Section 2
Characteristics of the ASEAN Economy from a Trade Structure Perspective: In Relation to Changes in U.S. Tariff Policy

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Introduction

Section 2 of this chapter focuses on two main areas: first, analyzing the ASEAN economies as key contributors to the U.S. trade deficit, and second, examining the trade structure between Japan, China, and the U.S. to identify changes over the last decade.

Table 2-2-1 lists the top 20 countries and regions contributing to the U.S. trade deficit in 2024. The data reveals that the primary contributors, in descending order, are China, followed by Mexico, Canada, EU countries, Taiwan, Japan, South Korea, India, and the ASEAN countries. This ranking confirms the conceptual framework presented in Figure 0-1 of the Introduction.

Furthermore, the relationship with the Kansai region is also analyzed, not just Japan as a whole.

First, in Section 2.1, the characteristics of changes in major regions are presented based on the sales and capital investment of Japanese overseas

Table 2-2-1 U.S. Trade Deficits by Country/Region: 2024

Rank	Trading partner	Trade balance (billion USD)	Trade deficit share (%)	Rank	Trading partner	Trade balance (billion USD)	Trade deficit share (%)
	World	-1,293.0		11	Thailand	-48.3	3.7%
1	China	-319.1	24.7%	12	Italy	-46.0	3.6%
2	Mexico	-175.9	13.6%	13	Switzerland	-39.0	3.0%
3	Vietnam	-129.4	10.0%	14	Malaysia	-26.1	2.0%
4	Germany	-88.0	6.8%	15	Indonesia	-19.3	1.5%
5	Ireland	-87.2	6.7%	16	France	-16.7	1.3%
6	Taiwan	-76.4	5.9%	17	Austria	-13.5	1.0%
7	Canada	-72.8	5.6%	18	Cambodia	-13.0	1.0%
8	Japan	-72.4	5.6%	19	Sweden	-10.3	0.8%
9	Korea	-69.9	5.4%	20	Hungary	-9.6	0.7%
10	India	-49.5	3.8%				

Source: Prepared by the authors based on UN Comtrade data

subsidiaries, while considering their relationship with domestic production activities. In addition, changes in local procurement behavior are examined to confirm trade and production networks.

Following this preparatory work, Section 2.2 analyzes the trade structure using the Grubel-Lloyd index, based on UN Comtrade data, to examine the international division of labor systems that have been established by Japan and Kansai with China and ASEAN.

Finally, the summary section organizes the analytical results and derives implications from them.

1. Characteristics of Overseas Subsidiary Operations: In Relation to Domestic Production

(1) Sales Revenue, Capital Investment

【Regional Trends】

Based on the Ministry of Economy, Trade and Industry's "Quarterly Survey of Overseas Subsidiaries," we examined the trends of Japanese companies in North America, China, Europe, and ASEAN[1]. We have specifically focused on the sales revenue and capital investment of overseas subsidiaries to clarify the characteristics of their business activities.

Figure 2-2-1 shows the changes in sales of overseas subsidiaries by region, revealing that North America's sales are higher than those of other regions. Sales have shown an increasing trend since Q1 2022 ($80.28 billion), reaching $97.59 billion in Q4 2024. As discussed later, this is likely influenced by increased sales of production machinery in North America, such as transportation equipment (e.g., automobiles) and semiconductor machinery, etc.

In contrast to North America, China's sales have rapidly declined since the Q1 2022 period (75.69 billion USD). The most recent Q4 2024 saw sales at 50.70 billion USD, with an average growth rate of -2.7% during this period. This decline is thought to be driven by China's economic slowdown, coupled with the impact of the Chinese government's push for localization[2].

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1) The regions defined in the overseas subsidiaries are as follows: North America: United States of America and Canada. ASEAN: Indonesia, Thailand, the Philippines, Malaysia, Cambodia, Singapore, Brunei, Vietnam, Myanmar, and Laos. China: People's Republic of China (including Hong Kong SAR). Europe: Ireland, United Kingdom, Italy, Ukraine, Austria, Netherlands, Greece, Switzerland, Sweden, Spain, Slovakia, Slovenia, Czech Republic, Denmark, Germany, Turkey, Hungary, Finland, France, Bulgaria, Belgium, Poland, Portugal, Montenegro, Luxembourg, Romania, and Russia

2) Mizuho Research & Technologies (2024) also makes a similar observation. Furthermore, an explanation is provided in Chapter 3, Section 1.

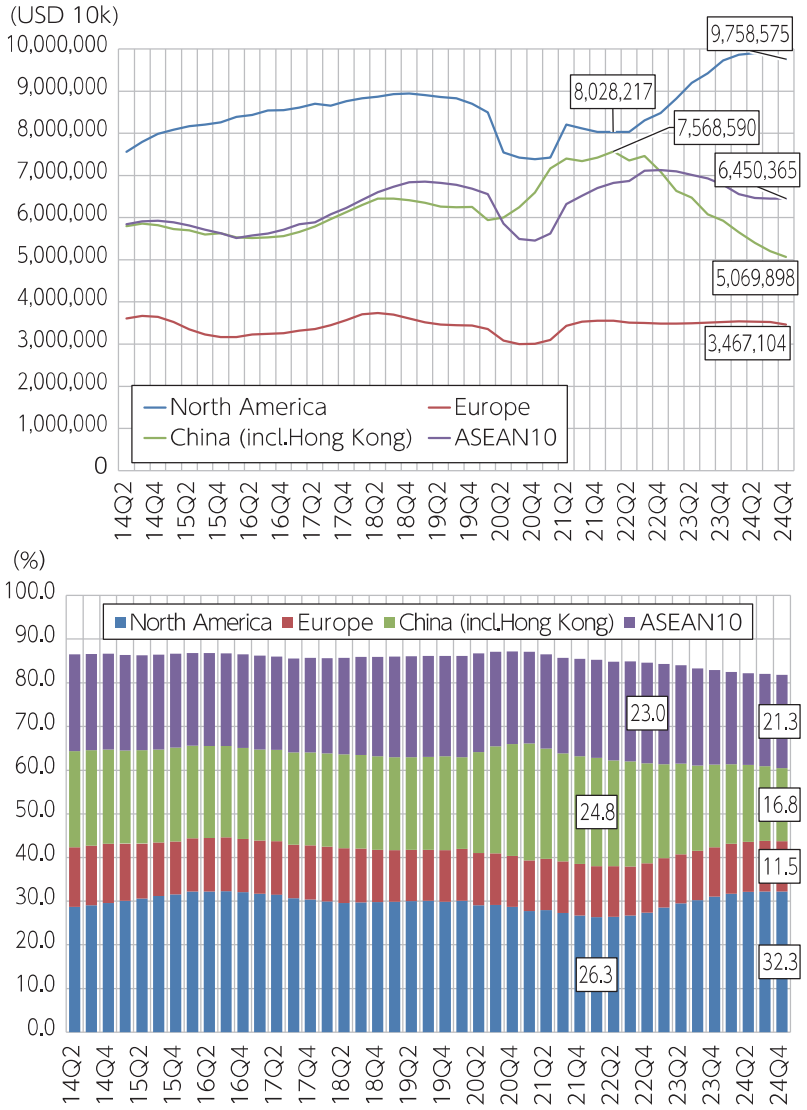

Figure 2-2-1 Change in Regional Sales and Market Share

Source: Prepared by the authors from "Quarterly Survey of Overseas Subsidiaries," Ministry of Economy, Trade and Industry

ASEAN has also shown a declining trend since Q1 2023, reaching $64.5 billion in Q4 2024. Meanwhile, sales in Europe have remained largely flat, totaling $34.67 billion in Q4 2024.

Next, examining the change in sales share, North America has been increasing during this period, reaching 32.3% in the latest Q4 2024. China, on the other hand, peaked at 24.8% in Q1 2022 and has been declining, falling to 16.8% currently. Furthermore, while ASEAN has also seen a gradual decline from 23.0% in Q4 (2022), it has maintained a share in the 20% range.

Looking at changes in tangible fixed assets (capital investment) by region, North America has been on an upward trajectory since Q1 2021 ($2.11 billion), reaching $2.92 billion in Q4 2024. ASEAN, on the other hand, has been declining since Q1 2023 ($1.97 billion), reaching $1.60 billion in Q4 2024. China has also

shown a declining trend since Q4 2021, reaching $910 million in the most recent Q4 2024 period, a level below both Europe ($1.01 billion) and ASEAN (Figure 2-2-2).

Looking at market share, North America showed an upward trend from 30.5% in Q4 2023 (October-December 2023), reaching 36.2% in Q4 2024 (October-December 2024). Conversely, China's share has been declining since Q4 2021 (21.1%), reaching 11.3% in Q4 2024, below both ASEAN (19.9%) and Europe (12.6%). Furthermore, ASEAN's share has been declining since Q2 2023, reaching 19.9% in Q4 2024.

Thus, examining changes in sales and capital investment reveals that the presence of the North American market is growing relative to China and ASEAN.

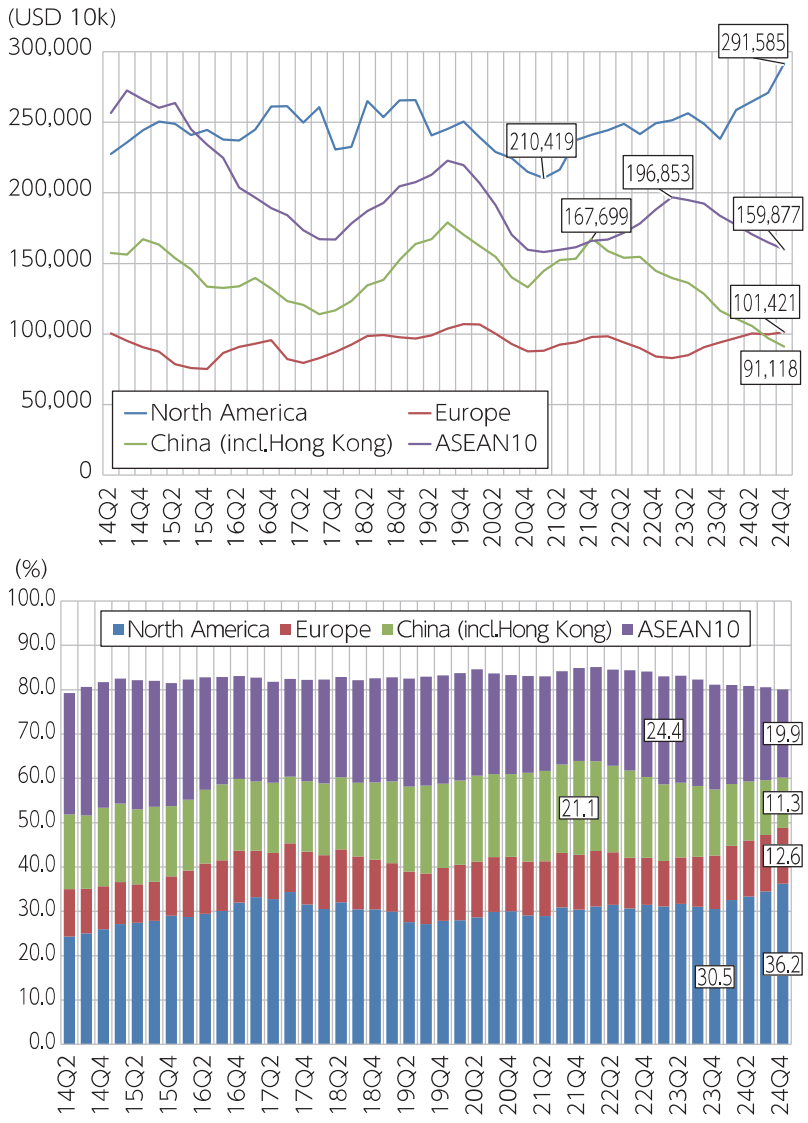

Figure 2-2-2 Change in Regional Capital Investment and Market Share

Source: Prepared by the authors from "Quarterly Survey of Overseas Subsidiaries," Ministry of Economy, Trade and Industry

【Industry Trends】

Before examining overseas trends by industry, let us first look at the relationship between the domestic market and the activities of overseas subsidiaries. Table 2-2-2 compares the relationship between domestic production (value added basis) and the sales revenue of overseas subsidiaries at three points in time: 2014, 2019, and 2023.

From 2014 to 2023, overseas production accelerated in industries excluding electrical machinery[3)]. The transportation machinery sector, particularly automo-

Table 2-2-2 Relationship between Domestic Market Size (Value Added Basis) and Overseas Local Subsidiary Sales

Unit: 10 billion JPY

	Domestic Market Size			Overseas Market Size		
	2014	2019	2023	2014	2019	2023
Groceries	12,165.0	13,644.6	14,201.5	3,088.1	3,606.6	7,015.3
Textile products	1,351.6	1,475.7	1,322.0	850.3	922.6	1,146.0
Pulp, Paper, and Paper Products	2,077.2	2,799.0	2,624.6	819.3	1,166.5	1,758.2
Chemistry	9,673.8	12,075.9	11,824.5	9,033.4	9,846.8	12,864.2
Metal products	4,608.0	5,730.1	6,039.9	931.7	1,197.0	1,892.4
General-purpose machinery, production machinery, industrial machinery	14,541.6	17,125.7	17,868.7	10,085.6	11,829.9	16,085.9
Electrical machinery	6,635.2	7,364.7	7,534.6	20,004.4	17,093.8	21,135.1
Transportation machinery	14,318.7	14,251.5	17,424.4	58,110.3	69,007.0	97,507.0

Note 1) Overseas market size is the sum of sales from Q1 to Q4 each year across all regions in the Quarterly Survey of Overseas Subsidiaries
Note 2) Domestic market is nominal GDP from national accounts
Note 3) Exchange rate: 2014 = 1 USD = 105.9 JPY, 2019 = 1 USD = 109.0 JPY, 2023 = 1 USD = 150.5 JPY

	Overseas Market Size/ Domestic Market Size			Changes in Overseas Market Size vs. Domestic Market Size	
	2014	2019	2023	2014—2023	
Groceries	0.25	0.26	0.49	↑	0.24
Textile products	0.63	0.63	0.87	↑	0.24
Pulp, Paper, and Paper Products	0.39	0.42	0.67	↑	0.28
Chemistry	0.93	0.82	1.09	↑	0.15
Metal products	0.20	0.21	0.31	↑	0.11
General-purpose machinery, production machinery, industrial machinery	0.69	0.69	0.90	↑	0.21
Electrical machinery	3.01	2.32	2.81	↓	-0.21
Transportation machinery	4.06	4.84	5.60	↑	1.54

Note: Arrows indicate the direction of change comparing 2014 and 2023
Source: Prepared by the authors based on Cabinet Office "National Accounts" and Ministry of Economy, Trade and Industry "Quarterly Survey of Overseas Subsidiaries"

3) Here, the domestic market refers to value added by industry from the Cabinet Office's "National Accounts," while overseas sales of local subsidiaries are based on sales figures from the Ministry of Economy, Trade and Industry's "Quarterly Survey of Overseas Subsidiaries." Therefore, caution is required when comparing the two, as fluctuations in the value-added rate also exist.

biles, saw significant changes, with production activities expanding primarily in the North American market. Meanwhile, electrical machinery (including home appliances) experienced a slowdown in overseas production activities relative to domestic production during this period, likely influenced by declining competitiveness against overseas manufacturers. Hereafter, we will examine the transportation machinery, general-purpose machinery, and industrial machinery sectors among industries where overseas production activities accelerated. By comparing them with the electrical machinery sector, where overseas production activities slowed, we can identify the characteristics of overseas subsidiaries.

【Transportation Machinery】

Figure 2-2-3 shows sales of transportation machinery by region. Sales in China and ASEAN have declined, while Europe remains flat. North America, however, has seen an increase, reaching $59.72 billion in Q4 2024. This is likely due to the progress of

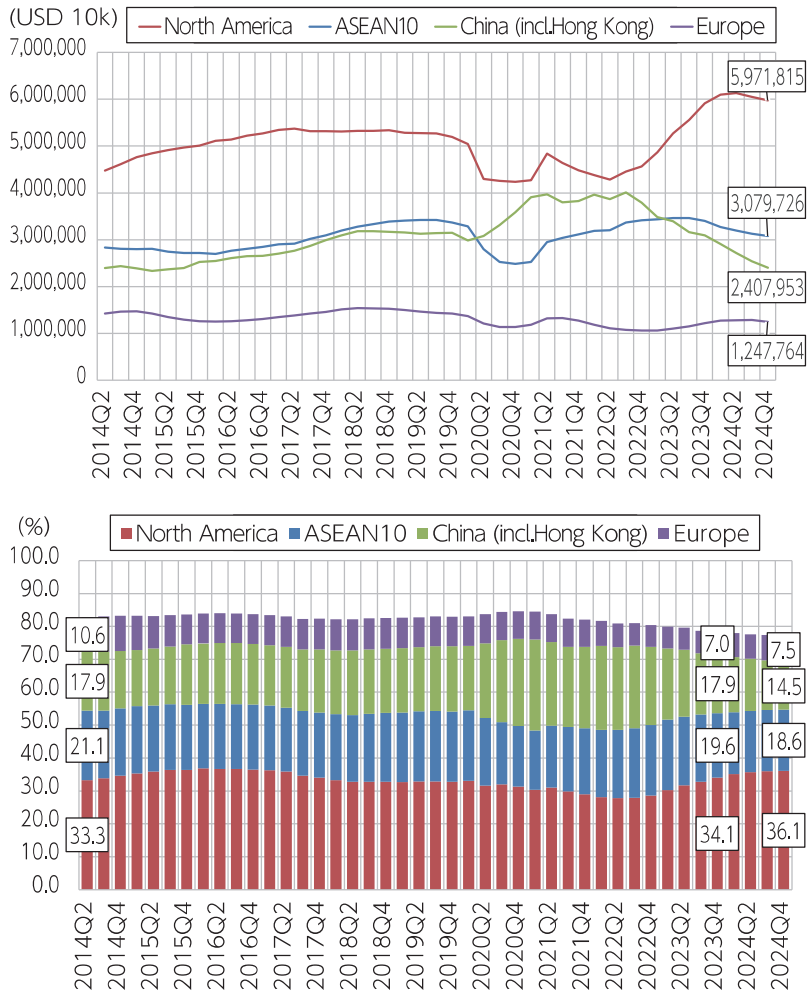

Figure 2-2-3 Changes in Sales and Market Share for Transportation Machinery: By Region

Source: Prepared by the authors from "Quarterly Survey of Overseas Subsidiaries," Ministry of Economy, Trade and Industry

the local production of automobiles and other goods in the North American market.

Furthermore, North America's market share has also risen, reaching 36.1% in Q4 2024. In contrast, while Europe's share remains largely flat, China's share has changed since 2022, currently standing at 14.5%. ASEAN's share has also decreased, now at 18.6%.

【General-purpose, production, and business oriented machinery】

In the following analysis, we will examine sales of general-purpose, production, and business oriented machinery (see Figure 2-2-4). It is clear that North America significantly outpaces other regions, reaching $11.29 billion in Q4 2024. It appears that one contributing factor is the rapid growth in demand for capital goods, such as construction and mining machinery, and semiconductor machinery, etc., which has driven sales growth.

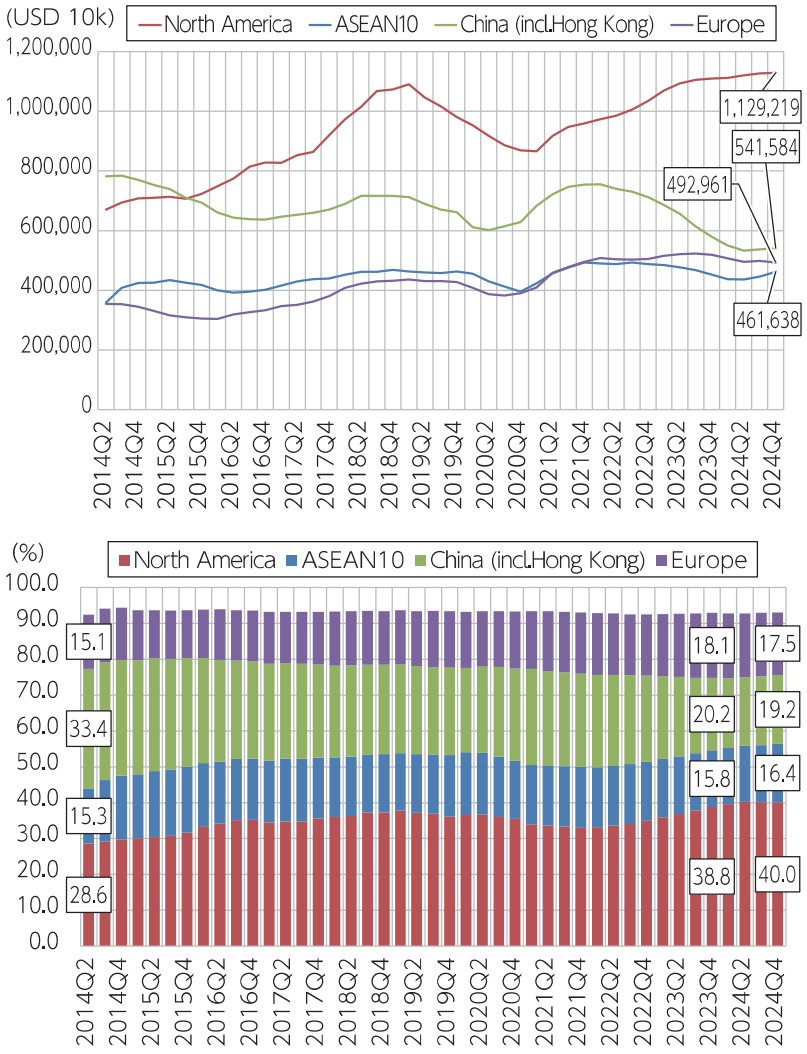

Figure 2-2-4 Changes in Sales and Market Share for General-Purpose, Production, and business oriented Machinery: By Region

Source: Prepared by the authors from "Quarterly Survey of Overseas Subsidiaries," Ministry of Economy, Trade and Industry

China's share has declined since 2022 and currently stands at 19.2%. Meanwhile, North America shows an upward trend, reaching 40.0%.

【Electrical machinery】

Looking at sales of electrical machinery (Figure 2-2-5), China's sales were high from 2014 to 2022, but they peaked in Q4 2021 and have since declined. Meanwhile, ASEAN sales have generally not changed, standing at $13.44 billion in Q4 2024.

Electrical machinery (including home appliances) appears to be struggling with sales growth compared to transportation machinery and general-purpose/production/business machinery as seen above, partly due to declining competitiveness against overseas manufacturers.

In terms of market share, China's share declined by 1.1 percentage points from Q4 2023 (32.7%) to Q4 2024 (31.6%). Meanwhile, ASEAN accounted for

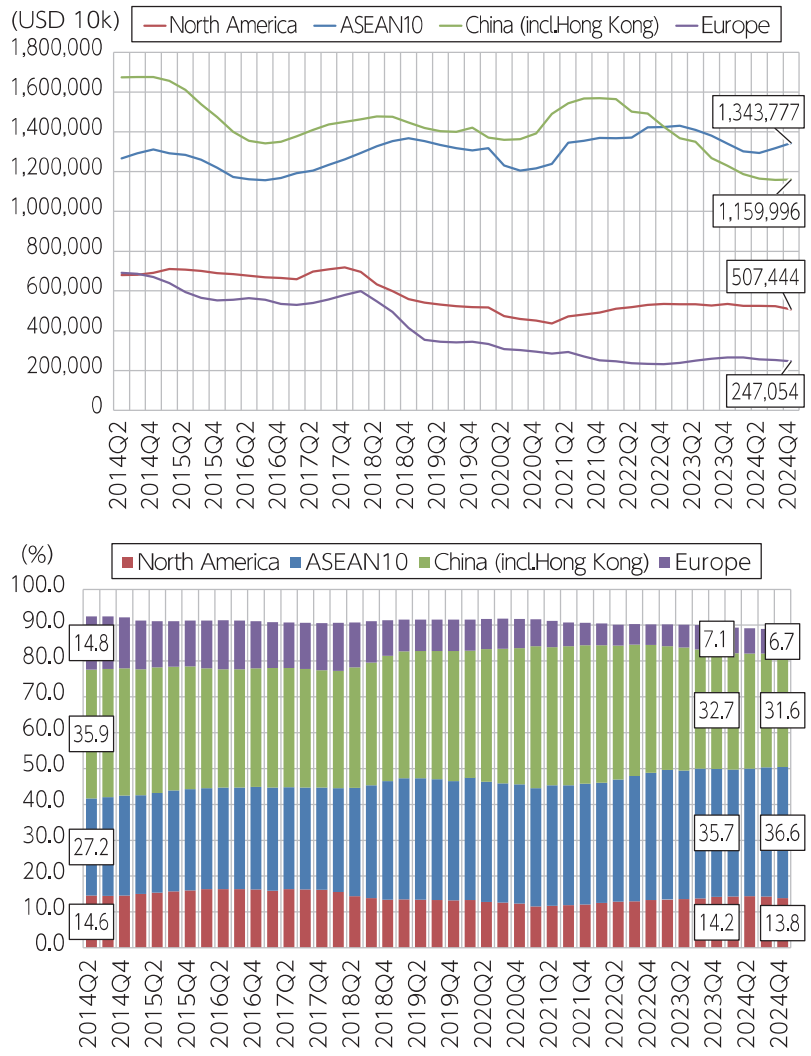

Figure 2-2-5 Changes in Sales and Market Share for Electrical Machinery: By Region

Source: Prepared by the authors from "Quarterly Survey of Overseas Subsidiaries," Ministry of Economy, Trade and Industry

China's loss of share during this period (35.7% → 36.6%).

Organizing sales by industry and region reveals that transportation machinery and production machinery are overwhelmingly centered in the North American market, while electrical machinery is primarily focused in China and ASEAN. However, while sales in China are currently declining, ASEAN is accounting for this decrease. This makes the structure of supply chains within ASEAN critically important. Below, we examine the characteristics of these supply chains based on the procurement activities of Japanese companies operating in the region.

(2) Changes in Local Procurement Rates: Focusing on ASEAN

The procurement activities of overseas subsidiaries consist of 1) local procurement or 2) procurement from countries/regions outside the local area (imports). Figure 2-2-6 shows the changes in procurement rates across ASEAN countries,

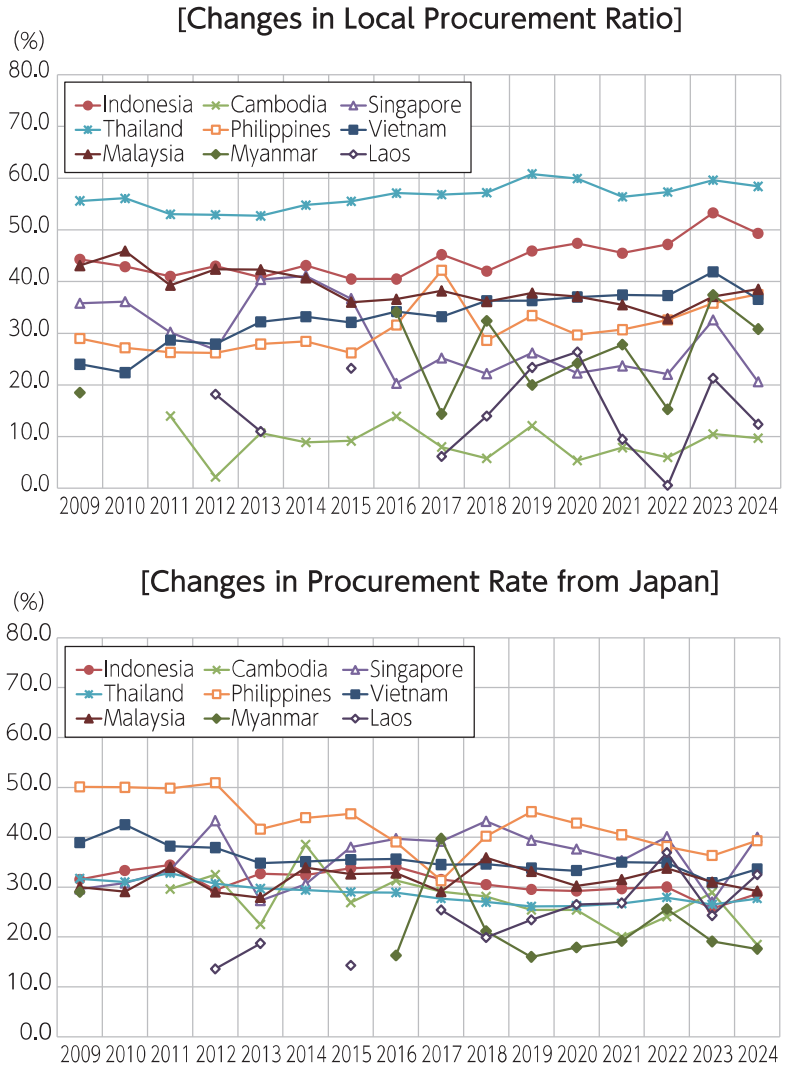

Figure 2-2-6 Procurement Rates for Overseas Subsidiaries (Japanese companies): ASEAN

Source: JETRO" Survey on Business Conditions of Japanese Companies Operating Overseas"

broken down into local procurement and procurement from Japan.

While this analysis primarily focuses on ASEAN, India, which stands out for its growth in Asia, is also included for reference.

Local procurement rates are advancing in Thailand and Indonesia, but procurement rates from Japan remain high in the Philippines and Singapore. As discussed later, differences in the production structures of each country's major industries appear to be a factor contributing to these disparities.

Local procurement can be further divided into 1) procurement from local companies and 2) procurement from Japanese companies operating locally. Figure 2-2-7 shows the share of local companies and Japanese companies operating locally in ASEAN countries and India. Notably, India and Malaysia have higher shares from local companies, while Thailand and the Philippines have

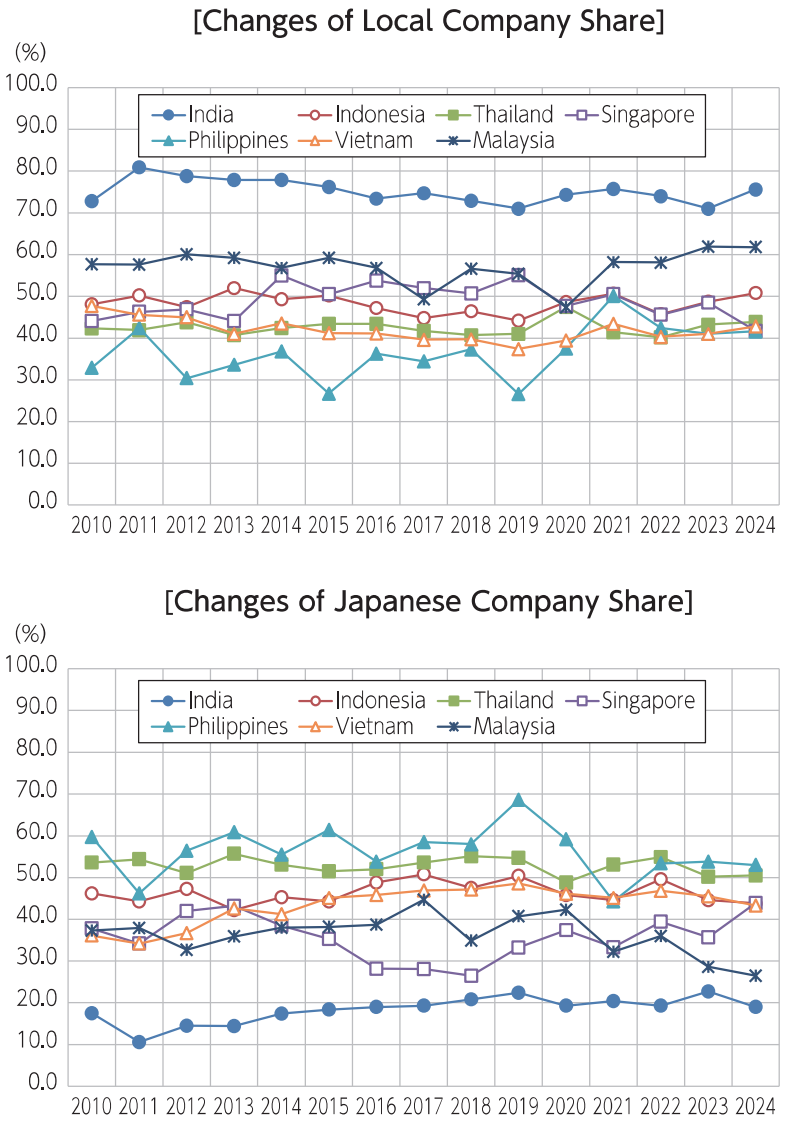

Figure 2-2-7 Changes in Procurement Rates for Local Companies and Japanese Companies Operating Locally

Source: JETRO" Survey on Business Conditions of Japanese Companies Operating Overseas"

higher shares from local Japanese companies compared to other regions. India's share from local companies is particularly high. This stems from the textile industry being a key sector, where a long-established structure exists for procuring raw materials through local companies[4]. Conversely, in the Philippines, the share from local Japanese companies is gradually declining, while that from local companies is increasing.

Figure 2-2-8 organizes the timing of Japanese companies' entry and differences in local procurement, positioning the characteristics of the four countries discussed so far within four quadrants.

Regarding Malaysia and Thailand, Japanese companies entered early, and these specific industries grew significantly after the 1960s. However, examining the breakdown of local procurement reveals that Malaysia has established supply chains for electrical appliances and electronic components that can be supplied by local firms[5]. Thailand, on the other hand, features a supply chain centered around the automotive industry, resulting in a higher number of Japanese companies operating there[6].

Unlike these two countries, Japanese companies entered India and the Philippines relatively late, from the late 1990s to the 2000s and beyond. Furthermore, the primary industries differ: textiles and automobiles in India, and electrical appliances and electronic components in the Philippines.

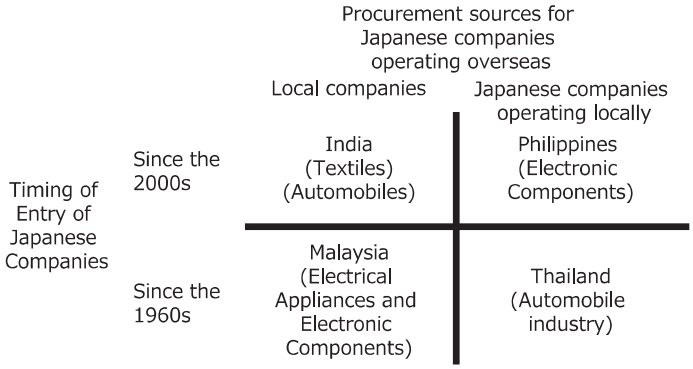

Figure 2-2-8 Procurement Sources and Entry Timing for Japanese Companies Operating in the Region

Source: Prepared by the authors based on JETRO's" Survey on Business Conditions of Japanese Companies Operating Overseas"

4) A similar observation is made in Japan External Trade Organization (JETRO) (2012), pp.17-18. Furthermore, Sato (ed.) (2016) provides a detailed analysis of India's textile industry.
5) According to Anazawa (1995), industrialization centered on the electrical industry progressed in the 1970s when electrical manufacturers such as Matsushita (now Panasonic), Hitachi, NEC, and Toshiba entered the free trade zones of Selangor and Penang.
6) According to Ueda (2007), the entry of Japanese automakers—Toyota, Isuzu, Honda, Nissan, and Hino—since the 1960s is cited as a major factor in the growth of Thailand's automotive industry.

Due to these differences in industrial structure, it is thought that supply chains have been established in India from local companies for sourcing raw materials needed for sewing, and in the Philippines from Japanese companies operating locally[7] for sourcing components needed for manufacturing electrical equipment and other products.

Looking at the procurement activities of Japanese companies in ASEAN and India, particularly in the Philippines where they expanded from the late 1990s to around 2000, the share of Japanese companies has declined somewhat, while the share of local companies is on an upward trend. This suggests a growing tendency to source raw materials locally rather than from Japan.

2. Analysis of Trade Structure: Changes in the Grubel-Lloyd Index

In the field of building production networks in Asia, the concept of "fragmentation" has gained significant importance in recent years (Figure 2-2-9). Kimura (2003) employs this fragmentation theory to analyze the international production and distribution networks being constructed in East Asia in recent years.

Fragmentation refers to the process of subdividing production activities, which were traditionally carried out within a single large factory, into multiple processes and dispersing these processes to locations with suitable conditions for each specific process.

For example, behind the expansion of Japanese companies into the ASEAN region lies a trend aimed at reducing production costs. This involves retaining technology- and capital-intensive processes in Japan or Taiwan within industries

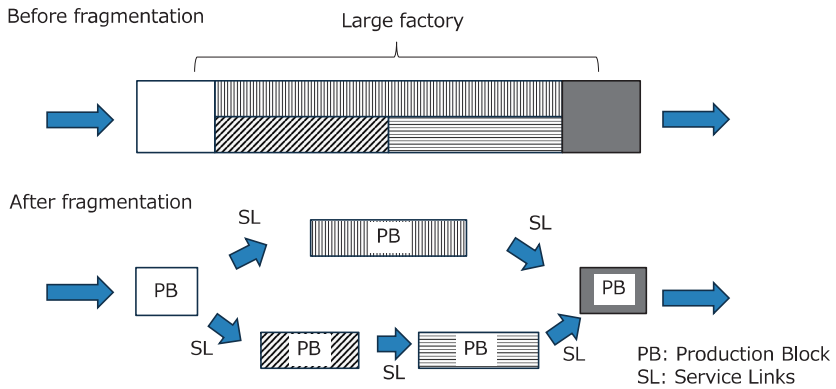

Figure 2-2-9 Overview of Fragmentation

Source: Based on Kimura (2003), modified by the authors

7) The Japan External Trade Organization (JETRO) (2016) notes that Japanese printer manufacturers entered the Philippines, followed by the subsequent entry of related parts manufacturers.

such as the electrical machinery sector, while transferring labor-intensive processes to China or ASEAN countries.

A key factor in making such an international division of labor system function effectively is reducing the costs of the "service links" connecting each production block. These service links include transportation costs and telecommunications expenses. Kimura (2003) positions the recent expansion of international production and distribution networks in East Asia as an advancement of globalization underpinned by the reduction of these service link costs.

Through the fragmentation of production processes and their international dispersion, countries have been able to specialize in processes based on their comparative advantage. The production network in East Asia has formed through these cost reductions achieved by specialization and the exchange of parts and intermediate goods via trade. In ASEAN countries, the international division of labor system has advanced through fragmentation, and it is thought that this has led to an increase in the overall volume of trade across the Asian region.

Kuroiwa (2014) analyzed the composition of intra-East Asian trade by goods as of 2011. According to this analysis, intermediate goods—such as parts and processed goods—accounted for over half of intra-regional trade, with a significant portion classified under electrical machinery and machinery. It is noted that intra-regional trade has expanded primarily through such intermediate goods trade, driving economic integration in East Asia. Conversely, it is also noted that a large portion of final goods are exported to the North American and EU markets, indicating that the East Asian production network remains heavily dependent on extra-regional markets.

Section 2.2 analyzes the trade structure from the perspective of intra-industry trade using the Grubel-Lloyd index to examine what kind of international division of labor Japan and the Kansai region have established with China and ASEAN countries. Concurrently, by examining trends in trade with the U.S., it also considers whether the U.S. is included in the production networks involving Japan.

(1) What does the Grubel-Lloyd Index explain?

The Grubel-Lloyd Index (hereafter GL Index) is "an indicator measuring the degree of overlap between exports and imports within a specific industry" (Grubel and Lloyd, 1971). This index is used to show the extent of intra-industry trade, serving as an indicator where values closer to 1 signify more active intra-industry trade, while values closer to 0 indicate less intra-industry trade. Specifically, if the export value and import value of an industry are roughly equal, the GL index approaches 1. Conversely, if there are only exports or only imports, the index approaches 0. The GL index is calculated as follows:

GL Index = 1 - (|Export Value - Import Value| / (Export Value + Import Value))

A GL index of 1 indicates perfect intra-industry trade (where export and import values are exactly equal), while a GL index of 0 signifies the complete absence of intra-industry trade (only exports or only imports). Thus, the closer the GL index is to 1, the higher the rate of intra-industry trade within that industry. This GL index is used to analyze trade structures and gauge the degree of specialization and diversification within an industry. For example, a high GL index for a specific industry suggests that industry possesses strong international competitiveness or has achieved a high level of specialization within particular countries.

Intra-industry trade indicated by the GL index encompasses two types: horizontal intra-industry trade (exports and imports of the same type of product) and vertical intra-industry trade (exports and imports of products of different quality or specifications). To capture vertical intra-industry trade, the classification used in the calculation must include both "parts" and "final products" within the same sector, necessitating the use of a sufficiently broad classification. It is important to note that the GL index calculated in this manner cannot separately measure horizontal and vertical intra-industry trade. These trade patterns may have different mechanisms and economic impacts.

This analysis uses data for the two-digit HS codes (21 sections) shown in Table 2-2-3 to calculate the GL index from Japan's and Kansai's import and

Table 2-2-3 HS Code 2-Digit Classification and Its Content

Section 1	LIVE ANIMALS; ANIMAL PRODUCTS	Section 12	FOOTWEAR, HEADGEAR, UMBRELLAS, SUN UMBRELLAS, WALKING-STICKS, SEAT-STICKS, WHIPS, RIDING-CROPS AND PARTS THEREOF
Section 2	VEGETABLE PRODUCTS	Section 13	ARTICLES OF STONE, PLASTER, CEMENT, ASBESTOS, MICA OR SIMILAR MATERIALS
Section 3	ANIMAL, VEGETABLE OR MICROBIAL FATS AND OILS AND RELATED PRODUCTS; PREPARED EDIBLE FATS; ANIMAL OR VEGETABLE WAXES	Section 14	NATURAL OR CULTURED PEARLS, PRECIOUS OR SEMI-PRECIOUS STONES, PRECIOUS METALS, METALS CLAD WITH PRECIOUS METAL AND ARTICLES THEREOF
Section 4	PREPARED FOODSTUFFS; BEVERAGES, SPIRITS AND VINEGAR; TOBACCO AND MANUFACTURED TOBACCO	Section 15	BASE METALS AND ARTICLES OF BASE METAL
Section 5	MINERAL PRODUCTS	Section 16	MACHINERY AND MECHANICAL APPLIANCES; ELECTRICAL EQUIPMENT
Section 6	PRODUCTS OF CHEMICAL OR ALLIED INDUSTRIES	Section 17	VEHICLES, AIRCRAFT, VESSELS AND ASSOCIATED TRANSPORT EQUIPMENT
Section 7	PLASTICS AND ARTICLES THEREOF; RUBBER AND ARTICLES THEREOF	Section 18	OPTICAL, PHOTOGRAPHIC, CINEMATOGRAPHIC, MEASURING, CHECKING, PRECISION, MEDICAL OR SURGICAL INSTRUMENTS AND APPARATUS
Section 8	RAW HIDES AND SKINS, LEATHER, FURSKINS AND ARTICLES THEREOF	Section 19	ARMS AND AMMUNITION; PARTS AND ACCESSORIES THEREOF
Section 9	WOOD AND ARTICLES OF WOOD; WOOD CHARCOAL; CORK AND ARTICLES OF CORK;	Section 20	MISCELLANEOUS MANUFACTURED ARTICLES
Section 10	PULP OF WOOD OR OF OTHER FIBROUS CELLULOSIC MATERIALS	Section 21	WORKS OF ART, COLLECTORS' PIECES AND ANTIQUES
Section 11	TEXTILES AND TEXTILE ARTICLES		

Source: Quoted from the Ministry of Finance, "General Trade Statistics"

export value data, comparing Kansai with Japan.

Japan's data was calculated from Comtrade import/export value data (dollar-based), while Kansai's data was extracted and used from customs-specific data based on the Trade Statistics to ensure comparability with Japan (JPY-based).

(2) Comparison of Kansai and Japan Trade Structures with China and the United States

The GL Index for each of the 21 HS code sections for Kansai and nationwide trade with the U.S. are shown in Table 2-2-4 and Table 2-2-5. An examination of the GL Index for Section 16 (Electrical Machinery and Equipment) reveals that there has been an increase in both the Kansai and Japan trade value rankings for 2024.

Moreover, an examination of the GL index for Section 6 (Chemical Products) reveals a decline in national output due to a trade deficit, whilst Kansai shows an increase.

Conversely, an examination of the national GL index for Section 17 (Vehicles and Transport Equipment), a significant export item for Japan, reveals a sustained decline from 2014 to 2024. The substantial export surplus has resulted in a decline in the GL index, which is indicative of a lack of intra-industry trade and integration into production networks.

Table 2-2-6 and Table 2-2-7 show an increase in both Kansai and Japan trade with China. The GL index for Section 16 (Electrical Machinery and Equipment) shows an increase in both regions, but Kansai has improved by more. In addition, when compared to the national level, Kansai is closer to 1, indicating a higher level of advanced intra-industry trade.

In relation to Section 6 (Chemical Products), the GL index indicates a decline in Kansai, whilst the national level shows an increase.

In relation to Section 11 (Textile Products), the GL index in Kansai remains relatively stable, while the national level exhibits a modest increase.

In comparison to the rise in the GL index for trade with China across a variety of goods in both Kansai and Japan, the GL index for trade with the U.S. shows a decline for numerous goods. This finding suggests that both Kansai and Japan overall are integrated into China's global value chain. Conversely, the U.S. has not been incorporated into such production networks, thus establishing itself as a consumption destination for final goods as export partners for Japan and Kansai.

Table 2-2-4 Kansai GL Index for the U.S.

Major Category	2014 GL Index	2024 GL Index	24/14 Change	Exports	Imports	Total Trade Volume Ranking
Section 16	0.26	0.36	0.10	1,717.7	377.1	1
Section 6	0.79	0.83	0.04	570.7	402.3	2
Section 18	0.88	0.66	-0.22	196.7	97.4	3
Section 15	0.31	0.33	0.03	210.2	41.8	4
Section 5	0.43	0.04	-0.39	4.3	224.8	5
Section 7	0.86	0.74	-0.12	127.1	74.6	6
Section 17	0.33	0.25	-0.07	165.3	23.9	7
Section 1	0.02	0.08	0.06	6.7	159.7	8
Section 4	0.40	0.75	0.34	50.0	84.0	9
Section 20	0.25	0.17	-0.08	108.7	10.1	10
Section 2	0.02	0.09	0.07	5.1	103.0	11
Section 13	0.83	0.55	-0.28	43.6	16.5	12
Section 11	0.73	0.61	-0.12	38.8	17.2	13
Section 10	0.59	0.58	-0.01	14.6	35.3	14
Section 14	0.74	0.58	-0.16	23.4	9.6	15
Section 9	0.12	0.13	0.00	1.8	26.1	16
Section 3	0.56	0.28	-0.28	7.5	1.2	17
Section 21	0.32	0.52	0.20	2.1	0.8	18
Section 8	0.23	0.69	0.45	0.7	1.3	19
Section 19	0.37	0.36	-0.01	0.2	1.0	20
Section 12	0.08	0.84	0.76	0.3	0.4	21

Note: Rankings for export value, import value, and total trade value are for 2024
Source: Prepared by the authors from the Ministry of Finance 'Trade Statistics'

Table 2-2-5 Japan GL Index for the U.S.

Major Category	2014 GL Index	2024 GL Index	24/14 Change	Exports	Imports	Total Trade Volume Ranking
Section 16	0.52	0.58	0.06	47.0	19.2	1
Section 17	0.23	0.17	-0.06	52.1	4.8	2
Section 6	0.79	0.74	-0.05	8.8	15.0	3
Section 18	0.94	0.93	-0.01	8.3	7.2	4
Section 5	0.21	0.03	-0.18	0.2	14.1	5
Section 2	0.02	0.05	0.03	0.2	6.8	6
Section 15	0.51	0.51	0.00	5.1	1.7	7
Section 7	0.65	0.60	-0.05	4.6	2.0	8
Section 1	0.10	0.20	0.10	0.5	4.3	9
Section 4	0.21	0.48	0.27	0.8	2.5	10
Section 14	0.73	0.81	0.09	0.8	1.2	11
Section 20	0.53	0.42	-0.11	1.5	0.4	12
Section 13	0.70	0.64	-0.06	1.1	0.5	13
Section 19	0.81	0.56	-0.25	0.4	1.0	14
Section 10	0.47	0.41	-0.06	0.2	0.9	15
Section 11	0.88	0.71	-0.17	0.6	0.4	16
Section 9	0.03	0.08	0.05	0.0	0.9	17
Section 21	0.90	0.11	-0.79	0.0	0.7	18
Section 3	0.89	0.73	-0.16	0.1	0.0	19
Section 12	0.63	0.89	0.26	0.0	0.0	20
Section 8	0.16	0.56	0.40	0.0	0.0	21

Note: Rankings for export value, import value, and total trade value are for 2024
Source: Prepared by the authors from the Ministry of Finance 'Trade Statistics'

Table 2-2-6 Kansai GL Index for China

Major Category	2014 GL Index	2024 GL Index	24/14 Change	Exports	Imports	Total Trade Volume Ranking
Section 16	0.91	0.97	0.06	2,517.9	2,355.0	1
Section 6	0.94	0.90	-0.04	563.5	457.0	2
Section 11	0.30	0.30	0.00	149.5	831.6	3
Section 15	0.92	0.87	-0.05	507.4	392.1	4
Section 7	0.83	0.69	-0.14	487.5	255.3	5
Section 20	0.22	0.20	-0.02	46.6	427.6	6
Section 18	0.37	0.74	0.37	289.1	168.7	7
Section 4	0.08	0.44	0.36	47.2	167.5	8
Section 17	0.65	0.74	0.08	57.2	97.8	9
Section 13	0.98	0.86	-0.12	79.0	59.7	10
Section 2	0.03	0.07	0.04	4.4	119.0	11
Section 12	0.01	0.07	0.06	4.2	114.7	12
Section 8	0.05	0.07	0.02	3.9	106.2	13
Section 10	0.93	0.57	-0.36	24.5	61.4	14
Section 9	0.03	0.06	0.03	1.6	51.2	15
Section 14	0.80	0.65	-0.15	23.8	11.4	16
Section 5	0.77	0.73	-0.03	12.5	21.5	17
Section 1	0.04	0.06	0.02	1.0	31.8	18
Section 3	0.53	0.49	-0.04	0.7	2.2	19
Section 21	0.53	0.98	0.45	0.2	0.2	20
Section 19	0.16	0.05	-0.12	0.0	0.0	21

Note: Rankings for export value, import value, and total trade value are for 2024
Source: Prepared by the authors from the Ministry of Finance 'Trade Statistics'

Table 2-2-7 Japan GL Index for China

Major Category	2014 GL Index	2024 GL Index	24/14 Change	Exports	Imports	Total Trade Volume Ranking
Section 16	0.75	0.80	0.05	52.8	78.5	1
Section 6	0.75	0.81	0.06	15.4	10.5	2
Section 15	0.84	0.91	0.07	11.9	10.0	3
Section 11	0.19	0.21	0.01	1.8	15.6	4
Section 7	0.83	0.79	-0.04	9.8	6.4	5
Section 17	0.51	0.81	0.30	9.3	6.3	6
Section 18	0.65	0.80	0.15	8.4	5.6	7
Section 20	0.19	0.17	-0.02	1.0	10.9	8
Section 4	0.04	0.24	0.20	0.7	5.2	9
Section 13	0.79	0.88	0.09	1.5	1.9	10
Section 5	0.94	0.86	-0.08	1.4	1.9	11
Section 12	0.01	0.06	0.06	0.1	2.8	12
Section 2	0.05	0.07	0.02	0.1	2.7	13
Section 10	0.86	0.73	-0.13	0.9	1.5	14
Section 8	0.04	0.05	0.01	0.1	2.2	15
Section 14	0.93	0.38	-0.55	1.4	0.3	16
Section 9	0.06	0.26	0.20	0.2	1.3	17
Section 1	0.33	0.02	-0.30	0.0	1.3	18
Section 3	0.46	0.36	-0.10	0.0	0.0	19
Section 21	0.26	0.58	0.32	0.0	0.0	20
Section 19	0.09	0.03	-0.07	0.0	0.0	21

Note: Rankings for export value, import value, and total trade value are for 2024
Source: Prepared by the authors from the Ministry of Finance 'Trade Statistics'

(3) Characteristics of Trade Structures with Major ASEAN Countries and India

The GL index for Japan's trade with ASEAN is presented in Table 2-2-8. The GL index for Part 16 (Electrical Machinery and Equipment) shows a substantial increase, approaching a value of nearly 1. In recent years, there has been a marked increase in the level of trade in electrical machinery and equipment production between Japan and the ASEAN countries, compared to trade between Japan and China. This suggests that production networks for these products have been established between Japan and the ASEAN countries.

The next stage of the research involves an examination of the trade structure between Japan and the major ASEAN countries and India.

Table 2-2-9 shows the following regarding Japan's trade with the Philippines. With regard to Section 16 (Electrical Machinery and Equipment), the GL index, which had been approaching 1 due to declining exports and increasing imports, has decreased.

This finding indicates a decline in the export of raw materials from Japan, with a concomitant increase in the domestic procurement of materials.

Table 2-2-10 illustrates Japan's trade relations with Malaysia. The GL index for Section 16 (Electrical Machinery and Equipment) remains close to 1, indicating the formation of pure intra-industry trade.

Table 2-2-8 Japan GL Index for ASEAN

Major Category	2014 GL Index	2024 GL Index	24/14 Change	Exports	Imports	Total Trade Volume Ranking
Section 16	0.76	0.99	0.23	34.1	33.7	1
Section 15	0.47	0.56	0.09	15.7	6.1	2
Section 5	0.19	0.20	0.01	2.0	18.2	3
Section 17	0.37	0.43	0.06	12.6	3.5	4
Section 7	0.96	0.93	-0.04	5.6	6.5	5
Section 6	0.86	0.84	-0.03	6.8	4.9	6
Section 11	0.44	0.33	-0.11	1.9	9.8	7
Section 18	0.82	0.98	0.17	4.1	4.3	8
Section 4	0.12	0.22	0.10	0.8	6.4	9
Section 14	0.48	0.94	0.47	3.5	3.2	10
Section 9	0.02	0.03	0.02	0.1	4.2	11
Section 20	0.42	0.41	-0.01	0.7	2.8	12
Section 2	0.09	0.11	0.02	0.2	2.9	13
Section 1	0.33	0.53	0.20	0.6	1.8	14
Section 12	0.03	0.03	0.00	0.0	2.4	15
Section 10	0.80	0.80	0.00	1.1	0.7	16
Section 13	0.94	0.81	-0.13	1.0	0.7	17
Section 8	0.28	0.17	-0.11	0.1	0.9	18
Section 3	0.04	0.21	0.17	0.1	0.9	19
Section 21	0.17	0.49	0.32	0.0	0.0	20
Section 19	0.50	0.00	-0.50	0.0	0.0	21

Note: Rankings for export value, import value, and total trade value are for 2024
Source: UN Comtrade, prepared by the authors

Table 2-2-9 Japan GL Index for Philippines

Major Category	2014 GL Index	2024 GL Index	24/14 Change	Exports	Imports	Total Trade Volume Ranking
Section 16	0.97	0.88	-0.09	3.6	4.5	1
Section 15	0.87	0.81	-0.06	1.3	0.9	2
Section 17	0.59	0.18	-0.41	1.4	0.1	3
Section 9	0.05	0.12	0.08	0.1	0.9	4
Section 2	0.01	0.02	0.01	0.0	0.9	5
Section 7	0.66	0.65	-0.00	0.6	0.3	6
Section 6	0.22	0.39	0.17	0.6	0.1	7
Section 18	0.75	0.85	0.10	0.3	0.4	8
Section 5	0.15	0.48	0.33	0.5	0.2	9
Section 11	0.98	0.96	-0.02	0.1	0.1	10
Section 20	0.43	0.29	-0.14	0.0	0.2	11
Section 4	0.31	0.76	0.46	0.1	0.1	12
Section 13	0.96	0.58	-0.38	0.1	0.0	13
Section 10	0.46	0.41	-0.04	0.1	0.0	14
Section 14	0.96	0.90	-0.06	0.0	0.1	15
Section 8	0.11	0.22	0.11	0.0	0.1	16
Section 1	0.16	0.79	0.63	0.0	0.0	17
Section 3	0.02	0.05	0.03	0.0	0.1	18
Section 12	0.10	0.12	0.02	0.0	0.0	19
Section 21	0.41	0.79	0.38	0.0	0.0	20
Section 19	-	0.00	-	0.0	0.0	21

Note: Rankings for export value, import value, and total trade value are for 2024
Source: UN Comtrade, prepared by the authors

Table 2-2-10 Japan GL Index for Malaysia

Major Category	2014 GL Index	2024 GL Index	24/14 Change	Exports	Imports	Total Trade Volume Ranking
Section 16	0.99	0.99	0.00	5.3	5.4	1
Section 5	0.03	0.09	0.06	0.3	6.4	2
Section 15	0.34	0.74	0.41	1.6	0.9	3
Section 17	0.13	0.09	-0.05	2.3	0.1	4
Section 7	0.94	0.95	0.01	0.8	0.8	5
Section 6	0.90	0.98	0.08	0.8	0.7	6
Section 18	0.89	0.66	-0.23	0.5	0.9	7
Section 14	0.33	0.64	0.31	0.6	0.3	8
Section 4	0.24	0.19	-0.05	0.1	0.6	9
Section 3	0.02	0.08	0.06	0.0	0.7	10
Section 9	0.00	0.00	-0.00	0.0	0.6	11
Section 11	0.77	0.63	-0.14	0.1	0.3	12
Section 20	0.39	0.55	0.16	0.1	0.2	13
Section 13	0.96	0.92	-0.03	0.1	0.1	14
Section 2	0.07	0.18	0.12	0.0	0.2	15
Section 10	0.54	0.46	-0.09	0.1	0.0	16
Section 1	0.33	0.92	0.59	0.0	0.0	17
Section 12	0.71	0.90	0.18	0.0	0.0	18
Section 8	0.46	0.69	0.23	0.0	0.0	19
Section 21	0.92	0.37	-0.55	0.0	0.0	20
Section 19	-	0.00	-	0.0	0.0	21

Note: Rankings for export value, import value, and total trade value are for 2024
Source: UN Comtrade, prepared by the authors

Table 2-2-11 shows Japan's trade with Thailand.

Looking at the GL index for Section 16 (Electrical Machinery and Equipment), it shows a significant increase, indicating intra-industry trade has progressed, reaching a level close to 1. A similar increase is seen for Section 17 (Vehicles and Transport Equipment), also showing progress in intra-industry trade.

Thus, in Malaysia and Thailand, horizontal or vertical trade is advancing within the Section 16 (Electrical Machinery and Equipment) industry. This reveals the formation of production networks between Japan and these two countries. Conversely, examining Section 16 for the Philippines shows that while Japanese exports to the Philippines are declining, imports from the Philippines are increasing. This suggests Japan is moving away from being a production network and is becoming a final consumption destination.

Table 2-2-12 examines Japan's trade with India. An increase in the GL index can be observed in Section 17 (Vehicles and Transport Equipment) and Section 16 (Electrical Machinery and Equipment). The rise in the GL index for the former is particularly significant, indicating a substantial increase in intra-industry trade within India's automotive sector and the formation of a production network for automobile manufacturing.

Table 2-2-11 Japan GL Index for Thailand

Major Category	2014 GL Index	2024 GL Index	24/14 Change	Exports	Imports	Total Trade Volume Ranking
Section 16	0.73	0.98	0.25	9.1	8.7	1
Section 15	0.37	0.40	0.03	6.0	1.5	2
Section 17	0.55	0.84	0.29	2.9	2.1	3
Section 7	0.82	0.74	-0.08	1.4	2.5	4
Section 4	0.04	0.07	0.03	0.1	3.1	5
Section 6	0.83	0.93	0.09	1.7	1.4	6
Section 18	0.67	0.91	0.24	1.5	1.2	7
Section 11	0.56	0.54	-0.02	0.3	0.8	8
Section 1	0.42	0.44	0.01	0.2	0.7	9
Section 14	0.60	0.85	0.25	0.5	0.4	10
Section 20	0.37	0.41	0.03	0.1	0.4	11
Section 2	0.09	0.15	0.06	0.0	0.5	12
Section 13	0.89	0.83	-0.07	0.2	0.2	13
Section 10	0.23	0.23	-0.00	0.2	0.0	14
Section 9	0.03	0.03	-0.00	0.0	0.2	15
Section 5	0.77	0.58	-0.20	0.1	0.2	16
Section 8	0.91	0.85	-0.06	0.0	0.1	17
Section 12	0.09	0.15	0.06	0.0	0.1	18
Section 3	0.24	0.28	0.04	0.0	0.0	19
Section 21	0.98	0.81	-0.17	0.0	0.0	20
Section 19	0.00	0.00	0.00	0.0	0.0	21

Note: Rankings for export value, import value, and total trade value are for 2024
Source: UN Comtrade, prepared by the authors

Table 2-2-12 Japan GL Index for India

Major Category	2014 GL Index	2024 GL Index	24/14 Change	Exports	Imports	Total Trade Volume Ranking
Section 16	0.17	0.35	0.18	4.7	1.0	1
Section 15	0.32	0.26	-0.06	4.5	0.7	2
Section 6	0.83	0.63	-0.21	3.2	1.5	3
Section 17	0.42	0.90	0.48	1.1	0.9	4
Section 7	0.15	0.18	0.04	1.3	0.1	5
Section 18	0.33	0.24	-0.09	0.9	0.1	6
Section 11	0.44	0.52	0.07	0.1	0.4	7
Section 14	0.07	0.10	0.03	0.0	0.5	8
Section 5	0.11	0.78	0.67	0.2	0.3	9
Section 1	0.00	0.01	0.01	0.0	0.4	10
Section 10	0.15	0.05	-0.10	0.2	0.0	11
Section 13	0.38	0.30	-0.08	0.1	0.0	12
Section 2	0.01	0.03	0.02	0.0	0.2	13
Section 4	0.04	0.13	0.09	0.0	0.2	14
Section 20	0.54	0.43	-0.11	0.1	0.0	15
Section 8	0.01	0.01	0.00	0.0	0.1	16
Section 3	0.04	0.33	0.29	0.0	0.0	17
Section 12	0.00	0.01	0.00	0.0	0.0	18
Section 9	0.25	0.18	-0.07	0.0	0.0	19
Section 21	0.10	0.06	-0.04	0.0	0.0	20
Section 19	0.15	-	-	0.0	0.0	21

Note: Rankings for export value, import value, and total trade value are for 2024
Source: UN Comtrade, prepared by the authors

(4) Characteristics of the U.S. Trade Structure

Looking at the GL index for U.S. trade with ASEAN (Table 2-2-13), a declining trend over the past decade is evident for many goods. For Section 16 (Electrical Machinery and Equipment), the goods with the highest trade value ranking, a significant trade deficit is observed, clearly showing the progression of the GL index decline. Furthermore, for Section 6 (Chemical Products), the GL index, which was close to 1, has also declined significantly. Section 11 (Textile Products) has also declined, but the GL index for both years is very small, around 0.1.

For major items with large trade volumes, the U.S. shows a declining GL index due to a trade deficit with ASEAN. This indicates that the U.S. has become an important export destination for ASEAN.

We also compared the trade structure with ASEAN between Japan and the U.S. (see Tables 2-2-8 and 2-2-13). In Section 16 (Electrical Machinery and Equipment), Japan's GL index rose by +0.23 points during this period, reaching a value close to 1, while the U.S. index fell significantly by -0.27 points.

This indicates that Japan has established an Electrical Machinery production network with ASEAN, while the U.S. is primarily an export destination.

On the other hand, examining the GL index for U.S. trade with China shows an increase over the past decade for many goods (Table 2-2-14). While most

Table 2-2-13 U.S. GL Index for ASEAN

Major Category	2014 GL Index	2024 GL Index	24/14 Change	Exports	Imports	Total Trade Volume Ranking
Section 16	0.65	0.38	-0.27	40.8	173.7	1
Section 6	0.94	0.62	-0.32	11.0	24.4	2
Section 11	0.13	0.10	-0.04	1.4	27.9	3
Section 20	0.11	0.03	-0.08	0.4	26.7	4
Section 7	0.58	0.37	-0.21	4.4	19.3	5
Section 18	0.85	0.62	-0.23	6.3	14.0	6
Section 5	0.59	0.26	-0.33	17.5	2.6	7
Section 17	0.24	0.64	0.39	11.9	5.6	8
Section 4	0.82	0.53	-0.29	4.2	11.4	9
Section 15	0.87	0.78	-0.09	5.7	9.0	10
Section 12	0.05	0.04	-0.01	0.3	13.9	11
Section 2	0.75	0.82	0.07	5.7	3.9	12
Section 14	0.98	0.66	-0.32	5.4	2.7	13
Section 8	0.33	0.12	-0.21	0.4	5.6	14
Section 1	0.72	0.86	0.14	2.2	2.9	15
Section 10	0.88	0.95	0.07	2.0	2.2	16
Section 3	0.06	0.04	-0.01	0.1	3.5	17
Section 9	0.67	0.25	-0.42	0.5	3.1	18
Section 13	0.80	0.37	-0.43	0.5	2.3	19
Section 21	0.42	0.21	-0.22	0.2	0.0	20
Section 19	0.47	0.72	0.25	0.1	0.1	21

Note: Rankings for export value, import value, and total trade value are for 2024
Source: UN Comtrade, prepared by the authors

Table 2-2-14 U.S. GL Index for China

Major Category	2014 GL Index	2024 GL Index	24/14 Change	Exports	Imports	Total Trade Volume Ranking
Section 16	0.19	0.23	0.05	281.4	2,121.9	1
Section 20	0.02	0.01	-0.01	3.2	580.4	2
Section 6	0.80	0.94	0.13	211.6	239.6	3
Section 17	0.67	0.96	0.30	180.0	193.4	4
Section 15	0.47	0.34	-0.13	56.0	271.7	5
Section 11	0.10	0.13	0.03	21.0	303.0	6
Section 7	0.44	0.49	0.05	79.3	243.1	7
Section 18	0.77	0.91	0.15	112.7	133.7	8
Section 2	0.17	0.18	0.01	166.0	16.0	9
Section 5	0.44	0.10	-0.34	166.4	8.9	10
Section 12	0.01	0.02	0.01	1.2	140.8	11
Section 13	0.18	0.26	0.08	9.9	65.3	12
Section 10	0.92	0.54	-0.38	20.2	54.4	13
Section 1	0.97	0.52	-0.45	43.8	15.5	14
Section 4	0.95	0.84	-0.11	23.7	32.6	15
Section 9	0.75	0.81	0.06	16.2	23.6	16
Section 8	0.35	0.31	-0.04	5.9	32.6	17
Section 14	0.46	0.80	0.34	11.9	17.8	18
Section 3	0.45	0.06	-0.39	0.4	12.8	19
Section 21	0.57	0.85	0.28	1.5	1.1	20
Section 19	0.01	0.00	-0.01	0.0	1.8	21

Note: Rankings for export value, import value, and total trade value are for 2024
Source: UN Comtrade, prepared by the authors

goods resulted in deficits due to import surpluses, the deficit margins have narrowed. Export values increased at an average annual rate of +1.4% over the decade, while import values decreased at an average annual rate of -0.7%.

While imports from China have decreased, imports from ASEAN have increased, confirming that key U.S. import partners are shifting from China to other countries such as ASEAN.

The recent slowdown in the Chinese economy and the deceleration of U.S.-China trade due to changes in U.S. tariff policies suggest that a shift in U.S. import partners from China to ASEAN is underway.

Summary

Summarizing the preceding content, the results of the analysis are as follows.

(1) Examining the activities of Japanese companies overseas by region, since 2022, sales and capital investment in North America have increased, while a noticeable decline in China is evident. Furthermore, sales in ASEAN showed only a gradual decrease, meaning that in terms of market share, ASEAN surpassed China. Thus, amid the slowdown in the Chinese economy, sales in the North American market are increasing, and the importance of ASEAN is also growing.

(2) Examining the procurement behavior of Japanese companies operating in ASEAN reveals that in countries like Thailand and the Philippines, where automotive and electronic components are core industries, supply chains have been established where local Japanese firms procure parts from local suppliers. However, in recent years, the procurement rate from local suppliers in the Philippines has risen somewhat, indicating emerging signs of change in the supply chain.

(3) Analysis using the GL index shows that for both the Kansai region and Japan as a whole, the GL index has declined for many goods in trade with the U.S. This indicates that the U.S. is not integrated into the production network, clearly establishing Japan and Kansai as import sources for final goods (Tables 2-2-4 and 2-2-5). Conversely, the GL Index for trade with China is rising for many goods. This indicates that both Kansai and Japan as a whole are integrated into China's global value chain (Tables 2-2-6 and 2-2-7).

(4) Looking at ASEAN as a whole, intra-industry trade is advancing, particularly in the production of Section 16 (Electrical Machinery and Equipment), indicating that these production networks are being formed.

(5) In major ASEAN countries, particularly Malaysia and Thailand, horizontal or vertical trade is advancing within the Electrical Machinery industry

(Section 16). This suggests production networks are forming between Japan and these countries.

(6) Finally, examining the U.S. trade structure shows imports from China are decreasing while those from ASEAN are increasing. This indicates ASEAN is becoming an increasingly important trading partner for the U.S.

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