10.4	8.5	7.6
Korea	0.8	0.3	0.3
Oceania	1.2	1.7	1.9
South Asia	2.5	3.4	3.2
NAFTA	7.5	4.8	3.8
EU-15	4.2	3.7	3.2
Import value ($m)	7,483	10,683	14,097
Import source structure (% of total import)			
ASEAN-10	6.8	7.8	8.9
China	1.5	2.8	3.4
Hong Kong	0.3	0.2	0.2
Japan	31.4	29.9	27.9
Korea	0.7	1.2	1.5
Oceania	0.2	0.4	0.4
South Asia	0.2	0.5	0.4
NAFTA	1.3	1.8	2.2
EU-15	6.0	3.9	3.7

Source: Author's compilation from UN Comtrade database.

Figure 6. Revealed Comparative Advantage Indices (RCAI) of Auto Parts Exports from Thailand, 2002-08



Source: Author's calculation using data extracted from UN Comtrade database.

5. Supply Chain in the Automotive Industry

5.1. Changes in the Supply Chain

There have been key recent changes in the automotive industry's supply chain. The first change was to output flows. In the 1970s and 1980s, when automotive industries in developing countries were highly protected by cross-border trade protection policies, MNEs set up assembly facilities in each individual country in order to access the highly-protected domestic markets and earn economic rent. Such a strategy has not been feasible since the mid-1980s after governments in a number of these emerging market economies moved away from highly protective policies based on quantitative restrictions and prohibitively high tariffs (Takayasu and Mori, 2004, p.209).[4] The liberalization approach of their automotive industries has taken place faster through a regional rather than a global context (Humphrey and Oeter, 2000, p.42; Humphrey and Memedovic, 2003, p.2). Many countries have formed regional groupings such as the European Union (EU), AFTA, the North America Free Trade Area, and regional integration in the Latin American countries (namely Mercosur, an economic and political agreement between Argentina, Brazil, Paraguay and Uruguay) to liberalize regional trade in cars and their parts. In several cases, extra efforts have been made to accelerate regional liberalization schemes for particular industries. For example, under the AFTA agreement, ASEAN countries strengthened their industrial cooperation program namely ASEAN Industrial Cooperation Scheme (AICO) that would be regarded as a shortcut to benefit ASEAN regional liberalization. This has encouraged MNE car assemblers to become involved with local assembly in these emerging markets.

The principal automotive markets in the Triad regions (North America, Western Europe and Japan), which accounted for over 90 percent of global vehicle sales, have been nearly saturated for the past 10 years (Abrenica, 1998). In contrast, promising growth perspectives for vehicle sales have been exhibited in emerging market economies. As a result, MNEs have shifted their business interest toward the emerging

[4] Two exceptional cases, China and India, should receive special attention. These two countries have gigantic domestic markets as a key to attracting auto maker MNEs to establish affiliates, even though the trade and policy regimes within these two countries are still highly restrictive. See details in Humphrey and Oeter (2000) and Doner et al. (2004).

market economies and are pursuing national specialization in each region. In each region (for example, North America, Latin America, South-East Asia, etc.), there would be a few production bases (countries) that specialized in producing and exporting certain types of vehicle models. Vehicles manufactured within a certain production base would be sold mainly within that region. The exception would be the pick-up truck, which is more or less a world-wide model that consists of a few region-specific features, such as product design and/or safety features.

Figure 7 illustrates the national specialization strategy used by MNE car makers in South-East Asia and Oceania. Toyota uses Thailand as a production and export base for small to medium passenger cars (Vios, Altis and Camry) as well as one ton pick-ups (Hilux). In the meantime, the company uses its production base in Indonesia for other family vehicle models, such as the Avanza and Inova and orders for these models within the region are supplied by Toyota affiliates in Indonesia. Other companies are pursuing more or less the same strategy, although their trade, investment, and production patterns are not necessarily the same. Another example is the Ford and Mazda network which uses Thailand as a base for manufacturing one ton pick-ups (e.g. Ford Ranger, Ford Everest and Mazda Fighter) and the Philippines for producing passenger cars (Ford Laser, Ford Escape, Mazda Protégé and Mazda Tribute). Cost competitiveness is a basic factor determining which models/parts are produced at which locations (countries) and for which markets.

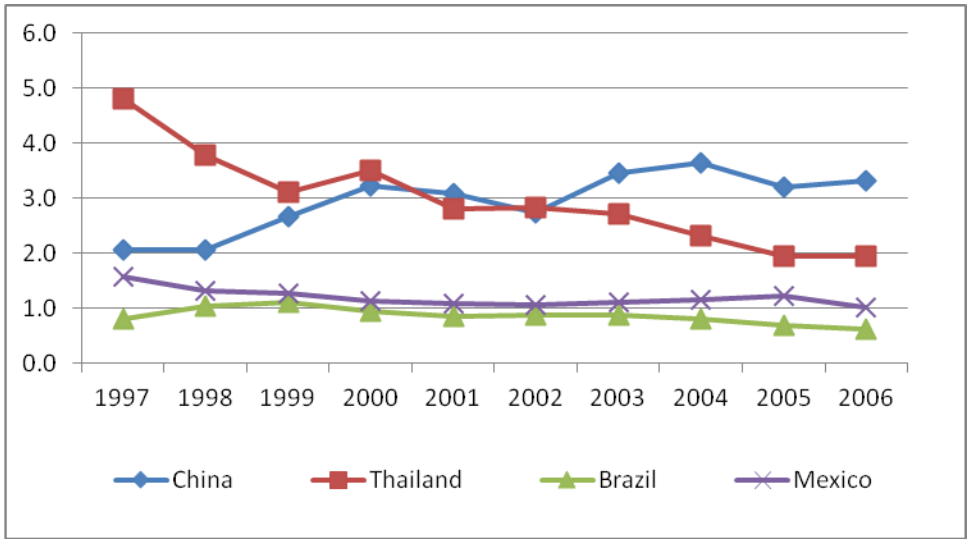
Figure 7. National Specialization in South-East Asia and Oceania

Source: Kohpaiboon (2006)

This would explain the change in product composition toward CBU vehicles observed in Table 5as well as in export destination toward ASEAN-10 and Australia for passenger vehicles. For commercial vehicles, export destination is not limited to the regional market only, with EU-15 and the Middle East also major markets. The import pattern is consistent with the national specialization strategy in which Indonesia and the Philippines are the two major sources of CBU vehicle imports of Thailand and the key import item is passenger vehicles (Table 6).

The second change in the supply chain is the trend toward localization of auto parts manufacture and the development of automotive clusters. As a vehicle consists of numerous parts and components, many of which are non-tradable, there are sizable transaction costs involved in procuring all of the parts. The proximity between car manufacturers and parts suppliers, therefore, saves on the transaction costs, and allows more efficient cooperation between car manufacturers and parts suppliers to match their production plan and delivery schedule. It also reduces exposure to exchange rate risk if they can source local parts. In addition, car manufacturers can exploit their existing comparative advantage as host countries in manufacturing a vehicle. This is consistent with the pattern revealed in Figure 5 where there was a declining trend in the ratio of imported auto parts (value) to vehicle production (unit) between 1988 and 2009. Interestingly, this declining trend was also observed in the other major vehicle production hubs of Mexico and Brazil (Figure 8). Of the four countries shown in Figure 8, China seems to be an outlier as the ratio has been increasing, reflecting more reliance on imported parts.

Figure 8. Ratio of (Real) Import Value of Parts to Locally Assembled Cars in Selected Emerging Markets, 1997-2006

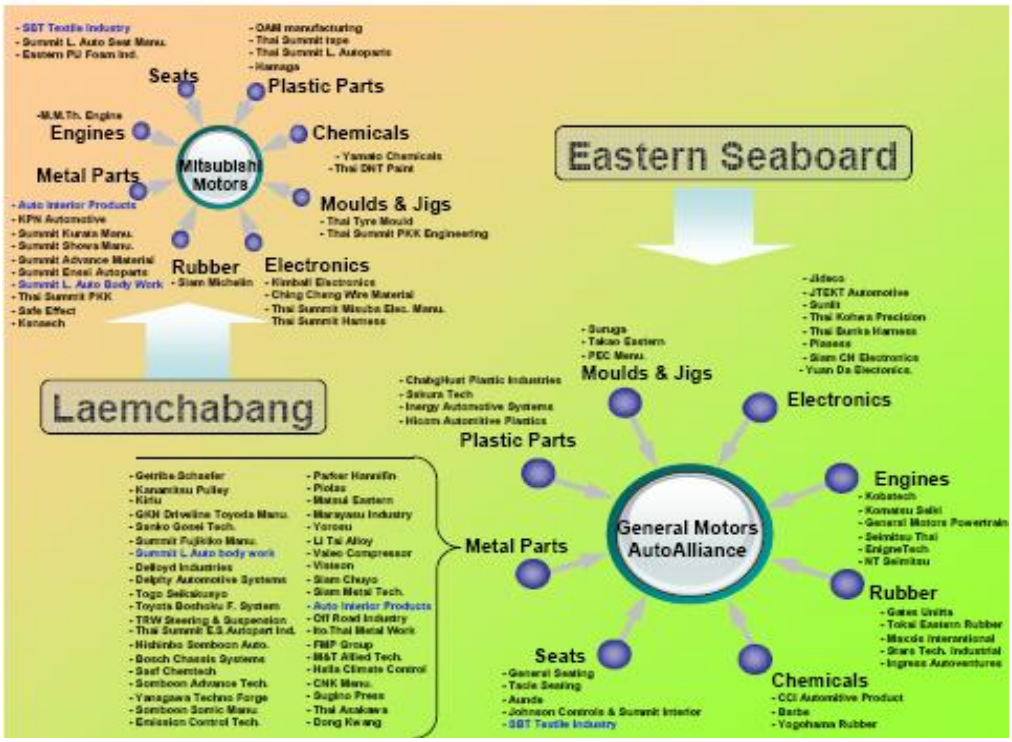


Sources: Production data are compiled from the CEIC Database and import values of parts are from the UN Comtrade Database at http://comtrade.un.org/db/.

Note: Lists of auto parts are compiled from six-digit HS items. The final list covers 84 items from HS 39, 40, 70, 73, 84, 85 and 87.

Geographic clustering of the automotive industry, with car assemblers at the centre surrounded by part suppliers was also observed, as illustrated in Figure 9. Figure 9 shows an industrial clustering in the automotive industry in two parts of Eastern Thailand – the Eastern Seaboard in Chonburi province and Hemaraj Industrial Estate in Rayong province. According to our interview with one of the major Thai parts suppliers, they set up individual factories for each customer (i.e. car makers) for the purposes of cost competitiveness and efficiency. In some parts, suppliers set up two factories (one in the Eastern Seaboard and another in Hemaraj Industrial Estate) to serve customers in each estate although distance between these two estates is less than 100km. The industry sample includes Summit Auto Body Work, SBT Textile industry and Auto Interior products (Figure 9).

Figure 9. Automotive Clusters in Eastern Thailand



Source: Kohpaiboon et al. (2010)

As revealed during our interviews with the car makers there is no explicit requirement for suppliers to be located near car assemblers. In fact, cost competitiveness is the primary concern in their policy for sourcing parts. The interview sample argues that many car makers adopt global bidding and an open-wide bidding process nowadays. As long as suppliers can both fulfill technical requirements and offer the lowest price, location does not matter. This is applicable even for non-traded parts. Even though such parts are not going to be internationally traded, price information from the bidding process would provide a rough benchmark of competitive world prices. Consequently, locating factories near to car assembly plants and/or the same country with the assembly plant is the market-driven response of suppliers in order to keep their cost competitiveness.

This is especially true for the current supply chain where new vehicle models, known as the 'original model', are produced. For the 'original model' car makers do not automatically have the full information for producing a vehicle because it has not

already been produced somewhere else.[5] Car assemblers and parts suppliers must jointly produce all the information necessary for the manufacturing process, based on the input prices available at selected production sites, in order to minimize the total cost of a vehicle. Hence, higher technological capabilities are required from parts suppliers as they are expected to participate in both the product development (i.e. prototype) and product engineering phases of production (identifying engineering qualifications). According to our firm interviews, car assemblers nowadays determine engineering properties and product qualification, as well as assign the spaces where parts have to be fitted to vehicles, over and above meeting the cost requirements of the car makers. For example, radiator suppliers must be able to design a radiator to fit within a space defined by car makers and manufactured radiators must fulfill all required qualifications such as heat dissipation, strength, etc. (as discovered in our interviews with car makers). Furthermore, car manufacturers must have frequent communication and meetings with part suppliers so that the quality of parts can be assured. Geographical proximity facilitates closer communication and also enables car manufacturers to fully adopt just-in-time production schedules which require the prompt delivery of parts to assembly plants – the so-called milk-run system.

5.2. Roles of Indigenous Suppliers

Even though the increased local content of locally manufactured vehicles would bring economic opportunity for local linkages, few indigenous suppliers which were dominant in the 1970s and 1980s can rise to this challenge. In fact, many MNE car assemblers switched from sourcing locally manufactured parts to MNE part suppliers as reflected the huge surge of FDI inflows in the automotive sector during the mid-1990s. Most of the indigenous suppliers were downgraded to become the 'suppliers of suppliers' or Tier-2 suppliers.[6]

[5] This is in sharp contrast to the past, when vehicle models that had already been launched somewhere else were simply replicated in developing countries.

[6] Under the new strategy, car makers adopted a modularization system so that car makers tend to deal with just a few major suppliers which are responsible for key modules, known as the first tier or Tier-1 suppliers. Smaller suppliers which provide individual parts and components are known as the second tier or Tier-2 suppliers. The third tier (Tier-3) supply primary inputs (e.g. plastic compound, steel and synthetic rubbers) for the second tier suppliers. Note that output of the third-tier suppliers is not necessarily automotive specific but can be used in other industries as well. Plastic compound is a

One major reason for this downgrading was that indigenous suppliers had limited capabilities with regard to product development and engineering and these capabilities were demanded from Tier-1 suppliers under the new strategy. As a result, indigenous firms could only participate in the value chain by supplying semi-finished parts to Tier-1 suppliers for further processing. Findings such as this call into question the ability of industrial upgrading policy packages, which include the protection of vehicles and imposition of LCR measures and the like, to promote the Thai automotive industry. It would be difficult to refute the hypothesis that during the import-substitution period, local suppliers did gain technological capability benefits from the presence of LCRs and other protection measures. The relevant question is whether such protection measures generate sufficient benefits to induce sustainable development in the automotive sector, particularly in the auto parts industry where local firms participate. The fact that only a few indigenous suppliers have survived in the new environment suggests that LCR measures are not a sufficient condition for building up the technological capabilities of local suppliers and enabling them to benefit from the gains of dynamic economies. Whilst LCR measures did help local firms to acquire well-established quality-controlled production technology, they failed to provide sufficient motivation for firms to use this technology efficiently and advance to even higher levels of technology.

According to ADC records, 354 out of 641 (or more than 50 per ent) Tier-1 suppliers are indigenous suppliers. However, this figure must be interpreted with care. During our interviews, at present there are less than 10 local firms among the Tier-1 suppliers who are truly involved in the design and manufacture of modules. The others local firms are involved in manufacturing simple inner body parts. In addition, there are 1,100 indigenous suppliers operating in the network at Tiers 2 and 3 in the supply chain.

As the demand for procuring auto parts locally increased, car assemblers enticed MNE parts manufacturers to establish affiliates in Thailand, thereby rapidly increasing FDI inflows in the automotive industry. Original Equipment Manufacturing (OEM) suppliers have been supplanted by MNE affiliates. Some of these parts manufacturers were technology owners and provided such knowledge to local parts suppliers under technology licensing agreements prior to 1990. When the foreign ownership restriction

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clear example of where products may be inputs for automotive, electrical appliances and electronics industries.

was abolished during the onset of the financial crisis in 1997, these technology owners took full control of the OEM market. Local partners are responsible for production for the after-market (i.e. repaired parts for vehicle services and maintenance). Some Thai firms become lower tier suppliers whereas many of them went out of business.

The dramatic increase in the role of MNEs in auto part production, and in particular their dominance at the first tier of the supply chain, has been interpreted by some observers as an indication of 'denationalization' of the Thai auto industry (Doner, 2009). However, this is not a uniquely Thai phenomenon. MNEs dominance at the first tier of the automotive supply chain has become an integral part of the globalization of the auto industry (Klier and Rubenstein, 2008). For example, by the late 1990s in Brazil (a regional automotive hub in Latin America) there was only a single locally-owned firm among the 13 largest component producers (Humphrey and Oeter, 2000). In South Korea, many large auto part firms were taken over by Western first-tier suppliers in the aftermath of the 1997/98 financial crisis (Doner et al., 2004). Given concerns about securing proprietary assets in cutting edge technology in a highly competitive market setting, the fully-owned affiliate has become the increasingly preferred mode of international operation of MNE auto part producers.

The fact that only a few indigenous suppliers have been able to maintain their OEM status suggests that the LCR regime during the 1970s and 1980s has failed to have a significant lasting positive impact on local part suppliers. Of course the LCR regime and other protection measures would have helped local suppliers in gaining technological capability, but the relevant issue is whether such protection measures are capable of laying the foundation for sustainable development of a local auto part sector. The Thai experience suggests that these measures were not a sufficient condition in building up the technological capability of local suppliers and allowing them to benefit from the gains of dynamic economies. Evidence from firm-level interviews suggests that the success of the few local OEM producers has not come from the protection provided by LCR measures, but from their ability to forge links with the car assemblers whose production strategy shifted in the late 1980s toward export orientation. The expansion of production in these firms took place from the mid-1990s when policy reforms, in particular the removal of LCR, enabled them to forge links with world-class part-makers.

At the initial stage of global integration of the automotive industry, opportunities seem limited for local firms to become OEM suppliers on their own (that is without forging links with MNE part suppliers) within the MNE-dominated production network. Their activities are going to be heavily concentrated at the second and third tiers until they gain technological expertise and establish themselves as quality players within the automotive chain. The few local OEM suppliers are currently concentrated in the production of automotive body parts. Designing of body-related parts is normally undertaken by the car assemblers (since these parts are directly related to the appearance of the vehicle). Therefore, production of these parts does not require a high level of technological capability. However, there are indications that the local OME suppliers and some local firms involved at the second tiers have begun to move up the technology ladder. For instance, the Thai company Aapico has emerged as one of the world's best suppliers of low volume tooling. A recent study of the procurement practices of Japanese car makers in Thailand has found many cases of Japanese car makers and first-tier firms expanding their procurement over time of high-tech parts from second-tier local firms (Japan Finance Corporation, 2007).

The number of local firms joining the automotive production chain at the second and third tiers has significantly increased over the past decade or so. They are involved in the production of standard parts and components, and intermediate inputs such as such as plastics, textile products and leather products. Growth prospects in these product lines seem promising because of the high growth of vehicle production and the increased local content of locally assembled vehicles. Evidence from interviews suggests that the process of knowledge and technology transfer from OEM firms and final assemblers to suppliers at the lower tiers has strengthened over time as the auto industry has become increasingly globally integrated.

5.3. Role of FTAs in the Supply Chain Changes

Facts revealed in section 5.1 suggest that vehicle exports from Thailand, particularly passenger vehicles, are primarily destined for regional markets. It is less clear for auto parts where there have not been any significant shifts from inter-regional to intra-regional trade. The major change over the past decade was the increasing importance of ASEAN-10 members as Thailand's auto part export destination and the

decreasing importance of Japan. Nonetheless, it remains unclear the extent to which FTAs have contributed to the changes.

To assess the role of FTAs in the supply chain changes, administrative records of preferential trade are used. Generally, tariff concessions offered by FTAs are not always readily available to the exporters due to the presence of ROO. In other words, actual and preferential trades are different where the latter reflects transactions recorded in administrative records of FTA implementation. Hence, FTA utilization rates, the ratio between administrative records to actual trade ones, are constructed. As revealed in Tables 2 and 3, preferential trade existed largely in AFTA, TAFTA, and TNZFTA so that our emphasis is on these FTAs.[7]

Tables 8 and 9 illustrate FTA utilization rates of vehicles and auto parts exports and imports respectively. Clearly, these FTAs only affect the output flows of the automotive sector's supply chain. Most of the vehicles traded in the region have benefited from preferential tariffs offered under these FTAs, reflected by the very high utilization rate for vehicles on both the import and export sides. The rate is approaching to 100 percent whereas the average utilization for AFTA is less than 30 percent (Kohpaiboon, 2010). Hence, we conclude that the increasing importance of ASEAN and Australia in vehicle trade is due to the presence of FTAs. In our firm interviews, the tariff margin is highlighted as the key reason to apply for FTAs. Automotive vehicles stand out among manufactured goods as their manufacture involves parts made from a range of materials, including plastic, rubber, electronics, metallic and glass. Hence, the change in tariff classification (CTC) ROO type is unlikely to represent a barrier for firms in accessing preferential tariffs. In addition, under the new business strategy of the car manufacturing industry, local content in a manufactured vehicle tends to increase so that it can easily fulfill the regional content requirement ROO type. Overall, the long experience in dealing with the LCR measures which were used from the mid-1970s to 2000 made it easier for Thai car makers to deal with ROO.

[7] Note there is no official record of preferential trade under the TNZFTA due to the use of a paperless system.

Table 8. FTA Utilization Rate of Thailand's Vehicle Industry, 2003-08

	ASEAN-10		Australia	
	Export	Import	Export	Import
2003	71.8	97.5	n.a.	n.a.
2004	73.7	98.8	n.a.	n.a.
2005	74.0	99.2	112.8	69.5
2006	74.3	97.1	95.0	73.7
2007	95.0	100.0	106.8	66.6
2008	90.6	68.4	98.1	0.0

Sources: Trade data are from the UN Comtrade database; administrative records of preferential exports from Bureau of Preferential Trade, Ministry of Commerce; administrative records of preferential imports from Custom Duty, Ministry of Finance.
Notes: n.a. = not available due to the agreement was effective in 2005 onward

By contrast, these FTAs have not had any significant impact on input flows in the automotive sector's supply chain as the utilization rate has been very low so far. On the export side (Thailand's exports to its FTA partners), the utilization rate was less than 5 percent on average. The maximum utilization rate was 70 percent in 2006 for the ASEAN-6 partners. The low utilization rate seems consistent with the low tariff rate for auto parts shown above, so that the expected tariff margin would be rather narrow. Clearly, any changes in auto parts exports are not largely related to presence of FTAs.

On the import side, the utilization rate on average is higher than that on the export side, reaffirming the role of the tariff margin in the decision to apply for FTA preferential trade. Auto parts tariffs in Thailand are generally higher than for Thailand's FTA partners. An interesting pattern of utilization rate on the import side is observed, i.e. the rates increased from 20 percent in 2003 to 50 percent in 2005 and then dropped to 21 percent in 2008. The top five items which applied for AFTA preferential tariffs are rubber products whose tariffs were further cut in 2005 according to the tariff reform implemented during 2005 to 2010 (Jongwanich and Kohpaiboon, 2007, Table 1). Again this highlights the relative importance of the tariff margin.

Overall, the presence of ROO matter for certain parts. A plastic bullets multinational company covered in our interviews points to the prime reason to not use FTA simply because the company must reveal details of the product's cost structure. Note that in Thailand, revealing the cost structure details is a compulsory step for FTA preferential tariff application (to receive a reference number used in certificate of origin application) regardless of what types of ROO are applied.

Table 9. FTA Utilization Rate of Thailand's Auto Parts Industry, 2002-08

Export	ASEAN-6			Australia			Japan		
	Average	Max.	Min.	Average	Max.	Min.	Average	Max.	Min.
2003	0.8	9.5	0.0	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
2004	1.0	38.8	0.0	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
2005	1.1	20.8	0.0	1.3	4.3	0.0	n.a.	n.a.	n.a.
2006	1.0	69.4	0.0	1.7	25.0	0.0	n.a.	n.a.	n.a.
2007	1.4	10.0	0.0	2.0	66.0	0.0	n.a.	n.a.	n.a.
2008	1.5	34.8	0.0	2.1	10.9	0.0	0.5	9.2	0
Import	ASEAN-6			Australia			Japan		
	Average	Max.	Min.	Average	Max.	Min.	Average	Max.	Min.
2002									
2003	20.5	99.0	0.0	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
2004	36.1	100.0	0.0	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
2005	50.3	100.0	0.0	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
2006	29.2	100.0	0.0	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
2007	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
2008	20.8	88.0	0.0	1.2	11.0	0.0	0.0	0	0

Sources: Trade data are from UN Comtrade database; administrative records of preferential exports from Bureau of Preferential Trade, Ministry of Commerce; administrative records of preferential imports from Custom Duty, Ministry of Finance.

Notes: n.a. = not available due to the agreement was effective in 2005 onward

6. Conclusion and Policy Implications

This paper demonstrates the supply chain of Thailand's automotive industry with emphasis on the recent changes in its composition and the impacts of FTAs. A systematic analysis of production and trade data are conducted and further supplemented by insights from in-depth firm-level interviews conducted between February and April 2011. The key finding is that there were changes in the automotive industry's supply chains after the country was selected to be a production platform for most of the major players in the international auto industry. The first observed change is the change in emphasis in export composition from auto parts to CBU vehicles. The second change is that the locally manufactured vehicles are not served only domestic market but also by the regional market. There is an exception of one-ton pick-up trucks which are sold world-wide including to Europe and the Middle East. The final change in the supply chain is the steady increase in the vehicle's local content.

We conclude that FTAs have contributed to the recent changes in the nature of Thai automotive supply chains, but only for outputs, not inputs. In particular, the preferential tariff offered under FTAs with ASEAN and Australia have facilitated regional vehicle trade. All vehicles traded between Thailand and ASEAN members, and Australia, applied for preferential tariff rates offered in the FTAs. In other words, official records of preferential trade are more or less the same as the actual trade (i.e. 100 per cent of FTA utilization). The high FTA utilization rate is due to the huge tariff margin, the nature of the production process and the long experience in dealing with government officials. By contrast, we find that FTAs do not have any significant impact on auto parts regional trade. While changes in the international trade pattern were observed, such changes naturally happen, without any influence from FTAs. The low FTA utilization rate was due to the low tariff margin and the restrictive effect of ROO on auto parts trade so that the role of FTAs on these trade flows seems to be limited.

Two policy lessons can be drawn from our paper. Firstly, changes in the nature of the supply chain are largely driven by economic fundamentals and business opportunities. There is limited room for policy-makers to influence such changes in favor of their indigenous suppliers. Secondly, FTAs have the potential to promote trade

for items which remain subject to high tariffs, such as CBU vehicles. Their trade-promoting effects are subject to certain conditions, including specific characteristics of the automotive industry which is highly concentrated and led by a handful of car makers; the nature of the production process in which local content increases naturally; and the long experience of car makers which are familiar with measures like ROO. It seems risky to generalize the example of vehicles to other industries. By contrast, the pattern of utilization rate between imports and exports suggests that the tariff margin matters. When the tariff margin is low, the presence of ROO discourages firms to make use of FTA preferential trade. To promote the use of FTAs for narrow tariff margins, ROO-free items should be introduced.

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Appendix

Table A1. Lists of Auto Parts

HS	Description
392630	Fittings for furniture, coachwork etc, of plastics
400921	Pipe, reinforced/combine w/metal only, w/o fitting
400922	Pipes, vulc rub, reinf/combo with metal,w/ fitting
400931	Pipe, reinforced/combine w/ textiles, w/o fitting
400932	Pipe of vul rub,reinf w/ text only mat,w/fittings
400941	Pipe, reinforced/combine w/ material, w/o fitting
400942	Pipe, reinfrcd/comb w/other textile mat,w/fitting
401011	Conveyor belts or belting reinforced with metal
401012	Conveyor belts reinforced with textile materials
401019	Conveyor belts/belting of vulcanize rubber, nesoi
401310	Inner tubes of rubber for mot cars, buses & trucks
401693	Gasket, washers & other seals, of vulcanized rub
700711	Toughnd safety gls of size a shape for vehcls etc
700721	Laminated safety glass for vehicles, aircraft etc.
700910	Rear-view mirrors for vehicles
732010	Leaf springs and leaves therefor, of iron or steel
732020	Helical springs of iron or steel
830230	Others bs metl mountngs fttngs etc for motor vehicles
840729	Inboard engines for marine propulsion
840733	Spark-igntn recrctng pistn eng etc >250 nov1000cc
840734	Spark-igntn recprcting piston engine etc > 1000 cc
840790	Spark-igntn rcprctng/rotary int combstn eng, nesoi
840820	Compression-igntn int combustion piston engine etc
840991	Spark-ignition int combustion piston eng pts nesoi
841330	Fuel, lub/cooling med pumps for int comb pistn eng
842123	Oil or fuel filters for internal combustion engine
842131	Intake air filters for internal combustion engines
842542	Jacks and hoists,hydraulic,exc blt-in jack systems
848210	Ball bearings
848220	Tapered roll brg, incl cone & roller assemblies
848230	Spherical roller bearings
848240	Needle roller bearings
848250	Cylindrical roller bearing nesoi
848280	Oth ball or roll brg, inc combined ball/roll brgs
848291	Balls, needles and rollers for bearings
848299	Parts of bearings, nesoi
848310	Transmission shafts (inc cam-&crank-shaft), etc.
848320	Housed bearings, incorp ball or roller bearings
848330	Bearing housings; plain shaft bearings
848340	Gears; ball or roller screws; gear boxes, etc
848350	Flywheels and pulleys, including pulley blocks
848360	Clutches & shaft couplings (inc universal joints)
848390	Toothed wheels,chain sprockets&oth trans elem; pts
848410	Gaskets, metal layers, or other matl, mech seals
848490	Sets or assortments of gaskets and similar joints
850131	DC motors & generators w output n ov 750 w
850220	Generating set w spark-ignition int combustion eng
850300	Parts of electric motors, generators & sets
850710	Lead-acid batteries of a kind used for stg engines
851110	Internal combustion engine spark plugs

851120	Internal combustion engine magnetos, magneto-dynam
851130	Distributors; ignition coils
851220	Elect lighting/visual signlng eq ex for bicycles
851230	Electrical sound signaling equipment for mtr vhl
851240	Windshield wipr dfrstr & dmstr for cycle/mtr vehcle
853190	Parts of electric sound or visual signaling aprts
853340	Variable resistors inc rheostat & potntiomtr nesoi
853610	Fuses for voltage not exceeding 1000 v
853630	Other apparatus for protecting elc crts =< 1000 v
853641	Relays for a voltage not exceeding 60 v
853661	Lampholders for voltage not over 1000v
853669	Elect plugs & sockets f voltage not over 1000 v
853910	Sealed beam electric lamp units
853921	Tungsten halogen electric filament lamps
853922	Filament lamp power nov 200 w & voltage over 100 v
853929	Filament lamps ex ultraviolet/infrared lamps nesoi
854420	Insulated coaxial cable & oth coaxial elect condct
854430	Insulated wiring sets for vehicles ships aircraft
870710	Bodies f mtr car/vehicles for transporting persons
870810	Bumpers and parts, for motor vehicles
870821	Safety seat belts for motor vehicles
870840	Gear boxes for motor vehicles
870850	Drive axles with differential for motor vehicles
870870	Road wheels & pts & accessories for motor vehicles
870880	Suspension shock absorbers for motor vehicles
870891	Radiators for motor vehicles
870892	Mufflers and exhaust pipes for motor vehicles
870893	Clutches and parts thereof for motor vehicles
870894	Steering wheels, columns & boxes f motor vehicles
870899	Parts and accessories of motor vehicles, nesoi
902920	Speedometers and tachometers; stroboscopes
903210	Thermostats
903220	Manostats
940120	Seats of a kind used for motor vehicles

Source: Kohpaiboon (2009)