

RESEARCH ARTICLE

Competitive Trend and the Development of Advantageous Goods in Terms of Value Added Among ASEAN Economies: A Multiregional Input–Output Analysis

Van Chung Nguyen
Quang Binh University, Dong Hoi, Vietnam

Van Hoa Nguyen*
University of Kinh Bac, Bac Ninh, Viet Nam
nvhoacva@gmail.com

This study aims to investigate the competitive trend and the development of advantageous goods in terms of value added among ASEAN economies in the context of the strong production shift that is taking place globally, especially in the Asia-Pacific region. To achieve this purpose, we use the inter-regional IO analysis method to analyze the value added by sector level of ASEAN economies. The results show a big disturbance in the ranking of value added for the garment and textile industries and high-tech goods among ASEAN countries. Noticeably, the participation in the total global value chain of countries such as Thailand and Malaysia remains at a high level, ranging from 40% to 45%. Meanwhile, Vietnam's value added has grown strongly and reached a level equivalent to previous countries with more developed economies in the region. The research results also show the big trend of competition in terms of value added among ASEAN countries in taking advantage of the recent shift of production from major countries out of China, especially industries with high value-added.

Keywords: Multiregional, input-output analysis, ASEAN, value-added, sector level, competition

JEL Codes: A13, D57, F43

Nowadays, there is a tendency for production companies from first-world countries, such as the United States and Japan, to leave China for geopolitical reasons and go to Southeast Asian countries. China's dependence on input materials from developed countries, especially from Japan,

tends to be slower than before (Okamoto, 2001), opening up great opportunities for ASEAN countries. Furthermore, Russia's invasion of Ukraine and the sanctions imposed on the country, as well as new pandemic-related lockdowns in China, are the latest events to shake up global supply chains (Simchi-Levi & Haren, 2022). This also brings many great opportunities and challenges for Southeast Asia.

On the other hand, the global value-added chain currently represents an important aspect of economic interdependence between countries within the region and globally (Wang et al., 2022). This shifting enables ASEAN countries to attract investment from developed countries and bring surplus value added to their country. Although ASEAN countries are cooperating closely with each other in many fields, fierce controversy is taking place. The trend of international economic integration is increasingly taking place in the Asia-Pacific region, especially in the ASEAN region. The economies of this region have many opportunities to become important links in the global value chain. However, at present, ASEAN countries are still not fully exploiting their economic potential in the global value chain because the enterprises of these countries are only engaged in industrial production activities in the outsourcing stage for foreign direct investment enterprises (FDI), which leads to low added value. Moreover, the role of governments in sourcing investment from developed countries is very important because this determines the quality of added value for the economy (Amendolagine et al., 2019). Therefore, focusing on high value added exports, especially high-tech goods, is of particular interest to the governments of Southeast Asian countries.

In general, most countries have seen GDP growth slow down from 2014 to 2016, but the trend has increased again from 2017 to 2022. This is also reflected in the value added from a perspective production edge. We assume that the main reason is partly due to the strong shift of production from major countries out of China

during the period 2016–2022. In the previous period, many foreign corporations, to reduce costs, expanded their strong production networks in the world's most populous country and formed a global value chain (Imai & Shiu, 2011).

In recent years, countries have realized that if an economy wants to prosper, it will not only increase the number of products produced but also greatly depend on the added value of products. Since then, quite a few studies have been conducted to help the governments of Southeast Asian countries find solutions to find the shortest way to increase added value for the country. However, previous studies have focused on studying at the macro level, so it is difficult to accurately determine the impact of the components of the economy. Different elements will affect the economy to different degrees.

Moreover, previous data analysis methods that reflect the current level of value added in goods are still unclear, which significantly affects the decisions as well as the development roadmap of the value added chain in exports. The inter-regional IO analysis method allows planners to get more specific analytical parameters to clearly see how Southeast Asian economies participate in the value chain when exporting goods in high-tech and other important industries. On the other hand, in recent years, the economic and political cooperation between countries in Southeast Asia has been very close. However, the gap in national income between countries in this region is still quite large, which also leads to fierce competition in value added by countries with lower GDP to quickly shorten the gap in economic development.

As shown in Figure 1, it is easy to see that Thailand's GDP growth is increasingly outstripping Vietnam's GDP, especially in 2016. This difference is up to 50% of Vietnam's GDP, equivalent to 206 billion USD compared to Thailand's 413 billion USD. From 2015 to 2020, the GDP difference between these two countries ranged from 48% to 50%, compared with a 41% to 46% difference in previous years. Thus, it can be said that Thailand's GDP growth rate is increasingly outpacing that of Vietnam. Despite having a low level of national income, Indonesia is a country with a superior economic scale compared to the rest of the region, from

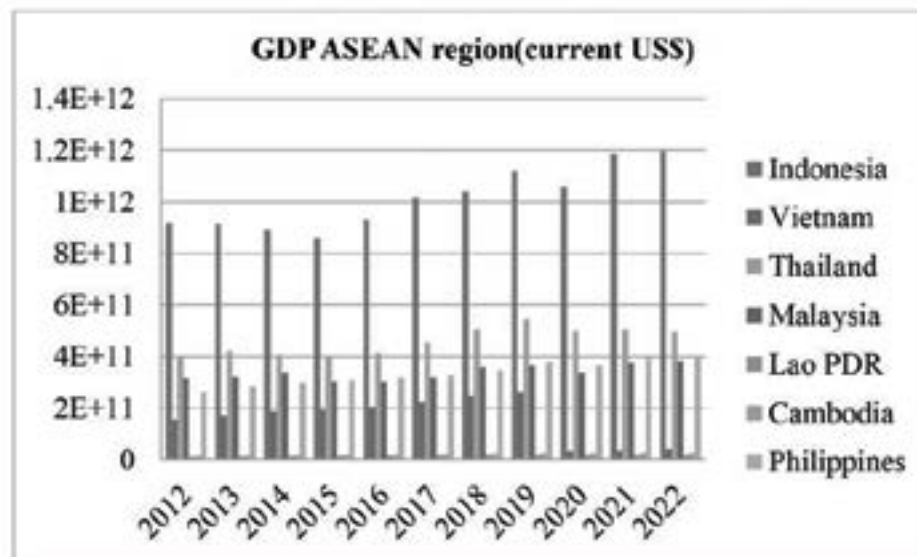


Figure 1

Comparison of GDP Growth Rate of ASEAN Economies

Source: Author's calculation based on *The World Bank (The World Bank, 2023)*

917 billion USD in 2012 to 1,181 billion USD in 2020. Countries like Laos and Cambodia have lower GDPs compared to the rest; specifically, Laos and Cambodia have only 2% GDP compared to Indonesia's economy. Therefore, if the governments of Vietnam, Laos, and Cambodia do not have more appropriate and stronger policies, the competitiveness will be severely reduced. Governments of small countries need specific solutions and roadmaps to increase the added value of high-tech products that they can benefit from to close the gap with countries with high GDP in the region, such as Thailand, Indonesia, or Malaysia, from 2021 to 2045.

The study uses a complex cross-regional analysis method with data provided by the Asian Development Bank (ADB) from 2015–2022 to help ASEAN countries have a more substantive view of the added value that goods create for each stage of production, identifying items that bring more value to the country. To see the gap between countries in the ASEAN region as well as better analyze the value added that these countries create, the next sections will proceed more clearly. The study only focuses on analyzing seven countries in Southeast Asia because Singapore is a developed economy, whereas Myanmar's economy is experiencing political instability. These two countries are not mentioned in the study to ensure accuracy and fairness in comparison. Brunei is not mentioned in this study because it is a country that depends heavily on oil exports and has a high income compared to the rest.

The research focuses on countries in Southeast Asia with quite similar economic structures.

Literature Review

Partnerships are very common in ASEAN. Indonesia, Thailand, Vietnam, and Malaysia were the ASEAN countries with the largest number of partnerships in the manufacturing sector during the period 2010–2016. In manufacturing, partnerships are mainly observed in processed foods, chemicals and plastics, base metals and fabricated metals, as well as machinery and transportation equipment (Organisation for Economic Co-operation and Development [OECD], 2022). International product fragmentation and the cross-border dispersion of component manufacturing and assembly in vertically integrated manufacturing processes are important features of structural interdependence, deepening the architecture of the world economy (Athukorala, 2005). Nakgyoon (2015) showed that in the world today, the value added to exports is often proportional to labor productivity as well as science and technology. High rates of value-added are often found in highly labor-productive countries where modern technological machinery is available.

In recent years, ASEAN countries in the region have actively cooperated, even with fierce competition, to create increasing value for each country in the

region. Chia (2013) emphasized that Southeast Asian countries' (ASEAN) participation in the free trade markets in the region, as well as trade agreements with major partners such as China, Japan, Thailand, India, and Australia, will bring many challenges and strong competition in the region. However, this competition has many positive aspects for ASEAN.

Ando and Fukunari (2014) studied North America's trade transition structure for East Asian countries, including ASEAN countries. The study showed that large countries such as the United States are more likely to buy machinery from East Asian countries, indicating that value-added tends to increase in this region. Khoi (2013) researched the value added chain in the Vietnamese dairy industry and found that strengthening the value added chain in the dairy industry not only enhances the strength of domestic dairy companies but also enhances the competitiveness of domestic products compared with products imported from abroad. Increasing value added also means the dairy industry must modernize production stages, including high-tech machinery. Over the past two decades, the participation of the East Asia-Pacific region in the global value chain (GVC) for electronic products has been deep and wide, both in terms of quality and quantity. The participation in the global value chain of Southeast Asian countries, namely Malaysia, Singapore, Thailand, and Vietnam, is increasingly increasing the production value chain, whereas China remains the main leader in the global value chain for electronic products and other high-tech products (Torsekhar & Verwey, 2019).

Most manufacturing activities use inputs from the financial and business services sectors. But these service industries also compete for resources with manufacturing activities, raising concerns about financial services—deindustrialization in industrialized countries, such as the United States and the United Kingdom, and financial services in developing countries, such as India and the Philippines (Liu et al., 2018). Mattoo et al. (2013) developed new measures of cross-border trade in the context of fragmentation of global production and value-added trade. The study also provided methodological guidance on how to calculate the import coefficient at the firm level and shows how trade microdata can refine the aggregated nature of input-output panel metrics by increasing their granularity. Karami et al., (2019) studied the effect of production value added on economic growth, recommending that policymakers should

invest in policies that can promote the growth of the manufacturing industry by increasing productivity and increasing the share of employment in the manufacturing industry for a sustainable, healthy, and competitive economy. The decline in value added in manufacturing in many developing countries is not due to changes in manufacturing but is the result of shifting production activities to other countries (Haraguchi et al., 2017). Kazakova et al. (2017) analyzed value added and forecasting trends in the manufacturing industry and examined issues of estimating the region's total value added. Developing small and medium-sized enterprises to integrate into GVCs is the strategic goal of the ASEAN Secretariat, as stated in the ASEAN Strategic Action Plan on Small and Medium Enterprise Development for the period 2016–2025 (López González et al., 2019).

Over the past decade, China's FDI inflows have strongly shifted from low-tech to high-tech. According to Liu and Daly (2011), four basic factors are affecting this shift: market size, labor costs, labor quality, and infrastructure. In addition, Torsekhar (2018) investigated Chinese medical products between 2003 and 2017, finding that the majority of foreign medical device suppliers to China are high-tech businesses. Moreover, in recent times, China has self-supplied high-tech medical products for domestic demand, even exported to advanced countries. Timmer et al. (2014) concluded that there is a global trend to move high-tech factories from countries with low-skilled workers to countries with highly skilled workforces. As a result, there is a decrease in value added in low-skilled labor force countries, indicating that the demand for low-skilled labor is declining.

Foster-McGregor (2019) studied Asian economies and found that the role of intermediaries is increasingly important because of the value of their intermediate goods in the global value chain. Besides, some final product assemblers also affirm their important role in the global value added chain. In other words, the importance of the final export economy and the intermediate export economy in job creation is the same. Some economies rely on export intermediaries to create jobs to a greater extent than others, reflecting their importance as intermediate input suppliers in the global value chain. Meanwhile, other economies rely to a greater extent on final exports, reflecting their role as assemblers in global value chains. Moïse and Sorescui (2015) assessed the impact of border procedures

on supply chain operations, focusing on three main issues of foreign value-added including domestic final demand; foreign value added as the total exports of a reference country and domestic value-added represents the ultimate foreign demand in five sectors. The results show that a 0.1 increase in TFI efficiency can result in a country's imported value-added increase in the range of 1.5 to 3.5%, while in the case of export, this increase can be in the range from 1 to 3%. Although indigenous technology capabilities are tied to export performance in the electronics sector, the tendency to import electronic components accounts for the largest share of differences between countries in terms of performance and specialization in electronics export (Srholec, 2007). Lee et al. (2016) found that globalization promotes differences between countries, depending on where countries are in the value chain. Both Korea and Taiwan have emerged as key players in the global market but in different parts of the global value chain. Their overall orientation towards global markets contrasts sharply with the inability of Japanese companies to successfully move their domestic success abroad. In addition, Chinese companies are simultaneously involved in different development paths, making the country's multi-path approach unique. This study has important implications for industrial development in East Asia in the era of globalization.

In recent times, there have been many studies referring to the value-added chain in Southeast Asia and some large countries in the region, such as China. However, no single study focused on comparing the development of added value within ASEAN countries. This study is an interesting development on the rise of a number of Southeast Asian countries, of which the two most notable countries in the region are Thailand and Vietnam. The study also found that the dynamism and development of a number of emerging regional economies, such as Vietnam or Cambodia, are the driving forces behind other economies in the region. The competition in value added by countries in the region also creates a significant development impetus for the ASEAN region. In particular, the study uses an interdisciplinary cross-regional balance sheet (IO table) combined with quite complex analyses that have not been mentioned in previous studies. The author compares the research results in Tables 5 and 6 in detail. Moreover, previous studies have not been analyzed at the sectoral level, so the analysis has not yet entered the essence of this study, once again helping

policymakers have more insight from which to make stronger decisions and have a more positive impact on different economies.

Methodology and Data Sources

Methodology

In multiregional input-output analysis, the economic system is described not only in terms of interdependent sectors but also in terms of interrelated regions (Leontief & Strout, 1963). Multiregional input-output (MRIO) analysis is applied to understand the countries that consume products globally and the sectors they need to buy in order to produce goods and services in order to construct their country (Liu et al., 2018). Suppose we proceed to observe an economy with (n) sectors. The input-output table (IoT) describes the transactions between sectors in that economy and with the rest of the world (RoW), summarized in Table 1.

Assuming there are three regions (R , L , and F) and each has three divisions, then the trade in products between industries in which intermediate inputs and required parts can be represented by Table 1. Accordingly, the intermediate input Z^{RR} to Z^{FF} is the quantity of goods invested in sector S of region R with Z as an intermediate input. The intermediate input can be represented as a matrix:

$$Z = \begin{bmatrix} Z^{RR} & Z^{RL} & Z^{RF} \\ Z^{LR} & Z^{LL} & Z^{LF} \\ Z^{FR} & Z^{FL} & Z^{FF} \end{bmatrix} \quad (1)$$

$$X_1^R = Z_{11}^{RR} + Z_{12}^{RR} + Z_{13}^{RR} + Z_{11}^{RL} + Z_{12}^{RL} + Z_{13}^{RL} + Z_{11}^{RF} + Z_{12}^{RF} + Z_{13}^{RF} + Y_1^R \quad (2)$$

Where X_1^R is the output value of the first industry in region R and Y_1^R is the final demand of the first industry in region R after subtracting imports. The input factor of R area ij can be calculated as follows:

$$a_{ij}^{RR} = \frac{Z_{ij}^{RR}}{X_j^R} \quad (3)$$

$$a_{ij}^{RL} = \frac{Z_{ij}^{RL}}{X_j^L} \quad (4)$$

$$P = A' P + P^M M' + v \text{ or } P = (I - A')^{-1} (P^M M' + v) \quad (5)$$

Table 1
Multiregional Input-Output Table Structure

		Intermediate input								
		R			L			F		
Intermediate input		1	2	3	1	2	3	1	2	3
R	1	Z_{11}^{RR}	Z_{12}^{RR}	Z_{13}^{RR}	Z_{11}^{RL}	Z_{12}^{RL}	Z_{13}^{RL}	Z_{11}^{RF}	Z_{12}^{RF}	Z_{13}^{RF}
	2	Z_{21}^{RR}	Z_{22}^{RR}	Z_{23}^{RR}	Z_{21}^{RL}	Z_{22}^{RL}	Z_{23}^{RL}	Z_{21}^{RF}	Z_{22}^{RF}	Z_{23}^{RF}
	3	Z_{31}^{RR}	Z_{32}^{RR}	Z_{33}^{RR}	Z_{31}^{RL}	Z_{32}^{RL}	Z_{33}^{RL}	Z_{31}^{RF}	Z_{32}^{RF}	Z_{33}^{RF}
L	1	Z_{11}^{LR}	Z_{12}^{LR}	Z_{13}^{LR}	Z_{11}^{LL}	Z_{12}^{LL}	Z_{13}^{LL}	Z_{11}^{LF}	Z_{12}^{LF}	Z_{13}^{LF}
	2	Z_{21}^{LR}	Z_{22}^{LR}	Z_{23}^{LR}	Z_{21}^{LL}	Z_{22}^{LL}	Z_{23}^{LL}	Z_{21}^{LF}	Z_{22}^{LF}	Z_{23}^{LF}
	3	Z_{31}^{LR}	Z_{32}^{LR}	Z_{33}^{LR}	Z_{31}^{LL}	Z_{32}^{LL}	Z_{33}^{LL}	Z_{31}^{LF}	Z_{32}^{LF}	Z_{33}^{LF}
F	1	Z_{11}^{FR}	Z_{12}^{FR}	Z_{13}^{FR}	Z_{11}^{FL}	Z_{12}^{FL}	Z_{13}^{FL}	Z_{11}^{FF}	Z_{12}^{FF}	Z_{13}^{FF}
	2	Z_{21}^{FR}	Z_{22}^{FR}	Z_{23}^{FR}	Z_{21}^{FL}	Z_{22}^{FL}	Z_{23}^{FL}	Z_{21}^{FF}	Z_{22}^{FF}	Z_{23}^{FF}
	3	Z_{31}^{FR}	Z_{32}^{FR}	Z_{33}^{FR}	Z_{31}^{FL}	Z_{32}^{FL}	Z_{33}^{FL}	Z_{31}^{FF}	Z_{32}^{FF}	Z_{33}^{FF}

Table 2. Multiregional Input-Output Table Considering Price and Quantity

Intermediate input	Intermediate input		
	R	L	F
R	$P^R Q^{RR}$	$P^R Q^{RL}$	$P^R Q^{RF}$
L	$P^L Q^{LR}$	$P^L Q^{LL}$	$P^L Q^{LF}$
F	$P^F Q^{FR}$	$P^L Q^{FL}$	$P^L Q^{FF}$
ROW	$P^M M^R$	$P^M M^L$	$P^M M^F$
VA	V^R	V^L	V^F
Total	X^R	X^L	X^F

$$P^L = (I - A^{LL})^{-1} (P^R A^{RL} + P^F A^{FL}) \quad (6)$$

$$P^R = (I - A^{LL})^{-1} (P^R A^{RF} + P^L A^{LF}) \quad (7)$$

$$P = A' P + P^M M' + v \text{ or } P = (I - A')^{-1} (P^M M' + v) \quad (8)$$

Based on the inter-regional price feedback effect among ASEAN regions, researchers can calculate the impact of increasing prices of energy and raw materials on the economy of each country in a certain proportion. The weighted average price index used for comparison is shown below:

$$PI_c = P_{c,i} \times \frac{P_{c,i} \times X_{c,i}}{\sum_j P_{c,i} \times X_{c,i}} \quad (9)$$

In which $P_{c,i}$ represents the price index of good i in country c , and the output value of good i represents the total value of output of that country.

Value added in trade is the import and export activities, and the value added trade difference between one economy and another. The value added in exports created by industry i of economy s and absorbed by economy t is calculated by the formula:

$$v_{r_l}(i) = r_s(i) x_{r_l}(i) \quad (10)$$

Where r_s is the ratio of value added to the output of each sector in the economy. Thus, the total value added in exports of economy s to economy t is:

$$v_{rl} = \sum_i r_r(i) x_{rl}(i) \quad (11)$$

The total value added in s exports to all trading partner economies is:

$$v_r = \sum_i \sum_r r_r(i) x_{rl}(i) \quad (12)$$

The total value added in imports of t economy from all trading partner economies is:

$$v_l = \sum_j \sum_r r_r(i) x_{rl}(i) \quad (13)$$

Thus, to evaluate the value-added in trade between two or more counterpart countries or other words, the economic performance of a country can be measured by the difference in value added in trade with the formula:

$$v_{ar} - v_{al} \quad (14)$$

Economy i 's ASEAN value change (AVC) participation rates for any given year t are given as follows:

Let $j \in$ [constant price, current price],

$$AVC_{i,t}^j = \frac{Rex_{i,t}^j + Ref_{i,t}^j + Fva_{i,t}^j + Pdc_{i,t}^j}{Gex_{i,t}^j} \quad (15)$$

where Rex is value-added exports that are re-exported and absorbed abroad. Ref is value-added exports eventually absorbed back at home. Fva is foreign value-added embedded in an economy's exports. Pdc is purely a double-counted trade resulting from back-and-forth trading. Based on Koopman et al. (2014) analyzed the value added in all products exported to foreign countries of a country, thereby dividing the value added into the following five parts: (a) value added in domestic production, (b) the value-added contained in the intermediate goods is then exported to a third country, (c) the value added contained in the final goods exported to foreign countries, (d) the value added contained in intermediate goods exported to foreign countries, and (e) domestic value added initially absorbed abroad then finally returns home.

Domestic value-added absorbed abroad (DVA):

$$DVA^x = VAX_B^x + VAX_F^x = FIN + INT \quad (16)$$

$VAX_F_j^x$ is forward-linkage based value-added exports of sector j from country x , which is sector j 's value-

Table 3. Sector Classification

No	Code	Industry	No	Code	Industry
1	D01T03	Agriculture	13	A4	Machinery and Other manufacturing
2	A1	Mining	14	A5	Motor vehicles Transportation
3	D07T12	Food, beverages	15	T39	Electricity, gas, water supply services
4	DT15	apparel, leather, and related products	16	T43	Construction
5	A2	Wood and Paper	17	T47	Wholesale and retail
6	D19	Coke and refined petroleum products	18	T56	Accommodation and food services
7	T21	Chemicals and pharmaceutical	19	A6	IT Telecommunications, audiovisual
8	A3	Rubber, non-metallic mineral products	20	A7	Financial and business
9	D24	Basic metals	21	D68	Real estate activities
10	D25	Fabricated metal products	22	A8	Public admin. Education
11	D26	Computer, electronic, and optical products	23	A96	Human health Arts, entertainment
12	D27	Electrical equipment	24	D97T98	Private households with employed persons

Source: Multiregional Input-Output Database Asian Development Bank (2023)

added embedded in all sectors' gross exports from country x , including indirect exports of sector j 's value-added through gross exports of country x 's other sectors. $VAX_B_j^x$ is backward-linkage based value-added exports of sector j of country x , which is value-added from all sectors in country x that is embedded in its sector j 's gross exports. FIN is the domestic value added absorbed abroad in exports of final goods. INT is the domestic value added absorbed abroad in intermediate exports absorbed directly by importers.

Data Sources

The data used for the study is from the (Asian Development Bank (Asian Development Bank, 2023). Accordingly, within the limits of the study, we separated the data of a number of ASEAN economies from 62 economies from 2007 to 2022 (data updated until June 2023) expressed as prices, fixed USD (base year 2010).

With 35 sectors provided by ADB, we continued to regroup them into 24 sectors. Accordingly, industries with similar properties will be grouped together. Specifically, mining and extraction of energy producing products, mining and quarrying of non-energy producing products, and mining support service activities will be grouped into mining with code A1; wood and products of wood and cork, and paper products and printing will be grouped in group A2; rubber and plastic products and other

non-metallic mineral products are to be grouped in heading A3; machinery and equipment, nec and other manufacturing, and repair and installation of machinery and equipment will be grouped into group A4; motor vehicles, trailers and semi-trailers, other transport equipment, and transportation and storage will be grouped into group A5; publishing, audiovisual and broadcasting activities, telecommunications, and IT and other information services will be grouped in group A6; financial and insurance activities and other business sector services will be grouped in group A7; public admin and defense, compulsory social security, and education will be grouped into group A8; human health and social work, arts, entertainment, recreation, and other service activities will be grouped into group A9.

Research Results

To be more appropriate for better relevance in terms of policies, the comparison is not only based on RCA indices but also based on levels. Accordingly, the level comparison method allows policymakers to monitor longitudinally. In other words, this method can help managers observe all separate industries. However, this method is limited because it cannot be tracked over time. Instead, the revealed comparative advantage (RCA) indices method can help policymakers have an overall view over time.

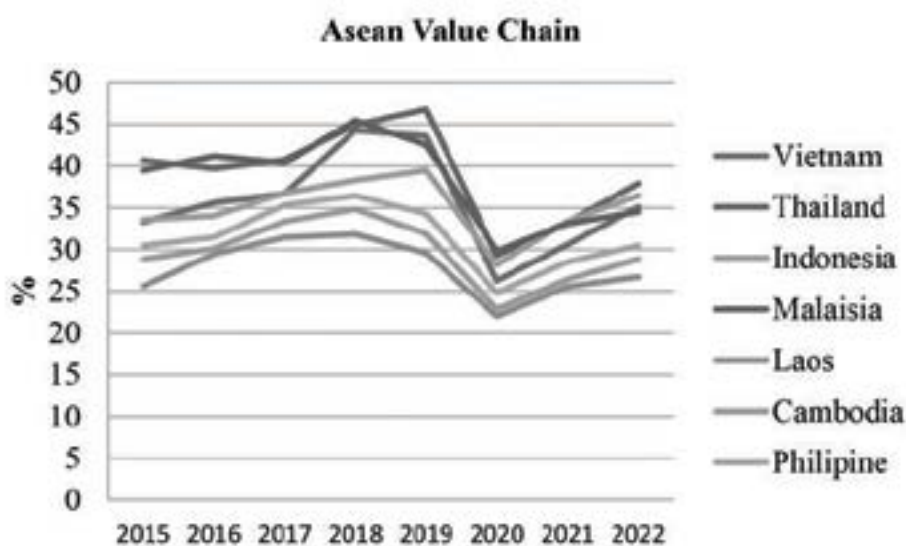


Figure 2.

ASEAN Value Chain, 2015–2022

In general, the global value added chain of ASEAN countries has improved significantly from 2015 to 2018. However, it decreased sharply during the COVID-19 epidemic outbreak from 2019 to 2021. In 2022, the value of ASEAN's growth recovery is weak because the world economy is still affected by high global inflation as well as political instability in many countries in the Middle East region. This has a significant impact on the economic development rate in Southeast Asian countries. Specifically, the participation in the global value chain of countries such as Thailand and Malaysia remains at a high level, ranging from 40% to 45%. Meanwhile, Vietnam's added value has grown strongly and reached a level equivalent to previous countries with more developed economies in the region. In 2018, the value added participation in Vietnam's global supply chain was the highest (44%). The remaining countries, such as Indonesia and Indonesia, still maintain a stable level compared to the rest of the world.

Final goods exports (FGE) is the domestic added value absorbed abroad in the final goods exports of ASEAN countries, which tends to increase gradually from 2015 to 2018. However, in the period 2019–2020, the world faced a big shock caused by the COVID-19 epidemic, along with a decline in exports, caused the world economy, including ASEAN countries, to suddenly decelerate. Specifically, from 2015 to 2018, Vietnam is a country with a rate of domestic added

value absorbed abroad in the export of final goods growing quite steadily and peaking in 2018 with the rate of value added abroad. The increase absorbed abroad in final goods exports was over 35%. This reflects the fact that foreign investment capital in Vietnam has continuously increased during this period. Besides, countries with strengths in domestic added value absorbed abroad in the export of final goods, such as Thailand and Malaysia, still prevail over the rest, with the ratio of added value in water absorbed abroad in final goods exports ranging from 31% to 36%. The domestic value added absorbed abroad in Laos's final goods exports is somewhat lower than that of regional countries as this ratio has remained below 30% since 2015, whereas Indonesia has not changed significantly when domestic value added is absorbed abroad in final goods exports fluctuating between 27% to 30%.

INT is the domestic value added absorbed abroad in intermediate exports absorbed directly by importers. Accordingly, the INT of ASEAN countries also tends to increase steadily in the period from 2015 to 2018. It is worth noting that Thailand and Malaysia have higher average INT than the remaining countries. Specifically, Thailand has an average of 7%–9% of INT. On the contrary, Indonesia and Vietnam have had a significant increase in INT from 2015 to present, ranging from 5-7%. However, the INT is, on average, lower than Thailand and Malaysia.

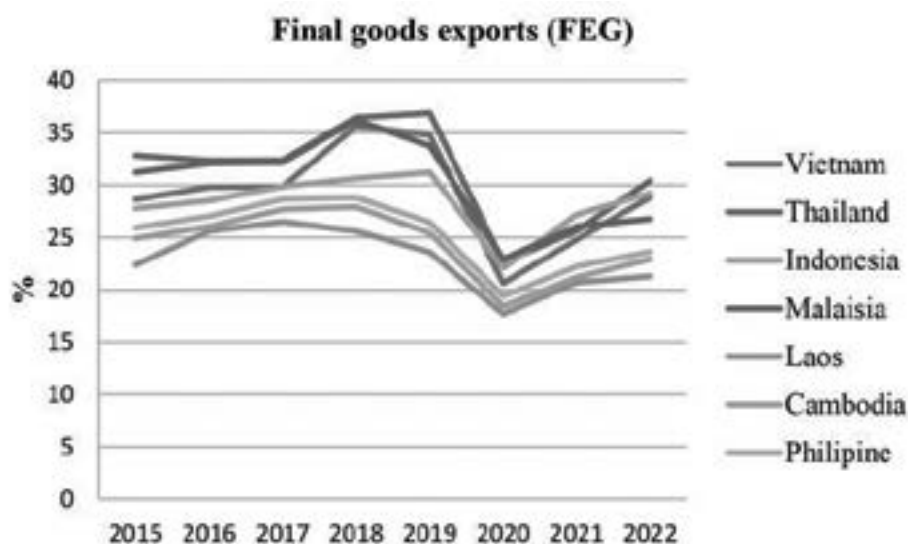


Figure 3.

Final Goods Exports in ASEAN, 2015–2022

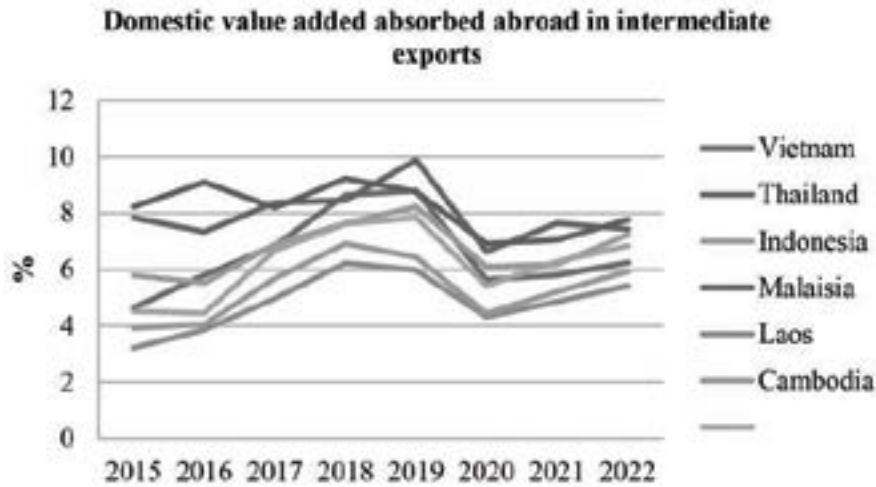


Figure 4.

ASEAN Domestic Value Added Absorbed Abroad in Intermediate Exports, 2015–2022

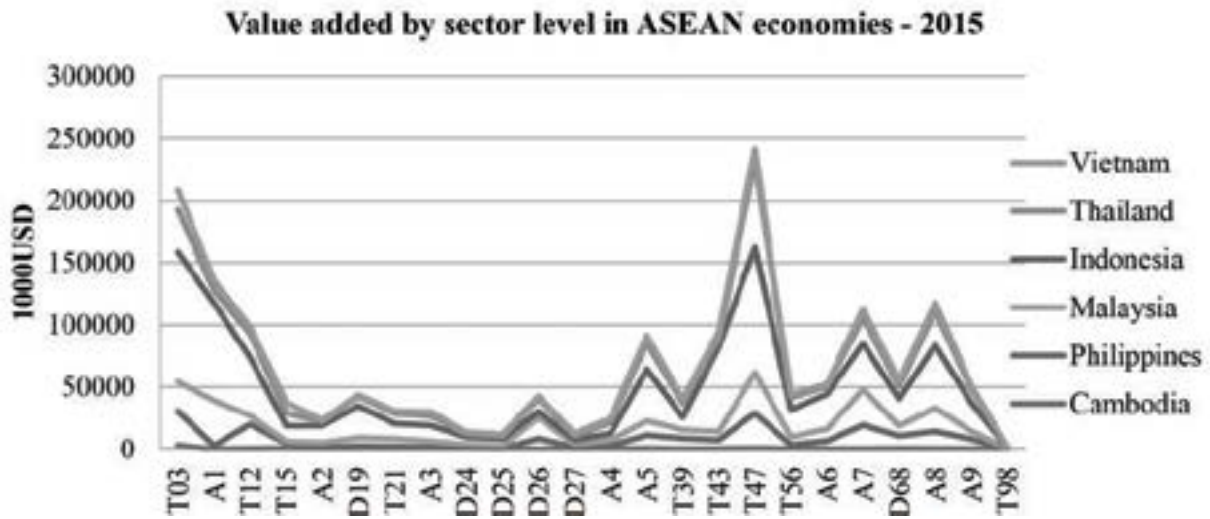


Figure 5

Value Added by Sector Level in ASEAN Economies – 2015

Figure 5 depicts the growth rate of value added at the sectoral level of ASEAN countries in 2015, whereby the value added of different sectors among different countries in ASEAN has a very significant difference. Specifically, industries such as agriculture, food, beverages, coke, and refined petroleum products have high value added for countries such as Vietnam, Thailand, and Indonesia; however, these same industries have a much lower value added in countries such as Malaysia, Philippines, Indonesia, and Laos.

This also reflects the outstanding development as well as the strengths of these countries in the fields of agriculture, mining, and food and beverages. Industries such as wood and paper, refined petroleum products, and chemicals, rubber, and metals have higher levels of value added in Vietnam and Thailand than in the rest of ASEAN countries. The computer and electronic industries are considered to be the light points of ASEAN countries. The field of wholesale and retail is considered as the outstanding point in value added of

Figure 6

Value Added by Sector Level in ASEAN Economies – 2022

Southeast Asian countries. In general, the value added of ASEAN countries is created by traditional industries, so the increase in value added in these fields is not high. High growth rates such as IT telecommunications or machinery and other manufacturing have not been promoted by these countries.

Value added by sector level in ASEAN economies for 2022 did not change as strongly as expected. However, there is also a change in the structure of value added sectors of different industries across countries. Countries like Vietnam, Thailand, and Malaysia are especially trying to change the structure of added value more than the rest; this can be seen more clearly in Tables 4 and 5. Figure 6 describes quite clearly the overall picture of value added at the sector level in 2022. In general, the country with the lowest value added by sector level is Cambodia, followed by the Philippines and Malaysia. Countries with higher value added by sector level are Indonesia, Thailand, and Vietnam. Notably, Thailand and Vietnam are two Southeast Asian countries with almost equal value added by sector level. Although Vietnam is an emerging economy due to the war decades before, it has quickly caught up with the larger economies in the region and even surpassed it in recent years. Similar to 2015, the general strength of Southeast Asian countries concentrated mainly in industries such as agriculture, wholesale, and retail.

Tables 4 and 5 compare the sector-level value-added correlations of ASEAN countries in 2015 and 2022. Over the five-year period, sector-level value added to most other positions in group A1

remained unchanged; the mining and processing industries of Vietnam and Thailand had a great disturbance. Thailand's position rose from the fourth position to the third position, whereas Vietnam dropped from the third position to the fourth position. The value added to Vietnam's food products, beverages, and tobacco industry has significantly improved from fifth position to the fourth position that Malaysia held. Notably, there was a big disturbance in the apparel, leather, and related products industry in 2015. The largest value added in this industry was Indonesia; the next two positions were from Thailand and Vietnam. However, in an exceptional way, Vietnam went from the third position to the first position within seven years. At the same time, Thailand ceded second place to Indonesia. Apart from Indonesia, Thailand, and Vietnam, with many changes in added value, the rest of the ASEAN countries are quite stable. There is only a slight disturbance in the value added to the basic metals industry of the Philippines and Malaysia; the Philippines rose from fourth position to third, and Malaysia was the opposite. The increase in value of the electrical equipment industry has the most change among the remaining industries. Vietnam is a country that has made great progress in creating high residual value for the electrical equipment industry, moving from the fourth position to the first position. Value added to group A4, which are important industries that bring

Table 4. The Value Added by Sector Level in ASEAN Economies – 2015

No.	1	2	3	4	5	6	7	8								
Country	T03	A1	T12	T15	A2	D19	T21	A3								
	rank	rank	rank	rank	rank	rank	rank	rank								
Cambodia	3225	6	47	6	581	6	964	6	322	6	57	6	100	6	88	6
Laos	2975	7	45	7	521	7	869	7	292	7	47	7	995	7	78	7
Philippines	27204	3	3012	5	19611	2	3797	4	1195	5	2711	4	2197	4	1600	5
Malaysia	23750	4	35984	2	6960	4	1627	5	3808	2	6510	3	6069	3	4750	3
Indonesia	104315	1	78350	1	46662	1	12656	1	13612	1	25511	1	12474	1	12843	1
Thailand	34137	2	10070	3	19209	3	9946	2	3218	3	7820	2	7973	2	7596	2
Vietnam	16007	5	8118	4	5523	5	8725	3	1273	4	1139	5	1824	5	3142	4
No.	9	10	11	12	13	14	15	16								
Country	D24	D25	D26	D27	A4	A5	T39	T43								
	rank	rank	rank	rank	rank	rank	rank	rank								
Cambodia	40	6	62	6	107	6	37	6	173	6	768	6	111	6	585	6
Laos	37	7	52	7	97	7	34	7	153	7	668	7	101	7	504	7
Philippines	1759	4	570	5	8394	3	1763	5	2890	5	10652	4	8663	3	6914	2
Malaysia	2147	3	1929	3	16997	1	2162	3	4291	3	11494	3	6868	4	6687	3
Indonesia	5943	1	5805	1	4781	4	3679	1	5397	2	41419	1	10108	2	68397	1
Thailand	2512	2	2308	2	10173	2	2961	2	8697	1	21157	2	11083	1	6248	4
Vietnam	1336	5	1453	4	2082	5	1892	4	3576	4	5894	5	3458	5	5944	5
No.	17	18	19	20	21	22	23	24								
Country	T47	T56	A6	A7	D68	A8	A9	T98								
	rank	rank	rank	rank	rank	rank	rank	rank								
Cambodia	968	6	440	6	158	6	271	6	654	6	372	6	445	6	12	6
Laos	868	7	390	7	128	7	256	7	554	7	292	7	423	7	8	7
Philippines	28047	4	3249	4	6593	3	19168	4	10122	2	14041	4	7875	3	24	5
Malaysia	32519	3	6290	3	9576	2	28645	2	7876	4	18996	3	6316	4	383	3
Indonesia	100803	1	21851	1	27936	1	36966	1	21626	1	50319	1	22739	1	1052	1
Thailand	69500	2	9553	2	6180	4	20896	3	9850	3	27568	2	10914	2	490	2
Vietnam	9525	5	2801	5	1868	5	6830	5	4507	5	6552	5	2853	5	103	4

Table 5. Value Added by Sector Level in ASEAN Economies - 2022

No.	1	2	3	4	5	6	7	8
Country	T03	A1	T12	T15	A2	D19	T21	A3
	rank	rank	rank	rank	rank	rank	rank	rank
Cambodia	4984	6	903	6	458	6	153	6
Laos	3824	7	833	7	426	7	123	7
Philippines	40187	3	28793	2	1776	5	3417	4
Malaysia	26988	4	8876	5	4316	2	7074	3
Indonesia	115216	1	55967	1	12275	1	15537	1
Thailand	40301	2	22776	3	4064	3	9472	2
Vietnam	26049	5	9022	4	2125	4	3060	5
No.	9	10	11	12	13	14	15	16
Country	D24	D25	D26	D27	A4	A5	T39	T43
	rank	rank	rank	rank	rank	rank	rank	rank
Cambodia	65	6	287	6	336	6	168	6
Laos	56	7	267	7	235	7	156	7
Philippines	2663	3	12333	3	4295	5	12899	1
Malaysia	2541	4	17507	1	7833	2	8108	4
Indonesia	6677	1	8407	4	5635	4	12204	3
Thailand	2966	2	13418	2	9043	1	12635	2
Vietnam	2234	5	3817	5	5969	3	5624	5
No.	17	18	19	20	21	22	23	24
Country	T47	T56	A6	A7	D68	A8	A9	T98
	rank	rank	rank	rank	rank	rank	rank	rank
Cambodia	1648	6	268	6	1050	6	872	6
Laos	1567	7	246	7	998	7	589	7
Philippines	42045	3	9696	3	15204	2	13235	3
Malaysia	36892	4	11383	2	8843	4	6978	4
Indonesia	113700	1	30067	1	24262	1	27512	1
Thailand	80325	2	7183	4	14528	3	14732	2
Vietnam	15445	5	3051	5	7354	5	4654	5

high value added to the economy of each country, also experienced significant disturbance in the past seven years. Malaysia increased from 3rd position to 2nd position. Indonesia, from first place in 2015, has left this position to Thailand in 2022.

Vietnam has also moved up from fourth position to third position in 2022. Group A5 also witnessed a change in position in terms of location. Malaysia increased by one step compared to 2015, and the Philippines has decreased one step; these two countries have changed positions for each other. Electricity, gas, water supply, sewerage, waste, and remediation services have witnessed a remarkable change in value added between Philippines and Thailand.

For the construction industry, Vietnam's value added increased significantly in 2020, from the fifth position to the third position. It is remarkable that far beyond other countries in the region, this reflects the fact that the Vietnamese government has actively attracted investment capital from abroad in recent years. Political stability is also a very important factor in helping attract a large number of foreign investors who are withdrawing from China and investing in Vietnam, especially in the high-tech and construction industries.

Conclusion and Policy Implication

Today, with the close cooperation of countries in one organization, the world is witnessing fierce competition in added value in exports between countries, even though Southeast Asian countries are trying to cooperate closely in many aspects to bring economic benefits to member countries. Competition still exists between countries for the development purposes of each country. Research results show that countries such as Vietnam, Thailand, Malaysia, and the Philippines are making efforts to increase added value in the production and export of goods. Vietnam, with an emerging economy, is making many changes in its economic structure, especially focusing on the value-added chain in strong goods such as textiles and garments and high-tech goods. Specifically, Vietnam had led a number of industries, such as garments, leather and related products, and electrical equipment, in just five years. Before that, they were in a relatively low position compared to major countries in the ASEAN region.

The study also shows that the added value of goods exports of Southeast Asian countries has improved significantly in recent years. However, the current economic growth rates and the growth rate of added value of industries are not commensurate with the potential of countries in the ASEAN region. Therefore, countries need to make more efforts to attract investment from large countries while taking advantage of the trend of shifting production of goods from large countries such as the United States, Japan, or the European Union out of China. The results of the analysis of added value at the industry level show that each country has its own strengths, typically Vietnam; the garment industry has the most positive ranking change compared to other countries in the region. Meanwhile, Thailand's machinery and equipment industry also has clear progress shown in the rankings. In general, there is a fierce pursuit of added value in the export of high-tech goods from emerging countries such as Vietnam and Indonesia to Thailand and Malaysia. The research results also show that the level of difference in added value in exports of ASEAN countries is not as large as before; some countries, such as Vietnam and Indonesia, have made great progress.

Besides close cooperation, there is fierce competition among countries in the bloc to attract high-tech investment. Therefore, it can be concluded that countries need to promote their strengths to be able to influence countries in the region, thereby creating positive inter-regional impacts. The development of one country will be the driving force for the development of the remaining countries in ASEAN.

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