Global value chain: An empirical investigation of Bangladesh's garments and textile industry

 Md. Sumon Hossain [(a)]* Jaap van Baars [(b)]

[(a,b)] *Assistant Professor(s), Kyungdong University, Department of Business Administration, 46, Bongpo 4-Gil, Toseong-Myeon, Goseong-Gun, Gangwon-do, Korea*

ARTICLE INFO

ABSTRACT

Bangladesh is the second-largest garments and textile exporting country in the world and has more than 80 percent of its total export earnings from this sector. Despite it playing a significant role in policymaking in developing countries like Bangladesh, there is a gap in study regarding the effect of participation and position of garments and textile industry in the global value chain (GVC). This paper empirically analyses the participation and position of Bangladesh's garments and textile industry in the context of the GVC by using the multiregional Input-Output table EORA Global MIRO. We found that this country has a comparative edge in terms of low-cost production and specialization and makes a significant contribution to the global garments industry, but it has not been able to fully integrate into the global production network. We also found that Bangladesh's garments and textile industry have higher backward participation than forwarding participation and occupy a downstream position in GVC. However, the downstream phases contribute to a large percentage of this country's trade. The findings of the study suggest that enhancing the GVC participation of Bangladesh's garments and textile industry may have a substantial positive impact on the local industry. To boost the capability, there must be local requirements, such as adequate backward linkage for the manufacturing process, research and development for innovation, fewer regulatory restrictions, a mature money market in international operation, and a favorable environment for foreign investors.

Introduction

The Readymade Garments industry (RMG) is a simple process to transform an economy from an agriculturally oriented one into an industry-focused economy (Kim et al., 2006). RMG is the starting point of economic development in many Asian countries (Chen et al., 2017). In the last twenty years, many garment and textile manufacturers have shifted to Asia, in particular China, which has become the leading exporter of textiles, followed by Bangladesh (Taplin, 2014). The RMG industry has played a pivotal role in the shaping of Bangladesh's economy since the mid-1990s. This particular industry is seen as a symbol of the country's dynamism in the world economy. This sector is also the leading non-agricultural sector, which has been creating job opportunities for impoverished people. A significant amount of these workers lack a high level of education and typically migrated from rural areas. The garment industry has been contributing to poverty reduction in Bangladesh by providing job opportunities with higher wages. Bangladesh's trade flow as well as the trade effect on the competitiveness of the garment industry. They suggest that increased open trade and greater export competitiveness contribute to higher rates of economic growth Yunus, M., & Yamagata, T. (2012). These improvements were the result of changes in horizontal relationship and the GVC within the garment industry.

GVC are a set of cross border activities of repetitive movement required to transform raw materials and intermediate goods into a final product. The extension of global value chain has brought new challenges for Bangladesh's garments industry. Over time the vertical integration process has lost its potency in most of the cases. Instead, firms are increasingly more involved in geographically and organisationally fragmented processes across a number of specialized facilities. These operating activities are often distributed

in different countries. However, developed countries take a part of high value-added activities (e.g., designing, branding, research and development) and least developed countries (LDCs) typically emphasize on low-value- added or labour incentive activities (e.g., final assembly). Therefore, trading with only final goods can provide a narrow participation in GVCs. There is no existing platform for LDCs for high value-added operations which are fully loaded by multinational corporations (MNCs). These MNCs are operating global value chains as well as setting global standards. Now that standard should be considered for participating in the GVC, especially for the least developed countries (LDCs) like Bangladesh.

The contribution of this study is twofold. Our first aim is to examine the contribution of value-added in Bangladesh's garments export, as well as the level of specialization in Bangladesh's garments industry. Second, the study investigates the position and participation of Bangladesh's garment industry in the GVC.

The result indicate that Bangladesh has made significant contributions to the global garment industry and improved its low cost manufacturing and specialization capabilities, but has not yet fully integrated into the global manufacturing network. Due to the low level of participation in GVCs, the country might not expect a higher flow of FDI. In addition, we found that the backward participation is greater than the forward participation of the garment and textile industries in Bangladesh, and occupies a lower position in the Global Value Chain. It signifies that the country's manufacturing capabilities have developed to their highest levels.

Next section presents the literature review. The section 3 focuses on the main characteristics of a general cross-country Input-Output model used to measure domestic, foreign, and indirect value-added. Then we repeat the same practice to measure the comparative advantage and GVC participation as well as position. Section 4 presents the empirical analysis and a discussion of the results which consists of backward and forward participation, GVC participation and position, comparative advantage, Value-Added Export (VAX) ratio, and domestic and foreign value-added share of total export. Finally, section 5 concludes the article with a summary of the findings.

Literature Review

In the last two decades, the expression GVC has emerged in the global market literature, and is currently seeing an increase in academic interest. (Kano et al., 2020). It originates from the global commodity chain. Gereffi and Fernandex (2011) identified a value chain as the broad range of actions that businesses and employees perform in order to get a product from its creation to its end stage, and this phase is referred to as a global value chain (GVC) because these activities are spread out over many countries.

The value-added immersion in intermediate products can be found across national borders, resulting in a double counting in typical trade flows (Ahmed et al., 2016). A variety of methods for pinning domestic and international content are contained in the overall export flow (Hummels et al., 2001; Johnson & Noguera, 2012; Koopman et al., 2014). To assess the contribution, a number of metrics have been used to quantify the percentage of trade flow that is related to GVC (Borin & Mancini, 2015; Gereffi et al., 2005; Hummels et al., 2001; Koopman et al., 2014). Moreover the backward and forward participation is used to determine GVC engagement. The share of foreign value-added in domestic export is referred to as backward participation and the share of domestic value-added in foreign export is referred to as forward participation(Javorsek & Camacho, 2015; Koopman et al., 2014). Many scholars discovered variation in GVC over different periods of time (Amador et al., 2015; Amador & Cabral, 2016; Grodzicki & Geodecki, 2016; Hoekman, 2014; Leitner & Stehrer, 2014).

According to Leitner and Stehrer (2014), the intensity of vertical specialisation has risen in most new EU member states, which is advantageous to export development effectively. Their findings suggest that export development and the degree of vertical specialisation are mutually reinforcing. In addition, evidence suggests that global value chains are increasingly fragmented internationally (Los et al., 2015). Amador et al. (2015) explore that GVCs for euro area members, China is more important than the US and Japan. The role of GVCs in European countries, as measured by their foreign value-added share in export, is balanced by their relative perseverance in the face of trade collapse. Furthermore, they discovered substantial variability between countries in the evolution of GVCs from 2000 to 2011. Grodzicki and Geodecki (2016) note that participation in the GVC hastened deindustrialisation and CEE affiliated countries are in a stronger situation than southern countries, mostly because of their continued reliance on foreign resources and technology.

According to Amador and Cabral (2016), common sources of GVC participation includes: dropping trade and investment rates, globalisation, international trade barriers, EU augmentation, and innovation, are all priorities. Hoekman (2014), found that constant heterogeneity in trade prices, which is dictated by a country's integration among their domestic market and foreign markets as a major cause of GVC heterogeneity. He also discovered that a country's capabilities, as well as the security of foreign investments are determinants of its GVC participation.

Another study focused on the textile industry in Pakistan, concluding on the basis of GVC that Pakistan carriers an advantage comparatively, particularly in the areas of cotton and textile make ups (Javed & Atif, 2021).

Research and Methodology

The data is compiled using the EORA Global Multi-Region Input-Output (MRIO)(Lenzen et al., 2013). From 1990-2015, this dataset assigns world input-output tables to more than 180 countries. The input-output table could also be obtained from another source, but

the number of countries and years is constrained. The OECD Inter-Country Input-Output (ICIO) tables and the World Input-Output Database (WIOD) are the most commonly used. However, this input-output table reveals periods from 1995-2011 for 63 countries and 34 industrial sectors. It has been expanding recently but it remains smaller than the EORA database. The WIOD applies to a matching period, but only for 40 countries and 35 industries. The Global Trade Analysis Project (GTAP) has a greater amount of countries available for matching years. Taking this into account, we decided to use the compressed EORA database.

Koopman et al. (2014) display an exhaustive explanation as well as description of the basic concepts necessary for evaluating trade in value-added expressions, both in a simple two country one sector case, and in a general case of G countries and N sectors.

$$X = AX + Y$$

We can rearrange the equation (1) such that $X = BY$, where

$$B = (I - A)^{-1}$$

Let X be the gross output matrix. Gross output is seen as intermediate goods or as final goods. A is the matrix of input-output coefficients, illustrating the units of intermediate goods required to construct one unit of gross output. Therefore AX is the matrix of goods for intermediate use (the T matrix in Eora.) Y is the matrix of goods used for final demand (the FD matrix in Eora).

B is the Leontief inverse matrix, which indicates the elements of total output and requires both elements directly and indirectly to create a unit of goods for final demand. To calculate the Leontief inverse matrix, we need to recover A, the matrix of input-output coefficients (Leontief, 1986).

Domestic and foreign value-added

To compute foreign value-added (FVA) and domestic value-added (DVA), we require rectifying the matrix of value-added shares, $\hat{V}$ also called the value-added coefficients matrix. $\hat{V}$ can be obtained by summing across rows of the A matrix, putting these elements on the diagonal of a square matrix and subtracting it from an identity matrix of size GN (country*sector), as follows:

$$\hat{V} = I_{GN*GN} - diag(\sum_{S}^{GN} A_{S1} .... \sum_{S}^{GN} A_{SGN}$$

$$\hat{V} = \begin{bmatrix} \hat{v}_1 & 0 & 0 \\ 0 & \hat{v}_2 & 0 \\ 0 & 0 & \hat{v}_{GN} \end{bmatrix}$$

T_V Indicates trade in value-added and $\hat{E}$ the diagonal matrix of gross export. T_V Mainly discusses how the value-added accommodates in gross export of the country and industry.

$$T_V = \hat{V} * L * \hat{E}$$

T_v Matrix in block matrix notation:

$$T_v = \begin{bmatrix} T_{v11} & T_{v11} & T_{v11} \\ T_{v11} & T_{v22} & T_{v11} \\ T_{v11} & T_{v11} & T_{vGG} \end{bmatrix}$$

In this section, we can calculate the domestic value-added (DVA), the indirect value-added export (DVX), and the foreign value-added (FVA).

$$DVA = diag(T_V)$$

The DVA for every country is given by the diagonal elements of the T_v matrix.

$$FVA = \sum_{j=1}^{n} T_{v,ij} - diag(T_V)$$

FVA for each country can be computed by simply summing up all the blocks in the corresponding column and subtracting the diagonal block matrix. Note that DVA and FVA, by construction, always add up to gross exports (or to unity if expressed as ratios to gross exports).

$$DVX = \sum_{i=1}^{n} T_{v,ij} - diag(T_V)$$

DVX for each sector of the country can be computed by summing up all the blocks in the corresponding row and deducting the diagonal block matrix. Similarly, we can compute DVA, DVX, and FVA at the country sector level, by summing over only over the corresponding rows or columns of the country block matrix.

Revealed comparative advantage

We adopt the concept of RCA, which is originally formulated by Balassa (1965). The RCA index has measured as follows:

$$RCA_i(s) = \frac{VAX_i(s) / \sum_i VAX_i(s)}{\sum_s VAX_i(s) / \sum_s \sum_i VAX_i(s)}$$

Where i is assigned to the product, s represents the country set, and the full set of our study represents the whole world. If RCA is higher than one, then it shows that this economy is specialized for producing the product i comparatively to other economies in the GVC.

GVC participation and position

Many researchers have calculated GVCs in the past, but they do not adequately represent the degree of a country's presence in such chains (Balassa, 1958). As a result, such tests are unable to determine the proportion of imported intermediates used in a country's exports versus domestic demand.

Koopman et al. (2014) described the GVC participation index, which is the amount of the foreign value-added embodied in gross export (backward GVC participation labelled as FVA), and the sum of domestic value-added embodied in the third country's export (forward GVC participation marked as DVX). This index shows the strength of GVC consolidation of a given country.

$$GVC_{participation} = \frac{FVA + DVX}{GrossExport}$$

The higher the ratio of participation means the involvement potential of a particular country is excellent in GVCs.

Koopman et al. (2014) described a position index that distinguishes the relative upstream of a country in a particular industry. They suggest measuring upstream as the log ratio of a country's supply of intermediates used in other countries' exports to the use of imported intermediates in its production. The position index is measured as follows:

$$\ln(1 + \frac{DVX}{GrossExports}) - \ln(1 + \frac{FVA}{GrossExport})$$

Countries with a large position index are in comparison more upstream. They deliver additional value-added to other country's exports rather than other countries give to their own. Of course, two countries should have identical values of the GVC position index in a sector even though they have very different degrees of participation in GVCs. Therefore, the position index should be used in conjunction with the participation index, which summarizes the importance of the global supply chain for that country.

Result and Discussion

Vax ratio

Johnson and Noguera (2012) suggested a ratio of value-added export to gross export (VAX ratio). This is a measure of how integrated a country is in the global manufacturing chain (Johnson & Noguera, 2012). We calculated the VAX ratio on a whole industry basis and individual textile industry basis to determine the percentage of
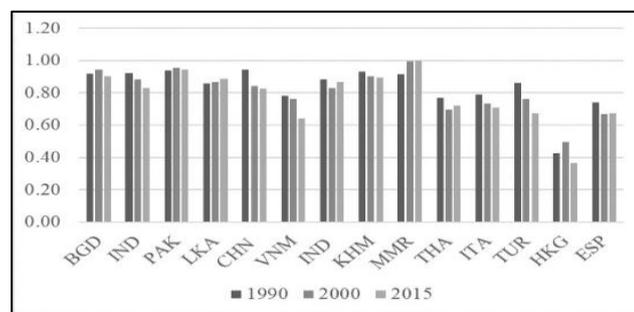

Figure 1: Value-added export (VAX) ratio from country; *Source:* Authors

textile and apparel exports in total exports. The findings are depicted in Figures 1 and 2. The VAX ratio was used as a method to categorize the countries. At the aggregated national level, most of countries showed a drop in the VAX ratio from 1990-2015.
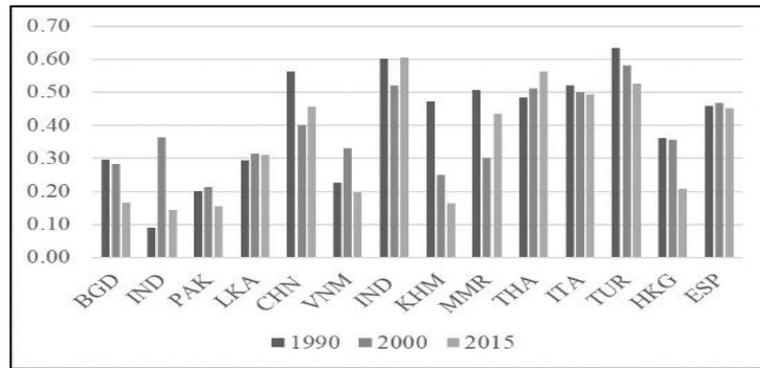
Figure 2: Value-added export (VAX) ratio from textile industry; *Source:* Authors

This might be due to the increase in processing trade and fragmentation in the global manufacturing industry. Bangladesh tops the list with the highest VAX ratio within this group of countries, after Pakistan (94 percent in 1995 and 2000). Unexpectedly, Cambodia and Myanmar are in the top of the VAX ratio, while Hong Kong's is surprisingly low.

When compared to the aggregate level, textile and clothing displays several distinct patterns (see Fig.2). Bangladesh, Pakistan, Sri Lanka, and Spain exhibit no consistent pattern in this market, whereas the VAX ratio decreased in China, Cambodia, Thailand, Italy, and Turkey. The highest VAX ratio is 64 percent in Indonesia, followed by 61 percent in Thailand, 58 percent in Turkey, and 54 percent in Italy. Bangladesh has a poor VAX ratio in this market (29 percent in 1990). It dropped dramatically from 25 percent in 2005 and 16 percent in 2015. The VAX ratio at the country level is the polar opposite of the VAX ratio at the industry level. However, Bangladesh's textile and apparel sector are losing value-added content as a consequence of enhanced trade openness.

Revealed comparative advantage

We used the revealed comparative advantage (RCA) to find specialised countries that produce textile and clothing. We placed VAX in terms of export in Balassa's (1965) formula to compute RCA index, according to Eq. (10). This model illustrates how globalisation affects competitive advantage and specialisation in specific economies.

RCA indices of all economies in the textile and clothing manufacturing industry are more comprehensive in the selected years. When the RCA is greater than one, the country has a revealed comparative in that area; when it is less than one, the country has a revealed comparative disadvantage in that area (Koopman et al., 2014). In 2015, all of the countries that are specialized in textile and apparel manufacturing, except for India and Myanmar, are shown in Figure 3. In 2015, the RCA index for Vietnam and Indonesia were relatively low. However, from 1990-2015, the majority of country's RCA indices did not show any steady growth.
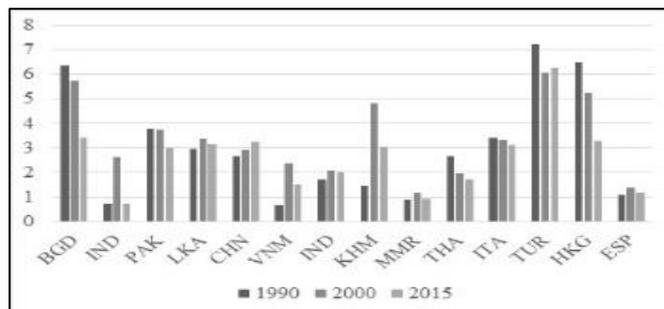

Figure 3: Revealed comparative advantage (RCA) of selected economies; *Source:* Authors

Decomposition of gross export

Figure 4 displays a comprehensive decomposition of each country's gross export based on the domestic and foreign value-added for 189 countries from 1990-2015. Bangladesh has the highest share of domestic value-added in gross export after Pakistan and Myanmar, and the lowest share of foreign value-added contents in gross export of garments. From 1990-2015, Bangladesh's domestic value-added share in its export is 91 percent, indicating that the most of the export are composed of its own commodities. In comparison, the lowest domestic value-added in gross exports is found in Vietnam and Hong Kong at 44 and 40 percent, indicating that Hong-Kong and Vietnam's foreign value-added accounts for more than half the value of its processing export.
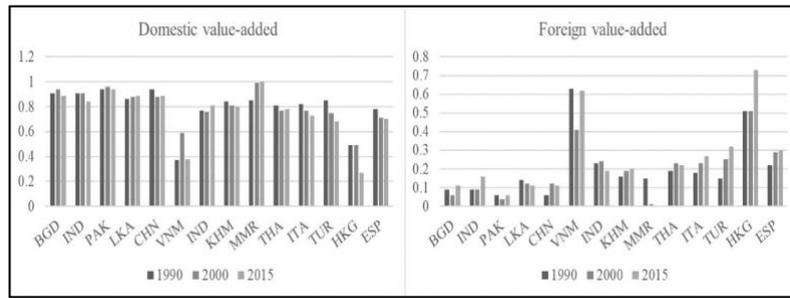
Figure 4: Domestic and foreign value-added shares of total final export of Textile and Apparel sector; *Source:* Authors

It implies that Bangladesh is more reliant on composite industry for its ultimate final outputs, which takes control over all stages for final production. As a result, Bangladesh's garments production is less vertically fragmented on a worldwide scale. However, Myanmar and Pakistan both produce raw materials. Therefore, their domestic value-added share in export is fairly substantial, despite their inefficient integration of manufacturing. Hong-Kong and Vietnam are extremely reliant on other nation for their Processing garments export. As a consequence, their foreign value-added share in export is rather significant than domestic value-added share.

The proportion of forwarding participation compared to backward participation reveals a country's dominance in the global value chain. The nation is further upstream in the supply chain when forward participation surpasses backward participation. It means the economy has honed in on the early stages of demand. On the other hand, when forward participation is lower than backward participation the country is further down the value chain. It denotes that the country's competencies in the final stages of manufacturing have been developed(Koopman et al., 2014).

Figure 5 represents the forward participation of textile and apparel sector. Forward participation is defined as indirect domestic value-added content plus domestic value-added content in intermediate export that finally return home, whereas backward participation is defined as foreign value-added content. However, forward participation in Bangladesh's garments industry is dwindling. It indicates that, Bangladesh's reimports are decreasing, but the backward linkage is increasing on the last stage production in garment industry. To put in another way, Bangladesh's garments industry is predominantly a supplier of domestic value-added As a consequence, Bangladesh benefits from a greater percentage of domestically made final goods over the long run in the local supply chain.
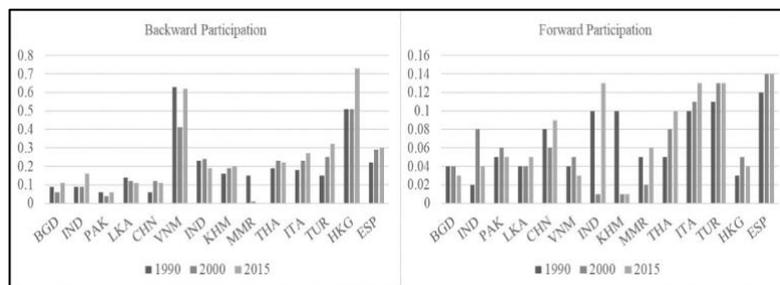

Figure 5: Backward and forward participation of Textile and Apparel sector; *Source:* Authors

To put in another way, Bangladesh's garments industry is predominantly a supplier of domestic value-added. As a consequence, Bangladesh benefits from a greater percentage of domestically made final goods over the long run in the local supply chain. In comparison, Myanmar's backward participation is lower than forward participation. It implies that this country's effort has been focused on the early stage of final demand.

GVC participation and position

The position of a nation in the value chain is determined by its competitive advantage Based on its specialty, a country may be upstream or downstream. If a country is located upstream in the global value chain, it contributes by supplying inputs to other intermediaries in the form of raw materials (such as Myanmar). The indirect value-added export (DVX) share of gross export for such a country will be greater than the foreign value-added (FVA) share. In contrast, if a country is downstream in the GVC, it will require a big percentage of intermediates goods from other nations to manufacture end products for export, and its foreign value-added (FVA) share will be larger than indirect value-added (DVX) share. Figure 6 depicts the relationship between GVC participation index (vertical axis) and position index (horizontal axis) for major textile exporting countries in the year 2015. Except for Myanmar, all of the countries occupy a downstream position index in the GVC, indicating that Myanmar is a first stage manufacturing specialist. Bangladesh, China, India, Pakistan, Sri Lanka have trivial value for the position index in GVC, but their participation index is very low.
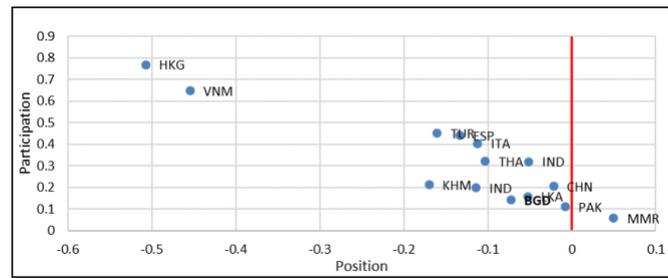
Figure 6: Backward and forward participation of Textile and Apparel sector; *Source:* Authors

It indicates that developed countries are a considerably more essential element in the GVC regarding the garment industry. Hong-Kong and Vietnam have the most downstream location according to the position index, but the participation index for them (all in excess of 65 percent) shows that fabrication using largely imported items is a key aspect of their export in the garments sector.

Bangladesh's garments industry has the lowest GVC participation among the nations investigated besides Pakistan and Myanmar, accounting for roughly 10 percent of the country's total gross export on average from 1990-2015. However, a stronger market atmosphere, political prosperity, and infrastructural efficiency can boost GVC participation in Bangladesh's gross export.

Conclusion

This study investigates the Bangladesh garments manufacturing industry in further depth by assessing participation and position in the global value chain, using data from the EORA multiregional input-output table and a sample of 189 advanced and emerging market economies over time. Bangladesh has been evaluated and compared to higher garment exporting economies using the VAX ratio, comparative advantage (scale of specialisation) for the clothing manufacturing business. Furthermore, position and participation has been established as a new criterion for placing the domestic sector in a global context.

The research has been focused on the following outcome. According to our RCA index and the structure of the value-added export (VAX) Bangladesh has the greatest comparative advantage in garment manufacturing in the final stage of the production. Therefore, Bangladesh has become a global hot spot for clothing industry. Bangladesh accounts for a significant portion of the global contribution to the garment manufacturing industry. However, when this part is compared to the value-added of Bangladesh's final product, it is found that Bangladesh is an exporter, implying that other countries contributed less value to Bangladesh's garments sector than Bangladesh's contribution of value-added to the global clothing industry. Following up on our study into the structure of GVC participation and position, we discovered that Bangladesh appears to be minimally incorporated into GVC among the nations we looked at. Bangladesh has the highest DVA compared to FVA, despite its indirect DVX being significantly lower than both domestic and foreign value-added. It indicates that this country is skilled in the last phases of production. As a result, this country's GVC has shifted downstream. Bangladesh should plan to increase its backward linkage engagement in order to rise up in the GVC and retain its competitiveness in this area.

References

Ahmed, J. U., Rifat, A., Nisha, N., Manirujjaman, M., & Shrensky, R. (2016). Beyond the Border: Yellow Goes International. *Global Business Review*, *17*(5), 1094–1106. https://doi.org/10.1177/0972150916656666

Amador, J., & Cabral, S. (2016). Global value chains: A survey of drivers and measures. *Journal of Economic Surveys*, *30*(2), 278–301. https://doi.org/10.1111/joes.12097

Amador, J., Cappariello, R., & Stehrer, R. (2015). Global value chains: A view from the euro area. In *ECB Working Paper: Vol. March* (Issue 1761). https://doi.org/10.1111/asej.12050

Balassa, B. (1958). Trade liberalisation and "Revealed" comparative advantage. *The Manchester School*, *33*(2), 99–123.

Borin, A., & Mancini, M. (2015). *Follow the value added: bilateral gross export accounting*. https://doi.org/:10.13140/RG.2.2.28615.60323

Chen, W., Lau, C. K. M., Boansi, D., & Bilgin, M. H. (2017). Effects of trade cost on the textile and apparel market: evidence from Asian countries. *Journal of the Textile Institute*, *108*(6), 971–986. https://doi.org/10.1080/00405000.2016.1206459

Gereffi, G., Humphrey, J., & Sturgeon, T. (2005). The governance of global value chains. *Review of International Political Economy*, *12*(1), 78–104. https://doi.org/10.1080/09692290500049805

Grodzicki, M. J., & Geodecki, T. (2016). New Dimensions of Core-Periphery Relations in an Economically Integrated Europe: The Role of Global Value Chains. *Eastern European Economics*, *54*(5), 377–404. https://doi.org/10.1080/00128775.2016.1201426

Hoekman, B. (2014). Supply chains, mega-regionals and multilateralism: a road map for the WTO. *Robert Schuman Centre for Advanced Studies*, *Research P*. Retrieved from http://www.cepr.org

Hummels, D., Ishii, J., & Yi, K.-M. (2001). The nature and growth of vertical specialization in world trade. *Journal of International Economics*, *54*, 75–96. https://doi.org/10.2139/ssrn.163193

Javed, A., & Atif, R. M. (2021). Global Value Chain: An Analysis of Pakistan's Textile Sector. *Global Business Review*, *22*(4), 879–892. https://doi.org/10.1177/0972150918822109

Javorsek, M., & Camacho, I. (2015). *Trade in value added: Concepts, estimation and analysis*. Retrieved from http://hdl.handle.net/10419/145386

Johnson, R. C., & Noguera, G. (2012). Accounting for intermediates: Production sharing and trade in value added. *Journal of International Economics*, *86*(2), 224–236. https://doi.org/10.1016/j.jinteco.2011.10.003

Kano, L., Tsang, E. W. K., & Yeung, H. W. chung. (2020). Global value chains: A review of the multi-disciplinary literature. *Journal of International Business Studies*, *51*(4), 577–622. https://doi.org/10.1057/s41267-020-00304-2

Kim, J. O., Traore, M. K., & Warfield, C. (2006). The textile and apparel industry in developing countries. *Textile Progress*, *38*(3), 1–64. https://doi.org/10.1533/tepr.2006.0003

Koopman, R., Wang, Z., & Wei, S.-J. (2014). Tracing Value-Added and Double Counting. *American Economic Review*, *104*(2), 459–494. Retrieved from http://www.nber.org/papers/w16426

Leitner, S. M., & Stehrer, R. (2014). *Trade Integration, Production Fragmentation and Performance in Europe - Blessing or Curse? A Comparative Analysis of the New Member States and the EU-15*, 5, wiiw Research Report, No. 397, The Vienna Institute for International Economic Studies (wiiw), Vienna. Retrieved from http://hdl.handle.net/10419/204169

Lenzen, M., Moran, D., Kanemoto, K., & Geschke, A. (2013). Building Eora: a Global Multi-Region Input-Output Database At High Country and Sector Resolution. *Economic Systems Research*, *25*(1), 20–49. https://doi.org/10.1080/09535314.2013.769938

Leontief, W. (1986). *Input-Output economics*. Oxford University Press.

Los, B., Timmer, M. P., & de Vries, G. J. (2015). How global are global value chains? A new approach to measure international fragmentation. *Journal of Regional Science*, *55*(1), 66–92. https://doi.org/10.1111/jors.12121

Taplin, I. M. (2014). Global commodity chains and fast fashion: How the apparel industry continues to re-invent itself. *Competition and Change*, *18*(3), 246–264. https://doi.org/10.1179/1024529414Z.00000000059

Yunus, M., & Yamagata, T. (2012), the garment industry in Bangladesh, in Fukunishi, T., Ed., Dynamics of the garment industry in low income countries: experience of Asia and Africa, *Interim Report*, Chousaken Kyu, Huokokusho, IDE-JETRO, Chapter 6

Appendix

Table 1: Framework of GVC flows

		Intermediate use		Final demand		
		Country A	Country B	Country A	Country B	Gross output
		industry	industry	industry	industry	
Country A	industry	Intermediate use of domestic output	Intermediate use by B of export from A	Final use of domestic output	Final use by B of export from A	X_A
Country B	industry	Intermediate use by A of export from B	Intermediate use of domestic output	Final use by A of export from B	Final use of domestic output	X_B
Value added		V_A	V_B			
Gross output		X_A	X_B			

Source: UNCTAD (2013)

Input output table framework

To understand the structure of the input output table. We have shown an example of an input-output table is presented in Figure 1. Every country represents only one sector in three keywords of an input-output table are:

1. Intermediate goods demand (the T matrix in Eora),

2. Final demand (the FD matrix in Eora), and

3. Value-added or primary inputs (the VA matrix in Eora)

Table 2: Sector aggregation

Sector
Agriculture
Fishing
Mining and Quarrying
Food & Beverages
Textiles and Wearing Apparel
Wood and Paper
Petroleum, Chemical and Non-Metallic Mineral Products
Metal Products
Electrical and Machinery
Transport Equipment
Other Manufacturing
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

Source: Eora Global MIRO

Table 3: Economy code

Code	Economy
BGD	Bangladesh
IND	India
PAK	Pakistan
LKA	Sri Lanka
CHN	China
VNM	Vietnam
IND	Indonesia
KHM	Cambodia
MMP	Myanmar
THA	Thailand
ITA	Italy
TUR	Turkey
HKG	Hong Kong
ESP	Spain

Source: Eora Global MIRO

Publisher's Note: SSBFNET stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.