
The Rise and Fall of Thailand's Export-Oriented Industries*

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Abstract

In the past three decades, with the exception of the Asian financial crisis in 1997–98, the Thai economy was propelled by the rapid growth of manufactured exports. There were 18 years of a double-digit export growth, averaging 20.5 percent per year. In 2009, Thailand's exports collapsed after the 2008–09 global financial crisis, but rebounded sharply in the following year. Thailand's exports growth significantly slowed down in 2011 and 2012. From 2013 to 2016, Thailand's exports experienced negative growth. The global recession and China's slowdown contributed to the dismal export performance. There was also a supply factor responsible for the negative growth, however: The dwindling level of foreign direct investment (FDI), caused by Thailand's political turmoil and pessimistic business sentiment, has diminished export capability and competitiveness. The fall of Thailand's export-oriented industries can be attributed to the country's inability to attract FDI inflows. Some industries that are able to secure continuous flows of FDI remain competitive, whereas others that cannot will progressively retreat from the world market.

I. Introduction

Thailand is an example of an export-driven economy. The country enjoyed double-digit growth of exports on the average of 23 percent per year from 1986 to 1995. The sharp rebound of the Thai economy after the 1997–98 Asian financial crisis in 1997 can be attributed to the strong export growth in 1999 and 2000. A short period after the U.S. recession resulted in a decline of exports by 7.1 percent. After the brief episode of the slowdown of world trade in 2001, domestic supply responded quickly to rising export demand during the upturn of the world trade, when world trade rebounded by 4.4 percent in 2002, driving Thailand back to double-digit export growth from 2003 to 2008. During those six years of export expansion, large foreign direct investment (FDI) continued flowing into

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export-oriented industries to support the growth of export-oriented industries. Similarly, when the global financial crisis (GFC) hit Thai exports in 2009, Thailand again experienced a drop in export growth, of 14 percent. Nevertheless, the export industry was able to rebound sharply to a double-digit growth rate of 27.1 percent in 2010 and 14.3 percent in 2011, thanks to the strong growth in the Chinese economy. As the Chinese economy entered a new normal growth era in 2014, the adverse impact of China's slowdown was felt around the world. Thailand's export took a direct hit through the impact on industrial supply chains, which link China's industrial growth to exports of parts and components from Thailand. Thailand's exports slowed to 3 percent in 2012 and entered a new era of declining exports. From 2013 to 2016, exports declined by 1.6 percent per year on average.

In this paper, the rise and fall of Thailand's export industries are examined in terms of their vulnerability to external shocks. Some industries are able to cope well with changing world export demand, whereas others face challenges and struggle to survive. Four export industries are selected to be analyzed in detail. Vehicles can be considered as a rising export star, whereas the exports of apparels and textile are retreating as they are losing market shares in the world economy. Electronic and electrical equipment is also chosen because of its importance in total exports and its sharp contrast with the processed food exports industry, which requires less imported raw materials. These industries' successes and failures depend to a large extent on the inflows of FDI. This study argues that without continuous flows of FDI, the future of Thailand's export-oriented industry remains bleak.

An overview of Thailand's export industries is provided in Section 2. The importance of FDI in determining manufactured exports is discussed in Section 3. Section 4 examines the processed food industry and its challenges. Section 5 explores the key factors contributing to the success of automobile industry. Section 6 analyzes the vulnerability of electronic and electrical equipment industry. Section 7 discusses the textile and garment industries' struggle to survive. Conclusions are provided in Section 8.

2. An overview of Thailand's export industries

As a small open economy, Thailand's exports' share in the world market was less than 3 percent. Processed food is Thailand's export with the highest world market share—2.9 percent in 2015 (Table 1). Thailand's other top exports of manufactured goods are electrical and electronic equipment (representing 1.7 percent in world market share), motor vehicles and transport equipment (1.6 percent), machinery and equipment (1.4 percent), and rubber and plastic products (2.5 percent). The very low world market shares imply that Thailand does not have the market power to set its own export prices. As a price taker in the world markets for these goods, it is the supply factor that is the most important determinant of

Table 1. Thailand's exports in 2015

Industry	Exports Level in 2015 (thousand US\$)	Share in Total World Trade (%)	Change per Year Since 2012 (%)	Change in World Share Since 2012 (%)
Electrical and electronic equipment	45,949.20	1.70	-0.40	-1.80
Motor vehicles transport equipment	30,861.80	1.60	1.50	0.40
Food and beverages	26,733.00	2.90	-3.10	-1.70
Chemicals and chemical products	19,948.10	1.10	-4.60	-2.70
Machinery and equipment	17,802.80	1.40	2.10	4.20
Metal and metal products	12,526.30	0.90	-10.40	-4.90
Rubber and plastic products	10,822.40	2.50	-4.40	-3.50
Agriculture	8,707.30	1.90	-9.70	-6.80
Textiles, clothing and leather	7,459.50	0.80	-1.60	-4.30

Source: UNCTAD/International Trade Center.

the international competitiveness. Between the periods of double-digit export growth from 1986 to 1995, Thailand's labor cost was still low. China had yet to enter the World Trade Organization (WTO) in 2001 to compete with Thailand's labor-intensive products and to divert FDI away from the country. Thailand's manufactured exports were driven by the low production cost of labor-intensive products. But low cost of production is only a temporary source of competitive advantage as this advantage can be eroded by increases in wages.

Since 2012, export of motor vehicles and machinery and equipment increased their respective world market shares by 0.4 percent and 4.2 percent, respectively, while metal products, textile and clothing, electrical and electronic equipment lost their shares in the respective world markets by 4.9, 4.3, and 1.8 percent, respectively. The export-oriented industry suffered from negative annual growth rates from 2013 to 2016, when the world economy was adversely affected by the slowdown in Chinese economy. The demand for Thai export products depends considerably on imports from China—China is Thailand's major trading partner. When China's economy expands, it imports more intermediate imported products from Thailand. Whether or not an industry copes well with the global slowdown is related to its external dependency, the income elasticity of its export products, and the diversification of export markets and export products. Some industries have their own specific industry challenges, such as market access restrictions and quality standards imposed by importing countries.

From the long-term perspective of exports growth in the last twenty years, automotive exports experienced the highest growth rate between 1995 and 2015, whereas apparels and textile grew only 1.9 percent on the average for the same period (Table 2). The textile industry exhibited the highest volatility, measured by the ratio of standard deviation to its mean growth rate, followed by electronics and electrical appliances. Agro-manufactured exports exhibited the least volatility, suggesting that the country can reduce export instability from exporting agro-manufactured products rather than primary commodities, which are subject to quantity and price fluctuations.

Table 2. Sectoral export growth rates (percent): 1995–2015

	Apparels and Textile	Electronics	Electrical Appliances	Automotive	Agro- manufactured	Total Exports
Mean	1.87	6.96	7.56	18.63	8.38	8.18
Maximum	20.78	29.42	31.03	53.73	20.91	24.64
Minimum	-15.31	-11.03	-14.74	-26.29	-4.91	-11.91
SD	9.96	11.82	11.55	18.17	7.37	9.40
SD/mean	5.34	1.70	1.53	0.97	0.88	1.15
World business cycle sensitivity	0.30	0.75	0.94	3.35	0.54	1.58

Source: Author's calculation.

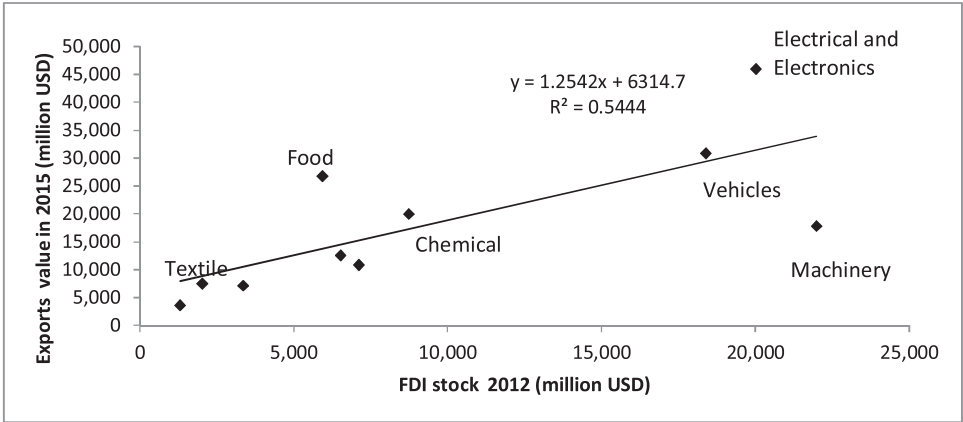
Note: World trade volume data are from the World Bank and Thailand exports data from the Bank of Thailand. The two series are used to calculate world trade volume elasticity of Thailand's exports to measure the sensitivity of each product to world business cycles. SD = standard deviation.

The textile and garment industry used to generate more than a million jobs in the early 1990s, but it experienced the lowest average annual export growth rate of 1.9 percent between 1995 and 2015. The automotive industry's average export growth rate was 18.6 percent (Table 2). Electronic and electrical equipment sectors registered an export growth rate of 7.6 percent during the same period. These two sectors' growth rates also fluctuated considerably; their standard deviation is around 1.5 and 1.7 higher than the mean growth rates.

In general, Thailand's exports are very sensitive to world business cycles, as can be seen from the world business cycle sensitivity index, approximated by the elasticity of world trade volume for Thailand's exports. For all exports, Thailand's world business cycle sensitivity is greater than unity (1.58). As such, Thailand's exports rise and fall faster than rate of changes in the global trade activities. Exports collapse spectacularly when world trade growth decelerates and rebound vigorously during upturns in global trade.

Automotive export products, including parts and components, demonstrated the highest degree of sensitivity to global trade fluctuations. Apparel and textile products were the least sensitive to changing global volumes of trade, but it incurred the highest degree of volatility. Its standard error of growth rate was about five times higher than its mean growth. The industry's products are normal goods, with positive but low values in the income elasticity of demand. Unlike automobiles, which can be considered luxury products, processed food exports do not have a high value of income elasticity of demand. The agro-manufactured exports are not as sensitive as electronics and electrical appliances. Although these industries do not suffer much during the global downturn, they usually miss the opportunity to grow rapidly during the global recovery period.

Exports of meat, fish, and seafood exhibit a high degree of product concentration. On the other hand, electronic and electrical equipment has the highest degree of product diversification, thanks to the FDI that creates network trade through the international fragmentation of products. In other words, product differentiation is difficult to achieve in

Figure 1. Sectoral FDI stock and exports

agro-manufactured products. High-valued manufacturing products in general require advanced technology, which is usually obtained from FDI in the case of Thailand.

3. FDI and Thailand's export-oriented industries

The validity of export-led and FDI-led growth hypotheses has been well documented. FDI raises productivity in the export sector of developing countries and boosts the overall productivity level of host countries (Saadi 2014). Within three decades, the rank in China's global exports rose from 32nd in 1978 to first in 2009 (Tang and Zang 2016). During this period, China was one of the world's top recipients of FDI. One of the key drivers of China's miracle growth is FDI. Large inflows of FDI may not automatically lead to an export boom, however, as the host country needs to possess absorptive capacity, which requires appropriate FDI policy, human capital, research and development (R&D) expenditures, and infrastructure. China's absorptive capacity reinforces the effect of FDI on growth by contributing to export capacity (Zhang 2015). Besides the quantity of exports, FDI also raises the quality of exports in developing countries (Harding and Javorcik 2012).

Export competitiveness depends on the level of foreign technology and knowledge assets that can lead to deepening the level of product sophistication and market diversification. The level of FDI inward stock in each sector is related to the export capacity of each sector. Figure 1 is a scatter diagram of sectoral FDI stocks in 2012 and the corresponding level of exports in 2015. Rather than using contemporaneous stock of capital, three-year lagged inward FDI stock is used to avoid the endogeneity problem. Data permitting, there are ten industries included: electrical and electronic equipment, motor vehicles and transport equipment, food and beverages, chemicals and chemical products, machinery and

Table 3. Percentage change of sectoral FDI inflows and exports (in parenthesis)

	Chemicals	Electrical	Electronics	Food	Machinery	Vehicles
2007–10	17.9 (8.3)	-24.5 (-0.2)	19.8 (-0.8)	12.9 (8.6)	28.9 (12.0)	13.9 (11.5)
2011–15	-2.3 (3.2)	18.7 (4.0)	0.5 (0.4)	6.7 (4.2)	11.8 (6.3)	5.7 (8.7)
2007–15	6.7 (5.5)	-0.5 (2.1)	9.1 (-0.2)	9.5 (6.2)	19.4 (8.9)	9.3 (9.9)

Source: Bank of Thailand.

equipment, metal and metal products, rubber and plastic products, textiles and clothing, petroleum products, and wood products. The highest level of inward FDI stocks is in the machinery sector, followed by electronic and electrical equipment sector. The wood products and textiles and clothing sectors attracted the least amount of FDI, representing only 6 percent and 9 percent, respectively, of the FDI stock in the machinery and equipment sector. Consequently, the export levels of wood products and textile and clothing sectors were low. In conclusion, higher the level of FDI stock, the higher the export capacity of the industry.¹

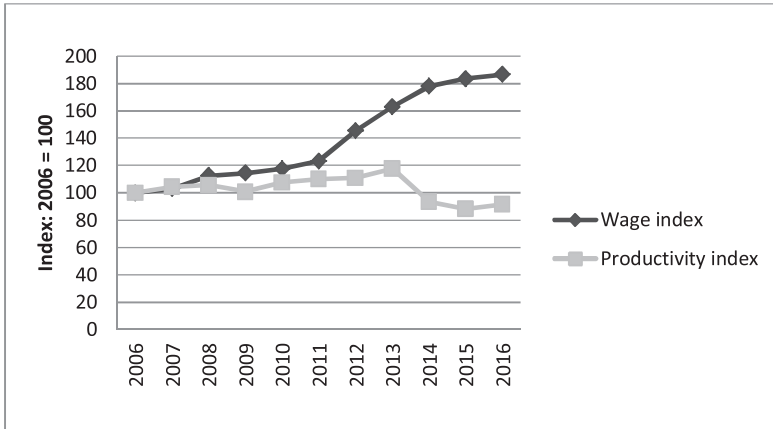
Despite the highest level of FDI stock, the machinery and equipment industry's export performance was below the average trend line (Figure 1). Electronics and automotive exports achieved the highest level of exports. The two points representing the two industries lie above the trend line. The processed food sector's exports performance was higher than the trend line, despite receiving a lower level of FDI. Because Figure 1 is a two-dimensional diagram representing the relationship between FDI stock and export level, there are other factors determining the level of exports.

During 2007–10, FDI increased rapidly in the following sectors: chemicals, food, machinery, and vehicles—and their exports also expanded significantly. For electrical equipment exports, the resurgence of FDI during 2011–15 led to a turnaround of exports from a negative to positive growth rate (Table 3). For other sectors, when FDI slowed down during 2011–15 we observe a substantial decline in export growth of chemical, electronics, machinery, and vehicles.

We can conclude that there was a significant slowdown in FDI inflows to the manufacturing sector after 2011, which is not a good sign for the future of Thailand's export-oriented industries. If the declining trend continues from 2016 to 2020, Thailand would badly need a new engine of growth. The country can no longer rely on a manufactured export engine of growth and the era of double-digit export growth will end permanently.

The declining competitiveness might be caused by baht appreciation, rising wages, and the decline in FDI to sustain productivity of labor in the industry. As can be seen from Figure 2,

¹ If the export level in 2013 and FDI stocks in 2010 are used, a positive relationship between FDI stock and export level can still be observed, albeit with a lower explanatory power at 48 percent.

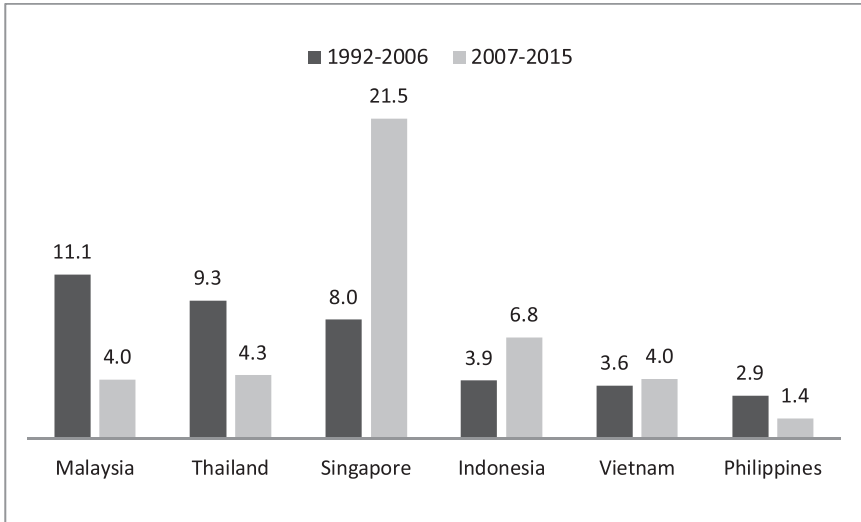
Figure 2. Wage and labor productivity

Source: Office of Industrial Economics.

Thailand's wage rates increased faster than labor productivity. The gap between wage and productivity has widened considerably since 2014. When private investment declined (because of increased risk perception from investors), labor productivity indicated signs of stagnation. The divergence between productivity and wage growth has long been a concern in the United States and Europe. In advanced countries, however, capital investment leads to a rapid rising productivity while the wage growth lags behind, causing problems of income inequality and exclusive growth. But in the sluggish recovery of the Thai economy with labor shortages, wage rate grew faster than labor productivity. The adverse consequences are a loss in international competitiveness and declining attractiveness of FDI.

The share of FDI in Thailand's GDP has plummeted since 2006, when the military coup took place, causing an increase in uncertainty and a decrease in investor confidence. The 2011 floods and the latest coup in 2014 further depressed FDI inflows. Thailand's neighbors, Cambodia, Laos, Myanmar, and Vietnam (CLMV)—countries with a more stable political environment—can be more attractive to FDI, despite the global economic slowdown. The ASEAN Economic Community, which promotes regional free trade, further encouraged FDI inflows to these neighboring countries, replacing Thailand as an export platform, with their lower wage rates besides providing a growing domestic market as well.

After China entered WTO in December 2001, some ASEAN countries experienced a slowdown in their inflows of FDI as China attracted huge FDI and FDI diversion from other developing countries. During the period 1992–2006, Thailand's FDI inflows averaged about 9.3 percent of China's inflows (Figure 3). During the period 2007–15, however, it declined

Figure 3. ASEAN FDI inflows (% China FDI inflow)

Source: Asian Development Bank.

to 4.3 percent of China's inflows. Malaysia and the Philippines experienced a similar decline in their respective share of FDI. All countries reported in Figure 3 experienced rising wages, but not all of them lost their FDI shares. Singapore, Indonesia, and Vietnam increased their respective shares of FDI. Singapore has a political infrastructure and improving rule of law to maintain political stability that is highly valued by foreign investors. In 2015, according to the worldwide governance indicator, Thailand's rank of political stability and absence of violence/terrorism was lower than that of Indonesia and Vietnam.

With political unrest, airport shutdowns, Bangkok shutdowns, and military coups, investor sentiment and consumer confidence deteriorated sharply. Unless Thailand restores political stability through establishing a democratic government, Thailand will not be able to establish government effectiveness, political participation, and the rule of law. Quality of institutions matters for economic growth. Because level of FDI is highly correlated with the level of exports, the longer the military government is in power, the less can Thailand rely on an export-led growth strategy.

4. The rise of the processed food industry and its challenges

The emergence of Thailand's processed food industry provides the country a smooth transition from agriculture to industry. There are several benefits from having a developed

processed food industry. The labor-intensive nature of the product generates more employment than other industries that are capital-intensive, such as the automobile industry. The processed food industry absorbs and speeds up the transfer of rural labor to the manufacturing sector. The industry, which is closely linked to the agricultural sector, creates higher value added for the primary commodities produced in the country. Unlike the electronics industry, it does not require large amounts of imported raw materials; thereby providing net gains in foreign exchange flows in this sector. Furthermore, the processed food industry has a higher scope of product diversification than traditional primary commodities. As such, exports in this industry can enhance international competitiveness via product differentiation, in addition to improvements in cost advantage through economies of scale. Processed food exports also benefit domestic consumers, who can enjoy the same quality and hygienic standards of export products.

As Ruan and Gopinath (2008) have shown, the average productivity of the processed food industry increases with trade liberalization. Countries with faster productivity growth than the global average can also acquire a larger share of the global market. For example, Thailand's exports of processed meat, fish, and seafood accounted for 14.6 percent of world exports in 2013. These products gained market share rapidly in high income countries. The gain in world market shares was not permanent, however. The industry is always subject to various shocks. The industry was hit in the early 2000s by the withdrawal of preferential tariffs under the Generalised System of Preferences from the EU countries. The industry also experienced an EU import ban on chicken and shrimp because of the presence of veterinary drug (nitrofurans) residues in chicken and shrimp exports. The outbreak of avian influenza further prompted the EU to ban exports of Thailand's frozen chicken. Between 2014 and 2016, shrimp output and exports further declined because of early mortality syndrome.

Among processed food exports, cereals flour and other food products experienced a double digit growth rate during the period 1995–2015 (Table 4). These are the products that have high income elasticity of demand. Exports of these items grow more rapidly than the world trade volume. On the other hand, exports of poultry, crustaceans, and canned pineapple were not able to sustain double-digit export growth as these export products are not sensitive to fluctuations of the world business cycle (Table 4).

To gain world market share, the processed food industry must stay focused on products that are growing more rapidly than world trade volume. These fast-growing products include sugar, canned fish, and cereals flour. Nevertheless, if exports of these products penetrate foreign markets so much that they seriously affect local producers, non-tariff barriers can be imposed to protect domestic producers. Sanitary and Phytosanitary Standards (SPS), environmental standards, animal welfare, and labor standards might be raised

Table 4. Thailand's processed food exports: Growth and sensitivity to world business cycle, 1995–2015

	Export Growth Rate	World Trade Volume Elasticity
Sugar	7.60	1.40
Fish, canned, prepared, or preserved	8.40	1.54
Crustaceans, canned, prepared, or preserved	2.30	-0.26
Meat of poultry, canned, prepared, or preserved	3.10	0.57
Pineapple, canned, prepared, or preserved	5.70	1.06
Other fruits & vegetables, canned, prepared, or preserved	5.60	1.01
Preparation of cereals flour or starch	11.30	2.18
Other food products	10.60	2.20
Beverages	12.10	2.06

Source: Author's estimated regression coefficients, using Bank of Thailand data from 1995 to 2015.

Note: Growth rates are exponential growth rate from time trend.

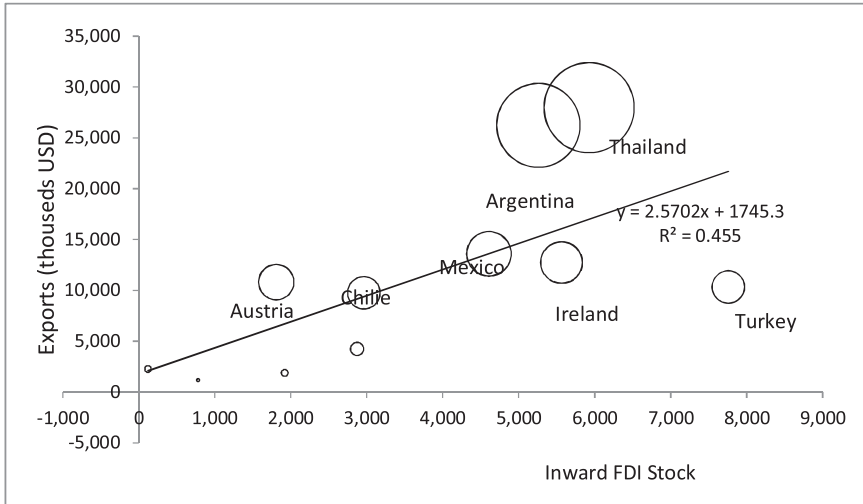
to maintain welfare of consumers and producers in import countries.² Since the bird flu outbreak in 2004, Singapore permitted only cooked chicken products from Thailand and South Korea had imposed a ban on imports of Thai chicken. In November 2016, South Korea lifted a 12-year ban after approvals were given by their officials who inspected Thai chicken processing plants.

With the availability of international data on sectoral FDI inward stocks in 2012 and export levels in 2013 (Figure 4), we can observe a positive relationship between exports and the size of FDI stock in twelve countries: Turkey, Argentina, Ireland, Mexico, Chile, Kazakhstan, Uruguay, Thailand, Finland, Austria, Japan, and Iceland. The size of the bubble indicates shares of each exporting country in total world trade of processed food and beverage.

It is clearly seen in Figure 4 that the stock of FDI is related to the level of exports. The cross-section data point of Thailand is above the linear trend, which implies that, given the same level of FDI, Thailand has a relatively higher than average capability to export processed food. Argentina and Austria also indicate competitive advantage in this industry. Ireland and Turkey do not have such an advantage, given the size of FDI stock. It is important to note that other factors, such as the distance to markets, size of domestic markets, trade policy, and membership of regional groupings, may also affect the level of exports.

Processed food products do not command a high income elasticity of demand. Unlike automobile exports, processed food exports do not rebound sharply after world economic recovery. The industry experiences a constant shock syndrome from both supply and demand. Rapid gains in export market shares can be considered as a threat to local producers. The industry must continue investing in upgrading SPS standards to meet increasingly

² Australia has banned imports of Thai shrimp for the first six months of 2017 because of the spread of white spot syndrome virus in these shrimps.

Figure 4. Exports and inward FDI stock: Food and beverages

Source: UNCTAS/Inter Trade Center.

stringent demands, especially in advanced countries. By establishing foreign partnerships, exporters can obtain information on changing tastes and new regulations in importing countries. FDI from developed home countries is the key success of the processed food industry to penetrate these particular export markets.

5. The success of Thailand's automobile industry

The entry of multinationals can affect a host country's composition of exports by producing more sophisticated goods than previous exports from host countries. Swenson (2013), using data from 1997 to 2009, finds evidence that Chinese private firm export capability was increased by product quality that was fostered by proximity to multinational firms. Harding and Javoricik (2012) argue that the knowledge spillovers from the presence of multinationals to local firms can boost the country's ability to export higher unit-value goods. Thus, policies aimed at attracting FDI inflows enable export firms climb up the export value chain, provided that domestic firms have sufficient absorptive capacity.

The auto industry was among the first industry to receive promotion from Thailand's Board of Investment. Import substitution was created through high tariff and limitation of new assembly plants, which was later lifted in 1993. From 1973 to 1999, the Thai government had implemented various promotion policies: Local Content Requirement (LCR),

mandatory and selective items for localization, high import tariffs, a ban on imported Completely Built Unit and localization of diesel engine.

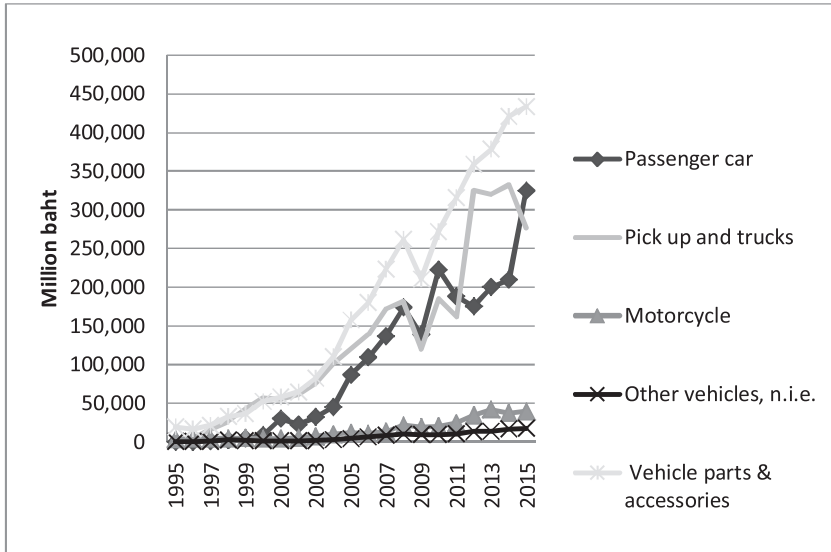
The minimum LCR was set at 54 percent for passenger cars and 70 percent for one-ton pickup trucks. Assemblers of pickup trucks were required to use local manufactured engines, and imports of their engines were banned. The protective tariff system on automobiles and parts were restructured. The LCR was abandoned by the end of 1999 and the car industry has been liberalized. After 40 years of development, the Thai automobile industry has become externally oriented and the previously protected industry has become more competitive.³

Thailand's Board of Investment promoted three Japanese joint ventures (Toyota, Nissan, and Isuzu) that began producing diesel and gasoline engines in Thailand. Before 1997, most production went to the domestic market as domestic purchasing power was rising rapidly. After the Asian financial crisis, domestic demand collapsed, with domestic sale declining sharply by 38 percent in 1997 and by 60 percent in 1998. Capacity utilization was the lowest, at 17 percent, in 1998. Producers therefore were forced to focus more on exports to improve capacity utilization and thus the financial crisis turned out to be a blessing in disguise.

The Thai domestic market has potential—political stability permitting. Car ownership in Thailand is 9 people per unit, much less than the rates of 1.3 in the United States and 1.7 in Japan. Thailand is facing competition from many Asian countries, especially China and India, to attract FDI from carmakers and auto parts suppliers to their homelands. The automotive industry share of exports in total production is about 60 percent, while capacity utilization in 2016 was between 60 percent and 70 percent. Because of the current economic slump, there would be no new investment unless the capacity utilization rate exceeds 80 percent.

The auto industry, which is the highest paid sub-sector in manufacturing, is facing a shortage of skilled labor. Salary increases are about 5.6 percent per year on average and labor unions in this sector are relatively more influential compared with those in other sectors. The domestic sales of vehicles fluctuated in line with GDP growth, rising during booms and falling during recessions. The GFC and recent global slowdown dictate domestic sales of the vehicle industry.

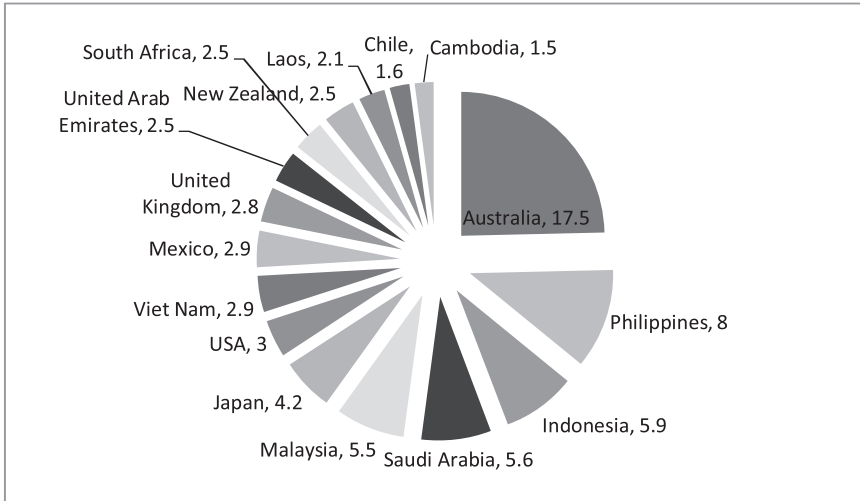
3 Soejachmoen (2016) provides evidence that FDI openness is the most important determinant of a country's participation in the global production network of the automotive industry. Indonesia is left behind because of restrictive FDI policies, high domestic protections, and low absorptive capacity in technology.

Figure 5. Automobile exports

Source: Bank of Thailand.

Exports of automobiles, parts, and components increased steadily from 2001 to 2012 (Figure 5) thanks to increased output capacity, which was enhanced by FDI. A regional automotive production network has emerged, as can be seen from the market shares of the Philippines, Indonesia, and Malaysia (Figure 6). Toyota has its unique production network, choosing Thailand as its producer for diesel engine, steering column, body parts, and pressed and resin parts. Toyota plants in Malaysia specialize in engine computers, steering linkages, and wiper arms and blades, whereas Indonesia's plants produce gasoline engines, multipurpose vehicles, door locks, and door frames. In the Philippines, transmissions, drive shafts (front wheel) and switches are produced. The product fragmentation process is also evident in Honda plants. Thailand plants produce pressed parts, meter parts, and cylinder blocks, whereas Honda Malaysia supplies bumpers, dashboards, and constant velocity joints. Indonesia plants produce cylinder blocks and heads, engine valves, automatic transmissions, and Honda Philippines produces manual transmissions, exhaust parts, and pedals.

Network trade of parts and components has become larger than final products (Figure 5), as product fragmentation facilitates the exploitation of economies of scale and scope in the automotive networks trade. The GFC caused a plunge in export levels in 2009. Nevertheless, the industry was resilient enough to rebound sharply in 2010. In 2011, the floods

Figure 6. Market diversification of Thai exports of vehicles and parts in 2015

disrupted the automobile production—resulting in another drop in the export level. If floods are considered a once-and-for-all shock by international investors, there should not be discernible impact on FDI. If, however, shocks are permanent and come in various forms such as political unrest or regime uncertainties, the decision of multinational corporations to invest in Thailand will take into account the risks from these random shocks when establishing production networks in the region.

One of the important feature of the automobile industry in Thailand is its market diversification. The top three market share amounted to about 30 percent of total Thailand's automobile exports (Figure 6). Thanks to the network trade and product fragmentation process, Thailand has ample product and market diversification, which can help the industry reduce its exposure to the volatile world business cycle.

Despite the strong cyclical demand impact of the world business cycle, market diversification provides a cushion for abrupt changes in the demand for vehicles. Table 5 provides a stark contrast between Thailand's automobile industry and other export-oriented industries. All export categories from passenger cars, pickup trucks, motorcycles, and vehicle parts and component experienced a double-digit exponential growth rate, with a high value of world trade volume elasticity.

Thailand obtained automotive technology from FDI, mainly from Japanese firms. According to the empirical evidence provide by Sadoi (2010), there has been a significant rise in

Table 5. Thailand's automobile export growth and world business cycle sensitivity

	Export Growth Rate	World Business Cycle Sensitivity Index
Passenger cars	11.4	2.24
Pickups and trucks	10.5	2.46
Motorcycles	14.2	2.61
Other vehicles	16.7	3.18
Vehicle parts & accessories	14.5	3.16

Source: Author's estimated regression coefficients, using Bank of Thailand data from 1995 to 2015.

Note: Growth rates are exponential growth rate from time trend.

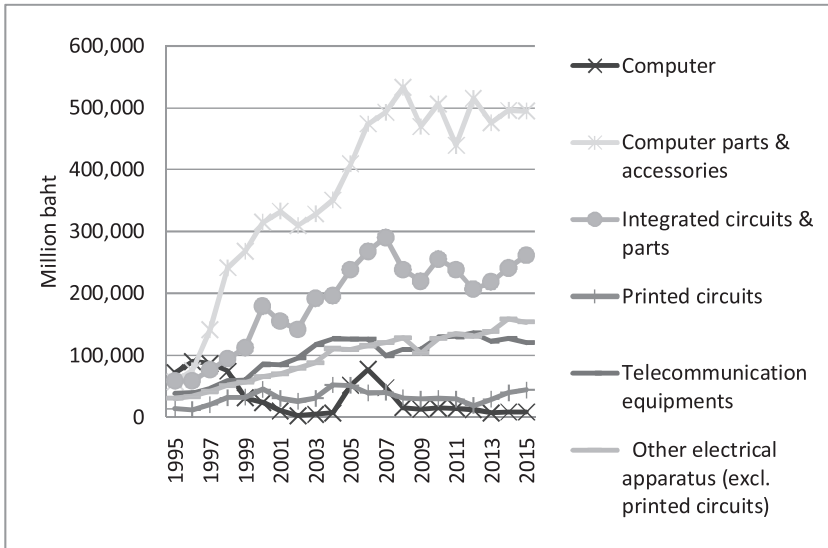
the demand for automotive engineering and technology in Thailand. The lack of engineers and technological capabilities among Thai supplier firms, however, has restricted technological development in the industry. The lack of process engineering capability remains because Thai suppliers need not perform designing, tooling, or planning in production process themselves. Busser (2008) provides evidence that industrial upgrading has taken place largely in Japanese enterprises but that technology transfer from these firms has hardly taken place. Hence, Thai suppliers have remained as second-tier suppliers, with no improvements in the indigenous technology capacity as seen in Korea, Taiwan, and China.

The future of Thailand's automotive industry depends on whether Thailand can successfully attract more higher-value added FDI into this sector. In 2007, at the beginning of the first phase of the eco-car projects, there were five Japanese car makers interested in the government's incentive schemes. When the government launched the second phase of the eco-car scheme in 2015, only Mazda started the operation and General Motors withdrew. The Thai government also has an ambitious policy to establish electric vehicle production plants. The investment incentives cover vehicle production, electric battery, engine, and charging infrastructure. By the end of 2016, there had been no electric vehicle application to the Board of Investment due, perhaps, to the unstable political environment and sluggish domestic and foreign demand.

6. The rise and fall of the electronic and electrical equipment sector

The largest sector in Thailand to receive FDI inflows is the electronic and electrical equipment. Production and export capacity had increased rapidly during the last two decades. The electronic industry has been dominated by multinational corporations such as Hitachi, Fujitsu, Seagate Technology, and Western Digital Corp., which are producing hard disc drives (HDDs) and making Thailand the largest exporter of HDD in the world. Recently, exports of HDDs have been on the decline because of the slowing down of demand for personal computers and tough competition from solid-state drives. In the long-term, HDD makers have to lower the price of their products because of intensifying competition with this sector and from competing sectors.

Figure 7. Exports of electronic equipment



Source: Bank of Thailand.

Exports of electronics are less sensitive to the world business cycle when compared with electrical equipment. The income elasticity of demand for electronics products was 0.75, which is still higher than exports of agro-manufactured exports (Table 2). The year 2009 was the peak for the electronics industry, which suffered from lackluster growth of exports. The industry has become a falling star.⁴

Exports of integrated circuits, telecommunication equipment, computers, and other electrical apparatus (such as computer keyboards, printers, and monitors) do not have a promising trend (Figure 7). Thailand cannot compete with cheap exports from low-cost countries such as Vietnam, where the exports of electronic machines rose 36 percent annually, from 2011 to 2015, when the world demand increased by only 2 percent.

FDI in the electronic industry brought along imported machinery, as the multinational corporations in this sector required imported intermediate inputs from their production networks. As a result, the electronics sector does not generate net gains in foreign exchange. The industry generally produces according to specification of the multinational corporations operating assembly plants in Thailand.

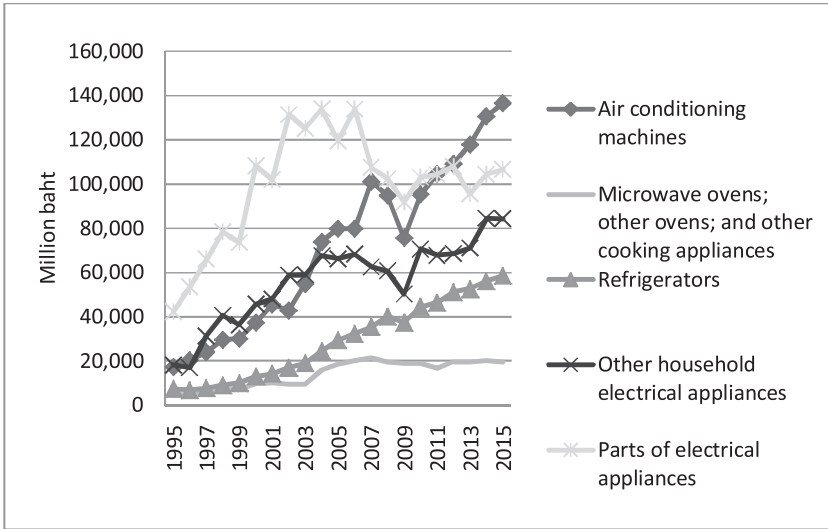
⁴ The growth of FDI into the sector declined sharply to just 0.5 percent between 2011 and 2015.

Thailand's electronic and electrical equipment (E&E) industry does not design its own products; there are no Thai brand names. The ability to create original products is limited by the availability of quality of human resources and telecommunication infrastructure. The challenge of the industry is inadequate human capital—the labor force in this sector has relatively low skills. The percentage of high-skilled computer professionals used is small. The average years of schooling for the Thai labor force older than 15 years old is only eight years, and the enrollment for tertiary education is extremely low (35 percent) compared with countries with successful electronic sectors. Despite the fact that the Thai government spends 5.5 percent of GDP annually on education, the low level of human capital has remained a perennial problem for Thailand. As a result, the absorptive capacity to FDI is low, making it difficult to attract advanced FDI that requires skilled labor. To make matters worse, Thailand has very low investment in research and development (R&D). Between 2001 and 2009, R&D expenditures averaged only 0.24 percent of GDP. Private R&D amounted to 64 percent of public expenditures, indicating that the private sector has yet to learn the importance of investing in product innovation.

Exports of electrical appliances exhibit a more promising trend than electronics equipment. Although experiencing the same fallout during the GFC in 2009, it has resumed an upward trend despite the global slowdown between 2012 and 2016. Note the wild fluctuations in exports of parts and components of electrical appliances, which reflect the volatility of network trades in this sector. The world income elasticity of Thailand's exports of electrical appliances was close to unity (Table 2). The champion products within these categories are air conditioners, refrigerators, and other household electrical appliances (Figure 8). An important factor contributing to an increase in exports is the turnaround of FDI. The resurgence of FDI growth from the decline by 24.5 percent during the period 2007–10 to a jump to 18.7 percent underlines the importance of the ability to attract FDI inflows.

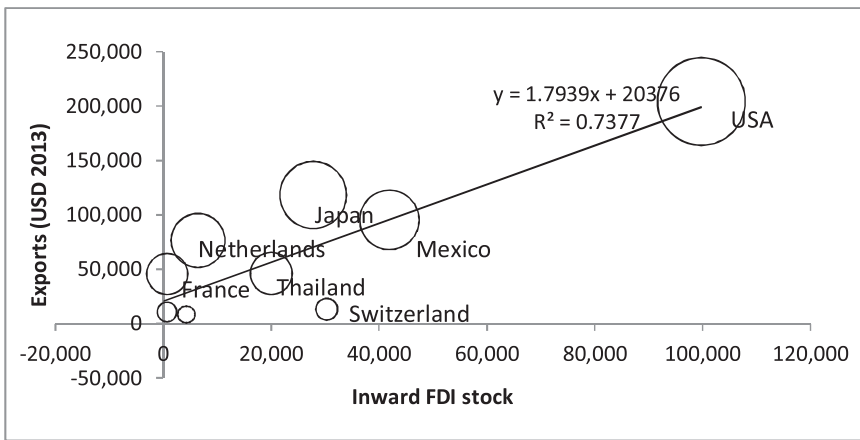
The data provided by UNCTAD/International Trade Center reveal that there is a positive relationship between exports and inward FDI stocks (Figure 9). The sample points in the figure include the following countries: the United States, Switzerland, Japan, Thailand, Mexico, Netherlands, Denmark, Turkey, and France. It should be noted that for Japan, Netherlands, and France, exports of E&E products are higher than average, given the same level of stock of inward FDI inflows. Domestic stocks of investment also contribute to E&E exports, in addition to FDI inflows. FDI are also attracted to countries with large domestic markets such as the United States—as the motivation for FDI is domestic sales, unlike a small domestic market such as Thailand, where hosting export platforms is the main motivation of FDI. Mexico, which is closer to the U.S. market, also benefits from being a member of NAFTA, as it attracted export-oriented FDI that aims to export to the United States and Canada.

Figure 8. Exports of electrical appliances



Source: Bank of Thailand.

Figure 9. Exports of electronic and electrical equipment



Note: Bubble size corresponds to world market share.

Thailand's exports of electronic and electrical equipment depend heavily on inflows of FDI. When compared with exports of processed food and textiles, using cross-country data, FDI stock has the highest explanatory power to the E&E export performance. To sum up, it is a hard road ahead for Thailand to maintain the high export growth in this sector that was achieved during the years with large FDI inflows.

7. The decline of the textile and garment industry

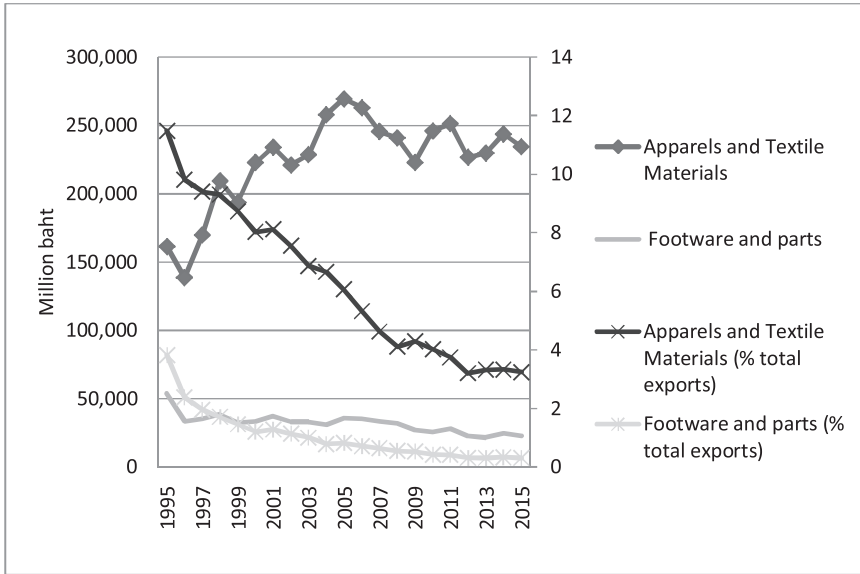
Thailand's textile and garment industry became integrated into international production networks by the 1980s. The industry was among the main drivers of Thailand's manufacturing sector at that time. The rise of the industry was mainly due to FDI, thanks to cheap wages and the strength of the Japanese yen in the 1980s. At its peak, the industry employed more than one million workers.

The comparative advantage of the industry has been declining since the slowdown of FDI, which reduces labor productivity, and the wage rate was rising because of an overall shortage of labor (Figure 3). Textile exports in Thailand's total exports have been declining over the last two decades. In 1995, the industry contributed around 12 percent of Thailand's total manufactured exports; this was reduced to 4 percent by 2015. Similarly, the share of FDI inflows into this sector has declined from 6 percent to less than 2 percent during the same period. Other labor-intensive products, such as footwear and parts, are facing the same fate (Figure 10). Exports of footwear in Cambodia and Vietnam grew annually by 52 percent and 17 percent, respectively, between 2011 and 2015, resulting in gains in their shares in the world market, which grew at 3 percent annually.

By nature, the textile industry is labor-intensive and trade-dependent. Labor shortages brought about rising wage rates, making the industry less competitive when compared with other developing countries. Labor-intensive products such as manmade staple fibers, and apparel [knit and crochet] cannot compete with labor-abundant countries such as Vietnam, Indonesia, and Bangladesh. Thailand's wage rate is currently almost three times higher than Vietnam's.

According to the Thailand Garment Manufacturers Association, the industry is experiencing a labor crisis: There is a shortage of 50,000 workers in the industry, and by the end of 2017 the shortage will reach 60,000 workers. Thailand has 400,000 people working in the garment industry. One of the main contributors to the labor shortage was the high price of agricultural products during the global food crisis in 2008. There was a shift of labor supply from the garment sector back to farming. The problem was mitigated after China's slowdown, which dampened commodity prices. The labor shortage can be eased somewhat by migrant workers, although there are also shortages of labor in Laos and Cambodia, which also increased their daily minimum wage rate in early 2016. It is expected that Myanmar's

Figure 10. Exports of labor-intensive products



Source: Bank of Thailand.

textile and garment industry will generate more than one million jobs in the next five years. Thus Thailand's problem of cost disadvantage will remain.

A high wage rate would not harm the industry as long as labor productivity rises in line with increasing wage rates. The growth of labor productivity of textiles and the apparel industry has remained subdued, which can be attributed to insufficient FDI and also low domestic investment to create new products. The production of fabric and apparel had actually declined since 2008. In 2013, the production of fabric declined by 40 percent from the level in 2000. Indeed, the industry's future depends largely on the growth of external demand. Thailand's export market shares were shrinking because of a cost disadvantage and the baht appreciation from 2008 to 2014.

Thailand's clothing industry was badly hit by the GFC, as the United States has been the biggest importer of Thailand's garment products. By the end of 2016, the industry had yet to recover from the impact of global economic slowdown.⁵ Despite the growing power of China as a global growth-driver, ASEAN-5 countries' dependence on the U.S. economy still remains stronger than their dependence on the Chinese economy (Tan, Abeyasinghe,

⁵ In 2016, fabric and home textile suffered the decline by 13.7 and 36.5 percent, respectively, and the total industry exports declined by 3 percent.

and Tan 2015). The rising dependence on China is worrisome, however, considering that China's GDP growth slowed down to 6.9 percent in 2015 and 6.7 percent in 2016. The free trade agreement between Thailand and advanced economies might have helped, but deals did not materialize, as the EU and the United States do not want to strike a trade deal with Thailand's military regime. This was a missed opportunity to upgrade textile technology via trade and investment creation effects from establishing free trade agreements.

Goto and Endo (2014) argue that rising wages and labor shortages require firms to upgrade and shift from labor-intensive assembly to higher value-added products. Wu, Chen, and Chen (2012) provide evidence that China's openness to trade and bilateral trade agreements determine the growth of its textile industry. There is also a home market effect in downstream exports and China's FDI outflows stimulate growth in mid-stream textile production exports. Thus, Thailand's investment outflow to CLMV countries might help stimulate up-stream and mid-stream exports.⁶

Thailand can no longer compete with Turkey, Bangladesh, Cambodia, Pakistan, and Vietnam. These countries are competitive in the traditional garment and textile sector. Between 2011 and 2015, annual export growth rates of apparel and clothing accessories in Cambodia and Vietnam were 11 percent and 36 percent, respectively, while the world imports of the products grew by 3 percent. The low-wage countries gained in the world market share because of Thailand's rising wages. The industry must differentiate and upgrade to high-valued textile production. Challenges are the ability to upgrade product quality and to create technical textile products that require R&D to differentiate Thailand's textile products from other developing countries. To survive the fierce competition from countries with lower wage rates, the industry must attract FDI to produce technical textiles and textiles for medical uses.

8. Conclusion

The rise and fall of Thailand's manufactured export industries depend on whether the country can attract inflows of the right type of FDI. The main strength of Thailand's export-oriented industries lies behind export upgrading and labor productivity enhancement by continued inflows of FDI. With imported technology and spillover effect to local industries, FDI can lead to sophisticated industrial production. If inflows of FDI declines or ceases to be attracted to Thailand, however, it would be difficult for the country to maintain competitiveness, as the country is squeezed between countries with the lower wage rate and countries with high wages but more advanced technology. It is not surprising that

⁶ The production of fiber amounted to 31.6 percent of total output of the industry. Yarns and fabric amounted to 10.1 and 7.1 percent, respectively, and home textiles and technical textiles amounted to 7.1 and 9.6 percent, respectively, of production in 2016.

Thailand does not have its own national brands of manufactured export products.⁷ Thailand will get stuck in the middle income trap until investment in human capital bears the fruit of innovation through creating indigenous higher-value added products.

We have seen the rise and fall of Thailand's industries. Some industries can sustain growth and maintain competitiveness, thanks to their ability to attract FDI. This is the case in the automobile industry, whose exports have grown faster than world trade volume. The processed food industry, having a comparative advantage through abundant agricultural food resources, faces constant challenges that always disrupt the steady growth path either from supply or demand sides. Electronic and electrical equipment exports are sensitive to world trade fluctuations. Rapid changes in technology and demand patterns may prevent the industry from maintaining a steady growth path.

The level of income elasticity of the demand for industrial products also matters during periods of strong world trade fluctuations. In other words, the export product of a country matters. If the export products can be differentiated from competitors in terms of superior quality and safety standards, if they can be produced with cost advantages, and if they can create sufficient product and market diversification, they will have a better chance to survive a global recession and will rebound immediately when the global economy recovers.

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⁷ This is why the Thai government has come up with a new strategy of industrial development: the Thailand 4.0 model, which targets 10 industries focusing on innovative technology development, namely, robotics, biofuels, biochemical, digital industry, and medical services.