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Overview of Foreign Direct Investment, Trade, and Global Value Chains in East Asia*

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Abstract: *This paper provides an overview of the patterns and trends of foreign direct investment (FDI) and trade as well as the formation and development of international production networks or global value chains in East Asia, with a special focus on Association of Southeast Asian Nations Member States. To conduct data observations and analyses, we rely on trade data disaggregated by stage in the production process, FDI inflows data by sector, and international input–output tables. East Asian countries trade manufactured parts and components intensively with each other whilst exporting capital goods and consumption goods to countries outside the region. Considering a complementary relationship between trade and FDI in evolving production fragmentation and offshoring, we investigate how and to what extent East Asian countries have been integrated into regional and global value chains, focusing on the machinery sectors.*

Keywords: Developing East Asia; FDI; Trade; Production networks

JEL Classification: F23; O53

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1. Introduction

East Asian countries have integrated into the regional and world economies by taking part in internationalised production activities, especially since the early 1990s. As communication costs have fallen substantially due to information and communication technology (ICT)-related advancements, in addition to the reductions in transportation costs and tariffs, firms can unbundle the manufacturing production process and disperse their production stages in different countries with different locational advantages. This new wave of globalisation based on the production stage – or task-wise fragmentation of production – is what Baldwin (2016) calls the 'second unbundling'.[1] Given the regional diversity and adequate supply potential in East Asia, together with the steady demand from the United States (US) and European markets for final manufactured products, the ICT revolution has increased the international fragmentation of production, leading to the networking of production chains across borders.

The development of such international production networks, or global value chains (GVCs) in a broader sense, has expanded trade in intermediate goods, especially that in manufactured parts and components, amongst neighbouring countries within East Asia, particularly in the machinery sectors. The major players in the East Asian production networks are multinational corporations whose headquarters are located in the forerunners of regional economic development, such as Japan, the Republic of Korea (hereafter, Korea), and Taiwan. Inward foreign direct investment (FDI) towards newly industrialising East Asian countries substantially increased in the late 1980s and 1990s. In order to attract FDI, developing East Asian countries introduced a duty-drawback system for firms operating in special export processing zones (EPZs), and further reduced tariffs on intermediates unilaterally. In addition to tariff cuts, developing East Asian countries have also made substantial policy efforts to reduce non-tariff barriers and enhance trade facilitation.

[1] The geographic separation of firms' production activities across borders has been described under different names from time to time, such as, 'fragmentation' (Jones and Kierzkowski, 1990); 'slicing the value chain' (Krugman, 1995); 'outsourcing' (Feenstra and Hanson, 1996); 'global production sharing' (Yeats, 1999); 'vertical specialization' (Hummels, Ishii, and Yi, 2001); and the 'second unbundling' (Baldwin, 2016).

Newly industrialised East Asian countries became a platform for multinational corporations to set up low-cost production sites and export to regional and worldwide markets. Rather than striving to become self-sufficient by nurturing their own industries, those East Asian countries promoted export-led growth policies by unilaterally liberalising their imports of intermediates and making use of the dynamism of new globalisation through production fragmentation. The export-led growth policies started in Thailand and Malaysia in the 1980s and were followed by Indonesia and the Philippines in the 1990s.

In this study, we aim to overview the patterns and trends of FDI and international trade, as well as the formation and development of international production networks or GVCs in East Asia. In doing so, we put emphasis on developing East Asian economies, in particular, ASEAN Member States (AMS). We make use of three different types of data, namely, data on trade disaggregated by the stage of the production process, data on FDI inflows disaggregated by sector, and international input–output tables. We highlight the observed trade pattern that East Asian countries trade in manufactured parts and components intensively with each other whilst exporting capital goods and consumption goods to countries outside the region. Considering a complementary relationship between trade and FDI in evolving production fragmentation and offshoring, we investigate how and to what extent East Asian countries have been integrated into regional and global value chains, focusing on the machinery sectors.

The remainder of the paper is organised as follows: Section 2 begins with an overview of the literature on FDI, trade, and GVCs in East Asia. After describing the trade and FDI data and the international input–output tables used throughout the paper in Section 3, Section 4 presents our findings from a series of data observations and analyses on the world and East Asian trade patterns, the industrial composition of inward FDI in AMS, and the extent of the engagement and position of AMS countries in GVCs. Section 5 concludes.

2. Literature overview

This section provides an overview of the literature on FDI, trade, and GVCs in East Asia from the following three aspects: a complementary relationship between trade and FDI (Section 2.1), region-specific FDI patterns (Section 2.2), and advances in production fragmentation and GVCs (Section 2.3).

2.1. Trade and FDI complementarity in East Asia

The dominance of world trade in intermediate goods concentrating more on manufactured parts and components has long been recognised empirically since at least as early as the 1960s, and it has also been studied theoretically (for a literature survey, see Ng and Yeats (2001) and Baldwin and Lopez-Gonzalez (2015)). It is well established that the internationalisation of firms' production activities has shaped such symptomatic trade patterns. Firms unbundle production processes across national borders when they can save considerably on the overall production costs and when facing a lower cost burden of coordination and communication amongst internationally fragmented production processes. Differences in locational advantages are thought to enhance the international fragmentation of production, conditional that trade barriers and transportation costs, as well as various coordination costs, are sufficiently low. As firms offshore some production stages or tasks through FDI (or other modes, such as foreign outsourcing), trade in intermediates emerges between the fragmented production stages. Indeed, Amiti and Wakelin (2003) conducted a gravity exercise and found that FDI had a positive effect on bilateral trade when countries were different in terms of their relative factor endowments and when trade costs were low.

In the East Asian context, the study by Ng and Yeats (2001) is one of the pioneering studies that investigated the transformation of trade patterns through the lens of the internationalisation of production. Ng and Yeats (2001) shed light on the remarkable dynamism and increasing importance of East Asian trade in manufactured parts and components since the mid-1980s. In addition, Ando and Kimura (2005) underline the explosive increase in both exports and imports of machinery parts and components by East Asian countries in the latter half of the 1990s. Using the overseas production and sales data of Japanese companies and

finely disaggregated trade data, Ando and Kimura (2005) discuss how the formation of vertical production chains of input–output linkages throughout East Asia fundamentally changed trade patterns in the region. Such a complementarity of trade and FDI is also highlighted by Fukao, Ishido, and Ito (2003), who found that a rapid increase in vertical transactions in the electrical machinery industry was largely driven by FDI flows from Japan to neighbouring East Asian countries.

2.2. FDI patterns in East Asia

A substantial portion of the international fragmentation of manufacturing production occurs between multinational parent firms and their affiliates (e.g. Alfaro and Charlton (2009) and Ramondo, Rodríguez-Clare, and Tintelnot (2015)). That is, FDI has been playing a key role in the formation and development of international production networks. Production fragmentation and offshoring through FDI operations are accompanied closely by transfers of human capital, know-how, and technology. For example, Javorcik (2004) found multinationals' affiliates to be more productive than comparable local firms, whilst Heyman et al. (2007) found a wage premium of foreign-owned firms with respect to local counterparts. There is also a large body of literature that points out that multinationals bring spillovers for local firms through various channels (e.g. Javorcik (2004) and Haskel, Pereira, and Slaughter (2007)). FDI appears to be a key factor for understanding the implications of advances in international production networks for regionwide economic development through industrial upgrading.

Looking at the FDI flows to developing East Asian economies, Japan, followed by Korea and Taiwan, has been playing a leading role in shifting labour-intensive production stages to lower-wage countries by leveraging the regional diversity in development levels and locational advantages.[2] This type of FDI is traditionally known as vertical FDI (Helpman, 1984), which has production stages dispersed to exploit gains from international differences in comparative advantages. Beyond the conventional distinction between horizontal (i.e. market-seeking) and vertical (i.e. efficiency-seeking) FDI, the recent literature finds more complex types

[2] Meanwhile, China also has become an increasingly active outward investor in addition to its dominance as a FDI recipient in the international fragmentation of production across the region (ASEAN Secretariat and UNCTAD, 2019).

of FDI, such as complex FDI (Baltagi, Egger, and Pfaffermayr, 2007; Grossman, Helpman, and Szeidl, 2006; Yeaple, 2003) and export-platform FDI (Ekholm, Forslid, and Markusen, 2007), to describe the complicated nature of cross-border production systems managed and operated by multinational corporations.

In the East Asian context, Hayakawa and Matsuura (2015) demonstrate the validity of the concept of 'complex vertical FDI' in the case of Japanese FDI in other East Asian countries. The empirical evidence they provide suggests that Japanese multinational corporations tend to have multiple affiliates in multiple countries, with different factor prices across the region. Furthermore, Baldwin and Okubo (2014) point out the fact that most affiliates of Japanese multinationals, unlike US multinationals' affiliates, bought substantial shares of their intermediate inputs from abroad and sold substantial shares of their output abroad. Baldwin and Okubo (2014) coined the term 'networked FDI' to highlight the emergence of such interconnected sales-sourcing patterns especially found within East Asia. These findings can be interpreted as suggesting that East Asian production networks are virtually FDI networks, and this involves intra-firm trade spread across the region and extends to arm's-length transactions through vertical production linkages.

2.3. The extent of fragmentation and GVCs in East Asia

To quantify the extent of the international fragmentation of manufacturing production at the country and sector levels, previous studies have used input–output tables (for earlier studies, see Feenstra and Hanson (1996) and Hummels, Ishii, and Yi (2001)). Due to the limited availability of input–output tables comparable across a wide range of countries and because input–output tables tend not to be frequently updated, however, some studies used customs statistics on product-level bilateral trade instead.[3] Ando and Kimura (2005) took this alternative approach to quantify the extent of production fragmentation: they scrutinised customs statistics to identify product codes of parts and components in machinery industries and highlighted the dominance of manufactured inputs in East Asian machinery trade. In further detail, Kimura and Obashi (2010) reported some evidence in support of the formation and development of East Asian production networks in terms of the

[3] Some other studies rely on customs statistics on processing trade (Clark, 2006; Egger and Egger, 2001).

expansion of exports and imports of machinery industries and, in particular, their parts and components. East Asian countries increased parts and components trade within the region whilst increasing exports of final goods to other parts of the world, such as the US and European markets.

Focusing on developing East Asian economies, Obashi and Kimura (2017) showed that Malaysia, the Philippines, and Singapore had 40% or even higher percentages of machinery parts and components, both in total manufacturing exports and imports throughout the last couple of decades. In stark contrast, for latecomers to ASEAN, such as Cambodia, the Lao People's Democratic Republic (Lao PDR), and Myanmar, the percentages of machinery parts and components were definitely limited as of 2013. Yet, they were found to be increasingly dependent on trade in machinery parts and components and on establishing trade links for a wider range of parts with a larger number of trading partners.

The concept of GVCs extends beyond that of production fragmentation by embracing various types of international industrial linkages, including trade in primary goods, processed raw materials, and services inputs, in addition to manufactured parts and components. To better approximate the cross-border sourcing of intermediate goods and services through GVCs, a comprehensive, harmonised database of annual industry-by-industry international input–output tables is indispensable. Thanks to prominent data construction initiatives such as the Organisation for Economic Co-operation and Development (OECD) Inter-Country Input–output (ICIO) Tables and World Input–output Database (WIOD), more recent studies, evolving from the above vein of literature, such as Hummels, Ishii, and Yi (2001), have made use of international input–output tables to look at the domestic and foreign value-added content of the observed trade flows in gross values. For example, Johnson and Noguera (2012, 2017) highlighted the growing importance of the cross-border sourcing of intermediates by demonstrating a decline in the ratio of the world's total value-added to gross exports of merchandise and services. That is, the increased value of imported intermediates that are embodied in a domestic industry's exports (i.e. an increase in the foreign value-added content of gross exports) is regarded as indicating the development of GVCs.

The foreign value-added embodied in exports, expressed as a proportion of the total gross exports of the exporting country, is known as the GVC 'backward' participation index in the relevant literature (see, for example, Backer and Miroudot (2013)). Looking at another side of the coin, the domestic value-added embodied in foreign exports, as a percentage of the gross exports of the value-added source country, is known as the GVC 'forward' participation index. These participation indices quantify a degree of country-industry's engagement in the form of buying from (i.e. 'backward') and selling to ('forward') GVCs or the demand and supply sides of activities through value chains. Furthermore, considering the central hubs and peripheral countries and industries within GVCs, Criscuolo and Timmis (2018) proposed GVC centrality metrics that go beyond GVC participation.[4] In the East Asian context, Aldaba (2017) examined the engagement of the Philippines in electronics GVCs using the value-added trade statistics obtained from the OECD–WTO Trade in Value Added (TiVA) database. Tham and Kam (2017) conducted similar data analysis on Malaysia in the ICT manufacturing sector.

3. Data descriptions

We rely on three different data sources to analyse the patterns and trends of FDI and trade as well as the development of international production networks or GVCs in East Asia. This section describes the data on trade disaggregated by the stage in the production process (Section 3.1), the data on FDI inflows disaggregated by sector (Section 3.2), and the international input–output tables (Section 3.3).

3.1. Data on trade by production stage

To analyse the patterns and trends of trade in relation to GVCs, we use the Research Institute of Economy, Trade and Industry (RIETI) Trade Industry Database 2018 (RIETI–TID 2018).[5] The RIETI–TID 2018 provides international merchandise trade statistics at the sectoral level, covering manufacturing sectors, some of which include agriculture and mining as an upstream sector, amongst 71

[4] Other indices have been proposed in the literature to quantify the average position (called 'upstream-ness' and 'downstream-ness') of a country in GVCs (Antràs et al., 2012) and so on.
[5] See http://www.rieti-tid.com/.

major economies and the rest of the world.[6] We focus on examining the trade patterns and trends from 2001 to the latest year of 2018. The total merchandise trade involving the 71 sample economies accounts for 85%–90% of the world total trade value in each year during the period 2001–2018.

We focus particularly on 16 East Asian economies out of the 71 sample economies, as listed in Table 1. We here define East Asia functionally as economies that are taking part in regional economic dynamism or regionwide international production networks, including Japan, Korea, Taiwan, China, Hong Kong, Singapore, Malaysia, Thailand, the Philippines, Indonesia, Viet Nam, Cambodia, Brunei Darussalam, India, Australia, and New Zealand. Note that the Lao PDR and Myanmar are not included in East Asia under our definition due to data limitations: their data are not provided in the RIETI–TID or the other two data sources (described in the subsequent subsections).[7]

Table 1: Sample Countries in the RIETI–TID Database

16 economies in the East Asia region under our definition

Australia	Malaysia
Brunei Darussalam	New Zealand
Cambodia	Philippines
China	Republic of Korea
Hong Kong, China	Singapore
India	Taiwan
Indonesia	Thailand
Japan	Viet Nam

[6] We refrain from using the data on the rest of the world because the total trade value amongst the rest of the world is somehow recorded as zero in 2016 and appears to not be reliable.
[7] In addition, import data on Brunei Darussalam for the years 2005 and 2007–2011, Cambodia for 2017 and 2018, and Viet Nam for 2018 are not available.

55 other economies

Argentina	Gabon	Peru
Austria	Germany	Poland
Belgium and Luxembourg	Greece	Portugal
Bolivia	Hungary	Qatar
Brazil	Iran	Romania
Bulgaria	Iraq	Russian Federation
Canada	Ireland	Saudi Arabia
Chile	Israel	Slovenia
Colombia	Italy	South Africa
Croatia	Kuwait	Spain
Cyprus	Latvia	Sweden
Czech Republic and Slovakia	Lithuania	Turkey
Denmark	Malta	United Arab Emirates
Ecuador	Mexico	United Kingdom
Egypt	Netherlands	Uruguay
Equatorial Guinea	Nigeria	United States of America
Estonia	Norway	Venezuela
Finland	Oman	
France	Paraguay	

Source: RIETI–TID 2018.

The RIETI–TID reports the nominal trade values of cost, insurance, and freight (CIF) prices in US dollars. The trade values are obtained mainly from the import statistics of the respective countries, combined with export statistics as needed, with appropriate conversions from free on board (FOB) to CIF prices. We used the import price index of the US available from the US Bureau of Labor Statistics website[8] to deflate the nominal trade values and obtain the constant dollar series.

[8] See https://www.bls.gov/mxp/.

The RIETI–TID classifies sectoral-level trade values into product categories based on the stage in the production process, according to the Basic Economic Categories (BEC) codes, in relation to the System of National Account (SNA) criteria. There are three broad product categories by production stage: (i) primary goods; (ii) intermediate goods, which are classified further into processed goods (of raw materials) and (manufactured) parts and components; and (iii) final goods, which are further classified into capital goods and consumption goods. In order to analyse the trade patterns and trends in relation to GVCs, we highlight trade in manufactured parts and components, most of which occurs in machinery industries. GVCs may involve any sort of international industrial linkages, including trade in primary goods. Here we would like to look in particular at international trade in the second unbundling, or international production networks based on the production stage- or task-wise fragmentation of manufacturing production.

3.2. Data on FDI inflows by sector

To analyse the patterns and trends of FDI flows into developing East Asia in relation to production fragmentation and offshoring, we ideally would like to use inward FDI data decomposed by industry and source country in an internationally comparable manner. Amongst AMS, however, Thailand is the only country that has reported inward FDI statistics by sector, with a breakdown amongst manufacturing sectors, though the classification is not so detailed. Singapore has a breakdown amongst manufacturing sectors but does not report FDI separately from domestic investments. Malaysia, the Philippines, Indonesia, and Viet Nam only report the total value of FDI inflows in the overall manufacturing sectors without detailed sectoral figures.

Given the data scarcity of by-sector FDI inflows in most countries, we instead made use of Japan's outward FDI data, which is compiled by the Institute for International Trade and Investment, Japan, and published in its latest statistical handbook (ITI, 2020). Japan's outward FDI data by ITI (2020) is available since 2005 and is decomposed by industry and destination country, which enables us to examine the sectoral (though coarse) composition of FDI inflows from Japan to the respective AMS countries. Looking at FDI inflows in machinery sectors that are known as advances in international production networks or GVCs, we approximate

the relative importance of foreign investments in relation to fragmentation and offshoring. Because Japan has long been one of the largest sources of FDI inflows to AMS (ASEAN Secretariat and UNCTAD, 2019), Japan's FDI can be considered as a representative of the sectoral composition of worldwide FDI inflows.

An exception is Thailand, for which inward FDI data are available with a breakdown of the manufacturing sectors since 2005. We use Thailand's inward FDI data as a supplementary source in addition to Japan's outward FDI data. Japan and Thailand's FDI statistics are both based on the Balance of Payments and International Investment Position Manual (BPM6) published by the International Monetary Fund and are comparable with each other.

3.3. Inter-country input–output tables

To analyse the extent of the cross-border sourcing of intermediate goods and services through GVCs, we calculate indices measuring the country-industry's engagement and position in GVCs using the 2018 release of the OECD ICIO tables. The 2018 release includes annual ICIO tables covering input–output linkages for 64 economies, including the 16 East Asian economies of interest as mentioned above, and 36 industries for the period from 2005 to 2015. Industries are classified based on the International Standard Industrial Classification of All Economic Activities (ISIC) Revision 4.[9]

Although these three different data sources employ different industrial classification systems, we are able to connect one data source to another at a broadly-defined sector level to investigate trade and FDI patterns and trends in relation to GVCs in a consistent manner. Namely, we focus on examining two machinery sectors that are, and have been, at the centre of evolving production fragmentation and offshoring. The first sector that we focus on is 'computer, electronic, and optical products, and electrical machinery', which corresponds to the BEC industry codes of 9, 10, and 12 in the RIETI–TID, the 'electrical machinery' and 'precision machinery' categories in the FDI statistics, and the ISIC codes of D26 and D27 in the ICIO tables. The other sector is 'transport equipment', which corresponds to the BEC industry code of 11 in the RIETI–TID, the 'transport

[9] See, for more details, oe.cd/icio.

equipment' category in the FDI statistics, and the ISIC codes of D29 and D30 in the ICIO tables.

4. Analysis

We begin by overviewing world and East Asian trade patterns by product category based on the stage of the production process (Section 4.1). Given the observed trade patterns, we employ a GVC diagram to analyse how East Asian countries have been integrated into international production networks (Section 4.2). The findings from the GVC diagram analyses are related to the observations on the industrial composition of inward FDI in AMS, highlighting the role of FDI in production fragmentation and offshoring (Section 4.3). We also investigate the extent of the participation of AMS countries in GVCs in terms of the importance of foreign value added in gross exports (Section 4.4) and their position or centrality in GVCs (Section 4.5).

4.1. Data overview of trade by production stage

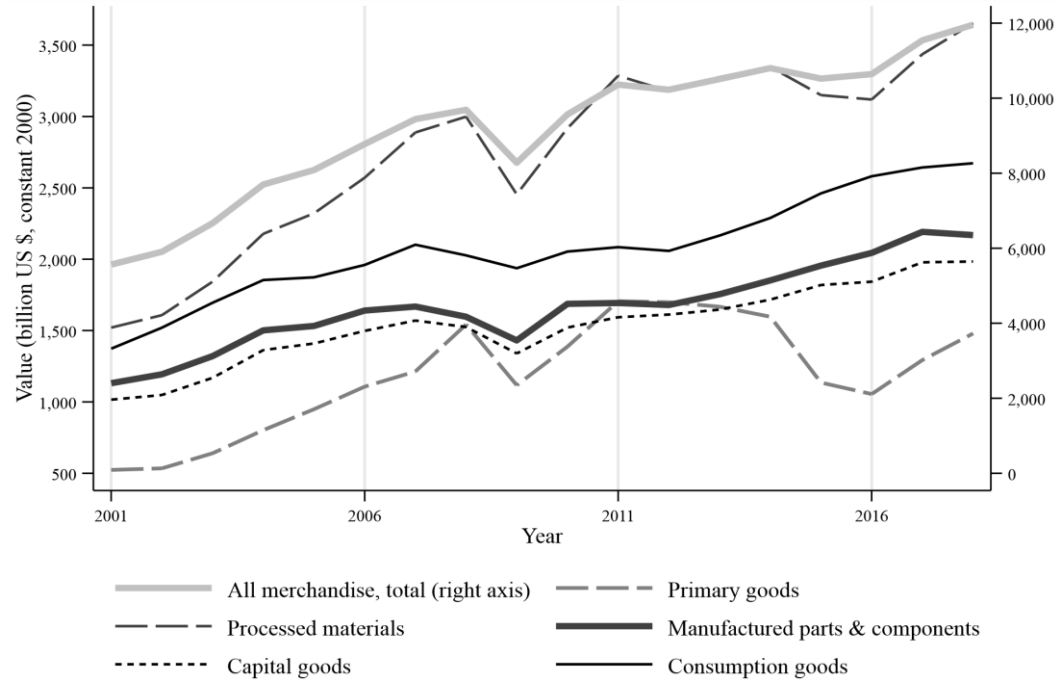
The top line chart of Figure 1 shows the evolution of trade by product category based on the production stage. The world total merchandise trade values (in light grey, solid line; measured on the right axis) are decomposed into primary goods (light grey, long-dash line), processed materials (medium grey, long-dash line), manufactured parts and components (medium grey, solid line), capital goods (black, short-dash line) and consumption goods (black, solid line). To compare the trends in intra-regional trade within East Asia with other trade flows, in the bottom part of the figure, world trade is decomposed into four trade flows: (A) intra-East Asian trade, (B) exports by East Asian countries to destination markets outside the region, (C) imports by East Asian countries from countries outside the region, and (D) trade between countries outside the region. Each trade flow is disaggregated into the five product categories by production stage.

Table 2 complements Figure 1 by showing (a) the values of world and East Asian trade in 2001, 2011, and 2018; (b) the annual average growth rates of trade during the periods 2001–2011 and 2011–2018; (c) the product composition of trade in 2001, 2011, and 2018; and d) the proportions of intra-East Asian trade and other

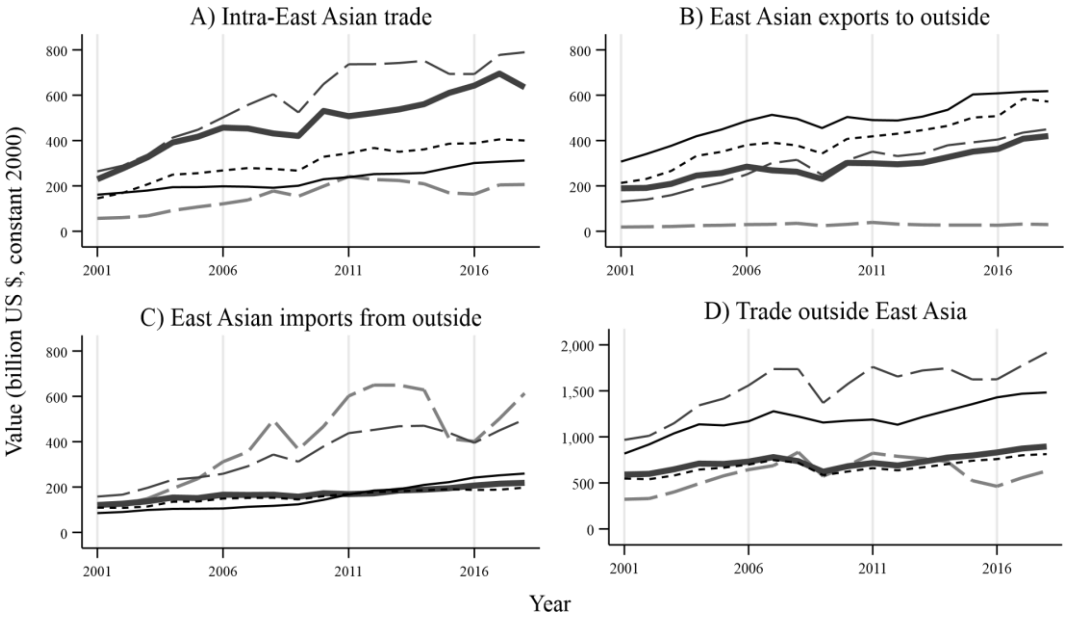
trade flows to world total trade in 2001, 2011, and 2018. For simplicity, the table shows the aggregated values of final goods as a whole (i.e. the sum of capital goods and consumption goods). The figures for primary goods are also combined with those for processed materials because most 'processed materials' are (semi-)processed raw materials used as intermediate inputs for chemicals, iron and metal products, and petroleum and coal products.

Figure 1: World and East Asian Trade by Production Stage, 2001–2018

World merchandise trade



Intra-regional and interregional trade in East Asia



Notes: 'East Asia' is defined as 16 economies, comprising Japan, Korea, Taiwan, (mainland) China, Hong Kong, Singapore, Malaysia, Thailand, the Philippines, Indonesia, Viet Nam, Cambodia, Brunei Darussalam, India, Australia, and New Zealand. See the main text for our way of decomposing trade into product categories by production stage. The figures do not completely cover the imports from Brunei Darussalam in 2005 and 2007–2011, those from Cambodia in 2017 and 2018, or those from Viet Nam in 2018. We deflated the trade values using the US import price index to obtain the constant dollar series.

Source: Author's calculations using the trade data (RIETI–TID 2018) and the US import price index (US Bureau of Labor Statistics).

Table 2: World and East Asian Trade by Production Stage, 2001–2018

a) Trade value (billions US$)

	All merchandise, total			Primary + Processed			Parts & components			Final goods		
	2001	2011	2018	2001	2011	2018	2001	2011	2018	2001	2011	2018
World merchandise trade, total	5,565	10,363	11,959	2,045	4,992	5,134	1,131	1,693	2,169	2,389	3,678	4,656
A) Intra-East Asian trade	858	2,069	2,343	321	978	996	230	508	635	307	583	713
B) East Asian exports to outside	859	1,600	2,090	149	390	480	190	300	420	521	909	1,190
C) East Asian imports from outside	599	1,546	1,788	284	1,040	1,112	121	169	219	195	337	457
D) Trade outside East Asia	3,249	5,149	5,737	1,291	2,583	2,546	591	716	895	1,367	1,849	2,296

b) Growth rate, annual average

	All merchandise, total		Primary + Processed		Parts & components		Final goods	
	01-11	11-18	01-11	11-18	01-11	11-18	01-11	11-18
World merchandise trade, total	6.4%	2.1%	9.3%	0.4%	4.1%	3.6%	4.4%	3.4%
A) Intra-East Asian trade	9.2%	1.8%	11.8%	0.3%	8.3%	3.2%	6.6%	2.9%
B) East Asian exports to outside	6.4%	3.9%	10.1%	3.0%	4.7%	4.9%	5.7%	3.9%
C) East Asian imports from outside	9.9%	2.1%	13.9%	1.0%	3.4%	3.7%	5.6%	4.5%
D) Trade outside East Asia	4.7%	1.6%	7.2%	-0.2%	1.9%	3.2%	3.1%	3.1%

c) Product composition by trade flow

	All merchandise, total			Primary + Processed			Parts & components			Final goods		
	2001	2011	2018	2001	2011	2018	2001	2011	2018	2001	2011	2018
World merchandise trade, total	100%	100%	100%	37%	48%	43%	20%	16%	18%	43%	35%	39%
A) Intra-East Asian trade	100%	100%	100%	37%	47%	42%	27%	25%	27%	36%	28%	30%
B) East Asian exports to outside	100%	100%	100%	17%	24%	23%	22%	19%	20%	61%	57%	57%
C) East Asian imports from outside	100%	100%	100%	47%	67%	62%	20%	11%	12%	33%	22%	26%
D) Trade outside East Asia	100%	100%	100%	40%	50%	44%	18%	14%	16%	42%	36%	40%

d) Trade flow composition by product group

	All merchandise, total			Primary + Processed			Parts & components			Final goods		
	2001	2011	2018	2001	2011	2018	2001	2011	2018	2001	2011	2018
World merchandise trade, total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
A) Intra-East Asian trade	15%	20%	20%	16%	20%	19%	20%	30%	29%	13%	16%	15%
B) East Asian exports to outside	15%	15%	17%	7%	8%	9%	17%	18%	19%	22%	25%	26%
C) East Asian imports from outside	11%	15%	15%	14%	21%	22%	11%	10%	10%	8%	9%	10%
D) Trade outside East Asia	58%	50%	48%	63%	52%	50%	52%	42%	41%	57%	50%	49%

Notes: 'East Asia' is defined as 16 economies, comprising Japan, Korea, Taiwan, (mainland) China, Hong Kong, Singapore, Malaysia, Thailand, the Philippines, Indonesia, Viet Nam, Cambodia, Brunei Darussalam, India, Australia, and New Zealand. See the main text for our way of decomposing trade into product categories by production stage. The figures do not completely cover the imports from Brunei Darussalam in 2005 and 2007–2011, those from Cambodia in 2017 and 2018, or those from Viet Nam in 2018. We deflated the trade values using the US import price index to obtain the constant dollar series.

Source: Author's calculations using the trade data (RIETI–TID 2018) and the US import price index (US Bureau of Labor Statistics).

The world total merchandise trade value doubled over the period 2001–2018 (see panel (a) of Table 2). Looking at the overall trend of world trade (see the top line chart of Figure 1), we can observe a V-shaped recovery from the great trade collapse in 2008–2009, followed by stagnated trade growth from 2012 to 2016. Both the great trade collapse and the recent trade slowdown appear to be largely driven by ups and downs in trade in primary goods and processed materials. In contrast, world trade in manufactured parts and components, capital goods, and consumption goods all grew steadily, though at a slower pace in recent years compared to the previous period before the great trade collapse.

Looking into decomposed trade flows (see the bottom part of Figure 1), there are distinct patterns showing that East Asian countries tend to trade manufactured parts and components with each other, import primary goods and processed materials from countries outside the region, and export capital goods and consumption goods to markets outside the region. Such patterns appear to be even reinforced over the period 2001–2018, as reflected in the relatively high rates of annual average growth compared to other product categories in each trade flow (reported in panel (b) of Table 2). From another aspect, the proportion of manufactured parts and components in intra-East Asian trade remained at 25%–27%, exceeding the levels of other trade flows of 11%–22% (see panel (c) of Table 2). Meanwhile, the proportion of primary goods and processed materials in East Asian imports from outside the region increased from 47% in 2001 to 62% in 2018, and that of final goods in East Asian exports to outside the region remained at an outstandingly high level of 57%–61%.

Furthermore, the dominance of East Asia in world trade is most noticeable in manufactured parts and components (see panel (d) of Table 2). As of 2018, East Asian countries engaged in 59% of the world trade in manufactured parts and components, half of which was accounted for by intra-East Asian trade. East Asian countries have substantially increased trade in manufactured parts and components intensively with their neighbouring countries: the proportion of intra-East Asian trade in world total trade in manufactured parts and components increased from 20% in 2001 to 29% in 2018. Meanwhile, East Asian countries have become integrated more with the rest of the world through importing primary goods and processed materials and exporting final goods: the proportion of East Asian imports from outside the region in the world total trade in primary goods and processed materials increased from 14% in 2001 to 22% in 2018. The percentage of East Asian exports outside the region in the final goods trade increased from 22% in 2001 to 26% in 2018. These changes in the relative importance of East Asia in world trade suggest that the above-mentioned patterns of East Asian intra-regional and interregional trade have become more clearly distinct since 2001.

Intra-East Asian trade in manufactured parts and components sharply declined from 2017 to 2018. Viet Nam's import statistics are not available in 2018, which accounts for a part of the decline. More importantly, however, a majority of the decline is accounted for by the decreased exports of Taiwan to China and Hong Kong in the electrical machinery sector (i.e. the BEC industry code of 9 in the RIETI–TID). This would be in part attributable to China–US trade conflicts over IT products.[10]

4.2. The GVC journey diagram

The data overview of trade by production stage in the previous subsection indicates distinct East Asian intra-regional and interregional trade patterns: East Asian countries trade manufactured parts and components intensively with each other whilst exporting capital goods and consumption goods to countries outside the region. Note that more than 94% of world trade in manufactured parts and components occurred in machinery industries. Given these observed trade patterns, we next look into how the respective East Asian countries have been integrated into international production networks over time by using the GVC journey diagram that was originally proposed by Baldwin and Okubo (2019).

[10] The decline in intra-East Asian trade in manufactured parts and components could be also partly because China has strengthened its domestic industrial base of parts suppliers and has reduced its reliance on imported parts and components from its neighbouring countries in the region. For example, Kee and Tang (2016) find that the substitution of domestic for imported intermediates by individual processing exporters has increased China's domestic content in exports over the last decade. Such a downward trend in China's reliance on imported intermediates (relative to exports) can also be detected in our GVC journey diagram depicted for the transport equipment sector in Figure 2.

The GVC journey diagram aims at capturing the evolution of trade in manufactured parts and components, on one hand, and of final goods, on the other, using indices that reflect the comparative advantage by product category at the country-industry level. As for the indices, Baldwin and Okubo (2019) construct a rough empirical measure of comparative advantage based on net exports (relative to the sum of exports and imports) that the authors call the 'Empirical Comparative Advantage (ECA)' index as defined below:

$$ECA_{cik} = \frac{X_{cik} - M_{cik}}{X_{cik} + M_{cik},} \qquad (1)$$

which is defined for a particular country *c* in industry *i* and for product category *k*. The ECA index is related to the well-known Revealed Comparative Advantage (Balassa, 1965) but uses only data on a single country's exports and imports. It is also akin to country *c*'s Grubel-Lloyd index of intra-industry trade (Grubel and Lloyd, 1975) but without the absolute value. Taking the ECA for final goods on the vertical axis and the ECA for manufactured parts and components on the horizontal axis, we can track the shifting pattern of the location of manufacturing in the GVC journey diagram.

We can draw the GVC journey diagram by country and industry using the trade data by production stage as in the previous subsection. Due to a space constraint, however, we narrow our attention to examining the two machinery sectors of 'computer, electronic, and optical products, and electrical machinery' and 'transport equipment', which are at the centre of evolving production fragmentation and offshoring. Trade in the two machinery sectors is decomposed into manufactured parts and components and final goods, the latter of which include capital goods and consumption goods.

Figure 2 depicts the GVC journey diagrams for selected East Asian economies to trace their industrialisation or de-industrialisation pathways in the electronics and electrical machinery sector (in medium grey) and the transport equipment sector (light grey). We presume that advanced economies initially had a dominant comparative advantage in producing both final goods and manufactured parts and components, as long as their technological superiority more than offsets the wage gap relative to less developed economies. Being consistent with this

presumption, the initial point of Japan as of 2001 was in the upper-right quadrant, which indicates that the calculated ECA was positive for both final goods and parts. Japan's ECA coordinates moved downward over the period 2001–2018 in the electronics and electrical machinery sector, unlike in the transport equipment sector. Such a transformation of the ECA coordinates in a downward direction suggests the shifting of assembly sites to less developed economies with lower wages. Japan appears to have accelerated the offshoring of the assembly of computer, electronic, and optical products and electrical equipment.

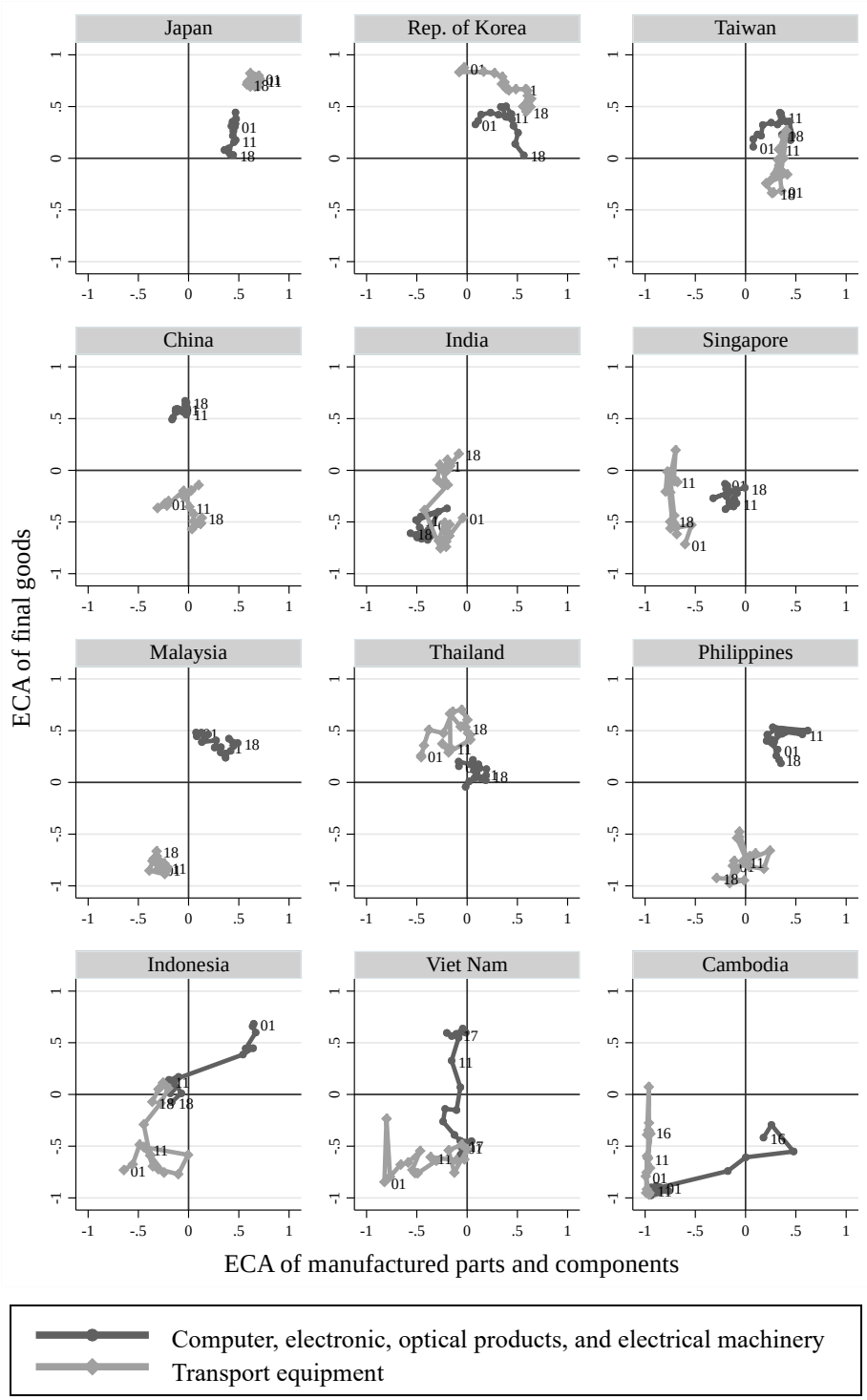
Korea's ECA coordinates were also initially in the upper-right quadrant, though close to the vertical centreline, but moved right and down over the period 2001–2018, both in the electronics and electrical machinery sector and in the transport equipment sector. The transformation of the ECA coordinates in the rightward direction suggests the further nationalisation of parts production. Korea appears to have accelerated the offshoring of assembly in both sectors whilst strengthening its domestic industrial base of parts suppliers. Similarly, Taiwan appears to have experienced advances in domestic supply chains in the electronics and electrical machinery sector.

As for the less developed economies, the ECA coordinates (of manufacturing sectors) are expected to be in the lower-left quadrant if there was no production fragmentation or offshoring from advanced economies. Fragmentation and offshoring, especially those through FDI operations, are accompanied by transfers from advanced to less developed economies of managerial, marketing, technical, organisational, and logistic know-how, which become sources of comparative advantage. With this in mind, Baldwin and Okubo (2019) argue that the boundaries of comparative advantage are no longer purely national and that we should distinguish the 'territorial' comparative advantage of production facilities located inside the country from the conventional notion reflecting the comparative advantage of a country's firms. In the case of less developed economies, we should be aware that a transformation of the ECA coordinates may reflect not only the exploitation of its 'conventional' national comparative advantage but also a change in its 'territorial' comparative advantage induced by fragmentation and offshoring.

Comparing the GVC journey diagrams amongst the AMS countries, there are a couple of noticeable features. First, in the electronics and electrical machinery sector, the ECA coordinates of the Philippines, Malaysia, and Thailand were already in the upper-right quadrant as of 2001. These newly industrialised economies appear to have attracted assembly bases of electronics and electrical equipment that shifted out of advanced economies and have benefited from the technological transfers from advanced economies in improving the productive capacities of their parts as well.[11] That is, they appear to have been well integrated with electronics and electrical machinery GVCs. Malaysia's ECA coordinates moved further rightward over the period 2001–2018, suggesting that strengthened its domestic industrial base of parts suppliers. In contrast, the Philippines' ECA coordinates moved leftward from 2011 to 2018, which can be interpreted as a sign of the increased use of parts imported from neighbouring and other developing East Asian countries.

[11] In China's context, Kee and Tang (2016) also discuss that the enhanced availability of parts and components domestically is in part linked to growing fragmentation and offshoring through FDI operations in the industries.

Figure 2: Global Value Chain Journey Diagram of Selected Economies, 2001–2018: Electronics and Electrical Machinery and Transport Equipment



Notes: 'ECA' stands for Empirical Comparative Advantage, which is proposed by Baldwin and Okubo (2019). See the main text for how we identified trade in final goods and in manufactured parts and components and calculated the ECA metrics.
Source: Author's calculation using the trade data (RIETI–TID 2018).

In addition, Thailand's ECA coordinates in the transport equipment sector were initially located in the upper-left quadrant as of 2001 and moved rightward, reaching the right-upper quadrant in 2018. Thailand, unlike the Philippines or Malaysia, appears to have attracted assembly bases of transport equipment and have been improving the productive capacities of parts.

Second, the ECA coordinates of Viet Nam and Cambodia have transformed drastically in the upward and rightward directions. These developing economies appear to have been increasing their participation in machinery GVCs. In particular, Viet Nam was initially a net importer but experienced a marked upward transformation of the ECA coordinates in the electronics and electrical machinery sector. Viet Nam appears to have attracted assembly bases and transformed into an export platform of electronics and electrical equipment over the period 2001–2017. Cambodia also appears to have attracted assembly bases of transport equipment, boosting exports. Meanwhile, Cambodia experienced a right-upward transformation of the ECA coordinates in the electronics and electrical machinery sector from 2011 to 2016, and the same change is found for Viet Nam in the transport equipment sector over the period 2001–2017. They appear to have benefited from the technological transfers from advanced economies in improving the productive capacities of parts as well. Still, the ECA coordinates of Viet Nam and Cambodia have not reached the upper-right quadrant yet, unlike the forerunner economies of AMS.

Moreover, India experienced an upward transformation of the ECA coordinates from 2001 to 2011 and appears to have attracted assembly bases in the transport equipment sector. Indonesia experienced a right-upward transformation of the ECA coordinates in the transport equipment sector over the period 2001–2018 but a left-downward transformation in the electronics and electrical machinery sector from 2001 to 2011. The former would suggest that Indonesia has attracted assembly bases and benefited from the technological transfers in improving the productive capacities of parts in the transport equipment sector. In contrast, the latter would suggest a deteriorated (territorial) comparative advantage and can be interpreted as suggesting a sign of losing relative attractiveness as a destination for assembly offshoring.

China's ECA coordinates for the electronics and electrical machinery sector were located in the upper-left quadrant close to the vertical centreline throughout 2001–2018. China appears to have been well integrated with electronics and electrical machinery GVCs as an export platform through importing manufactured parts and components to be assembled into final goods and exporting those final goods to the world markets. Notice that the active back-and-forth transactions of manufactured parts into and out of China may result in the calculated ECA being close to zero since the ECA index is calculated based on net exports. Meanwhile, China experienced a right-downward transformation of the ECA coordinates, moving from the lower-left quadrant to the lower-right quadrant in the transport equipment sector over the period 2001–2018. Whilst China appears to have been strengthening its domestic industrial base of parts suppliers, its growing demand for imported (as well as domestic) transport equipment may have reduced the ECA in final goods.

4.3. FDI inflows as a channel to enhance comparative advantage

We have interpreted the industrialisation or de-industrialisation pathways traced by GVC diagrams from the viewpoint of how the locations of assembly and manufacturing parts and components have been changing through production fragmentation and offshoring, or participation in GVCs. FDI has been playing a key role in fragmentation and offshoring and ultimately in the formation and development of international production networks or GVCs. To confirm that fragmentation and offshoring through FDI enhance the (territorial) comparative advantage in the FDI recipient country, we next look at the industrial composition of inward FDI in AMS and relate the observed FDI patterns to our findings from the GVC diagrams in the last subsection.

Examining the transformation of the comparative advantage in relation to FDI itself is not new. In the traditional literature on the 'flying geese' development theory, FDI was considered as a channel for advanced economies to recycle their comparative advantage to less developed economies. Dowling and Cheang (2000), for example, examined whether comparative advantage had moved from advanced economies to less developed economies in East Asia and found that the enhanced comparative advantage occurred in the industry that accounted for the largest

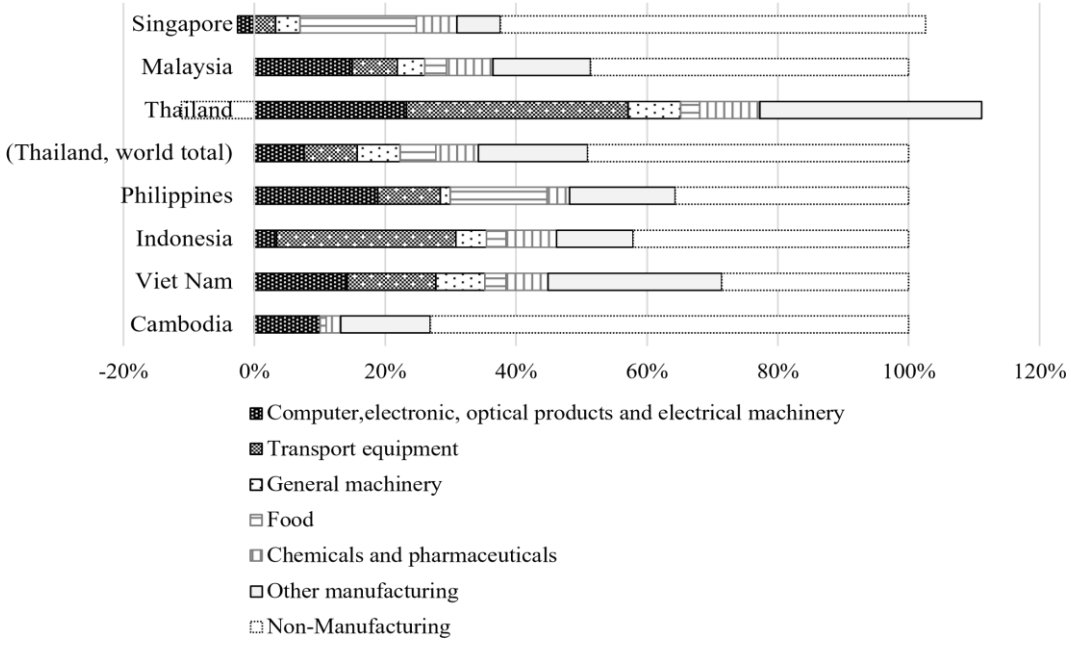
proportion of FDI inflows from Japan. Unlike Dowling and Cheang (2000), however, we here highlight the role of FDI in evolving fragmentation and offshoring to examine its effects on comparative advantage in the FDI recipient country.

The stacked bar charts in Figure 3 show the sectoral composition of FDI inflows from Japan to respective AMS countries. The sectoral shares are calculated in percentages as an average over the period 2005–2018. Our particular interest continues to be in the electronics and electrical machinery sector and the transport equipment sector. In addition to the two machinery sectors of interest, we show separate percentage figures for the general machinery, food, and chemicals and pharmaceuticals sectors, which are of the major industries receiving a substantial portion of Japanese FDI. The figures for other industries are aggregated into either 'other manufacturing' or 'non-manufacturing'. As for Thailand, as an exception, we included an additional bar chart showing the sectoral composition of the total FDI inflows from the rest of the world.

For Malaysia and the Philippines, about a third of manufacturing FDI flowed into the electronics and electrical machinery sector. These countries were outstanding in their upper-right position in the GVC diagram of the electronics and electrical machinery sector. The relative importance of FDI in the electronics and electrical machinery sector can be interpreted as supporting the view that these countries have benefited from FDI inflows in relation to production fragmentation and offshoring in enabling themselves to enhance their comparative advantage in electronic and electrical final goods and their parts. For Cambodia, more than a third of manufacturing FDI flowed into the electronics and electrical machinery sector. Although Cambodia has not reached the upper-right quadrant of the GVC diagram yet, it experienced a marked right-upward transformation of the ECA coordinates in the electronics and electrical machinery sector. Cambodia also appears to have benefited from FDI inflows in relation to fragmentation and offshoring in enhancing comparative advantage in both electronic and electrical final goods and their parts.

For Thailand, about a quarter of manufacturing FDI flowed into the transport equipment sector. Thailand experienced a striking rightward shift of the ECA coordinates in the transport equipment sector and has reached the upper-right quadrant of the GVC diagram. The relative importance of FDI in the transport equipment sector would support the view that Thailand has benefited from FDI inflows in relation to fragmentation and offshoring in enabling enhanced comparative advantage not only in transport equipment but also in its parts. For Indonesia, half of manufacturing FDI flowed into the transport equipment sector. Indonesia experienced another marked right-upward transformation of the ECA coordinates in the transport equipment sector. Indonesia appears to have benefited from FDI inflows in relation to fragmentation and offshoring in enhancing comparative advantage in both transport equipment and its parts.

Figure 3: Foreign Direct Investment Inflows into ASEAN Member States, the Average Composition of Sectors Over 2005–2018



Notes: Due to the data scarcity of by-sector foreign direct investment (FDI) inflows in most countries, we made use of the data on Japan's outward FDI decomposed by country and sector. An exception is Thailand, whose data on FDI inflows is available at the sectoral level.
Source: Author's calculation using Japan's outward FDI flow data and Thailand's inward FDI flow data (ITI, 2020).

4.4. Backward linkages with East Asia and the rest of the world

We next turn to look at the extent of the participation of AMS countries in GVCs in terms of the importance of foreign value added in gross exports. By making use of the ICIO tables, we can decompose the value of a country's exports in an industry into domestic and foreign value added content by source country as well as by source industry. Such a decomposition enables us to reveal how the value of a country's exports in an industry is an accumulation of the value generated by multiple industries domestically and in many other foreign countries. Here, we focus on examining the value-added flows from AMS (other than the country of concern), East Asia except for AMS, and other parts of the world. Calculating the proportions in exports of value added coming from AMS, other East Asia, and the rest of the world, we estimate a country's dependence on the cross-border sourcing of intermediate goods and services through regional and global value chains.

The stacked bar charts in Figure 4 show the origin of the value-added content of exports in the electronics and electrical machinery sector (in the top part of the figure) and the transport equipment sector (bottom) by respective AMS countries. The horizontal axis is scaled as a percentage of the country's total gross exports in the sector of concern. The figures for 2005 can be compared with those for 2015. The value-added content coming from AMS and other East Asia, respectively, is split into that of the manufacturing sectors (in darker grey) and services and other sectors (lighter grey). The height of each bar indicates the proportion of overall foreign value added in the country's total gross exports, which is widely used as a measure of 'backward participation in GVCs' in the relevant literature. The rest of the value of gross exports comes from domestic value added.

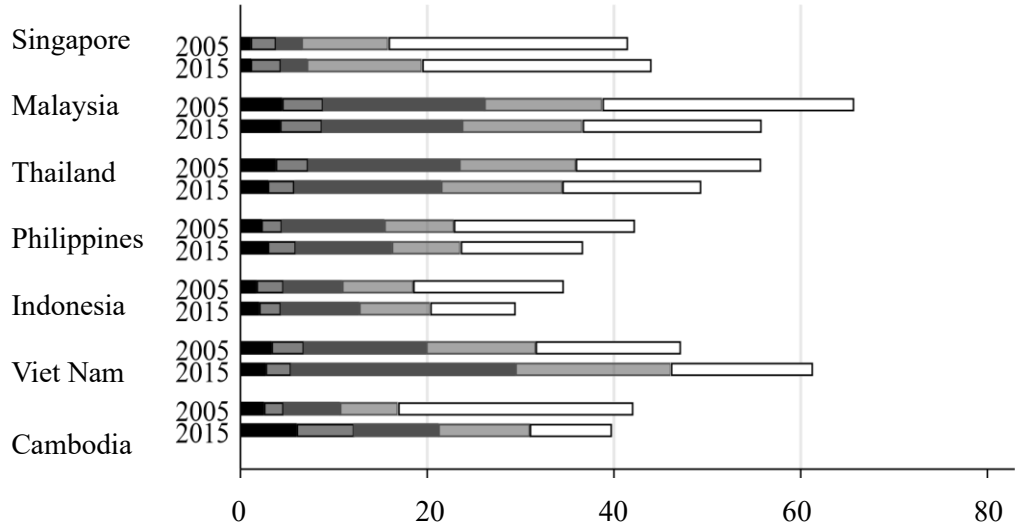
The proportion of foreign value added in gross exports tends to be higher in the electronics and electrical machinery sector than in the transport equipment sector. Still, similar patterns are observed in both sectors. In 2005, the proportion of foreign value added in exports was the highest for Malaysia, followed by Thailand and Viet Nam. As of 2015, however, Viet Nam had an increased foreign value-added share, exceeding the levels of Malaysia and Thailand. These three countries appear to be highly dependent on backward linkages with foreign

intermediate goods and services suppliers through GVCs, to the greatest degree amongst AMS.

More noteworthy is that Viet Nam largely increased its dependence on foreign value added coming from East Asia over the decade whilst having a proportion of value added from the rest of the world that was almost unchanged. In particular, Viet Nam strikingly increased, more than proportionally, the value added generated through manufacturing activities in East Asia other than AMS, centring on China. Meanwhile, the decrease in the foreign value added share of Malaysia and Thailand's exports, respectively, can be accounted for by the reduced dependence on value added from the other regions than East Asia. In the transport equipment sector, Malaysia and Thailand even increased, although slightly, the proportion of value added from AMS and other East Asia. These observed changes would suggest that Viet Nam, Malaysia, and Thailand have become more intensively integrated with regional value chains through backward participation than with other parts of the world. A similar tendency of more intensive integration with regional value chains is observed for all other AMS countries in both sectors, except for Cambodia's exports in the transport equipment sector. The most noticeable increase in the proportion of value added from East Asia is found for Cambodia's exports in the electronics and electrical machinery sector.

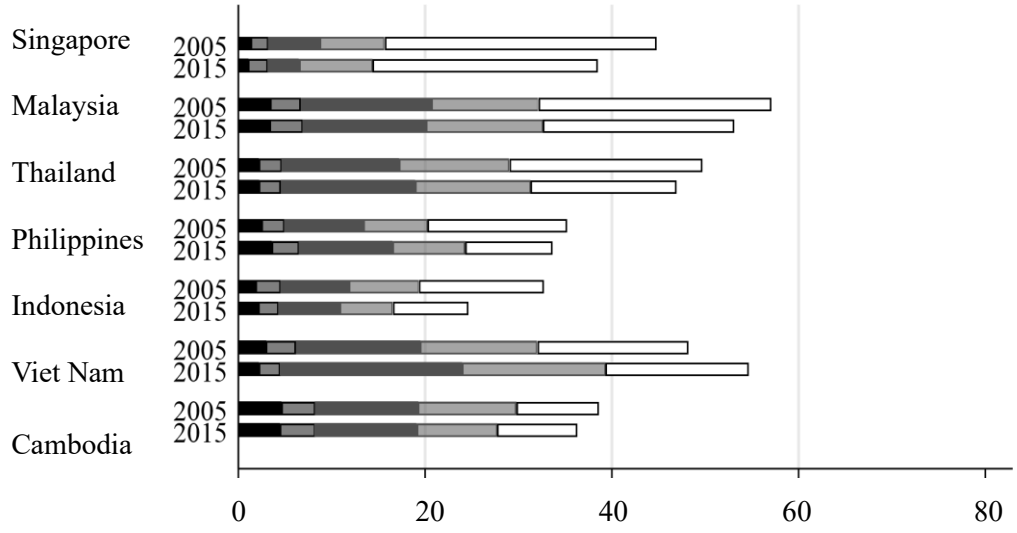
Figure 4: Foreign Value Added Embodied in Gross Exports by ASEAN Member States in 2005 and 2015

Electronics and electrical machinery

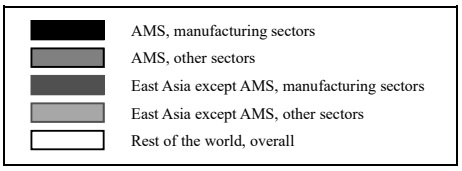


Origin of value added, as a proportion (%) in total gross exports

Transport equipment



Origin of value added, as a proportion (%) in total gross exports



AMS = ASEAN Member States.
Notes: 'East Asia' is defined as 16 economies, comprising Japan, Republic of Korea, Taiwan, (mainland) China, Hong Kong, Singapore, Malaysia, Thailand, the Philippines, Indonesia, Viet Nam, Cambodia, Brunei Darussalam, India, Australia, and New Zealand. The height of a bar indicates the proportion of foreign value added in the country's total gross exports in the sector of concern. The foreign value-added content of exports is split by source region (AMS other than the country of concern, East Asia except AMS, and the rest of the world) and by source industry (manufacturing and other sectors). The rest of the gross exports comes from domestic value added.
Source: Author's calculations using the 2018 release of the OECD ICIO tables.

4.5. Centrality in GVCs

We further look at the position of AMS and other East Asian countries in GVCs, employing the GVC centrality metrics to identify key hubs and peripheral countries by industry. Although a country cannot be a key hub without participating in GVCs, the centrality metrics not only simply reflect the degree of participation but also the interconnectedness with influential markets in the complex networks of value chains. We calculated the backward and forward centrality indices based on the Bonacich-Katz eigenvector centrality metric, following Criscuolo and Timmis (2018), using the ICIO tables.

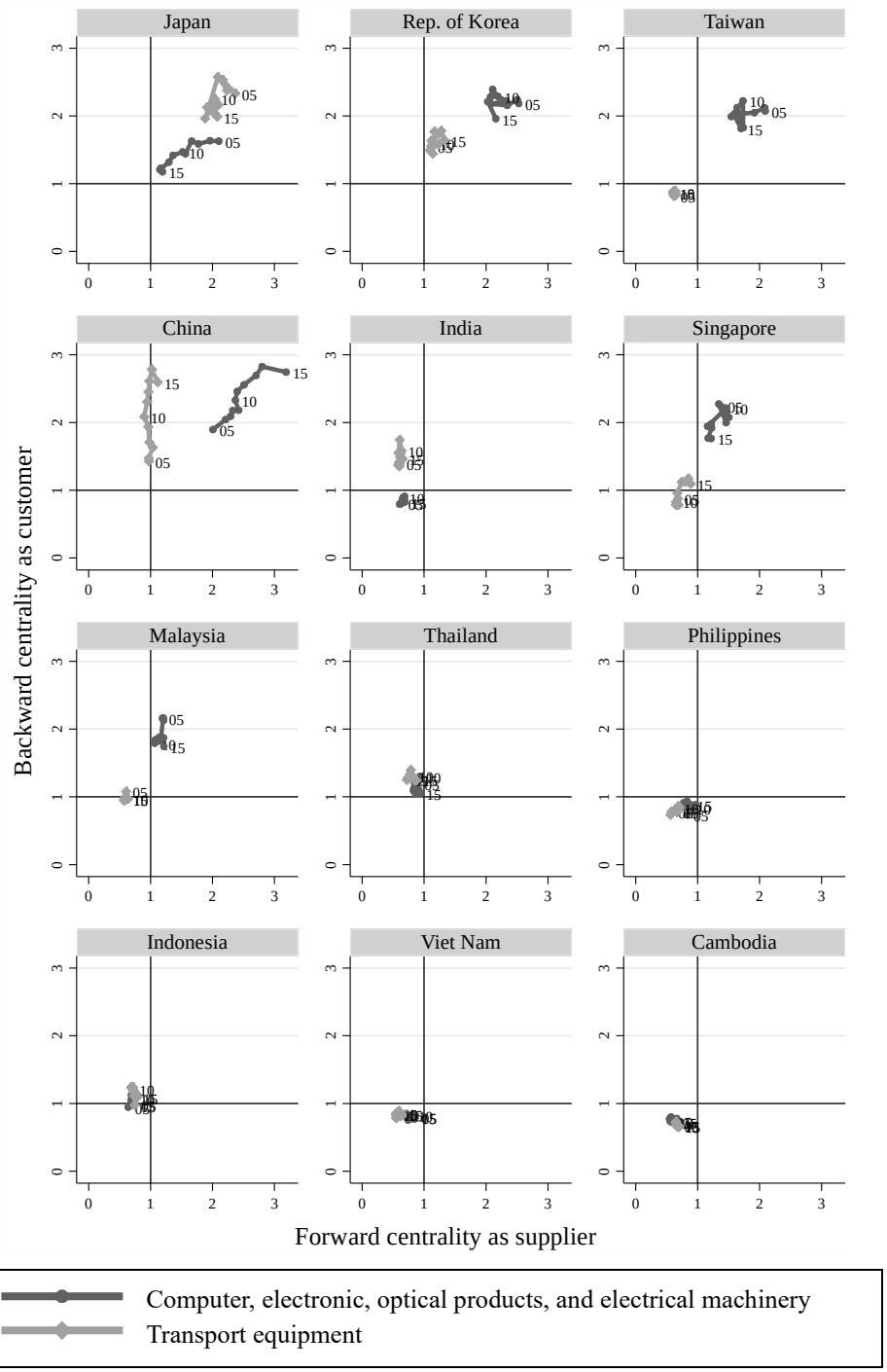
The backward and forward centrality indexes measure the degree to which a country is a key customer and a key supplier, respectively, in GVCs. For example, a country specialising in assembly activities whilst importing foreign intermediate inputs, as well as sourcing domestically, to be assembled into final goods tends to be a key customer with a higher calculated value of the backward centrality index. A country specialising in producing primary goods, processed raw materials, and manufactured parts and components tends to be a key supplier with a higher value of forward centrality. The centrality index is a relative measure calculated with respect to other countries in the network of value chains in the industry of concern. A rise in centrality, for example, may be induced because the country has become more influential in an absolute sense or because the trading partner countries connected through the network have become less influential.

Figure 5 plots the backward centrality on the vertical axis and the forward centrality on the horizontal axis, both of which are calculated for selected East Asian economies annually from 2005 to 2015 in the GVCs of the electronics and electrical machinery sector (in medium grey) and the transport equipment sector (light grey). Japan was initially outstanding amongst East Asian countries in terms of its high centrality through both backward and forward linkages in the GVCs of both sectors; however, Japan has been losing its backward and forward centrality over the decade. In contrast, China has been evolving into a new centre of GVCs, in terms of both backward and forward linkages, in the electronics and electrical machinery sector, exceeding the level of Japan. China also has significantly improved its backward centrality in the transport equipment GVCs, which suggests

that China has become a more influential customer, sourcing greater amounts of intermediate inputs internationally as well as domestically through the backward linkages of the networks.

Korea and Taiwan, respectively, have retained greater centrality in terms of both backward and forward linkages in the electronics and electrical machinery sector over the decade. In addition, Malaysia has been one of the key customers in electronics and electrical machinery GVCs, which suggests its influential involvement in export platform type activities, although it has slightly lost its relative dominance over the past decade. India and Thailand also appear to be taking relatively influential positions as assembly bases of transport equipment compared to other developing East Asian countries. The Philippines, Viet Nam, and Cambodia were, as of 2015, still left behind as peripheries in terms of both backward and forward centrality in either sector.

Figure 5: Global Value Chain Backward and Forward Centrality of Selected Economies, 2005–2015: Electronics and Electrical Machinery and Transport Equipment



Notes: See the main text for how we calculated the global value chain backward and forward centrality metrics. The centrality index is a relative measure calculated with respect to other countries in the network of value chains in the industry of concern, with an average of 1 displayed as the centreline in each plot diagram.

Source: Author's calculations using the 2018 release of the OECD ICIO tables.

5. Conclusion

In this paper, we conducted a series of data observations and analyses to overview the patterns and trends of trade and FDI as well as the development of GVCs in East Asia, with a special emphasis on AMS and other developing East Asian economies. To do so, we made use of trade data disaggregated by production stage, FDI data disaggregated by sector, and international input–output tables. We highlighted the observed trade pattern that East Asian countries trade manufactured parts and components intensively with each other whilst exporting capital goods and consumption goods to countries outside the region. Behind the observed trade pattern, we considered a complementary relationship between trade and FDI in evolving production fragmentation and offshoring to investigate how and to what extent East Asian countries had become integrated regionally and globally, focusing on the machinery sectors.

Developing East Asian economies have been aggressively utilising the globalisation forces of multinational corporations for their economic development. Accepting multinationals, or attracting inward FDI in relation to fragmentation and offshoring, is not merely the hosting of foreign exporting firms but enables developing East Asian economies to participate in international production networks or GVCs, form industrial agglomerations, and benefit from transfers of human capital, know-how, and technology. Multinationals can also bring spill-overs for local firms through various channels. The policy efforts of individual countries and regional cooperation in further liberalising and facilitating trade and investment across borders can be called for in a way that maximises the global efficiency gains and additional benefits from the dynamism of GVCs.

The more deeply countries are interconnected through internationalised production and trade, the more likely an economic shock originating in one country is to be transmitted to another. Indeed, US–China trade conflicts not only adversely affected the bilateral trade between the US and China themselves, but the increased US–China bilateral tariffs indirectly affected AMS and other countries through input–output production linkages (Abiad et al., 2018). Furthermore, in the face of the COVID-19 outbreak, AMS and other neighbouring countries in East Asia were first hit by disrupted imports from China. Some blamed international production

chains stretched across the region centring on China for working as a transmission mechanism in the spread of shocks. Inward-turning arguments have arisen for the end of internationalised production and trade along with debate that shorter supply chains and the reshoring of production sites back to the domestic economy would reduce vulnerability to economic shocks (Miroudot, 2020).

Nevertheless, some previous studies show the resilience of East Asian production networks. Even if crises and negative shocks hit the economy, trade in parts and components through production chains tends to survive and recover quickly (Ando and Kimura, 2012; Obashi, 2010; Okubo, Kimura, and Teshima, 2014). To create the dynamism of GVCs for all, one way forward would be to seek a path of regionwide development through facilitating inclusive participation, such as the involvement of SMEs, in resilient value chains (Susantono and Park, 2020). In addition, the COVID-19 pandemic seems to have accelerated the adoption of digital technologies, which may have multifaceted influences on the international division of labour and ultimately transform its depth and scope. To become more integrated into the regional and global production networks, developing East Asian economies appear to need to exploit the complementarity between information technologies and indigenous resources whilst utilising communication technologies to enhance service-link connectivity (Obashi and Kimura, 2021).

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