

## **The auto industry in Thailand: value transfer, technological dependence and relations between local and foreign capital**

Chiara Pollio

### ABSTRACT

The paper analyzes the features of Thai auto industry from the late 1980s to the present. It uses an approach consistent with the Global Value Chain analyses, and focuses on three aspects: the relation between local and foreign capital; the role of the local supply base in the process of value creation; value capture and transfer dynamics among countries. The country is a relevant case as it is the largest ASEAN market and a main regional and global export hub. Thailand represents the centre of the regional production networks of all Japanese automakers and, from the Asian crisis (1997-1998), of the biggest western too. It has also a fundamental role for automakers regional market access strategies. The paper places Thai auto industry origins and development in the context of the expansion of Japanese industrial capital in Southeast Asia. Hence, it assumes that Japanese production organization has both shaped the local automotive manufacturing sector and determined its structural weaknesses. Data from the United Nations Commodity Trade Statistics Database from 1989 to 2010 are processed in the paper, in order to analyze trade relations between Thailand on one hand and ASEAN selected countries and "Triad" countries on the other and, hence, to assess value transfer dynamics. In sum, the paper underlines two main problems for local auto industry: the first is a substantial technological dependence from foreign assets and the existence of captive linkages between foreign assemblers or first tier suppliers and Thai suppliers; the second is a partial transfer towards the Triad - mainly Japan - of the value created in the country, which happens through technological dependence and trade deficit mechanisms.

Keywords: auto industry, Thailand, global value chain

Chiara Pollio  
Università di Napoli - L'Orientale  
chiaria.pollio@gmail.com

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## I. Introduction

Since the mid-80s, Thailand is one of the main automotive production and export hubs among emergent economies. It is nowadays the fifteenth largest producer in the world, the largest market among ASEAN and the world second largest market for pickup trucks. Moreover, its production capacity exceeds 2 million vehicles per year and the sector is characterized by clear international commercial surpluses. The main feature of Thai automotive sector is its FDI- and export-led development path: such “etero-directed” feature has been generally acknowledged as the determinant for its success, as its development has been mainly due to the presence of foreign (above all Japanese) players. The sector’s growth originated in the second half of the 1980s thanks to Japanese FDI, and boosted dramatically after the Asian financial crisis (1997-1998), when both Japanese automakers and suppliers increased their presence and the major Western producers entered the country in order to use it as a export hub on the regional – and also global – scale.

The context where the automotive industry evolution in the country should be placed in is the expansion of Japanese industrial capital towards Southeast Asia, which took place from the second half of the 1980s. That is, Thai specificities must be situated in a regional division of labour frame. In fact, the development trajectory of the sector has been shaped in deep by foreign and in particular Japanese capital pressures, interests and needs. Moreover, the recent transformations of the production chains are important to the issue of this paper. Among these, the processes of M&A during the 1990s and the 2000s, and the growing competition among automotive global players – both assemblers and first-tier suppliers –,<sup>1</sup> which eventually drove such actors to restructure the production network on a “cost-cutting” basis, have affected the whole production chain. The pressure on the reduction in prices has led assemblers and first-tier suppliers to concentrate on core, higher value added activities, meanwhile outsourcing both low value added functions and cost pressure to the lower stages of value chain.

The specific aim of this paper is to go beyond the impressive growth data of the automotive sector in Thailand and point at some aspects of Thai auto industry, which are directly consequent upon the etero-directed feature of the sector, showing how the process of value creation happens, and if there exists a process of value transfer abroad or in foreign hands, in order highlight some possible weaknesses of the sector. This study is meant to be an introductory analysis of such issues, which will need further investigation in the future.

In the paper an approach consistent with the Global Value Chain (GVC) analysis – which is the most useful theoretical approach to evaluate value creation and value transfer mechanisms - will be used. The GVC studies can be considered as an integral part of International Production Networks (IPN) analysis, which aims at explaining economic regionalization processes as internal to the globalization of production and uses firms’ networks as unit of analysis. The GVC analysis focuses on spatial (that is, on an international scale) and functional (that is, among different firms) dispersion of production processes to explain how the value chain is structured and how linkages, governance and power asymmetry among firms and between firms and territories regulates value appropriation.<sup>2</sup>

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<sup>1</sup> Cf. Noble, 2001; Sturgeon et al., 2008; Nag et al., 2007; Kohpaiboon, 2008

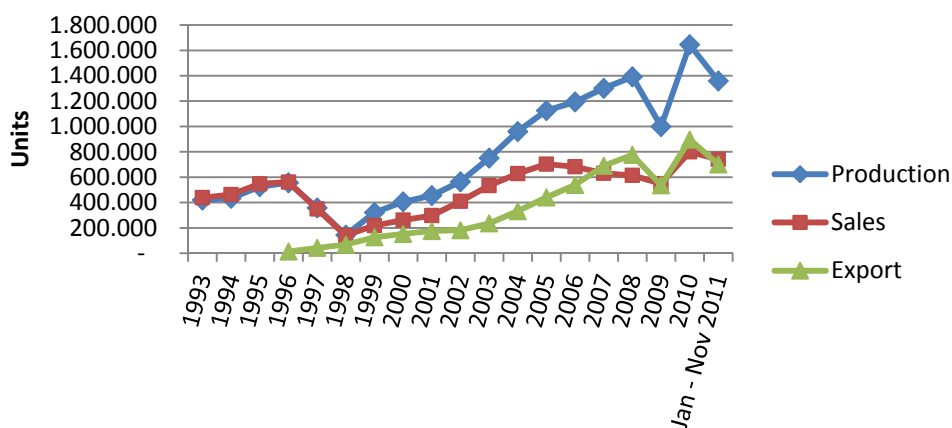
<sup>2</sup> For an in-depth examination of the GVCs approach see among the others Gereffi, 1994, Gereffi, 1999, Gereffi et al., 2001, Gereffi et al., 2005, Gibbon et al., 2008, Sturgeon et al., 2008, Sturgeon, 2008

The paper is divided in five parts. In the introduction a brief overview of Thai production and market conditions will be given in order to highlight the relevance of Thailand case. In the second part the role of Japanese capital in Thai automotive industrialization will be shown, both in its historical evolution and at the present situation. The third part will describe the local production chain and its relation with Japanese capital, focusing on the features and the weaknesses of technological transfer. The topic of the fourth part will be an empirical analysis of trade relations between Thailand and two geographical and economic poles: Europe, Japan and the United States – the “Triad”, from which almost all automotive FDI come to the country – on one hand, and Indonesia, Malaysia, Philippines and Singapore – that together with Thailand form the ASEAN-5 – on the other, in order to assess possible value transfer processes from and to Thailand. In the last part some concluding remarks will be made.

Since the mid-80s Thailand has played a crucial role as a production and export hub among Southeast Asian countries. After the 1997-1998 Asian financial crisis, FDI flows for the sector towards the country increased dramatically and determined a strong expansion of the production. Nowadays, the country is the fifteenth largest producer in the world (OICA, 2012), and in 2010 its production peaked at 1,645,304 vehicles. In the same year, 800,357 vehicles were sold in the country and 895,855 were exported abroad (Thailand automotive institute, 2011; Thai Automotive industry Association, 2011), which attests the export orientation of the sector. Figure 1 shows vehicles production, sales and export trends in recent years.

The 1997 Asian financial crisis can be considered a turning point in the development path of the sector: on one hand, the subsequent domestic market crash pushed the automakers present in the country to sell outside Thailand; on the other, the dramatic depreciation of the baht made Thai export strikingly competitive (Kasuga et al., 2005) and gave rise to the entry of a massive flux of FDI to the sector: their annual average value raised from \$5 million between 1970 and 1985 to US \$ 37 million between 1986 and 1989, to \$ 87 million between 1991 and 1995 and to \$ 818 million in 1998 (Kohpaiboon, 2008).

**Figure 1 - Thailand vehicles production, sales and export, 1993-2011 (January-November)**

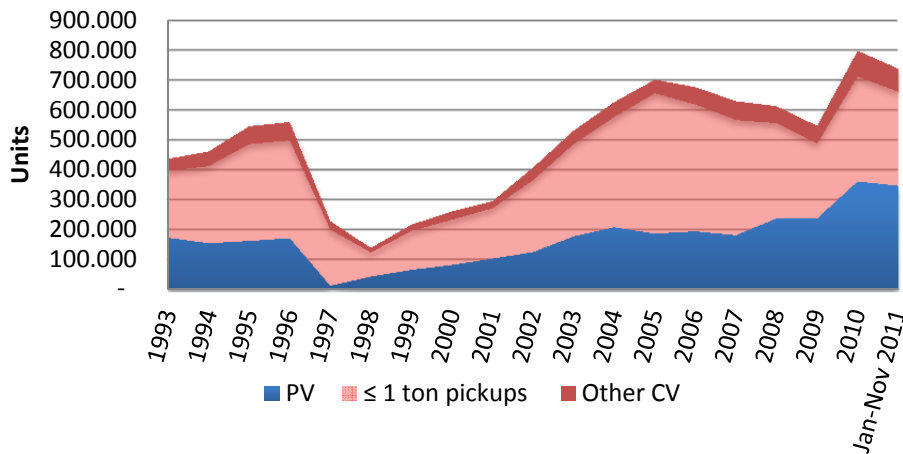


**Source: elaboration of the author on data from the Federation of Thai Industries, the Thailand Automotive Institute, the International US Trade Administration**

At the present time, the automotive sector represents about 12 percent of Thailand GDP, it is one of the main industry in the country and generates employment of about 300.000 people (BOI, 2012). The domestic market is characterized by a high demand, which has more than doubled between

2001 and 2010. In particular, 1-ton pickup sales have risen dramatically, partly due to a favourable tax regime that promotes light of commercial vehicles sales.<sup>3</sup> Figure 2 shows sales distribution among different kind of vehicles.

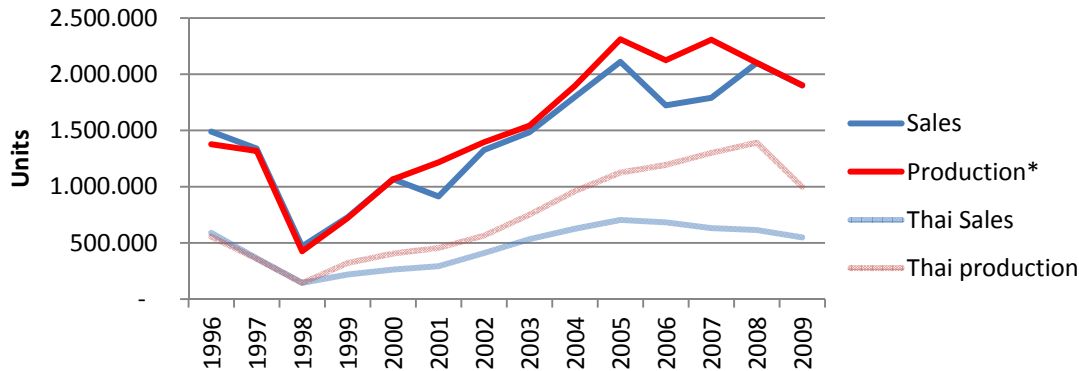
**Figure 2 - Sales in the country, 1993-2011**



Source: elaboration of the author on data from the Thailand Automotive Institute

Still, Thailand international role is even more relevant: it is in fact the largest ASEAN market and the world's second largest market for one-ton pickup trucks behind the United States. Between 1989 and 1996, the vehicles sales in the country represented about the 42 percent of total sales in the ASEAN-4 - Indonesia, Malaysia, Philippines and Thailand (Kohpaiboon, 2008). Although the other ASEAN-5 markets (here including Singapore too) expanded in the subsequent years, Thai market still constitutes a third of the total share (Figure 3), both for CBUS sales and production.

**Figure 3 - Production and sales in the ASEAN-5 and in Thailand, 1996-2009**



Source: elaboration of the author on data from the Japan Automobile Manufacturers Association, US International Trade Administration; ASEAN production data for 2008 and 2009 are rounded up to hundreds of thousands; \* Singapore not included.

## II. The role of Japanese capital in Thai automotive industry development

Japanese automakers were present with small operations in Thailand since the 1960s (Doner, 1991), but their presence definitely improved in the second half of the 1980s and in the 1990s. This process

<sup>3</sup> For example, the excise rate for passenger vehicles is between 30 and 50 percent of the value of the vehicle, while that on 1-ton pickup trucks is only 3. Source: Office of Industrial Economics Ministry of Industry (edited), 2006.

was situated in the context of the expansion of Japanese capital to Southeast Asia and the consequent regional division of labour the countries experienced. Two dynamics form the basis of the massive entry of Japanese FDI in the area.

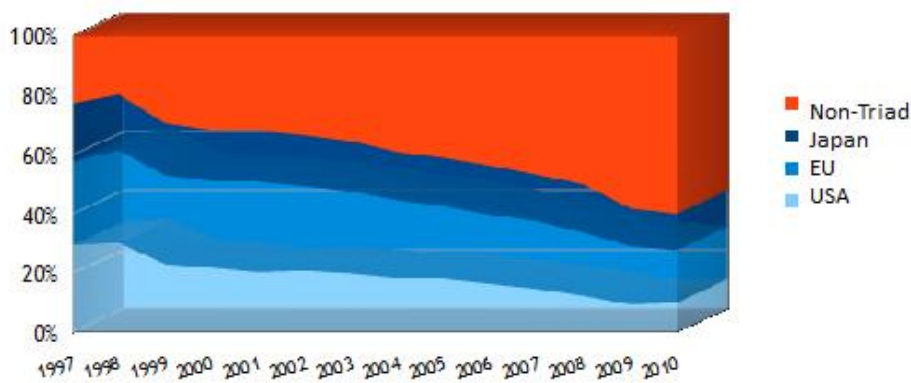
The former is the saturation of the traditional vehicles markets, such as Europe, Japan and USA, *versus* the growth of new emergent markets. While global vehicles sales increased by 8.3 between 1990 and 1997, those in the United States and Canada increased by 9 percent, while the trends for Western Europe and Japan were even negative: sales in Europe fell by 1 percent, while those in Japan collapsed by 13.5 percent. Taken together, hence, Triad data increased only by 0.8 percent. On the other hand, China, India, Mexico, South America, the ASEAN and Eastern Europe countries “increased vehicle sales by 80 per cent and production by 93 per cent” (Humphrey, Memedovic, 2003, p.3). Such fast growing economies became hence very attractive for automakers in the '90, given that the Triad market stagnation – that continued in the 2000s - pushed up competition among automakers in maintaining their market shares in developed economies while expanding their presence in the emerging ones. However, in order to enter such markets global automakers had to face governments' protectionist measures and claims for localization of the manufacturing. This produced a market-seeking investment flow, as automakers began to allocate in these countries the lowest value added production stages, starting with assembly, to please governments pressures while maintaining high productivity and quality. Such internationalization of production is demonstrated by the growing percentage of production operations in developing countries compared with the decline of that in Triad countries, as shown in Figure 4.

The second trend is the trade dispute between Japan and USA of the 1980s that led in the end to the Plaza accord in 1985: the subsequent appreciation of the yen determined the fall in competition of Japanese exports and eventually pushed Japanese firms, which had always been 'reluctant multinationals' because of their particular production organization based on 'just in time' and a close collaboration with suppliers,<sup>4</sup> to privilege production abroad instead of exports. While market trends mainly concern the transformations of global automotive sector, and thus especially affected automotive industrial capital, the fall of Japanese exports competitiveness constituted “an irresistible rationale for direct foreign investment” (Hill, Lee, 1994, p.297) for the manufacturing sector as a whole, but strongly affected automotive too and is generally acknowledged as the main goad to the regional division of labour by Japanese industrial capital.

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<sup>4</sup> The close collaboration between assembler and suppliers for design and quality control requires a continuous technology and skill enhancement by parts makers and the strengthening of the relation between the automakers and the suppliers, where the first acted as a partner for technical assistance and shareholding. Such linkages were difficult to structure in emergent economies, given the technological weaknesses of the industrial base and the lack of facilities. Moreover, Japanese firms have been carrying out low labour content and high capital content productions, which made less attractive low labour costs in Southeast Asia: at the beginning of 1980s, a Japanese firm employed only 65 percent of the labour needed for the production of a similar vehicle in the U.S. industry, and about 60 percent of the Western Germany average. (Doner, 1991)

**Figure 4 – Vehicles production percentages divided by geographic areas**



**Sources – elaboration of the author on data from OICA, 2010; data for “USA” from 1997 to 1998 include the whole NAFTA; data for “EU” only include EU-15 countries**

Between 1985 and 1990 Japanese firms invested abroad in automotive and electronics about 596 billion dollars, allocating some basic production stages while maintaining the more complex at home (Hill, Lee, 1994). FDI flows went mainly towards two regions. The former were the United States, where the objective of Japanese firms was to get over their domestic market protection measures. Secondly, Japanese capital expanded its operations mainly in Southeast Asian countries, in order to take advantage of their better international trading conditions (compared with both Japan and NIEs South Korea and Taiwan) and use them as a global export base. However, such a dynamic eventually led local governments to complain about their trade deficits and reliance on Japanese products, and hence to raise local pressures to localization of manufacturing for domestic sales, meanwhile fostering technological transfer and local firms involvement. Japanese automakers were thereby pushed to allocate a growing share of production to emergent South-eastern economies and hence stimulated Japanese suppliers and assemblers’ keiretsu members to follow them to invest (the phenomenon of “follow source”. Doner et al., 2005).

Both Japanese automakers and the Japanese government have always considered Southeast Asian countries *as a whole*, that is on a regional scale. Until the ‘70s, between 70 and 95 percent of the total amount of vehicles that were sold there were CKDs whose only assembly stage was made *in loco* (Noble, 2001). From the second half of the ‘80s on, Japanese companies, with Toyota and Nissan in the lead, increasingly contended major shares in ASEAN markets, and were thus forced to increase their involvement in the localization of manufacturing. The ‘90s competitive thrust in the sector led auto assemblers to rationalize their manufacturing assets in the region. They have thus consolidated their regional production network by implementing a pattern of product specialization on a national base. Figure 5 shows how they realized such a scheme by allocating different vehicles lines in each country and there exporting them to the whole region in order to achieve economies of scale.

**Figure 5 - Production and International Trade Networks in Southeast Asia of Selected MNE Car Assemblers**



Source: Kohpaiboon, 2008, p.19

Also the allocation of the manufacturing of parts and components was involved: the shift of Japanese capital towards ASEAN countries has in fact determined a reorganization of the supply chain too, in particular for what concerns the linkages between automakers and their suppliers. Japanese production chain has historically been structured in the form of *keiretsu*: in this organizational scheme, the assembler drive its high quality suppliers to develop an almost exclusive relation, structuring a “paternalistic ‘captive’” linkage (Sturgeon et al., 2008, p.309). In the *keiretsu*, a strict technological and R&D cooperation exists among actors, that is, the automakers give continuous assistance to their suppliers in order to assure high quality products and fidelity. When such linkages have shifted outside Japan, they have partly been maintained, even with some differences. Toyota production network can give a good example.

In the ‘60s, when Southeast Asian operations were almost reduced to CKDs assembly, parts and components were entirely supplied by Toyota supply network in Toyota City, Japan. When in the ‘70s Toyota began to establish manufacturing operations in Indonesia and Thailand, many first tier suppliers were asked to follow (Hill, Lee, 1994). Toyota was also the first to expand its production abroad after the Plaza Agreement; therefore, it began developing its regional subcontracting network, integrating it with its supply system: as an example, Toyota “began exporting metal moulds manufactured in Thailand to Indonesia, Taiwan, Malaysia and Australia where they were used in the production of inexpensive pressed parts for export to Japan and the United States” (Hill, Lee, 1994, p.299).

As Toyota, almost all Japanese TNCs set up supply chains on a regional level, supported by a favourable regional trade agreements system.<sup>5</sup> As long as 1997, Japanese TNCs were producing “diesel engines, electronic and body parts in Thailand; steering gears, radiators and shock absorbers in Malaysia; engines for commercial vehicles in Indonesia; and transmissions in the Philippines”

<sup>5</sup> For closer examination of the regional trade agreements see International US Trade Administration (edited), 2011, Noble, 2001, Hill, Lee, 1994



(Fujita, Hill, 1997, p.317). While expanding their production, hence, TNCs kept on relying on their Japanese suppliers, that were “supplying everything from wire harnesses to seat upholstery, from alternators to brake systems”. Instead, they assigned a peripheral role to local firms, which supplied mainly lower value added minor components. “For example, Toyota Motors Thailand (TMT), tightly controlled by the giant automaker in Japan, did not rely on non-Japanese suppliers to supply any of the critical components for vehicles it assembled there in the late 1990s”. (Hatch, 2005, p.54-55). Although Japanese suppliers have traditionally been considered to have very poor leverages toward the assemblers, “local suppliers in Southeast Asian countries usually have been in an even weaker position” (Noble, 2001, p.165).<sup>6</sup>

Two are the main reasons why Thailand became the central hub among ASEAN countries. The former is the 1997 crisis, which made Thai economic environment attractive for its exports profitability. The second reason is that, unlike other countries of the region (e.g. Malaysia), Thai governments have never had “an explicit goal to promote a national car” (Kohpaiboon, 2008, p.15), nor they have targeted at nationalizing parts industry, while pushing for localization of production by foreign automakers until 2000s.<sup>7</sup> Instead, especially from the mid-80s Thailand has been an obedient follower and promoter of regional liberalization, in order to attract FDI to the region. Thai auto sector has been historically dominated by Japanese automakers: Toyota and Nissan moved in already in the first half of 1960s, followed by Isuzu in 1966. Between ‘70s and ‘80s, other Japanese TNCs established their production in the country, while the suppliers belonging to the *keiretsu* of those companies that were already there - that is, Isuzu, Toyota and Mitsubishi suppliers - made their first investments (JAMA, 2009). By the mid-80s, both the stage of the final assembly and the production of many parts - mainly rubber components and engine parts - had been fully introduced. From 1995 on, also the major Western producers went in – in chronological order: Ford (which set up Auto Alliance with Mazda in 1995 and started the production in 1998), General Motors, BMW and Volkswagen (2000) - opportunistically capitalizing on “the considerable manufacturing base created by thirty years of patient investments by Japanese assemblers and parts firms” (Noble, 2001, p.167).<sup>8</sup>

Nowadays, Japanese corporations dominate both local production and domestic sales. For what concerns production, “Toyota and Honda both have two assembling plants in Thailand, Suzuki, Hino, while Mitsubishi, Isuzu, Nissan, Yamaha, and Kawasaki each have one” (Busser, 2008, p.35): taken together, Japanese assemblers represent about the 80 percent of total capacity (Table 1). Automakers have mainly focused on the production of pickup trucks: in 2006 Toyota has moved its whole pickups production from Japan to the country investing more than a billion dollars; Mitsubishi has expanded its pickup production capacity from 90.000 units in 2004 to 180.000 in 2007. Similarly, Isuzu closed down its pickup factories in USA and Japan to establish its pickup trucks production in the country, and also Ford and Mazda in Auto Alliance have chosen Thailand as a pickups (and SUV) production hub (Busser, 2008). In 2010, hence, Toyota was the first commercial vehicles producer, with 36.3 percent of the total, followed by Isuzu (11.8) and Nissan (9.6). The fourth producer was the Western GM, with only 5.2 percent of the total (OICA, 2011,

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<sup>6</sup> However, the linkages between suppliers and assemblers in Southeast Asia seem to be less exclusive than those existing in Japan, as it will be shown subsequently in the text with regard to Thailand (part III).

<sup>7</sup> See e.g. the local content requirements, which were established in 1972 and were in force till 2000 (Doner, 1991, Kohpaiboon, 2008)

<sup>8</sup> Recently, also the Indian Tata has established a production plant of 30.000 vehicles yearly, while the Chinese Geely has taken over from Ford in the ownership of Volvo (OICA, 2011, Nag et al., 2007)



Thailand Automotive Institute, 2011).

Domestic sales too are dominated by Japanese: in 2010, all the top 10 selling vehicles were by Japanese automakers (Mototrader.com, 2011). The 2010 market leaders Toyota (326,000 vehicles sold) and Isuzu (157,787 vehicles) together hit nearly the 77 percent of total sales. Taken altogether, Japanese producers hold between the 85 and the 90 percent of Thai market (Ploy, 2011).

“Japanese companies do not only dominate production but are also the dominant exporters of CBUs”: in 2003, they totalled almost 90 percent of total exports. From 2005 on Toyota has been the first exporter, thanks above all to pickups sales, followed by Mitsubishi, GM, AA and Isuzu (Busser, 2008, p.36 and ff). All these corporations have acted since the mid-90s to integrate Thailand as an export hub in their global production networks.

### III. Features and weaknesses of the local supply chain

Parts and components industry in Thailand is nowadays well-developed: it supplies about the 80 percent of the parts used in locally assembled commercial vehicles, less than the 50 percent for passenger vehicles and almost all for motorcycles. “Locally produced or assembled parts include engines, suspension control and spring, axles, hubs, propeller shaft, brakes, clutches, steering systems, body parts, electronic parts, air conditioning, tires, wheels, internal and external trim components and glass” (Office of Industrial Economics Ministry of Industry (edited), 2006, p.17). The supply chain is composed by about 2,400 firms, 700 of which are classified by the Board of Investments as first-tier suppliers (BOI, 2011). The aim of this part is to comprehend which role is assigned to local capital in the supply chain.

As nearly the 80 percent of the assembly capacity is in Japanese hands, the most part of first-tier suppliers belongs to Japanese keiretsu “supplying to their own customer base” (Office of Industrial Economics Ministry of Industry, 2006, p.17). According to Kohpaiboon (2008), Japanese TNCs or first-tier suppliers became involved in the parts industry in two ways. The former was the integration of lower-tier suppliers in their *keiretsu*, which was realized both through technology licensing and foreign minor equity. Since the end of ‘80s and even more since the elimination of the bans on foreign majority ownership after the financial crisis, Japanese corporations increased their shares in local firms and often became majority shareholders, in order to strengthen their control on the manufacturing. Only since such transformation in the proprietary structure, TNCs heavily invested in technology capabilities of firms or in their equipment upgrading: “this did not occur when these MNEs were involved through technology licensing channel or minor and less active shareholders” (Kohpaiboon, 2008, p.10). Secondly, Japanese first-tier suppliers, several of which are global suppliers, established their own operations in the country since the mid-80s, gradually acquiring growing control over the sector.<sup>9</sup>

Although the primacy of Japanese assemblers and suppliers is evident, the way the supply chain is structured in Thailand differs from the classic Japanese keiretsu. The linkages between the automakers and their suppliers are in fact weaker: although the assemblers still offer some technical cooperation to the suppliers, “there are only two levels of subcontracting and the relationships

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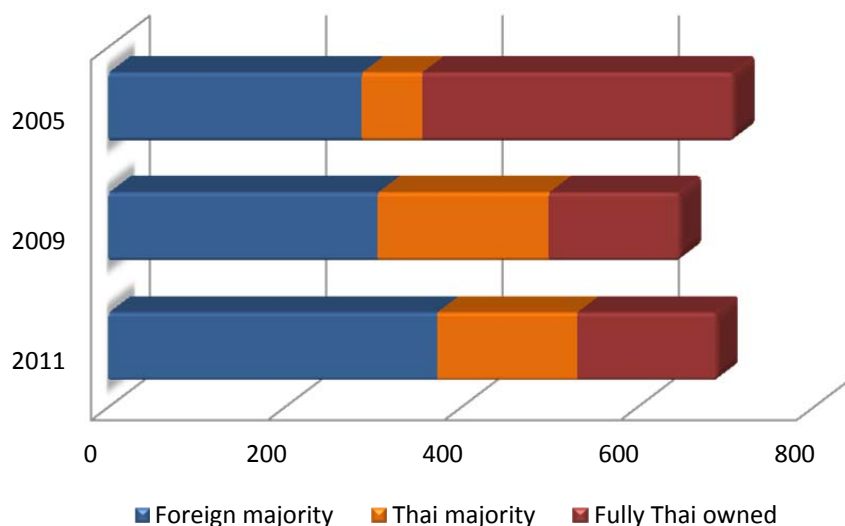
<sup>9</sup> It is the case of Nippondenso, now Denso, a Toyota affiliate which is actually the second largest supplier in the world. It moved in the country following Toyota in 1972 to produce cooling systems. Gradually, Denso expanded the number of factories and the number of parts, components and systems produced. Today, Thai Denso group owns five plants and produces a great number of components (“starter, alternator, magneto, windshield, wiper motor, oil cooler, radiator, fuel filter, rail, injector, supply pump, relay, flasher, oil pressure valve, air cleaner filter”. Kohpaiboon, 2008, p.11), with a total sales amount of 66,364 million bath in 2010. (Globaldenso.com, 2011)

between suppliers and assemblers are multiple, i.e., a supplier supplies parts to several assemblers (Maruhashi 1995)” (Techakanont, 2008, p.10). These *trans-keiretsu* relations, which are peculiar to the whole supply network in Southeast Asia, were initially encouraged by the assemblers themselves: being the local market still limited, it was the only way to allow the suppliers to benefit from economies of scale and assure a cost-efficient production.

Notwithstanding the entry of several Western global suppliers in the country between the 90s and the 2000s,<sup>10</sup> the weight of Japanese firms is still evident for Japanese automakers: “of all parts and components bought by Toyota in Thailand, Japanese affiliated companies supply 90 per cent. Figures for Mitsubishi and Isuzu are in the range of 70 per cent to 80 per cent” (Busser, 2008, p.41). Also Western automakers have taken advantage of the Japan technologically advanced supply base presence, using it as their own supply base (Nopprach, 2006).

Given the pre-eminence of foreign and above all Japanese suppliers, what is the room for manoeuvre for local firms? According to 2005 data by the Thailand automotive Institute, about 709 of more than 2000 suppliers were first-tier; in 2009 they had reduced to 648 and in 2011 they had risen again to 690 (Figure 6). In 2005, 287 firms had foreign majority shares - the 90 percent of which were Japanese -, 68 were Thai firms with “important minority shares” (Busser, 2008, p.37) by Japanese firms. The other 354 - nearly the 50 percent - were fully Thai owned. However, some authors (Kohpaiboon, 2008; Busser, 2008) consider that such data would overestimate Thai role in the first tier of the supply chain: on one hand, they would include minor parts or parts for old vehicles suppliers; on the other, they would omit the great technological dependence of the production of local firms on foreign automakers’ technological licenses through Technical Assistance (TA) agreements.

**Figure 6 – Ownership in the first tier of the supply chain in Thailand**



**Source: elaboration of the author on data from Busser (2008), BOI (2009, 2011)**

Moreover, data in 2011 show a process of compression of the space left to Thai ownership: while the total number of first-tier suppliers has decreased by only 3.7 percent, the share of Thai firms has dropped from 50 to 23 percent (about 195 less firms). In the meanwhile, the presence of foreign

<sup>10</sup>The main suppliers were Dana (which moved in in 1994), Federal Mogul (1995), Bosch (1996), TRW Steering & Suspension (1998), Visteon (1998), Johnson Controls (1999), Delphi (2001) and Tenneco Automotive (2002) (Techakanont, 2008; Kasuga et al., 2005)

capital, both with majority or minority shares, has increased. Such process of *denationalization* is the result of a different strategic approach by transnational automakers and suppliers: since the abolition of foreign ownership restrictions, “these technology owners” tended to cease technology licensing practice to take “full control of the OEM [Original Equipment Manufacturing] market” (Kohpaiboon, 2008, p.23) in order to face growing competition among global manufacturers and quality problems of the local supply base.

Nowadays, hence, some first-tier local suppliers have been confined in the aftermarket, others have been downgraded to the lower supply tier, still others have dropped out the market. Actually, those local suppliers still remaining in the first tier of the chain produce above all rubber components, pressing and stamping parts for auto body or seats, all of which base their competitiveness on prices, require a lower technology level and little or no R&D and design skills (Komolavanij et al., 2009). Instead, “where other sophisticated OEM parts are concerned”, that is where the value added increases “it is very unlikely for indigenous parts suppliers to be and/or maintain their OEM supplier status in foreseeable future” (Kohpaiboon, 2008, p.26)<sup>11</sup>, given the presence of high technologically equipped foreign suppliers.

This context given, it is essential to understand how much technology is transferred to the local industrial base. This is a crucial aspect to evaluate the nature of the relation between international capital and the territory, and how much value remains there and how much is transferred abroad.

As Doner et al. (2005) assert, the history of automotive in East Asia would demonstrate that “the best-performing local firms have limited foreign ownership and diversified sources of technology rather than depending on foreign parent companies for capital or technology (Toyota versus Nissan in Japan, Hyundai versus Daewoo in Korea, Yulong-China Motors versus Liu Ho in Taiwan [...])” (p.197). This is because local ownership is supposed to help acquisition of technology, technology transfer and the formation of local autonomous industrial strategies.

Nevertheless, being independent of foreign capital doesn't directly mean having success: in this sense, the transformation of the international economic environment has a great influence on local capital trajectories. Since the neoliberal trend in international political economy has become mainstream, pressures to reduce the role of the State in economy and abolish protectionism have increased and the room for local firms has been heavily reduced. Moreover, for what concerns the automotive, this trend has been reinforced by the dynamics of consolidation and competition among global players. In Thailand, this has led to the proliferation of foreign majority equity and to the acquisition of whole ownerships by foreign, Japanese capital. Such a process was also boosted by the 1997 financial crisis, when several local suppliers went to bankrupt and were bought up by foreign suppliers, most of all Japanese (Busser, 2008). A great role was also played by the growing competition within automakers and suppliers, which pushed such actors to gain stronger control on technological key assets.

“ [A]lthough we cannot simply conclude from this development alone that technology transfer from Japanese enterprises to Thai enterprises does not take place” (Busser, 2008, p.39), according to interviews and surveys by several authors (Takayasu, Mori, 2004; Busser, 2008; Komolavanij et al., 2009)<sup>12</sup> Thai suppliers' capabilities does not develop fast enough, their production are low-technology, they “do not yet have technical capability to assemble the knowledge intensive components such as ignition, chassis electrical system, drive train system (i.e., engine, axles and

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<sup>11</sup> See also Busser, 2008; Azlan et al., 2011

<sup>12</sup> See also Azlan et al., 2011

transmission), rolling chassis” (Techakanont, 2008, p.33). To some extent, however, TNCs work to increase local suppliers skills, above all through technology licensing, but local firms which benefits from TA generally keep being characterized by management problems and out of dated technology (Office of Industrial Economics Ministry of Industry (edited), 2006). In addition, often the offer by TNCs for technology assistance is only for the improvement of those functions that local firms *already carry out*, and it is aimed at satisfying assemblers’ demand for quality and cost reduction. Moreover, most of Thai producers - even those listed among first-tier suppliers - rarely carry out R&D or technological upgrading activities, both because the kind of products they produce doesn’t require upgrading and because they generally produce “according to the automotive makers’ specifications” (Komonlavanji et al., 2009, p.286). It can be thus asserted that “automotive manufacturers and foreign first-tier suppliers confine product innovations *within* the companies” (Komolavanij et al., 2009, p.267; emphasis added).

On one hand, all the previous elements indicate the high dependence of the local supply base on foreign assemblers and suppliers’ strategies. On the other, the absence of autonomous technological capabilities by Thai capital determines a captive linkage by foreign actors and prevent local firms from improving their position in the value chain.

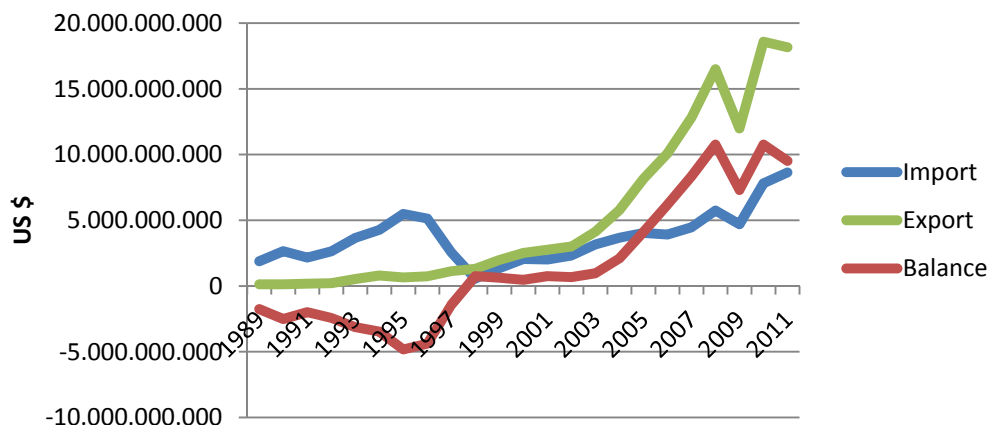
In conclusion, the need of Japanese capital to obtain high quality levels and contain costs has determined the acquisition of the core functions of manufacturing, among which first-tier supply. This has led to the reinternalisation of technological assets by foreign firms and to the consequent downgrading of the local industrial base to the lowest and less value added stages of the supply chain, preventing the local suppliers from acquiring higher technological capabilities than those required by first-tier suppliers’ or assemblers’ market requirements.

#### **IV. An analysis of trade flows**

In order to give an overall description of Thai international role and to assess possible value transfer processes from and to the country, this part will analyze Thailand’s trade relations for the sector. Thailand is the first among ASEAN countries for trade volumes in the automotive sector. CBUs constitute the larger export flow since 1996. One-ton pickups have a considerable weight, as they were 44 percent of the total export for CBUs in 2005. However, parts and components exports also rose significantly between 2002 and 2005: the increase was more than threefold and, contemporary, the ratio of (real) import value of parts to locally assembled parts definitely decreased (Kohpaiboon, 2008).

Figure 7 reports import and export flows for HS87 items from United Nation Commodity Trade Statistics (UN Comtrade) Database, which covers CBU vehicles and some of the key components for automotive. As it is neatly shown in the figure, from 1998 on Thailand accumulates a growing surplus: as a consequence of the financial crisis, in fact, the automakers which were already in the country turned to exports in order to keep high the capacity utilization in their plants, while new producers moved in to take advantage of the baht devaluation. Nowadays about 50 percent of vehicles production goes to exports, mainly towards Southeast Asia: passenger vehicles (PV) exports toward the region grew from 12 percent to 50 percent between 2002 and 2005 (Kohpaiboon, 2008).

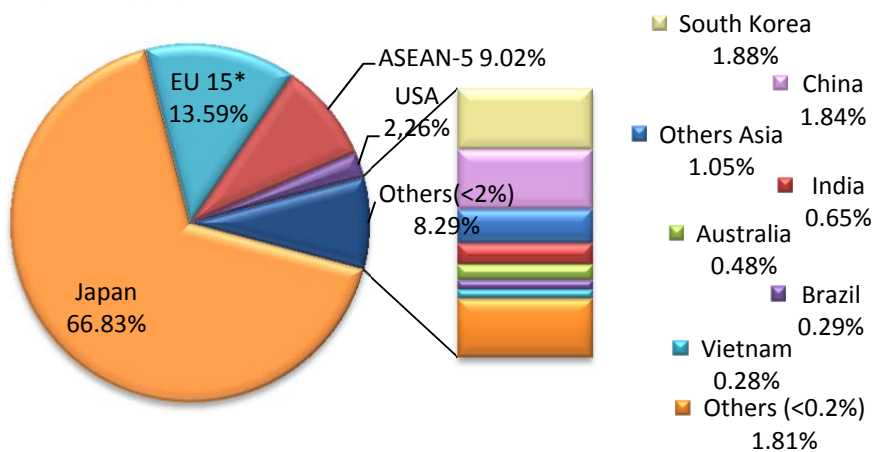
**Figure 7 - Thailand's Commercial flows (HS87 items), 1989-2011**



Source: elaboration of the author on data from the United Nations Commodity Trade Statistics Database

The next figures show the distribution of imports and exports by partners from 1989 to 2011.<sup>13</sup> This may give a general representation of Thailand’s trade relations in recent years. The total value of imports for HS87 in the period is US \$ 76,231,019,975, while exports total US \$ 104,151,896,395, which indicate an clear surplus on a global base. The distribution of imports (Figure 8) shows an evident dependence on Japanese products, which are about 67 percent of whole import, followed by EU 15 (13.5 percent), and the ASEAN-5<sup>14</sup> (9 percent). Among the others, only the United States exceed 2 percent, while import value from the other partners altogether doesn’t clear the 8.6 percent. Such data seem to confirm the geographical polarization of Thai imports, which comes for over the 90 percent from Triad countries and ASEAN-5.

**Figure 8 - Thailand’s imports, aggregate data for 1989-2010**



Source: elaboration of the author on data from UN-Comtrade – HS87; \*Data for EU 15 are calculated by aggregating the figures for each country; Before 1991 data for Germany are calculated on the base of those for West Germany

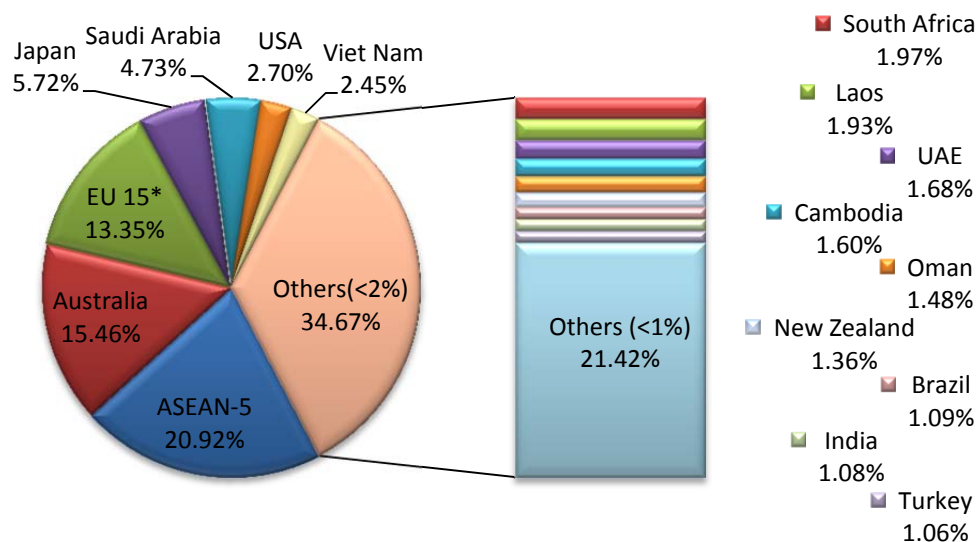
For what concerns exports, instead, the picture is much more diversified (Figure 9): the flows from 1989 to 2010 are mainly directed towards emergent markets. In this case, Triad markets only represent the 22 percent of the whole value, and it is noteworthy the reduction of Japan’s role compared with imports. Several export destinations, such as Australia (4.7 percent of the total) and Middle East countries (8.2 percent), have a wretched role for imports: this should confirm that

<sup>13</sup> All the following data are elaborated from the United Nation Commodity Trade Statistics Database

<sup>14</sup> For this case and the following, ASEAN-5 won’t include Thailand

global automakers have been using Thailand as an export hub toward both regional and global emergent markets. Moreover, the distribution of exports is even more fragmented than that of imports: those country which, taken individually, count for less than 2 percent of total exports represent altogether more than a third of the whole figure. Finally, the percentage weight of ASEAN-5 increase: the remarkable data for both imports and exports concerning these countries testify the deep regional integration which was carried out by automakers on the production side.

**Figure 9 - Thailand's exports, aggregate data for 1989-2010**



**Source: elaboration of the author on data from UN-Comtrade – HS87; \*Data for EU 15 are calculated by aggregating the figures for each country; Before 1991 data for Germany are calculated on the base of those for West Germany**

A useful way to analyze the mechanisms of value transfer from and to Thailand is the study of the country's trade relations with those groups of countries which hold a central role in Thailand's trade relations system: the Triad, where the largest part of FDI and imports comes from, and the ASEAN-5, which are integrated together with Thailand in the automakers' regional production networks. In the following pages more than 80 HS items relevant to the automotive sector from UN Comtrade Database, both inside and outside HS87, have been considered. They have been divided into seven groups: Rubber and Glass components (I), Iron and Steel components (II), Engines and parts thereof (III), Small parts such as pulleys, gaskets, electrical fittings etc (IV), Body parts, bumpers, brakes, clutches and other safety components (V), Seats and indicators (VI) and full vehicles (VII).<sup>15</sup> Among the groups for parts and components, the first three include the "critical and major components for any vehicle" (Nag et al., 2007, p.17), while groups from IV to VI consist most o all of small parts or accessories. Thailand's trade relations with Triad countries and the ASEAN-5, both one by one<sup>16</sup> and by regions, have been measured for the totality of the items, for parts on one hand and full vehicles on the other and, eventually, for each group, from 1989 to 2010. Such division should allow the comprehension of how trade relations are structured and, also, of the level of development of the manufacturing for each group in the country: given the export orientation of the country, if Thai exports for a group show a positive trend, then it will mean that production concerning those items quite developed - and then relatively autonomous - in the country. If, on the

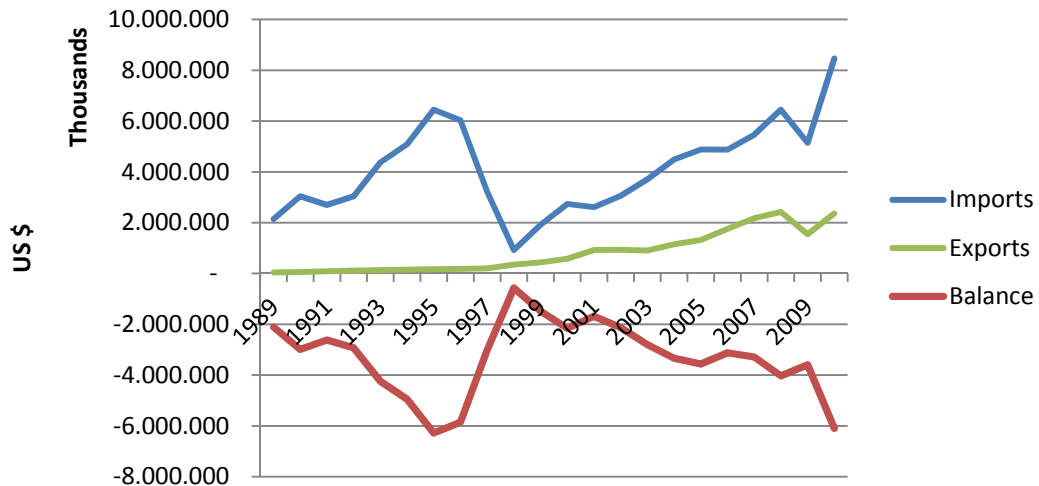
<sup>15</sup> The division among groups is taken from Nag et al., 2007. Detailed Group wise HS codes are given in the appendix

<sup>16</sup> However, UE 15 countries have been considered as a single economic unit

contrary, a group shows a persistent deficit, it will be the sign for a weakness of the production and a dependence on the manufacturing from abroad.

Notwithstanding the impressive growth of Thai trade volume and its surplus, and although exports from Thailand have grown since the years of the financial crisis, the figures for the Triad countries show a substantial trade deficit (Figure 10).

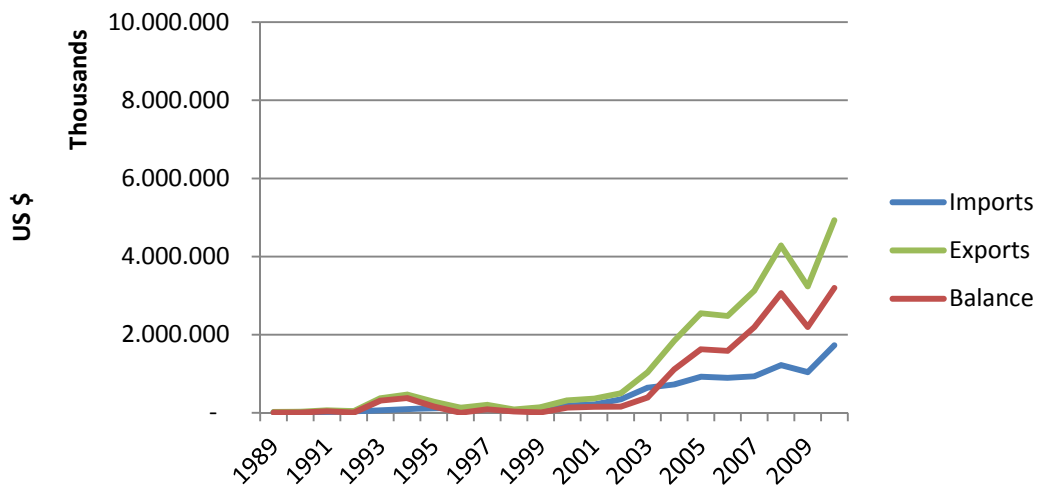
**Figure 10 – Trade balance with the Triad, 1989-2010**



Source: elaboration of the author on data from UN-Comtrade Database

Thailand’s negative balance towards the Triad is chronic till 1997. In 1997-1998, the deficit tails off as a consequence both of the compression in domestic demand and of the rise in exports. After 1998, however, Thai deficit resumes its trend and peaks at over 6 billion dollars in 2010, reaching pre-crisis levels. There is however a difference between the trend for components (groups I to VI – Tables 2 to 7) and that for vehicles (group VII – Table 8): although both have deficits, the data for CBUs after the crisis don’t seem to reach the same negative status than before, and this mainly due to the slowdown in imports from the Triad. The situation is different for parts and components - whose trade value is much higher - where Thailand shows a larger deficit.

**Figure 11 – Trade balance with the ASEAN-5, 1989-2010**



Source: elaboration of the author on data from UN-Comtrade Database



The relation with ASEAN-5 (Figure 12) is completely different: it is characterized by a net and growing surplus from 2000. Moreover, from the same year, the volume of the trade both for CBUs and for parts soars as a consequence of the growing regional integration.

At this point, it is possible to turn to the analysis of trade trends for each group. Thai balance for group I (Rubber and Glass components, Table 2) is positive since 2000. Exports towards the ASEAN-5 rocket from 1998 on, while imports keep even and low throughout the period. From 2000 on, a net surplus is registered also towards the Triad thanks to the improvement of Thai position towards Japan, whose large trade volume heavily influences Thai balance.

The case is different for group II (Iron and Steel components, Table 3): the trade value appears higher than group I, but showing a deficit both towards the Triad and, to a lesser extent and not continuously, towards the ASEAN-5. The high level of imports from Japan, not balanced by the rise in exports that took place from 1998, form the base for Thailand's heavy deficit towards Japan and the whole Triad – while the relations with USA and Europe are in balance or even in surplus. The trends for ASEAN-5 are determined instead by the high level of imports from Singapore, which is not balanced by the positive trends with Malaysia, Indonesia and the Philippines.

However, the highest deficit among the “key component” is for engines and parts thereof (Group III, Table 4): the value for this group has reached high levels, peaking at over 3 billion dollars in recent years. Thailand seems to occupy in this case a typical semi-peripheral position: engines and their components are imported from the central Triad countries, particularly Japan, and are exported to the peripheral ASEAN-5, most of all Indonesia and Malaysia.

For what concerns the group including Small parts such as pulleys, gaskets, electrical fittings etc (IV, Table 5), Thailand suffers from a structural negative balance, which even rise from the years of the financial crisis. Such deficit is due to the growth of imports from all the Triad regions from 2000. On the other hand, Thailand is increasingly exporting to ASEAN-5, above all to Indonesia and Malaysia. However, the surplus thus accumulated is still lower than pre-crisis levels.

Also the performance for group V (Table 6), which includes Body parts, bumpers, brakes, clutches and other safety components, is constantly negative, and for higher values than the others. The deficit rises from 1997-1998 and peaks at 2 billion dollars in 2010. This is a consequence, on one hand, of a negative balance with Japan and with the other Triad poles and, on the other, of a surplus towards some ASEAN countries (Indonesia and Malaysia), but a deficit towards the others (Philippines and, partially, Singapore).

Among minor parts and accessories groups, that of seats and indicators (VI, Table 7) shows the best Performance: the surplus for Thailand is due to the decrease in imports from Japan since 1995 and the rise in exports to ASEAN-5 since 2000. However, the value of the trade for these components is lower than that for the other two groups and thus affects to a lesser extent Thailand's overall position.

Some consideration can be drawn from this brief overview of Thailand's trade relations. The country's international trade position is undeniably thriving: since 1997-1998, global automakers have been using Thailand as an export hub towards developing economies above all, generating hence elevated surpluses for the country. If one turns to the relations with the Triad and the ASEAN-5, a confirmation of the export oriented nature of Thai auto sector will be found. However, the negative trend shown towards the Triad is not balanced by surpluses from the ASEAN-5: that is, although Thailand has a core position in the region, it (and the automakers present there) bases its

strength on global scale trade relations.

The relevant role of Japan in Thailand's trade system questions to some extent the state of domestic production: the steady growth of parts and components imports from Japan - only glass and rubber parts excluded – seems to attest that Japanese producers are not actually using local production for the whole number and kind of components needed for domestic CBUs production. This is an evidence for the “inclination of Japanese producers towards Japanese components” (Nag et al., 2007, p.35) not only by Japanese suppliers in Thailand but also by those producing at home. Furthermore, trade data testify a possible phenomenon of *value migration* from Thailand to Japan through trade mechanisms, which should be further examined.

Some further consideration can be done about the features of the integration among ASEAN-5, Thailand included. Although Thailand's balance is positive for the most part of the groups, the high value of trade for parts and components suggests the presence of a process of “disintegration of production” (Gereffi et al., 2005, p.80) for the automotive value chain among ASEAN countries, which compels Thailand manufacturing to depend on the regional firms' networks. It could be thus said that the regional production network planned by Japanese automakers, which allow them to produce efficiently by allocating different productions in each country and then exporting them to the region, may probably limit Thailand's local production base autonomy.

## **V. Conclusive remarks**

The process of expansion of Japanese capitalism on the regional scale during the second half of the 1980s and throughout the last two decades has determined the regional division of labour wherein Thailand has acquired its role as a production and export hub, entering thus in Japanese automakers' value chain. As competitive pressures among global producers intensified, Thailand has been included in Western automakers' strategies too. This has deeply shaped the development of Thai automotive industry, which could be defined as *other-directed* by foreign capital efficient division of labour strategies. Much as macroeconomics indicators are impressive, they are not sufficient to give an overall description of the state of Thai industry, not even to highlight its weaknesses.

The first point to make is about the relation between local content in production and technology transfer. In this case, an analysis of the room to local production is unavoidable in order to comprehend to which extent technology transfer has happened. Nowadays, Thai capital manufacturing stands mainly at the lower stages of the automotive supply chain. From 1997-1998 crisis on, local firms have gone through a progressive downgrading of their competencies and functions, and their condition even worsened after the abolition of foreign ownership restrictions in 2000. The global dynamic of the shifting of cost pressure towards the lower stages of the value chain entails that those firms will base their competitiveness on costs rather than quality. Consequently, their products may incorporate less value added. This is supported by the evidence that the most part of the local supply base carries out basic functions and simple productions, often without any technological upgrading activity. In this condition, suppliers' asset specificity is very low and they face significant switching costs: as they mainly depend on market requirements and technological collaboration by their foreign partners, it is possible to affirm that they are 'captive' of their foreign costumers.

Thailand case may be taken as a demonstration that there exists a distinction between production activity and production control - that is, between production and power - which has its key element in the ownership of some strategic assets that allow value appropriation. In fact, the value produced

in Thailand goes through a transfer in foreign hands, which could be only partially measured here and will need further investigation.

*Technology dependence* has been identified as one of the main means of value transfer. There are at least three aspect of the issue to be mentioned. First, the local supply base depends on foreign capital, given especially the denationalization process it underwent in the last decade: in this way, Japanese and Western producers could internalize again technological strategic assets. Second, local firms depend on foreign technical assistance, which takes the form both of TA contracts and of the employment of foreign and especially Japanese machinery. Finally, the whole production process depends on R&D activities which are mainly held elsewhere, usually in global automakers' headquarters.

Also the *commercial dynamics* seem to highlight value transfer phenomena. Given the general surplus, which confirms Thailand's role as a significant export hub to global automakers, the analysis of trade flows shows some of the weaknesses of the country's trade position. The structural deficit towards Japan, which in 2010 was double than Thailand's surplus towards the ASEAN-5, points out an undeniable dependence on Japan's production, while the regional integration of production among ASEAN-5, which allows an efficient production to automakers, seems to be on the other hand constrictive for Thai local production expansion and autonomy.

Although the present analysis has only partially analyzed the case, and some deeper examination will be hence needed, it was however possible to document that, besides its central role as a production and export hub in the increasingly competitive automotive sector, Thailand seems to suffer from some deep weaknesses that produce value transfer towards Japan, and a structural dependence of the local sector and its development trajectory on global automakers' technology and strategies, seems to pose some doubts to the real strength of Thai auto industry.

**Table 1 – Automakers capacity in Thailand**

	1985	1989	1994	1999	2003	2005	2007	2010
Toyota	40,800	54,805	135,000	200,000	240,000	350,000	550,000	600,000 <sup>2</sup>
Mitsubishi	n.a.	54,000	126,600	174,400	190,200	170,200	200,000	200,000
Isuzu	30,000	27,400	83,200	140,600	189,600	200,000	220,000	220,000
General Motor	n.a.	n.a.	n.a.	40,000	40,000	100,000	160,000	160,000
Auto Alliance & Mazda	n.a.	7,200	8,400	135,000	135,000	135,000	155,000	275,000
Nissan	n.a.	23,520	96,500	113,100	124,000	102,000	134,400	200,000
Honda	n.a.	8,220	39,000	70,000	80,000	120,000	120,000	240,000
Hino	9,600	19,200	24,000	9,600	28,800	28,800	28,800	28,800
DaimlerChrysler	n.a.	2,340	4,600	14,900	18,100	16,300	16,300	16,300
YMC Assembly	6,000	12,000	14,000	12,000	12,000	12,000	12,000	12,000
Volvo	3,000	6,000	7,000	6,000	6,000	10,000	10,000	10,000
BMW	n.a.	n.a.	n.a.	n.a.	n.a.	10,000	10,000	10,000
Tata Motors	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	35,000	35,000
Total	89,400	214,685	538,300	915,600	1,063,700	1,254,300	1,651,500	2,007,100

Source: Techakanont, 2011, p.197

**Table 2 – Trade flows for Group I - Rubber and Glass components**

Group I	Exports										
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Japan	719,850	558,181	1,348,679	1,808,938	2,185,735	1,966,244	1,492,123	1,779,710	2,243,636	3,233,163	1,905,690
USA	1,906,876	2,767,151	2,038,553	2,601,130	2,087,449	1,044,430	1,594,504	1,576,595	3,906,294	6,126,731	5,947,630
UE 15	2,137,154	3,316,949	4,978,175	4,361,005	5,055,648	7,358,244	5,722,773	6,463,528	7,725,607	4,367,605	7,657,648
<b>Triad</b>	<b>4,763,880</b>	<b>6,642,281</b>	<b>8,365,407</b>	<b>8,771,073</b>	<b>9,328,832</b>	<b>10,368,918</b>	<b>8,809,400</b>	<b>9,819,833</b>	<b>13,875,537</b>	<b>13,727,499</b>	<b>15,510,968</b>
Indonesia	118,387	471,495	130,090	19,788	933,853	414,027	117,241	410,564	635,259	74,914	345,705
Malaysia	918,865	1,604,675	2,998,445	1,250,465	1,666,837	2,003,003	1,648,203	3,086,555	2,292,013	527,225	1,297,092
Philippines	49,086	267,753	305,864	2,192,781	356,452	478,202	331,542	613,485	226,122	403,588	640,726
Singapore	1,050,816	973,026	1,543,776	897,971	2,098,506	4,463,012	3,625,787	2,352,924	4,572,213	3,361,878	5,374,125
<b>ASEAN-5</b>	<b>2,137,154</b>	<b>3,316,949</b>	<b>4,978,175</b>	<b>4,361,005</b>	<b>5,055,648</b>	<b>7,358,244</b>	<b>5,722,773</b>	<b>6,463,528</b>	<b>7,725,607</b>	<b>4,367,605</b>	<b>7,657,648</b>
Group I	Imports										
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Japan	13,790,449	20,239,028	23,910,856	29,967,818	40,695,105	45,918,895	57,224,343	61,485,758	43,004,019	22,643,918	41,482,224
USA	2,438,557	3,396,970	3,372,943	2,898,971	3,939,047	7,442,311	8,384,307	10,501,685	11,096,449	12,406,800	9,746,217
UE-15	1,955,769	2,443,374	4,236,217	7,282,652	7,816,106	10,143,830	12,122,388	13,393,777	16,586,484	9,104,371	11,220,295
<b>Triad</b>	<b>18,184,775</b>	<b>26,079,372</b>	<b>31,520,016</b>	<b>40,149,441</b>	<b>52,450,258</b>	<b>63,505,036</b>	<b>77,731,038</b>	<b>85,381,220</b>	<b>70,686,952</b>	<b>44,155,089</b>	<b>62,448,736</b>
Indonesia	7,958	-	2,310	750	776	23,904	73,851	446,274	193,445	329,677	1,232,822
Malaysia	28,212	53,387	489,220	587,631	697,253	843,726	1,134,510	1,713,130	1,679,762	1,603,736	1,865,818
Philippines	250,176	239,717	279,290	253,053	358,770	416,873	617,579	609,110	720,848	497,698	408,757
Singapore	307,641	552,194	1,064,945	974,134	1,408,263	2,021,843	1,928,246	1,928,886	2,094,484	1,921,188	2,045,385
<b>ASEAN-5</b>	<b>593,987</b>	<b>845,298</b>	<b>1,835,765</b>	<b>1,815,568</b>	<b>2,465,062</b>	<b>3,306,346</b>	<b>3,754,186</b>	<b>4,697,400</b>	<b>4,688,539</b>	<b>4,352,299</b>	<b>5,552,782</b>
Group I	Exports										
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Japan	3,256,662	3,888,580	4,584,382	10,623,684	12,547,178	10,128,027	8,620,867	11,421,172	9,523,252	7,271,780	10,694,107
USA	7,629,425	6,460,108	5,152,919	5,466,322	2,876,497	6,470,119	9,188,272	11,468,132	9,140,050	7,106,708	7,831,383
UE 15	9,188,822	10,811,831	13,203,367	20,093,626	29,265,386	34,907,203	33,395,980	48,594,290	50,873,192	35,888,295	51,498,310
<b>Triad</b>	<b>20,074,909</b>	<b>21,160,519</b>	<b>22,940,668</b>	<b>36,183,632</b>	<b>44,689,061</b>	<b>51,505,349</b>	<b>51,205,119</b>	<b>71,483,594</b>	<b>69,536,494</b>	<b>50,266,783</b>	<b>70,023,800</b>
Indonesia	512,661	1,160,100	2,710,261	4,127,206	5,606,005	9,852,908	7,595,197	21,397,788	19,145,094	12,819,504	21,095,865
Malaysia	2,188,000	2,838,212	4,417,939	4,185,566	6,384,515	7,249,246	6,586,193	8,324,613	13,933,304	10,284,962	15,176,949
Philippines	1,050,734	1,560,076	961,863	1,781,220	3,398,431	4,385,011	4,774,748	5,240,174	5,675,854	5,750,191	7,518,380
Singapore	5,437,427	5,253,443	5,113,304	9,999,634	13,876,435	13,420,038	14,439,842	13,631,715	12,118,940	7,033,638	7,707,116
<b>ASEAN-5</b>	<b>9,188,822</b>	<b>10,811,831</b>	<b>13,203,367</b>	<b>20,093,626</b>	<b>29,265,386</b>	<b>34,907,203</b>	<b>33,395,980</b>	<b>48,594,290</b>	<b>50,873,192</b>	<b>35,888,295</b>	<b>51,498,310</b>
Group I	Imports										
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Japan	55,042,013	25,451,817	22,291,495	19,939,562	24,231,408	20,172,804	20,279,277	15,231,159	15,230,119	13,468,172	21,966,445
USA	7,326,527	3,474,711	4,854,534	3,710,761	5,991,144	6,099,727	6,386,827	5,740,456	6,628,351	6,539,656	12,054,317
UE-15	11,493,496	8,786,555	6,390,684	6,938,816	5,460,737	6,790,746	7,636,758	8,056,207	8,868,099	6,610,786	10,698,014
<b>Triad</b>	<b>73,862,036</b>	<b>37,713,083</b>	<b>33,536,713</b>	<b>30,589,139</b>	<b>35,683,289</b>	<b>33,063,277</b>	<b>34,302,862</b>	<b>29,027,822</b>	<b>30,726,569</b>	<b>26,618,614</b>	<b>44,718,776</b>
Indonesia	1,480,154	1,632,807	1,320,748	4,269,482	4,849,507	5,648,529	6,672,399	1,191,323	1,601,892	1,421,973	1,330,819
Malaysia	2,022,583	702,995	218,310	98,494	430,377	633,340	743,097	485,919	532,144	393,142	1,633,747
Philippines	634,032	482,268	464,724	432,729	438,462	388,193	361,191	12,291	17,745	9,281	23,706
Singapore	2,137,997	803,974	314,262	298,997	392,428	543,029	1,410,981	900,736	713,224	1,332,337	2,073,978
<b>ASEAN-5</b>	<b>6,274,766</b>	<b>3,622,044</b>	<b>2,318,044</b>	<b>5,099,702</b>	<b>6,110,774</b>	<b>7,213,091</b>	<b>9,187,668</b>	<b>2,590,269</b>	<b>2,865,005</b>	<b>3,156,733</b>	<b>5,062,250</b>

Source: elaboration of the author on data from UN-Comtrade Database

**Table 3 – Trade flows for group II - Iron and Steel components**

Group II	Exports										
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Japan	3,469,359	5,584,261	10,345,074	11,597,187	8,976,792	8,633,140	9,477,858	10,887,754	13,961,508	21,773,215	25,261,215
USA	1,389,072	1,490,073	1,537,964	762,983	1,913,692	2,520,945	3,305,380	2,626,260	1,545,546	2,215,159	9,235,960
UE 15	962,606	1,911,563	2,337,605	4,308,429	5,889,966	6,670,984	10,142,496	9,926,228	9,016,402	12,271,693	11,006,552
<b>Triad</b>	<b>5,821,037</b>	<b>8,985,897</b>	<b>14,280,643</b>	<b>16,668,599</b>	<b>16,780,450</b>	<b>17,825,069</b>	<b>22,925,734</b>	<b>23,440,242</b>	<b>24,523,456</b>	<b>36,260,067</b>	<b>45,503,727</b>
Indonesia	34,837	13,621	19,538	43,484	95,940	108,571	133,241	413,385	432,272	485,696	533,914
Malaysia	666,553	392,047	471,986	451,474	600,934	700,266	1,080,178	1,932,805	4,052,956	693,772	1,238,526
Philippines	233,035	296,222	63,657	69,223	13,659	55,626	31,754	976,176	762,885	685,383	480,950
Singapore	2,026,054	2,187,185	2,433,374	2,470,978	2,264,066	2,650,451	2,740,268	3,678,389	2,230,981	2,125,558	1,335,249
<b>ASEAN-5</b>	<b>2,960,479</b>	<b>2,889,075</b>	<b>2,988,555</b>	<b>3,035,159</b>	<b>2,974,599</b>	<b>3,514,914</b>	<b>3,985,441</b>	<b>7,000,755</b>	<b>7,479,094</b>	<b>3,990,409</b>	<b>3,588,639</b>
Group II	Imports										
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Giappone	45,541,814	80,181,047	85,758,822	89,564,311	158,869,339	183,837,211	209,166,955	210,050,810	126,903,206	64,241,284	103,460,234
USA	1,572,476	2,364,870	2,963,112	2,909,376	3,921,033	5,810,767	6,953,265	8,424,331	7,813,016	7,411,120	6,957,650
UE-15	2,472,247	2,936,865	7,508,211	7,282,976	8,788,341	11,629,095	15,898,106	12,565,350	11,802,177	5,374,547	5,283,725
<b>Triad</b>	<b>49,586,537</b>	<b>85,482,782</b>	<b>96,230,145</b>	<b>99,756,663</b>	<b>171,578,713</b>	<b>201,277,073</b>	<b>232,018,326</b>	<b>231,040,491</b>	<b>146,518,399</b>	<b>77,026,951</b>	<b>115,701,609</b>
Indonesia	6,851	-	4,682	-	1,489	34,525	293,276	369,253	535,129	378,493	301,230
Malaysia	58,752	57,468	142,116	171,713	338,273	847,119	1,584,017	1,789,596	2,063,754	2,370,282	2,996,775
Philippines	1,913	26,291	4,637	14,041	130,857	1,123	50,602	12,508	438,581	91,566	87,190
Singapore	2,124,351	3,423,775	7,383,042	8,254,707	8,183,350	11,883,501	13,787,255	15,334,639	15,398,025	12,944,846	11,243,492
<b>ASEAN-5</b>	<b>2,191,867</b>	<b>3,507,534</b>	<b>7,534,477</b>	<b>8,440,461</b>	<b>8,653,969</b>	<b>12,766,268</b>	<b>15,715,150</b>	<b>17,505,996</b>	<b>18,435,489</b>	<b>15,785,187</b>	<b>14,628,687</b>
Group II	Exports										
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Japan	34,585,843	29,025,147	31,901,207	38,240,726	42,388,320	51,466,636	73,185,926	74,979,685	76,333,498	61,279,057	83,417,414
USA	21,057,055	14,674,164	31,638,491	41,242,890	60,001,421	65,742,294	87,867,897	108,360,345	108,381,688	76,655,535	120,428,938
UE 15	14,845,378	11,490,517	11,251,649	20,703,429	27,774,115	31,066,147	40,089,080	50,656,798	42,811,508	31,913,152	48,740,374
<b>Triad</b>	<b>70,488,276</b>	<b>55,189,828</b>	<b>74,791,347</b>	<b>100,187,045</b>	<b>130,163,856</b>	<b>148,275,077</b>	<b>201,142,903</b>	<b>233,996,828</b>	<b>227,526,694</b>	<b>169,847,744</b>	<b>252,586,726</b>
Indonesia	2,321,196	2,780,103	4,369,778	7,001,351	16,655,707	25,378,058	15,635,252	30,774,780	49,787,788	30,306,387	53,708,341
Malaysia	3,027,169	3,699,212	4,332,513	7,137,012	10,605,996	16,315,795	22,417,849	32,266,519	48,937,170	42,076,105	52,864,779
Philippines	1,431,370	1,389,622	2,442,614	2,485,585	2,330,045	4,886,248	7,120,000	8,868,893	14,008,721	13,127,469	15,793,918
Singapore	993,423	1,059,015	1,059,838	995,694	2,484,302	4,391,415	6,236,756	9,610,341	13,115,976	7,580,112	10,575,101
<b>ASEAN-5</b>	<b>7,773,158</b>	<b>8,927,952</b>	<b>12,204,743</b>	<b>17,619,642</b>	<b>32,076,050</b>	<b>50,971,516</b>	<b>51,409,857</b>	<b>81,520,533</b>	<b>125,849,655</b>	<b>93,090,073</b>	<b>132,942,139</b>
Group II	Imports										
	2,000	2,001	2,002	2,003	2,004	2,005	2,006	2,007	2,008	2,009	2,010
Japan	105,169,747	98,992,845	114,424,810	135,116,881	187,156,651	226,408,335	218,473,779	239,503,556	286,305,923	219,616,208	359,352,113
USA	7,040,547	4,887,205	7,047,572	19,287,507	15,504,946	10,676,240	13,157,515	18,228,960	16,551,319	12,467,648	16,559,598
UE 15	10,106,141	21,106,036	16,389,449	14,273,363	12,902,841	17,384,488	14,503,894	19,723,815	21,821,448	19,004,744	34,905,809
<b>Triad</b>	<b>122,316,435</b>	<b>124,986,086</b>	<b>137,861,831</b>	<b>168,677,751</b>	<b>215,564,438</b>	<b>254,469,063</b>	<b>246,135,188</b>	<b>277,456,331</b>	<b>324,678,690</b>	<b>251,088,600</b>	<b>410,817,520</b>
Indonesia	123,898	354,433	286,018	432,038	2,239,345	7,609,835	9,860,169	13,722,833	16,763,015	14,106,784	24,419,456
Malaysia	4,089,647	1,990,049	4,397,631	4,893,862	7,068,104	12,944,878	14,495,628	22,817,552	33,630,313	28,399,418	38,176,622
Philippines	483,595	352,091	111,438	614,234	1,078,880	533,738	661,346	470,915	711,398	589,773	1,707,517
Singapore	11,654,719	11,678,426	13,596,995	17,749,201	20,662,789	37,437,500	52,322,123	59,652,543	59,373,323	105,294,125	53,614,415
<b>ASEAN-5</b>	<b>16,351,859</b>	<b>14,374,999</b>	<b>18,392,082</b>	<b>23,689,335</b>	<b>31,049,118</b>	<b>58,525,951</b>	<b>77,339,266</b>	<b>96,663,843</b>	<b>110,478,049</b>	<b>148,390,100</b>	<b>117,918,010</b>

Source: elaboration of the author on data from UN-Comtrade Database

**Table 4 – Trade flows for group III - Engines and parts thereof**

Group III	Exports										
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Japan	4.102.363	6.345.011	7.407.939	7.785.404	7.259.955	3.802.738	14.992.134	23.437.110	24.686.783	41.776.785	48.454.451
USA	1.199.809	1.423.707	1.862.643	2.857.793	3.214.992	3.059.412	4.274.982	3.609.595	2.428.658	1.381.150	939.013
UE 15	3.551.223	5.799.928	8.044.298	14.991.745	15.585.609	14.982.180	14.168.903	12.476.271	9.226.456	9.505.447	13.400.510
<b>Triad</b>	<b>8.853.395</b>	<b>13.568.646</b>	<b>17.314.880</b>	<b>25.634.942</b>	<b>26.060.556</b>	<b>21.844.330</b>	<b>33.436.019</b>	<b>39.522.976</b>	<b>36.341.897</b>	<b>52.663.382</b>	<b>62.793.974</b>
Indonesia	764.122	747.887	680.050	826.739	1.171.000	1.235.074	1.598.778	5.364.820	31.120.842	3.160.993	15.741.309
Malaysia	270.833	528.871	833.025	1.904.702	4.495.740	8.254.922	12.635.244	13.879.606	10.669.657	782.842	7.517.356
Philippines	680.965	172.773	3.218.808	2.170.693	4.133.005	3.256.578	7.938.944	10.313.009	6.249.180	3.943.124	5.862.138
Singapore	1.730.134	1.629.058	733.695	936.849	11.091.607	1.231.747	1.325.081	2.709.494	7.451.622	2.701.004	594.495
<b>ASEAN-5</b>	<b>3.446.054</b>	<b>3.078.589</b>	<b>5.465.578</b>	<b>5.838.983</b>	<b>20.891.352</b>	<b>13.978.321</b>	<b>23.498.047</b>	<b>32.266.929</b>	<b>55.491.301</b>	<b>10.587.963</b>	<b>29.715.298</b>
Group III	Imports										
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Japan	1.110.789.888	1.450.005.576	941.656.060	902.805.126	1.089.271.693	1.393.120.744	1.891.448.582	1.758.798.814	917.129.935	207.388.329	409.248.183
USA	5.410.938	6.049.454	7.127.970	8.430.050	9.263.861	9.362.064	16.900.087	17.810.567	14.763.365	12.470.781	12.660.523
UE 15	17.002.365	32.861.558	82.827.892	38.230.641	36.307.746	80.195.854	75.666.738	42.584.659	29.898.767	38.595.825	24.784.423
<b>Triad</b>	<b>1.133.203.191</b>	<b>1.488.916.588</b>	<b>1.031.611.922</b>	<b>949.465.817</b>	<b>1.134.843.300</b>	<b>1.482.678.662</b>	<b>1.984.015.407</b>	<b>1.819.194.040</b>	<b>961.792.067</b>	<b>258.454.935</b>	<b>446.693.129</b>
Indonesia	105.923	9.637	252.909	968.612	834.655	587.991	521.685	326.233	1.713.707	3.006.166	2.212.395
Malaysia	668	83.609	16.235	53.771	511.548	178.296	158.568	118.820	356.652	142.912	2.566.414
Philippines	2.180.014	0	0	0	0	343.331	1.791.024	206.344	740.819	1.442.454	122.303
Singapore	153.256	618.467	900.678	668.036	1.267.465	920.506	489.364	1.889.025	1.097.349	810.420	672.249
<b>ASEAN-5</b>	<b>2.439.861</b>	<b>711.713</b>	<b>1.169.822</b>	<b>1.690.419</b>	<b>2.613.668</b>	<b>2.030.124</b>	<b>2.960.641</b>	<b>2.540.422</b>	<b>3.908.527</b>	<b>5.401.952</b>	<b>5.573.361</b>
Group III	Exports										
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Japan	52.636.355	37.601.539	47.020.263	52.243.780	68.101.489	111.834.377	216.687.161	337.472.779	334.059.563	167.539.676	335.292.470
USA	2.982.940	9.308.585	11.898.932	17.970.814	31.972.612	42.267.587	55.489.257	48.760.114	40.134.505	35.304.984	51.650.955
UE 15	11.575.248	10.178.585	11.681.791	15.218.254	16.609.130	27.648.583	49.252.923	50.351.458	52.149.906	30.069.188	58.466.145
<b>Triad</b>	<b>67.194.543</b>	<b>57.088.709</b>	<b>70.600.986</b>	<b>85.432.848</b>	<b>116.683.231</b>	<b>181.750.547</b>	<b>321.429.341</b>	<b>436.584.351</b>	<b>426.343.974</b>	<b>232.913.848</b>	<b>445.409.570</b>
Indonesia	54.762.743	59.426.543	59.466.726	73.298.825	142.143.086	190.947.048	138.619.157	207.831.457	343.147.741	237.153.054	374.142.358
Malaysia	18.720.762	18.842.527	23.913.331	54.714.594	82.656.072	102.274.396	120.899.462	156.634.815	227.745.621	180.111.771	242.804.045
Philippines	12.261.546	9.555.622	18.306.371	35.540.881	47.592.372	91.042.703	96.236.777	115.554.934	92.355.686	84.030.627	125.993.019
Singapore	649.532	2.744.172	7.691.935	12.514.999	15.428.072	30.057.556	48.249.345	23.533.315	18.553.971	14.365.593	16.685.216
<b>ASEAN-5</b>	<b>86.394.583</b>	<b>90.568.864</b>	<b>109.378.363</b>	<b>176.069.299</b>	<b>287.819.602</b>	<b>414.321.703</b>	<b>404.004.741</b>	<b>503.554.521</b>	<b>681.803.019</b>	<b>515.661.045</b>	<b>759.624.638</b>
Group III	Imports										
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Japan	621.410.886	569.738.653	779.066.425	1.035.764.431	1.179.144.480	1.291.043.280	1.389.565.072	1.534.787.038	1.796.434.973	1.330.960.173	2.377.338.083
USA	11.668.460	22.277.177	12.300.077	12.853.797	12.729.585	17.486.970	24.198.569	44.158.583	67.360.211	58.191.266	50.326.268
UE 15	36.768.481	130.620.796	147.452.523	91.200.515	57.873.430	42.561.787	56.130.849	110.953.471	178.018.093	129.889.970	171.257.479
<b>Triad</b>	<b>669.847.827</b>	<b>722.636.626</b>	<b>938.819.025</b>	<b>1.139.818.743</b>	<b>1.249.747.495</b>	<b>1.351.092.037</b>	<b>1.469.894.490</b>	<b>1.689.899.092</b>	<b>2.041.813.277</b>	<b>1.519.041.409</b>	<b>2.598.921.830</b>
Indonesia	2.397.568	4.650.387	5.779.613	19.774.368	32.131.706	89.801.149	102.078.967	112.575.623	135.210.351	119.096.133	186.045.745
Malaysia	5.162.526	3.629.410	10.676.327	4.436.075	3.303.850	5.225.278	2.022.119	1.620.261	2.605.108	2.214.637	3.185.433
Philippines	5.539.219	880.583	1.758.792	7.528.790	9.773.185	13.929.848	22.267.969	23.446.346	25.674.395	24.044.372	36.125.231
Singapore	802.324	710.367	958.756	2.159.923	2.178.234	4.517.929	3.280.044	4.581.790	6.982.016	3.577.206	6.721.035
<b>ASEAN-5</b>	<b>13.901.637</b>	<b>9.870.747</b>	<b>19.173.488</b>	<b>33.899.156</b>	<b>47.386.975</b>	<b>113.474.204</b>	<b>129.649.099</b>	<b>142.224.020</b>	<b>170.471.870</b>	<b>148.932.348</b>	<b>232.077.444</b>

Source: elaboration of the author on data from UN-Comtrade Database



**Table 5 – Trade flows for group IV - Small parts such as pulleys, gaskets, electrical fittings etc**

Group IV	Exports										
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Japan	2,517,938	3,651,126	5,664,478	8,671,255	17,957,585	16,978,580	14,404,509	9,280,359	8,570,947	20,805,600	35,155,725
USA	4,528,537	4,890,110	5,621,174	12,290,956	13,056,823	16,955,386	16,358,572	17,839,493	9,481,420	7,130,796	12,876,327
UE 15	102,661	223,504	269,200	2,301,714	3,539,052	3,034,736	6,314,886	2,084,233	935,629	1,759,957	2,606,180
<b>Triad</b>	<b>7,149,136</b>	<b>8,764,740</b>	<b>11,554,852</b>	<b>23,263,925</b>	<b>34,553,460</b>	<b>36,968,702</b>	<b>37,077,967</b>	<b>29,204,085</b>	<b>18,987,996</b>	<b>29,696,353</b>	<b>50,638,232</b>
Indonesia	194,980	1,609,171	2,223,520	1,390,526	1,801,465	2,085,066	3,564,570	14,861,148	11,067,876	1,617,457	5,334,071
Malaysia	1,632,966	2,749,018	3,381,692	3,575,354	11,645,173	18,368,441	5,756,664	6,504,431	11,534,994	5,967,281	14,161,347
Philippines	207,167	72,124	208,495	412,477	795,565	770,426	377,731	1,416,470	2,152,829	1,530,260	2,150,132
Singapore	859,240	788,338	1,211,764	2,321,381	194,739,221	157,361,033	175,600,350	2,284,378	2,956,325	2,146,421	2,181,704
<b>ASEAN-5</b>	<b>2,894,353</b>	<b>5,218,651</b>	<b>7,025,471</b>	<b>7,699,738</b>	<b>208,981,424</b>	<b>178,584,966</b>	<b>185,299,315</b>	<b>25,066,427</b>	<b>27,711,824</b>	<b>11,261,419</b>	<b>23,827,254</b>
Group IV	Imports										
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Japan	94,922,083	122,321,843	118,201,348	134,857,181	193,277,384	227,002,472	277,632,271	207,825,188	131,717,308	69,351,651	112,134,827
USA	6,398,023	6,935,530	7,863,190	11,641,785	15,590,918	18,404,909	20,755,415	27,670,056	24,432,745	19,143,816	24,399,679
UE 15	14,270,339	16,546,301	29,862,111	36,661,236	44,796,373	52,361,967	82,793,432	82,741,604	66,029,559	29,350,307	56,724,740
<b>Triad</b>	<b>115,590,445</b>	<b>145,803,674</b>	<b>155,926,649</b>	<b>183,160,202</b>	<b>253,664,675</b>	<b>297,769,348</b>	<b>381,181,118</b>	<b>318,236,848</b>	<b>222,179,612</b>	<b>117,845,774</b>	<b>193,259,246</b>
Indonesia	1,041,454	903,191	869,914	1,767,472	1,527,688	1,898,946	2,414,605	2,310,797	2,198,983	1,772,517	2,078,676
Malaysia	80,584	373,327	146,386	162,566	387,786	1,028,212	3,959,167	5,180,618	2,153,526	1,123,219	3,388,408
Philippines	16,859	57,790	327,473	715,986	1,001,072	94,591	376,130	1,027,252	1,318,858	963,858	1,312,174
Singapore	2,127,713	1,715,563	1,413,385	3,101,819	3,182,222	6,237,508	9,850,669	6,962,133	5,174,122	3,883,911	2,741,556
<b>ASEAN-5</b>	<b>3,266,610</b>	<b>3,049,871</b>	<b>2,757,158</b>	<b>5,747,843</b>	<b>6,098,768</b>	<b>9,259,257</b>	<b>16,600,571</b>	<b>15,480,800</b>	<b>10,845,489</b>	<b>7,743,505</b>	<b>9,520,814</b>
Group IV	Exports										
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Japan	42,608,144	29,237,015	31,602,126	43,104,741	55,069,003	61,047,511	72,596,842	103,859,036	98,471,712	54,214,317	103,970,174
USA	13,032,934	13,179,756	16,420,445	14,525,458	19,557,373	24,933,008	24,478,594	31,179,011	20,156,679	12,990,152	25,287,405
UE 15	3,285,085	5,360,852	6,634,546	15,141,337	24,132,625	34,566,970	44,510,823	50,644,466	50,870,030	32,495,153	46,688,149
<b>Triad</b>	<b>58,926,163</b>	<b>47,777,623</b>	<b>54,657,117</b>	<b>72,771,536</b>	<b>98,759,001</b>	<b>120,547,489</b>	<b>141,586,259</b>	<b>185,682,513</b>	<b>169,498,421</b>	<b>99,699,622</b>	<b>175,945,728</b>
Indonesia	18,966,800	24,245,918	34,594,511	40,910,776	59,882,325	70,630,347	56,844,347	103,568,195	148,338,569	111,040,824	158,925,367
Malaysia	17,275,638	26,872,183	30,702,778	33,421,534	41,981,310	49,536,313	56,090,856	67,971,577	89,094,981	75,825,833	89,528,112
Philippines	4,000,428	4,019,103	4,861,552	5,417,701	7,328,215	13,178,805	20,355,614	26,114,482	30,400,897	29,302,633	41,898,932
Singapore	2,130,387	3,048,175	3,826,785	5,759,162	8,683,391	9,879,030	9,552,450	19,854,764	26,773,373	16,322,026	17,330,063
<b>ASEAN-5</b>	<b>42,373,253</b>	<b>58,185,379</b>	<b>73,985,626</b>	<b>85,509,173</b>	<b>117,875,241</b>	<b>143,224,495</b>	<b>142,843,267</b>	<b>217,509,018</b>	<b>294,607,820</b>	<b>232,491,316</b>	<b>307,682,474</b>
Group IV	Imports										
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Japan	146,526,583	140,198,143	154,836,030	212,874,802	280,990,933	334,704,452	343,753,908	381,416,501	441,760,740	360,054,143	562,827,109
USA	33,279,783	21,869,502	29,685,468	37,427,181	56,949,047	39,445,915	44,224,664	64,001,959	73,581,219	53,006,179	53,966,614
UE 15	40,917,403	48,506,166	49,367,036	54,381,299	70,734,543	83,688,798	73,251,656	99,219,917	123,233,038	89,413,063	121,001,804
<b>Triad</b>	<b>220,723,769</b>	<b>210,573,811</b>	<b>233,888,534</b>	<b>304,683,282</b>	<b>408,674,523</b>	<b>457,839,165</b>	<b>461,230,228</b>	<b>544,638,377</b>	<b>638,574,997</b>	<b>502,473,385</b>	<b>737,795,527</b>
Indonesia	2,235,093	4,235,205	4,498,435	11,688,054	24,325,792	40,626,080	37,502,556	41,437,323	51,652,477	37,948,291	61,853,553
Malaysia	4,823,424	6,294,942	6,728,985	15,184,615	22,952,622	26,530,706	31,241,528	30,581,788	28,257,325	22,073,796	39,347,113
Philippines	4,527,342	10,626,701	15,923,659	14,790,335	20,424,165	25,350,769	27,101,517	33,861,125	34,452,510	23,512,029	33,696,548
Singapore	3,021,948	3,973,874	4,635,819	5,561,695	10,021,498	9,313,322	9,085,518	12,303,219	16,808,151	13,505,477	11,890,732
<b>ASEAN-5</b>	<b>14,607,807</b>	<b>25,130,722</b>	<b>31,786,898</b>	<b>47,224,699</b>	<b>77,724,077</b>	<b>101,820,877</b>	<b>104,931,119</b>	<b>118,183,455</b>	<b>131,170,463</b>	<b>97,039,593</b>	<b>146,787,946</b>

Source: elaboration of the author on data from UN-Comtrade Database

**Table 6 – Trade flows for group V - Body parts, bumpers, brakes, clutches and other safety components**

Group V	Exports										
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Japan	2.571.834	2.142.187	6.756.911	9.826.129	10.606.732	10.046.385	11.421.190	17.552.746	40.786.749	73.098.344	104.139.650
USA	8.473.021	9.228.599	13.199.281	13.349.947	18.860.257	23.953.640	25.648.305	32.406.690	36.667.612	45.049.676	63.780.561
UE 15	2.397.811	2.047.720	6.035.751	8.403.805	9.747.858	9.590.813	15.975.340	9.762.430	7.816.480	23.861.466	63.732.195
<b>Triad</b>	<b>13.442.666</b>	<b>13.418.506</b>	<b>25.991.943</b>	<b>31.579.881</b>	<b>39.214.847</b>	<b>43.590.838</b>	<b>53.044.835</b>	<b>59.721.866</b>	<b>85.270.841</b>	<b>142.009.486</b>	<b>231.652.406</b>
Indonesia	377.158	900.548	653.704	148.942	533.392	666.917	3.243.466	1.712.522	4.289.249	1.662.507	3.244.368
Malaysia	921.064	1.041.061	1.616.545	1.677.739	4.455.120	8.057.634	8.014.837	13.213.529	20.709.285	1.693.735	19.374.653
Philippines	369.793	219.366	238.099	800.152	1.931.304	1.806.153	2.742.204	14.267.063	11.040.373	8.189.287	12.987.783
Singapore	5.356.461	4.354.280	5.292.589	6.701.094	116.386.462	237.190.241	27.680.196	5.413.339	5.253.622	9.487.143	3.312.969
<b>ASEAN-5</b>	<b>7.024.476</b>	<b>6.515.255</b>	<b>7.800.937</b>	<b>9.327.927</b>	<b>123.306.278</b>	<b>247.720.945</b>	<b>41.680.703</b>	<b>34.606.453</b>	<b>41.292.529</b>	<b>21.032.672</b>	<b>38.919.773</b>
Group V	Imports										
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Japan	297.774.399	510.835.065	491.231.606	446.831.256	794.965.514	958.028.753	1.500.603.834	1.745.430.282	827.144.573	171.030.142	554.979.242
USA	39.131.587	21.470.943	8.080.750	6.574.843	24.176.732	14.108.761	18.333.230	23.022.057	17.571.407	14.258.578	17.321.694
UE 15	22.938.775	33.994.549	49.524.260	48.948.640	66.942.171	68.016.758	87.643.157	96.605.420	56.334.011	25.487.540	29.278.147
<b>Triad</b>	<b>359.844.761</b>	<b>566.300.557</b>	<b>548.836.616</b>	<b>502.354.739</b>	<b>886.084.417</b>	<b>1.040.154.272</b>	<b>1.606.580.221</b>	<b>1.865.057.759</b>	<b>901.049.991</b>	<b>210.776.260</b>	<b>601.579.083</b>
Indonesia	266.777	402.836	228.715	46.391	248.135	491.810	3.003.570	3.745.056	4.392.064	2.297.432	11.607.942
Malaysia	1.448.360	796.255	1.023.523	2.366.857	5.290.061	5.036.001	10.421.768	14.440.785	13.823.335	3.260.489	4.523.093
Philippines	8.190.362	9.023.744	8.038.785	8.841.819	32.208.730	47.274.823	62.451.342	66.856.211	42.046.460	8.041.114	41.126.303
Singapore	168.105	724.557	1.124.565	1.299.358	2.274.409	786.680	772.049	1.442.538	726.591	166.568	423.209
<b>ASEAN-5</b>	<b>10.073.604</b>	<b>10.947.392</b>	<b>10.415.588</b>	<b>12.554.425</b>	<b>40.021.335</b>	<b>53.589.314</b>	<b>76.648.729</b>	<b>86.484.590</b>	<b>60.988.450</b>	<b>13.765.603</b>	<b>57.680.547</b>
Group V	Exports										
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Japan	128.870.007	139.488.557	167.453.081	230.709.527	298.225.121	311.217.341	372.218.284	469.188.665	604.735.232	300.313.522	444.868.838
USA	62.516.656	58.811.860	71.529.305	73.032.489	106.009.396	165.398.572	200.123.822	150.489.094	125.931.605	98.452.178	146.300.844
UE 15	80.110.022	66.820.918	69.190.406	88.620.848	111.935.102	117.772.144	176.720.293	231.698.345	228.463.278	146.819.391	237.172.689
<b>Triad</b>	<b>271.496.685</b>	<b>265.121.335</b>	<b>308.172.792</b>	<b>392.362.864</b>	<b>516.169.619</b>	<b>594.388.057</b>	<b>749.062.399</b>	<b>851.376.104</b>	<b>959.130.115</b>	<b>545.585.091</b>	<b>828.342.371</b>
Indonesia	27.826.789	28.120.290	41.536.007	53.055.505	127.517.266	223.322.879	160.497.528	381.351.697	540.927.003	274.535.797	501.427.521
Malaysia	46.689.889	57.306.273	85.620.813	140.220.637	181.880.024	321.484.706	329.449.550	345.722.473	458.770.359	408.820.995	496.840.394
Philippines	22.198.916	25.397.995	37.563.863	41.701.708	32.014.277	55.092.622	62.376.146	88.751.640	113.808.972	116.960.022	155.201.416
Singapore	4.188.873	6.449.046	5.512.507	11.267.724	18.012.280	36.662.476	36.204.998	37.641.243	45.761.590	23.764.103	28.642.041
<b>ASEAN-5</b>	<b>100.904.467</b>	<b>117.273.604</b>	<b>170.233.190</b>	<b>246.245.574</b>	<b>359.423.847</b>	<b>636.562.683</b>	<b>588.528.222</b>	<b>853.467.053</b>	<b>1.159.267.924</b>	<b>824.080.917</b>	<b>1.182.111.372</b>
Group V	Imports										
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Japan	944.804.993	874.083.669	1.076.627.170	1.478.011.208	1.725.204.479	1.865.561.399	1.781.781.747	1.714.217.070	1.934.321.042	1.634.462.980	3.002.312.991
USA	37.009.697	22.822.501	25.132.910	34.390.413	41.974.453	51.185.751	46.949.339	44.948.338	45.150.144	42.129.806	54.499.622
UE 15	190.622.467	269.065.065	251.569.841	229.513.016	301.395.031	256.062.237	164.317.375	174.528.112	238.377.859	178.599.859	246.907.885
<b>Triad</b>	<b>1.172.437.157</b>	<b>1.165.971.235</b>	<b>1.353.329.921</b>	<b>1.741.914.637</b>	<b>2.068.573.963</b>	<b>2.172.809.387</b>	<b>1.993.048.461</b>	<b>1.933.693.520</b>	<b>2.217.849.045</b>	<b>1.855.192.645</b>	<b>3.303.720.498</b>
Indonesia	24.604.115	28.140.283	44.165.752	58.738.952	64.701.495	78.134.746	97.385.418	139.291.745	191.653.711	171.272.546	252.972.413
Malaysia	16.014.860	21.277.804	33.934.234	58.838.525	65.439.549	68.315.515	67.945.506	73.098.009	81.566.189	62.353.507	83.945.762
Philippines	95.097.143	98.602.929	141.965.687	185.525.736	196.205.825	242.243.733	219.775.580	222.079.582	290.860.610	211.625.489	355.994.770
Singapore	547.335	507.950	937.207	2.081.341	3.017.543	2.490.050	3.185.003	6.175.299	4.357.729	24.447.830	97.721.775
<b>ASEAN-5</b>	<b>136.263.453</b>	<b>148.528.966</b>	<b>221.002.880</b>	<b>305.184.554</b>	<b>329.364.412</b>	<b>391.184.044</b>	<b>388.291.507</b>	<b>440.644.635</b>	<b>568.438.239</b>	<b>469.699.372</b>	<b>790.634.720</b>

Source: elaboration of the author on data from UN-Comtrade Database

**Table 7 – Trade flows for group VI - Seats and indicators**

Group VI	Exports										
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Japan	350.794	298.315	527.750	2.399.369	2.578.626	1.354.733	1.493.290	1.464.963	3.809.733	5.184.821	13.524.574
USA	35.686	1.499	49.277	83.928	214.144	515.991	251.454	188.691	244.280	503.358	577.235
UE 15	205.374	125.542	147.967	616.188	1.676.056	2.506.176	4.940.040	5.188.914	6.631.976	13.549.612	6.745.965
<b>Triad</b>	<b>591.854</b>	<b>425.356</b>	<b>724.994</b>	<b>3.099.485</b>	<b>4.468.826</b>	<b>4.376.900</b>	<b>6.684.784</b>	<b>6.842.568</b>	<b>10.685.989</b>	<b>19.237.791</b>	<b>20.847.774</b>
Indonesia	710.511	1.433.473	1.715.835	1.228.115	2.326.267	2.674.073	1.443.186	3.713.955	5.199.275	659.573	634.907
Malaysia	2.091.357	3.352.402	3.083.464	2.021.063	4.030.251	3.712.358	2.815.717	4.163.120	2.759.316	808.918	2.828.914
Philippines	188.891	104.550	41.620	224.117	358.143	563.377	1.691.111	2.382.835	2.142.258	9.943.000	6.787.551
Singapore	572.907	189.818	202.816	281.143	762.255	969.072	844.902	1.107.462	1.197.483	2.736.108	366.264
<b>ASEAN-5</b>	<b>3.563.666</b>	<b>5.080.243</b>	<b>5.043.735</b>	<b>3.754.438</b>	<b>7.476.916</b>	<b>7.918.880</b>	<b>6.794.916</b>	<b>11.367.372</b>	<b>11.298.332</b>	<b>14.147.599</b>	<b>10.617.636</b>
Group VI	Imports										
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Japan	75.457.656	117.960.194	146.229.622	163.862.376	232.661.242	289.666.472	421.284.008	296.330.259	126.589.453	42.870.165	44.251.175
USA	555.284	1.062.052	885.203	1.017.644	741.348	800.541	1.369.967	1.602.011	1.770.611	1.036.332	900.522
UE 15	1.112.257	2.456.430	3.681.199	3.163.003	1.657.739	2.105.511	3.112.974	4.397.931	2.484.115	840.384	935.301
<b>Triad</b>	<b>77.125.197</b>	<b>121.478.676</b>	<b>150.796.024</b>	<b>168.043.023</b>	<b>235.060.329</b>	<b>292.572.524</b>	<b>425.766.949</b>	<b>302.330.201</b>	<b>130.844.179</b>	<b>44.746.881</b>	<b>46.086.998</b>
Indonesia	85.750	17.782	7.178	0	73.572	248.851	304.650	850.459	89.803	161.699	31.408
Malaysia	86.444	217.365	246.192	36.476	133.673	204.058	269.926	70.019	102.252	75.177	163.078
Philippines	0	0	0	0	0	2.049	23.456	45.718	1.125	7.528	1.347
Singapore	38.827	106.663	179.139	75.482	97.162	135.533	139.963	60.801	101.852	197.038	133.347
<b>ASEAN-5</b>	<b>211.021</b>	<b>341.810</b>	<b>432.509</b>	<b>111.958</b>	<b>304.407</b>	<b>590.491</b>	<b>737.995</b>	<b>1.026.997</b>	<b>295.032</b>	<b>441.442</b>	<b>329.180</b>
Group VI	Exports										
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Japan	17.919.652	16.635.676	9.401.458	34.936.854	23.328.018	24.623.713	28.181.732	22.293.184	29.383.225	29.045.665	39.197.566
USA	568.864	1.185.798	1.582.859	1.058.472	1.096.939	7.375.289	16.004.211	20.165.448	26.830.738	16.875.578	17.370.449
UE 15	7.110.404	6.152.916	8.030.385	13.888.870	30.147.203	33.542.239	48.952.663	76.443.435	80.980.000	64.654.922	73.492.267
<b>Triad</b>	<b>25.598.920</b>	<b>23.974.390</b>	<b>19.014.702</b>	<b>49.884.196</b>	<b>54.572.160</b>	<b>65.541.241</b>	<b>93.138.606</b>	<b>118.902.067</b>	<b>137.193.963</b>	<b>110.576.165</b>	<b>130.060.282</b>
Indonesia	3.016.502	6.874.008	37.464.306	61.012.470	93.294.338	127.189.632	93.903.992	135.357.045	206.488.564	162.828.957	176.995.832
Malaysia	3.716.841	5.100.167	8.577.482	14.688.665	30.187.472	38.190.929	50.893.925	66.204.027	75.691.277	48.718.048	49.452.952
Philippines	17.707.522	18.573.972	22.328.403	20.093.220	31.077.497	52.789.263	90.404.333	88.964.248	57.059.831	45.049.392	66.286.343
Singapore	744.908	548.589	1.002.944	1.597.742	2.242.954	3.184.052	1.968.094	2.462.307	3.683.285	1.919.751	1.547.977
<b>ASEAN-5</b>	<b>25.185.773</b>	<b>31.096.736</b>	<b>69.373.135</b>	<b>97.392.097</b>	<b>156.802.261</b>	<b>221.353.876</b>	<b>237.170.344</b>	<b>292.987.627</b>	<b>342.922.957</b>	<b>258.516.148</b>	<b>294.283.104</b>
Group VI	Imports										
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Japan	58.730.984	54.064.681	35.607.979	30.256.355	32.406.580	36.411.306	38.336.677	60.919.871	127.675.583	100.385.132	147.970.132
USA	1.727.970	1.160.041	1.146.023	2.357.861	1.152.010	1.522.499	2.590.580	1.816.843	2.957.908	2.236.635	2.718.399
UE 15	2.075.131	2.739.656	3.756.582	4.697.505	2.953.664	4.750.475	10.372.136	25.076.585	27.702.849	16.732.962	33.046.901
<b>Triad</b>	<b>62.534.085</b>	<b>57.964.378</b>	<b>40.510.584</b>	<b>37.311.721</b>	<b>38.512.254</b>	<b>42.684.280</b>	<b>51.299.393</b>	<b>87.813.299</b>	<b>158.336.340</b>	<b>119.354.729</b>	<b>183.735.432</b>
Indonesia	327.876	267.222	11.888.269	12.878.263	23.532.840	31.127.831	31.814.830	22.022.519	22.746.748	13.883.864	23.609.494
Malaysia	336.749	656.537	2.593.762	1.783.579	2.246.359	2.357.336	2.487.430	3.512.412	6.966.345	3.484.911	7.073.385
Philippines	123.483	572.722	764.965	5.357.655	9.079.538	11.911.132	17.003.667	25.489.077	33.727.789	24.032.723	34.574.273
Singapore	142.583	211.551	112.045	183.485	163.335	274.254	182.357	606.914	558.858	630.948	1.017.048
<b>ASEAN-5</b>	<b>930.691</b>	<b>1.708.032</b>	<b>15.359.041</b>	<b>20.202.982</b>	<b>35.022.072</b>	<b>45.670.553</b>	<b>51.488.284</b>	<b>51.630.922</b>	<b>63.999.740</b>	<b>42.032.446</b>	<b>66.274.200</b>

Source: elaboration of the author on data from UN-Comtrade Database

**Table 8 – Trade flows for group VII – full vehicles**

Group VII	Exports										
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Japan	1.081.632	22.804	38.243	529.628	91.303	2.624.880	4.133.999	3.005.197	1.833.508	17.747.713	1.434.276
USA	335.520	20.611	38.243	104.534	91.303	357.292	799.242	236.896	1.833.508	15.472.474	5.037.349
UE 15	1.094.978	3.074.022	5.868.071	3.178.588	4.594.971	2.620.075	4.334.054	5.111.120	6.168.773	24.420.680	2.724.307
<b>Triad</b>	<b>2.512.130</b>	<b>3.117.437</b>	<b>5.944.557</b>	<b>3.812.750</b>	<b>4.777.577</b>	<b>5.602.247</b>	<b>9.267.295</b>	<b>8.353.213</b>	<b>9.835.789</b>	<b>57.640.867</b>	<b>9.195.932</b>
Indonesia	0	4.971	73.331	1.707	340.709	227.669	510.012	199.257	2.510.542	49.304	353.562
Malaysia	723.365	1.301.520	395.673	354.922	265.289	3.624.989	635.915	710.949	1.805.690	295.165	1.127.353
Philippines	12.703	4.264	18.686	50.677	91.416	2.032.536	3.605.702	5.394.285	14.477.630	4.372.785	5.443.946
Singapore	1.233.823	593.546	30.176.898	6.650.698	4.956.327	2.350.788	10.929.958	7.854.850	36.826.196	16.548.056	22.256.279
<b>ASEAN-5</b>	<b>1.969.891</b>	<b>1.904.301</b>	<b>30.664.588</b>	<b>7.058.004</b>	<b>5.653.741</b>	<b>8.235.982</b>	<b>15.681.587</b>	<b>14.159.341</b>	<b>55.620.058</b>	<b>21.265.310</b>	<b>29.181.140</b>
Group VII	Imports										
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Giappone	270.235.331	406.180.671	403.073.774	635.178.828	930.692.679	804.108.702	847.806.923	586.248.129	397.333.223	76.619.158	352.231.642
USA	24.440.191	13.166.592	13.283.529	13.958.159	19.570.071	30.780.810	52.761.337	83.532.138	63.321.569	25.999.980	38.888.584
UE-15	99.181.369	188.781.922	270.326.810	444.750.978	692.096.474	875.815.260	837.868.815	739.287.963	321.378.666	66.720.490	63.752.466
<b>Triad</b>	<b>393.856.891</b>	<b>608.129.185</b>	<b>686.684.113</b>	<b>1.093.887.965</b>	<b>1.642.359.224</b>	<b>1.710.704.772</b>	<b>1.738.437.075</b>	<b>1.409.068.230</b>	<b>782.033.458</b>	<b>169.339.628</b>	<b>454.872.692</b>
Indonesia	0	4.971	73.331	1.707	340.709	227.669	510.012	199.257	2.510.542	49.304	353.562
Malaysia	723.365	1.301.520	395.673	354.922	265.289	3.624.989	635.915	710.949	1.805.690	295.165	1.127.353
Philippines	12.703	4.264	18.686	50.677	91.416	2.032.536	3.605.702	5.394.285	14.477.630	4.372.785	5.443.946
Singapore	1.233.823	593.546	30.176.898	6.650.698	4.956.327	2.350.788	10.929.958	7.854.850	36.826.196	16.548.056	22.256.279
<b>ASEAN-5</b>	<b>1.969.891</b>	<b>1.904.301</b>	<b>30.664.588</b>	<b>7.058.004</b>	<b>5.653.741</b>	<b>8.235.982</b>	<b>15.681.587</b>	<b>14.159.341</b>	<b>55.620.058</b>	<b>21.265.310</b>	<b>29.181.140</b>
Group VII	Exports										
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Japan	3.464.518	3.298.880	34.003.849	13.698.537	71.036.082	17.247.946	22.022.909	9.798.582	36.848.164	27.401.501	145.504.365
USA	3.849.092	25.988.008	34.003.849	37.636.592	54.427.532	66.521.678	103.472.093	89.464.055	139.043.647	135.975.925	72.355.834
UE 15	59.780.029	425.839.982	312.496.547	117.549.192	63.138.097	72.548.035	68.860.866	177.329.853	258.106.550	176.372.846	247.061.357
<b>Triad</b>	<b>67.093.639</b>	<b>455.126.870</b>	<b>380.504.245</b>	<b>168.884.321</b>	<b>188.601.711</b>	<b>156.317.659</b>	<b>194.355.868</b>	<b>276.592.490</b>	<b>433.998.361</b>	<b>339.750.272</b>	<b>464.921.556</b>
Indonesia	7.349.089	17.508.524	29.519.228	189.895.964	384.811.134	462.796.255	338.136.689	423.804.413	628.007.464	421.596.609	981.001.029
Malaysia	432.388	3.618.218	2.360.287	20.483.734	65.438.877	61.630.266	90.586.742	208.563.653	337.006.194	252.257.659	441.146.039
Philippines	2.496.293	686.018	2.892.558	109.891.209	174.811.336	278.243.836	312.891.190	356.138.454	436.582.367	460.586.331	725.399.124
Singapore	40.562.847	26.664.129	18.418.329	73.037.498	232.205.498	246.417.819	279.707.728	142.587.555	225.213.513	144.737.245	52.707.228
<b>ASEAN-5</b>	<b>50.840.617</b>	<b>48.476.889</b>	<b>53.190.402</b>	<b>393.308.405</b>	<b>857.266.845</b>	<b>1.049.088.176</b>	<b>1.021.322.349</b>	<b>1.131.094.075</b>	<b>1.626.809.538</b>	<b>1.279.177.844</b>	<b>2.200.253.420</b>
Group VII	Imports										
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Giappone	224.368.072	177.799.107	172.429.003	217.820.027	299.065.881	384.941.840	474.144.790	686.555.795	868.339.360	687.277.115	813.062.270
USA	6.342.541	8.702.187	4.934.419	8.984.220	11.039.927	12.143.593	14.208.249	38.124.823	31.575.198	42.358.307	50.387.210
UE-15	186.897.256	106.688.834	144.190.659	56.172.121	162.653.508	170.814.353	127.387.919	169.607.097	137.985.588	140.909.776	321.633.908
<b>Triad</b>	<b>417.607.869</b>	<b>293.190.128</b>	<b>321.554.081</b>	<b>282.976.368</b>	<b>472.759.316</b>	<b>567.899.786</b>	<b>615.740.958</b>	<b>894.287.715</b>	<b>1.037.900.146</b>	<b>870.545.198</b>	<b>1.185.083.388</b>
Indonesia	1.799.916	4.168.544	10.537.193	33.602.860	83.093.026	90.380.777	29.522.597	33.041.928	52.114.885	28.653.608	189.094.897
Malaysia	539.784	517.158	14.847	221.941	122.416	74.234	19.388.596	10.934.474	41.112.858	24.426.367	66.324.245
Philippines	1.325.954	4.460.921	25.913.097	175.309.136	116.740.552	115.878.344	82.966.897	40.137.256	79.121.597	77.224.068	117.760.710
Singapore	15	850.123	597.627	362.305	263.590	243.841	381.717	915.750	1.755.883	991.159	169.035
<b>ASEAN-5</b>	<b>3.665.669</b>	<b>9.996.746</b>	<b>37.062.764</b>	<b>209.496.242</b>	<b>200.219.584</b>	<b>206.577.196</b>	<b>132.259.807</b>	<b>85.029.408</b>	<b>174.105.223</b>	<b>131.295.202</b>	<b>373.348.887</b>

Source: elaboration of the author on data from UN-Comtrade Database

## **Appendix – HS Codes Relevant to Automotive Sector**

### HS Code and Descriptions Groups

#### GROUP-I

- 400930 : Tubes, pipes & hoses vulcanized /rubber reinforced with textile material without fittings
- 400940 : Tubes, pipes & hoses vulcanised rubber reinforced nes ,without fittings
- 401693 : Gaskets, washers and other seals of vulcanised rubber
- 681210 : Fabricated asbestos fibres; mixture with a basis of asbestos and magnesium carbonates
- 681310 : Asbestos brake linings and pads
- 681390 : Asbestos friction material and articles nes
- 700711 : Safety glass toughened (tempered) vehicles, aircraft, spacecraft/vessel
- 700721 : Safety glass laminated for vehicles, aircraft, spacecraft or vessels
- 700729 : Safety glass laminated nes
- 700910 : Rear-view mirrors for vehicles

#### GROUP-II

- 731815 : Bolts o screws nes, with or without their nuts or washers, iron or steel
- 731823 : Rivets, iron or steel
- 731824 : Cotters and cotter-pins, iron or steel
- 731829 : Non-threaded articles of iron or steel, nes
- 732010 : Springs, leaf and leaves thereof, iron or steel
- 732020 : Springs, helical, iron or steel
- 732090 : Springs, iron or steel, nes
- 732619 : Articles of iron or steel, forged or stamped, but not further worked
- 830120 : Locks of a kind used for motor vehicles of base metal
- 830230 : Mountings, fittings & similar articles of base metal for motor vehicles, nes

#### GROUP-III

- 840731 : Engines, spark-ignition reciprocating, displacing not more than 50 cc
- 840732 : Engines, spark-ignition reciprocating, displacing >50 cc but not more 250cc
- 840733 : Engines, spark-ignition reciprocating, displacing > 250 cc to 1000 cc
- 840734 : Engines, spark-ignition reciprocating, displacing more than 1000 cc
- 840820 : Engines, diesel, for the vehicles of Chapter 87
- 840991 : Parts for spark-ignition type engines nes
- 840999 : Parts for diesel and semi-diesel engines
- 841330 : Fuel, lubricating or cooling medium pumps for internal combustion piston engines
- 842123 : Oil or petrol-filters for internal combustion engines
- 842131 : Intake air filters for internal combustion engines
- 870600 : Chassis fitted with engines for the vehicles of headings Nos 87.01 to 87.05

#### GROUP-IV

- 841520 : Air conditioners used in vehicles
- 842139 : Filtering or purifying machinery and apparatus for gases nes

848310 : Transmission shafts and cranks, including cam shafts and crank shafts  
848320 : Bearing housings, incorporating ball or roller bearings  
848340 : Gears & gearing, ball screws, gear boxes, speed changers/torque converters  
848350 : Flywheels and pulleys, including pulley blocks  
848360 : Clutches and shaft couplings (including universal joints)  
848390 : Parts of power transmission equipment/other goods used to transmit power  
848410 : Gaskets of metal sheeting combined with other material  
848420 : Mechanical seals  
848490 : Gasket sets consisting of gaskets of different materials  
851120 : Ignition magnetos, magneto-generators and magnetic flywheels  
851130 : Distributors and ignition coils  
851140 : Starter motors  
851190 : Parts of electrical ignition or starting equipment  
851220 : Lighting or visual signaling equipment nes  
851230 : Sound signaling equipment  
851240 : Windscreen wipes, defrosters and demisters  
851290 : Parts of electrical lighting, signaling and defrosting equipment

#### GROUP V

870710 : Bodies for passenger carrying vehicles  
870790 : Bodies for tractors, buses, trucks and special purpose vehicles  
870810 : Bumpers and parts for motor vehicles  
870821 : Safety seat belts for motor vehicles  
870829 : Parts and accessories of bodies nes for motor vehicles  
870831 : Mounted brake linings for motor vehicles  
870839 : Brake system parts nes for motor vehicles  
870840 : Transmissions for motor vehicles  
870850 : Drive axles with differential for motor vehicles  
870860 : Non-driving axles and parts for motor vehicles  
870870 : Wheels including parts and accessories for motor vehicles  
870880 : Shock absorbers for motor vehicles  
870891 : Radiators for motor vehicles  
870892 : Mufflers and exhaust pipes for motor vehicles  
870893 : Clutches and parts for motor vehicles  
870894 : Steering wheels, steering columns and steering boxes for motor vehicles  
870899 : Motor vehicle parts nes

#### GROUP-VI

871411 : Motorcycle saddles  
871419 : Motorcycle parts nes  
902910 : Revolution counters, prodion counters taximeters, milometer  
902920 : Speed indicators and tachometers; stroboscopes  
940120 : Seats, motor vehicles

## GROUP-VII

8701 : Tractors (other than tractors of heading no. 87.09)

8702 : Motor vehicles for the transport of ten or more persons, including the driver

8703 : Motor cars and other motor vehicles principally designed for the transport of persons other than those of heading no. 87.02, including station wagons and racing cars

8704 : Motor vehicles for the transport of goods

8705 : Special purpose motor vehicles, other than those principally designed for the transport of persons and goods

8711: Motorcycles (including mopeds) and cycles fitted with an auxiliary motors with or without side cars, side cars



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