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Thailand's automobile industry: The 'Detroit of Asia' confronting the BEV transition

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Thailand's automobile industry: The 'Detroit of the East' confronts the EV transition

Prema-chandra Athukorala and Archanun Kohpaiboon

Abstract

This paper explores the growth trajectory and current state of Thailand's automotive hub—often dubbed the “Detroit of the East”—and the adjustment challenges it faces in transitioning from the combustion engine era to the electric vehicle era. The findings suggest that Thailand's success has been driven by a combination of structural changes in the global automotive industry, which opened opportunities for peripheral countries to join production networks, and the pragmatic, market-oriented policy approach of Thai authorities, which made the country an attractive location for international production. Despite this impressive performance during the combustion engine era, Thailand's automotive sector is now undergoing significant structural adjustments due to the rise of electric vehicles. Whether Thailand can continue to function as a global automobile hub under the emerging dominance of Chinese BEV manufacturers remains uncertain. Even under the optimistic scenario of vehicle assembly continues to expand in Thailand under Chinese dominance, the parts and components segment—which accounts for the bulk of employment in the industry—is likely to face a substantial contraction in the BEV era. This gloomy prospect underscores the need for a reorientation of industrial and labour market policies, including targeted support for supplier upgrading, workforce reskilling, and the development of complementary manufacturing and services capabilities to mitigate employment losses.

JEL codes: F13, F14, F23, L16, O19, O25

Key words: Thailand, automobiles, battery electrical vehicles (BEVs), combustion engine vehicles (ICEs), industrialisation, globalisation.

1. Introduction

The automobile industry in Thailand has grown rapidly over the past four decades, with growth accelerating markedly since the late 1990s following the emergence of a world-class automotive cluster through global integration. Until the mid-1990s, automobile production in Thailand lagged behind that of India and Malaysia among Asian economies. In 2008, *The Economist* dubbed Thailand the “Detroit of the East” (*Economist Intelligence Unit* 2008, p. 21). Over subsequent decades, Thailand’s ranking in automobile production within Asia declined to sixth place as production expanded rapidly in China and India. However, in terms of export value, Thailand is currently the fourth-largest automobile exporter in Asia, after Japan, South Korea, and China. Automobile exports account for around 10 per cent of total merchandise exports and about 5 per cent of GDP. Despite this impressive performance during the internal-combustion-engine era of the global automotive industry, the Thai automotive sector is now undergoing significant structural adjustment driven by the global transition towards electric vehicles.

The purpose of this paper is to examine the growth trajectory and current state of the Thai automotive industry¹, with particular attention to the factors that underpinned its successful transition from import substitution to global integration through export expansion. The automobile industry has been targeted as a key instrument of industrial development in many countries because of its potential as a growth driver—providing employment, fostering technological capability, and stimulating other sectors through backward linkages. Automobiles are complex products comprising numerous parts and components that embody diverse production processes and factor intensities. Many of these parts and components are produced by independent suppliers in related industries such as textiles, glass, plastics, electronics, rubber products, and steel and other metals. Promotion of the automotive industry can therefore induce complementary investments by parts and components producers, thereby laying the foundation for broad-based industrial growth. However, only a small number of developing countries have succeeded in building internationally competitive automotive industries that deliver the anticipated development dividends. In most cases, automobile production has remained a high-cost activity sustained within protected domestic markets and heavily dependent on government support. This paper seeks to deepen understanding of the causes of these divergent outcomes and to draw policy lessons for achieving better results in an era of rapid structural change in vehicle production at national, regional, and global levels.

The paper is structured as follows. The next section surveys the evolution of Thailand’s

¹ The term ‘automotive industry’ refers here to final assembly and production of parts and components of passenger cars and commercial vehicles.

automotive policy regime and its key policy instruments. The subsequent section examines the growth of the automotive industry, with particular emphasis on developments following the policy shift from import substitution to global integration in the late 1990s. This section also analyses linkages between assemblers and parts and components producers, and Thailand's role within regional automotive production networks. The following section identifies the factors underpinning Thailand's emergence as a successful player in the global automobile industry during the combustion engine era of the automotive industry. Against this backdrop, growth and structural challenge is discussed in the next section. The final section summarises the main findings and draws policy implications.

2. Policies

The Thai policy regime relating to the automotive industry has evolved, as an integral part of the overall industrialization strategy, in two distinct phases. During the period from the early 1960s until the late 1980s import substitution was the basic tenet of development strategy. During this period Thai government enticed car makers to set up assembly plants in the country by providing tariff protection for vehicle manufacture and imposing local-content requirements (LCRs) to promote local parts manufacture. Since then, there has been a shift in the policy regime from domestic-market orientation and towards global integration, setting the stage for the country to emerge as centre of automobile and auto part manufacturing in the region. Table 1 provides a chronology of key policy changes.

2.1 Import-substitution era

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

Table 1: Chronology of Trade and Investment Policies Impacting on Thai Automotive Industry 1960 -2005¹

1961	Industrial Investment Promotion Act provides incentives for the local assembly of automobiles.
1962	Revised Industrial Investment Promotion Act announced 50% reduction in tariffs on CKD kits and new import duty rates: passenger cars 30%; pick-ups 20%; and trucks 10%.
1969	Ministry of Industry (MOI) set up Automotive Development Committee (ADC) . Increase in tariffs on CBU vehicles: passenger cars 50%; pick-ups 40%; and trucks 30%.
1971	MOI restricted the number of locally assembled passenger car, pick-ups and trucks models and announced local content requirements (LCR) to become effective in 1974: domestically assembled vehicles had to use locally produced parts to at least 25% of the total value of the vehicle.
1978	Suspended approval of new assembly plants to reduce over capacity. Tariffs of CBU passenger cars and CKD passenger cars were increased to 150% and 80% respectively.
1982	LCR requirement for all vehicles set at 45%
1985	Mandatory local-content list announced. Ban on imported CBU vehicles with engine capacity over 2,300cc lifted.
1986	LCR for passenger cars lifted to 54%. List for compulsory and non-compulsory parts introduced.
1989	Ceiling on production capacity of existing assembly plants lifted.
1990	Abolished restrictions on domestic production of series and models. Replaced quantitative import restriction (including the ban on imports of CBUs under 2.3 liters) on passenger cars with tariff.
1991	Reduced tariffs on all types of CBUs and CKD kits: CBUs over 2.3 liters from 300% to 100% CBUs under 2.3 liters from 180% to 60% CKDs for cars, pickups and vans from 112% to 20% Required use of locally produced diesel engines for 1-ton pickup trucks
1992	Exempted pick-up trucks from exercise tax
1993	Ban on new assembly plants lifted.
1995	Reduced CKD tariffs from 20% to 2%.
1997	Abolished local ownership requirement on foreign-invested projects (announced 1993; implemented 1997).
1999	Raised tariffs on CKD vehicles from 20% to 30-35% to cushion against the

	potential adverse impact of impending LCR abolition.
2000	Abolished ADC following the termination of LCR requirement.
2002	BOI introduced the New Automotive Investment Policy targeting pick-up-trucks and the related component production.
2003	Tariff preferences under the ASEAN Free Trade Agreement (AFTA) came into full effect: import duties applicable to intra-ASEAN trade d own to 0--5%.
2007	Launched of ‘Eco-car’ project Phase 1’, a scheme to promote environmentally friendly (energy efficient and low CO2-emitting) small cars by offering excise tax rate of 17% as opposed to 30 % for usual passenger vehicles. Five carmakers were approved under the project: Toyota, Nissan, Mitsubishi, Suzuki and Honda.
2014	Launched of ‘Eco-car project Phase 2’. Increased tariffs on CBUs and reduced excise duties on eco cars, hybrid electrical vehicles (HEVs) and battery electrical vehicles (BEVs) to 17% , 10-30%, and 10%, <i>respectively</i> subject to targeted domestic parts production. Another 5 firms were approved: Ford and General Motors. Suzuki, MG and Volkswagen.
2020	Identified BEVs as the ‘technology winner’ over HEVs and Eco cars; set up National Electric Vehicle Policy Committee (referred to as EV Board) chaired by the Prime Minister.
2022	EV Board introduced an incentive package for EVs and local content requirement for EV battery manufacturing. The incentive package included excise tax reduction on EV sales (from 8% to 2% for cars and 0 rate for trucks) and a direct subsidy to EV buyers. Import duties reduced from 80% 40% for passenger BEVs. Import to local production ration of 1:1 for EV makers.
2023	Adjustment of subsidy to BEV buyers in favour of domestically produced BEVS. New policy emphasis on diversifying BEV manufacturing to buses, trucks and tricycles, and conversion of internal combustion vehicles to EV.
2025	Imports to domestic production ratio for EV makers was set at 1:1.5

Source: Athukorala & Kohpaiboon (2010), Sussangkarn (2016), Doner et al. (2021), Kohpaiboon (2024 & 2025)

To complement the protectionist trade policy, the Board of Investment (BOI) was established to approve foreign investment projects and undertake investment promotion measures under the Investment Promotion Act (1960). The BOI introduced a range of investment promotion measures, including income tax breaks for approved investment projects. Unlike in many other developing countries, investment promotion policy in Thailand treated domestic and foreign investors equally. A revision made in 1977 to the Investment Promotion

Act stipulated majority Thai ownership in domestic-market oriented joint-venture firms (which sell more than 70 of the output in the domestic market). Other than this ownership restriction, foreign firms had the option of setting up affiliates in Thailand without obtaining BOI approval.²

By the late 1960s, there was a growing concern in Thai policy circles that the nascent automobile industry had failed to set the stage for broad-based industrial growth through backward linkages with local parts and components producers. In response, the government set up an Automotive Development Committee (ADC) in 1969 to design and implement local content requirement (LCR) measures. According to the LCR system designed by ADC and came to effect in 1975, domestically assembled passenger vehicles and commercial vehicles had to use locally produced parts equivalent to at least to 25% and 15%, respectively, of the total value of the vehicle to qualify for the importation of CKD kits and auto parts. The introduction of LCR system was accompanied by an upward adjustment in import tariffs on CBU units of passenger vehicles, vans and pick-up trucks to 80%, 60% and 40 %, combined with an increase of the respective rates on CKD kits to 50, 40 and 30%. As a further measure to promote local content, in 1978 an import ban was imposed on CBU passenger vehicles. The tariffs on CBU units and CKD kits of vans and pick-up trucks increased to 80 and 60%, respectively. Approval of new automobile assembly plants was withheld in 1978 because the existing plants were running under capacity. In 1984, the domestic assembly of passenger cars was limited to two models of each of the 42 brands produced in the country at the time.

The LCR system soon encountered implementation problems for two reasons. First, value-based LCR calculation was rather sensitive to exchange rate fluctuations, making it difficult to calculate the domestic-currency value of the imported parts. Second, there was evidence of widespread manipulation of the system by car makers by understating the value of CKD kits on shipping documents and over invoicing the value of local purchases. To redress these issues, the ADC, in consultation with the carmakers, developed a new point-based LCR system. Under the new system, which came into effect in 1983, all auto assembler was required to use locally produced parts up to a minimum mandatory total, initially set at 50 points. This was reduced to 45 points in the following year in response to requests by automaker.

In 1983, the then Ministry of Industry mooted the idea of a 'Thai Vehicle' project which aimed to increase the local content of domestically assembled cars first to 70% and then to 100% within a period of ten years. Naturally, the project was warmly welcomed by local part manufacturers, but it faced strong resistance from the carmakers, particularly Toyota, which at

² Business ventures set up without BOI approval were, however, not eligible for investment incentives or to own land. For these reasons almost all major MNE affiliates operating in the country have been set up under BOI approval.

the time was the largest local car assembler in the country (Doner 1991). The major concern of car makers was that the high local content requirement could depress domestic demand for both vehicles and parts with adverse implications for the growth of the nascent car industry. The underlying logic of the argument was that, given the prevailing ban on CBU imports, carmakers could easily pass the increase in cost of production resulting from high LCR on to customers. The compromise response of the government involved two key elements.

First, the LCR target for passenger cars was set at 54 points based on a two-way classification of auto parts—a mandatory list (Account A) and selective list (Account B)—with LCR points divided equally (27 each) between the two lists. Car makers were required to adhere strictly to Account A in procuring inputs and they were permitted to choose items freely from Account B. If any of the parts in list A was not available locally, carmakers could select substitutes from the selective lists to fulfill the requirement. Account A consisted of several parts (eg: radiator, battery, wiring harness, muffler, wheels and tyres, glass doors, rear spring) which most carmakers had already been procuring domestically. Therefore, there was little resistance from the carmakers to the new system.

Second, a new project specifically aimed at the local production of diesel engines for one-ton pick-up trucks (labeled ‘one-ton diesel engine project’) was launched.³ The project included two key elements: (a) giving government approval to three selected firms (Siam Toyota Manufacturing, Isuzu Engine Manufacturing, and Thai Automotive Industry (Nissan affiliate)) to locally produce diesel engines for one-ton pickup truck subject to specific local content and export performance requirements, and (b) requiring local assemblers of one-ton pick-up trucks to use only locally produced engines to create a captive market for the engine producers.

The specific LCR requirement applicable to engine manufacturers stipulated that they use at least 20% of the engine parts locally in the first year (1989) and increase this by 10% every year to achieve 70% local content by the end of the seven-year implementation period (1995). The producers were given the flexibility of deciding what components are to be procured locally, subject to the condition that they achieve full localization of casting, forging and machining of cylinder blocks, cylinder heads, crankshafts, camshafts, and connecting rods by 1995. According to the export performance requirement, an engine manufacturer had to export (in gross value) not less than \$ 4.8 million worth of engines during the first four years, and at least US\$ 11.2 million worth of engines annually in the subsequent three years.

The diesel engine for one-ton pickup trucks was selected as the specific target of this project based on an assessment of domestic demand. At the time, this vehicle

³ At the planning stage of the project, the Japanese government sponsored a visit by senior officials of BOI and MOI to diesel engine production facilities in Japan.

model had the largest domestic demand among all vehicle assembled in Thailand, because of its popularity as a multi-purpose vehicle among farmers and urban vendors. Production volume was rapidly approaching 100,000 by the mid -1990s.⁴ In addition, the one-ton pickup truck was a relatively more homogenous product compared to passenger vehicle. This was considered an added advantage in achieving economies of scale in production.⁵

The project was designed by ADC based on extensive consultation with the relevant private sector stakeholders. For instance, the original LCR scheduled prepared by the ADC the final LCR target was 80% and this had to be achieved by 1992. This was subsequently reduced to 70% and the implementation period was extended by three years based on requests by producers. The project was strongly supported and pushed by the large Thai-owned agglomerated company, Siam Cement Group, whose subsidiary, Siam Nawaloha Foundry (SNF), was successfully manufacturing agriculture diesel engines under a joint-venture arrangement with Kubota, Japan. The chief executive of the Group (an engineer, who was also the Chairman of Federation of Thai Industries and a board member of BOI) had profound faith in the viability of the project. His views had a strong influence on ADC officials.⁶

2.2 From import-substitution to global integration

Policy transition from import substitution to export orientation commenced in the late 1980s. As noted, for the first time an export performance requirement was written into domestic automobile production under the ‘one-ton diesel engine project’. In 1995 Thailand became a signatory to the ASEAN Brand-to-Brand Complementation (BBC) programs (1995).⁷ This program aimed to promote trade in parts and components among auto companies operating in ASEAN member countries. It provided for 50% reduction in prevailing import duties on parts and components trade among member countries, while treating these imports as part of the local content in estimating the minimum local content of the final products (40%) applicable to duty concessions under the ASEAN Free Trade Agreement (AFTA). These regional arrangements set the stage for Thai automobile industry to specialise in particular models of cars as part of the

⁴ Data on Thai auto industry reported in this paper, unless otherwise stated, come from Thailand Automotive Institute website (www.thaiauto.or.th).

⁵ For example, at the time Toyota Thailand produced one model of pickups but five models of passenger cars..

⁶ Based on interview.

⁷ In 1998, this program was generalized to cover entire auto part trade under the new title ASEAN Investment Complementary Operation (AICO) program.

regional and global value chain.

The emphasis on export orientation received added impetus from the Asian Financial Crisis (1997-98) when automobile industry suffered from a massive contraction in domestic demand. Policy reforms introduced I reduced restrictions in the aftermath of the crisis included restrictions on foreign ownership, cutting duties on imported machinery and equipment, reducing excise duties.

During 1998-2000, the Thailand honored its commitment under the WTO agreement on Trade Related Investment Measures (TRIMS), becoming the first developing-country WTO member to do so. Abolition of LCR with effect from January 2000 was announced in 1998. In the area of FDI policy, all selective incentives granted to export-oriented activities and 49% equity ownership restriction on domestic-market oriented projects were abolished with immediate effect in 1999. In 1990 the limits on the number of series of cars permitted for local production were removed. In the following year the import ban on brand new cars was lifted. Since then, the import trade regime for automobile have remained free of quantitative restrictions, with the sole exception of non-automatic licensing for the importation of certain types of diesel engines and a ban on motorcycle engines and used passenger cars (WTO 2007, pp 115-16).

As part of trade policy reforms, all quantitative import restrictions were supplanted with advalorem import duties. However, automotive tariffs continued to remain high with a pronounced cascading pattern: duties on CKD kits range from 10% (chassis with engine under HS87.06) to 30% (most items), while rates on completely-build-up (CBU) automobiles ranges from 20% to 80%, depending on the type of vehicles. Given the cascading nature of the tariff structure, the effective rate of protection (ERP)⁸ for domestic motor vehicle production is much higher than the average tariff. According to estimates based on data for 2005, the effective rate of protection for producing automobiles for the domestic market is as high as 64.8% compared to the overall manufacturing average of 24.4% (Jongwanich and Kohpaiboon 2007, Table 5). However, importation of parts and components for export productions was permitted under a revamped import duty rebate procedure, tilting the incentive structure in favour of export production under the still protectionist trade regime.⁹

Trade and investment policy reforms for promoting export-oriented production was combined with infrastructure reforms trade-related logistic costs and also to facilitate cluster promotion: location of parts and component producers and final assemblies in proximity to one

⁸ The ERP measures the proportionate increase in per unit value added of a given industry/sector due to the complete system of tariffs. More specifically, it is designed to capture both tariff protection on output and the effects on cost of production of protection on inputs (Corden 1966).

⁹ This important point has been ignored in the debate on the so-called puzzle of the coexistence of high import tariffs and rapid export expansion in Thailand.

another.

From the early 2000s, The Industrial State Authority promoted privately financed and operated industrial states within which firm enjoyed profit repatriation and accorporate tax (and trade related unfactured. In 2017, the government embarked on a massive infrastructure project, the Eastern Seaboard Scheme centered on a new port in Laem Chabang, designed to provide direct access to container vessels. The project turned three southeastern provinces into an industrial hub with the port connected to privately operated industrial estate through a highway system. The project was pivotal for promoting the export-oriented automotive industry and other heavy manufacturing: by the late 1980s the Bangkok port had become inadequate to support these industries and road connections to the port from industrial areas had to pass through Bangkok's nested tariffs (Warr & Kohpaiboon 2018, Doner et al. (2021).

3 Global contexts

Liberalization reforms in Thailand auspiciously coincided with the massive transformation of the structure, conduct, and performance of the global automobile industry from the mid-1980s onward, opening opportunities for peripheral countries to integrate into global automotive production networks (Klier and Rubenstein 2008, Shapiro 1994).

Historically, auto firms were predominantly engaged in multi-market operations by setting up production bases in individual countries. Since the mid-1980s, the automobile industry has become increasingly globally integrated in the sense that manufacturing, sourcing and marketing had become increasingly cross-national. Production standards had become increasingly universal, accompanied by a palpable shift in production process from generic to modular technology. Consequently, parts and components production has grown rapidly to cater for multiple assemblers. In this context, intense competition among carmakers transformed the geographic spread of the automobile industry beyond the mature industrialized countries. Deciding to decide which models to produce at what locations, at what prices and quality standards, and for which markets become a key feature of the global operations of carmakers. The search for low-cost production sites thus led to new waves of setting up production plants by automotive MNEs in peripheral countries.

The process of global spread of auto industry has also been aided by a notable shift in global demand patterns. The principal automobile markets in North America, Western Europe and Japan have been rapidly approaching the point of saturation in

recent years. In contrast, growth perspectives for vehicle sales were increasingly promising in emerging market economies. This shift in demand patterns led auto MNEs to set up new assembly bases to serve regional markets. With this regional focus, carmakers tend to consolidate their assembly facilities within a region and decide which models to produce at which locations (country), at what prices and quality standards, and for which markets (either region or global).

4. Outcomes

After the imposition of import tariffs in the early 1960s, multinational car makers, who had until then serving the Thai market by through exporing from their home bases, set up assembly plants in Thailand. By the late 1960s all Japanese carmakers (Toyota, Honda, Nissan, Mitsubishi, Daihatsu, Isuzu), three European carmakers (Volvo, Renault Mercedes) and the two major US carmakers Ford and General Motors) were present in Thailand. Many of them, especially Japanese carmakers, operated through joint ventures with large local conglomerates, although foreign ownership restrictions had not yet been implemented.

Following the sharp increase in oil prices during the early 1970s, there was a sharp contraction in domestic demand for automobiles, accompanied by a notable compositional shift in demand for smaller-engine vehicles. Given the government suspension of approval of new assembly plants, the number of carmakers remained unchanged at 12 for the next two decades (Kohpaiboon 2006, 195).

Until the implementation of LCR measures in 1975, local car assembly was predominantly based on imported parts and components. There were about 20 parts and component manufacturers, but they were producing predominantly for the replacement equipment markets (REM) (supplying spare parts to car users). Following the imposition of LCR, some Japanese part producers establish production plants in Thailand. At the same time some carmakers engaged REM firms as original equipment manufacturers (OEM). The number of parts manufacturers had increased to around 180 enterprises by 1980. The range of locally manufactured auto parts had widened and included rubber parts, suspension systems, radiators, inner panel pressed parts, brake drums, gaskets, pistons, safety glass, electrical equipment and wiring harnesses. As the part producers tended to locate closer to assembler to meet the requirements of just-in-time production, LCR policy set the stage for the formation of

production clusters in Rayong and Chonburi provinces.

The three firms involved in the one-truck pickup truck project (Toyota, Nissan and Isuzu) began to implement their production plans in the late 1980s. In 1986, Nissan's expanded its operations, aiming to export pickup trucks to South Korea, Malaysia, Australia and New Zealand as part of the company's global plan. In the same year, Isuzu announced a three-step export plan or the production of engines and then pickup trucks. The three firms together designed a production sharing arrangement among them to make the implementation of the project feasible, particularly in the areas of casting, forging, and machining processes. Under this arrangement each firm agreed to produce designated components to be exchanged among them. For instance, forged crankshaft and connecting rods were manufactured by Isuzu and sold to Toyota and Nissan. Meantime, Toyota and Nissan made casting cylinder blocks and cylinder heads, respectively. Ford, Daimler Chrysler and General Motor (GM), which had left Thailand during the economic recession in the early 1970s, re-entered the country in the mid-1990s with the main objective of producing one-ton pickup trucks. Production capacity in the car assembly industry began to increase rapidly from the second half of 1990s. By the late 2000s, one-ton pick-up trucks (about 900 thousand units) accounted for nearly 60% of the total automobile production capacity of Thailand (Kohpaiboon & Jongwanich (2012).

The expansion of auto assembly industry through MNE participation was accompanied by a similar expansion in local auto part production by firms that had already entered the industry during the import-substitution era. The expansion of activities of Denso, a Japanese auto parts maker, provides a clear example. Denso first set up a factory in 1972 to produce cooling systems. It then established two new factories in 1995 and 2000 and five more since then to produce a wide range of auto parts. Many other foreign part suppliers, which had been operating through joint ventures with local partners, also expanded production capacity following the removal of ownership restriction in 1998, by increasing their equity shares and, in some cases, by acquiring full ownership. With change in ownership, MNEs also started bringing in cutting edge technology, better managerial practices and close supervision of assembly/production by bringing in foreign technicians and managers (Kohpaiboon and Jongwanich, 2012).

Until the mid-1990s, Thai auto automobile part industry was dominated by Japanese companies. Since the mid-1990s, several world class non-Japanese multiple-parts manufacturers entered the industry: Dana (1994), TRW Steering & suspension (1998), Visteon Thailand (1998), Johnson Controls (1999), Delphi Automotive Systems (2000) and Tenneco Automotive (2002), Jason Engineering (UK affiliate), Siam Calsonic Co. Ltd and Visteon (Ford supplier) and Halla Climate Co. Ltd (Ford supplier) Suppliers). By the mid-2020s there were around 700 first-tier firms, and 1,100 second and third-tier firms in Thai auto part industry.

4.1 Growth and Composition of Production

Automobile production in Thailand increased from about 140 thousand in 1980 to over 600 thousand in late 1990s at an annual rate of over 10 percent (Athukorala & Kohpaiboon 2012, Figure 3). Output expansion during the ensuing years, when industry became increasingly export-oriented, was much faster. In 2000, Thailand was the 19th largest automobile producer in the world with an annual production of 412 units. By 2020, its global ranking had elevated to the 11th position with 1.2 million units, accounting for 1.8% of the total world output. Since then, Thailand's global ranking the dropped because of the increase in production in China and India, but by 2024 it still remained by far the largest auto producer in ASEAN, accounting for almost half of total automobile production in the region, and fourth largest producer in Asia after China, Japan, and South Korea, and India (Table 2).

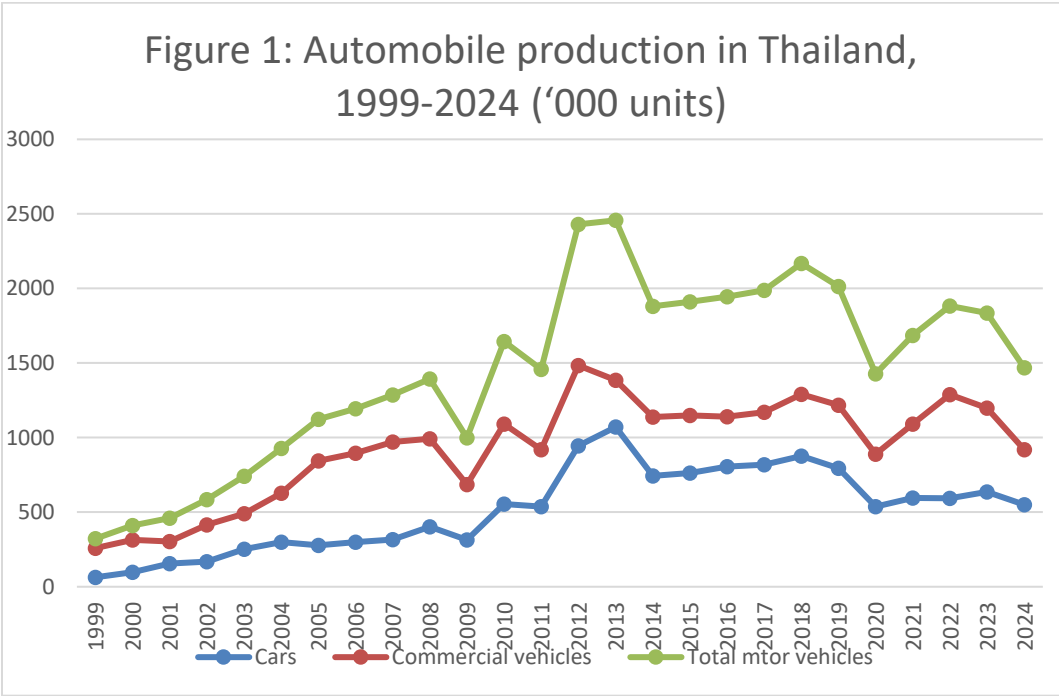
The composition automobile production in Thailand is dominated by commercial vehicles, reflecting the success of the 'one-truck' project launched in the late 1980s (Figure 1). Commercial vehicles accounted for over two thirds of total vehicle production since the early 2000s, with one-ton pickups accounted for the lion's share over 90% . From about the late 2000s Thailand has been the biggest producer of one-ton vehicle producer in the world outplacing the United State (Amorn 2007).

Table 2: World Automobile Production (thousand units))¹: Top 20 Producing Countries, 2000, 2010, 2020 and 2024

	2000			2020			2024		
Rank	Country	Production	Wolrd share (%)	Country	Production	Wolrd share (%)	Country	Production	Wolrd share (%)
1	USA	12800	21.9	China	25,225	32.50	China	24,503	27.0
2	Japan	10141	17.4	USA	8,822	11.37	USA	12,100	13.3
3	Germany	5527	9.5	Japan	8,068	10.39	Japan	9,278	10.2
4	France	3348	5.7	Germany	3,742	4.82	Germany	6,033	6.6
5	South Korea	3115	5.3	South Korea	3,507	4.52	South Korea	4,556	5.0
6	Spain	3033	5.2	India	3,394	4.37	India	4,126	4.5
7	Canada	2962	5.1	Mexico	3,177	4.09	Mexico	3,565	3.9
8	China	2069	3.5	Spain	2,268	2.92	Spain	2,733	3.0
9	Mexico	1936	3.3	Brazil	2,014	2.59	Brazil	2,429	2.7
10	UK	1814	3.1	Russia	1,435	1.85	Canada	2,283	2.5
11	Italy	1738	3	Thailand	1,427	1.84	France	1,970	2.2
12	Brazil	1682	2.9	Canada	1,377	1.77	Thailand	1,915	2.1
13	Russia	1206	2.1	France	1,316	1.70	UK	1,682	1.9
14	Belgium	1033	1.8	Turkey	1,298	1.67	Russia	1,384	1.5
15	India	801	1.4	Czech Rep.	1,159	1.49	Turkey	1,359	1.5
16	Poland	505	0.9	UK	987	1.27	Czech Rep.	1,304	1.4
17	Czech Rep	455	0.8	Slovakia	985	1.27	Indonesia	1,099	1.2
18	Turkey	431	0.7	Iran	881	1.13	Italy	1,014	1.1
19	Thailand	412	0.7	Italy	777	1.00	Slovakia	1,000	1.1
20	Taiwan	373	0.6	Indonesia	691	0.89	Iran	982	1.1
	Other	2977	5.1	Other	7,374	9.50	Other	5,447	6.0
	World total	58374	100	World total	77,622	100	World total	90,781	100

Note: 1. Production comprises “passenger cars” and “commercial vehicle” including light commercial vehicles, heavy commercial vehicles and heavy bus and coach.

Source: OICA (<http://www.oica.net/>)



Source: Kohpaiboon 2024 & 2025

With the expansion of automobile assembly, carmakers tended to increase local parts procurement to strengthen their international competitiveness. Many vehicle parts are characterized by high ‘weight to value’ ratios and some of them are bulky. Therefore, there is sizable trade cost involved in procuring all the parts from distant suppliers. There is also a need for close cooperation between car manufacturers and parts suppliers to match their production plans and delivery schedules in order to ensure just-in-time production while maintaining the quality of the final product. Local procurement also serves to reduce exposure to exchange rate risk. These considerations explain the tendency for geographic clustering of automobile industry, with car assemblers at the centre surrounded by part suppliers.

According to ADC records by the early 2020s there are 1,454 indigenous part suppliers in Thai auto industry. Of these 354 are first-tier suppliers, while the rest operates at the second- and third-tiers in the supply chain. The first-tier suppliers are involved in designing and manufacturing of modules, not just individual

parts and components. They directly deal with car manufacturers. The second and third-tier suppliers produce parts and components for the first-tier suppliers.

There are only about 10 local firms among the first-tier suppliers who are truly involved in design and manufacture modules. The other local firms are involved in manufacturing simple inner body parts. The dramatic increase in the role of MNEs in auto part production, and in particular their dominance at the first-tier of the supply chain, has been interpreted by some observers as an indication of 'denationalization' of Thai auto industry (Doner 2009). However, this is not a unique Thai phenomenon. MNEs' dominance at the first tier of the automotive supply chain has become an integral part of the globalization of auto industry (Klier and Rubenstein 2008). For example, by the late 1990s in Brazil (a regional automotive hub in Latin America) there was only a single locally owned firm among 13 largest component producers (Humphrey and Oeter 2000). In South Korea, many large auto part firms were taken over by Western first-tier suppliers in the aftermath of the 1997-98 financial crisis (Doner et al. 2004). Given concerns about securing proprietary assets in cutting edge technology in a highly competitive market setting, the fully owned affiliate has become the increasingly preferred mode of international operation of MNE auto part producers.

In the new globalized auto industry, at the initial stage of global integration opportunities available for pure local firms to become OEM suppliers on their own (that is without forging links with MNE part suppliers) within MNE-dominated production networks seem limited. Their activities are going to be heavily concentrated at the second and third tiers until they gain technological expertise and establish themselves as quality players within the automotive chain. The few local OEM suppliers are currently concentrated on the production of auto-body parts. Designing of body-related parts is normally undertaken by the car assemblers (since these parts are directly related to the appearance of the vehicle). Therefore, production of these parts does not require a high level of technological capability. However,

there are indications that the local OME suppliers and some local firms involved in the second tier have begun to move up the technology ladder. For instance, the Thai company Aapico, has emerged as one of the world's best suppliers of low-volume tooling. A recent study of the procurement practices of Japanese automakers in Thailand has found many cases of Japanese automakers and first-tier firms expanding over time procurement of high-tech parts from second-tier local firms (Japan Finance Corporation 2007).¹⁰

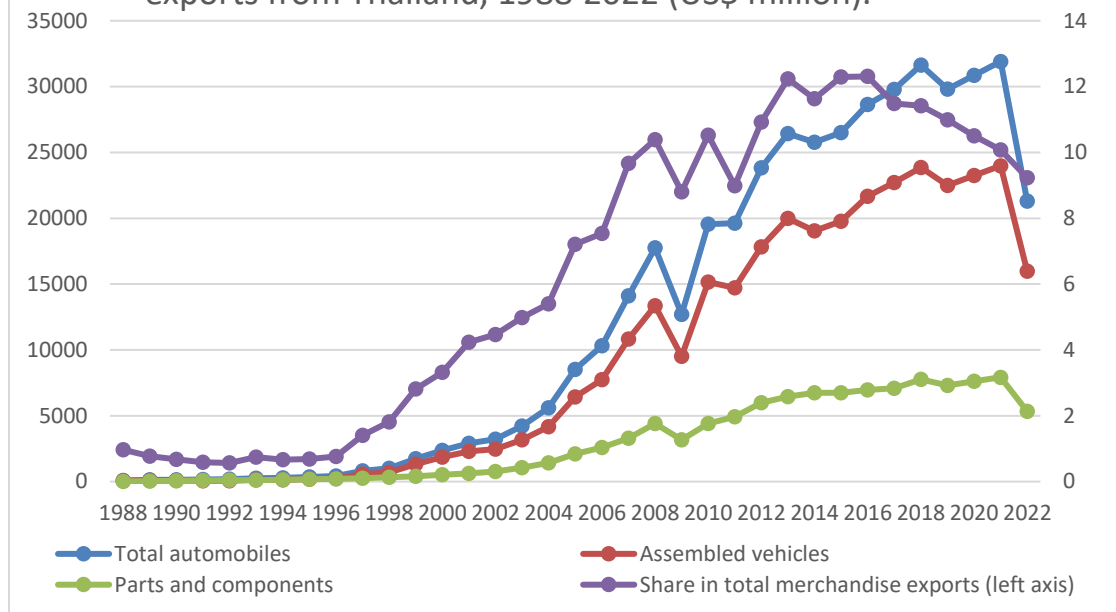
The number of local firms joining the automotive production chain at the second and third tiers has significantly increased over the past decade or so. They are involved in the production of standard parts and components, and intermediate inputs such as plastics, textile products, and leather products.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

4.2 Export trends and patterns

Until the late 1990s Thai automotive industry continued to remain heavily domestic market oriented, with exports, on average, accounting for less than 5% of total sales and less than 1% of total merchandise exports (Athukorala & Kohpaiboon 2010, Figure 2). Since then exports have grown continuously at an average rate of 10% (measured in current US\$ terms), passing the 3 billion US by 2020, before the interruption by the COVID19 pandemic. The share of automobile exports in total merchandise export from Thailand reached 12% by the mid-2010s, following a mild decline since then as the overall export composition diversified into other products.

¹⁰ We thank Shuhei Nishitatenno for drawing our attention to this study.

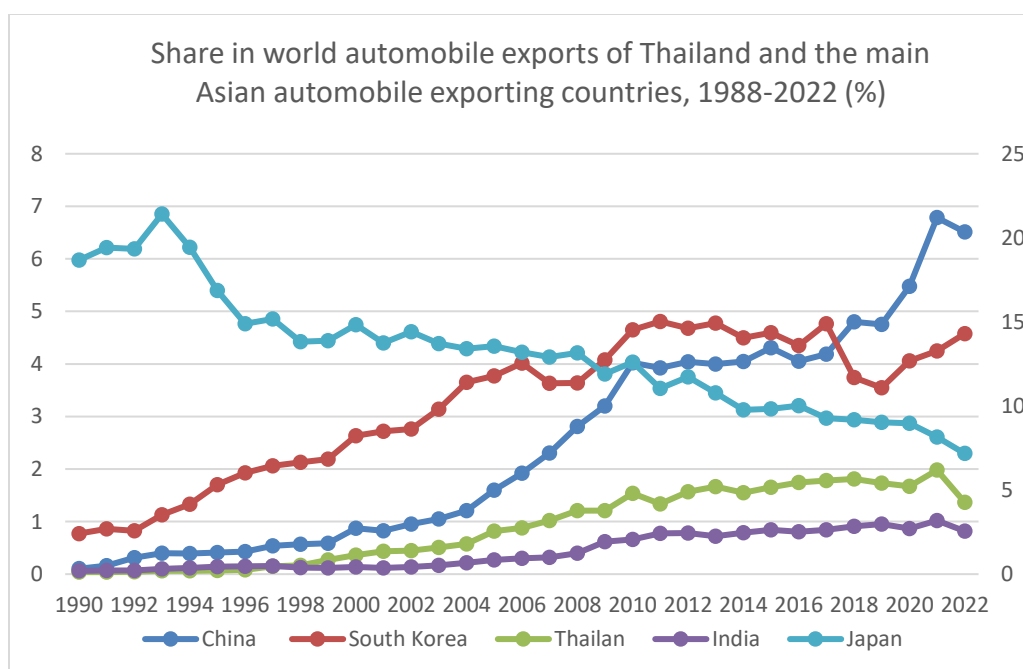
Figure 2: Automobiles and parts and components exports from Thailand, 1988-2022 (US\$ million).



Source: data compile from the UN Comtrade database.

Parts and components accounted for over a three fourth of total automobile exports in the 1990s. Since then, this share has decline reflecting a dramatic shift in export composition toward completely built vehicles. However, parts and components still account for about a fifth of total exports (Figure 2).

A striking feature of the automobile industry in Asia over the past three decades is the dramatic decline in Japan's relative position (Figure 3). This reflects the geographical diversification of production bases as part of the global restructuring of the automotive industry. Thailand has so far maintained its position as the fourth-largest automobile exporter in the region, with a global export share of about 2%. India's market share has increased over the past two decades but still lags well behind Thailand. As discussed in the next section, how the ongoing EV transformation—particularly China's meteoric rise in the electric vehicle industry—would reshape these geographical patterns is at the forefront of the contemporary policy debate on the future of the Thai automotive industry.



Source: Data compiled from the UN Comtrade database.

The geographic profile of automobile exports from Thailand has undergone notable changes since the early 1990s (Athukorala and Kohpaiboon 2010, Table 8 and Kohpaiboon 2024). The most notable change is the sharp increase in the market share of ASEAN-10 countries—from 7% during 1990-2000 to about 20% since then. This increase seems to reflect preferential access to markets in these countries under the CEPT tariff preferences. However, extra-regional exports still account for the lion's share of total motor vehicle exports, with a notable shift from EU-15 to other countries (countries in the Middle East, in particular).

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

Relating to the role of Thailand within the regional automobile production networks in Southeast Asia. Toyota, which has continuously accounted for the largest share

in production in Thailand of both passenger cars and pickups, uses the country as a production and export base of small-to-medium passenger cars and one-ton pickups. Toyota exports the cars mostly to Southeast Asian countries, Australia and New Zealand. It exports pickups mostly to Europe. Passenger cars manufactured by Honda in Thailand (i.e. Honda accord, civic and city) are exported to other Southeast Asian countries whereas Honda Stream is produced in Indonesia and exported to other countries in the region, including Thailand. Ford and Mazda use their production base in the Philippines for assembling passenger cars (Ford Laser, Ford Escape, Mazda Protégé, and Mazda Tribute) for the other countries in the region including Thailand. Thailand is the production base for producing one-ton pickups. These firms adopt platform production strategy to produce one-ton pickups to more than 100 countries. In the platform production strategy, automakers use a small number of underbody platforms as the basis for a greater number of vehicle models. This strategy reduces costs of platform development and enables component sharing among models. For example, platform sharing between Chrysler and Mitsubishi allowed Mitsubishi to reduce by half (from 12 to 6) its number of light-vehicle platforms. Another example, Honda Odyssey and Accord share the same platform. The platform used for Ford Everest and Mazda Fighter are also the same.

4.3 Automotive Industry in the National Economy

During the period from 1960 until about the late 1990s, automobile industry accounted for about 4% of the country's manufacturing output (value added). This figure had doubled to about 8% in 2024 (Kohpaiboon 2006 and 2024).

Employment in the automotive industry too has grown over time, but at a much slower rate, from about 3.3% in total employment in the 1990s to 4.5% (about 700 to 800 thousands) in 2024. The gap between output and employment shares automobile industry reflects the relatively high capital intensity of automobile industry compared to the average level of total manufacturing. Value added per worker (a rough indicator of (capital intensity of production) in transport equipment manufacture is about three times that of total manufacturing.

A major concern of the debate on national gains for the expansion of auto industry in Thailand relates to the extent of its value addition to the national economy. Studies conducted in the early 1990s have come up with estimates which suggest very low value added, less than 20% of the total value of gross output. (Kohpaiboon 2006). However, the evidence from firm level surveys suggests that value added would have significantly increased during the ensuing years as the local production of parts and components has rapidly increased in line with rapid output expansion. The bulk of parts and components embodied in locally assembled cars (over 90%) are now sourced locally, although the import content of some automotive components is admittedly high.

Some ideas about the overall trends in change in domestic values added in line with output expansion can be obtained by looking at the co-movement of parts and components imports and domestic automobile production. The real US\$ value of parts and component per vehicle (at 1985 price) has declined sharply from about 8,500 in the early 1990s to around \$ 2000 by the late 2000s. Interestingly, the rate of decline is much sharper during the period after the abolition of LCR requirements compared to the preceding period. This suggests that the market-driven process of localization of auto industry has yielded a much better outcome compared to the outcome of the LCR regime (Kohpaiboon 2006 and 2025).

5. Electronic Vehicle challenge

Thailand's automotive hub now faces a formidable challenge with the transition of the world automobile industry to the era of battery electric vehicles (BEVs). Thailand's competitive edge as an automotive hub in Asia is under threat, and the structural adjustment is going to be painful, not only because ICEV and BEV are two different industries in terms of the nature of the production process but also because the structure and conduct of the global automotive industry has fundamentally changed due to the rise of China as a dominant player in the production of both BEVs and batteries.

On the demand side, a BEV is a perfect substitute for an ICEV, subject of course to access to charging stations and other enabling environments in each country. However, on the supply side, BEVs are not merely upgraded versions of traditional internal

combustion engine vehicles (ICEVs); they are fundamentally different products in terms of production processes. The key components of a BEV are a battery pack, electric motor, and power electronics (like the motor controller, and DC/CD converter).

BEVs eliminate or sharply reduce demand for a wide range of ICE-specific components—such as engines, transmissions, exhaust systems, fuel injection systems, and associated mechanical sub-assemblies. As a result, the overall parts content per vehicle, in terms of both number and complexity of components, is significantly lower in BEVs. As Automobile parts and components production for ICEVs are far more labour-intensive than vehicle assembly, the EV transition has disproportionately large employment implications. While

On the global production side, the drivers of the international dispersion of production bases have been fundamentally altered by the rise of China as the dominant player in global BEV production. Unlike the most traditional players in the ICES industry, Chinese BEV makers have the advantage of vast scale economies of domestic production. Moreover, unlike in other countries EV battery production and the related component production has evolved hand in hand with final assembly in China, providing an ideal low-cost production base for just-in-time production. For these reasons, setting up of production hubs in other countries to produce for the wider global market is unlikely to be a major motivation behind the global reach of Chinese car makers. Their overseas investment strategy is likely to be primarily driven by the traditional ‘tariff jumping’ motive’- producing for the domestic under existing tariff barriers - or at best exporting to adjacent regional markets.

In Thailand, policy focus on promoting BEVs commenced in 2014 when BEVs included for selective investment incentives and excise tax concession is a scheme to promote environmentally friendly vehicles. The scheme included BEVs together with traditional combustion engine vehicles emitting less CO₂, using environmentally friendly fuel and energy efficient vehicles (‘eco cars’), and hightbred electric vehicles (HEVs). Under the scheme BEVs were offered lower excise tax rate (10%) compared to eco cars (10-30%) and BEVs (10%). The incentives were subjected to the requirement of using some targeted parts procured locally.

In 2020, BEVs was earmarked as the technology winner over the other

environmentally friendly cars, and the National Electric Vehicle Policy Committee (the ‘EV Board’), chaired by the Prime Minister, was formed. During the ensuing years the government BEV policy has evolved as a two-pronged strategy of promoting car usage in the country driven by environmental protection, and promoting domestic production of BEVs. To promote domestic BEV usage, tariffs on BEVs have been reduced (from 80% to 60%) and introduced direct subsidies to buyers of BEVs. The production-side policies include new investment incentives and further reduction of excise tax of domestic sales, and local content requirements on EV battery production, and linking imports to domestic production requirements for car makers. As of 2014, import-domestic production norm applicable to BEB was 1:1.5 - one car import per 1.5 car produced domestically (1:1.5) In 2023, BEV incentives are restructured in favour of buses, trucks, tricycle and EV conversion of ICEVs.

The number of registered BEVs in Thailand has increased, from 3.3 thousand in 2013 to 167.3 thousand in 2024 (12% in total sales in 2024). However, BEV still amounts to small share in total registered vehicles, about 1.3% in 2024. Imports account for over 95% of BEVS sold domestically and imports from China dominate total BEV imports (91% in 2024) (Kohpaiboon 2025). The industry is experiencing intense price competition from Chinese imports. In addition to attractive prices, they offer advanced features in cars such as voice commands and rotating touch screens (Zhou 2025).

Several Chinese carmakers have established or are establishing factories in Thailand, encompassing both BEVs and conventional vehicle assembly. Key names so far include BYD, Great Wall Motor (GWM), Changan, GAC Aion, Hozon/Neta, and SAIC (MG), with additional plans from Chery.

In July 2024, BYD inaugurated its first wholly-owned factory outside China (a \$490-million investment) in Rayong in the Eastern Economic Corridor. The facility undertakes both final assembly of cars, and component production, with an annual capacity of around 150,000 vehicles. In July 2025, BYD celebrated one year of operations in Thailand and had delivered its 90,000 vehicles from the Rayong plant. Thailand is now BYD's largest foreign market, and the company is rapidly expanding its product line and manufacturing capabilities to solidify its position as a leading EV provider in the region. The company is expected to leverage Thailand's position as a manufacturing and automotive hub to expand its footprint in Southeast Asia.

In late 2020, GWM—China’s leading producer of SUVs and pickup vehicles—

acquired General Motors' Rayong plant and commenced production in early 2021, with an annual capacity of 80,000 units. GWM plans to make Rayong its ASEAN production base for eight electric vehicle models; the first of these, the Ora Good Cat, was launched in early 2024.

So far, the only new none-Chinese car makers to set up BEV assembly to in response to the government's incentive scheme is FOMM Asia, a Japanese firm producing a small EV (in 2019). The only traditional car maker to participate in the scheme is Mercedes Benz. It has started producing electric cars for both domestic and export markets.

In face of stiff competition from Chinese car makers, some established car makers are scaling down production. Nissa has announce sweeping restructuring of its operations in Thailand. Suzuki announced shutting down of its assembly plant in 2025. Honda has announced that it is consolidating its production at its Prachinburi factory after stopping production at its Ayutthaya plant. Whether the fiscal resources promote domestic EV industry would work remain an open question. Some informed observers are of the view that investors involved in the automobile industry should begin exploring alternative opportunities in repair and after-sale services Kohpaiboon 2025).

Under the emerging dominance of Chinese firms in Thailand's automobile industry, whether Thailand can continue to function as the "Detroit of Asia"—that is, as a global automobile hub—has become debatable. As discussed above, the primary interest of Chinese automakers is to produce for the domestic market. Chinese EV firms have already begun exporting from Thailand to Australia and Europe. However, it remains to be seen whether they will use Thailand as a major export hub, as traditional automakers have done, given China's continuing advantages as a production centre for global markets.

Be that as it may, the automobile parts and components segment of the Thai automobile industry is likely to bear the largest burden of structural adjustment arising from the transition to battery electric vehicles (BEVs). More than 70 per cent of total employment in the Thai automobile industry—around 500,000 out of an estimated 700,000 workers—is concentrated in the parts and components subsector. To date, only a limited number of local suppliers are involved in the production of vehicle bodies and accessories, as well as auxiliary components such as air-conditioning systems, cooling systems, and charging equipment. However, as noted earlier, the value of parts and components required per unit of final automobile output is **much lower** for BEVs than for internal combustion engine vehicles. Moreover, it is doubtful whether the incentives offered by the Thai government to promote local BEV battery production will

prove effective, given the substantial economies of scale in battery manufacturing in China and the highly vertically integrated nature of the Chinese BEV value chain.¹¹ Our preliminary estimates suggest that only about 40% parts and components currently produced in Thailand are used on both BEVs and ICEVs, and the balance will gradually shrink with the gradual shift in production to BEVs.¹²

6. Concluding remarks

Over the past five decades, Thailand has emerged as a hub of automotive production for the regional and global markets. Rapid expansion in auto industry has spawned a parts and components supplier network in the country, resulting in an impressive increase in the domestic content of assembled cars. Both car manufacturing and component production are dominated by MNEs, with most pure local firms involved in the production network as second and third-tier suppliers of simple, diffused-technology parts and components. Thailand's emergence as the 'Detroit of Asia' has been underpinned by a favourable combination of three factors: (a) structural changes in global auto industry which opened up opportunities countries in the periphery to join production networks to produce for the global and regional markets; (b) pragmatic, market-conforming policy posture of the Thai authorities which enabled domestic auto industry to evolve in line with trends in the wider global economy; and (c) the size of the protected Thai maker which has met the market requirements of domestic car assembly to achieve economies of scale at the early stage of production expansion. Tariff protection on auto imports continued to remain high

¹¹ For instance, the largest Chinese carmaker, BYD own and operate its own EV battery production and is one of the few automakers globally that manufactures battery cells in-house rather than relying predominantly on external suppliers.

¹² There are only four items of automobile parts and components (at the 6-digit level of the harmonised system (HS) of trade classification) that overlap with one another. They are
 841330 Fuel, lubricating or cooling medium pumps for internal combustion piston engines
 850131 DC motors nesoi and generators of an output not exceeding 750 W
 850300 Parts of electric motors, generators, generating sets and rotary converters
 870899 Parts and accessories for motor vehicles, nesoi

The policy instruments used by the Thai authorities during the import-substitution era were basically the same as those used by their counterparts in Malaysia and other developing countries: tariff protection to entice MNEs to set up production plants to serve the domestic market and local content requirements to force these plants to forge backward linkages with local auto part makers. However, the Thai policymakers implemented these policy instruments in a market-conforming manner in consultation with auto makers and other private-sector stake holders. This pragmatic approach to policy making was instrumental in winning investor confidence and thus laying a solid foundation for building a world-class production base. Unlike Malaysia and Indonesia (for a limited period), Thailand never pursues a national car policy; both foreign and local companies involved in the automotive industry were treated on an equal footing.

The process of Thailand becoming a regional hub was facilitated by the timely abolition of local content requirements and ownership restrictions on affiliates of foreign companies under the cover provided by the WTO commitments. Thailand was the first developing country member of WTO to honor these commitments. These reforms, undertaken at a time when the global auto industry was beginning to go global, played a pivotal role in setting the stage for the domestic auto industry to become a part of global production networks.

Against the backdrop of its impressive performance during the internal combustion engine era, the Thai automotive sector is now entering a period of profound structural adjustment driven by the global shift toward electric vehicles. Whether Thailand can continue to function as a global automobile hub—the “Detroit of Asia”—under the emerging dominance of Chinese BEV manufacturers, replacing the traditional industry leaders, remains uncertain. More importantly, even if vehicle assembly continues to expand under Chinese dominance, the parts and components segment—which accounts for the bulk of employment in the industry—is likely to face a substantial contraction in the BEV era. This gloomy prospect underscores the need for a reorientation of industrial and labour market policies, including targeted support for supplier upgrading, workforce reskilling, and the development of complementary manufacturing and services capabilities, to mitigate employment losses.

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