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The Role of Product Deepening, Emergence, and Failure in Export Performance: A Comparative Study of Developing Asian Countries

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Abstract

This study explores the contribution of the deepening of existing products (intensive margin), the emergence of new products (extensive margin), and the demise of existing products (failure margin) to the export expansion of developing Asian countries in 1990-2017. Using data based on the Standard International Trade Classification (SITC) revision 3 at the 5-digit level, we find that product deepening plays a crucial role in export success for total merchandise and its subcategories. There is less window opportunity for the emergence of new products when a country already has a high number of exported products. The emergence of new products and product failure margins are important for latecomer exporting countries in the region. GDP per capita, world demand, and FDI inflow have a positive impact on the deepening of existing products. Product emergence is significantly aided by trade barrier reductions.

Keywords: Trade margins, International trade, Export performance
JEL Classifications: F13, F14, O10

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1. Introduction

How can we evaluate the impact of changes in the product mix on the export performance of countries? This question is of significant policy relevance given the contemporary policy emphasis on export performance as a critical determinant of inter-country differences in economic performance. One approach, which has gained popularity in the trade literature for addressing this issue, is the decomposition of export growth into the roles of market penetration of existing exports, and the discovery of new products (Evenett & Venables, 2002; Hummel and Klenow, 2005; Besedes & Prusa, 2011; Kehoe & Ruhl, 2013). Here, the intensive margin refers to the growth of exports of existing products or already exported products, while the extensive margin is the changes in exports due to diversifying new products or new market destinations.

Besedes and Prusa (2011) have broadened this decomposition method to incorporate product failure and the demise of the existing products (the failure margin). This extended decomposition permits us to examine the role of the survival rate of both existing products and new products in export expansion. The identification of the failure margin also helps understand the stage of a country's export maturity.

Understanding the relative importance and the underlining causes of the deepening of existing products, the emergence of new products, and product death are important for designing an appropriate policy for achieving export growth. Suppose that in a given country, export expansion has been driven by the deepening of certain products, while new products have disappeared within a few years. This gives clear signals for the government to reconsider its policy stance relating to export promotion. It suggests that either the existing policy environment is not conducive for the emergence of new products that are competitive in the world market or exporters of existing products are successful in sustaining competitiveness on their own without any policy intervention (Rodrik, 1995; Bjorvatn & Coniglio, 2012; Perkins, 2013, Easterly., Reshef, & Schwenkenberg, 2009).

This paper aims to contribute to this emerging literature through a comparative study of 21 developing Asian countries during the period 1990 - 2017 by using the trade decomposition methodology proposed by Besedes and Prusa (2011). The analysis covers total non-oil merchandise exports disaggregated into four subcategories (primary products, manufactured products, GPN products, and non-GPN products) to examine whether the growth of trade in each commodity group has a different pattern of export margins, using data compiled at the 5-digit level of the Standard International Trade Classification revision 3.

The results suggest that the intensive margin plays a crucial role in export success for total merchandise and its subcategories. It appears that there are fewer opportunities for discovering new products when a country already has a large number of exported products. The extensive margin and failure margins play a significant role in determining export performance in latecomer exporting countries in the region. GDP per capita, world demand, and FDI inflow have a positive impact on the intensive margin. The extensive margin is significantly determined by FDI inflow and access to domestic bank financing.

The rest of the paper is structured as follows. Section 2 provides the literature review and empirical results on trade margins. Section 3 details the method and data used for the decomposition of exports in this study. The results of export decomposition for developing Asian countries are discussed in section 4. Section 5 explains the model specification for trade margins and the estimation results. The last section provides the conclusion and policy implications.

2. Review of Literature

The method of export decomposition has been well discussed in the last decade to decompose a country's export growth into two trade components: changes in export of existing products (the intensive margin: IM) and changes in export of new products (the extensive margin: EM). However, the previous studies measure trade margins at different levels of classification: the product level, the country level, and the country-product level. The details of measuring trade margin levels are specified in the extensive margin as follows (Besedes & Prusa, 2011).

At the product level, the extensive margin is any product that a country has never exported before. However, at the country level, the extensive margin is defined as any product (existing and new) that a country starts exporting to new markets. Lastly, at the product-country level, the extensive margin is defined as changes in exports through which a country exports 'existing products' to a new market or exports 'new products' to already existing market destinations and new market destinations. According to previous empirical studies, Amiti and Freund (2008) select the product level approach, while Felbermayr and Kohler (2006) employ the country level. Finally, the most popular method is at the product-country level, such as Evenett and Venables (2002), Hummels and Klenow (2005), and Amurgo-Pacheco and Pierola (2008).

The literature on trade margin studies found two conclusions (see Table 1). The first is that the intensive margin is the main component of trade growth (Amurgo-Pacheco & Pierola, 2008; Amiti & Freund, 2008; Brenton & Newfarmer, 2009; Besedes & Prusa, 2011; Gao et al., 2014; Kehoe & Ruhl, 2013) for developing countries and developed countries. For example, the intensive margin accounts for 90% of trade growth in NAFTA country pairs (Kehoe & Ruhl, 2013). Conversely, another one finds the opposite conclusion. The extensive margin plays a vital role in trade growth for developed countries as well as developing countries (Evenett & Venables, 2002; Hummels & Klenow, 2005; Dutt, Mihov, & Van Zandt, 2013).

Regarding the above cases, the intensive margin plays a crucial role in boosting trade growth compared to the extensive margin. For example, Brenton and Newfarmer (2009) show that the intensive margin contributed to total export growth for 99 developing countries in the period 1995-2004 by 80.4%. However, the extensive margin accounted for only about 19.6% of the total export growth. Interestingly, the most contribution of extensive margin is from exporting existing products into new markets, not from exporting new products. In other words, new market diversification is more crucial than new product diversification as a tool for rapid export growth in developing countries.

More recent studies have further decomposed the intensive margin by two approaches: (1) the decomposition of the intensive margin into price margin and quantity margin (Hummels & Klenow (2005); Veeramani et al. (2018)), and (2) the decomposition of the intensive margin into deepening margin (the expansion of existing products) and survival margin (number of survival products) (Besedes & Prusa, 2011). These two approaches aim to analyse the differential determinant factors of the intensive margin as follows.

First, most previous studies further decompose the intensive margin into price margin and quantity margin to measure the role of increases in price and quantity on the intensive margin growth. For instance, Veeramani, et al. (2018) compare price margin and quantity margin between China and India in the period 2000-2015. Their finding

reveals that China's expansion along the intensive margin was caused by the quantity margin, but India's by the price margin.

Table 1: Literature Review on Trade Margins

Study	Data	Classification level	Results
Evenett and Venables (2002)	23 developing countries (1970-1997)	The product-country level	EM dominate IM. Within EM, new trading partners accounted for about one-third of total export growth.
Hummels and Klenow (2005)	126 developed and developing countries (1995)	The product-country level	EM dominates IM. The IM is dominated by higher quantity margins rather than higher price margins.
Felbermayr and Kohler (2006)	The U.S. and the trading partners (1950-1997): Trade in manufactures	The country-level	IM dominates EM.
Amiti and Freund (2008)	China (1992 -2005)	The product level	IM dominates EM.
Amurgo-Pacheco and Pierola (2008)	24 developed and developing countries (1990-2005)	The product-country level	IM dominates EM.
Bernard, Jensen, Redding, and Schott (2009)	The U.S. and the trading partners (1993-2003): firm-level data	The product-country level	IM dominates EM.
Brenton and Newfarmer (2009)	99 developed and developing countries (1995-2004)	The product-country level	IM dominates EM. The role of new geographic markets is more important than new products.
Besedes and Prusa (2011)	46 developed and developing countries (1975-2003)	The product-country level	IM dominates EM. Export survival has a positive impact on long-run export performance.
Bingzhan (2011)	China and the trading partners (2001-2007)	The product-country level	IM dominates EM. China's export growth mainly relies on quantity margin.
Dutt, Mihov, and Van Zandt (2013)	150 developed and developing countries (1962-2010)	The product-country level	EM dominates IM. WTO membership has a positive impact on EM.
Kehoe and Ruhl (2013)	NAFTA countries, Chili, South Korea, and China (1995- 2005)	The product-country level	IM dominates EM.
Gao, Whalley, and Ren (2014)	China (1995-2010)	The product-country level	- IM dominates EM. - China's export growth relies on more and more on price margin, but less and less on quantity margin.
Veeramani, Aerath, and Gupta (2018)	China and India (2000-15)	The product-country level	- EM dominates IM - China outperforms India for rapid export growth due to quantity margin.

Source: Author's compilation.

Second, the intensive margin is decomposed into two parts: survival margin and deepening margin (Besedes & Prusa, 2011). This approach aims to explain the role of survival products in the growth of the intensive margin because the survival rate of new exports from developing countries is low. For example, the evidence from the US market shows that the average duration of exporting a product from about 180 countries is about only 2-4 years (Besedes & Prusa, 2006).

In the previous studies, two setting approaches (a comparative static approach and a dynamic approach) were applied to determine the existing products and new products. First, a comparative static approach determines two specified time frames to classify

existing products and new products for each country (Feenstra,1994; Evenett & Venables, 2002; Amurgo-Pacheco & Pierola, 2008; Brenton & Newfarmer, 2009). This approach chooses arbitrary k years old. Any already exported products, which occur before the random k years, are classified as existing products (the intensive margin). However, any exported products after the arbitrary k years refer to new products (the extensive margin).

In contrast, a dynamic approach does not determine a specified k-year to distinguish between existing products and new products. Indeed, this approach considers the status of the survival of exports in any previous year to identify existing products and new products at the current year (Besedes & Prusa, 2011). In the first year, the new product is recognised when it starts exporting for the first time. Then, once it can continue to survive in the second year and go on, it will become the existing product. However, when the new product cannot remain in the second year, it starts export again at some later years. In the latter case, it is classified as a new product too.

3. Methodology and Data

3.1 Methodology

The methodology of decomposing growth in this study follows Besedes and Prusa (2011) which decomposes total export growth into the intensive margin (IM), the extensive margin (EM), and the failure margin (FM). The intensive margin consists of the survival and deepening margins. The latter decomposition (survival margin) helps identify how many export opportunities are lost through product failure. The details of the decomposition procedure are as follows. The value of an export can be written as

$$V_t = n_t v_t$$

where V_t is the value of exports in year t, n_t is the number of survival exports in year t, and v_t is the average value per survival exports. The number of survival exports (n_t) consists of the number of survival products (s_t) and the number of new products (e_t), $n_t = s_t + e_t$. So, the terminology of number of survival products in year t (s_t) refers to existing products that can survive from year t-1 to year t. We can rewrite the growth of exports between t and t+1 as

$$\begin{aligned} V_{t+1} - V_t &= n_{t+t} v_{t+1} - n_t v_t \\ &= (s_{t+1}+e_{t+1})v_{t+1} - (s_t+e_t)v_t \\ &= s_{t+1}v_{t+1} + e_{t+1}v_{t+1} - (s_{t+1}+d_t)v_t \quad ; s_{t+1} = s_t + e_t - d_t. \\ &= s_{t+1}(v_{t+1} - v_t) - d_t v_t + e_{t+1}v_{t+1} \end{aligned} \tag{1}$$

where s_{t+1} is the number of survival products in year t+1, $(v_{t+1} - v_t)$ represents changes in average exports of survival products between both years. d_t denotes the number of products that end in year t, and their total failure value is $d_t v_t$. The last term, $e_{t+1}v_{t+1}$, is the total value of new exports in year t+1 with numbers of new products (e_{t+1}).

In a dynamic setting, we can define the set of survival rate, failure rate, number of failed products (non-survival products), the average exporting value of survival products at the year of service i as follows.

$$s_t \equiv \{s_t^0, s_t^1, s_t^2, \dots, s_t^i, \dots, s_t^I\}$$

$$h_t \equiv \{h_t^0, h_t^1, h_t^2, \dots, h_t^i, \dots, h_t^I\}$$

$$d_t \equiv \{d_t^0, d_t^1, d_t^2, \dots, d_t^i, \dots, d_t^I\}$$
$$v_t \equiv \{v_t^0, v_t^1, v_t^2, \dots, v_t^i, \dots, v_t^I\}$$

where h_t is the failure rate of products that end between year t-1 and year t. By construction, the failure rate is the flip-side of the survival rate, $h_t = 1 - s_t$. Time of service starts from year 0 to year I, in which I denotes the maximum potential year of service. During the first year of service, the failure rate is zero ($h_t^0 = 0$). So, by definition, the survival rate will be 1 ($s_t^0 = 1$), and the number of failed products will be 0 ($d_t^0 = 0$). At the second year of service, the percentage of survival products between the first year of service and the second year of service is s_t^1. Thus, we can write down the number of survival products between year t-1 and t that survive through any year of service i[th]. Finally, we can rewrite equation (1) as follows.

$$V_{t+1} - V_t = \sum_{i=1}^{I} \underbrace{\left[\left(1 - h_{t+1}^i\right) n_t^i\right]\left[v_{t+1}^i - v_t^i\right]}_{\text{intensive}} - \sum_{i=1}^{I} \underbrace{\left[\left(h_{t+1}^i n_t^i\right) v_t^i\right]}_{\text{failure}} + \underbrace{e_{t+1}^0 v_{t+1}^0}_{\text{extensive (new entry)}} \qquad (2)$$

Equation (2) represents the decomposition of export changes between two periods, t and t_{+1}. The first term is the intensive margin (the number of survival products times the export expansion of survival products between year t and year t+1). The second term is the failure margin, representing the total value of the failed products that cannot survive from year t to year t+1. The last term is the extensive margin (new entry) that denotes the total export value of new products at each year t+1. Notice that each summation starts at i = 1 because we evaluate the contribution of products that survived and failed after the first year of service. Also, the superscript i in the last term is 0 because we count 'new products' only as their initial year of service.

As discussed in the last section for export decomposition approaches, we use the product level approach for exploring trade margins in this study for two reasons. First, the product level approach is simpler than the product-country level approach in dealing with databases. The product level analysis has some advantages, especially avoiding uncorrected trade data reports. However, at the product-country trade data level, there are many numbers of exported products reporting zero-valued exports and low-valued exports (less than US$1000 for an annual period) (Besedes & Prusa (2006)).

Second, the product level approach could still show an overall pattern of trade margins: existing products, new products, and failed products. One concern is that the product level approach leads to an underestimated trade margin result compared to the product-country approach. However, it is a difficult task to determine the status of a new market destination because most developing countries experience the pattern of in-out exporting (Besedes, & Prusa (2011). A developing country could export to one market for a short period, then could not export for some period, and could reexport to the same market again. Thus, we may not correctly determine the status of the new market destination.

3.2 Data

The empirical analysis is undertaken using export data at the 5-digit level of the Standard International Trade Classification (SITC) Revision 3. The data is extracted from the UN Comtrade database at the 5-digit level in the period 1990 - 2017. The UN Comtrade data reporting system sifted from SITC Rev. 2 to Rev. 3 in 1987. However, we

use 1990 as the starting year because most countries moved to the new system with a time lag of one to three years. The countries covered in the study are listed in Table 2. These countries are suitable for our main research question because of significant differences in inter-country diversity in export performance during the period under this study.

Table 2: List of Country Coverage[1]

Region	Country
North Asia (3 countries)	China (1992), Hong Kong (1992), and South Korea (1990)
Southeast Asia (8 countries)	Brunei (2000), Cambodia (2000), Indonesia (1990), Malaysia (1990), Philippines (1991), Singapore (1990), Thailand (1990), and Vietnam (2000)
South Asia (5 countries)	Bangladesh (1990), India (1990), Nepal (2000), Pakistan (1990), and Sri Lanka (1990)
Central and West Asia (5 countries)[2]	Armenia (2000), Azerbaijan (2000), Georgia (2000), Kazakhstan (2000), and Kyrgyzstan (2000)

Note: [1] The figure in parentheses denotes the starting year of data in each country.
[2] Some countries in Central and West Asia have had trade data since the late 1990s. However, there is a missing value of trade data in that period. To avoid the poor reliability of data, this study employs the starting year data of 2000 for these countries.
Source: Author's compilation

We use data based on SITC rather than data based on the Harmonized System (HS) because the former provides data on a comparable basis for the entire period under the study.[1] One main problem with using HS Classification is that there were major reclassification changes in the trade data in 1996 and 2002 (Amiti & Freund, 2008). These changes in classification can potentially distort estimates of matter trade margins, especially the extensive margin, because new reclassification would cause some existing products to erroneously become new products. Also, the five-digit disaggregation of SITC is broadly equivalent to the HS at the 6-digit level.

Total non-oil merchandise exports are divided into primary products and manufactured products[2]. Next, we decompose manufactured products into Global Production Network products (GPN) and non-Global Production Network products (non-GPN). Table 3 shows the definition of each commodity group and the number of product lines. This decomposition aims to examine the role of export margins in total merchandise and its subcategories. This decomposition analysis can also suggest which export margins in each commodity group are essential for high export performance.

There are concerns relating to the definition of 'exported product or export relationship' using the available trade data. First, an exported product is identified when a country exports any product to its partners with a positive export value. However, sometimes a zero-value of exports may not necessarily imply the absence of exports because of the minimum cut-off point used by customs statisticians in recording data (Kehoe & Ruhl, 2013). For example, the US requires only export shipments with a value of greater than US$2,500 to be reported. This minimum reporting requirement varies across countries. Second, zero reported value in any product may be simply a misreported product.

[1] The Harmonized System (HS) classification has changed product-lists six times during the period under study (1992, 1996, 2002, 2007, 2012, and 2017).

[2] This paper excludes oil products because of the needs to avoid the impact of their price volatility on export margins.

Table 3: Definition of Commodity Group

No.	Commodity	Definition	Number of product lines
1	Total non-oil merchandise	SITC section 0 – 8 less SITC 3	3,115
2	Primary products	SITC section 0, 1, 2, 4 and 68	786
3	Manufactured products	SITC section 5 + 6 (less SITC 68: nonferrous metals) + 7 + 8	2,329
4	GPN products	See Athukorala (2014, 2019)	767
5	Non-GPN products	Item 3 - 4	1562

Source: Author's compilation.

Because of these concerns, we examine the pattern of the number of exported products using reported zero values as given as well as using two minimum cut-off values of $100 and $1,000 to see the sensitivity of the results. We found that the number of exported products significantly changes in some countries for a few years when we use the fixed cut-offs between the value of $0 and $100. Therefore, this study set the fixed cut-off at $100, defining the status of exporting products.

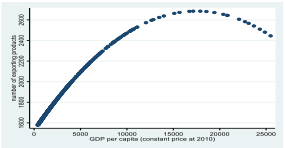
4. Results

4.1 Trends and Patterns of Exported Products in Developing Asian Countries

In order to provide the context for the decomposition of product deepening, emergence, and death (intensive, extensive, and failure margins) of export composition, we first examine the number of products in the export basket (identified at the 5-digit level SITC, Revision 3) and the level of development (measured by GDP per capita) of each country (Figure 1).

A quadratic polynomial regression estimated for the 21 countries by fitting a quadratic polynomial regression between the number of exporting products and GDP per capita exhibits a hump-shaped pattern (Figure 1). It shows that the number of export lines increases as GDP per capita until a turning point of $17,500; the number of export lines will decrease (Figure 1). We exclude some outliers (Hong Kong, Singapore, and Brunei) to avoid the overestimation. Besides, our regression reveals that only South Korea currently experienced a reconcentrate in its number of exporting products. Thus, the level of economic development roughly determines a country's export basket that can diversify in a range of the lower turning point and can reconcentrate after the turning point.

Figure 1: Relationship between Number of Exporting Products and GDP per Capita[1]



Notes: [1] Based on the OLS estimation of $Y_{it} = \alpha_0 + \alpha_1 GDPC_{it} + \alpha_2 GDPC_{it}^2 + \varepsilon_{it}$, with Y_{it} being the number of exported products and GDPC noting as GDP per capita at constant 2010 price. The equation is estimated by applying the fixed effect estimator to a panel dataset for 18 developing Asian countries over the period 1990-2017.

Source: Author's calculations using the UN Comtrade database.

On average, North Asia and Southeast Asia have larger diversified export baskets compared to South Asia and Central and West Asia over the period. For example, in 2007, North Asia had the highest number of exported exports (2,651), followed by Southeast Asia (2,213), South Asia (1,975), and Central and West Asia (1,524). However, North Asia and Southeast Asia conversely experienced a reconcentrated export basket (a lower number of exported products) between 1990 and 2017. In contrast, there was a significant upward increase in the number of exported products in South Asia and Central and West Asia. (Table 4).

There are notable differences in the number of exported products among countries in each subregion, except in North Asia (Table 4). For example, in Southeast Asia, Singapore, Thailand, and Malaysia have diversified export baskets. However, Cambodia and Brunei have a lower number of exported products in this region.

China and India are the top two ranked countries with the highest number of exported products. In 2017, the number of exported products was 2,749 and 2,763 for China and India, respectively. Interestingly, even though China and India exported almost the same number of product lines, their export shares in the world market were extremely different. China's export share accounted for around 17% of total world exports. However, India's export share was only 2%. Thus, a highly diversified export basket does not necessarily guarantee higher export performance.

The numbers of export products in primary products, manufactured products, GPN products, and non-GPN products are reported in Appendix A. The data show that North Asia and Southeast Asia have more diversified export baskets in all subcategories compared to South Asia and Central and West Asia, but their number of exported products was decreasing for all subcategories over the period. The commodity mix of GPN exports has changed over time in the former countries. Countries in North Asia and Southeast Asia, on average, have around 600 to 700 GPN products. However, the number of products does not represent these countries' engagement in global production networks. For example, even though the numbers of GPN products for China and India are almost the same in 2017 (694 products and 692 products, respectively), GPN exports account for 27.1% of the total export value of China compared to only 0.8% of that of India.

Table 5 shows the numbers of survived, failed, and new products based on the methodology developed in Section 3. Note that new products are identified here using 'the first one-year service'. In short, the number of survival exports per year depends on the number of failures and the number of new products each year. Also, the number of failures can indicate the level of survival performance. North Asia has superior survival performance compared to other regions over the period.

Also, all regions experienced a downward trend in the number of new products. Particularly, North Asia could introduce 243 new exporting products per year during the period 1990-99. However, its new export products significantly decreased to only 57 products per year in 2010-17. In contrast, the number of new products was high for latecomer exporting countries in South Asia and Central and West Asia (Table 5).

It is important to note that a country with a highly diversified export basket tends to have fewer new exporting products, such as China, India, and Singapore. Also, there is a positive relationship between the number of product failures and the number of new products for most countries in South Asia and Central and West Asia. For example, Nepal could launch new exports of 288 products per year in 2010-17. However, it experienced high failure rates with 323 failed products per year. This situation implies that new exports for latecomer exporting countries are likely to fail rapidly. Thus, the number of exported products in Nepal was increasing at a slow rate because of its high failure rate.

Table 4: Number of Exported Products in Developing Asian Countries[1]

	1990-96	1997-99	2000-04	2005-08	2009-10	2011-13	2014-16	2017
North Asia	**2,841**	**2,844**	**2,823**	**2,779**	**2,730**	**2,734**	**2,736**	**2,651**
China	2,991	2,975	2,952	2,897	2,834	2,823	2,827	2,749
	(96.0)	(95.5)	(94.8)	(93.0)	(91.0)	(90.6)	(90.7)	(88.3)
Hong Kong	2,791	2,789	2,756	2,693	2,623	2,632	2,613	2,511
	(89.6)	(89.5)	(88.5)	(86.4)	(84.2)	(84.5)	(83.9)	(80.6)
South Korea	2,742	2,768	2,762	2,747	2,734	2,747	2,767	2,693
	(88.0)	(88.9)	(88.7)	(88.2)	(87.8)	(88.2)	(88.8)	(86.5)
Southeast Asia	**2,439**	**2,578**	**2,074**	**2,118**	**2,131**	**2,179**	**2,202**	**2,213**
Brunei	n.a.	n.a.	1,090	1,129	1,455	1,425	1,414	1,408
			(35.0)	(36.2)	(46.7)	(45.7)	(45.4)	(45.2)
Cambodia	n.a.	n.a.	593	588	600	714	805	991
			(19.0)	(18.9)	(19.3)	(22.9)	(25.8)	(31.8)
Indonesia	2,226	2,515	2,801	2,747	2,665	2,609	2,590	2,537
	(71.5)	(80.7)	(89.9)	(88.2)	(85.6)	(83.7)	(83.2)	(81.4)
Malaysia	2,826	2,772	2,778	2,791	2,751	2,740	2,720	2,631
	(90.7)	(89.0)	(89.2)	(89.6)	(88.3)	(88.0)	(87.3)	(84.5)
Philippines	1,490	1,904	1,927	1,933	1,779	1,939	2,019	2,073
	(47.8)	(61.1)	(61.8)	(62.1)	(57.1)	(62.3)	(64.8)	(66.5)
Singapore	3,005	2,917	2,896	2,686	2,740	2,797	2,775	2,774
	(96.5)	(93.6)	(93.0)	(86.2)	(87.9)	(89.8)	(89.1)	(89.1)
Thailand	2,648	2,781	2,762	2,788	2,790	2,833	2,809	2,735
	(85.0)	(89.3)	(88.7)	(89.5)	(89.6)	(90.9)	(90.2)	(87.8)
Vietnam	n.a.	n.a.	1,747	2,285	2,271	2,371	2,485	2,551
			(56.1)	(73.4)	(72.9)	(76.1)	(79.8)	(81.9)
South Asia	**1,386**	**1,528**	**1,661**	**1,869**	**1,805**	**1,841**	**2,050**	**1,975**
Bangladesh	328	612	875	1,277	1,290	1,276	1,982	2,230
	(10.5)	(19.7)	(28.1)	(41.0)	(41.4)	(41.0)	(63.6)	(71.6)
India	2,603	2,758	2,890	2,936	2,853	2,854	2,841	2,763
	(83.6)	(88.5)	(92.8)	(94.3)	(91.6)	(91.6)	(91.2)	(88.7)
Nepal	n.a.	n.a.	1,049	1,106	1,100	1,116	1,322	847
			(33.7)	(35.5)	(35.3)	(35.8)	(42.5)	(27.2)
Pakistan	1,019	1,045	1,430	2,029	2,098	2,054	1,988	1,912
	(32.7)	(33.5)	(45.9)	(65.1)	(67.4)	(65.9)	(63.8)	(61.4)
Sri Lanka	1,593	1,698	2,061	1,998	1,686	1,904	2,118	2,121
	(51.1)	(54.5)	(66.2)	(64.1)	(54.1)	(61.1)	(68.0)	(68.1)
Central and West Asia	**n.a.**	**n.a.**	**1,057**	**1,217**	**1,185**	**1,272**	**1,338**	**1,524**
Armenia	n.a.	n.a.	910	1,067	978	1,020	1,145	1,414
			(29.2)	(34.2)	(31.4)	(32.7)	(36.8)	(45.4)
Azerbaijan	n.a.	n.a.	851	909	828	826	983	1,284
			(27.3)	(29.2)	(26.6)	(26.5)	(31.5)	(41.2)
Georgia	n.a.	n.a.	1,001	1,238	1,273	1,458	1,564	1,636
			(32.1)	(39.7)	(40.9)	(46.8)	(50.2)	(52.5)
Kazakhstan	n.a.	n.a.	1,327	1,745	1,744	1,874	1,976	2,059
			(42.6)	(56.0)	(56.0)	(60.1)	(63.4)	(66.1)
Kyrgyzstan	n.a.	n.a.	1,194	1,126	1,101	1,182	1,024	1,225
			(38.3)	(36.1)	(35.3)	(38.0)	(32.9)	(39.3)

Notes: [1] The number of product lines identified at the SITC 5-digit level is 3,115 products. The figures in parentheses are the share of exported products as % of the total number of product lines. n.a. denotes non-available data.

Source: Author's calculations based on the UN Comtrade database.

Table 5: Number of Survival, Failure (non-survival), and New Products

	number of survival exports			number of non-survival exports			number of new exports		
	1990-99	2000-09	2010-17	1990-99	2000-09	2010-17	1990-99	2000-09	2010-17
North Asia	**2,377**	**2,664**	**2,620**	**81**	**84**	**67**	**243**	**73**	**57**
China	2,280	2,890	2,795	44	42	33	373	28	22
Hong Kong	2,113	2,655	2,549	56	81	73	368	64	58
South Korea	2,640	2,672	2,691	106	86	60	117	81	56
Southeast Asia	**2,282**	**2,052**	**1,994**	**318**	**275**	**262**	**394**	**322**	**136**
Brunei	n.a.	726	1,150	n.a.	271	278	n.a.	414	276
Cambodia	n.a.	324	509	n.a.	208	211	n.a.	266	262
Indonesia	2,045	2,650	2,485	220	123	131	318	120	109
Malaysia	2,692	2,683	2,650	120	102	85	120	97	70
Philippines	1,197	1,687	1,684	214	245	245	431	232	276
Singapore	2,936	2,743	2,740	49	72	34	37	50	42
Thailand	2,539	2,683	2,764	139	90	49	173	91	43
Vietnam	n.a.	1,597	2,273	n.a.	191	116	n.a.	418	152
South Asia	**1,191**	**1,493**	**1,695**	**210**	**220**	**215**	**253**	**265**	**238**
Bangladesh	239	770	1,300	109	278	244	189	304	367
India	2,517	2,843	2,809	120	52	40	156	62	28
Nepal	n.a.	711	866	n.a.	256	323	n.a.	369	288
Pakistan	726	1,402	1,795	294	233	245	309	331	225
Sri Lanka	1,280	1,737	1,706	318	280	224	356	261	280
Central and West Asia	n.a.	**809**	**1,032**	n.a.	**271**	**243**	n.a.	**325**	**285**
Armenia	n.a.	702	814	n.a.	271	243	n.a.	281	293
Azerbaijan	n.a.	617	669	n.a.	261	216	n.a.	256	271
Georgia	n.a.	798	1,216	n.a.	300	236	n.a.	321	287
Kazakhstan	n.a.	1,152	1,650	n.a.	250	230	n.a.	390	262
Kyrgyzstan	n.a.	775	812	n.a.	272	291	n.a.	379	311

Source: Author's calculations based on the UN Comtrade database.

4.2 The Role of Trade Margins in Developing Asian Countries

This section presents estimates of trade margins by showing the contributions of the intensive margin, the failure margin, and the extensive margin to changes in total exports. The estimates are presented for four periods: the 1990s, the 2000s, 2010-17, and 1990-2017.

Table 6 reports estimates of intensive, failure, and extensive margins for four developing Asian regions: North Asia, Southeast Asia, South Asia, and Central and West Asia. From the methodology, the sum of three-margin contributions is 100% (-100%). The intensive margin can be positive (as in higher export deepening) or negative values (as in lower export deepening), while the failure margin and the extensive margin are always negative and positive, respectively. The negative failure margin represents the total loss of export failure in the country's export changes. The positive extensive margin captures the export expansion of new products.

Exports from countries in North Asia have expanded at a much faster rate compared to other subregions during the last three decades. In North Asia, changes in export values rose from around 440.5 billion US$ in the 1990s to 1,009.5 billion US$ in the 2000s. However, since the world economic crisis, developing Asian countries have not experienced high levels of export growth as they once did. Particularly, Central and West Asia had negative changes in exports during 2010-17 due to the consequences of the global economic crisis.

Table 6 indicates that there are notable differences in trade margins among the subregions. However, the intensive margin contributed mostly to changes in total merchandise exports over the period (1990-2017) for all four regions. It accounted for almost 100% or more than 100% in most cases. On the other hand, the extensive margin increased changes in total merchandise exports by less than 10% in all cases, except in Central and West Asia. Lastly, the failure margins were high for some products in some periods, especially during 2000-09.

North Asia and Southeast Asia experienced high failure margins during 2000-2017, in which their failure margins were greater than 10% of total merchandise exports. Also, the failure margins were higher in manufactured products. For example, the failure margin for Southeast Asia was -72.7% of the change in manufactured exports in 2000/09. However, changes in manufactured exports were positive because of the massive increase in their intensive margin. Besides, in a comparison between GPN and non-GPN products, the failure margin in GPN products was higher than in non-GPN products. This is unsurprising because each product in GPN is likely to have a higher export value compared to non-GPN products.

In South Asia, the failure margin was lower than in other regions. However, the low percentage share in the failure margin may not guarantee higher export performance. For example, in 1990/2017, shares of the failure margin for total exports were -18.2% and -4.8% in Southeast Asia and South Asia, respectively. However, changes in total exports in Southeast Asia (852.7 billion US$) were greater than those of South Asia (291.2 billion US$) in the same period.

In Central and West Asia, interestingly, the role of new products in export growth was almost as high as the role of existing products for manufactured products, GPN, and GPN products in some periods. For example, in GPN products, the intensive margin and the extensive margin accounted for 85.4% and 80.2% of the changes in GPN exports in 2000/09. However, this region had poor export performance because of its high failure margin, especially in 2010-17. Also, the region relied heavily on primary products. In the last decade, most countries in the region recorded negative changes in total exports, mainly because of the decline in commodity prices (Table 6).

At the country level, the intensive margin also has a higher impact on export growth than the extensive margin in most cases[3]. The percentage share of failure margin has increased higher for new exporters in South Asia (Nepal and Pakistan) and Central and West Asia. In addition, in fact, newly industrialised countries (NICs) and emerging countries in Southeast Asia, except Vietnam, had a high failure margin since 2000. In Table B.1, it shows that the failure margin resulted from GPN exports, especially in Malaysia, the Philippines, and Thailand. In Malaysia, the negative growth in total exports in 2010/17 resulted mainly from adverse changes in GPN exports. This pattern may indicate the reallocation of global production sharing in Southeast Asia, from some GPN products in Malaysia and Thailand to Vietnam.

As already discussed, China and Vietnam achieved high export performance. Their export successes are due mainly to the intensive margins for all cases. For example, in China, the percentage share of intensive margin accounted for almost 100% or more than 100% in total merchandise exports and its subcategories, except primary products in 1992/99. On the other hand, the shares of extensive margin were less than 5% in most cases. Also, the extensive margin share tended to decrease over time. This implies that the introduction of new products may contribute to lower export values.

[3] The results are not shown in this paper.

Table 6: The Contribution of Trade Margins in Developing Asian Countries[1]

Region	Period	Trade margin	Total merchandise	Primary	Manufacture	GPN	Non GPN
North Asia	1990-99	Change in export (Billion US$)	440.5	39.1	401.4	278.3	123.1
		Intensive margin (IM) (%)	100	67.1	101.9	99.7	107.8
		Failure margin (FM) (%)	-4.2	-33.4	-2.5	-0.3	-8.2
		Extensive margin (EM) (%)	4.1	66.2	0.6	0.6	0.4
	2000-09	Change in export (Billion US$)	1,009.5	48.7	960.7	653.1	307.6
		Intensive margin (IM) (%)	111	100.5	111.6	118.8	96.2
		Failure margin (FM) (%)	-13.0	-0.8	-13.6	-18.9	-2.3
		Extensive margin (EM) (%)	1.9	0.3	2	0.1	6.1
	2010-17	Change in export (Billion US$)	611.2	35.4	575.8	283.7	292.1
		Intensive margin (IM) (%)	116.6	119.4	116.4	125.2	107.8
		Failure margin (FM) (%)	-18.7	-19.9	-18.6	-29.7	-7.9
		Extensive margin (EM) (%)	2.1	0.4	2.2	4.5	0
	1990 - 2017	Change in export (Billion US$)	2,632.3	151	2,481.3	1,584.5	896.8
		Intensive margin (IM) (%)	109.1	108	109.1	113.2	101.9
		Failure margin (FM) (%)	-10.8	-15.1	-10.6	-14.2	-4.2
		Extensive margin (EM) (%)	1.7	7.1	1.5	1	2.3
Southeast Asia	1990-99	Change in export (Billion US$)	205.3	15.1	190.2	154.6	35.7
		Intensive margin (IM) (%)	100.0	102.4	99.8	99.7	100.4
		Failure margin (FM) (%)	-10.5	-149.6	-1.1	-0.6	-3.2
		Extensive margin (EM) (%)	10.5	147.2	1.2	0.9	2.8
	2000-09	Change in export (Billion US$)	216.6	109.1	107.4	22.8	84.6
		Intensive margin (IM) (%)	131.9	98.7	165.7	391.4	104.7
		Failure margin (FM) (%)	-36.5	-1.3	-72.2	-307.1	-8.8
		Extensive margin (EM) (%)	4.5	2.5	6.6	15.7	4.1
	2010-17	Change in export (Billion US$)	199.1	21.1	178.0	125.0	53.0
		Intensive margin (IM) (%)	111.7	118.9	110.8	113.9	103.6
		Failure margin (FM) (%)	-18.0	-25.8	-17.1	-19.5	-11.4
		Extensive margin (EM) (%)	6.4	7.0	6.3	5.6	7.8
	1990 - 2017	Change in export (Billion US$)	852.7	213.8	638.9	410.8	228.1
		Intensive margin (IM) (%)	112.7	107.1	114.4	120.9	102.9
		Failure margin (FM) (%)	-18.2	-18.5	-18.1	-24.2	-7.2
		Extensive margin (EM) (%)	5.5	11.4	3.6	3.3	4.3
South Asia	1990-99	Change in export (Billion US$)	27.6	2.8	24.8	11.0	13.8
		Intensive margin (IM) (%)	100.0	100.9	99.8	99.5	100.1
		Failure margin (FM) (%)	-6.1	-19.5	-4.6	-2.4	-6.3
		Extensive margin (EM) (%)	6.1	18.6	4.7	2.8	6.2
	2000-09	Change in export (Billion US$)	123.0	24.5	98.5	39.5	59.0
		Intensive margin (IM) (%)	99.4	100.5	99.1	99.4	98.8
		Failure margin (FM) (%)	-1.8	-2.4	-1.7	-2.4	-1.2
		Extensive margin (EM) (%)	2.4	1.9	2.6	3.0	2.3
	2010-17	Change in export (Billion US$)	92.2	4.8	87.4	50.0	37.4
		Intensive margin (IM) (%)	106.2	182.7	102.0	97.0	108.6
		Failure margin (FM) (%)	-10.7	-95.3	-6.1	-3.0	-10.1
		Extensive margin (EM) (%)	4.5	12.6	4.1	6.0	1.5
	1990 - 2017	Change in export (Billion US$)	291.2	47.3	243.9	111.8	132.1
		Intensive margin (IM) (%)	101.7	108.7	100.3	98.4	101.9
		Failure margin (FM) (%)	-4.8	-12.2	-3.4	-2.5	-4.1
		Extensive margin (EM) (%)	3.1	3.5	3.1	4.1	2.2
Central and West Asia	2000-09	Change in export (Billion US$)	49.4	43.1	6.2	0.8	5.5
		Intensive margin (IM) (%)	91.7	93.9	76.0	85.4	74.7
		Failure margin (FM) (%)	-2.1	-0.7	-11.8	-65.5	-4.4
		Extensive margin (EM) (%)	10.4	6.8	35.8	80.2	29.7
	2010-17	Change in export (Billion US$)	-11.7	-12.9	1.2	0.5	0.7
		Intensive margin (IM) (%)	-97.6	-100.0	122.9	132.7	116.1
		Failure margin (FM) (%)	-15.9	-3.7	-110.9	-130.0	-97.6
		Extensive margin (EM) (%)	13.5	3.8	88.0	97.3	81.5
	2000 - 2017	Change in export (Billion US$)	58.6	49.6	9.0	1.5	7.5
		Intensive margin (IM) (%)	93.7	94.7	88.0	112.1	83.2
		Failure margin (FM) (%)	-5.3	-1.7	-25.5	-87.4	-13.1
		Extensive margin (EM) (%)	11.6	6.9	37.4	75.3	29.9

Notes: 1. Change in export (billion US$) is the change in export between two years.
Source: Author's calculations from the UN Comtrade database

4.3 Robustness check

Regarding the decomposition of trade margin reported in the previous section, a significant concern is the use of 'one-year' duration for determining the status of new products. To test the sensitivity of estimates, we estimate trade margins by selecting a breaking point that separates all exports into old products (being exported before a breaking point) and new products (being exported after a breaking point) (Amurgo-Pacheco & Pierola, 2008; Brenton & Newfarmer, 2009). However, implementing the same breaking point for all developing Asian countries may not be sensible because of the vast differences in their stage of trade development. Taking this concern into account, we believe that developing Asian countries should be separated into two groups.

The first group (South Korea, Singapore, Hong Kong, China, India, Thailand, Malaysia, and Indonesia) is at a high stage of trade development with a relatively high export product mix in 1990. We define the already exported products in the year 1990 as existing products, while any new exported products after the starting year are classified as new products[4].

The second group is a low stage of trade development with a relatively low exported-product mix in 1990 or 2000. We employ a similar method to Amurgo-Pacheco and Pierola (2008). We define existing products as all products that have been exported for at least three years in the first five years to deal with the low survival rate of exporting products in developing countries. However, new products are defined as all exporting products that are not included in the former list[5].

In our robustness results, we estimate only the intensive margin and extensive margin. The results are reported in Tables 7 and 8. Existing products are more important than new products. At the regional level, the intensive margin accounted for more than 90% of the total change in exports in most cases, except in some cases in Central and Western Asia. For example, total changes in merchandise exports between 1990 and 2017 in North Asia were mostly reliant on total changes in existing exports (99.0%), while the new exports contributed only 1.0% to total change in merchandise exports.

Table 7: Weighted Average Contribution Share of Trade Margins to Total Export Growth between 1990 and 2017 by Asian Subregions[1]

	North Asia		Southeast Asia		South Asia		Central and West Asia[2]	
	IM (%)	EM (%)	IM (%)	EM (%)	IM (%)	EM (%)	IM (%)	EM (%)
Total merchandise	99.0	1.0	93.2	6.8	92.3	7.7	93.3	6.7
Primary	98.5	1.5	90.3	9.7	89.5	10.5	94.9	5.1
Manufacture	99.1	0.9	94.2	5.8	92.9	7.1	84.7	15.3
GPN	99.0	1.0	94.6	5.4	94.2	5.8	85.1	14.9
Non-GPN	99.2	0.8	93.5	6.5	91.8	8.2	84.7	15.3

Note: [1] IM and EM denote intensive margin (existing products) and extensive margin (new products), respectively.

[2] Due to data limitations for Central and West Asia, these figures show the weighted average contribution share of trade margins to total export growth between 2000 and 2017.

Source: Author's calculations based on the UN Comtrade database.

[4] Due to data availability, export data for China and Hong Kong started in 1992. Thus, the list of existing products for both countries is defined as all exported products in 1992, whereas the list of new products is any exported product occurring after 1992.

[5] Due to data availability, we employ two periods of the first five-year for defining old products for the two groups. The first group (Philippines, Bangladesh, Pakistan, and Nepal) relies on the period of 1990-1994. On the other hand, another group (the rest of sample) use the period of 2000-04 for clarifying their old products.

Estimates reported in Table 8 show that existing products play a crucial role in export performance in most cases in developing Asian countries, except for some commodity groups. For example, the extensive margin was significantly high for the Philippines (around 40% and 45% of total merchandise exports and manufactured exports, respectively). In contrast, the increased contribution of new exports could not drive high growth of exports in the case of low export survival rate and low deepening rate. For example, Nepal experienced significant new export growth between 2000 and 2017, with around 45 million US$. However, the intensive margin in Nepal decreased by about 57 million US$. As a result, its total merchandise exports slightly fell from 734 million US$ in 2000 to 723 million US$.

In sum, the alternative estimates confirm the importance of existing products (the intensive margin) compared to new products (the extensive margin). One reason is that new products tend to fail in a short period and need time for keeping their survival in a highly competitive global market while also developing their deepening. In the case of Vietnam, the number of new products increased by around 800 products during the period 2000-17. However, its new products contributed only 3.9% of total export growth (Table 8).

Table 8: Weighted Average Contribution Share of Trade Margins to Total Export Growth by Country[1, 2]

	Total merchandise		Manufacture		GPN		Non-GPN	
	IM (%)	EM (%)	IM (%)	EM (%)	IM (%)	EM (%)	IM (%)	EM (%)
Brunei (2000)	93.0	7.0	-30.3	130.3	-102.7	2.7	55.1	44.9
Cambodia (2000)	81.9	18.1	84.8	15.2	88.2	11.8	4.1	95.9
China (1992)	99.6	0.4	99.7	0.3	99.8	0.2	99.4	0.6
Hong Kong (1992)	99.2	0.8	99.2	0.8	99.1	0.9	99.3	0.7
Indonesia (1990)	89.7	10.3	88.1	11.9	90.1	9.9	85.9	14.1
Malaysia (1990)	98.6	1.4	99.1	0.9	100.0	0.0	97.6	2.4
Philippines (1991)	58.9	41.1	53.7	46.3	50.3	49.7	75.2	24.8
South Korea (1990)	95.5	4.5	95.2	4.8	93.5	6.5	97.8	2.2
Singapore (1990)	99.8	0.2	99.8	0.2	100.0	0.0	99.7	0.3
Thailand (1990)	91.9	8.1	95.4	4.6	98.0	2.0	91.7	8.3
Vietnam (2000)	96.1	3.9	96.6	3.4	98.8	1.2	89.4	10.6
Bangladesh (1990)	91.5	8.5	92.5	7.5	93.9	6.1	68.0	32.0
India (1990)	93.1	6.9	93.3	6.7	94.0	6.0	93.0	7.0
Nepal (2000)	-514.0	414.0	-114.9	14.9	-101.3	1.3	59.4	40.6
Pakistan (1990)	82.0	18.0	86.6	13.4	97.5	2.5	78.3	21.7
Sri Lanka (1990)	93.9	6.1	93.4	6.6	94.0	6.0	91.0	9.0
Armenia (2000)	92.1	7.9	79.9	20.1	73.4	26.6	85.6	14.4
Azerbaijan (2000)	87.8	12.2	61.3	38.7	-180.6	80.6	64.9	35.1
Georgia (2000)	87.0	13.0	86.5	13.5	88.4	11.6	85.5	14.5
Kazakhstan (2000)	95.5	4.5	86.6	13.4	94.6	5.4	85.7	14.3
Kyrgyzstan (2000)	80.1	19.9	69.9	30.1	68.6	31.4	73.5	26.5

Note: [1] IM denotes for intensive margin, whereas EM is extensive margin.

[2] The figures in parentheses are the starting year for each country in developing Asian countries due to available trade data. Total contribution shares are 100% (-100%) when a country experiences positive changes in exports (negative changes in exports) between two years.

Source: Author's calculations based on the UN Comtrade database.

5. Determinants of Trade Margins

5.1 The Model

In this section, we examine the factors causing trade margins of export performance. The analysis is undertaken by pooling data over the period 1990-2017, for developing Asian countries, excluding Brunei and the small island economies in the Pacific. The export model is specified as follows:

$$\begin{aligned}\ln TRM_{it} = {} & \alpha + \beta_1 \ln GDPC_{it} + \beta_2 \ln WD_{it} + \beta_3 \ln FDI_{it} + \beta_4 \ln REER_{it} \\ & + \beta_5 LIB_{it} + \beta_6 \ln OPEN_{it} + \beta_7 WTO_{it} + \beta_8 \ln TR_{it} + \beta_9 \ln FIN_{it} \\ & + \beta_{10} \ln NUM_{it-1} + \beta_{11} TIME_t + \theta_t + \gamma_i + \varepsilon_{it}\end{aligned} \quad (3)$$

In this model, TRM denotes trade margins, including intensive margin (IM), extensive margin (EM), and failure margin (FM). The right-hand side variables consist of GDP per capita ($GDPC$), world demand (WD), FDI inflow (FDI), real effective exchange rate ($REER$), trade liberalization index based on Sachs and Warner index (LIB), trade openness ($OPEN$), the status of membership in WTO (WTO), average tariff rate (TR), level of domestic credit (FIN), and number of exported products (NUM). Also, we include time trend ($TIME$) in the model. θ and γ stand for time fixed effect and country fixed effect, respectively. ε is the error term. Subscript i and t denote country and time, respectively.

GDPC is included to capture the impact of the stage of development on trade margins. World demand (WD) captures the impact of a change in global demand. The coefficient of FDI measures the impact of FDI inflow on trade margins, while the coefficient of REER examines the effect of exchange rate changes on trade margins. According to our definition of REER, an increase in REER indicates a real exchange rate appreciation (reduction in international competitiveness). The expected sign of the coefficient of REER is negative. Four trade policy variables, (LIB, $OPEN$, WTO, and TR), are included to capture the effect of trade liberalization on trade margins. The important difference between trade liberalization index (LIB) and trade openness (OPEN) in our model is that LIB shows the effect of trade barrier reductions, while OPEN captures the effect of the actual stage of trade liberalization. Lastly, the model includes two determinant factors of the stage of export development, such as the level of domestic credit and the number of exported products.

However, the coefficients in the model may have different signs (positive or negative) among the three trade margins. For example, according to our results of trade margin decomposition (Section 4), we found that when a stage of the economy is highly developed, the intensive margin tends to increase, whereas the extensive margin becomes less. Thus, the coefficient of GDPC for the intensive margin and the extensive margin may be positive and negative, respectively.

We observed that China had outperformed other developing Asian countries in terms of export expansion during the period 1990-2017. To capture this unique 'China factor', we include the interaction term for China into the three explanatory variables in the model: GDPC, WD and FDI. Thus, when these three interaction variables are added, the trade margin model takes the following form:

$$\begin{aligned}\ln TRM_{it} = {} & \alpha + \beta_1 \ln GDPC_{it} + \beta_2 \ln WD_{it} + \beta_3 \ln FDI_{it} + \beta_4 \ln REER_{it} \\ & + \beta_5 LIB_{it} + \beta_6 \ln OPEN_{it} + \beta_7 WTO_{it} + \beta_8 \ln TR_{it} + \beta_9 \ln FIN_{it} \\ & + \beta_{10} \ln NUM_{it-1} + \beta_{11} TIME_i + \beta_{12} (\mathrm{D}_i \times \ln GDPC_{it}) + \theta_t + \gamma_i + \varepsilon_{it}\end{aligned} \quad (4)$$

where Di is a dummy variable for China which takes the value of one for China and zero for other Asian countries.

In equation (4), we can interpret 'China factor' effect on trade margins as following example. Assume that the coefficient of GDPC is positive and statistically significant for both β_1 and β_{12}. This would indicate that an increase in GDP per capita can lead to higher growth along the trade margin for China compared to other developing Asian countries. In other words, β_{12} represents the China factor effect on GDPC. However, one concern is that we can analyse the China factor effects only if the non-interaction term and the interaction term are statistically significant together.

To assess the differential export performance along the different trade margins, we estimate separate regressions for these three dependent variables into total merchandise exports and their subcategories: manufactured exports, GPN exports, and non-GPN exports. We assume the determinant factors in our export model can cause differential impacts on trade margin along with the different commodity groups. Also, we exclude the trade margin model for primary products because primary exports tend to be less important over the period, and its growth along the intensive margin and the extensive margin reflects differences in resource endowment among countries.

5.2 Data

The model (Equation 4) is estimated using unbalanced panel data for the period 1990 -2017. As discussed in Section 4.4, trade margins were estimated using export data in US$ extracted from the UN Comrade database. For the purpose of the econometric analysis, these are converted into real terms using the import price index (as a proxy for world export price) extracted from the US Bureau of Labour database (https://www.bls.gov/). This index is available at the three-digit level of the Harmonised System (HS) of commodity classification. The price indices for the total (non-oil) exports, manufactured exports, GPN exports, and non-GPN exports are separately constructed by using the HS-SITC concordance obtained from the database of the UN Statistical Office.

GDP per capita of developing Asian countries, trade openness (the ratio of trade to GDP), average tariff rate, domestic credit (the ratio of domestic credit to private to GDP), number of labour force, and level of education (average years of schooling for the population older than 25 participated in formal education) are obtained from the World Development Indicator database of the World Bank.

World demand (WD) is measured for each country as the export-share weighted average GDP of the 20 major export destination countries. Thus, world demand varies within each country depending on the nature of its geographical profile of exports. FDI inflow is obtained from UNCTAD and is converted into real terms, while the REER index is provided by the French Research Center in International Economics (CEPII). Trade liberalization index is a binary index that takes the value of one for the status of liberalised trade policy regime and zero for otherwise. This index was developed by Sachs and

Warner (1995) and updated by Wacziarg and Welch (2008) and Paudel (2014).[6] The status of membership in WTO is from the WTO website.

5.3 Results

The results for the intensive margin (IM), the extensive margin (EM), and the failure margin (FM) are reported in Table 9 to Table 12[7]. The interaction terms of China are statistically significant in a few cases, mostly in the case of the failure margin model. Thus, we drop the interaction term of China in the case of intensive margin and extensive margin. In other words, China does not have a marginal effect on export growth along the intensive and extensive margin from our analysis period when compared to other developing Asian countries. However, we include the interaction term of China's GDP per capita in the case of failure margin because China experienced a lower failure margin compared to other countries.

One concern is the reverse causality problem between trade margin and GDP per capita. Based on the Durbin–Wu–Hausman test, we found that there is a strong endogeneity problem only in the case of intensive margin. OLS regression leads to biased estimators. Thus, two-stage least square (2SLS) is employed for the intensive margin model. In 2SLS estimation, the trade-weighted world income (WD) is used for the instrumental variables for GDP per capita. Table 9 and Table 10 show the estimation results from OLS and 2SLS, respectively. However, our trade margin analysis relies on the 2SLS result for the intensive margin and the OLS result for the extensive margin and the failure margin.

The overall results show that GDP per capita (GDPC) and world demand are statistically significant for most cases in the intensive margin. However, the extensive margin and the failure margin models are poorly determined by GDP per capita and world demand. FDI inflow and REER are significant in a few cases. Also, most trade policy variables have a statistically significant impact on trade margins, especially the openness index and the average tariff rate. Domestic credit is less statistically significant. Finally, the lagged number of exported products determines statistically trade margins for many cases. The details of the regression results are as follows.

In the intensive margin model (Table 10), GDP per capita is positively associated with growth along the intensive margin at the 1% significance level for all cases. The coefficient of GDP per capita ranges between 1.80 and 9.70. Interestingly, an increase in GDP per capita results in a faster increase in the intensive margin growth of GPN products compared to non-GPN products. For example, the coefficients of GDPC are 9.617 and 1.823 for GPN products and non-GPN products, respectively. Therefore, since the intensive margin is in terms of change in the log of variables, we can interpret the results that an annual change in GDP per capita of 1% results in a yearly change in the intensive margin of around 9.6% and 1.8% for GPN products and non-GPN products, respectively.

Surprisingly, FDI inflow has a negative impact on the intensive margin. The coefficient is negative and statistically significant for all cases, but its magnitude is relatively small. This moderate adverse effect may result from the fact that FDI inflow may be driven by market seeking in some developing countries such as China and India.

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[6] According to this binary index, a country is considered to have a closed economy if it has (1) more than 40% of the average tariff, (2) non-tariff barrier covering more than 40% of imports, (3) state monopoly of major exports, and (4) exchange rate black-market premium that exceeded 20%.

[7] This study attempts to include the possible determinant factors for each trade margin suggested by the previous literature. The same baseline model as shown in equation (4) is applied to all trade margins, however we drop insignificant variables to fit different development patterns in each trade margin.

Also, FDI inflow may stimulate too many existing products, which have less contribution to export growth along the intensive margin.

The effect of tariff rate on intensive margins is mixed in our result. Tariff rate is negatively associated with the intensive margin expansion for only non-GPN cases. However, there is a positive relationship between tariff rate and trade margin for manufactured and GPN cases. The latter result may be caused by the ignorance of tariff exemptions for exporters in our model. In most developing countries, the government has granted import duty exemptions on raw materials to some targeted exporters. Thus, high import tariffs do not affect their export performance. All in all, our result does not suggest that a higher tariff rate leads to a higher intensive margin.

Table 9: Determinants of the Intensive Margin (IM) Results (OLS)[1]

Dep var: IM	total merchandise	manufacture	GPN	non-GPN
GDP per capita	0.955***	2.290**	3.531**	1.364***
	(0.004)	(0.047)	(0.123)	(0.007)
World demand	0.160***	0.293**	0.541**	0.025*
	(0.001)	(0.011)	(0.026)	(0.003)
FDI inflow	-0.032**	-0.014**	0.001	-0.007
	(0.001)	(0.000)	(0.001)	(0.003)
REER	0.289	0.251	0.225	0.136
	(0.068)	(0.068)	(0.068)	(0.025)
Trade liberalization index (Sachs and Warner index)	0.047**	0.020	-0.035	0.027
	(0.001)	(0.005)	(0.018)	(0.008)
Trade Openness	0.451*	0.549**	0.604*	0.307
	(0.054)	(0.041)	(0.054)	(0.073)
WTO	-0.038	-0.010	-0.106	0.080**
	(0.072)	(0.058)	(0.147)	(0.002)
Tariff rate	-0.009**	-0.041*	0.070	-0.078
	(0.000)	(0.004)	(0.015)	(0.016)
Lagged number of exported products	0.022**	-0.101*	-0.313*	0.046
	(0.001)	(0.008)	(0.024)	(0.011)
Time trend	-0.002**	-0.003***	-0.004*	-0.004*
	(0.000)	(0.000)	(0.000)	(0.000)
Constant	4.117**	8.318***	10.180**	9.231*
	(0.121)	(0.097)	(0.515)	(1.270)
Country fixed effect	Yes	Yes	Yes	Yes
Time fixed effect	Yes	Yes	Yes	Yes
Observations	434	436	436	436
R-squared	0.330	0.307	0.312	0.219

Note: [1] All variables are in terms of change in the log of variable, except the lagged number of exported products, liberalization index, WTO, and Time trend. This is because this form can solve the negative value of the intensive margin in some periods. The figures in parentheses represent the robust standard errors.
*** p<0.01, ** p<0.05, * p<0.1.

Source: Author's estimation.

Table 10: Determinants of the Intensive Margin (IM) Results (2SLS)[1]

Dep var: IM	total merchandise	manufacture	GPN	non-GPN
GDP per capita[2]	2.888***	5.607***	9.617***	1.823***
	(0.322)	(0.434)	(0.745)	(0.094)
FDI inflow	-0.044***	-0.036***	-0.037***	-0.011***
	(0.001)	(0.002)	(0.007)	(0.001)
REER	0.118	-0.034	-0.301***	0.079
	(0.074)	(0.066)	(0.065)	(0.049)
Trade liberalization index (Sachs and Warner index)	0.068***	0.052***	0.027	0.031***
	(0.004)	(0.014)	(0.035)	(0.008)
Trade Openness	0.531***	0.682***	0.839***	0.311***
	(0.031)	(0.005)	(0.109)	(0.082)
WTO	-0.048	-0.030	-0.150	0.057**
	(0.081)	(0.076)	(0.179)	(0.023)
Tariff rate	0.003	0.025***	0.191***	-0.068***
	(0.003)	(0.007)	(0.008)	(0.017)
Lagged number of exported products	0.018***	-0.111***	-0.290***	0.043***
	(0.001)	(0.008)	(0.027)	(0.011)
Time trend	-0.00007	-0.001***	-0.002***	-0.003***
	(0.0003)	(0.0001)	(0.0003)	(0.0001)
Constant	-0.016	-0.016	4.093***	6.174***
	(0.686)	(0.686)	(0.025)	(0.127)
Country fixed effect	Yes	Yes	Yes	Yes
Time fixed effect	Yes	Yes	Yes	Yes
Observations	434	436	436	436
R-squared	0.258	0.226	0.216	0.205

Note: [1] All variables are in the term of change in the log of variable, except the lagged number of exported products, liberalization index, WTO, and Time trend. This is because this form can solve the negative value of the intensive margin in some periods. The figures in parentheses represent the robust standard errors.

*** p<0.01, ** p<0.05, * p<0.1.

[2] In our model, the instrumental variable for GDP per capita is world demand (WD).

Source: Author's estimation.

There are mixed results for the number of exported products (*Number*). An increase in the lagged number of exported products results in higher export growth along the intensive margin for total merchandise and non-GPN products but causes lower export growth along the intensive margin for manufactured products and GPN products. The contradictory results may suggest that the benefit of a diversified export basket may be different in each commodity group. In the case of manufactured products, its negative coefficient may indicate that developing countries have too many existing products. Some existing products may not be consistent with their comparative advantage, causing a lower probability of expanding their export values.

We turn to the extensive margin results (Table 11). The coefficients of domestic credit are positive for all cases. However, the domestic credit is statistically significant for only GPN exports. Thus, boosting the expansion of new exports through domestic credit can be clearly effective in the sector highly associated with Multinational enterprises (MNEs) activities. MNEs can facilitate new exports through their tangible

knowledge and customer information. In GPN exports, an increase in domestic credit of 1% leads to an increase in the extensive margin of 0.96%.

The effect of trade barrier reductions on the extensive margin is clear. Table 11 shows that the trade liberalization index (Sachs and Warner index) is positive and statistically significant for all cases. The trade barrier reductions can induce the expansion of new exports.

Unsurprisingly, the lagged number of exported products is negatively associated with export growth along the extensive margin. A high number of exported products leads to a smaller window of opportunity for new exported products. Also, when a country highly diversifies its export basket, it may expand its new products towards only lower export values compared to its previous new products.

The coefficient of tariff is statistically significant for only total merchandise and non-GPN products. This result is consistent with the intensive margin model. A decrease in the average tariff rate encourages domestic firms to import lower-cost materials to produce some new exported products, resulting in higher export growth in the extensive margin.

The results of the failure margin are reported in Table 12. The coefficient of GDP per capita is statistically significant at the 10% level, with a positive sign in all four cases. Overall, the results suggest that the stage of economic development of a given country does not necessarily ensure the survival of exported products. This is understandable because product-specific external factors matter much more than country-specific factors in export success (Daruich et al, 2019). If a country reaches a higher stage of economic development, it could have a high possibility of producing and exporting new products. However, the country may experience higher export failures when it cannot succeed in its new exports in the long term. Also, a higher stage of economic development leads to changes in their comparative advantages, which sometimes make some existing products less competitive. Thus, the failure margin always occurs all the time for countries with low or high economic development levels. However, the effect of GDP per capita on failure margin in China is less than in other countries in the case of manufactured products and GPN products because of the negative coefficient in China's GDP interaction term.

The coefficient of REER is negative and statistically significant in all cases. This result runs counter to the general perception that maintaining international competitiveness is important for reducing product failure (export success). This negative relationship is a vital issue for further scrutiny. However, this finding is consistent with the emerging literature on the 'dominant currency paradigm' (Gopinath, Itskhoki, & Rigobon, 2010; Gopinath, Boz, Casas, Díez, Gourinchas, & Plagborg-Møller 2020). Most of the exports in world trade, in particular exports from developing countries, are involved in the US$. Given that world prices are mostly denominated in the US$ ('the dominant currency'), the overall real exchange rate (as used in this study) could be largely irrelevant for determining export performance. At the same time, REER appreciation could help export competitiveness by reducing the domestic-currency price of imported inputs. This postulate is particularly relevant for GPN exports given their high import content. Real exchange rate appreciation could reduce the cost of imported parts and components used in GPN production while the export price expressed in dominant current (US$) remains virtually unchanged. Therefore, this result is an important issue for further research.

The coefficient of trade openness is significant at the 10% level, with a negative sign in some cases. This result provides moderate statistical support for the hypothesis that trade openness promotes product sustainability. It seems that, in a relatively more open trade regime, entrepreneurs are in a better position to plan the launch of new

products with a deeper understanding of market prospects based on exposure to international competition and information gained from interaction with foreign buyers.

Table 11: Determinants of the Extensive Margin (EM) Results (OLS)[1]

Dep var: EM	total merchandise	manufacture	GPN	non-GPN
GDP per capita	-0.466	0.0837	0.379	-0.585
	(0.079)	(0.889)	(0.919)	(0.104)
World demand	-0.146	0.324	1.425**	-0.525
	(0.448)	(0.096)	(0.271)	(1.526)
FDI inflow	0.055	0.012	0.141	-0.029
	(0.026)	(0.035)	(0.090)	(0.033)
REER	-0.881	1.017	-0.826	0.696
	(0.272)	(1.091)	(1.685)	(1.142)
Trade liberalization index (Sachs and Warner index)	1.138*	0.859**	2.049***	0.648**
	(0.178)	(0.055)	(0.197)	(0.015)
Trade Openness	-1.452	-1.406**	-2.555	-1.397
	(0.289)	(0.093)	(1.345)	(0.727)
WTO	-0.692	-0.738*	-0.872*	-0.074
	(0.139)	(0.113)	(0.255)	(0.196)
Domestic credit	0.496	0.649	0.963*	0.561
	(0.149)	(0.171)	(0.294)	(0.309)
Tariff rate	-0.431**	-0.037	0.171	-0.256***
	(0.033)	(0.011)	(0.199)	(0.000)
Lagged number of exported products	-1.078***	-1.000*	-1.697***	-0.843
	(0.005)	(0.093)	(0.109)	(0.271)
Time trend	0.060	0.057	0.031	0.034
	(0.025)	(0.087)	(0.028)	(0.026)
Constant	-98.220	-129.600	-81.680	-67.690
	(35.330)	(171.900)	(46.070)	(87.540)
Country fixed effect	Yes	Yes	Yes	Yes
Time fixed effect	Yes	Yes	Yes	Yes
Observations	442	310	434	310
R-squared	0.170	0.178	0.160	0.169

Note: [1] All variables are in the term of change in the log of variable, except Trade liberalization index, WTO, and Time trend. The figures in parentheses represent the robust standard errors.
*** p<0.01, ** p<0.05, * p<0.1.

Source: Author's estimation.

Table 12: Determinants of the Failure Margin (FM) Results (OLS)[1]

Dep var: FM	total merchandise	manufacture	GPN	non-GPN
GDP per capita	0.903*	1.754*	1.531***	1.128***
	(0.233)	(0.164)	(0.001)	(0.015)
World demand	0.483	0.415	0.350	0.369
	(0.368)	(0.078)	(0.149)	(0.215)
FDI inflow	0.202**	0.154	0.174	0.103**
	(0.035)	(0.026)	(0.029)	(0.005)
REER	-1.197**	-1.959*	-1.453**	-1.499**
	(0.218)	(0.277)	(0.030)	(0.024)
Trade liberalization index (Sachs and Warner index)	-0.166	-0.088	-0.170	-0.341
	(0.393)	(0.025)	(0.120)	(0.177)
Trade Openness	-1.889	-1.974**	-1.676*	-1.884
	(0.650)	(0.124)	(0.187)	(0.389)
WTO	-0.270	-0.268	-0.458	-0.271
	(0.239)	(0.353)	(0.199)	(0.711)
Lagged number of exported products	0.501	0.391	0.480	0.401*
	(0.183)	(0.126)	(0.186)	(0.041)
Time trend	0.069	0.055	0.060	0.067
	(0.045)	(0.022)	(0.027)	(0.056)
China*GDP per capita	-0.481	-0.893*	-0.779*	-0.032
	(0.248)	(0.072)	(0.086)	(0.282)
Constant	-17.46	-15.16	-18.23*	-15.54
	(10.210)	(2.685)	(2.484)	(7.880)
Country fixed effect	Yes	Yes	Yes	Yes
Time fixed effect	Yes	Yes	Yes	Yes
Observations	444	444	438	443
R-squared	0.287	0.251	0.190	0.247

Note: [1] All variables are in the term of change in the log of variable, except Trade liberalization index, WTO, and Time trend. The figures in parentheses represent the robust standard errors.
*** p<0.01, ** p<0.05, * p<0.1.
Source: Author's estimation.

To check the robustness of the results, we estimate the export margins by decomposing the sample into three income-level groups based on the World Bank's income-based country classification in 2017: high-income countries, upper middle-income countries, and lower middle-income countries[8]. These results are not reported in this paper. However, the main findings are as follows.

[8] According to the World Bank's income-based country classification in 2017, our developing Asian countries are divided into three income-level groups: three high income countries (South Korea, Hong Kong, and Singapore), six upper middle-income countries (China, Malaysia, Thailand, Azerbaijan, Georgia, and Kazakhstan), and eleven lower middle-income countries (Armenia, Bangladesh, Cambodia, India, Indonesia, Kyrgyzstan, Nepal, Pakistan, Philippines, Sri Lanka, and Vietnam). In fact, Nepal is classified as a low-income country in 2017. However, we include Nepal in the lower middle-income countries because many countries in the last group were low-income countries before 2010.

In the intensive margin model, the coefficient of GDP per capita is positive and statistically significant in all cases. However, the magnitude coefficients in the upper middle-income countries are comparatively higher than those in other income-level groups. Also, interestingly, the coefficient of REER is positive and statistically significant only in high-income countries. This result is consistent with the 'dominant currency paradigm', as previously discussed. The results of an extensive margin model show that only upper middle-income and lower middle-income groups have positive and statistically significant coefficients for the domestic credit variable. This result suggests that the domestic credit is more important for middle-income countries to promote the emergence of new products.

For the failure margin, an increase in GDP per capita would result in a decrease in the failure margin for only the case of total merchandise in the high-income countries. In addition, higher trade openness is negatively associated with failure margin in only the upper and lower middle-income countries. Also, the coefficient of REER is negative in most cases. However, the coefficient is negative and statistically significant for only total merchandise and manufacturing exports in the lower middle-income countries. Thus, higher real exchange rate appreciation would reduce the failure margin for only the lower middle-income countries other than all developing Asian countries, as the same result shown in Table 12.

6. Conclusion

This paper has investigated the role of the expansion of existing exports (intensive margin), the emergence of new exports (extensive margin), and the demise of existing exports (failure margin) on export performance in developing Asian countries during the period 1990-2017. Within total non-oil exports, total manufacturing is further divided into exports within global production networks (GPN exports), and non-GPN exports are treated as separate categories. Following an analytical narrative of intercountry differences in these three sources of export performance, an econometric analysis has been undertaken to explore the underlying economic drivers.

The results suggest that the deepening of existing products is much more important compared to the emergence of new products for export success. Naturally, the emergence of new products and product survival are much more important for newcomers to exporting compared to the relatively more established exporting countries. The number of new products is growing slowly when a country already has a broad-based commodity composition.

GDP per capita and world demand are positively associated with export growth along the intensive margin. Also, higher intensive margin growth is determined by the level of trade openness and a decrease in the average tariff rate. Exchange rate depreciation has a positive impact on the intensive margin for export success within global production networks. Domestic credit and trade openness facilitate export expansion based on extensive margins through involvement in global production networks for the extensive margin. High-performing development Asian economies such as South Korea and Singapore have lower failure margin growth compared to other countries. There is evidence that manufacturers in relatively more open trade regimes are in a better position to plan the launch of new products with a deeper understanding of market prospects based on exposure to international competition and information gained from interaction with foreign buyers.

Relating to policy implications for developing Asian countries, the results suggest that appropriate government policy relating to export promotion depends on the stage of export development of the given country. For a late-comer developing country, facilitating the emergence of new products is the appropriate policy choice. In this case, promoting FDI and the availability of domestic bank financing has a potential role in encouraging new high-growth exports. The incidence of product failure tends to naturally decline as a country reaches a higher stage of development.

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Appendix A

Number of exported products in developing Asian countries[1]

Primary products

	1990-96	1997-99	2000-04	2005-08	2009-10	2011-13	2014-16	2017
North Asia	**638**	**653**	**640**	**626**	**611**	**614**	**619**	**606**
China	727	732	716	694	662	659	665	657
Hong Kong	636	644	628	601	579	585	574	544
South Korea	550	584	576	582	591	598	618	617
Southeast Asia	**557**	**577**	**451**	**454**	**469**	**478**	**478**	**480**
Brunei	n.a.	n.a.	122	133	234	230	225	203
Cambodia	n.a.	n.a.	104	104	101	112	137	170
Indonesia	525	585	675	638	606	566	547	549
Malaysia	629	617	623	631	633	630	622	606
Philippines	322	349	374	381	397	428	441	448
Singapore	721	696	679	599	618	650	635	629
Thailand	588	636	632	644	657	685	671	658
Vietnam	n.a.	n.a.	400	503	504	521	545	574
South Asia	**306**	**332**	**359**	**419**	**415**	**419**	**459**	**460**
Bangladesh	64	113	157	268	279	268	443	499
India	516	596	680	714	687	686	675	662
Nepal	n.a.	n.a.	209	211	227	218	280	257
Pakistan	219	206	282	434	469	482	448	442
Sri Lanka	426	413	465	470	412	442	448	442
Central and West Asia	n.a.	n.a.	**218**	**250**	**246**	**265**	**288**	**322**
Armenia	n.a.	n.a.	138	187	201	209	227	263
Azerbaijan	n.a.	n.a.	167	183	191	179	209	267
Georgia	n.a.	n.a.	209	240	211	276	306	322
Kazakhstan	n.a.	n.a.	303	372	360	412	473	486
Kyrgyzstan	n.a.	n.a.	273	266	266	251	224	271

Manufactured products

	1990-96	1997-99	2000-04	2005-08	2009-10	2011-13	2014-16	2017
North Asia	**2,204**	**2,191**	**2,183**	**2,153**	**2,120**	**2,120**	**2,116**	**2,045**
China	2,264	2,243	2,236	2,203	2,172	2,164	2,161	2,092
Hong Kong	2,155	2,145	2,128	2,092	2,044	2,046	2,039	1,967
South Korea	2,192	2,184	2,186	2,165	2,143	2,150	2,149	2,076
Southeast Asia	**1,882**	**2,001**	**1,623**	**1,665**	**1,663**	**1,701**	**1,724**	**1,733**
Brunei	n.a.	n.a.	968	996	1,221	1,195	1,189	1,205
Cambodia	n.a.	n.a.	488	484	500	602	667	821
Indonesia	1,701	1,930	2,125	2,109	2,060	2,043	2,044	1,988
Malaysia	2,197	2,155	2,154	2,161	2,118	2,110	2,097	2,025
Philippines	1,168	1,555	1,553	1,552	1,382	1,512	1,578	1,625
	2,284	2,221	2,217	2,087	2,122	2,147	2,140	2,145
Singapore								
Thailand	2,060	2,145	2,130	2,144	2,133	2,148	2,137	2,077
Vietnam	n.a.	n.a.	1,347	1,783	1,768	1,850	1,940	1,977
South Asia	**1,079**	**1,196**	**1,302**	**1,450**	**1,391**	**1,422**	**1,592**	**1,514**
Bangladesh	263	499	717	1,009	1,011	1,008	1,540	1,731
India	2,087	2,161	2,209	2,223	2,167	2,168	2,166	2,101
Nepal	n.a.	n.a.	840	895	873	898	1,042	590
Pakistan	800	839	1,148	1,595	1,629	1,572	1,540	1,470
Sri Lanka	1,167	1,285	1,596	1,527	1,274	1,462	1,670	1,679
Central and West Asia	**n.a.**	**n.a.**	**839**	**967**	**939**	**1,006**	**1,051**	**1,202**
Armenia	n.a.	n.a.	772	880	777	811	918	1,151
Azerbaijan	n.a.	n.a.	684	726	637	646	774	1,017
Georgia	n.a.	n.a.	792	998	1,062	1,182	1,257	1,314
Kazakhstan	n.a.	n.a.	1,025	1,373	1,384	1,462	1,504	1,573
Kyrgyzstan	n.a.	n.a.	921	859	836	931	801	954

Global production network (GPN) products

	1990-96	1997-99	2000-04	2005-08	2009-10	2011-13	2014-16	2017
North Asia	**743**	**745**	**745**	**724**	**700**	**701**	**700**	**683**
China	753	756	755	733	711	710	710	694
Hong Kong	729	733	730	709	683	684	683	667
South Korea	748	747	749	729	707	708	707	687
Southeast Asia	**662**	**711**	**602**	**603**	**591**	**605**	**616**	**618**
Brunei	n.a.	n.a.	453	467	523	514	521	519
Cambodia	n.a.	n.a.	248	234	244	288	313	379
Indonesia	598	685	739	733	714	695	693	676
Malaysia	750	749	748	746	706	702	694	679
Philippines	483	632	628	605	536	603	642	626
Singapore	751	746	750	688	696	704	702	703
Thailand	727	743	743	730	709	712	708	690
Vietnam	n.a.	n.a.	504	620	597	625	657	674
South Asia	**415**	**464**	**491**	**539**	**509**	**517**	**578**	**537**
Bangladesh	139	247	323	425	411	410	585	633
India	709	734	741	748	708	708	707	692
Nepal	n.a.	n.a.	322	354	348	367	424	209
Pakistan	332	347	451	591	588	553	553	535
Sri Lanka	478	526	620	578	490	545	621	616
Central and West Asia	**n.a.**	**n.a.**	**336**	**395**	**386**	**412**	**433**	**492**
Armenia	n.a.	n.a.	308	331	306	335	372	459
Azerbaijan	n.a.	n.a.	281	298	264	276	342	455
Georgia	n.a.	n.a.	294	427	447	482	510	534
Kazakhstan	n.a.	n.a.	422	567	550	583	593	595
Kyrgyzstan	n.a.	n.a.	374	352	361	386	348	418

Non-Global production network (non-GPN) products

	1990-96	1997-99	2000-04	2005-08	2009-10	2011-13	2014-16	2017
North Asia	**1,461**	**1,445**	**1,439**	**1,430**	**1,420**	**1,420**	**1,416**	**1,362**
China	1,512	1,487	1,481	1,470	1,461	1,455	1,451	1,398
Hong Kong	1,427	1,412	1,398	1,383	1,361	1,363	1,356	1,300
South Korea	1,444	1,437	1,437	1,436	1,437	1,441	1,441	1,389
Southeast Asia	**1,220**	**1,290**	**1,022**	**1,062**	**1,073**	**1,096**	**1,108**	**1,115**
Brunei	n.a.	n.a.	515	529	698	681	668	686
Cambodia	n.a.	n.a.	241	250	256	314	354	442
Indonesia	1,103	1,245	1,387	1,376	1,346	1,348	1,351	1,312
Malaysia	1,447	1,406	1,407	1,415	1,413	1,408	1,403	1,346
Philippines	685	923	925	947	846	909	936	999
Singapore	1,533	1,474	1,467	1,399	1,426	1,443	1,437	1,442
Thailand	1,333	1,401	1,387	1,414	1,424	1,436	1,430	1,387
Vietnam	n.a.	n.a.	843	1,163	1,171	1,225	1,283	1,303
South Asia	**665**	**733**	**810**	**910**	**882**	**905**	**1,013**	**977**
Bangladesh	124	253	394	584	600	598	954	1,098
India	1,378	1,427	1,468	1,474	1,459	1,460	1,459	1,409
Nepal	n.a.	n.a.	518	541	526	531	619	381
Pakistan	468	493	697	1,004	1,042	1,019	986	935
Sri Lanka	689	758	975	949	785	917	1,049	1,063
Central and West Asia	**n.a.**	**n.a.**	**503**	**572**	**554**	**594**	**618**	**710**
Armenia	n.a.	n.a.	464	549	471	476	546	692
Azerbaijan	n.a.	n.a.	403	428	374	370	432	562
Georgia	n.a.	n.a.	498	571	615	700	747	780
Kazakhstan	n.a.	n.a.	602	807	835	878	911	978
Kyrgyzstan	n.a.	n.a.	546	507	475	546	453	536

Note: [1] n.a. denotes non-available data.

Source: Author's calculations based on the UN Comtrade database.