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### The Turning Point of Global Value Chain's Position in Emerging East Asian Economies

Hiroyuki Taguchi  
*Saitama University*

Ken Nibayashi  
*Saitama University*

#### Abstract

This paper aims to examine the dynamic process of participation in global value chains (GVCs) along with development stages in emerging East Asian economies by using the GVC indexes and the UNCTAD-Eora Global Value Chain Database. The main research focus of this study is to investigate a turning point of the GVC position from a downstream-driven participation to an upstream-driven one, which reflects an industrial upgrading from a buyer position for industrial inputs to a supplier position for them. The empirical estimation could verify the U-shaped curve in the combination between the GVC position index and per capita GDP, and identify a turning point of the GVC position in the reasonable range of per capita GDP. The estimation result also showed variability of the turning points in per capita GDP among the sectors: 3,668 US dollars in total industry, 6,088 US dollars in manufacturing sector, and 9,510 US dollars in machinery industry.

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**Contact:** Hiroyuki Taguchi - [htaguchi@mail.saitama-u.ac.jp](mailto:htaguchi@mail.saitama-u.ac.jp), Ken Nibayashi - [ken.nibayashi@gmail.com](mailto:ken.nibayashi@gmail.com)

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# 1. Introduction

Global value chains (GVCs) have been a remarkable trend in the world economic activities over the past decades, and have also been one of the great concerns for policy makers and academic circles. The GVCs are described by UNCTAD (2013), namely, the World Investment Report 2013, in such a way as the fragmentation of production processes, and the international dispersion of tasks and activities among the economies with diversified development stages, which have led to the emergence of borderless production networks. The GVCs are considered to boost an economic growth, as the specialization in production processes enhances efficiency and productivity, and the durable firm-to-firm relationships promote the diffusion of technology along the chains. World Bank (2020), for instance, estimated that a 1 percent increase in GVC participation would boost per capita income by more than 1 percent, or cause a much more than 0.2 percent income gain from standard trade.

From an academic perspective, the causes and economic effects of the GVCs have been intensively investigated by theoretical and empirical studies. The concept of GVCs was initially introduced by Hummels et al. (2001) in terms of the “vertical specialization”. Koopman et al. (2010) and (2014) then generalized formally the concept of vertical specialization to account for all sources of value-added in gross exports in a multi-country multi-sector framework, and thus integrated vertical specialization and value-added trade in the literature. In accordance with their GVC conceptualization, the value-added-trade data have been developed by several international organizations such as OECD, WTO and UNCTAD, and the database has enabled us to analyze the value added contributions of gross exports. In fact, the combination of the GVC conceptualization and its database development has led to a great number of empirical works on GVC (e.g., Li et al. 2019, Gereffi 2018, UNCTAD 2013, World Bank 2016 and 2020).

The GVCs characterized by vertical specialization have been discussed also by the “fragmentation” theory in the context of intra-industry trade, as in Jones and Kierzkowski (1990, 2005) and Deardorff (2001). Kimura (2006) and Kimura et al. (2007), following the fragmentation theory, argued that the mechanics of the East Asian value chains are characterized by the “vertical” division of labor in “intra-industries” among a number of countries with different income levels, and that the mechanics are typically found in such sophisticated manufacturing industries as machinery, which involve many multi-layered vertical production processes. Thus, from the geographical perspective, emerging market economies in East Asia with different factor prices under different development stages could be one of the major players in GVCs in terms of intra-industry trade.

The pattern for engaging in GVCs contains not monotonous but dynamic processes. Taking an example of China's GVC participation process, China started with pure assembling activities in producing and exporting manufacturing items such as Apple iPods and iPhones by importing their parts and components from Japan, Korea, and the United States, and its value added accounted for only a small fraction of their selling prices (e.g., Backer 2011, Xing and Detert 2010, and Linden et al. 2009). In recent times since the mid-2000s, however, China's GVC participation has shown a different pattern from the "downstream" to the "upstream" contribution to GVCs with industrial upgrading (e.g., Zhu 2019, Peng and Zhang 2020). Li et al. (2019) emphasized that the Chinese economy has played an increasingly significant role as a supply hub in its GVC activities.

In general, the dynamic process of GVC participation were described by previous studies in the following ways. Kuroiwa (2016) depicted the GVC involvement as consisting of two phases — participation and upgrading — that require different development strategies, and argued that the second phase is more challenging for many developing countries. UNCTAD (2013) found a set of distinct "GVC development path" in host countries participating GVCs: some emerging market economies have managed to regain the domestic value added share to exports, after its decline at the initial stage of GVC participation, through upgrading productive capacities within GVCs and by expanding them into higher-value chains, as in the Philippines, Malaysia and Thailand. Taguchi (2014) analyzed the dynamic process of domestic value creation in GVCs by eight manufacturing sectors in Asian economies. World Bank (2020) showed regularities in the type of GVC integration (backward and forward GVC participations) depending on the degree of countries' industrial upgrading. The report classified 146 countries into four taxonomy groups by their degree of industrial upgrading: commodities, limited manufacturing, advanced manufacturing and services, and innovative activities. Then, the report described the patterns of GVC participations along with industrial upgrading as follows: the backward GVC participation with an inverted-U shape peaks out at the innovative activities as this stage requires less imported inputs; and the forward GVC participation with a U shape bottoms out at the advanced manufacturing and services as this stage starts to increase inputs to third countries.

This paper examines the dynamic process of GVC participation along with development stages in emerging East Asian economies, by using GVC indexes proposed by Koopman et al. (2010), based on the UNCTAD-Eora Global Value Chain Database (UNCTAD-Eora Database).<sup>1</sup> The study targets seven economies: China, Malaysia,

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<sup>1</sup> See the website: <https://worldmrio.com/unctadgvc/>. (Accessed December 1, 2020) The property of this database will be explained in Section 2.

Thailand, Indonesia, the Philippines, Vietnam, and Cambodia<sup>2</sup>; and four industrial categories: total industry, manufacturing, machinery and non-machinery in manufacturing. The main research focus of this study is to investigate a turning point of the GVC position from a downstream-driven participation to an upstream-driven one, as the turning point reflects an industrial upgrading from a buyer position for industrial inputs to a supplier position for them.

The remainder of the paper is structured as follows. Section 2 illustrates the dynamic process of GVC participation in the individual East Asian economies by using Koopman's GVC indexes; Section 3 conducts an econometric analysis to find out a turning point in the GVC position from a downstream-driven participation to an upstream-driven one; and Section 4 summarizes and concludes.

## 2. GVC Participation in Emerging East Asian Economies

This section observes the dynamic process of GVC participation in the individual East Asian economies by using Koopman's GVC indexes, based on the UNCTAD-Eora Database. Koopman et al. (2010) constructed an index to gauge whether a country is likely to be in the upstream or downstream of the GVC position in any particular sector, and also a separate index to gauge the extent to which a country-sector participates in the GVCs. Their two kinds of indexes are presented as follows.

$$GVC\_Position_{ir} = \ln(1 + IV_{ir} / E_{ir}) - \ln(1 + FV_{ir} / E_{ir}) \quad (1)$$

$$GVC\_Participation_{ir} = IV_{ir} / E_{ir} + FV_{ir} / E_{ir} \quad (2)$$

where the subscripts *i* and *r* denote a country and a sector, respectively; and *IV*, *FV*, and *E* stand for “domestic value-added embodied in intermediate exports used by the direct importer to produce goods for third countries (indirect value added exports)”, “value-added from foreign countries embodied in gross exports (foreign value added used in exports), and “gross exports,” respectively. In Equations (1) and (2), the first item (*IV* / *E*) represents a GVC upstream participation, and the second item (*FV* / *E*) shows a GVC downstream participation. These two indices can be computed for any countries (*i*) and sectors (*r*). Then, Equation (1) denotes the country-sector's GVC position: if the country-sector lies upstream in a GVC, the numerator tends to be large, but if it lies downstream,

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<sup>2</sup> The study excludes Lao PDR and Myanmar, which are resource-rich countries and less linked with global value chains.

then the denominator tends to be large. Equation (2) describes the total extent of GVC participation in a country-sector.

The necessary data for computing the GVC indexes above are provided by the UNCTAD-Eora database in this study.<sup>3</sup> The database offers the GVC data with global coverage (189 countries and a “Rest of World” region) and a time series from 1990 to 2018, and provides the key GVC indicators: foreign value added (FVA), domestic value added (DVA), and indirect value added (DVX) for total industry. The variables of IV and FV in Equation (1) and (2) correspond to DVX and FVA in the UNCTAD-Eora database, respectively.

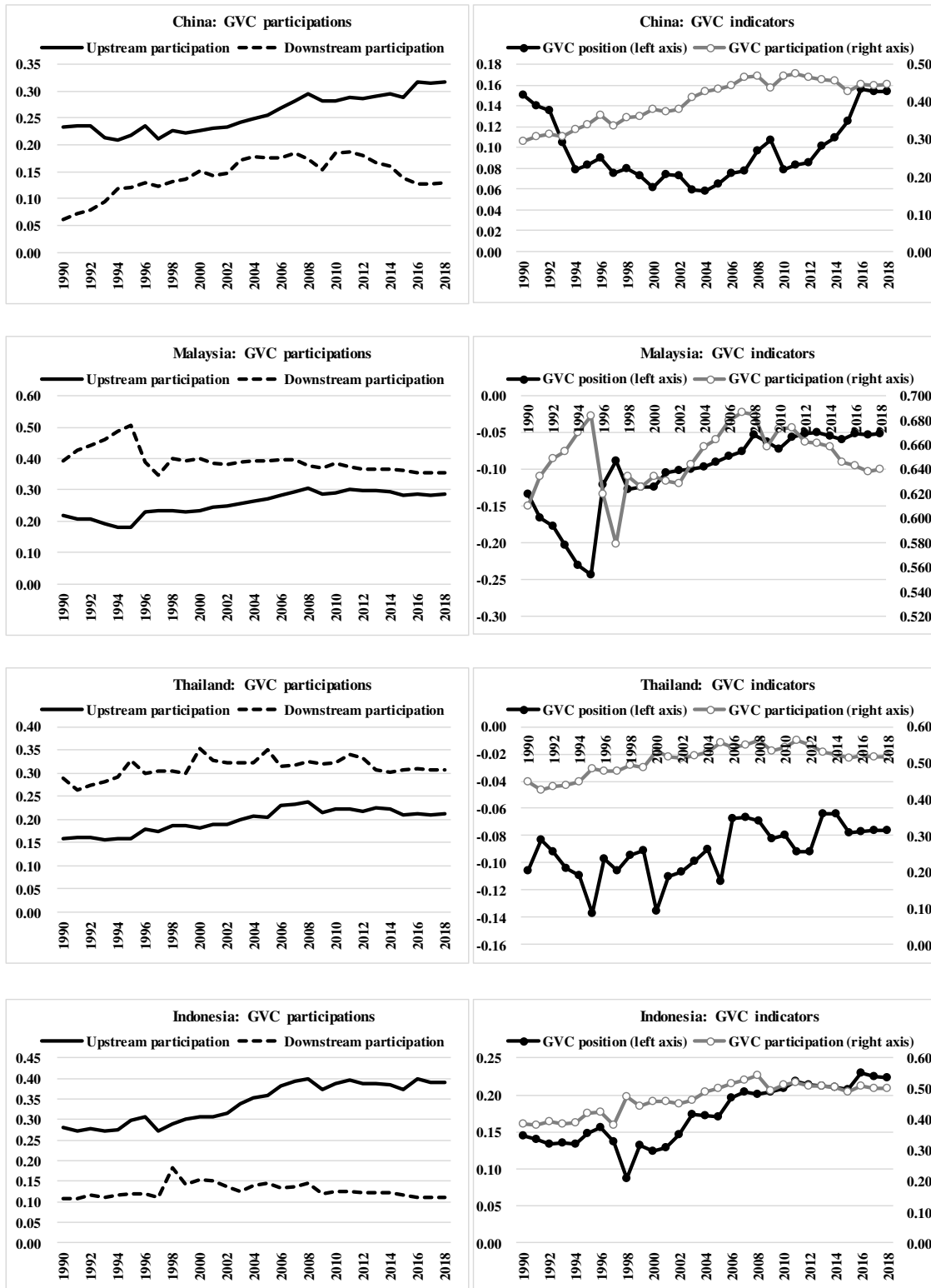
Figure 1 displays the trends for 1990-2018 in GVC position and participation indexes and their components (GVC upstream and downstream participations relative to gross exports) in seven emerging East Asian economies with a focus on total industry. Looking at the components of the indexes first by the left side, it is found that there are the different trends under the different income groups: in the relatively higher income group (China, Malaysia, Thailand, Indonesia and the Philippines), the GVC upstream participation follows an increasing trend while the downstream one shows an inverted-U-shaped curve or flat trend. In the relatively low income group (Vietnam and Cambodia), on the other hand, the GVC upstream participation does not show an increasing trend and the downstream one reveals an increasing or flat trend. This difference is typically reflected in the shapes of the GVC position index, that is, a U-shaped curve commonly in the high income group and a declining trend in the low income group. The GVC participation index, on the other hand, does not have a clear common trend.

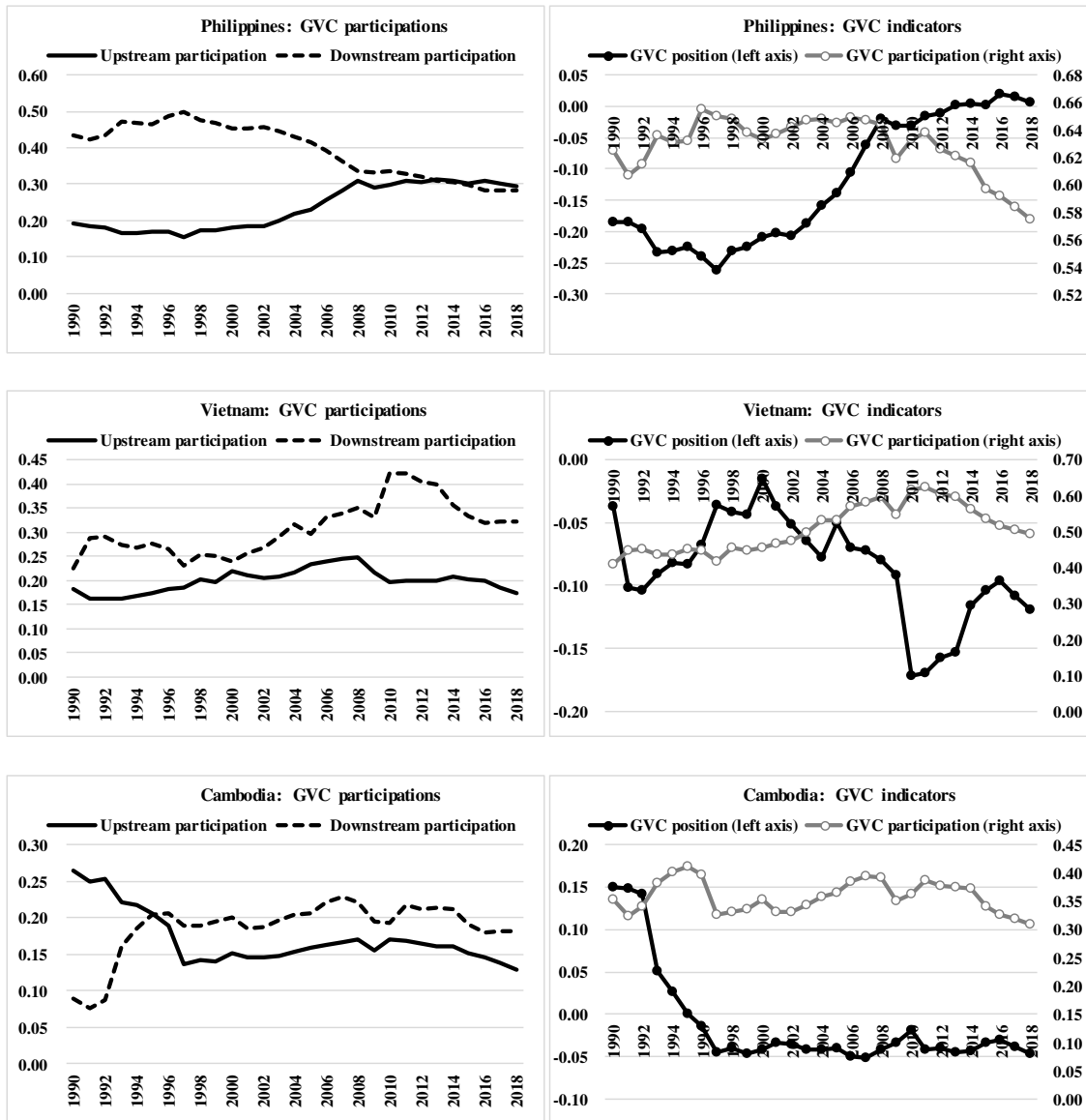
The trend in the GVC position index described above implies that the pattern of the GVC participation has been transformed from a downstream-driven participation to an upstream-driven one at some turning point in the development stages in emerging East Asian economies.

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<sup>3</sup> The methodological background of the UNCTAD-Eora database was described by Casella et al. (2019). The value-added-based trade data originated from the work of the OECD and WTO as the “Trade in Value Added (TiVA)” dataset (see OECD and WTO, 2012). Thus, Casella et al. (2019) also provided a comparison of the results of the UNCTAD-Eora database against the TiVA database.

**Figure 1 GVC Indexes in Emerging East Asian Economies**





Sources: Author's estimation based on the UNCTAD-Eora database

### 3. Econometric Analysis of Turning Point in GVC Position

This section conducts an econometric analysis to find out a turning point in the GVC position from a downstream-driven participation to an upstream-driven one in emerging East Asian economies. This section start with a model specification, followed by the description of data and samples, and estimation outcomes and discussions.

#### 3.1 Model Specification

The turning point in the GVC indexes is examined in the combination between the GVC indexes and the economic development stages in terms of per capita real GDP, for

the categories of total industry, manufacturing, machinery and non-machinery of sample economies. The estimation model is specified as follows:

$$GVC\_Index_{i,r,t} = \alpha_0 + \alpha_1 \ln PCY_{i,t} + \alpha_2 \ln mpo_{i,t} + \alpha_3 f_i + e_{i,t} \quad (3)$$

$$GVC\_Index_{i,r,t} = \beta_0 + \beta_1 \ln PCY_{i,t} + \beta_2 \ln (PCY_{i,t})^2 + \beta_3 \ln mpo_{i,t} + \beta_4 f_i + e_{i,t} \quad (4)$$

where the subscripts  $i$ ,  $r$ , and  $t$  denote countries (seven emerging East Asian countries presented in Introduction), sectors (categorized into total industry, manufacturing, machinery and non-machinery) and years (for 1990-2018), respectively;  $GVC\_Index$  stands for the GVC position index as well as the GVC participation index;  $PCY$  means per capita GDP in a real term;  $mpo$  is a market potential;  $f$  is a time-invariant country-specific fixed effect;  $e$  is a residual error term;  $\alpha_{0...3}$  and  $\beta_{0...4}$  are estimated coefficients, respectively; and  $\ln$  shows a logarithm form.

This study applies a fixed-effect model represented by  $f$  for the panel estimation. It is because there should be exogenously given country-specific factors (e.g., geographical property and institutional system) that are supposed to affect the GVC indexes, and a model specification that ignores these factors would lead to an inefficient estimation. Aside from controlling the time-invariant fixed-effects, this study also handles the “time-variant” country-specific effects. There are plenty of candidates for the variables to capture those effects (e.g., human capital development and productivity improvements) that would indeed affect the GVC indexes. However, these variables might, once inserted in Equation (3) and (4), induce multicollinearity with per capita GDP ( $PCY$ ) or another endogeneity problem with the error terms. Carefully selecting them, this study focuses on the “market potential” as a time-variant country-specific factor, as it can be hardly correlated with the country’s  $PCY$ . The Market potential is computed based on the measuring method proposed by Krugman (1992): a weighted sum of the partner country’s GDP with the weights depending inversely on geographical distance.

The estimation is conducted in a linear form in Equation (3) and in the quadratic form in Equation (4). The turning point of the GVC position index under a U-shaped curve is identified in the estimation of Equation (4), in case that  $\beta_1 < 0$  and  $\beta_2 > 0$  hold significantly, and that the calculated value  $-\beta_1 / (2 \beta_2)$  for the turning point falls within a reasonable range of per capita GDP as an emerging market economy.

### 3.2 Data and Sample for Estimation

The GVC indexes in total industry are computed as in Section 2 using the UNCTAD-Eora database for 1990-2018. The indexes in manufacturing, machinery and non-



machinery sectors are calculated using the country/sector-by-country matrix and the country-by-country/sector matrix for all years from 1990 to 2017 in the UNCTAD-Eora database, by reorganizing the commodity classification of sample countries as shown in Appendix. The data for per capita GDP (PCY) are retrieved from the UNCTAD Stat<sup>4</sup> by the series of “gross domestic product per capita, US dollars as constant prices (2010).” For computing the market potential (*mpo*), the GDP and geographical distance are respectively from the UNCTAD Stat and "dist\_cepil" included in the GeoDist database compiled by CEPII<sup>5</sup>. The study then constructs a set of panel data of seven sample countries for 1990-2018 in total industry and for 1990-2017 in manufacturing, machinery and non-machinery sectors.

### 3.3 Estimation Outcomes and Discussions

Table 1 and Figure 2 report the estimation outcomes on the GVC position and participation indexes. Focusing on the GVC position index first, the quadratic estimation of Equation (4) produces more consistent and appropriate results than the linear estimation of Equation (3). In the estimation of Equation (4),  $\beta_1 < 0$  and  $\beta_2 > 0$  are verified at 99 percent significant level so that the U-shaped curves can be valid in all the sectoral cases, while in the one of Equation (3),  $\alpha_1$  is insignificant (the linear correlation is invalid) in the non-manufacturing case. In addition, the values of adjusted R-squared are higher in the quadratic estimation than in the linear estimation in all the sectoral cases. As for the GVC participation index, neither estimation of Equation (3) nor (4) shows consistent outcomes:  $\alpha_1$  is insignificant in the machinery in the linear estimation, and  $\beta_1$  and  $\beta_2$  are insignificant in the total industry and manufacturing in the quadratic estimation.

The U-shaped curve identified in the GVC position estimation with per capita GDP is consistent with the previous studies' findings that the GVC downstream-driven participation has been transformed into the upstream-driven participation along with industrial upgrading in accordance with economic development (e.g., Li et al. 2019 and World Bank 2020). It should be also worth noting that all the turning points represented by  $-\beta_1 / (2 \beta_2)$  in the GVC position index falls within a reasonable range in terms of per capita GDP, but they show variability among the sectoral cases as shown in Figure 2. The turning point of manufacturing sector (6,088 US dollars) is higher than that of total industry (3,668 US dollars), and among manufacturing sector, the tuning point of machinery (9,510 US dollars) is much higher than that of non-machinery sector (2,264

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<sup>4</sup> See the website: <https://unctadstat.unctad.org/EN/>. (Accessed December 1, 2020)

<sup>5</sup> See the website: [http://www.cepii.fr/cepii/en/bdd\\_modele/presentation.asp?id=6](http://www.cepii.fr/cepii/en/bdd_modele/presentation.asp?id=6). (Accessed December 1, 2020)

US dollars). It suggests that the machinery industry involving sophisticated skills and technologies requires the higher development stage to upgrade its GVC position from the buyer of value added in the downstream position to its supplier in the upstream position. This sectoral outcome in the GVC position is also in line with the finding of Taguchi (2014), which showed that the turning point of the domestic value creation in the GVC participation process fall in the higher per capita GDP in the industries of machinery, electrical and transport equipment than in the other manufacturing industries in Asian developing economies.

Figure 3 displays the positions of per capita GDP in 2018 of individual emerging East Asian economies in comparison with the turning points of the GVC position index of total industry, manufacturing and machinery. Cambodia, Vietnam and the Philippines do not reach the turning point of total industry (3,668 US dollars); the Philippines passes the turning point of total industry; Thailand and China stay beyond the turning point of manufacturing (6,088 US dollars); and Malaysia is further beyond the turning point of machinery (9,510 US dollars).

#### **4. Concluding Remarks**

This paper examined the dynamic process of GVC participation along with development stages in emerging East Asian economies, by using GVC indexes proposed by Koopman et al. (2010), based on the UNCTAD-Eora Database. The main research focus of this study is to investigate a turning point of the GVC position from a downstream-driven participation to an upstream-driven one, which reflects an industrial upgrading from a buyer position for industrial inputs to a supplier position for them.

The empirical estimation could verify the U-shaped curve in the combination between the GVC position index and per capita GDP, and identify a turning point of the GVC position in the reasonable range of per capita GDP. The estimation result also showed variability of the turning points in per capita GDP among the sectors: 3,668 US dollars in total industry, 6,088 US dollars in manufacturing sector, and 9,510 US dollars in machinery industry.

**Table 1 Estimation Results**

[Dependent Variable: GVC Position]

Total industry	Equation (3)	Equation (4)
Const.	0.339 *** (3.957)	2.484 *** (13.145)
ln PCY	-0.068 *** (-5.740)	-0.657 *** (-14.442)
ln (PCY) <sup>2</sup>		0.040 *** (14.431)
ln <i>mpo</i>	0.088 *** (13.505)	0.078 *** (12.691)
Turning Point USD		3,668
Adj R <sup>**2</sup>	0.820	0.864
Sample size	203	203
Manufacturing	Equation (3)	Equation (4)
Const.	0.291 ** (2.304)	1.779 *** (7.317)
ln PCY	-0.078 *** (-4.466)	-0.488 *** (-8.916)
ln (PCY) <sup>2</sup>		0.028 *** (8.968)
ln <i>mpo</i>	0.091 *** (14.403)	0.083 *** (14.674)
Turning Point USD		6,088
Adj R <sup>**2</sup>	0.832	0.852
Sample size	196	196
Machinery	Equation (3)	Equation (4)
Const.	0.551 ** (2.522)	2.348 *** (3.271)
ln PCY	-0.124 *** (-4.140)	-0.620 *** (-3.609)
ln (PCY) <sup>2</sup>		0.033 *** (3.361)
ln <i>mpo</i>	0.125 *** (12.881)	0.116 *** (16.069)
Turning Point USD		9,510
Adj R <sup>**2</sup>	0.826	0.844
Sample size	196	196
Non machinery	Equation (3)	Equation (4)
Const.	0.000 (0.005)	1.361 *** (7.846)
ln PCY	-0.020 (-1.565)	-0.396 *** (-10.027)
ln (PCY) <sup>2</sup>		0.025 *** (10.431)
ln <i>mpo</i>	0.033 *** (5.735)	0.027 *** (4.242)
Turning Point USD		2,285
Adj R <sup>**2</sup>	0.843	0.868
Sample size	196	196

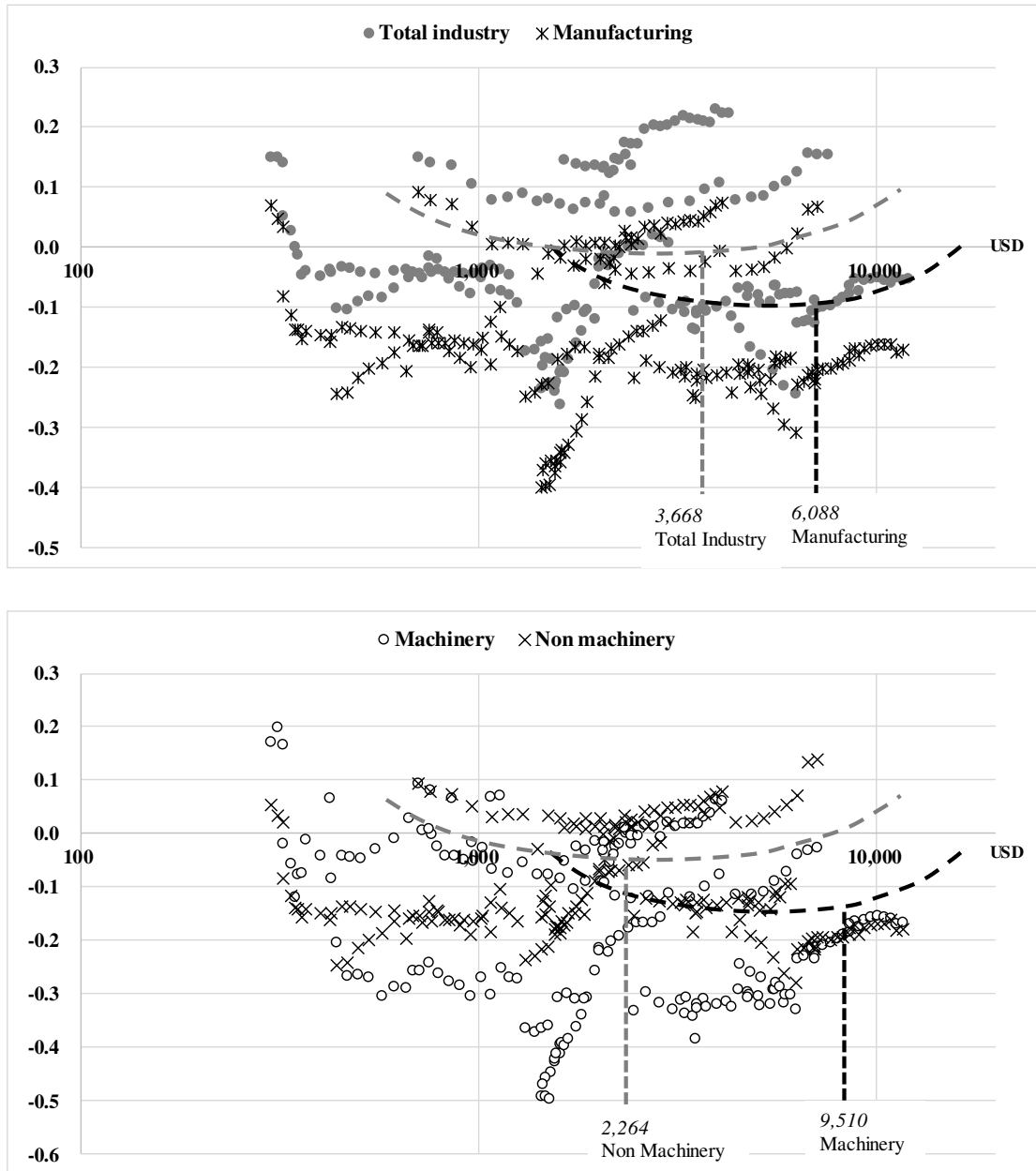
[Dependent Variable: GVC Participation]

Total industry	Equation (3)	Equation (4)
Const.	0.057 (1.101)	0.248 * (1.765)
ln PCY	0.056 *** (8.525)	0.003 (0.101)
ln (PCY) <sup>2</sup>		0.003 (1.620)
ln <i>mpo</i>	0.008 (0.290)	0.007 (0.937)
Turning Point USD		
Adj R <sup>**2</sup>	0.894	0.894
Sample size	203	203
Manufacturing	Equation (3)	Equation (4)
Const.	0.039 (0.656)	0.092 (0.511)
ln PCY	0.062 *** (6.915)	0.047 (1.042)
ln (PCY) <sup>2</sup>		0.000 (0.325)
ln <i>mpo</i>	-0.022 *** (-2.985)	-0.023 *** (-2.911)
Turning Point USD		
Adj R <sup>**2</sup>	0.926	0.926
Sample size	196	196
Machinery	Equation (3)	Equation (4)
Const.	0.574 *** (8.149)	-0.247 (-0.571)
ln PCY	0.012 (1.287)	0.239 ** (2.175)
ln (PCY) <sup>2</sup>		-0.015 ** (-2.189)
ln <i>mpo</i>	-0.027 *** (-2.724)	-0.023 ** (-2.134)
Turning Point USD		
Adj R <sup>**2</sup>	0.747	0.749
Sample size	196	196
Non machinery	Equation (3)	Equation (4)
Const.	0.013 (0.237)	0.466 ** (2.556)
ln PCY	0.049 *** (5.611)	-0.075 (-1.542)
ln (PCY) <sup>2</sup>		0.008 ** (2.536)
ln <i>mpo</i>	0.010 (0.224)	0.008 (0.954)
Turning Point USD		
Adj R <sup>**2</sup>	0.904	0.906
Sample size	196	196

Note: \*\*\*, \*\*, \* denote the rejection of null hypothesis at the 99%, 95% and 90% level of significance in the coefficients.

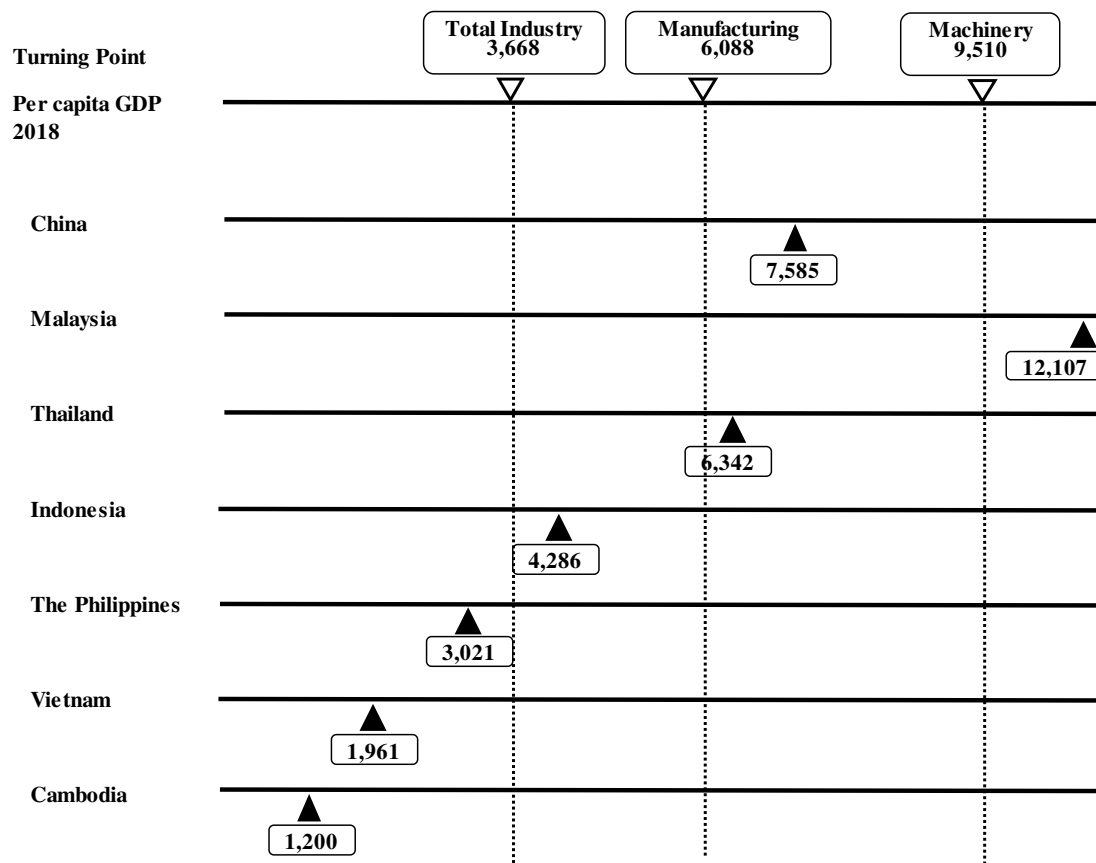
Sources: Author's estimation

**Figure 2 Turning Point in GVC Position**



Sources: Author's estimation

**Figure 3 Turning Point in GVC Position and Per capita GDP**



Sources: Author's estimation

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## Appendix Industrial Classifications

China	Total Industry	Crop cultivation; Forestry; Logging and transport of timber and bamboo; Livestock and livestock products; Fishery; Technical services for agriculture, forestry, livestock and fishing; Coal mining and processing; Crude petroleum products and Natural gas products; Ferrous ore mining; Non-ferrous ore mining; Salt mining; Non-metal minerals and other mining; Scrap and waste; Electricity and steam production and supply; Gas production and supply; Water production and supply; Construction; Railway passenger transport; Railway freight transport; Highway freight and passengers transport; Domestic public transport; Water freight and passengers transport; Air passenger transport; Air freight transport; Pipeline transport; Warehousing; Post; Telecommunication; Computing services and software; Wholesale and retail trade; Hotels; Eating and drinking places; Finance; Insurance; Real estate; Leasehold; Business services; Tourism; Scientific research; General technical services; Geological prospecting; Water conservancy; Environmental resources and public infrastructure; Resident services and other services; Educational services; Health services; Social welfare; Culture and arts, radio, film and television; Sports; Recreational services; Public administration and other sectors; Re-export & Re-import
	Manufacturing: non-machinery	Grain mill products; Feeding stuff production and processing; Vegetable oil and forage; Sugar refining; Slaughtering, meat processing, eggs and dairy products; Prepared fish and seafood; Other food products; Wines, spirits and liquors; Non-alcoholic beverage; Tobacco products; Cotton textiles; Woolen textiles; Hemp textiles; Other textiles not elsewhere classified; Knitted mills; Wearing apparel; Leather, furs, down and related products; Sawmills and fiberboard; Furniture and products of wood, bamboo, cane, palm, straw, etc.; Paper and products; Printing and record medium reproduction; Cultural goods; Toys, sporting and athletic and recreation products; Petroleum refining; Coking raw chemical materials; Chemical fertilizers; Chemical pesticides; Chemicals for painting, dyeing and others; Synthetic chemicals; Chemicals for special usages; Chemical products for daily use; Medical and pharmaceutical products; Chemical fibers; Rubber products; Plastic products; Cement and cement asbestos products; Glass and glass products; Pottery, china and earthenware; Fireproof products; Other non-metallic mineral products; Iron-smelting; Steel-smelting; Steel-processing; Alloy iron smelting; Nonferrous metal smelting; Nonferrous metal processing; Metal products; Arts and crafts products; Other manufacturing products
	Manufacturing: machinery	Boiler, engines and turbine; Metalworking machinery; Other general industrial machinery; Agriculture, forestry, animal husbandry and fishing machinery; Other special industrial equipment; Railroad transport equipment; Motor vehicles; Vehicles fittings production; Ship building; Other transport machinery; Generators; Household electric appliances; Other electric machinery and equipment; Communication equipment; Electronic computer; Other computer devices; Electronic element and device; Electronic appliances; Other electronic and communication equipment; Instruments, meters and other measuring equipment; Cultural and office equipment
Malasia	Total Industry	Agricultural products other; Rubber primary products; Oil Palm primary products; Coconut; Tea; Livestock etc.; Forestry & logging products; Fish etc.; Crude petrol, natural gas & coal; Metal ore; Stone, clay & sand quarrying; Electricity & gas; Water; Buildings & constructions; Wholesale & retail trade; Hotels & restaurants; Transport; Communication; Banking services; Other financial services; Insurance; Real estate; Ownership of dwellings; Business services; Education – Private; Education – Public; Health – Private; Health – Public; Private non-profit services; Entertainment; Radio & TV broadcasting; Recreation; Repair motor vehicles; Other repair; Recycle products; Other private services; Public administration; Public order; Defense; Other public administration; Imputed Bank Charges; Unspecified industry; Domestic Services; Re-export & Re-import
	Manufacturing: non-machinery	Meat & meat products; Dairy products; Preserved fruits & vegetables; Preserved seafood; Oils and fats; Grain mill products; Bakery products; Confectionery; Ice; Other foods; Animal feeds; Wine and spirits; Soft drinks; Tobacco; Yarns & cloth; Knitted fabrics; Other textiles; Wearing apparel; Leather products; Footwear; Sawmill products; Other wood products; Furniture; Paper & board; Printed products; Industrial chemicals; Paints & lacquers; Drugs & medicines; Soap & cleaning preparations; Other chemical products; Petrol & coal products; Processed rubber; Rubber products; Plastic products; China, glass & pottery; Clay products; Cement, lime & plaster; Other non-metal products; Iron & steel; Non-ferrous metal; Other fabricated metal and fixtures; Structural metal products; Other metal products; Other manufacturing products
	Manufacturing: machinery	Industrial machinery; Household machinery; Radio, TV & com. Equipment; Elect. appliances & houseware; Other electrical machinery; Ships & boats; Motor vehicles; Cycles & motorcycles; Other transport equipment; Instruments & clocks



Thailand	Total Industry	<p>Paddy; Maize; Cassava; Beans and Nuts; Vegetables; Fruits; Sugarcane; Rubber; Other Cereals; Other Root Crops; Coconut; Oil Palm; Kenaf and Jute; Crops for Textile and Matting; Tobacco; Coffee and Tea; Other Agricultural Products; Agricultural Services; Cattle and Buffalo; Swine; Other Livestock; Poultry; Poultry Products; Silk Worm; Logging; Charcoal and Firewood; Other Forestry Products; Ocean and Coastal Fishing; Inland Fishing; Coal and Lignite; Petroleum and Natural Gas; Iron Ore; Tin Ore; Tungsten Ore; Other Non-ferrous Metal Ore; Fluorite; Chemical Fertilizer; Minerals; Salt Evaporation; Limestone; Stone Quarrying; Other Mining and Quarrying; Slaughtering; Electricity; Pipe Line; Water Supply System; Residential Building Construction; Non-Residential Building Construction; Public Works for Agriculture &amp; Forestry; Non-Agricultural Public Works; Construction of Electric Plant; Construction of Communication Facilities; Other Constructions; Wholesale Trade; Retail Trade; Restaurant and Drinking Place; Hotel and Lodging Place; Railways; Route &amp; Non Route of Road Passenger Trans.; Road Freight Transport; Land Transport Supporting Services; Ocean Transport; Coastal &amp; Inland Water Transport; Water Transport Services; Air Transports; Other Services; Silo and Warehouse; Post and Telecommunication; Banking Services; Life Insurance Service; Other Insurance Service; Real-estate; Business Service; Public Administration; Sanitary and Similar Services; Education; Research; Hospital Business and Labor Associations; Other Community Services; Motion Picture Production; Movie Theater; Radio, Television and Related Services; Library and Museum; Amusement and Recreation; Repair; Not Elsewhere Classified; Personal Services Unclassified; Re-export &amp; Re-import</p>
	Manufacturing: non-machinery	<p>Canning Preserving of Meat; Dairy Products; Canning of Fruits and Vegetables; Canning Preserving of Fish; Coconut and Palm Oil; Other Vegetable Animal Oils; Rice Milling; Tapioca Milling; Drying and Grinding of Maize; Flour and Other Grain Milling; Sugar; Bakery Products; Noodles and Similar Products; Confectionery; Ice; Monosodium Glutamate; Coffee and Tea Processing; Other Food Products; Animal Feed; Distilling Blending Spirits; Breweries; Soft Drinks; Tobacco Processing; Tobacco Products; Spinning; Weaving; Textile Bleaching and Finishing; Made-up Textile Goods; Knitting; Wearing Apparels Except Footwear; Carpets and Rugs; Cordage Rope and Twine Products; Pulp Paper and Paperboard; Paper Products; Printing and Publishing Basic; Industrial Chemicals; Synthetic Resins and Plastics; Fertilizer and Pesticides; Paints Varnishes and Lacquers; Drugs and Medicines; Soap and Cleaning Preparations; Cosmetics; Matches; Other Chemical Products; Petroleum Refineries; Other Petroleum Products; Rubber Sheets and Block Rubber; Tires and Tubes; Other Rubber Products; Plastic Wares; Cement Concrete and Cement Products; Ceramic and Earthen Wares; Glass and Glass Products; Structural Clay Products; Other Non-metallic Products; Iron and Steel; Secondary Steel Products; Non-ferrous Metal; Cutlery and Hand Tools; Furniture and Fixtures Metal; Structural Metal Products; Other Fabricated Metal Products; Tanneries; Leather Finishing; Leather Products; Footwear Except Rubber; Saws Mills; Wood and Cork Products; Furniture and Fixtures Wood; Scientific Equipment; Photographic &amp; Optical Goods; Watches and Clocks; Jewelry &amp; Related Articles; Recreational and Athletic Equipment; Other Manufacturing Goods</p>
	Manufacturing: machinery	<p>Engines and Turbines; Agricultural Machinery; Wood and Metal Working Machinery; Special Industrial Machinery; Office and Household Machinery; Electrical Industrial Machinery; Radio and Television; Household Electrical Appliances; Insulated Wire and Cable; Electric Accumulator &amp; Battery; Other Electrical Apparatuses &amp; Supplies; Motor Vehicle; Motorcycle, Bicycle &amp; Other Carriages; Repairing of Motor Vehicle; Ship Building; Railway Equipment; Aircraft</p>
Indonesia	Total Industry	<p>Paddy; Other grain; Food crops; Non-food crops; Livestock and poultry; Forestry; Fishery; Crude petroleum and natural gas; Iron ore; Other metallic ore; Non-metallic ore and quarrying; Electricity and gas water supply; Building construction; Other construction; Wholesale and retail trade; Transportation; Telephone and telecommunication; Finance and insurance; Real estate; Education and research; Medical and health service; Restaurants; Hotel; Other services; Unclassified; Public administration; Re-export</p>
	Manufacturing: non-machinery	<p>Milled grain and flour; Fish products; Slaughtering, meat products and dairy products; Other food products; Beverage; Tobacco; Spinning; Weaving and dyeing; Knitting; Wearing apparel; Other made-up textile products; Leather and leather products; Timber; Wooden furniture; Other wooden products; Pulp and paper; Printing and publishing; Synthetic resins and fiber; Basic industrial chemicals; Chemical fertilizers and pesticides; Drugs and medicine; Other chemical products; Refined petroleum and its products; Plastic products; Tires and tubes; Other rubber products; Cement and cement products; Glass and glass products; Other non-metallic mineral products; Iron and steel; Non-ferrous metal; Metal products; Other manufacturing products</p>
	Manufacturing: machinery	<p>Boilers, engines and turbines; General machinery; Metal working machinery; Specialized machinery; Heavy electrical equipment; Television sets, radios, audios and communication equipment; Electronic computing equipment; Semiconductors and integrated circuits; Other electronics and electronic products; Household electrical equipment; Lighting fixtures, batteries, wiring and others; Motor vehicles; Motor cycles; Shipbuilding; Other transport equipment; Precision machines</p>

The Philippines	Total Industry	Paddy; Other grain; Food crops; Non-food crops; Livestock and poultry; Forestry; Fishery; Crude petroleum and natural gas; Iron ore; Other metallic ore; Non-metallic ore and quarrying; Electricity and gas; Water supply; Building construction; Other construction; Wholesale and retail trade; Transportation; Telephone and telecommunication; Finance and insurance; Real estate; Education and research; Medical and health service; Restaurants; Hotel; Other services; Unclassified; Public administration; Re-export
	Manufacturing: non-machinery	Milled grain and flour; Fish products; Slaughtering, meat products and dairy products; Other food products; Beverage; Tobacco; Spinning; Weaving and dyeing; Knitting; Wearing apparel; Other made-up textile products; Leather and leather products; Timber; Wooden furniture; Other wooden products; Pulp and paper; Printing and publishing; Synthetic resins and fiber; Basic industrial chemicals; Chemical fertilizers and pesticides; Drugs and medicine; Other chemical products; Refined petroleum and its products; Plastic products; Tires and tubes; Other rubber products; Cement and cement products; Glass and glass products; Other non-metallic mineral products; Iron and steel; Non-ferrous metal; Metal products; Other manufacturing products
	Manufacturing: machinery	Boilers, engines and turbines; General machinery; Metal working machinery; Specialized machinery; Heavy electrical equipment; Television sets, radios, audios and communication equipment; Electronic computing equipment; Semiconductors and integrated circuits; Other electronics and electronic products; Household electrical equipment; Lighting fixtures, batteries, wiring and others; Motor vehicles; Motor cycles; Shipbuilding; Other transport equipment; Precision machines
Vietnam	Total Industry	Paddy (all kinds); Raw rubber, Coffee beans; Sugarcane; Tea; Other crops; Pig (All kinds); Cow (All kinds); Poultry; Other Livestock; Irrigation service; Other Agricultural services; Forestry; Fishery; Fish – Farming; Coal; Metallic ore; Stone; Sand, Gravel; Other none-metallic minerals; Electricity, gas; Water; Civil construction; Other construction; Trade; Repair of small transport means, motorbikes and personal household appliances; Hotels; Restaurants; Transportation; Railway transport services; Water transport services; Air transport services; Communication services; Tourism; Banking, credit, treasury; Lottery; Insurance; Science and technology; Real estate; Real estate business and consultancy services; State management, defense and compulsory social security; Education and training; Health care, social relief; Culture and sport; Association; Other services; Re-export /Re-import
	Manufacturing: non-machinery	Crude oil, natural gas (except exploration); Processed, preserved meat and by-products); Processed vegetable, and animals oils and fats; Milk, butter and other dairy products; Cakes, jams, candy, coca, chocolate products; Processed and preserved fruits and vegetables; Alcohol, beer and liquors; Beer and liquors; Non-alcohol water and soft drinks; Sugar, refined; Coffee, processed; Tea, processed; Cigarettes and other tobacco products; Processed seafood and by products; Rice, processed; Other food manufactures; Glass and glass products; Ceramic and by products; Bricks, tiles; Cement; Concrete, mortar and other cement products; Other building materials; Paper pulp and paper products and by products; Processed wood and wood products; Basic organic chemicals; Basic inorganic chemicals; Chemical fertilizer; Fertilizer; Pesticides; Veterinary; Health medicine; Processed rubber and by products; Soap, detergents; Perfumes and other toilet preparation; Plastic (including semi-plastic products); Other plastic products; Paint incl. varnish and other painting materials; Other chemical products; Non-ferrous metals and products (except machinery equipment); Ferrous metals and products (except machinery equipment); Weaving of cloths (all kinds); Fibers, thread (all kinds); Ready-made clothes, sheets (all kinds); Carpets; Weaving and embroidery of textile-based goods (except carpets); Products of leather tanneries; Leather goods; Animal feeds; Products of printing activities; Products of publishing house; Other physical goods; Gasoline, lubricants (already refined)
	Manufacturing: machinery	Health instrument and apparatus; Precise and optics equipment, meter (all kinds); Home appliances and its spare parts; Motor vehicles, motor bikes and spare parts; Bicycles and spare parts; General-purpose machinery; Other general-purpose machinery; Other special-purpose machinery; Automobiles; Other transport mean; Electrical machinery; Other electrical machinery and equipment; Machinery used for broadcasting, television and information activities
Cambodia	Total Industry	Agriculture; Fishing; Mining and Quarrying; Recycling; Electricity, Gas and Water; Construction; Maintenance and Repair; Wholesale Trade; Retail Trade; Hotels and Restaurants; Transport; Post and Telecommunications; Financial Intermediation and Business Activities; Public Administration; Education; Health and Other Services; Private Households; Others; Re-export & Re-import
	Manufacturing: non-machinery	Food & Beverages; Textiles and Wearing; Apparel; Wood and Paper; Petroleum; Chemical and Non-Metallic Mineral Products; Metal Products; Other Manufacturing
	Manufacturing: machinery	Electrical and Machinery; Transport Equipment

Sources: UNCTAD-Eora database