

DRIVERS AND BENEFITS OF ENHANCING PARTICIPATION IN GLOBAL VALUE CHAINS

LESSONS FOR INDIA

Sabyasachi Mitra, Abhijit Sen Gupta, and Atul Sanganerla

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Drivers and Benefits of Enhancing Participation in Global Value Chains: Lessons for India

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CONTENTS

TABLES AND FIGURES	iv
ABSTRACT	vi
I INTRODUCTION	1
II LITERATURE REVIEW	3
III INDIA'S INTEGRATION IN GLOBAL VALUE CHAINS	6
IV ECONOMIC AND INSTITUTIONAL DETERMINANTS OF GLOBAL VALUE CHAIN PARTICIPATION	15
A. Trade Costs and Trade Facilitation	15
B. Foreign Direct Investment	17
C. Quality of Infrastructure	18
D. Quality of Institutions	19
E. Business Environment	21
F. Skill Development	22
V DRIVERS AND BENEFITS OF GLOBAL VALUE CHAIN PARTICIPATION: EMPIRICAL ANALYSIS	24
A. Drivers of Global Value Chain Participation	24
B. Benefits of Global Value Chain Participation	29
VI CONCLUSIONS AND POLICY RECOMMENDATIONS	31

TABLES AND FIGURES

TABLES

1	Summary Statistics of Key Variables	26
2	Key Determinants of Global Value Chain Participation	26

FIGURES

1	Global Value Chain and Traditional Exports Worldwide, 2017	8
2	Global Value Chain Exports, 2017	8
3	Backward Participation Ratio, 2017	9
4	Forward Participation Ratio, 2017	10
5	Change in Global Value Chain Participation between 2010 and 2017	10
6	Top Destinations of India's Global Value Chain Exports, 2017	11
7	Composition of Global Value Chain Exports Worldwide	12
8	Composition of India's Global Value Chain Exports by Sector, 2017	12
9	Composition of India's Global Value Chain Exports by Participation, 2017	13
10	Share and Growth of Major Sectors in India's Global Value Chain Exports	14
11	A Comparison of the Share of Asian Economies in Global Value Chain Exports, 2017	14
12	Weighted Tariffs and Global Value Chain Participation, 2010–2017	15
13	Evolution of Weighted Tariffs, 2010–2017	15
14	Customs Burden and Global Value Chain Participation, 2010–2017	16
15	Evolution of Customs Burden, 2010–2017	16
16	Inward Foreign Direct Investment Stocks and Global Value Chain Exports	17
17	Foreign Direct Investment Restrictiveness Index and Global Value Chain Participation	17
18	Quality of Power and Global Value Chain Participation, 2010–2017	19
19	Evolution of Power Infrastructure, 2010–2017	19
20	Transport Infrastructure and Global Value Chain Participation, 2010–2017	20
21	Evolution of Road Quality, 2010–2017	20
22	Institutional Quality and Global Value Chain Participation, 2010–2017	21
23	Evolution of Institutional Quality, 2010–2017	21
24	Ease of Doing Business Score and Global Value Chain Participation, 2010–2017	21
25	Contract Enforcement and Global Value Chain Participation, 2010–2017	22
26	Resolution of Insolvency and Global Value Chain Participation, 2010–2017	22
27	Comparison of Contract Enforcement Index, 2018	23
28	Comparison of Resolution of Insolvency Index, 2018	23
29	Skill Quality and Global Value Chain Participation, 2010–2017	23
30	Distribution of Countries According to Global Value Chain Participation	25
31	Impact of GVC Participation on Economic Outcomes	30

ANNEXES

1	Classification of Sectors in the Multiregional Input–Output Database of the Asian Development Bank	34
2	Economies Covered in the Multiregional Input–Output Database of the Asian Development Bank	35
3	Key Determinants of GVC Participation	36

ANNEX TABLES

3.1	Determinants of GVC Participation in Primary Products	36
3.2	Determinants of GVC Participation in Manufacturing Products	36
3.3	Determinants of GVC Participation in Services	37
3.4	Determinants of GVC Participation (Lagged Explanatory Variables)	37

ABSTRACT

In the last 2 decades, global production has become increasingly fragmented and organized around global value chains (GVCs). Enhancing participation in GVCs has been found to facilitate a wide range of development outcomes that a country at India's stage of development strives to achieve including generating productive employment opportunities, increasing labor productivity, and gaining a larger share of global exports. However, these benefits are not preordained, and countries have to surmount several bottlenecks to participate in GVCs and move to more sophisticated sectors and activities. The paper contributes to the nascent but growing literature on drivers and economic outcomes of enhanced GVC participation. The paper uses a new multi-regional input-output database (MRIOD) developed in the Asian Development Bank and highlights the role of various drivers of GVC participation across primary, manufacturing, and services sectors. The paper further decomposes GVC participation into backward and forward participation, and evaluates the drivers and economic consequences of participating in different segments of GVCs. Our results indicate that a country could be successful in increasing its GVC participation if it reduces tariffs, improves customs efficiency, strengthens infrastructure, upgrades institutional quality, improves skill quality, and brings in flexibility in the labor market. GVC participation also contributes to raising per capita income, labor productivity, investment, and exports.

JEL Classification: F15, F31, L23, and L24

Keywords: global value chains, gains from trade, international linkages, policy coordination

I. INTRODUCTION

1. India's standing in the global economy has increased significantly during the last 25 years. Its share in world output (measured in US\$) has increased from 1.4% in 1990 to over 3.2% in 2017.¹ The rise has been even more substantial in terms of purchasing power parity with India's share in global output rising from 3.4% to 7.3% during this period, and India emerging as the third largest economy in the world. However, India's export performance has trailed, accounting for only 2.1% of global exports of goods and services. India's share in global merchandise exports is even smaller at 1.7%.² This is lower than other smaller economies like the Republic of Korea; Hong Kong, China; Mexico; and the Russian Federation.

2. The central cause of India's low export share may lie in the decades of export pessimism and import substitution strategy that India followed from independence (in 1947) to the late 1970s. The policy paradigm entailed an intricate maze of regulations that shielded domestic producers from international competition through stringent restrictions on imports and allowed firms extensive monopoly by curbing competition. Consequently, firms had little incentive to improve their competitiveness and venture into the risky export markets. In addition, the inability to produce competitively owing to poor infrastructure, unavailability of raw material, and lack of ability to import intermediate goods prevented firms from engaging in exports. This resulted in India's exports accounting for only 7.1% of its gross domestic product (GDP) in 1990, well below other economies like the People's Republic of China (the PRC, 13.6%), the Republic of Korea (25.3%), Malaysia (74.5%), Indonesia (27.3%), and Thailand (34.1%).³

3. Since 1990s, India has taken a liberalized industrial and trade policy stance, allowing for healthy export growth of 13.4% between 1990 and 2017, with the share of exports in the GDP rising to 19.1% in 2017.⁴ However, India continues to trail most of the East and Southeast Asian economies, where exports account for much higher share of GDP, such as the Republic of Korea (43.1%), Malaysia (71.4%), the Philippines (31.0%), Thailand (68.2%), and Viet Nam (101.6%). Even in the PRC, the share of exports in GDP nearly tripled from 13.6% in 1990 to 36.1% in 2006.⁵ The share has declined in recent years with the PRC focusing on rebalancing its growth strategy by reducing its dependence on external demand and enhancing the role of domestic consumption.

4. Economic openness and export-led growth have been able to deliver major development benefits to a large number of economies, especially in East and Southeast Asia. Exports have proved to be a vital enabler of high growth, job creation, and poverty reduction through a variety of channels. Exposure to the global market allows dynamic firms to innovate by adopting new technology and cutting costs. By servicing world markets, domestic firms can operate at larger scales, thereby benefitting from reduced costs. Exposure to global competition also provides opportunities for the firms to adopt cutting edge technologies and industry standards from foreign competition.

5. In fact, Haddad and Shepherd (2011) argue that no country in the past 5 decades has been able to maintain high levels of economic growth and improve the living standards of its citizens without increasing integration with the global economy. The correlation between average annual per capita GDP growth and average annual export growth between 1990 and 2017 is more than 0.73.⁶ For example, while the PRC's per capita income grew 28 times between 1990 and 2017 to reach \$8,827, its export value increased

¹ World Bank. 2020. *World Development Indicators 2020*. Washington, D.C.

² Footnote 1.

³ Footnote 1.

⁴ Footnote 1.

⁵ Footnote 1.

⁶ Mona Haddad and Ben Shepherd. 2011. *Managing Openness: From Crisis to Export-Led Growth v2.0*. In Mona Haddad and Ben Shepherd (eds.). *Managing Openness: Trade and Outward-Oriented Growth after the Crisis*, World Bank.

almost 50 times over the same period to \$2.4 trillion. Similarly, Viet Nam experienced a 100-fold increase in exports from \$2.3 billion in 1990 to \$230 billion in 2017, and 25-fold increase in per capita income from \$95 to \$2,342.⁷

6. Over the last decade, policymakers in India have envisaged a strong increase in exports and have articulated ambitious targets in various strategy documents, which have not always been achieved.⁸ To achieve these export targets it is imperative for India to enhance its participation in global value chains (GVCs) for a variety of reasons. First, currently global exports are primarily made up of exports of intermediate products or GVC exports. According to Asian Development Bank (ADB, 2018), GVC exports stood at \$15.7 trillion in 2018, accounting for nearly 70% of global exports of goods and services, which was \$21.7 trillion.⁹ Given the dominance of GVC exports in overall exports, no country can sustain a rapid growth in exports without improving its GVC participation. Second, for an emerging economy like India, GVCs provide new opportunities in engaging with global trade. As pointed out by Baldwin (2006), GVCs involve two types of unbundling.¹⁰ Just as production and consumption are geographically separated, so also are different production activities across stages. In the absence of GVCs, emerging economies would have to develop a complete product to be able to export it. However, this is often not possible owing to various structural and regulatory bottlenecks. The GVCs allow emerging economies like India to enhance their exports of manufactured products by engaging in specific parts of the value chain and producing niche outputs. Third, GVCs help build the capacity of the local firms through cross-border transfer of knowledge, investment, management, and other global best practices. Access to such global best practices offers unprecedented development opportunities to emerging economies and improves their export potential.

7. Apart from enhancing share in global exports, greater participation in GVCs could also contribute to achieving some of India's other developmental goals, such as generating productive jobs, increasing manufacturing share in GDP, and faster and more inclusive growth.

8. This paper presents a cross-country empirical analysis to identify the key drivers of GVC participation across economies, and articulates measures through which India can enhance the same. The paper contributes to the nascent but growing literature on drivers and economic outcomes of better GVC participation. The paper uses a new multi-regional input-output database (MRIOD) developed by the ADB, which includes several economies in the Asia Pacific region. The paper highlights the role of the drivers of GVC participation across primary, manufacturing, and services sectors. The paper decomposes GVC participation into backward and forward participation and evaluates the drivers and economic consequences of participating in different segments of GVCs.

9. Section II provides a brief review of the existing literature on key determinants and benefits of GVC participation. In Section III, the MRIOD is used to evaluate India's current integration with GVCs and compare it with other emerging economies. Section IV reviews the key economic, infrastructural, and institutional determinants of GVC participation. In Section V, the extent to which various factors influence GVC participation is empirically tested. Economic benefits from greater participation in

⁷ Footnote 1.

⁸ The Twelfth Five Year Plan envisaged an increase in merchandise exports from \$300 billion in 2012–13 to \$570 billion in 2016–17. As mentioned in Planning Commission. Government of India. 2011. *Faster, Sustainable and More Inclusive Growth: An Approach to the Twelfth Five Year Plan (2012–2017)*. New Delhi. ⁹ Similarly, the Foreign Trade Policy 2015–2020 targeted an increase in exports of goods and services from \$474 billion in 2014–15 to \$900 billion by 2019–20. As mentioned in Ministry of Commerce and Industry. Government of India. 2015. *Foreign Trade Policy 2015–2020*. New Delhi. ¹⁰ However, India's merchandise exports at the end of 2018–19 stood at \$337 billion and services' exports stood at \$208 billion. As mentioned in Reserve Bank of India. 2019. *Handbook of Statistics on Indian Economy 2018–19*. Mumbai. ⁹ NITI Aayog's Strategy for New India @ 75 aims an increase in exports of goods and services to \$800 billion by 2022–2023. NITI Aayog. As mentioned in Government of India. 2018. *Strategy for New India @ 75*. New Delhi.

⁹ Asian Development Bank. 2018. *Key Indicators for Asia and the Pacific 2018*. Manila.

¹⁰ Richard Baldwin. 2006. Globalisation: The Great Unbundling (s). Economic Council of Finland. 20. pp: 5–47.

GVCs are also analyzed in this section. Given the empirical findings, Section VI outlines the key policy recommendations for India and provides the main conclusions of the paper.

II. LITERATURE REVIEW

10. According to the new trade theory, participation in GVCs leads to better developmental outcomes for countries that are keen to transition to a higher growth trajectory.¹¹ Anecdotal evidence and limited empirical research reveal that participation in GVCs benefited East and Southeast Asian economies like the PRC, the Republic of Korea, Malaysia, Thailand, and Viet Nam in the late 1990s and early 2000s.¹² However, there is limited empirical evidence on the determinants of GVC participation and outcomes for both economies as well as regions.

11. Kowalski et al. (2015) identify structural factors like geography, size of the market, and level of development as the key determinants of GVC participation.¹³ According to them, trade and investment policy reforms as well as improvements of logistics and customs, intellectual property protection, infrastructure, and institutions can also play an active role in determining GVC participation.

12. A couple of other research initiatives reveal the importance of transport infrastructure and trade facilitation. Lanz and Piermartini (2018) find that countries with better transport infrastructure and trade facilitation tend to specialize in both time-sensitive and supply chain-intensive industries.¹⁴ This is also in line with the findings of Hummels and Schaur (2013), which show that the industries that are most sensitive to time as a trade cost are the ones in which GVCs are a prominent feature.¹⁵

13. Ignatenko et al. (2019) use the structural gravity equation based on data from the Eora database to investigate determinants of GVC participation.¹⁶ The study reveals the importance of strong institutional characteristics including a favorable business environment and good infrastructure facilities. A high degree of contract enforcement as well as the rule of law facilitates a country's participation in a GVC both on the exporting and importing side. According to the United Nations Industrial Development Organization, GVC participation is driven by falling trade barriers and costs of international trade.¹⁷ Lower trade costs relate to money, time, and uncertainty, all of which are crucial for successful GVCs. At the same time, only a small number of the world's countries participate in GVCs, indicating that national characteristics are also important determinants of GVC participation. These characteristics not only include aspects that are directly related to trade such as port infrastructure, but also institutions and capabilities.

¹¹ World Bank. 2020. *World Development Report 2020: Trading for Development in the Age of Global Value Chains*. Washington, D.C. |¹¹ Claire H. Hollweg. 2019. Firm Compliance and Public Disclosure in Vietnam. *Policy Research Working Paper 9026*. World Bank. Washington, D.C.

¹² World Trade Organization and Institute of Developing Economies–Japan External Trade Organization. 2011. *Trade Patterns and Global Value Chains in East Asia: From Trade in Goods to Trade in Tasks*. Geneva. Switzerland.

¹³ Przemyslaw Kowalski, Javier Lopez Gonzalez, Alexandros Ragoussis Ragoussis, and Cristian Ugarte. 2015. Participation of Developing Countries in Global Value Chains. *OECD Trade Policy Papers*. No. 179. OECD Publishing. Paris.

¹⁴ Rainer Lanz and Roberta Piermartini. 2018. Specialization within Global Value Chains: The Role of Additive Transport Costs. *WTO Staff Working Papers ERSD-2018-05*. Economic Research and Statistics Division. World Trade Organization. Geneva.

¹⁵ David L. Hummels and Georg Schaur. 2013. Time as a Trade Barrier. *American Economic Review*. 103 (7). pp: 2935–59. December. American Economic Association.

¹⁶ The Eora global supply chain database consists of a multiregional input–output table model that provides a time series of high-resolution input–output tables with matching environmental and social satellite accounts for 190 countries.¹⁶ Anna Ignatenko, Raei Faezeh, and Borislava Mircheva. 2019. Global Value Chains: What are the Benefits and Why Do Countries Participate?. *IMF Working Papers 19/18*. International Monetary Fund. Washington, D.C.

¹⁷ United Nations Industrial Development Organization. 2018. *Global Value Chains and Industrial Development: Lessons from China, South-East and South Asia*. Vienna.

14. In the World Development Report 2020,¹⁸ the assessment of the drivers of GVC participation across countries relies on GVC participation measures from Borin and Mancini (2019) using the Eora database, which draws on a combination of international input–output tables, domestic production, and trade data.¹⁹ The econometric model assesses the marginal impacts on GVC participation of seven broad types of determinants emphasized in the trade literature: (i) factor endowments, (ii) geography, (iii) market size, (iv) trade policy and foreign direct investment (FDI), (v) quality of institutions, (vi) connectivity, and (vii) financial and business environment factors. This assessment estimates the impact of country averages of the determinants in the previous decade (e.g., the 1990s) on country average GVC participation in the following decade (e.g., the 2000s). It considers the following dependent variables: (i) the share of backward or forward GVC participation in gross exports, which captures the intensity of GVC trade relative to that of traditional exports; (ii) backward or forward GVC participation levels (logs); and (iii) gross exports (logs). The determinants are measured as averages in the previous decade and include manufacturing import tariffs, FDI inward inflows, distance to major GVC hubs (the PRC, Germany, and the United States), manufacturing value added, political stability index, ratio of low-skilled labor to GDP, ratio of resource rents to GDP, ratio of land to GDP, ratio of capital stock to GDP, nominal exchange rate appreciation, and decade fixed effects. Significance is based on the GVC participation share regressions. Only determinants with statistically significant coefficients are considered. For example, Viet Nam’s integration into GVCs was driven by a stable investment climate, availability of abundant low skilled, low cost labor, proximity to input providers including development of a local supplier base and improvement in connectivity and import clearance process.

15. A limited body of literature explains the measures which can be used to study the impact of GVC participation on development outcomes. Taglioni and Winkler (2016) argue that GVCs can help in job creation through three main channels.²⁰ First, GVC participation raises the demand for workers who possess the required skills to provide specialized services. Second, the lead firms provide training in technology and skill development to local workers, thereby increasing their employability. Third, dispersion of knowledge from the labor force of participating firms to other local firms raises the skill level and employability of other workers. They suggest that impact of social upgrade can be evaluated using both direct and indirect measures. For indirect measures, the literature suggests the use of descriptive statistics to identify sectors associated with better labor market outcomes. Such statistics include the number of employees in a sector, the wages and salaries, wage rate (wages and salaries divided by the number of employees), or labor share (wages and salaries as a percentage of value added). In addition, analysis of employment-generating industries and their level of GVC integration may be carried out by running cross-country “controlled correlations” by sector, whereby the labor market indicators discussed in the previous section are regressed on indicators of GVC participation while controlling for other factors, such as region and GDP. Pooled regressions can also be used by controlling for industry fixed effects to see which industries have more labor-market-enhancing outcomes conditional on GVC involvement.

16. The first direct measure of social upgrading is the labor content of gross exports. The World Bank data set on LACEX can be used to explore the social upgrading linked to GVC participation. The data set is computed on the basis of the social accounting matrix data available in the Global Trade Analysis Project for intermittent years between 1995 and 2011. The matrix includes data for more than 100 countries with data available for 24 and 57 sectors across different versions. Taglioni and Winkler (2016) illustrate the case of machinery and equipment from the PRC, including non-transport machinery and electronics.²¹ The PRC’s labor value added in the machinery and equipment sector has expanded dramatically overtime,

¹⁸ Footnote 11.

¹⁹ Alessandro Borin and Michele Mancini. 2019. Measuring What Matters in Global Value Chains and Value Added Trade. *Policy Research Working Paper 8804*. World Bank. Washington, D.C.

²⁰ Daria Taglioni and Deborah Winkler. 2016. *Making Global Value Chains Work for Development*. World Bank. Washington, D.C.

²¹ Footnote 20.

particularly its backward link component. This finding is confirmed by the ratio of backward to direct labor value added in exports, which has increased rapidly since 1997. This suggests that the PRC has increased its domestic production in the sectors providing inputs for the final exports of machinery. The increase has also translated into an increase in the share of domestic labor value added in exports. The total labor content of machinery exports in backward links increased from \$0.23 per \$1 of exports in 1995 to almost \$0.4 in 2011. In other words, each \$100 of machinery exports generated \$40 of wages in the economy, only \$11 of which is a result of the direct labor in final production. The increase has been much milder for direct and forward links. The increase in the labor intensity of the PRC's machinery exports also has been more marked relative to the rest of the world. Using the newly developed LACEX database, a World Bank study found that GVC integration in South Africa has led to higher net jobs but lower job intensity.²² Kumar (2017) points out that integration of the apparel industry with GVCs in Bangladesh has contributed to the employment of more than 3 million (mostly women) workers in the past 2 decades. Similarly, Lesotho's integration with the global apparel sector provided employment to 10% of the workforce.²³

17. Enhancing participation in GVCs has also been found to result in an increase in the share of manufacturing in GDP by improving productivity of firms. Stöllinger (2018) suggests that a 1 percentage point rise in GVC participation leads to an increase of 0.1% in the share of manufacturing in GDP.²⁴ The GVCs can stimulate productivity growth in manufacturing through of the following channels. Firms can specialize in their most productive, core activities and outsource their least productive tasks. The possibility of specialization in a given task also provides small and medium enterprises (SMEs) with more opportunities to indirectly participate in GVCs as compared to trade in final goods. Firms can gain from access to a wider set of competitive and high-quality inputs. Topalova and Khandelwal (2011) establish how pro-competitive forces resulting from lower tariffs on final goods as well as access to better inputs, due to lower input tariffs, have a positive impact on firm level productivity, with input tariffs having a larger impact.²⁵ The effect was strongest in import-competing industries and industries not subject to excessive domestic regulation. Interaction with frontier lead firms facilitates knowledge spillovers through domestic supply chains.²⁶ Access to larger markets and competition from foreign firms leads to the growth of more productive firms while at the same time inducing the exit of the least productive firms.²⁷

18. Generating additional employment opportunities and increasing the productivity of the workforce provides impetus to economic growth. In addition, the regulatory, institutional, and structural reforms that necessarily precede high GVC participation also yield growth dividends. However, participation in GVCs is not without its costs. The high economic growth fostered by participation in GVCs could come with increasing income inequality. Participation in GVCs raises the wages for skilled workers, potentially widening income gaps within industries. Winkler, Farole, and Hollweg (2018) find that greater returns to skilled labor are correlated with GVC expansion on the buying side (backward integration).²⁸ Firm-level analysis also confirms a positive and significant relationship between GVCs and skilled labor. Shepherd and Stone (2012) find a positive and significant relationship between the number of skilled workers and

²² Massimiliano Cali and Claire Hollweg. 2015. The Labor Content of Exports in South Africa and Botswana. World Bank Other Operational Studies 23828. World Bank. Washington, D.C.

²³ Ruchira Kumar. 2017. Global Value Chains: A Way to Create More, Better and Inclusive Jobs. *Jobs and Development Blog*. World Bank. Washington, D.C.

²⁴ Roman Stöllinger. 2018. Asian Experiences with Global and Regional Value Chain Integration and Structural Change. *Research Report 436*. The Vienna Institute for International Economic Studies. Austria.

²⁵ Petia Topalova and Amit Khandelwal. 2011. Trade Liberalization and Firm Productivity: The Case of India. *Review of Economics and Statistics*. 93 (3). pp: 995-1009.

²⁶ Dan Andrews, Chiara Criscuolo, and Peter N. Gal. 2015. Frontier Firms, Technology Diffusion and Public Policy: Micro Evidence from OECD Countries. Organisation for Economic Co-operation and Development. Paris.

²⁷ Chiara Criscuolo and Jonathan Timmis. 2017. The Relationship between Global Value Chains and Productivity. *International Productivity Monitor*. Centre for the Study of Living Standards. Volume 32. pp: 61-83. Spring.

²⁸ Deborah Elisabeth Winkler, Thomas Farole, Claire Honore Hollweg. 2018. Trade in Global Value Chains : An Assessment of Labor Market Implications. Issue 18. Jobs Working Paper. World Bank Group. Washington, D.C.

firms with international linkages (that import, export, and are foreign owned).²⁹ At the same time, GVCs foster specialization through resource reallocation not just across sectors but also within firms toward the most productive stages of production, thus inducing layoffs in the other production stages. Furthermore, in some GVCs that rely on domestic subcontracting, there exists the possibility of loss of transparency, resulting in creation of noncontractual, low-paying jobs in unsafe working conditions.

20. While interdependent firms in GVCs benefit from sharing knowledge and technology, in several instances the lead firms maintain a restrictive control over the knowledge and technology and prevent diffusion. This reduces the incentive for the lower-tier firm to innovate and upgrade and diminishes the benefits to the economy.

21. Participation in GVCs may benefit large foreign firms disproportionately as their better bargaining power allows them to extract favorable terms from smaller domestic firms. This market power can lock the emerging markets into low value-added segments of GVCs and reduce the positive spillovers from GVC participation. World Bank (2020) points to the example of large garment corporations in the United States charging a high mark-up and not passing on the cost reductions resulting from upstream GVC participation by Indian manufacturers to the end consumers.³⁰ Similarly, within the garment industry, there could be reallocation of value added from labor to capital, growing premium for skilled workers, and near-stagnation of wages for unskilled workers.

22. Finally, GVC participation can raise environmental costs to the emerging economies especially if the production stages with high carbon footprint are pushed into these economies, which often have lower environmental standards.³¹ Many of these costs can be mitigated with the appropriate policy mix encompassing skilling of the workforce, social safety nets for the workers, stringent environmental standards, and regulatory support to the SMEs.

III. INDIA'S INTEGRATION IN GLOBAL VALUE CHAINS

23. Given that GVCs involve fragmentation of the production process across different economies, traditional statistical systems are unable to accurately capture important elements of the complicated trade relationships. Consequently, it has become important to analyze the export structure of the economy differentiating between foreign and domestic value added, as well as double-counted components due to back-and-forth trade.³² Over the last few years, ADB has been developing the MROID and trade in value-added statistics to highlight the multifaceted production sharing arrangements among economies.³³

24. As pointed out in ADB (2018), economies engage in GVCs in two ways.³⁴ Firstly, GVC exports of Country A entail import of intermediate products from Country B by Country A, and their use in manufacturing a product, which is then exported to Country C either as an intermediate or final good. This is known as the backward participation export. Backward participation ratio (BPR) denotes the foreign value-added contribution to an economy's exports. Secondly, GVC exports of Country A include exports of intermediate goods by Country A to Country B, where incremental value is added, and is further exported to Country C, where it is either consumed or again exported. This is known as

²⁹ Ben Shepherd and Susan Stone. 2013. *Global Production Networks and Employment: A Developing Country Perspective*. *OECD Trade Policy Papers 154*. OECD Publishing, Organisation for Economic Co-operation and Development, Paris.

³⁰ Footnote 11.

³¹ Footnote 11.

³² Asian Development Bank. 2015. *Global Value Chains Indicators for International Production Sharing*. *Key Indicators for Asia and the Pacific 2015*. Manila.

³³ All data related to global value chain participation cited in the paper has been sourced from ADB's MROID unless otherwise mentioned.

³⁴ Footnote 9.

the forward participation export. Forward participation ratio (FPR) denotes economy's locally generated value-added embedded in the production of other economies for their exports.

25. Data on intermediate and final exports by economy and by sector are extracted from the MRIOD, and decomposed into 16 value-added terms following the methodology espoused by Wang et al. (2014) and described in ADB (2015).³⁵

26. Backward participation ratio for sector k in economy i (BPR_i^k) is given by

$$BPR_i^k = \frac{\sum_j DDC_{ij}^k + FVA_FIN_{ij}^k + FVA_INT_{ij}^k + FDC_{ij}^k}{\sum_j EXP_{ij}^k} \quad (1)$$

while backward participation ratio for economy i (BPR_i) is given by

$$BPR_i = \frac{\sum_k \sum_j DDC_{ij}^k + FVA_FIN_{ij}^k + FVA_INT_{ij}^k + FDC_{ij}^k}{\sum_k \sum_j EXP_{ij}^k} \quad (2)$$

where

- FVA_FIN = Value of imported components used to manufacture a commodity, which is then exported for final consumption.
- FVA_INT = Value of imported components used to manufacture an intermediate commodity, which is then exported to be used in the production process in another country.
- DDC = Domestic value added that is embedded in its intermediate exports to another economy but returns home as its intermediate imports and is used for the production of commodities that are again exported to be either used in production or consumption.
- FDC = Foreign economies' value added embedded in economies' intermediate exports to another economy that returns home as intermediate imports and is used for the production of its intermediate and final use commodity exports.

The numerator in equations (1) and (2) indicate the value of backward participation exports of sector k in economy i and backward participation exports of economy i, respectively.

27. Similarly, the forward participation ratio for sector k in economy i (FPR_i^k) is given by

$$FPR_i^k = \frac{\sum_j DVA_INT_{ij}^k + DVA_INTre_{ij}^k + RDV_B_{ij}^k}{\sum_k \sum_j EXP_{ij}^k} \quad (3)$$

while the forward participation ratio of economy i (FPR_i) is given by

$$FPR_i = \frac{\sum_k \sum_j DVA_INT_{ij}^k + DVA_INTre_{ij}^k + RDV_B_{ij}^k}{\sum_k \sum_j EXP_{ij}^k} \quad (4)$$

where

- DVA_INT = Domestic value added is embedded in economy's intermediate exports, which is used by direct importer in another economy to produce and consume final goods in that economy.

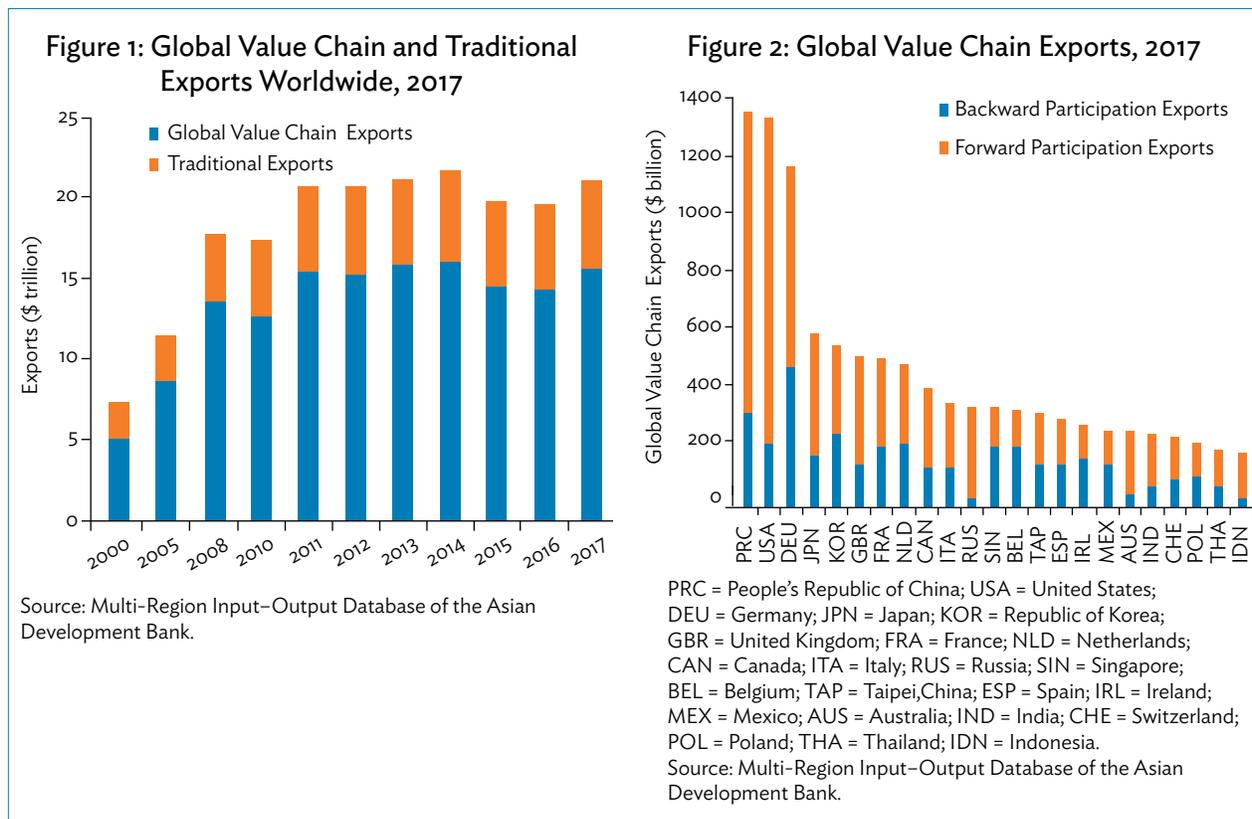
³⁵ Z. Wang, S. Wei, and K. Zhu. 2014. Quantifying International Production Sharing at the Bilateral and Sector Levels. *NBER Working Paper no. 19677*. National Bureau of Economic Research. Cambridge, MA. |³⁵ Footnote 32.

- DVA_INTrex = Domestic value added is embedded in intermediate exports, which is used by the direct importer in another economy to produce exports and ultimately absorbed by other economies except the source economy.
- RDV_B = Domestic value added embedded in an economy’s exports of intermediate use commodities that are exported first and returned to be consumed domestically.

The numerator in equations (3) and (4) indicates the value of forward participation exports of sector k in economy i and forward participation exports of economy i, respectively.

28. Overall GVC exports are the sum of backward participation exports and forward participation exports while GVC participation is the sum of BPR and FPR.

29. According to the MROID, global export of goods and services increased from \$7.4 trillion in 2000 to \$21.7 trillion in 2017. Over the same period, GVC exports grew from \$5.2 trillion to \$15.7 trillion, and account for nearly 70% of global exports (Figure 1). However, India has remained a fringe player, accounting for only \$241 billion or 1.5% of global GVC exports in 2017, which was even lower than India’s share in global exports of goods and services (Figure 2).

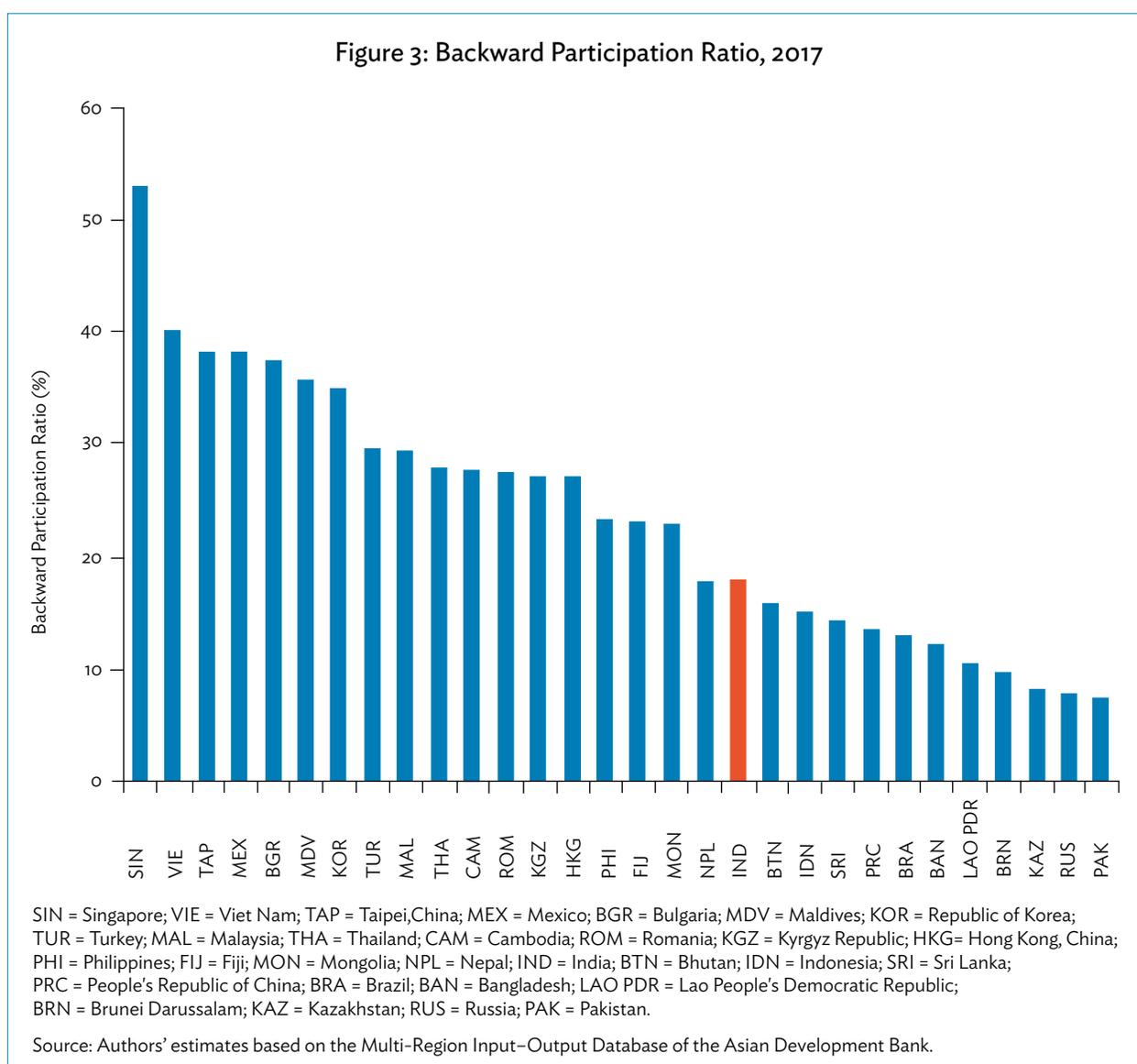


30. The BPR and FPR vary widely across countries. Countries which import a significant volume of intermediate inputs and then add value before exporting rank higher on BPR. As can be seen in Figure 3, Singapore; Viet Nam; and Taipei,China lead in terms of using foreign inputs in the production of exports. Singapore has emerged as a major petrochemical manufacturing and refining hub using imported crude oil. Similarly, Taipei,China has a well-developed electronics processing ecosystem. Viet Nam is also fast emerging as an assembly hub for electrical and optical equipment and other high technology manufacturing. Most South Asian economies, along with some Central Asian economies, are placed

poorly in terms of BPR. South Asian economies like Pakistan and Bangladesh mainly export textile and textile products, whose inputs are sourced from within the country.³⁶

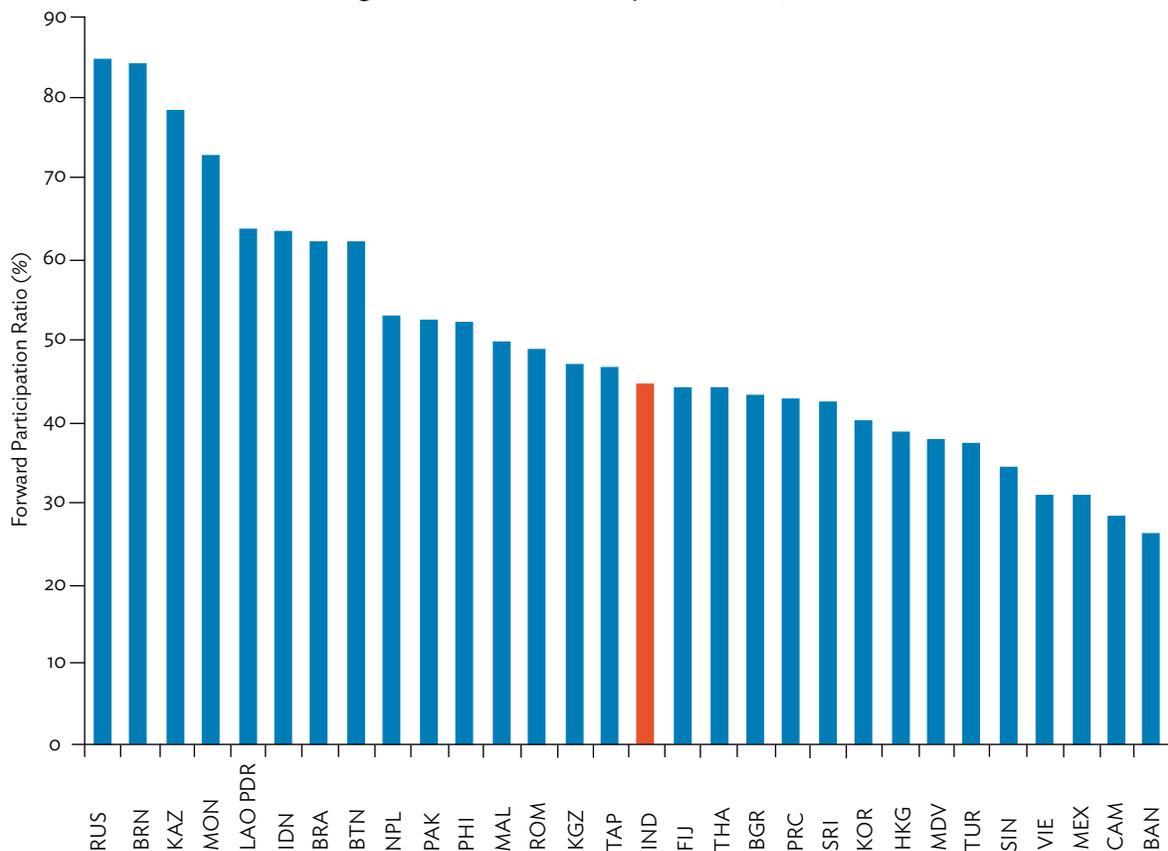
31. Similar variation is also observed in the case of FPR. Given the dominance of natural resource-based commodities in their exports, the Russian Federation, Kazakhstan, Mongolia, and Indonesia lead in locally generated value-added that is embedded in the production of other economies for their exports or FPR (Figure 4). Bangladesh and Cambodia, which primarily produce and export final or near-end textile products remain at the lower end of the spectrum.

32. As can be seen from Figure 3 and Figure 4, India trails behind most economies ranked according to BPR and is somewhat middling when ranked according to FPR. Even more worrisome is the fact that India witnessed the highest drop in GVC participation between 2010 and 2017 (Figure 5). This is in sharp contrast to many other Asian economies, such as Viet Nam; the Republic of Korea; the Philippines; and Taipei,China, that had improved their participation.



³⁶ Footnote 9.

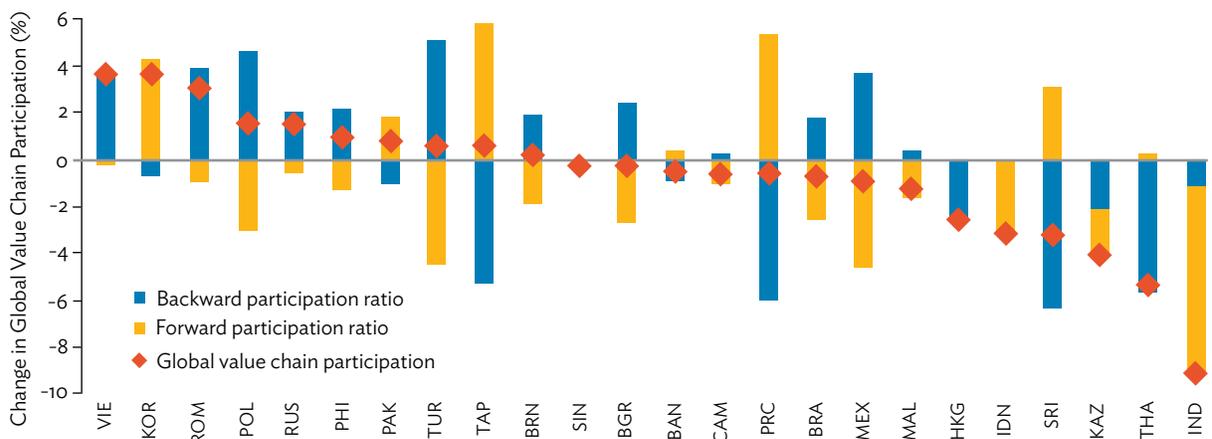
Figure 4: Forward Participation Ratio, 2017



RUS = Russia; BRN = Brunei Darussalam; KAZ = Kazakhstan; MON = Mongolia; LAO PDR = Lao People's Democratic Republic; IDN = Indonesia; BRA = Brazil; BTN = Bhutan; NPL = Nepal; PAK = Pakistan; PHI = Philippines; MAL = Malaysia; ROM = Romania; KGZ = Kyrgyz Republic; TAP = Taipei, China; IND = India; FIJ = Fiji; THA = Thailand; BGR = Bulgaria; PRC = People's Republic of China; SRI = Sri Lanka; KOR = Republic of Korea; HKG = Hong Kong, China; MDV = Maldives; TUR = Turkey; SIN = Singapore; VIE = Viet Nam; MEX = Mexico; CAM = Cambodia; BAN = Bangladesh.

Source: Authors' estimates based on the Multi-Region Input-Output Database of the Asian Development Bank.

Figure 5: Change in Global Value Chain Participation between 2010 and 2017



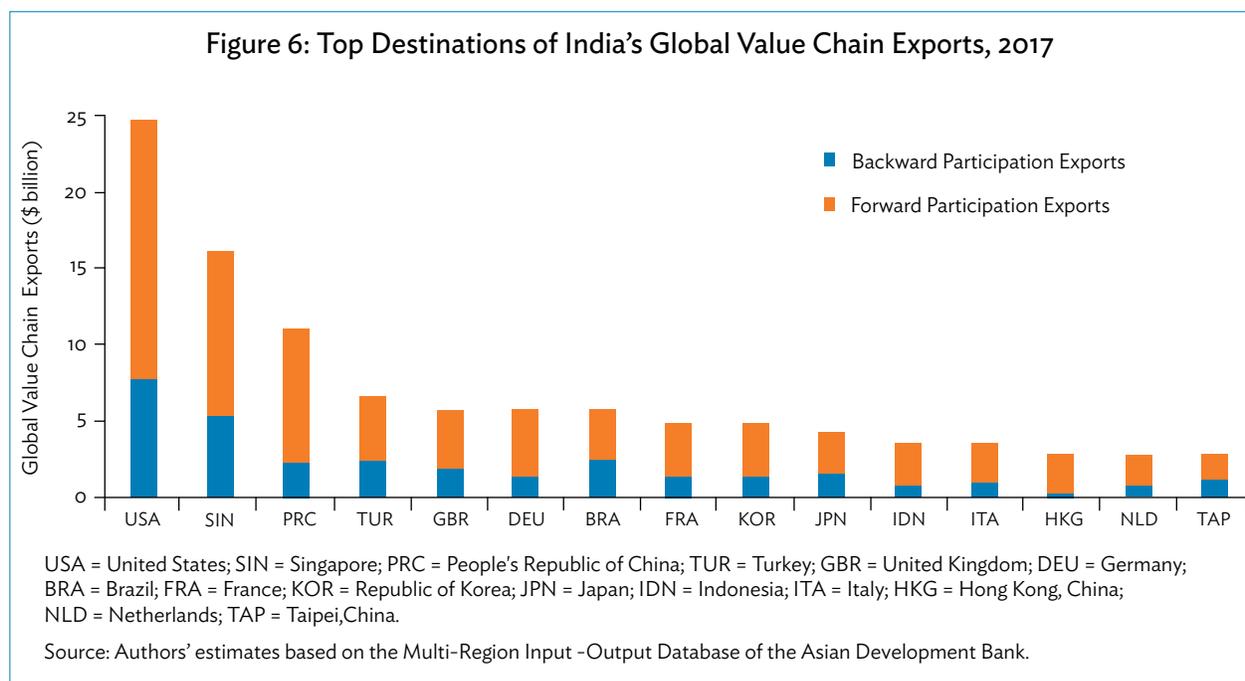
The economies are ranked in descending order according to change in global value chain participation. VIE = Viet Nam; KOR = Republic of Korea; ROM = Romania; POL = Poland; RUS = Russia; PHI = Philippines; PAK = Pakistan; TUR = Turkey; TAP = Taipei, China; BRN = Brunei Darussalam; SIN = Singapore; BGR = Bulgaria; BAN = Bangladesh; CAM = Cambodia; PRC = People's Republic of China; BRA = Brazil; MEX = Mexico; MAL = Malaysia; HKG = Hong Kong, China; IDN = Indonesia; SRI = Sri Lanka; KAZ = Kazakhstan; THA = Thailand; IND = India.

Source: Authors' estimates based on the Multi-Region Input-Output Database of the Asian Development Bank.

33. India's GVC export growth during 2010 to 2017 has lagged most other emerging markets (Figure 5). The GVC exports in economies like Viet Nam, Cambodia, and Bangladesh grew by more than 10%, annually while India's GVC exports rose by a meager 0.9%. Other Asian economies like Thailand; the Republic of Korea; the Philippines; Singapore; and Hong Kong, China have also registered healthy growth in GVC exports. Even the PRC, which adopted a rebalancing strategy shifting away from export-led growth, experienced GVC export growth of 4.5% between 2010 and 2017.

34. Thus, if India is to realize the export target of \$800 billion by 2022/23 set out by the NITI Aayog, it is imperative to reverse this trend and improve India's GVC participation as GVC exports continue to account for nearly 70% of overall exports.³⁷ This would require identifying the key factors that have been found to influence GVC exports globally, evaluate India's performance on those factors, and outline measures that would help India improve.

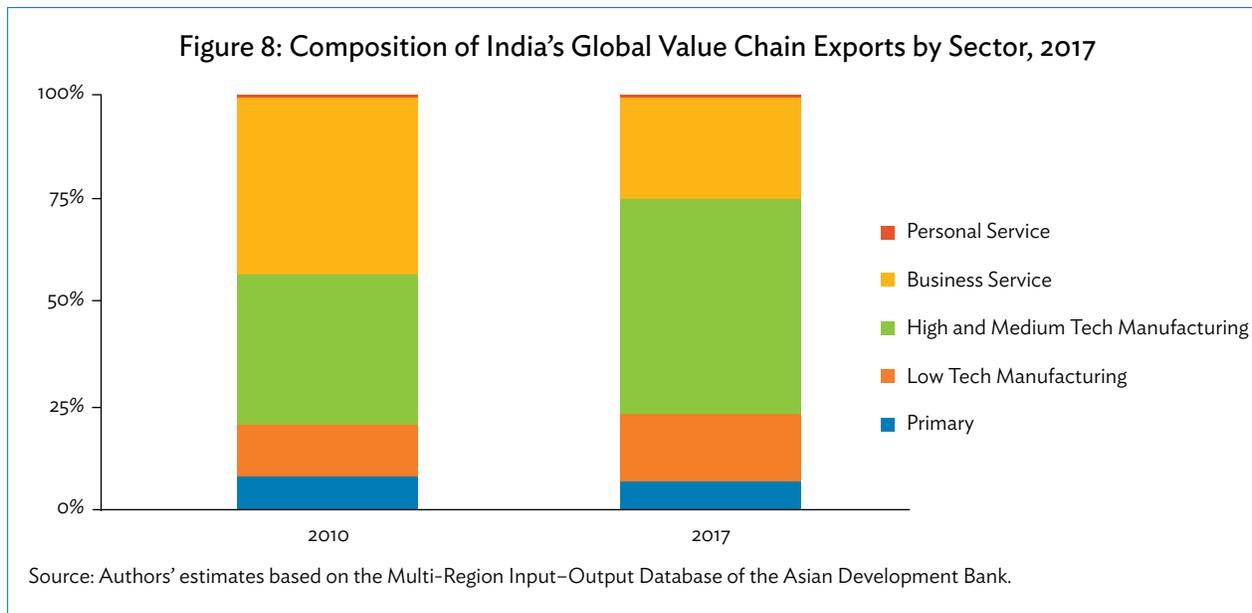
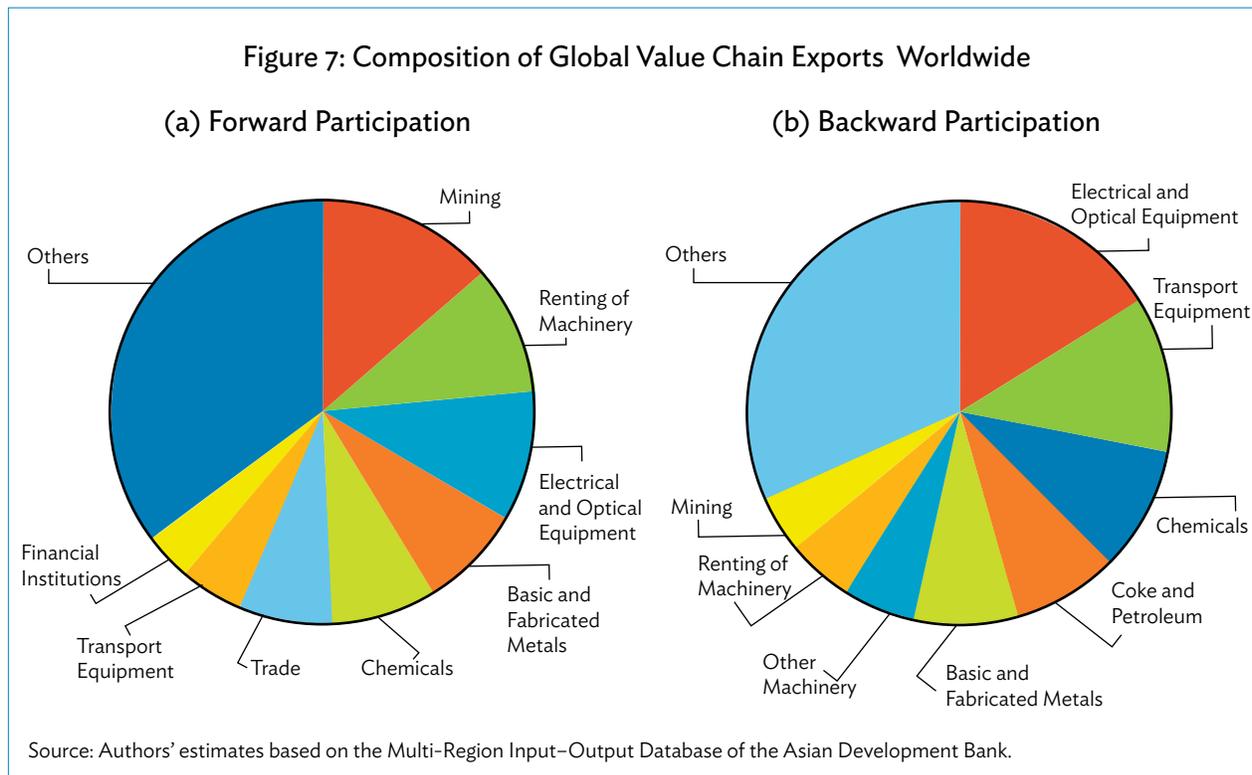
35. As discussed above, India remains a fringe player in GVC exports accounting for 1.5% of global GVC exports, amounting to \$241 billion. Of these, nearly 10% of India's GVC exports are directed towards the United States, followed by Singapore (6.7%) and the PRC (4.6%). Other important destinations include Turkey, the United Kingdom, Germany, Brazil, France, and the Republic of Korea (Figure 6).



36. India's GVC exports vary widely across destinations. More than half of the GVC exports to the United States comprise chemicals, coke and petroleum, basic and fabricated metals, and transport equipment. On the other hand, GVC exports to the PRC are mainly dominated by raw materials including basic and fabricated metals, chemicals, mining, and agriculture. In sharp contrast, services like renting of machinery, post and telecom, water transport and air transport, dominate the GVC exports to Singapore. India also exports a significant amount of coke and petroleum to Singapore, which is a major petrochemical and refining hub in the region. Furthermore, India's GVC exports to the European Union comprise basic and fabricated metals, coke and petroleum, chemicals, and the renting of machinery. Besides these, textiles, electrical, and optical equipment rank among the top ten GVC exports from India.

³⁷ V.K. Saraswat, Prachi Priya and Aniruddha Ghosh. 2018. A Note on Free Trade Agreements and Their Costs. NITI Aayog. Government of India.

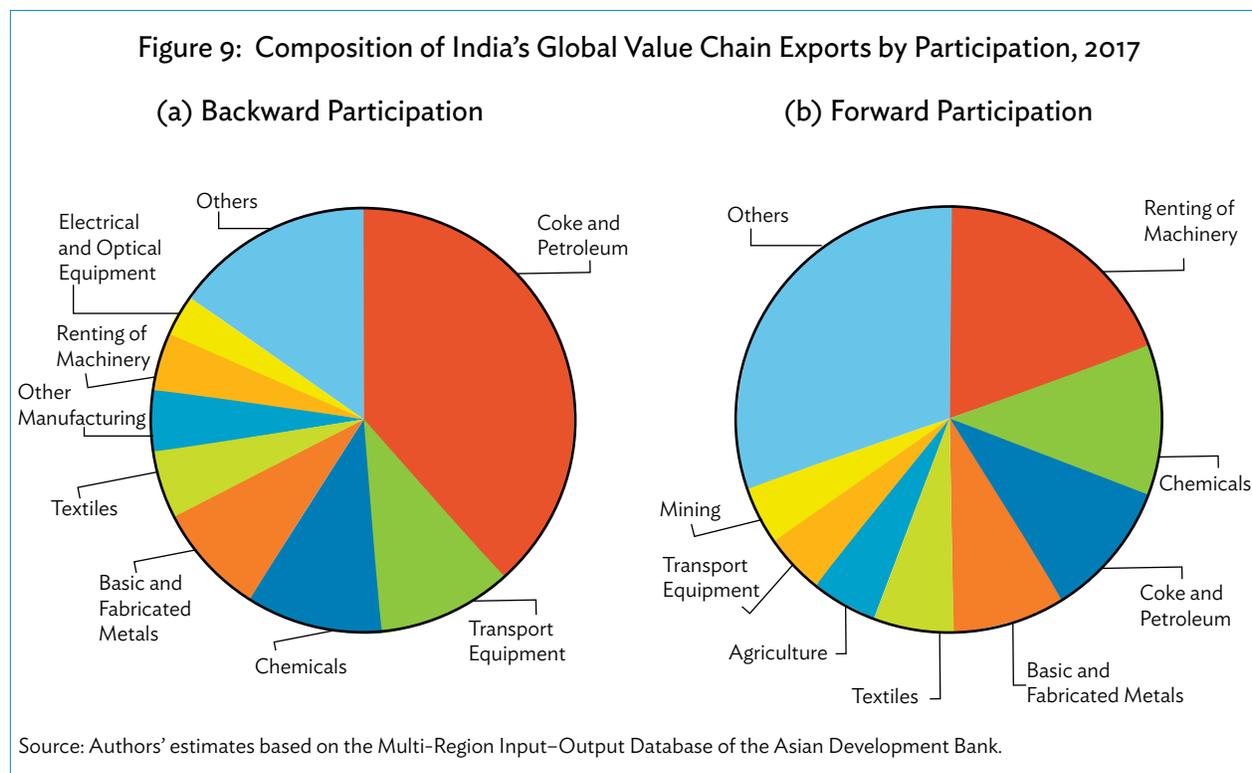
37. The MRIOD disaggregates GVC exports of 63 economies across 35 sectors, which are outlined in Annexes 1 and 2. Globally, the top six sectors account for nearly 55% of GVC exports. These include electrical and optical equipment (12.1%), mining (10.3%), chemicals (8.4%), renting of machinery (8.2%), basic and fabricated metals (8.0%), and transport equipment (7.9%). The relevance of these sectors varies in terms of backward and forward participation exports. Forward participation exports are dominated by mining, renting of machinery, and electrical and optical equipment (Figure 7a). Electrical and optical equipment is also dominant in backward participation, or exports containing foreign value-added component. Other key sectors include transport equipment, chemicals, and coke and petroleum (Figure 7b). Some of the leading sectors like transport equipment, renting of machinery, coke and petroleum, and electrical and optical equipment have also registered healthy growth during 2010 to 2017.



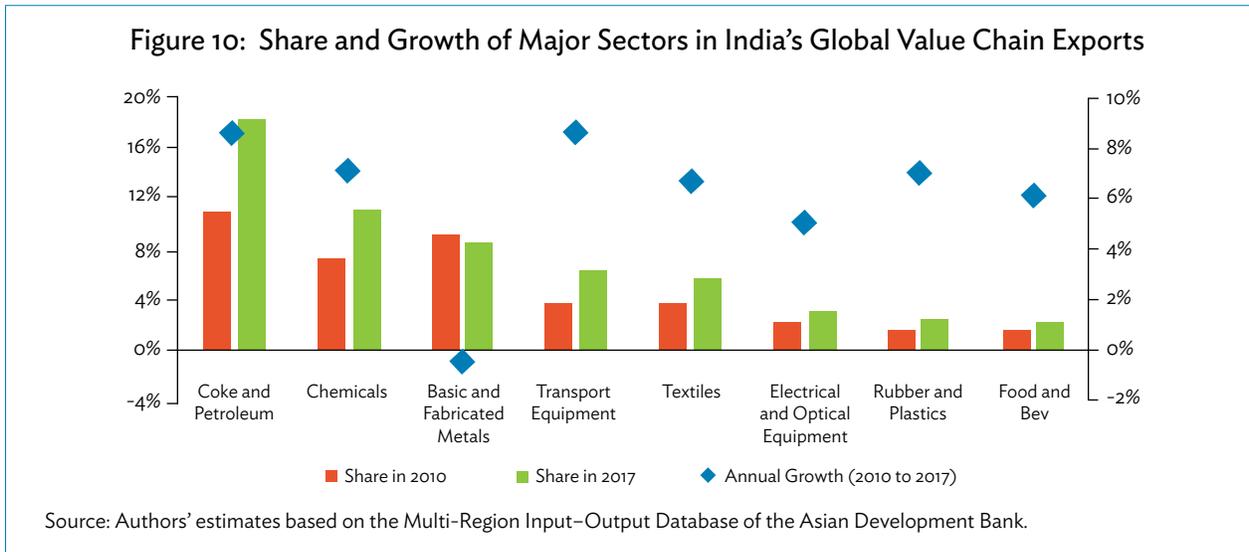
38. India's GVC exports are dominated by the manufacturing sector, whose share increased from 48.1% in 2010 to 68% in 2017 (Figure 8). This was accompanied by a sharp decline in share of services from 42.9% to 25.1%. The decline in services' share was mainly due to sluggish performance of wholesale and retail trade services, renting of machinery, equipment, and transport services.

39. With the top six sectors accounting for nearly 66% of India's GVC exports, it tends to be less diversified than the global average. Among these coke and petroleum account for 18.3% of GVC exports, followed by renting of machinery (14.9%), chemicals (11.2%), basic and fabricated metals (8.6%), and transport equipment (6.3%). Coke and petroleum dominate because a significant part of the crude oil imported by India is exported as refined petroleum, and hence forms an important part of backward participation exports. Other sectors dominating backward participation exports include transport equipment, chemicals, basic and fabricated metals, and textiles (Figure 9a).

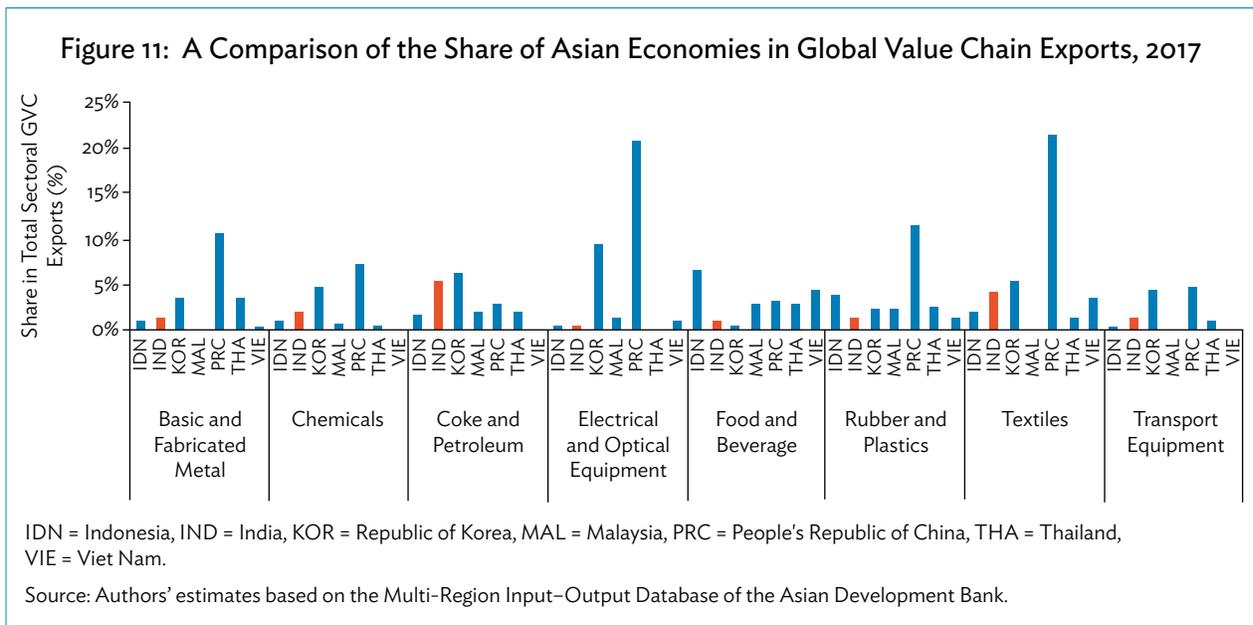
40. Within forward participation, the biggest contributor is renting of machinery and equipment, which includes renting of transport equipment, agriculture machinery, construction machinery, and office machinery. This is followed by chemicals where India has a diversified base including organic and inorganic chemicals, plastics, pesticides, drugs, and pharmaceuticals. Other forward participation sectors include coke and petroleum, basic and fabricated metals, textiles, and agriculture products (Figure 9b).



41. However, some of these leading sectors have grown sluggish in recent years. Thus, India's GVC exports of sectors like mining, renting of machinery, basic and fabricated metals, and wholesale trade contracted between 2010 and 2017 even though global GVC exports of these sectors witnessed an increase (Figure 10). On the other hand, GVC exports of sectors like agriculture, textiles, coke and petroleum, chemicals, and electrical and optical equipment have grown at rates that are more than double their global growth rates.



42. Consequently, India's share in GVC exports of these sectors increased between 2010 and 2017, albeit at a modest pace. While India's share in agricultural GVC exports increased from 2.3% to 2.7%, it increased from 4.0% to 4.4% in coke and petroleum GVC exports, and 3.3% to 4.3% in textile GVC exports (Figure 11).



43. Despite the improved performance of some of these sectors, India has remained a marginal player compared to other Asian economies. In fact, of the 35 sectors covered in the MRIOD, only in coke and petroleum India's share in sector-wise global GVC exports is more than 5.0%. This in sharp contrast to the PRC, where 17 sectors have shares of over 5.0% of sector-wise global GVC exports. India fares poorly compared to much smaller economies as well. For instance, Singapore's share in global GVC exports is more than 5.0% in five sectors, the Republic of Korea in four, and Thailand in two (Figure 12).

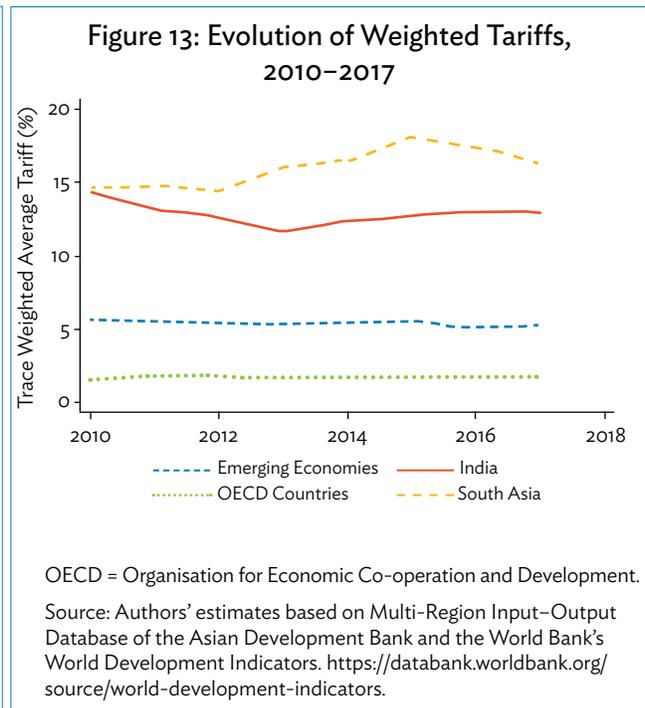
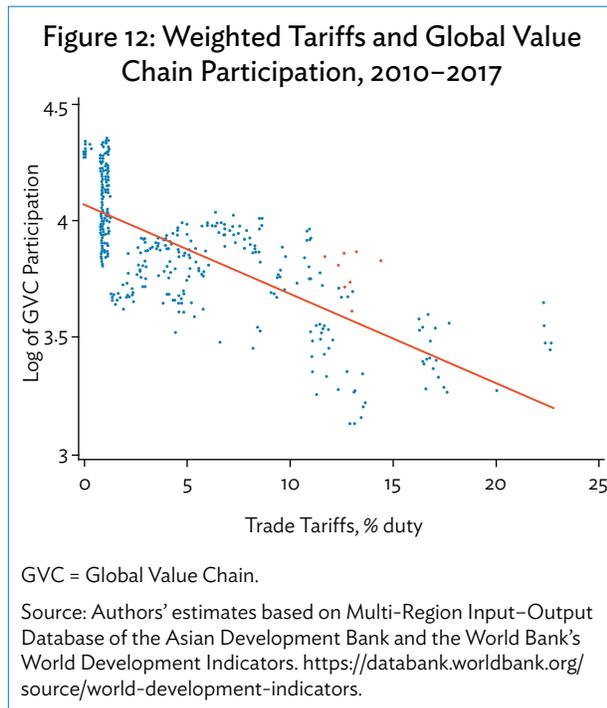
IV. ECONOMIC AND INSTITUTIONAL DETERMINANTS OF GLOBAL VALUE CHAIN PARTICIPATION

44. Participation in GVC is not preordained and countries need to surmount several challenges to participate in global production networks and move to more sophisticated sectors and activities. Moreover, after growing at a rapid pace between 1990 to 2007, growth in trade and GVC participation have slowed down due to decline in economic growth, reversal of trade reforms, and maturing of fragmentation of production.³⁸ A revival of GVC participation would entail identifying the drivers of GVC participation and incorporating technologies and introducing policies that can strengthen these drivers. World Bank (2020) points out that GVC participation is determined by fundamentals like endowments, market size, geography and institutional quality.³⁹ However, national policies play an important role in shaping these fundamentals including policies related to tariffs and trade facilitation, logistics and infrastructure, FDI, skill development, and labor market.

A. Trade Costs and Trade Facilitation

45. A necessary condition for participation in GVCs is the presence of low trade barriers and reduction of international trade costs. With manufacturing of products being geographically fragmented across economies, high trade costs in the form of high tariffs or nontariff measures get passed on to the downstream firms and raises the cost of the finished goods, which, in turn, impacts the production and investment decisions of firms involved in GVCs. As can be seen in Figure 12, average tariff rates have a strong negative relation with GVC participation, implying that countries with lower tariff rates are more amenable to GVC participation. Data on weighted tariff rate is obtained from World Bank’s World Development Indicators.

46. A comparison with other economies in Figure 13 shows that India’s trade weighted average tariff rates are on the higher side compared to other economies. Although India’s tariffs between 2010 and



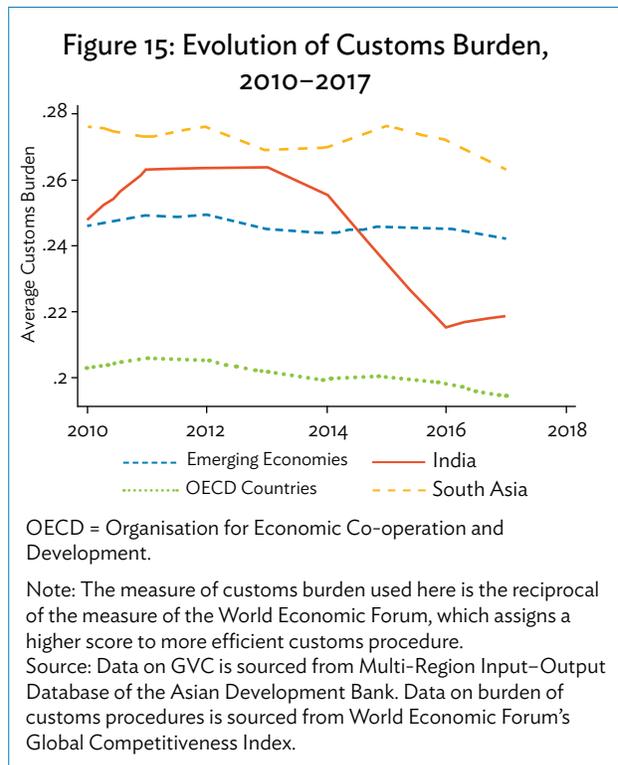
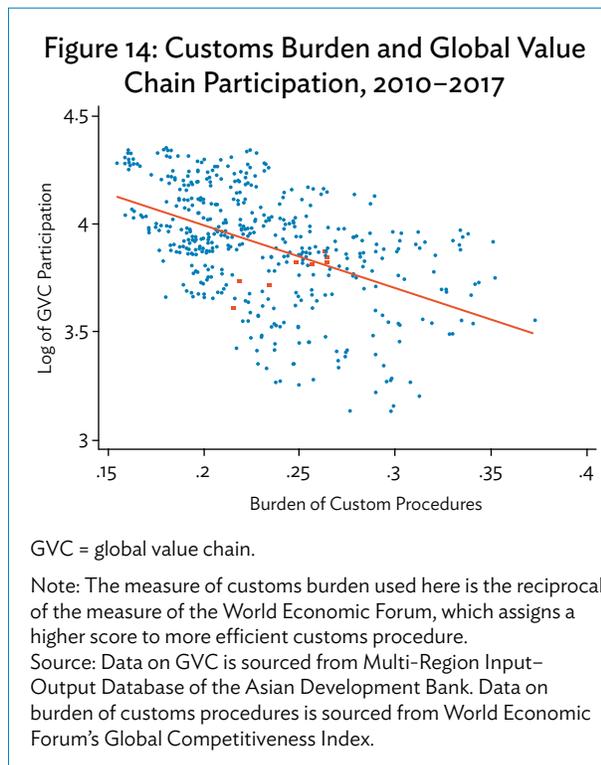
³⁸ Footnote 11.

³⁹ Footnote 11.

2017 declined compared to other South Asian economies, it continues to be three times higher than the average for emerging economies in other regions.⁴⁰ Most members of the Organisation for Economic Co-operation and Development (OECD) significantly reduced their tariff rates in the 1990s and 2000s. India has been identified as trade restrictive based on various measures devised by the OECD and World Bank.⁴¹ India has also been characterized as being restrictive in terms of services trade.⁴²

47. Countries can opt to reduce trade cost by simplifying customs procedures and improving border infrastructure. The GVC products are more vulnerable to burdensome customs procedures and weak border infrastructure as they cross borders several times and the costs are accumulated. This is evident from Figure 14, which suggests a strong negative relationship between burdensome customs procedure and GVC participation. According to Hummels and Schaur (2013), the cost of an extra day spent in transit is 60% higher for importers of intermediate goods compared to importers of final goods.⁴³ Similarly, Kumar and Shepherd (2019) show that complete implementation of the World Trade Organization's Trade Facilitation Agreement would help to boost global trade by 3.5% and global output by 0.5%.⁴⁴

48. India, along with other South Asian economies, was characterized by high customs burden till 2014 (Figure 15). However, since 2014, there has been a substantial improvement in customs procedures in India as evidenced by a sharp decline in customs burden since then. This improvement is also validated by World Bank's Ease of Doing Business wherein India's rank on Trading Across Borders improved to 80 in 2018 from 146 earlier.⁴⁵ India has reduced the time and cost involved in exporting and border compliance.



⁴⁰ South Asia includes Bangladesh, Bhutan, Maldives, Nepal, Pakistan, and Sri Lanka.

⁴¹ Rahul Anand, Kalpana Kochhar, and Saurabh Mishra. 2015. Make in India: Which Exports Can Drive the Next Wave of Growth?. *IMF Working Papers* 15/119. International Monetary Fund.

⁴² Ingo Borchert, Batshur Gootiiz, and Aaditya Mattoo. 2012. Guide to the Services Trade Restrictions Database. *Policy Research Working Paper Series* 6108. World Bank Group. Washington, D.C., United States.

⁴³ Footnote 15.

⁴⁴ Utsav Kumar and Ben Shepherd. 2019. Implementing the Trade Facilitation Agreement: From Global Impacts to Value Chains. *ADB South Asia Working Paper Series No. 67*. Asian Development Bank. Manila.

⁴⁵ World Bank. 2019. *Doing Business 2019: Training for Reform*. Washington, D.C.

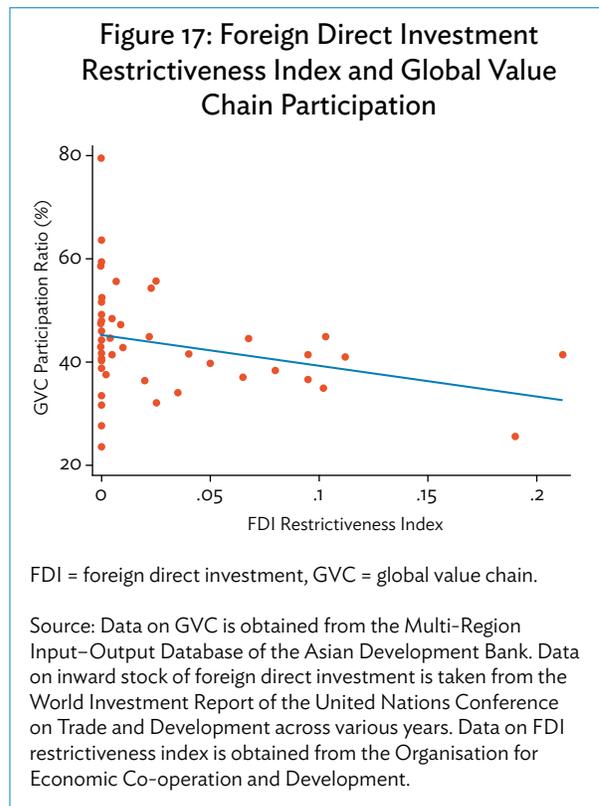
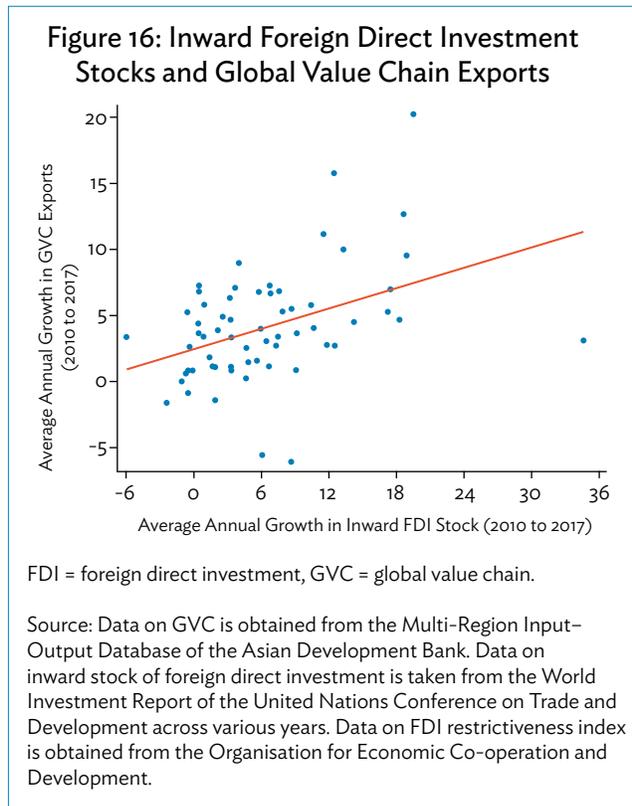
This has been a result of greater coordination among different ministries, extensive use of digitization, new technologies, and business process re-engineering to facilitate trade.

49. Despite the significant improvement in recent years, the current rank of 80 shows that India can make further progress. Even in 2018, India scored much below the PRC, Malaysia, Thailand, Singapore, and Viet Nam on the World Bank’s Logistics Performance Index related to quality of trade and transport-related infrastructure.⁴⁶ Improving trade facilitation, which will help in reducing trade costs export and import costs, is essential for realizing higher trade potential.

B. Foreign Direct Investment

50. The GVC participation or cross-border production sharing is often a result of firms setting up foreign affiliates and situating certain stages of their production process in other countries. As is well known from the pioneering work of Dunning (1993), FDI can be motivated by various objectives: (i) natural resource-seeking, (ii) market-seeking, (iii) asset-seeking, and (iv) efficiency-seeking.⁴⁷ The last kind, where the investor wants to take advantage of factors that enable it to compete in international markets, is very important for GVCs as it results in the establishment of foreign affiliates of multinational corporations to predominantly supply third markets, and facilitate trade creation through cross-border intra-firm trade. Efficiency-seeking FDI has been found to be not only vital for enhancing exports but also key to export diversification and is associated with expertise and technology transfers, boosting research and development, and economic upgrade.

51. Apart from enhancing GVC participation by driving intra-firm trade, FDI also facilitates GVC participation through a variety of other channels. FDI helps raise the productivity of the domestic firms



⁴⁶ Jean-François Arvis, Lauri Ojala, Christina Wiederer, Ben Shepherd, Anasuya Raj, Karlygash Dairabayeva, Tuomas Kiiski. 2018. Connecting to Compete 2018: Trade Logistics in the Global Economy. World Bank. Washington, D.C.

⁴⁷ J. H. Dunning. 1993. *Multinational Enterprises and the Global Economy*. Addison Wesley. Wokingham, Berkshire.

through a variety of spillovers. These encompass greater diffusion of technology and knowledge related to production, management, and organizational practices from global leaders to local firms. These would enhance export competitiveness by lowering production costs and boost GVC participation. In particular, foreign investors aid internationalization of local firms by (i) providing access to global marketing, supply and distribution networks; (ii) local sourcing of different intermediate products and requiring the domestic firms to meet global standards in terms of quality and time; and (iii) enhancing the scale and productivity of the local firms.

52. Global experience also suggests that there is a strong positive relationship between growth in inward FDI and growth in GVC exports (Figure 16). A number of Asian economies like Viet Nam, Bangladesh, and Cambodia experienced both FDI stock and GVC exports growth at more than 10% annually between 2010 and 2017.

53. Furthermore, FDI regulations can have a strong bearing on GVC exports with restrictions on FDI limiting a country's attractiveness to GVC lead firms. Using OECD data on FDI restrictiveness in the manufacturing sector, Figure 17 clearly shows that a more restrictive investment environment is associated with a lower level of GVC participation. As a result, the policy conclusion, as in the case of trade policy in goods and services, is that restrictions may have significant costs in the context of GVCs.

54. India has significantly liberalized its FDI regime over the last decade and has emerged as one of the major recipients of FDI. However, a large part of the FDI investment inflows seeks to serve the domestic market (market-seeking type). Despite this, there is scope for further improvement as the OECD's FDI Restrictiveness Index, shows that India's score of 0.035 is lower than that of the PRC (0.102) and Indonesia (0.065), and is only slightly higher than Viet Nam (0.025).

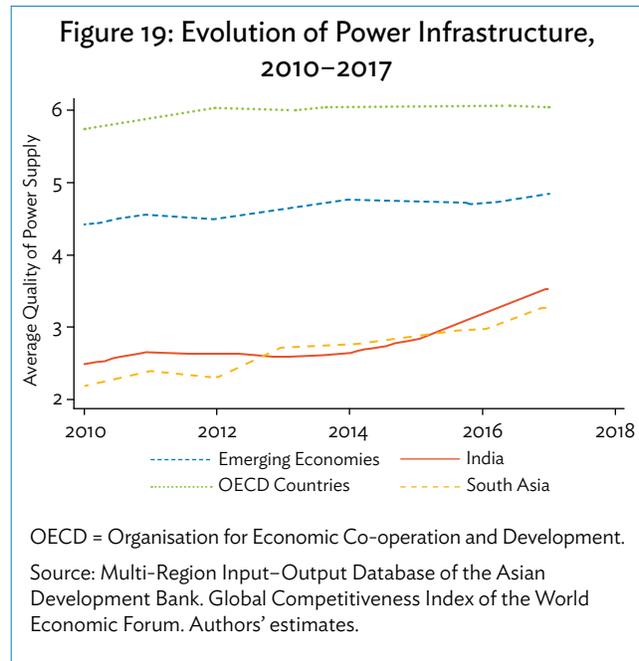
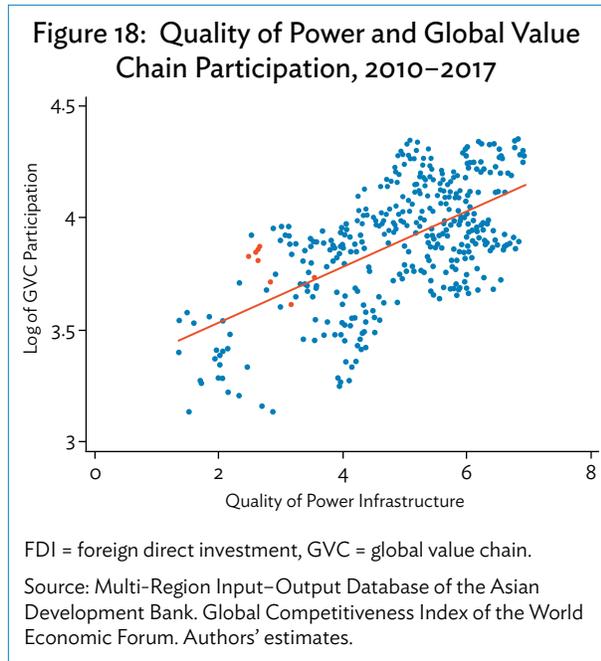
55. To attract more efficiency-seeking FDI, India would have to make progress on several key areas like (i) ability of the country to meet international production standards; (ii) easy cross-border movement of goods, services, capital and knowledge; (iii) easy access to vital inputs like industrial land, skilled labor, and infrastructure; and (iv) confidence in regulatory assessment.

C. Quality of Infrastructure

56. A country's ability to connect with GVCs depends on the quality of its infrastructure. One of the main reasons for geographic fragmentation of production under GVCs is to take advantage of varying production costs across countries and produce each component at its cheapest location. The quality of power, industry, logistics, and communication infrastructure in an economy is a key determinant of production costs.

57. Poor quality of power disrupts the production process in various ways. Every time the production is interrupted due to a power failure there is a loss of production forgone. Moreover, poor power quality and frequent power outages can damage a partially completed product, causing the items to be scrapped. A voltage disruption can force the firm to restart the assembly line process to restore production, clean up and repair, and disposing of the faulty products, all of which substantially reduce the competitiveness of the firm. Finally, the voltage sag may result in an error that is discovered after the product has been transported to the next firm in the chain, and product recall and negative public relations can result in significant reputation cost. To overcome these costs, firms rely on captive gensets, which tend to be expensive and burdensome, especially for SMEs, and reduce their competitiveness significantly.

58. Thus, it is not surprising that global experience indicates a strong positive relationship between quality of power infrastructure and GVC participation (Figure 18). Although there has been some improvement in the quality of infrastructure in India between 2010 and 2017, India, along with other South Asian economies, significantly trail emerging markets (Figure 19).



59. Similarly, a key determinant of the ability of a GVC to spread production across multiple countries is the facility to move intermediate goods rapidly, reliably, and at reasonable cost from one production base to another. If this cannot be achieved, the business model could become economically unsustainable, with production tending to concentrate in one or a few areas rather than dispersing across multiple centers.

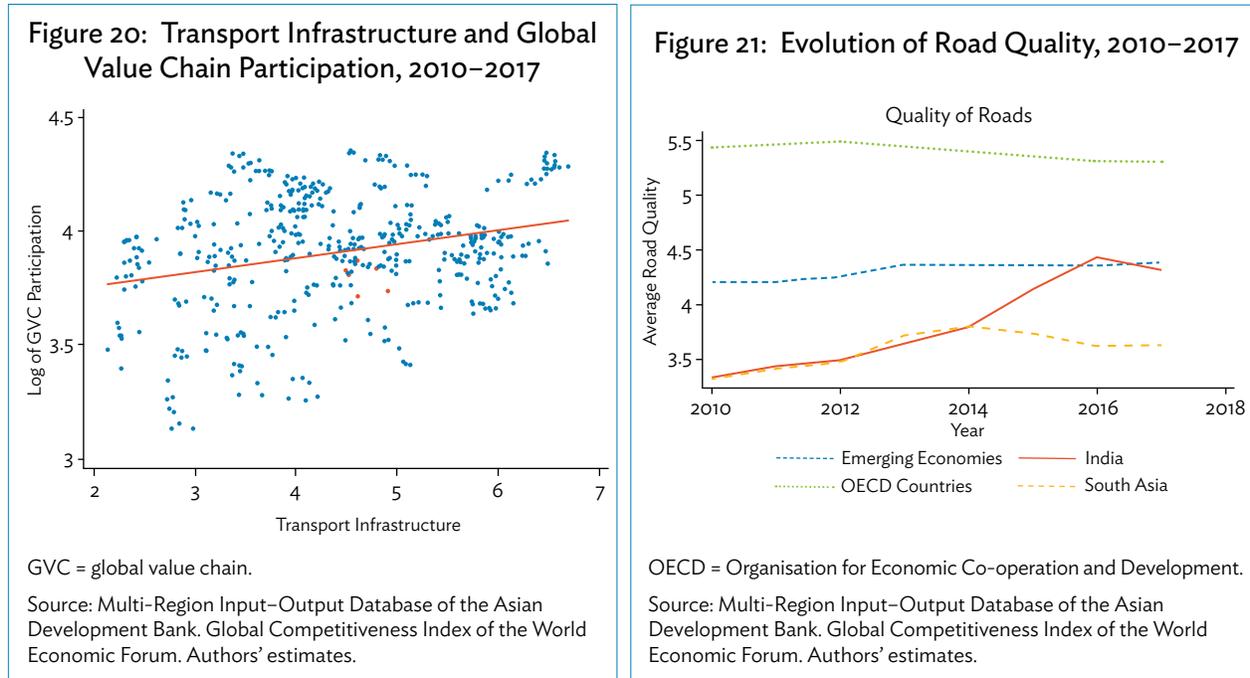
60. Thus, the quality of roads has strong implications for GVC participation as it makes it feasible to spatially separate production across regions. A well-developed road and rail transport infrastructure facilitates connectivity between ports and production centers, and results in time and cost savings. Additionally, investments in improving inland roads and enhancing capacity of ports to handle import and export consignments have been found to facilitate GVC participation.

61. Experience across a large number of countries has shown that improved transport infrastructure also links product and factor markets better and facilitates interregional trade and specialization, thus improving competitiveness. There also exists a positive relationship between transport infrastructure and GVC participation, although the relationship is not as strong as that between quality of electricity and GVC participation (Figure 20). India has shown significant improvement in the quality of roads since 2014, to match the average for emerging economies. However, it still trails far behind the OECD economies (Figure 21).

D. Quality of Institutions

62. Given that GVCs comprise transactions among firms that are incorporated in different countries, they are subject to transaction costs. These transaction costs are determined by the quality of institutions. Presence of corruption, political instability, uncertainty of reforms, and policy measures tend to be detrimental for cross-border trade as they enhance the risks faced by global buyers and sellers. These risks can result in suboptimal trade and investment decisions and hold-ups. Quality institutions can help improve the contracting ecosystem and reduce these difficulties.⁴⁸

⁴⁸ Andrei Levchenko. 2007. Institutional Quality and International Trade. *Review of Economic Studies*. 74(3). pp: 791–819. [⁴⁸ Also, Nathan Nunn and Daniel Treffer. 2014. Domestic Institutions as a Source of Comparative Advantage. In G. Gopinath, E. Helpman, and K. Rogoff (eds). *Handbook of International Economics*. Chapter 5. pp: 263–315. Elsevier.



63. For example, legal institutions affect monitoring and contract enforcement costs, and facilitate transactions across firms as they reduce risks and uncertainty. In a GVC, firms across countries enter into relationship-specific investment, and in the absence of good institutions, some firms may have the incentive to renegotiate the contract to get better terms.⁴⁹ Global evidence suggests that by mitigating the threat of disruption and reducing risks through improved contract management and better institutions facilitate participation in GVCs.⁵⁰

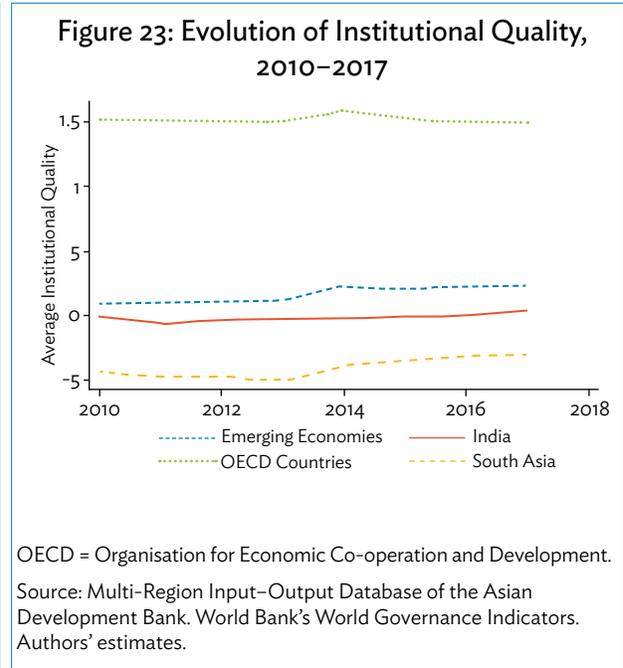
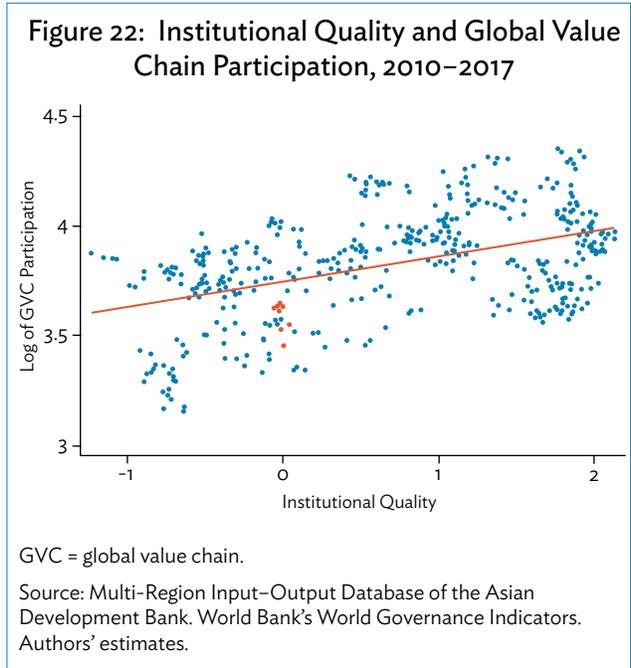
64. Apart from legal institutions, another key driver of GVC participation is the extent of corruption. Presence of corruption acts as an additional tax on the local firms thereby reducing their competitiveness, forcing foreign companies to collaborate with firms from other countries. Corruption also raises the transaction costs and time as both domestic and foreign firms have to negotiate with corrupt officials. Government effectiveness, which indicates the ability of the government to formulate and implement policies that promote private sector development, have been identified as having important influence on GVC participation.⁵¹

65. Cross-country experience suggests a strong positive relationship between the quality of institutions and GVC participation (Figure 22). The institutional quality index covers six indicators from the World Governance Indicators Database. To extract the relevant information from these indicators, principal component analysis is used and an institutional quality index devised. While India's institutional quality is higher than other economies of South Asia, it continues to remain below the average for emerging markets, with the gap widening in recent years (Figure 23). With the advanced economies, the gap is significantly pronounced. Individual components of the institutional quality index show that India is well ahead of the

⁴⁹ As pointed out in UNIDO (2018) in buyer driven GVCs, the buyer of the input has an incentive to renegotiate a contract to seek better terms once the supplier has made the investment to produce the input as the input would have lower value to other buyers. Similarly, if a supplier provides a vital input under the GVC with no alternate suppliers readily available, the supplier would have the incentive to demand better terms by threatening to disrupt the entire value chain. These incentives to renegotiate the contract after production has begun are referred to as "hold-up".⁴⁹ Footnote 9.

⁵⁰ Footnote 14.

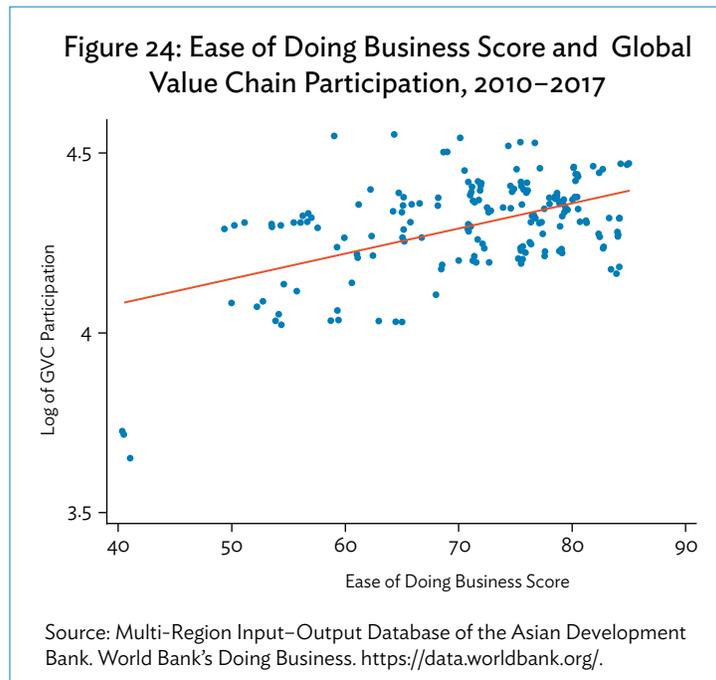
⁵¹ David Dollar, Ying Ge, and Xue Yu. 2016. Institutions and Participation in Global Value Chains. Background Paper for the *Global Value Chain Development Report*. The World Bank Group. Washington, DC.



emerging economies in terms of “quality of legal institutions” and “voice and accountability” but trails in terms of “government effectiveness” and “regulatory quality”.

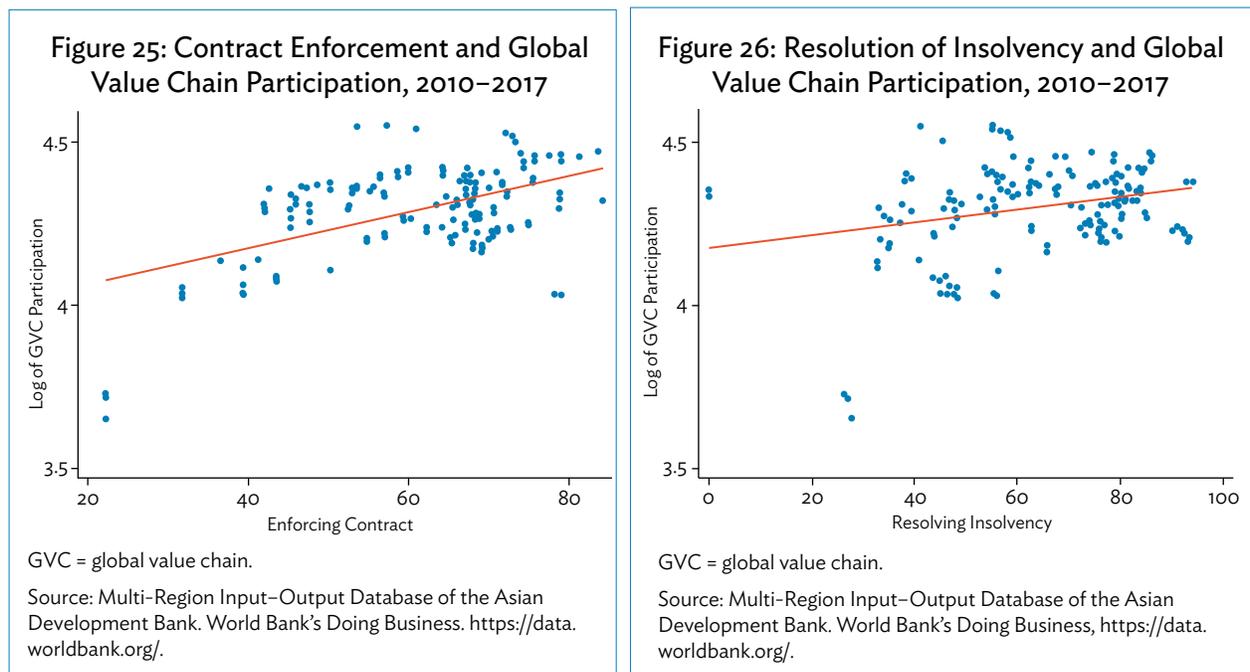
E. Business Environment

66. Another aspect of policy that could potentially affect the operation and expansion of GVCs is the business environment. This encompasses a range of factors that make it easier or harder for firms to do business in a country. As discussed above, one issue that stands out is contract enforcement: GVCs rely on complex contractual arrangements with suppliers, so if those arrangements are difficult or costly to enforce, lead firms may be wary of investing in such relationships. Similarly, aspects of the business



environment that affect a lead firm’s propensity to invest—such as the ease of resolving insolvency—could impact the ability of GVCs to work productively in a new environment. Beyond these particular examples, there are numerous other aspects of the business environment, including access to credit and regulation of the labor market, that affect firm-level production costs and therefore competitiveness. These factors can influence the attractiveness of a location from a lead firm’s perspective.

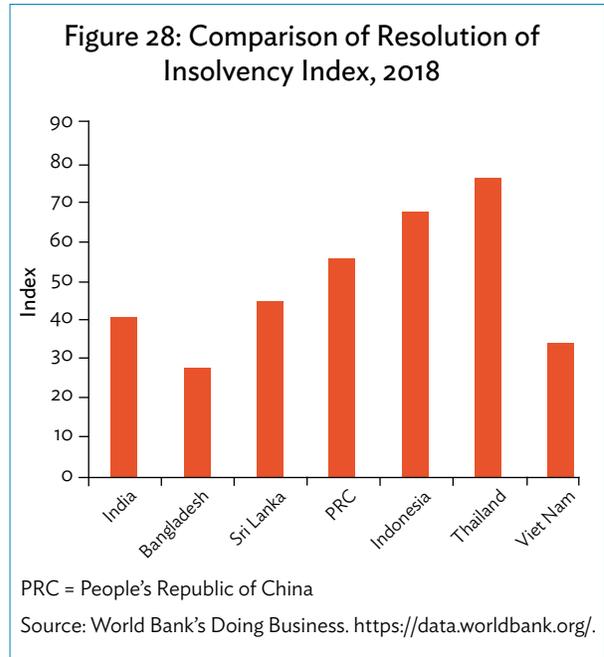
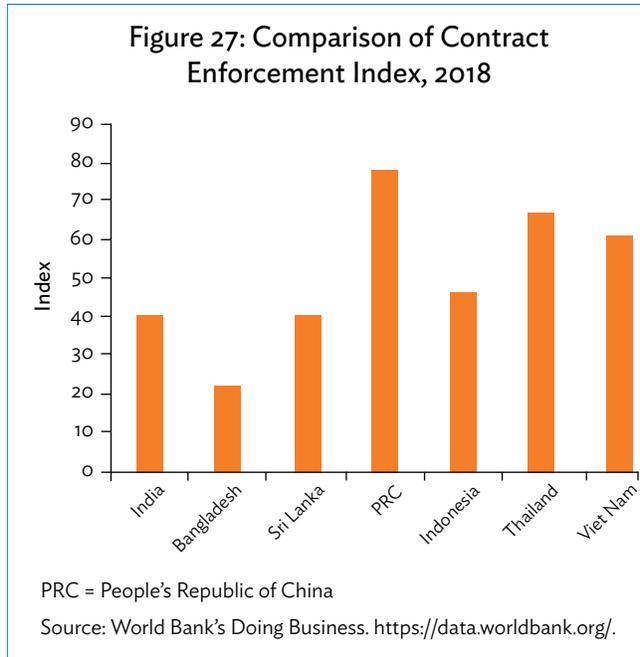
67. To see the point broadly, Figure 24 highlights the positive relationship between the World Bank’s Ease of Doing Business Index and GVC participation. However, certain aspects of business environment are more important for influencing GVC participation compared to others. Two such measures are (i) enforcing contract and (ii) resolving insolvency. As noted above, the quality of contract enforcement plays an important role in influencing GVC participation as all arm’s length dealings rely on contracts. Figure 25 shows that countries with better quality of contract enforcement have also experienced higher GVC participation. Similarly, quality of insolvency resolution influences GVC participation as a time and cost intensive resolution process would deter foreign investors from entering into partnerships with local manufacturers. Figure 26 shows that countries that perform well in resolving insolvency witness better GVC participation, although the relationship is not as strong as the one with contract enforcement.



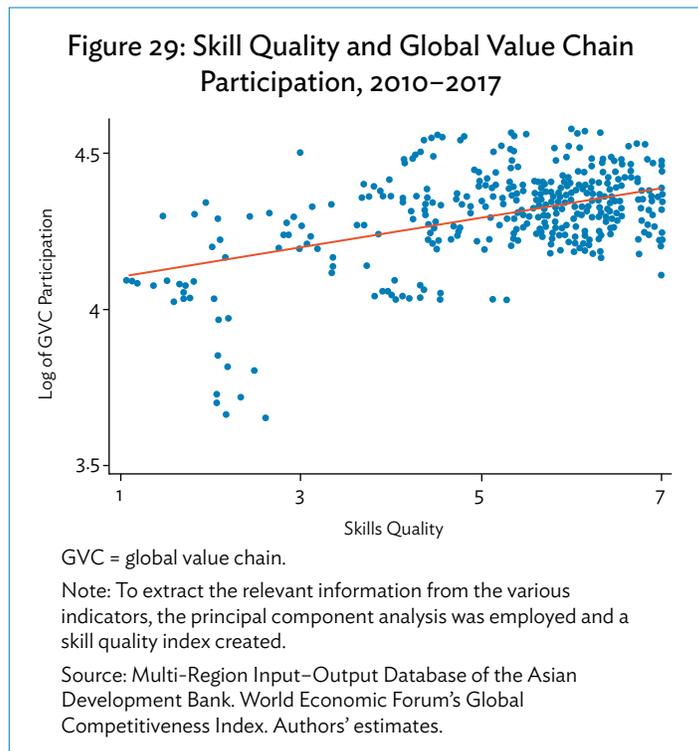
68. India’s performance in terms of the contract enforcement index is stronger than South Asian comparators, but weaker than the East and Southeast Asian countries, in particular the PRC (Figure 27). Again, it is striking that a country like Viet Nam, which has lower per capita income in purchasing power parity terms than India as well as prominent governance issues, still scores higher on this metric than India. Figure 28 shows a broadly similar, but not identical pattern, for the resolution of insolvency index. This area is one that the government has identified as needing substantial work, as evidenced by the passage of the new Insolvency and Bankruptcy Code in 2016.

F. Skill Development

69. Employees’ skills have been widely cited as being vital for an economy’s participation in GVCs and export performance. However, there is less clarity on the type of skill required across channels. Availability of the right mix of skills is essential to realize the productivity gains offered by participation in GVCs as firms require employees who can assimilate and adapt to the new technologies and benefit



from newer modes of work organization. Participation in GVCs yields the maximum benefits to firms when their workers have a threshold level of skills.⁵² Furthermore, with the help of a skilled workforce, countries have been successful in transitioning from low-skilled, low value-added activities to high-skilled, high value-added activities. Thus, at the industry or the country level, availability of skilled workers helps in achieving higher productivity gains from participation in GVCs. While traditionally educational



⁵² Organisation for Economic Co-operation and Development. 2017. *OECD Skills Outlook 2017: Skills and Global Value Chains*. OECD Publishing, Paris.

attainment has been the primary metric to evaluate the skills of the works, recent studies have found that educational attainment fails to adequately represent the skills and experience workers can gain after completing their education, which can be important for facilitating GVC participation.

70. Pertinent skill-sets include (i) quality of math and science education, (ii) quality of management schools, (iii) tertiary education enrolment, and (d) on-the-job training. The skill quality index combines these using the empirical method of principal component analysis. Cross-country experiences show a strong positive relationship between the skill quality of an economy and GVC participation (Figure 29).

71. The extent of skill deficit in India can be illustrated by the fact that only 4.7% of the workforce has received formal training, much lower than in other large economies of Asia: Japan at 80%, the PRC at 24%, and the Republic of Korea at 96%.⁵³ This creates a mismatch between demand and supply of skills, especially in the manufacturing sector, and dents the competitiveness of the sector. Workers willing to work in the manufacturing sector lack the requisite skill to work there while those who have the skills are less willing to work in the sector.

V. DRIVERS AND BENEFITS OF GLOBAL VALUE CHAIN PARTICIPATION: EMPIRICAL ANALYSIS

72. The above section broadly reviewed the relationship between GVC participation and various policy and institutional indicators. This section begins with a simple econometric specification to focus on country-specific factors and the leverage of commercial policies in explaining the differences in GVC participation. According to the MRIOD, countries show diverse patterns of participation across sectors. ADB (2015) groups the 36 sectors in the MRIOD into 5 categories, viz., primary, low-technology manufacturing, high-technology manufacturing, business services, and personal services.⁵⁴ Countries perform very differently across these sectors (Figure 30). For instance, Viet Nam is positioned at the higher end in both primary and high-technology manufacturing products in overall GVC participation. Now, high GVC participation in primary products is driven by higher FPR compared to BPR, indicating GVC exports are mainly made up of domestic value added. At the same time, high GVC participation in high-technology manufacturing products indicates that BPR is higher than FPR, that is, high foreign value added in GVC exports. Viet Nam is also one of the few countries which have higher FPR compared to BPR across both low- and high-technology manufacturing products, indicating that its manufacturing GVC exports are heavily dependent on imported inputs.

A. Drivers of Global Value Chain Participation

1. *The Study*

73. It therefore becomes imperative to understand the role played by the country-specific factors and policy variables in influencing GVC participation across sectors. Moreover, given the difference between backward and forward participation GVC exports, these factors would be expected to have contrasting impact on the two kinds of exports. See Equation 5.

$$\gamma_{it} = \alpha_i + \alpha_t + \beta_1 T_{it} + \beta_2 I_{it} + \beta_3 \Gamma_{it} + \beta_4 \Lambda_{it} + \beta_5 \Theta_{it} + \epsilon_{it} \quad (5)$$

where

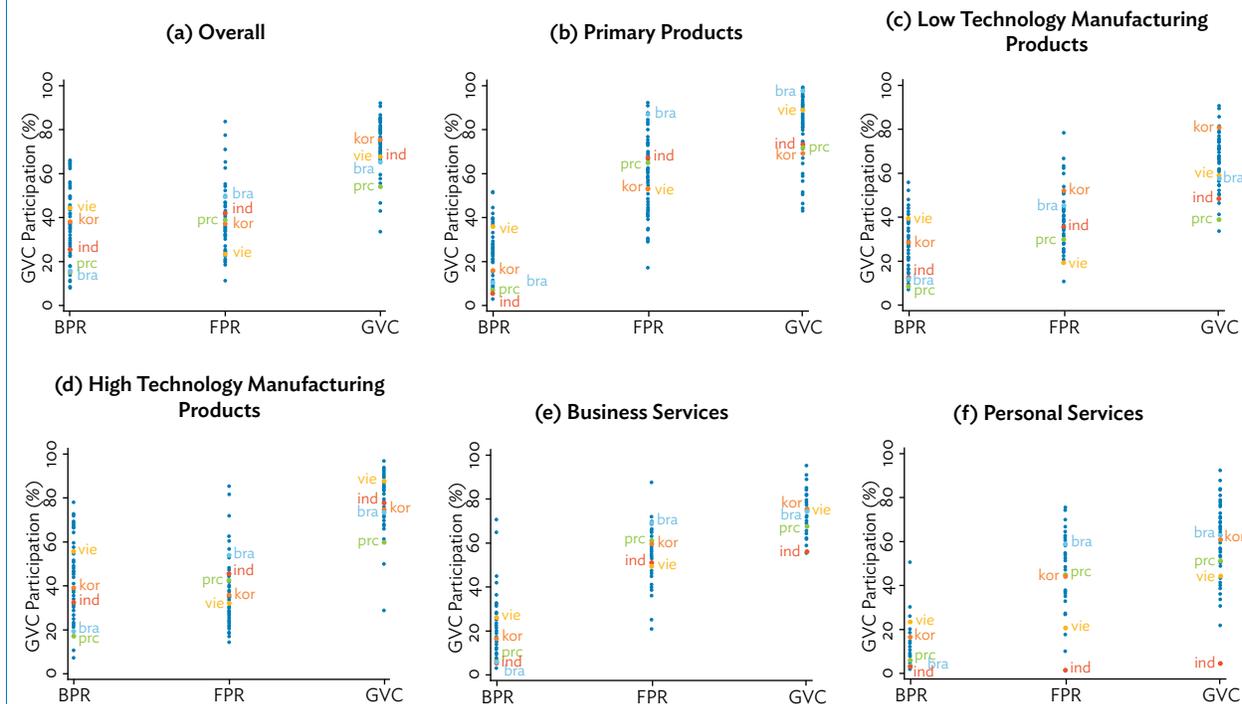
i = country;

t = years;

⁵³ Ministry of Skill Development and Entrepreneurship. Government of India. 2017. *Annual Report 2016–2017*. New Delhi.

⁵⁴ Footnote 33.

Figure 30: Distribution of Countries According to Global Value Chain Participation



BPR = Backward participation ratio, BRA = Brazil, FPR = Forward participation ratio, GVC = Global value chain, IND = India, KOR = Republic of Korea, PRC = People's Republic of China, VIE = Viet Nam.

Source: Multi-Region Input-Output Database of the Asian Development Bank. Authors' estimates.

γ_{it} = log of the ratio of GVC exports to total exports (GVC participation), the log of the ratio of backward participation exports to total exports (BPR), and the log of the ratio of forward participation exports to total exports (FPR);

$T_{i,t}$ = trade-weighted average tariff rate and efficiency of customs burden (that is, trade impediments);

$I_{i,t}$ = quality of roads and quality of electricity supply (that is, quality of infrastructure);

$\Gamma_{i,t}$ = composite institutional quality index including: voice and accountability; political stability and absence of violence; government effectiveness; regulatory quality; rule of law; and control of corruption. The composite institutional quality index is the first principle component of these six variables;

$\Lambda_{i,t}$ = composite skill quality index including quality of math and science education, quality of management schools, tertiary education enrolment, and on-the-job training. Again, the composite skill quality index is the first principle component of these four variables.

$\Theta_{i,t}$ = labor market flexibility (sourced from WEF's Global Competitiveness Index).

The choice of variables is driven by existing literature including Cheng et al. (2015),⁵⁵ Dollar et al. (2016),⁵⁶ Ignatenko et al. (2019),⁵⁷ and Pathikonda and Farole (2016).⁵⁸

⁵⁵ Kevin C. Cheng, Sidra Rehman, Dulani Seneviratne, and Shiny Zhang. 2015. Reaping the Benefits from Global Value Chains. *IMF Working Papers 15/204*. International Monetary Fund. Washington, D.C.

⁵⁶ Footnote 51.

⁵⁷ Anna Ignatenko, Raei Faezeh, and Borislava Mircheva. 2019. Global Value Chains: What are the Benefits and Why Do Countries Participate?. *IMF Working Papers 19/18*. International Monetary Fund. Washington, D.C.

⁵⁸ Vilas G. Pathikonda and Thomas Farole. 2016. The Capabilities Driving Participation in Global Value Chains. *Policy Research Working Paper No. WPS 7804*. World Bank Group. Washington, D.C.

74. Given the coverage in MRIOD, WEF's Global Competitiveness, World Governance Indicators, and World Development Indicators databases, a panel of 59 economies over the period 2010–2017 was constructed. The summary statistics of the key variables are given in Table 1.

Table 1: Summary Statistics of Key Variables

Variables	Number of Observations	Mean	Standard Deviation	Minimum	Maximum
Log of GVC Participation	488	4.28	0.17	3.50	4.62
Log of Forward Participation	488	3.57	0.36	2.28	4.45
Log of Backward Participation	488	3.46	0.50	1.81	4.22
Weighted Tariff	464	4.35	4.95	0.00	22.71
Road Quality	464	4.53	1.23	1.66	6.64
Electricity Supply	464	5.01	1.24	1.35	6.92
Education Quality	464	4.16	0.87	2.20	6.19
Customs Burden	464	0.23	0.04	0.15	0.37
Institutional Quality	427	0.71	0.89	-1.05	2.24
Labor Market Flexibility	464	4.55	0.61	3.38	6.34

Source: Authors' estimates.

Table 2: Key Determinants of Global Value Chain Participation

	GVC	BPR	FPR
Constant	4.208*** [69.969]	4.239*** [23.683]	3.378*** [25.354]
Weighted Tariff	-0.009*** [-6.405]	-0.029*** [-5.882]	0.006 [1.696]
Customs Burden	-0.082** [2.605]	-1.508*** [-3.510]	0.706 [1.425]
Quality of Roads	0.015*** [3.085]	0.030** [2.275]	0.009* [1.867]
Electric Supply Quality	0.027*** [4.302]	0.030** [2.560]	-0.006 [-0.448]
Skill Quality	0.015** [2.438]	0.084*** [4.394]	-0.044 [-1.558]
Institutional Quality	0.025** [2.417]	0.070** [2.211]	0.015** [1.923]
Labor Market Flexibility	0.016*** [2.772]	0.004 [0.246]	-0.015 [-1.076]
Observations	405	405	405
Number of economies	59	59	59
R-squared			

Note: z-statistics in brackets and *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$
Source: Authors' estimates.

2. Results by Backward and Forward Participation

75. Table 2 highlights the estimation results for economy-wide GVC participation, BPR, and FPR. Trade impediments play a significant role in determining the extent of GVC participation with both measures, i.e., weighted tariff and customs burden exhibiting a significant negative impact. Specifically, if a country were to reduce its average weighted tariff from the 90th percentile of the cross-country distribution of tariffs in 2017 (which, at around 12.3%, is close to India's average weighted tariff) to the 75th percentile of around 5.2% (like the average for the emerging economies), the ratio of GVC exports to total merchandise exports could increase by an average of 6.9% (that is, from India's current GVC participation of 62.7% to 66.8%). The impact is mainly driven by BPR, which would experience an increase from 17.9% to 22.0%. The impact turns out to be insignificant for FPR.

76. Similarly, customs burden also has a strong impact on GVC participation. A reduction in customs burden from its current level of 0.21 to 0.17 (i.e., an improvement in the original variable from current 4.7 to 6) would help GVC participation to increase by around 1.0%. Again, the impact is largely on account of BPR, which is expected to increase by an average of 7.2% on account of easing of customs burden.

77. The higher responsiveness of BPR to reduction in trade impediments like tariff rates and customs complexities appears intuitive as BPR comprises exports, which have high content of imported inputs. On the other hand, FPR primarily comprising domestic value added does not encounter costs related to high tariffs or customs burden.

78. Power supply quality has a higher impact than roads on GVC participation. An improvement in quality of power from India's current level of 4.7 to 6.0 would help GVC participation increase by an average of 4.0%. Again, much of this is driven by BPR as these exports benefit significantly from good quality roads and electric supply. As shown in Figure 7(b), backward participation exports worldwide are dominated by sectors like electrical and optical equipment and transport equipment, which together account for 28% of such exports. Such sectors tend to be power intensive and efficient power supply forms a crucial aspect of production.

79. Poor quality of roads also adversely affects competitiveness by raising the transportation time and cost as well as the incidence of damage during transit. An improvement in quality of roads from India's current level of 4.3 to 6.0 would help GVC participation increase by an average of 5.2%. Backward participation exports are more sensitive to road quality than forward participation exports (where impact is less than a third of backward participation and is significant only at the 10% level).

80. Participation in GVC is also influenced by the quality of skilled labor, once again largely driven by BPR. Given that backward participation exports are dominated by high-technology manufacturing the finding appears intuitive. In these sectors, assembly and production of high-technology components play a vital role and such activities require skilled workers with technical knowhow. On the other hand, forward participation exports comprise sectors like mining and quarrying, basic and fabricated metal; and coke, refined petroleum, and nuclear fuel, which as either primary or processed primary goods, require limited skilled workers.

81. Institutional quality also plays an important role for GVC participation both in terms of FPR and BPR, although the extent of impact is much higher for BPR. Finally, flexible labor market also bolsters GVC participation.

3. Results by Sector

82. Sector-wise estimations highlighted in Annex 3 reveal some noteworthy differences. Tariff rates have a negative impact on GVC participation across all merchandise sectors. The impact is the highest for high-technology manufacturing, followed by low-technology manufacturing, and primary products. Across all these sectors, the impact is largely driven by backward participation exports, which is intuitive as these exports depend crucially on imported input. GVC participation in services sectors is also impacted by tariff rates, albeit to a lesser extent. This could be driven by the fact that countries which have high tariff rates are also the ones to impose barriers to trade in services. Indeed, in the sample of countries, the World Bank's Services Trade Restrictiveness Index is highly correlated with weighted tariff rates ($R^2=0.70$). Customs burden also has a much larger influence on GVC participation of manufactured products compared to services, mainly as the latter involve limited physical movement across the border. Nevertheless, backward participation exports of services are impacted by customs burden as production of these services may depend crucially on import of some tools and equipment.

83. Quality of roads remains an important driver of GVC participation across sectors. With most primary goods being produced in the hinterland, road connectivity to metro areas, ports, and airports plays a crucial role in determining their competitiveness in GVCs. In the case of low-technology products, both forward and backward participation exports are impacted by quality of roads while in the case of high- and medium-technology products, only backward participation exports are affected by road quality. Backward participation exports make more intensive use of roads as they depend on imported inputs, which have to be transported from ports or airports to the production facility. Further, these products are then transported across the part of the value chain that is located within the home country, before being transported to the trade gateways for being exported out.

84. Quality of power supply also has an important influence on GVC participation, with the impact being highest in the services sector, followed by manufacturing and primary sectors. Most of the services like wholesale and retail trade, hospitality, financial intermediation, transport, education, and health depend crucially on regular and good quality power. Across both business and personal services, backward participation exports remain more sensitive to quality of power compared to forward participation exports. Poor quality of power has a strong impact on manufacturing GVC, increasing damage, wastage, time, and resource costs.

85. While skill quality also shows up as an important determinant for GVC participation for manufacturing and business services, institutional quality is a key determinant for primary products and manufacturing sector. Labor market flexibility or less restrictive labor market regulations have a beneficial impact on GVC participation for primary and low technology manufacturing sectors, which tend to be labor intensive.

86. A potential concern with the above estimation is the treatment of endogeneity given that countries experiencing an increase in GVC participation may seek to reduce tariff and customs burden, improve infrastructure, institutions and skill and have more flexible labor policy. To address this issue, lagged explanatory variables, similar to Cheng et al. (2015) were used.⁵⁹ The results are reported in Annex Table 3.4 and are broadly similar to the baseline results in Table 2 and Annex Table 3.3.

⁵⁹ A more robust way to treat endogeneity would involve using Arellano–Bond linear dynamic panel estimations. However, the Arellano–Bond method uses deeper lags of the dependent variable as instruments, which is not always possible with the existing sample size.
|⁵⁹Footnote 55.

87. While these findings are in line with existing literature like Cheng et al. (2015),⁶⁰ World Bank (2020),⁶¹ and Ignatenko et al. (2019),⁶² this paper provides additional insights on the drivers of GVC participation for sectors with different technologies.

B. Benefits of Global Value Chain Participation

88. As described in Section II, the literature has identified numerous channels through which GVC participation can foster economic development. This section empirically tests the impact of growth in GVC exports on some key measures of economic development such as, per capita income, labor productivity or output per worker, investment, and exports. It also looks at the impact of growth in non-GVC exports on various measures of economic development to understand the incremental impact of GVC exports. A similar exercise with the Eora MROID has been undertaken in Ignatenko et al. (2019).⁶³ However, this paper, in addition to examining at the impact of overall GVC exports, also evaluates the impact of both backward and forward participation. The regression specification is outlined in Equation 6:

$$\Delta y_{it} = \alpha_i + \beta_1 K_{it} + \beta_2 \Delta \Theta_{it} + \beta_3 \Delta \Gamma_{it} + \omega_i + \varepsilon_{it} \quad (6)$$

where

Δy_{it} = annual growth in macroeconomic variable like per capita income, output per worker, investment, and exports;

K_{it} = measure of country characteristics such as land and population, which indicate the impact of internal trade; and

$\Delta \Theta_{it}$ = annual growth in non-GVC exports, GVC exports, and its two components.

$\Delta \Gamma_{it}$ = change in other control variables like institutions, innovation, infrastructure, financial market and labor market efficiency.

89. Figure 31 highlights the impact of GVC exports and its components on the key macroeconomic variables.⁶⁴ Figure 31a suggests that growth in GVC exports contributes to raising a country's per capita GDP. Both forward and backward participation have a positive impact on per capita income growth. Moreover, the impact of GVC exports on per capita income is nearly 30% higher than non-GVC exports. Thus, if India is able to accelerate average growth in GVC participation five-fold from the prevailing <1.0% to match that of the Association of South East Asian Nations (of almost 4.9%), India's per capita income growth is estimated to rise by 1.6%.

90. Output per worker or labor productivity also rises with GVC exports and its components, although the impact is weaker than in the case of per capita income (Figure 31b). The impact of GVC exports, again, is bigger than non-GVC exports.

⁶⁰ Footnote 55.

⁶¹ Footnote 11.

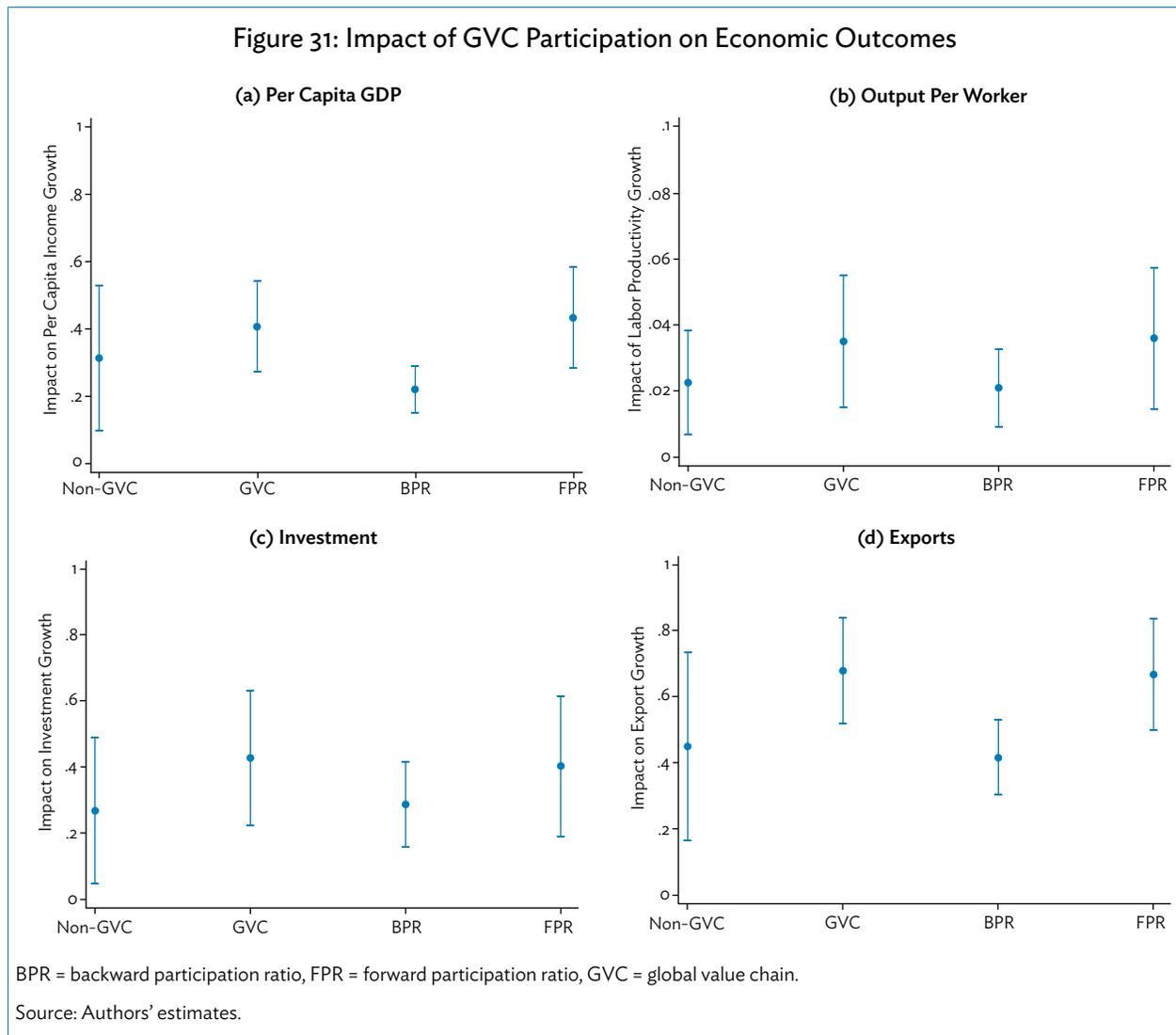
⁶² Footnote 57.

⁶³ Footnote 57.

⁶⁴ The GVC participation and its components as well as per capita GDP and per worker output are measured in logs. Other control variables like size of the economy, total population, and country fixed effects are included in the regression specification.

91. Participating in GVCs allows firms to specialize in that part of the value chain where they are most productive. They gain access to improved technology, cheaper inputs, and global markets (to exploit economies of scale). As a result, output per worker as well as per capita GDP start looking better.⁶⁵

92. Increase in GVC exports is also associated with a significant growth in investment. Part of this is driven by transfer of capital from the lead firm to their subsidiaries located in different countries to get integrated into the value chains. Domestic firms also have an incentive to undertake investment and become competitive enough to avail the opportunities arising out of GVCs. Part of this rise in investment is likely to be offset by the fact that as a country gets more integrated with GVC some unproductive firms are unable to compete with foreign firms for inputs and close down, which may cause some decline in investment. However, as shown in Figure 31c, the net effect is unambiguously positive. The impact of GVC exports on investment is nearly 60% higher than non-GVC exports.



93. Unsurprisingly, a high growth of GVC exports and its components is associated with strong growth in overall exports (Figure 31d). The GVC exports again have a 50% higher impact on overall exports compared to non-GVC exports. This would suggest that for a revival of global exports there is a need to

⁶⁵ Footnote 11.

bolster GVC exports and reverse the decline in share of GVC exports in total exports. This is important for India as well, where overall exports of goods and services have registered a tepid annual growth of 3.6% between 2014–15 and 2018–19.⁶⁶

94. Thus, results confirm that GVC exports and their components (backward and forward participation exports) have a beneficial impact on macroeconomic outcomes like per capita income, output per worker, investment, and exports. Moreover, the positive impact of GVC exports is significantly higher than non-GVC exports for all the macroeconomic variables considered. This is in line with the findings outlined in World Bank (2020).⁶⁷ In addition, among the components of GVC exports, forward participation exports have a bigger impact on the macroeconomic variables compared to backward participation exports. This is intuitive as forward participation exports embody the extent to which locally generated value added is embedded in the exports and therefore has a greater impact on country's macroeconomic performance.

VI. CONCLUSIONS AND POLICY RECOMMENDATIONS

95. Promoting GVC participation is not an objective in itself but a means to attain other economic and development objectives. For a country at the stage of development of India, these objectives primarily entail rapid long-term growth in per capita income in a sustainable manner, generation of productive employable opportunities, and reduction in number of people living in abject poverty. This would necessitate sharp increase in productivity. However, at times productivity growth can be at odds with employment generation as certain kinds of productivity growth reduce the demand for labor. Given India's twin challenge of employing people coming out of agriculture with limited skill levels and providing jobs to a large number of youths who are entering the job market with varying skill levels, India can enhance integration with GVCs at different levels. While continuing to maintain its status as supplier of intermediate inputs, India should seek to engage more in assembly of products as such tasks tend to be more labor intensive. In addition, given the labor abundance, India needs to examine the factors inhibiting the growth of the more labor intensive segments of the value chain.

96. In the empirical analysis discussed above, cross-country data shows that a number of factors have been found to influence GVC participation. These include tariffs and other trade impediments, state of infrastructure, institutional quality, ease of doing business, and availability of skills. Notwithstanding the significant progress in recent years on some of these, India trails many of the emerging markets in East and Southeast Asia. These have inhibited India's participation in GVCs. The broad measures that India can take to improve its GVC participation are listed below.

- a. **Reducing trade costs.** This encompasses reducing tariffs, especially for intermediate goods, which have the potential to act as inputs for exports, reducing customs burden, and improving trade facilitation.
 - i. India's applied tariff on intermediate goods is significantly higher than East and Southeast Asian economies. This amplifies the cost of production for domestic market and exports. There is a need to reduce tariffs on intermediate inputs to make exports competitive vis-à-vis other countries.
 - ii. India's rank on "Trading Across Border", despite recent improvement, remains well below that of comparators like the PRC, Malaysia, the Republic of Korea, Thailand, and Turkey.

⁶⁶ Reserve Bank of India. 2019. *Handbook of Statistics on Indian Economy 2018–19*. Mumbai.

⁶⁷ Footnote 5.

Thus, there is ample scope for India to reduce the time and cost involved for documentary and other border compliance for imports and exports. Multiple compliance requirements at the state and central level need to be reduced.

- b. Improving trade related infrastructure.** A large number of infrastructural areas have a bearing on the competitiveness of Indian exports, so a multipronged strategy is required.
 - i. Port infrastructure needs to be strengthened with a focus on deepening of drafts of berth, upgrade and increased usage of minor ports, improved connectivity with inland container depots, and reduction in various fees charged for port services.⁶⁸
 - ii. Improve the quality of road and rail connectivity between ports and hinterland to reduce the cost of transport of the intermediate goods. Last mile connectivity to major ports needs to be improved to prevent time and cost overrun due to congestion. Under the flagship Sagarmala Program of the Government of India, 235 projects worth \$33 billion have been identified to provide enhanced connectivity between ports and the hinterland production and domestic centers.
 - iii. Resolving shortage of electricity and improving the quality of electricity supply will help reduce production costs and make exports competitive.
- c. Skill development.** Better alignment of India's skills characteristics with industries' skills requirements may be achieved by focusing on high quality vocational education and training that encompasses a robust work-based learning component, and policies to foster closer collaboration between the private sector, higher education institutions, and research institutions.
- d. Incentivize export-related FDI.** In addition to focusing on the fundamentals (strong institutional frameworks, good governance structures, and economic stability), this will require:
 - i. setting up locational asset bases with local network infrastructures that are attractive for FDI;
 - ii. policies to enhance local capabilities and absorptive capacity; as well as
 - iii. policies to correct coordination failures.
- e. Improving institutional quality.** Improvement of institutions that ensure equitable protection of rights, enforceability of contracts, and anticorruption measures to make customs processes efficient will help firms to join GVCs. Deep trade agreements can enhance GVC participation as these agreements target specific institutional bottlenecks.

97. Finally, trade policy, investment policy, and industrial policy have deep and direct impact on GVC participation. These three sets of policies should, as far as possible, reinforce each other with the overall objective of supporting rapid productivity growth. Historically, these policies have often not been mutually supportive. In the era of import substitution, restrictive trade policies undermined the objective of promoting productivity growth: productivity tended to stagnate in protected sectors. There is now a huge volume of empirical evidence showing that sector-wise productivity increases significantly when tariffs are liberalized. Further, evidence from India shows that liberalizing import tariffs promotes domestic innovation through the introduction of new product varieties. There is a strong argument that liberal trade policy can help promote rapid productivity growth. While analysis of trade policy has traditionally focused

⁶⁸ A study by the Associated Chambers of Commerce and Industry of India (ASSOCHAM) has pointed out that marine charges in India, comprising port dues, berth hire and pilotage fees, are substantially higher than ports in Sri Lanka, United Arab Emirates, Singapore, and Malaysia. Indian terminals are also more expensive than their foreign counterparts in terms of other cargo related charges including stevedoring, wharfage and demurrage. ⁶⁸ As mentioned in Bency Mathew. 2019. High Port Costs Hurt Indian Hub Efforts: Study. JOC. com. Available at https://www.joc.com/port-news/asian-ports/port-jawaharlal-nehru/high-port-costs-hurt-indian-hub-efforts-study_20190702.html. Accessed 14 September 2020.

on tariffs, it is necessary to look beyond at nontariff measures to ensure that goods and services can move across borders as efficiently as possible. From the point of view of GVC participation, a liberal trade policy is a condition *sine qua non*: the business model is impossible to conceptualize in an environment of restrictive trade policies. Trade liberalization, covering tariffs and nontariff measures, can therefore be a way to promote rapid productivity growth, in line with the objectives discussed above.

98. Similar arguments apply in the case of investment policy. Firms with foreign investment are more likely to license foreign technology, as well as to engage in international trade. Foreign investment is typically found to increase productivity at the firm level. At the same time, foreign investment is a key aspect of GVC participation. A liberal investment policy therefore reinforces a liberal trade policy in both promoting GVC participation and supporting rapid productivity growth.

99. The intersection of these two policy areas with industrial policy is complex.⁶⁹ Too often, industrial policy is mischaracterized as the objective of growing the manufacturing sector. Like GVC participation, growing manufacturing is not an end in itself; it is at best an intermediate outcome. If the primary objective is to promote rapid productivity growth so as to support rapid income growth, then it would require healthy growth in manufacturing. Manufacturing has desirable characteristics like economies of scale, high demand for labor with limited qualifications, and tradability. But some services sectors have these characteristics as well, so it would be a mistake to use industrial policy to privilege manufacturing growth over growth in high potential commercial services sectors. Helble et al. (2019) find that some parts of the services sector which include information and communications services, and digital intensive services such as distribution and financial services have experienced great productivity increases in developing countries.⁷⁰ Thus, the objective of industrial policy should be to promote rapid productivity growth across all industrial sectors, encompassing goods and services.

⁶⁹ Ben Shepherd. 2019. Background Note on Enhancing India's Participation in GVCs. Submitted to Asian Development Bank. Manila. Unpublished.

⁷⁰ Matthias C. Helble, Trinh Q. Long, and Trang T. Le. 2019. Sector-wise and Skill Contributions to Labor Productivity in Asia. In Matthias Helble and Ben Shepherd (eds). *Leveraging Services for Development: Prospects and Policies*. Asian Development Bank Institute. pp: 301–21.

Annex 1: Classification of Sectors in the Multiregional Input–Output Database of the Asian Development Bank

Sectors at the Level Used by World Input–Output Database	Sector Classification	
1	Agriculture, Hunting, Forestry, and Fishing	Primary
2	Mining and Quarrying	Primary
3	Food, Beverages, and Tobacco	Low Tech
4	Textiles and Textile Products	Low Tech
5	Leather, Leather Products, and Footwear	Low Tech
6	Wood and Products of Wood and Cork	Low Tech
7	Pulp, Paper, Printing, and Publishing	Low Tech
8	Coke, Refined Petroleum, and Nuclear Fuel	High and Medium Tech
9	Chemicals and Chemical Products	High and Medium Tech
10	Rubber and Plastics	Low Tech
11	Other Non-Metallic Minerals	High and Medium Tech
12	Basic Metals and Fabricated Metals	High and Medium Tech
13	Machinery, Nec	High and Medium Tech
14	Electrical and Optical Equipment	High and Medium Tech
15	Transport Equipment	High and Medium Tech
16	Manufacturing, Nec; Recycling	Low Tech
17	Electricity, Gas, and Water Supply	Low Tech
18	Construction	Low Tech
19	Sale, Maintenance, and Repair of Motor Vehicles and Motorcycles; Retail Sale of Fuel	Business Service
20	Wholesale Trade and Commission Trade, Except of Motor Vehicles and Motorcycles	Business Service
21	Retail Trade, Except of Motor Vehicles and Motorcycles, Repair of Household Goods	Business Service
22	Hotels and Restaurants	Business Service
23	Inland Transport	Business Service
24	Water Transport	Business Service
25	Air Transport	Business Service
26	Other Supporting and Auxiliary Transport Activities, Activities of Travel Agencies	Business Service
27	Post and Telecommunications	Business Service
28	Financial Intermediation	Business Service
29	Real Estate Activities	Business Service
30	Renting of Machinery and Equipment, Other Business Activities	Business Service
31	Public Administration and Defence, Compulsory Social Security	Personal Service
32	Education	Personal Service
33	Health and Social Work	Personal Service
34	Other Community, Social, and Personal Services	Personal Service
35	Private Households with Employed Persons	Personal Service

Source: Asian Development Bank. 2015. Global Value Chains Indicators for International Production Sharing. *Key Indicators for Asia and the Pacific 2015*. Manila.

Annex 2: Economies Covered in the Multiregional Input–Output Database of the Asian Development Bank

Code	Economy	Code	Economy
AUS	Australia	LTU	Lithuania
AUT	Austria	LUX	Luxembourg
BAN	Bangladesh	MAL	Malaysia
BEL	Belgium	MLD	Maldives
BHU	Bhutan	MLT	Malta
BRA	Brazil	MEX	Mexico
BRU	Brunei Darussalam	MON	Mongolia
BGR	Bulgaria	NEP	Nepal
CAM	Cambodia	NET	Netherlands
CAN	Canada	NOR	Norway
HRV	Croatia	PAK	Pakistan
CYP	Cyprus	PRC	People’s Republic of China
CZE	Czech Republic	PHI	Philippines
DEN	Denmark	POL	Poland
EST	Estonia	POR	Portugal
FIJ	Fiji	ROM	Romania
FIN	Finland	RUS	Russian Federation
FRA	France	SIN	Singapore
GER	Germany	SVK	Slovak Republic
GRC	Greece	SVN	Slovenia
HKG	Hong Kong, China	SPA	Spain
HUN	Hungary	SRI	Sri Lanka
IND	India	SWE	Sweden
INO	Indonesia	SWI	Switzerland
IRE	Ireland	TAP	Taipei,China
ITA	Italy	THA	Thailand
JPN	Japan	TUR	Turkey
KAZ	Kazakhstan	UKG	United Kingdom
KOR	Republic of Korea	USA	United States
KGZ	Kyrgyz Republic	VIE	Viet Nam
LAO	Lao People’s Democratic Republic	ROW	Rest of the World
LVA	Latvia		

Source: Asian Development Bank. 2015. Global Value Chains Indicators for International Production Sharing. *Key Indicators for Asia and the Pacific 2015*. Manila.

Annex 3: Key Determinants of GVC Participation

Annex Table 3.1: Determinants of GVC Participation in Primary Products

	Primary Products		
	GVC	BPR	FPR
Constant	4.365*** [46.194]	3.123*** [12.413]	3.955*** [24.565]
Weighted Tariff	-0.004** [-2.151]	-0.046*** [-9.952]	0.006* [1.949]
Customs Burden	0.343* [1.699]	-1.564*** [-2.866]	0.700** [2.157]
Quality of Roads	0.043*** [5.917]	0.061*** [3.341]	0.065*** [4.965]
Electric Supply Quality	0.022** [2.460]	0.136*** [5.529]	0.016 [0.974]
Skill Quality	0.016 [1.581]	0.019*** [4.401]	-0.040 [-1.207]
Institutional Quality	0.044*** [2.865]	0.159*** [3.727]	0.009 [0.330]
Labor Market Flexibility	0.025*** [2.939]	0.052** [2.135]	0.004 [0.241]
Observations	405	405	405
Number of Countries	59	59	59

Note: z-statistics in brackets and *** p<0.01, ** p<0.05, * p<0.1

Source: Authors' estimates.

Annex Table 3.2: Determinants of GVC Participation in Manufacturing Products

	Low Technology Manufacturing Products			High and Medium Technology Manufacturing Products		
	GVC	BPR	FPR	GVC	BPR	FPR
Constant	4.210*** [49.145]	3.567*** [18.248]	3.734*** [24.721]	4.282*** [70.568]	4.455*** [31.361]	3.103*** [22.124]
Weighted Tariff	-0.006*** [-3.134]	-0.026*** [-5.728]	0.001 [0.320]	-0.007*** [-5.169]	-0.024*** [-6.218]	0.002 [0.510]
Customs Burden	-0.263 [-1.512]	-1.302*** [-2.903]	-0.005 [-0.014]	0.112 [0.810]	-1.545*** [-4.072]	1.311 [1.575]
Quality of Roads	0.016** [2.390]	0.033** [1.977]	0.013*** [2.830]	0.020*** [4.267]	0.028*** [2.819]	-0.015 [-1.319]
Electric Supply Quality	0.028*** [2.992]	0.024** [1.975]	0.001 [0.069]	0.023*** [3.868]	0.021** [1.979]	-0.010 [-0.678]
Skill Quality	0.019** [2.124]	0.079*** [3.892]	-0.025 [-1.521]	0.023** [2.493]	0.096*** [6.768]	-0.056 [-1.515]
Institutional Quality	0.055*** [3.859]	0.035 [1.091]	0.058** [2.221]	-0.005 [-0.483]	0.072*** [2.654]	-0.087 [-1.369]
Labor Market Flexibility	0.054** [2.511]	0.081*** [4.270]	0.041*** [2.600]	0.015 [1.201]	-0.002 [-0.158]	0.003 [0.213]
Observations	405	405	405	405	405	405
Number of Countries	59	59	59	59	59	59

Note: z-statistics in brackets and *** p<0.01, ** p<0.05, * p<0.1

Source: Authors' estimates.

Annex Table 3.3: Determinants of GVC Participation in Services

	Business Services			Personal Services		
	GVC	BPR	FPR	GVC	BPR	FPR
Constant	4.338*** [94.470]	2.462*** [9.942]	4.103*** [48.956]	4.287*** [33.548]	2.462*** [10.222]	3.936*** [20.375]
Weighted Tariff	-0.001 [-0.633]	-0.011** [-2.511]	-0.003* [1.776]	-0.018*** [-6.382]	-0.014** [-2.453]	-0.014*** [-3.317]
Customs Burden	-0.049 [-0.572]	-1.001* [-1.870]	-0.287* [1.688]	0.658** [2.394]	-0.802* [-1.652]	0.709* [1.799]
Quality of Roads	0.025*** [5.999]	0.102*** [5.279]	-0.010 [-1.606]	0.041*** [4.115]	0.056*** [2.888]	-0.016 [-0.955]
Electric Supply Quality	0.047** [2.115]	0.110*** [4.879]	-0.019 [-1.395]	0.053*** [4.001]	0.104*** [4.468]	0.045** [2.418]
Skill Quality	0.015*** [3.047]	0.044* [1.805]	-0.014 [-1.657]	0.005 [0.530]	0.045* [1.895]	0.024 [1.319]
Institutional Quality	0.007 [0.892]	0.050 [1.359]	-0.033 [-1.281]	0.035* [1.652]	-0.027 [-0.721]	0.011 [0.362]
Labor Market Flexibility	0.041** [2.198]	0.066*** [2.859]	0.031*** [3.708]	0.064*** [5.188]	0.039 [1.627]	0.079*** [4.486]
Observations	405	405	405	405	405	405
Number of Countries	59	59	59	59	59	59

Note: z-statistics in brackets and *** p<0.01, ** p<0.05, * p<0.1
Source: Authors' estimates.

Annex Table 3.4: Determinants of GVC Participation (Lagged Explanatory Variables)

	All Products			Primary Products			Low Technology Manufacturing Products		
	GVC	BPR	FPR	GVC	BPR	FPR	GVC	BPR	FPR
Constant	4.352*** [73.521]	3.873*** [22.089]	3.524*** [28.174]	4.481*** [46.773]	3.088*** [13.629]	4.336*** [27.378]	4.234*** [47.912]	3.715*** [21.314]	3.557*** [27.094]
Lag Weighted Tariff	-0.010*** [-7.236]	-0.026*** [-5.934]	0.010 [1.082]	-0.006*** [-3.510]	-0.039*** [-6.964]	0.003 [1.229]	-0.008*** [-4.031]	-0.026*** [-6.007]	0.003 [0.937]
Lag Customs Burden	-0.202** [-2.432]	-1.026** [-2.541]	0.661 [1.486]	-0.121 [-0.557]	-1.924*** [-3.641]	-0.087 [-0.256]	-0.500*** [-2.716]	-1.274*** [-3.267]	0.172 [0.678]
Lag Road Quality	0.020*** [4.533]	0.023** [2.279]	0.016* [1.869]	0.046*** [6.673]	0.046** [2.571]	0.054*** [4.192]	0.011** [2.024]	0.027** [1.987]	0.013** [2.149]
Lag Electricity Supply	0.018*** [3.034]	0.039** [2.136]	-0.012 [-0.927]	0.017** [2.120]	0.151*** [7.242]	0.003** [2.037]	0.019** [2.004]	0.013* [1.750]	0.010 [0.734]
Lag Education Quality	0.014** [2.190]	0.052*** [3.045]	-0.013 [-0.945]	0.000 [0.008]	0.106*** [4.416]	0.049 [1.548]	0.010** [2.015]	0.043** [2.470]	-0.012 [-0.889]
Lag Institutional Quality	0.025** [2.435]	0.052* [1.740]	0.021 [0.949]	0.024* [1.753]	0.089*** [2.709]	0.013 [0.494]	0.020** [2.416]	0.029** [2.168]	0.027* [1.890]
Lag Labor Market Flexibility	0.016*** [2.714]	0.018 [0.924]	-0.013 [-0.938]	0.023*** [2.614]	0.047** [2.209]	-0.012 [-0.677]	0.015* [1.851]	0.045*** [2.720]	0.023* [1.689]
Observations	346	346	346	346	346	346	346	346	346
Number of Countries	59	59	59	59	59	59	59	59	59

Note: z-statistics in brackets and *** p<0.01, ** p<0.05, * p<0.1
Source: Authors' estimates.

	High and Medium Technology Manufacturing Products			Business Services			Personal Services		
	GVC	BPR	FPR	GVC	BPR	FPR	GVC	BPR	FPR
Constant	4.453*** [75.442]	3.967*** [22.741]	3.415*** [22.917]	4.380*** [99.689]	3.224*** [13.972]	3.900*** [44.981]	4.273*** [34.501]	3.144*** [12.090]	3.921*** [20.327]
Lag Weighted Tariff	-0.009*** [-6.405]	-0.017*** [-4.466]	0.004 [1.086]	0.000 [0.150]	-0.010** [-2.491]	0.004* [2.549]	-0.017*** [-6.501]	-0.016*** [-2.628]	-0.020*** [-4.495]
Lag Road Quality	0.019*** [4.519]	0.006** [2.378]	-0.008 [-0.738]	0.024*** [6.004]	0.078*** [3.982]	-0.011 [-1.615]	0.043*** [4.193]	0.053*** [2.590]	-0.023 [-1.328]
Lag Customs Burden	0.010 [0.069]	-0.889** [-2.181]	-1.227*** [-3.611]	-0.277*** [-3.385]	-2.278*** [-4.607]	0.648 [1.657]	-0.841*** [-3.232]	-2.266*** [-4.093]	1.107*** [2.643]
Lag Electricity Supply	0.029** [2.419]	0.027** [2.478]	0.006** [2.377]	0.008** [1.993]	0.047** [2.146]	0.001 [0.165]	0.041*** [3.689]	0.017 [0.704]	0.033* [1.801]
Lag Education Quality	0.026** [2.350]	0.043** [2.473]	-0.017 [-1.162]	0.007** [1.994]	0.002** [2.083]	-0.004 [-0.452]	0.005 [0.423]	0.041 [1.605]	0.025 [1.374]
Lag Institutional Quality	0.007 [0.647]	0.038** [2.326]	-0.007 [-0.286]	0.005 [0.692]	0.048 [1.391]	-0.031** [-2.090]	0.053*** [2.883]	0.037 [0.954]	-0.003 [-0.101]
Lag Labor Market Flexibility	0.000 [0.040]	-0.002 [-0.084]	-0.010 [-0.632]	0.005** [2.081]	0.053** [2.409]	-0.022** [-2.522]	0.059*** [4.654]	0.044* [1.774]	0.080** [2.170]
Observations	346	346	346	346	346	346	346	346	346
Number of Countries	59	59	59	59	59	59	59	59	59

Note: z-statistics in brackets and *** p<0.01, ** p<0.05, * p<0.1
Source: Authors' estimates.

Drivers and Benefits of Enhancing Participation in Global Value Chains

Lessons for India

Enhancing participation in global value chains (GVCs) can facilitate development outcomes that India strives to achieve, including generating productive employment opportunities, increasing labor productivity, and gaining a larger share of global exports. This paper draws from the Asian Development Bank's Multiregional Input–Output Database and highlights the role of various drivers of GVCs participation across primary, manufacturing, and services sectors. It also evaluates the drivers and economic consequences of participating in different segments of GVCs, which can apply to India's potential development outcomes. Results of the study indicate increasing GVC participation can positively impact the economy and contribute to raising per capita income, labor productivity, investment, and exports.

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