

ENHANCING SME PARTICIPATION IN GLOBAL VALUE CHAINS

Edited by Shujiro Urata

Enhancing SME Participation in Global Value Chains: Determinants, Challenges, and Policy Recommendations

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Shujiro Urata

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Abbreviations

ASEAN	Association of Southeast Asian Nations
ASYCUDA	Automated System for Customs Data
FDI	foreign direct investment
GDP	gross domestic product
GVC	global value chain
ICT	information and communication technology
IV	instrumental variable
MNC	multinational corporation
MNE	multinational enterprise
OECD	Organisation for Economic Co-operation and Development
OLS	ordinary least squares
RRR	relative risk ratio
SMEs	small and medium-sized enterprises
TFP	total factor productivity
TiVA	Trade in Value Added
WTO	World Trade Organization

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1

Introduction and Summary

Shujiro Urata

1.1 Background, Motives, and Objectives

The world has been witnessing growing anti-globalization sentiment in recent years, despite proof that globalization of economic activities contributes to economic growth. Globalization as a result of rapid expansion of international economic activities such as international trade and investment is considered one of the most important factors that contributed to rapid global economic growth in the postwar period. Among various regions of the world, East Asia has been a model for globalization-led high economic growth.

One reason behind the growing anti-globalization sentiment is the presence of groups of people or firms that did not benefit much from globalization as they were not able to take advantage of the opportunities arising from globalization. One such group of firms that missed out on the opportunities is small and medium-sized enterprises (SMEs). Due to limited availability of human and financial resources and technological capability, SMEs have not been successful in exporting their products and/or importing high-quality intermediate goods. SMEs are in a disadvantageous position compared with large firms for gaining benefits from globalization.

Reconciling the growing anti-globalization sentiment and the importance of globalization for economic growth, increased participation of SMEs in globalization is a key for achieving inclusive growth, which benefits many people and thereby contributes to sustainable economic growth by ameliorating anti-globalization sentiment. Global value chains (GVCs), which involve a number of tasks or processes in the form of international networks and have been actively constructed mainly by multinational corporations (MNCs) in recent decades, provide a good opportunity for SMEs to participate in globalization. This is because SMEs with limited resources and capability can participate in GVCs by taking up one task or process within the value chain and thus do not need to have an entire production system.

International trade has been an engine of economic growth for many developing countries, particularly those in East Asia. Trade enables countries and firms to use resources such as labor and capital efficiently, promoting economic growth. Additionally, exports and imports bring in various benefits that contribute potentially to economic growth. Exporting countries and firms benefit from making use of economies of scale, as exports remove the constraints of small domestic markets and provide exporting firms an opportunity to sell their products in large foreign markets. Exporting improves productivity and competitiveness of exporting firms as they acquire efficient management know-how, as well as high-level technology by conducting business in competitive foreign markets. This phenomenon is known as the “learning by exporting hypothesis.” In addition, strong pressure from conducting business in highly competitive foreign markets forces exporting firms to improve their competitiveness. Turning to the impacts on importing firms, imports of high-quality intermediate goods such as parts and components have been shown to contribute to an improved productivity and competitiveness. Further, imports also could improve the competitiveness of domestic firms facing competition from imports, known as the “import-discipline hypothesis.”

These observations indicate that globalization in the form of trade is likely to promote economic growth by improving allocative and technical efficiency of trading firms. Importantly, participating in GVCs, which is generally defined as engaging both in importing of intermediate goods and in exporting of the products, possibly gives participating firms all the benefits discussed above.

SMEs play a very important role in economic development and growth, and they occupy an important position in the economic activities of many countries. In terms of magnitude, the shares of SMEs in the total number of firms, total employment and total production are over 90%, 60%–70%, and around 50%, respectively, in many countries. They are located in both urban and rural areas, and support the economic activities in many areas and regions. SMEs provide job opportunities for various types of workers, ranging from unskilled workers to innovative entrepreneurs, and employ many female workers in rural areas. They are an important source of dynamism, contributing to economic growth. New entry of SMEs in the industry injects competitive pressure to incumbent firms. Creative and innovative SMEs transform the existing industries and develop new industries. Indeed, small size is often an advantage of SMEs, as it enables them to be agile in making decisions and implementing business plans.

Another important role that SMEs play in economic activities is to support other firms, in many cases within the GVC networks. This

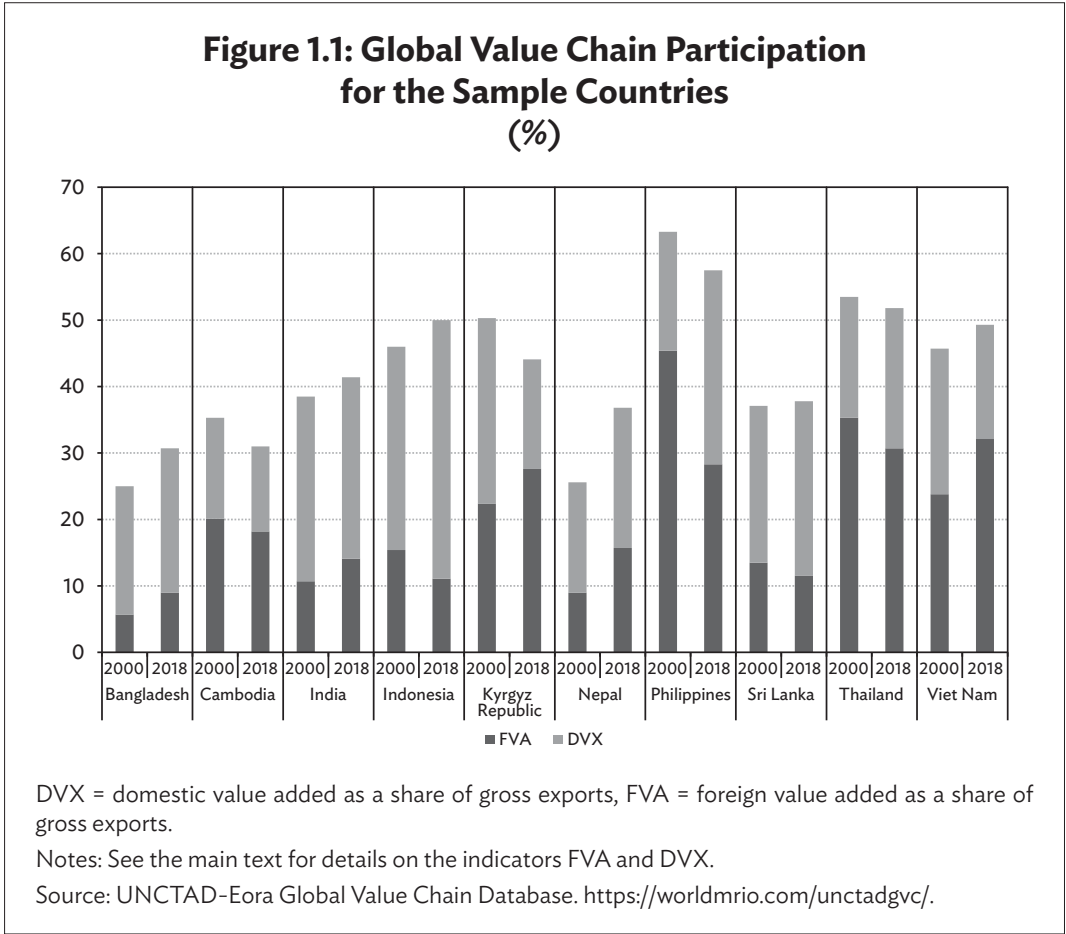
supportive role of SMEs is very notable in manufacturing, particularly the machinery industry, which uses a large number of parts and components for the production of final products. For example, in the case of automobile production, SMEs supply many of the required parts and components to large firms to assemble cars. Without the efficient and effective support of SMEs, many machinery industries and firms cannot be competitive. These observations indicate the importance of developing and nurturing competitive SMEs for achieving inclusive and sustainable economic growth.

The preceding discussions indicate the importance of international trade and the role of SMEs for achieving inclusive and sustainable economic growth. However, participation in international trade is not easy, particularly for SMEs. Firms must overcome a number of obstacles to participate in trade. In the case of exporting, for example, they have to set up distribution networks in a foreign market, about which they have limited knowledge. They have to hire efficient logistics firms to export their products at low cost. Firms have to have sufficient resources to finance the necessary fixed costs associated with starting exports, since payment for the exported goods will come in only sometime after the shipment. Moreover, firms face various kinds of risks related to international business such as timely delivery, in addition to exchange rate risk. These obstacles to engaging in international trade are particularly serious for SMEs because they have limited human and financial resources, technological capability, and bargaining power. As noted earlier, given the many disadvantages SMEs face, GVCs provide an easier way to engage in trade because they can take part in one task or process—and not the entire production process.

In light of these observations, this book examines the pattern and evolution of SMEs' participation in international trade, particularly in GVCs. We also examine the factors that determine their participation in trade and GVCs, as well as identify obstacles and how SMEs deal with these obstacles. Our analysis adopts two approaches. One is a quantitative, statistical approach; the other is a qualitative, case-study approach. A mix of these two approaches is expected to yield meaningful results. We selected 10 developing countries from Asia: Bangladesh, Cambodia, India, Indonesia, the Kyrgyz Republic, Nepal, the Philippines, Sri Lanka, Thailand, and Viet Nam (in alphabetical order). A study of these 10 countries, which vary greatly in many respects, such as their level of economic development, economic size, industrial structure, and geographical characteristics, would contribute to deepening our understanding of the issues related to the participation of SMEs in GVCs.

1.2 Global Value Chain Participation and SMEs in Asian Countries

An international comparison of the level of GVC participation among the sample countries reveals wide variation. Figure 1.1 shows two indicators, that is, foreign value added (FVA) and domestic value added (DVX) as a share of gross exports, which are frequently used to measure the extent of GVC participation of a country.¹ FVA indicates the foreign value added embodied in the country’s gross exports and DVX indicates the domestic value added embodied in gross exports of foreign countries. As such, FVA and DVX represent backward and forward participation, respectively.



¹ These indicators are considered to capture the pattern and the level of GVC participation correctly, as they take into account direct and indirect (inter-industry) relationships. See OECD (2019) for an explanation of these indicators. One drawback is the limited availability of required data. Because of this problem, chapters in this book use several other indicators to measure the level of GVC participation.

The level of GVC participation (sum of FVA and DVX shares) increased from 2000 to 2018 in six countries (Bangladesh, India, Indonesia, Nepal, Sri Lanka, and Viet Nam), while it declined in four countries (Cambodia, the Kyrgyz Republic, the Philippines, and Thailand). In 2018, the Philippines registered the highest level of GVC participation at 57.5%, followed by Thailand (51.8%), Indonesia (50.0%), and Viet Nam (49.3), while Bangladesh (30.7%), Cambodia (31.0%), Nepal (36.7%), and Sri Lanka (37.8%) had levels of GVC participation below 40%. India (41.4%) and the Kyrgyz Republic (44.1%) are placed between these two groups.

A comparison of the FVA and DVX shares for a country reveals how it is involved in GVCs. A low (high) ratio between FVA and DVX shares indicates that the country is more actively engaged in upstream (downstream) tasks in GVCs. Among developing countries, such a country tends to be more concentrated in supplying primary products or natural resource-intensive and low-value added activities. With this observation in mind, let us examine how the sample countries are involved in GVCs. The sample countries that are involved relatively heavily in upstream activities are Indonesia (0.3),² Bangladesh (0.4), Sri Lanka (0.4), India (0.5), and Nepal (0.7), while those countries involved relatively heavily in downstream activities are Viet Nam (1.9), the Kyrgyz Republic (1.7), Thailand (1.5), and Cambodia (1.4). For the Philippines (1.0), the weight or importance of upstream and downstream activities is balanced. It should be noted that the importance of downstream activities increased more rapidly than that of upstream activities in six countries from 2000 to 2018: Bangladesh, Cambodia, India, the Kyrgyz Republic, Nepal, and Viet Nam. The rapid increase of downstream activities relative to upstream activities generally reflects the progress in industrialization. The rate of increase was remarkably high for the Kyrgyz Republic and Viet Nam. By contrast, the relative importance of downward activities declined in four countries: Indonesia, the Philippines, Sri Lanka, and Thailand. The rate of decline was particularly large for the Philippines.

Table 1.1 shows the position of SMEs in economic activities in the sample countries.³ An examination of the data reveals some common patterns with a few variations among the sample countries. First, SMEs dominate in terms of the number of enterprises in all the countries as the SME share in total number of enterprises is over 98% in all the

² The figures in parentheses are the ratios between FVA and DVA for 2018.

³ An international comparison of data on SMEs needs to be conducted with caution because there exist substantial differences among the countries regarding the data on SMEs, including their definitions and coverage.

Table 1.1: Position of SMEs in Sample Countries

Country	Number of SMEs (% of total)	Employment by SMEs (% of total)	SME Contribution to GDP (%)	SME Exports (% of total)
Bangladesh	91.5	40.9	52.8	–
Cambodia	99.8	71.8	–	–
India	–	–	28.9	–
Indonesia	99.9	97.0	61.1	14.4
Kyrgyz Republic	78.8	–	41.5	39.3
Nepal	99.3	65.6	–	24.9
Philippines	99.5	63.2	35.7	25.0
Sri Lanka	99.8	99.8	–	–
Thailand	99.8	85.5	43.0	28.7
Viet Nam	98.1	44.5	–	–

– = not available, GDP = gross domestic product, SMEs = small and medium-sized enterprises.

Notes: Sources and years for the data.

Bangladesh data for 2012: Bangladesh Bureau of Statistics, Survey of Manufacturing Industries 2012 (<http://203.112.218.65:8008/WebTestApplication/userfiles/Image/LatestReports/SMI-%202012.pdf>).

Cambodia data for 2014: Asian Development Bank, Asia SME Finance Monitor 2014 (<https://www.adb.org/sites/default/files/publication/173205/asia-sme-finance-monitor2014.pdf>).

India data for 2016–2017: Ministry of Micro, Small and Medium Enterprises, Annual Report 2018-19 (<https://msme.gov.in/sites/default/files/Annualrprt.pdf>).

Indonesia data for 2018: Ministry of Cooperatives and SMEs ([http://www.depkop.go.id/uploads/laporan/1580223129_PERKEMBANGAN%20DATA%20USAHA%20MIKRO,%20KECIL,%20MENENGAH%20\(UMKM\)%20DAN%20USAHA%20BESAR%20\(UB\)%20TAHUN%202017%20-%202018.pdf](http://www.depkop.go.id/uploads/laporan/1580223129_PERKEMBANGAN%20DATA%20USAHA%20MIKRO,%20KECIL,%20MENENGAH%20(UMKM)%20DAN%20USAHA%20BESAR%20(UB)%20TAHUN%202017%20-%202018.pdf)).

Kyrgyz Republic data for 2018: National Statistical Committee of the Kyrgyz Republic (<http://stat.kg/en/statistics/maloe-i-srednee-predprinimatelstvo/>).

Nepal, data for 2018: number of enterprises, employment, Central Bureau of Statistics, National Planning Commission, National Economic Census 2018: National Report. [Report No. 1-2 by Size of Persons Engaged].

Philippines data on the number of SMEs and employment for 2018 and GDP and exports for 2016: Department of Trade and Industry, 2018 MSME Statistics (<https://www.dti.gov.ph/resources/msme-statistics/>).

Sri Lanka data for 2013–2014: employment and GDP (<https://www.advocata.org/commentary-archives/2019/10/31/is-sri-lanka-keeping-its-small-businesses-small>), number of firms and employment (http://www.statistics.gov.lk/Economic/Non_agri/PRESS%20RELEASEEcoCen_en.pdf).

Thailand data for 2019: Office of Small and Medium Enterprise Promotion, SMEs White Paper Report 2019 (Executive Summary) (https://www.sme.go.th/upload/mod_download/download-20190919092631.pdf).

Viet Nam data for 2017: General Statistics Office (https://gso.gov.vn/default_en.aspx?tabid=515&idmid=5&ItemID=18974).

countries except Bangladesh (91.5%) and the Kyrgyz Republic (78.8%). The low share in the Kyrgyz Republic may be due to the country's status as a transition economy, where a large number of firms are large in size and established by the government, while the number of small and private firms is limited. The importance of SMEs in employment, gross domestic product (GDP) and exports is significantly lower compared to the case of the number of firms or enterprises. The share of SMEs in total employment varies widely between 99% (Sri Lanka) and 40% (Bangladesh) with an average of around 70%, while the corresponding shares for GDP are significantly lower between 61% (Indonesia) and 29% (India) with an average of 44%. These observations indicate that labor productivity, measured by GDP per employee, is lower for SMEs compared to large firms. The shares of SMEs in total exports are even lower than those for gross national product, ranging between 39% (Kyrgyz Republic) and 14% (Indonesia) with an average of 26%. These figures imply that exporting, or conducting business in foreign countries, requires financial and other resources, which SMEs lack, in order to deal with various obstacles such as a lack of familiarity of the foreign market, the presence of strong competition, the difficulty in setting up sales networks, and so forth.

1.3 A Brief Review of Major Studies

Reflecting a growing interest in GVCs, a number of studies have examined the patterns and factors determining GVC participation. Roughly speaking, there are two types of studies: cross-country country-level studies, and firm-level studies. Most are cross-country country-level studies, which have been conducted by international organizations such as the Organisation for Economic Co-operation and Development (OECD), United Nations Conference on Trade and Development (UNCTAD), United Nations Industrial Development Organization (UNIDO), World Trade Organization (WTO), and World Bank.⁴ These studies measure the patterns and levels of GVC participation by using trade in value-added data at country and sector levels. Firm-level studies, which have been mostly conducted for a particular country or a group of countries, are relatively few. This section first reviews cross-country studies and then turns to firm-level studies, with a particular focus on SMEs. It should be noted that chapters contained in this book analyze the issue from firm or SME perspectives.

⁴ See, for example, UNCTAD (2013, 2015), UNIDO (2015), WTO (2019), and World Bank (2017, 2020). The WTO studies were produced in collaboration with the Institute of Developing Economies – Japan External Trade Organization, OECD, University of International Business and Economics, and World Bank.

Cross-country studies found some common determinants of GVC participation. A recent publication by the World Bank (2020) analyzes the factors that determine the participation in GVCs at country as well as broad sector levels by using Trade in Value Added data covering 190 countries and areas. GVC participation is broken down into backward and forward participation. In its quantitative analysis, the explanatory variables are chosen from the following five broad categories: (1) factor endowments, (2) geography, (3) market size, (4) trade policy and foreign direct investment (FDI), and (5) quality of institutions. The study finds that all of these variables matter for GVC participation. Abundance of low-skilled labor promotes backward participation, while abundance of natural resources promotes forward participation. Distance away from GVC hubs discourages GVC participation (both backward and forward participation). Geographical barriers can be overcome by enhanced connectivity such as improved transportation infrastructure. Market size reduces backward participation but increases forward participation. Liberal trade policy and FDI inflows increase backward integration. Good institutions reflected in rule of law and political stability increases GVC participation. These findings lead to the following policy recommendations: create a flexible labor market, promote trade and FDI liberalization and facilitation, build infrastructure, and improve institutional quality.

A few studies have analyzed the issues of GVC participation at the level of firms, particularly at the level of SMEs.⁵ The World Bank (2016) examines GVC participation by SMEs in low-income countries by mainly summarizing and synthesizing previous studies. It finds that many SMEs participate in exporting indirectly by supplying parts to large firms, which use these parts for their exports. The study identifies the key challenges for successful GVC participation by SMEs and classifies them into those internal and external to SMEs. The key challenges internal to a firm include becoming a formal enterprise, increasing productivity, acquiring technology and managerial skills, and promoting innovation, while the key obstacles external to a firm include having to face limited access to trade finance, as well as to information about export opportunities and export procedures, high transportation and shipping costs, inadequate infrastructure, and regulatory uncertainty. The study recommends a number of policies that would help SMEs overcome these obstacles, including the provision of education and training, establishment of a favorable environment for acquiring technology and improving technological capability, promotion of trade facilitation and efficient logistics, improvement of physical and information and

⁵ For the studies that analyze GVC participation by firms, see, for example, Chapter 2 of this book by Urata and Baek, and the references provided in the chapter.

communication technology connectivity, provision of assistance for obtaining quality certificate, and increased access to finance.

The Asian Development Bank Institute (2015) identifies the successful factors and impediments for SME participation in GVCs by using the results of a questionnaire survey of SMEs in four Asian countries—Kazakhstan, Papua New Guinea, the Philippines, and Sri Lanka. The study finds that competitiveness and connectivity are two key factors for successful participation in GVCs. The study further identifies six specific successful factors: (1) quality of the products or services; (2) skilled labor; (3) strength of customer relations; (4) ambition of the owner; (5) education, experience, and international exposure of the owner; and (6) access to finance. It also finds five serious impediments: (1) limited access to finance, (2) unavailability of skilled labor, (3) labor market rigidity, (4) weak institutional support, and (5) lack of competitiveness of the sector in which SMEs are operating. The study indicates six broad policy areas for the government to consider in formulating policies to promote SMEs' participation in GVCs: (1) access to finance; (2) workers' skills; (3) infrastructure (particularly transportation and communication networks); (4) trade facilitation (e.g., efficient trade procedures); (5) technology; and (6) innovation.

1.4 Main Findings

Our study found that the number of SMEs that are engaged in international trade is limited in many countries. The proportion of SMEs engaged in importing materials and parts or components is greater compared to those engaged in exporting products. Defining GVC participation as involvement in importing inputs and exporting outputs, the proportion of SMEs participating in GVCs is similar to those engaged in exports, since many—if not all—exporting SMEs import inputs. We also found that many SMEs participate in GVCs indirectly by supplying inputs, materials, and/or components to other firms, which use these inputs to produce products that are exported. Many SMEs acquire the knowledge and methodology necessary for direct exporting by accumulating experiences through indirect exporting.

The findings about the determinants of GVC participation by SMEs from our study can be classified into two groups: the first is those related to SMEs and the other concerns the business and/or economic environment surrounding SMEs. SMEs can individually control the first group of determinants or factors, but they cannot control the second group of determinants or factors. This second group is controlled or influenced by the governments and groups of firms or SMEs, such as business associations.

To begin with the factors internal to SMEs that affect their participation in GVCs, we found that being competitive is a necessary condition. Without competitiveness, SMEs cannot conduct the process or task within the GVC network of producing the products that are directly or indirectly exported overseas. Competitiveness of SMEs reflects various factors, such as high labor productivity, uniqueness or high quality of their product or task, and low cost. To possess competitiveness, SMEs need educated, trained, and high-skilled workers; capable and ambitious managers; high-quality technology; and imported inputs. Linkages to foreign MNCs, as well as access to technology, finance, and information on foreign markets, help SMEs improve their competitiveness. Competitiveness of SMEs is reflected in the ownership of international certification such as through the International Organization for Standardization. As such, being internationally certified facilitates SME participation in GVCs.

As for the factors external to SMEs, our study found that their participation in GVCs is facilitated by openness to trade and FDI inflows, availability of educated people, finance, technology and information on foreign markets, well-developed infrastructure, efficient logistics, and good governance. The rather broad concept of infrastructure, which plays an important role for the promotion of economic activities, may be divided into soft infrastructure, which includes educational, regulatory, and legal systems, and hard infrastructure, which includes transportation and communication systems. An efficient public sector, including governments and business associations, also facilitates SMEs to participate in GVCs.

Our study identified a number of obstacles faced by SMEs in participating in GVCs. Many obstacles are attributable to the absence of the factors discussed, such as a lack of capable workers and managers, as well as a lack of access to technology, finance, and market information. According to the results of questionnaire surveys and interviews of managers of SMEs, financial constraints turn out to be one of the most serious obstacles. Additionally, meeting various technical standard and quantity requirement imposed by the buyers, for example, is found to be an obstacle to SMEs that supply materials and/or components to other companies. It is important to note that meeting technical standards contributes to improving technological capability of SMEs. Governments identifying and understanding these obstacles would help them formulate effective policies for the promotion of GVC participation by SMEs.

Turning to the obstacles that are external to SMEs, naturally these obstacles are closely related to those internal to SMEs. Limited availability of finance, capable workers, technology, and market information makes it difficult for SMEs to gain the competitiveness

necessary to participate in GVCs. Underdevelopment of soft and hard infrastructure is also a serious obstacle for SMEs. This problem shows up in many areas, including transportation and communication systems, logistics, education, and legal and financial systems, among others.

In many developing countries, the problem of infrastructure is not its absence but low quality. For example, in the case of sea transportation, unavailability of large cargo ships precludes low-cost shipping of the products, while in the case of financial systems, the availability of financing with reasonable borrowing conditions is limited. Underdevelopment of infrastructure is particularly serious for SMEs, because large firms with abundant financial and human resources can deal with the problems. It should be noted that underdevelopment of infrastructure is largely attributable to a lack of government capability in formulating and implementing appropriate policies. In addition, these problems stem from unstable political systems and a lack of governance in the political system.

Restrictive international economic policies such as import protection and regulation on inward FDI reduces the opportunities for SMEs to participate in GVCs. High cost of imported material/inputs due to import tariff and other regulations reduces competitiveness of SMEs in international market, making it difficult for them to participate in GVCs. Regulation of inward FDI reduces the opportunities for SMEs to link with foreign firms, which provide opportunities for SMEs to participate in GVCs.

SMEs face obstacles not only in their home countries but also in their export destinations. Import restrictions in the form of tariffs and non-tariff measures (NTMs) imposed by foreign countries make it difficult for SMEs to export their products to these countries. NTMs include a variety of measures such as technical barriers to trade (TBT), sanitary and phytosanitary measures (SPS), pre-shipment inspection and other formalities, and contingent trade-protective measures such as anti-dumping duties.⁶ While the application of some NTMs such as TBT and SPS is justified for the protection of safety and health, even those measures may be used to protect domestic industries; such cases are known as disguised protectionism.

1.5 Policy Recommendations

Based on the findings on the obstacles SMEs face in participating in GVCs, the authors of the studies in this book make various policy recommendations for promoting SME participation in GVCs. Similar

⁶ See the UNCTAD website (<https://unctad.org/en/Pages/DITC/Trade-Analysis/Non-Tariff-Measures/NTMs-Classification.aspx>) for information about NTMs.

to the approach we adopted in section 1.4 on the main findings, we divide the policies into two groups: One is the SME policies applied to contend with the challenges that are internal to SMEs; the other with those external to SMEs. To put it differently, the former deals with the challenges intrinsic to SMEs, while the latter deals with the environment under which SMEs operate.

Improving competitiveness is a necessary condition for SMEs to participate in GVCs. Governments can play an important role in doing this. Realizing that SMEs are at a disadvantage in improving competitiveness as compared with large firms, mainly in the areas of human, financial, and marketing resources, governments should provide assistance in these areas. Specifically in the area of human resource development, for example, governments should provide not only basic education but also vocational and technical education, which would furnish workers in SMEs with practical skills and knowledge that can be effectively used. Governments can also provide practical assistance, which would help SMEs improve competitiveness. For example, governments can help SMEs obtain technical certificates by providing necessary information such as on the application procedure.

Financial assistance is important also, as our study revealed that for many SMEs, a lack of access to finance is a very serious obstacle. We may consider financial assistance in two different ways: One is to increase the availability of financial resources for SMEs; the other to provide financial resources for SMEs. For the first type of assistance, governments need to establish financial markets and systems and ensure the effective functioning of the markets. Under such a system, SMEs can acquire financial resources at an appropriate cost—that is, appropriate conditions in terms of interest rates, collateral, and so on. The development and establishment of well-functioning financial markets may not be sufficient for SMEs for overcoming their disadvantageous position when it comes to improving competitiveness. Under such circumstances, governments are justified to provide financial resources for SMEs under favorable market conditions. This may be considered a type of industrial policy that is selective and preferential and applied only to SMEs. When supplying this type of financial assistance, the governments need to select SMEs with potentiality to ensure the effective use of financial resources. SMEs need to develop human resources to improve their potentiality, possibly with government assistance, in order for them to be selected to receive financial assistance, while governments in turn need to develop the ability to identify appropriate SMEs.

Marketing assistance would prove useful for SMEs to export their products or to participate in GVCs. One of the serious obstacles for SME participation in GVCs is the lack of knowledge or information

about export markets or foreign buyers. Large firms can use their own resources, such as overseas networks, to obtain such information, but it is difficult for SMEs with limited financial and human resources to do so. Governments or semi-government agencies can play an effective role in providing SMEs with market and other kinds of information, because the marginal cost of disseminating information is very low. We may add that governments can play an intermediary role for linking SMEs with exporters and MNCs, for example, by organizing trade fairs.

Let us turn to government policies dealing with the obstacles external to SMEs. We can divide these into two groups: domestic or internal policies and external policies. For domestic policies, governments need to establish and improve the quality of hard and soft infrastructure in order to respond to the need strongly felt by SMEs. It is advisable for governments to collaborate with the private sector for constructing and managing infrastructure because of limitations in financial, human, and technical resources. Government also need to establish a competitive, transparent, fair, and stable market environment that does not discriminate against SMEs and thus promotes efficiency and dynamism. Specifically, governments need to formulate and implement appropriate regulatory and competition policies and undertake necessary economic reforms. For formulating and implementing these policy measures, governments should use assistance from external sources such as bilateral and multilateral donors as well as nongovernment organizations.

For policies external to SMEs, governments need to establish open trade and FDI regimes for SMEs to improve their access to imported inputs and foreign capital—two important external elements that would facilitate SME participation in GVCs. Unilateral policies for market opening such as liberalization in trade and FDI policies are desirable, but in many cases are complicated due to opposition from protected industries. Under such circumstances, free trade agreements (FTAs) may be effective as exporters would benefit by increasing exports to FTA partners, whose markets will be liberalized by such agreements and support trade liberalization policy strongly. FTAs are the second-best policy behind multilateral liberalization under the WTO, which would bring in maximum benefit. FTAs are recommended because currently the WTO is not functioning effectively due to problems in various areas, mainly differences of opinion of its members.

It should be emphasized that the expected impacts of the policies would be large when domestic policies (e.g., regulatory reforms) and external policies (e.g., market opening) are jointly pursued. Another important consideration is that many policies, such as provision of financial and other types of assistance as well as construction of

infrastructure, have been introduced, but the problem is in their effective implementation. Without effective implementation of the policies, the resources used are wasted; furthermore, such policies would become obstacles. To avoid such a problematic situation, policies have to be monitored and evaluated properly.

1.6 Synopsis of the Chapters

In this section, we present a brief summary of the chapters that follow in this book, with a focus on the major findings and policy recommendations. Table 1.2 shows a brief description of the analyses conducted in the following chapters.

Table 1.2: Brief Description of the Analyses in the Chapters

No.	Authors	Coverage	Theme	Method	Main Data Sources	Time Period
2	Urata and Baek	111 countries	Determinants of GVC participation	Econometric	World Bank, Enterprise Survey	2009–2018
3	Mendoza	Philippines	GVC entry and exit	Econometric	Annual establishment surveys/ censuses, and firm-level export and import data	2008–2010, 2012
4	Hing, Thangavelu, and Narjoko	Indonesia	Human capital and GVC participation	Econometric	Annual manufacturing survey	1996, 2006
5	Korwatanasakul and Paweenawat	Thailand	Determinants of GVC participation and firm performance	Econometric	Annual survey on industries	2004–2014
6	Shepherd	Bangladesh	GVC participation and trade	Econometric	World Bank, Enterprise Survey	2007, 2011, 2013
7	Reddy and Sasidharan	India	GVC participation, financial constraints	Econometric	Prowess database	2006–2016

continued on next page

Table 1.2 continued

No.	Authors	Coverage	Theme	Method	Main Data Sources	Time Period
8	Karymshakov	Kyrgyz Republic	Determinants of export performance	Econometric	European Bank for Reconstruction and Development, European Investment Bank, and World Bank, Enterprise Survey	2013, 2019
9	Dang and Dang	Viet Nam	GVC participation and innovation	Econometric	Small and Medium Scale Manufacturing Enterprise survey	2007–2015
10	Deyshappriya and Maduwanthi	Sri Lanka	Impacts of GVCs on firm performance	Econometric and qualitative	Authors' own survey	2019
11	Sok, Phim, Keo, and Kim	Cambodia	Connection to regional value chains	Qualitative	Interviews and discussions	2019
12	Kharel and Dahal	Nepal	Constraints on exporting	Qualitative	Interviews and discussions	2019
13	Sudan	India	GVC participation in automotive industry	Case study	Interviews and discussions	2019
14	Rifin and Naully	Indonesia	Impacts of GVCs on coffee farmers/firm performance	Case study	Interviews and discussions	2019

GVC = global value chain.

Notes: Data from national sources if other than World Bank, European Bank for Reconstruction and Development, and European Investment Bank.

Cross-Country Analysis of Global Value Chain
Participation of SMEs

In chapter 2, Urata and Baek identify the firm- and country-related factors that determine the probability of a firm participating in GVCs and the level of GVC participation. They conduct an econometric analysis using the data obtained from the World Bank’s Enterprise Surveys, covering 111 countries and 38,966 firms for the 2009–2018 period with a focus on SMEs. Their study finds that 20.7% of the sample SMEs are

engaged in GVCs. In terms of firm-related factors, their analysis shows that high labor productivity, large firm size, foreign ownership, and high technological capability are important for the firms in general to participate in GVCs and to increase their level of engagement in GVC networks. For SMEs, technological capability is particularly important. As for the country-related factors, openness to trade and FDI inflows, availability of educated people, well-developed infrastructure, efficient logistics, and good governance are found to facilitate firms' participation in GVCs and to increase their level of GVC participation. These attributes are particularly important for SMEs. The authors recommend that governments provide high-quality soft and hard infrastructure. Soft infrastructure includes educational and legal systems, and hard infrastructure includes transportation and communication systems. Furthermore, they recommend that governments establish an open trade and FDI environment by pursuing liberalization policies.

Global Value Chain Entry and Exit of SMEs in the Philippines

In chapter 3, Mendoza explores firm-level data from the Philippines to uncover new stylized facts about the participation of manufacturing SMEs in GVCs. The empirical analysis shows that manufacturing SMEs are weakly connected to foreign markets, especially to GVCs. Compared to large manufacturers, SMEs also trade fewer products with a smaller set of foreign partners. The evidence also suggests that self-selection into exporting and importing may be more relevant for SMEs than for large manufacturers. The logistic regressions partly support this view, with total factor productivity (TFP) being a significant contributor to the GVC entry of SMEs but not of large manufacturers. In general, the factors driving GVC entry are not exactly the same for small and large manufacturers. For large firms, employment size as well as research and development (R&D) are significant. For SMEs, however, age and TFP seem to be the variables that uniquely determine their GVC participation. Foreign ownership, past importing activities, and proximity to economic zones can be considered universal factors important to all establishments. The author draws several policy implications from the empirical results. Based on the finding about heterogeneity of SMEs, he argues for a nuanced approach to industrial and trade policy. He also argues that policy makers need to make a distinction between SMEs and large firms in their formulation of policies, because SMEs are not simply smaller versions of large firms. On SMEs' participation in GVCs, Mendoza contends that the government should pay more attention to programs that can help weaker SMEs acquire the capabilities necessary to overcome the barriers to GVC participation, because superior SMEs self-select into international operations. He points out that the wider

access to indirect channels of exporting and importing where entry costs are lower may stimulate greater GVC participation of SMEs.

Role of Human Capital in Global Value Chain Participation of Manufacturing SMEs in Indonesia

In chapter 4, Hing, Thangavelu, and Narjoko examine the effects of human capital on SMEs' participation in GVCs in Indonesia using firm-level data from the Indonesian Annual Manufacturing Survey in 1996 and 2006. They adopt the discrete choice model of the probit framework to examine the behavior of firms in the export market. The results indicate that SMEs' size, ownership structure, high labor productivity, high-skilled workers, formal training, and financing capability drive their participation in GVCs. The results also suggest that SMEs with linkages to GVC activities are more likely to have a higher level of human capital, higher productivity, more assets, and investment in R&D. They also find that "learning by exporting" and proximity to an export hub tend to play an important role in shaping SMEs' role in GVCs. Based on their findings on the importance of human capital for SMEs' GVC participation, the authors make various policy recommendations, which include establishing a formal education system as a good backbone for lifelong learning and acquiring skills for SMEs and workers, setting up SME training funds that enterprises can use to develop the skills of their workers, introducing MNC-SME mentorship schemes to create a network of MNCs and SMEs for closer discussions and sharing of knowledge, and expanding technical and vocational training programs to sharpen the skills of the workforce that are of great use in value chain production.

Impacts of SME Global Value Chain Participation on Firm Performance in Thailand

In chapter 5, Korwatanasakul and Paweenawat analyze the determinants of GVC participation as well as the relationship between the degree of GVC participation and firms' performance in Thailand. The main estimation method for both analyses is a panel fixed-effect regression employing unique panel firm-level data from the Office of Industrial Economics of the Ministry of Industry in Thailand for the 2004–2014 period. Their results show that SMEs have a lower degree of engagement in both backward and forward GVC participation when compared with larger firms. They also find that GVC participation, both backward and forward, is positively associated with firm performance measured by total revenue. Their results imply that being a small or medium-sized enterprise is associated with a lower degree of GVC participation, but GVC participation can help firms (both SMEs and large firms) increase

their revenue. This would lead to an observation that policies to help local SMEs to enter GVCs smoothly would be a priority. The authors identify various obstacles such as a lack of ability to meet international standards, a lack of managerial and human capital resources, limited access to credit and loans, and limited access to information and innovation, among others. They argue that any policy that practically addresses these challenges that SMEs face will help local SMEs enter GVCs smoothly. Specifically, they assert that the government can empower SMEs through a mix of policy tools, such as promoting their digital capabilities, easing access to commercial bank credit, giving corporate tax incentives, and providing high-quality business support services, among others.

Global Value Chain Participation of Manufacturing Firms in Bangladesh

In chapter 6, Shepherd examines the trade participation of Bangladesh's manufacturing firms using 3-year (2007, 2011, and 2013) panel data from the World Bank's Enterprise Survey covering approximately 1,300 firms. The study distinguishes between extensive margin (probability of export participation) and intensive margin (intensity of export participation) effects using a Heckman sample selection model. The author pays particular attention to the role of imported intermediates and inward FDI, which are used as proxies for GVC participation, in promoting export development. He finds that there is a strong association between export performance and firm size, and, further, that imported intermediates and inward FDI have a positive impact on trade participation at the intensive margin for firms of all sizes, while importing intermediates also have a positive impact on trade participation at the extensive margin. The analysis further reveals that small firms experience the smallest export boost from importing and inward FDI, although the effect is still quantitatively large. From a policy perspective, he highlights the importance of international openness and GVC linkages as drivers of export success, including for smaller firms. He also stresses alternative ways through which SMEs may participate in the international economy, such as by exporting indirectly. He identifies indicative factors that limit the magnitude of the gains from GVC participation for small firms as a future research agenda.

Global Value Chain Participation of Manufacturing Firms in India

In chapter 7, Reddy and Sasidharan examine the participation of Indian manufacturing SMEs in GVCs and highlight the role of financial constraints in shaping their GVC participation by performing an

econometric analysis. They use an unbalanced panel of 888 SMEs in the Indian manufacturing sector over the 2006–2016 period. They find that the number of SMEs participating in GVCs, defined as SMEs engaged in importing and exporting, increased significantly during that period. For their analysis, they use an instrumental approach and a two-step probit selection model to correct for possible reverse causality and selection bias, respectively. Their findings highlight that the sample Indian SMEs trying to participate in GVCs find financial constraints to be a significant deterring factor. Further, the findings of their study are robust to alternative definitions of SMEs and GVCs. Based on the result that one of the most serious obstacles for SMEs to participate in trade and GVCs is financial constraints, the authors make various policy recommendations for facilitating access to finance for SMEs, including establishing a broad range of funding mechanisms. In this regard, they support recent government policies, which include the establishment of the public credit registry and the Micro Units Development Refinance Agency Limited (MUDRA) scheme for extending formal and affordable credit to SMEs.

Determinants of Export Performance of SMEs in the Kyrgyz Republic

In chapter 8, Karymshakov examines the factors affecting export performance of SMEs in the Kyrgyz Republic. Empirical estimations based on the World Bank's Enterprise Survey data set reveal that correspondence with quality requirements, increasing participation of foreign capital in the ownership of firms, availability of financial resources, and labor productivity are important determinants of exporting activities of SMEs. Along with this, firms in industries with a low technology level demonstrate relatively higher export activities. He argues that SMEs do not have enough capability to adopt medium and high technology in their production processes, which may lead to a concern over the long-term sustainability of their competitiveness in international markets. The author draws several policy recommendations from the results of the analysis. It is essential for the government to provide information about exporting, such as standards, regulations, and foreign markets. Based on the finding that implementation of quality control and assurance processes is important, the government needs to provide information about quality requirements and build infrastructure to implement these processes. Furthermore, the government is expected to support SMEs to acquire new technology that would help them meet quality requirements and to improve labor productivity. Given the importance of the participation of foreign investment in firms' ownership structure and the availability

of financial resources for SMEs' participation in GVCs, the government needs to implement policies to attract FDI and to enhance access to financial resources.

Global Value Chain Participation and Innovation of SMEs in Viet Nam

In chapter 9, Dang and Dang examine the relationship between the participation of SMEs in GVCs and SMEs' innovation in Viet Nam over the 2007–2015 period. Using the data from the Viet Nam Small and Medium Enterprise survey, they test their hypothesis that a higher share of foreign value added in exports, that is, a higher level of backward participation in GVCs, leads to SMEs innovating in three different ways: improvement of existing products, introduction of new products, and technology. To address the problem of omitted variable biases, they use the People's Republic of China's domestic value added in gross exports to the world as an instrument for foreign value added in gross exports in Viet Nam. The authors find that foreign value added in gross exports negatively correlates with firms' decision to introduce new products but positively associates with their decision to improve existing products. These relationships are more profound for micro firms, firms in industrial zones, and non-exporting firms. They also find evidence that the foreign value added in gross exports increases firms' sales and number of subcontracts, which may expand SMEs' resources to innovate. Recognizing that the introduction of new products and technology are key challenges for Vietnamese SMEs for improving their competitiveness, the authors recommend that the government create a favorable environment for innovation by improving the innovation system. To create such an environment, the government needs to implement policy packages that include the provision of financial assistance to SMEs eager to invest in learning and to adopt new technologies.

Impact of Global Value Chains on SME Performance in Sri Lanka

In chapter 10, Deyshappriya and Maduwanthi examine the impact of GVCs on the performance of SMEs in Sri Lanka. They identify challenges and success factors in relation to linking SMEs with GVCs by conducting both quantitative and qualitative analyses based on the results of their original survey and interviews. They find that SMEs that are linked either directly or indirectly with GVCs have a higher level of profits than those that are not. Their study recognizes the main obstacles to linking with GVCs as lack of access to finance, lack of technology, lack of information, inability to meet quality standards, and inability to produce the required quantity. Conversely, the factors increasing the potential for SMEs to

link with GVCs are guaranteed quality of products, the availability of skilled labor, access to finance and technology, the ability to produce at low cost, and access to business development services. The authors make a number of recommendations to the government. It is essential to recognize SMEs that are interested in joining GVCs and to provide technical and financial assistance. Advanced technological know-how can be acquired through FDI, so the government should facilitate access to FDI. Access to finance should be improved by getting the help of both state-owned and private banks as well as financial institutions. A further recommendation is to ensure a solid public–private partnership to inculcate an entrepreneurial culture in the society. SMEs should be enriched with information and awareness regarding GVCs, the required infrastructure, appropriate business development services, and training programs to develop human capital capabilities to enhance SMEs' potential to link with GVCs.

Connections to Regional Value Chain of SMEs in Cambodia

In chapter 11, Sok, Phim, Keo, and Kim identify the obstacles (missing links) faced by SMEs in Cambodia in GVC participation by conducting a qualitative study using the results of interviews with SME executives as well as academic, think tank, and government experts. Their qualitative study is supplemented by the data and information obtained from various sources including the World Bank's Enterprise Survey, the OECD–WTO Trade in Value Added database, and relevant economic and survey data. They find that while some of the obstacles external to SMEs, including business environment and regulatory practice, customs and trade facilitation, and logistics, have been more or less overcome, others internal to SMEs persist. They include limited production capacity, lack of financing, poorly maintained supply of raw materials and finished products, absence of information on potential business and market opportunities, technical standards, and certification. The authors make a number of policy recommendations, including that the government should galvanize reforms to both address remaining business environment issues and develop the private sector, in particular SMEs. Engaging and building more trust with small business communities in a consistent, transparent, and supportive manner will improve the business formalization process, which is an important stepping stone for SMEs in accessing adequate financing and internationalizing. Establishing a fully functioning and sustainable SME center and information portal is critical in helping SMEs make better-informed decisions about marketing and technological development by providing the necessary information, such as the product requirements and the relevant administrative procedures to meet them. Facilitating

business matching between local SMEs and foreign firms is equally important. The authors conclude by stating that while the list of new priorities and actions seems long and daunting, efforts like these must build up momentum.

Constraints to Exporting of SMEs in Nepal

In chapter 12, Kharel and Dahal examine the challenges and constraints faced by manufacturing SMEs in Nepal in integrating themselves into GVCs. Their analysis combines the limited available secondary data, including firm-level information, with qualitative primary data. They find that Nepal, a landlocked least-developed country, lacks a concrete policy framework for SMEs, let alone a strategy for their internationalization and participation in GVCs. Other major challenges include an inadequately trained or skilled workforce, limited access to finance, high tariffs on raw materials and intermediate goods, poor dissemination of information about existing incentives and facilities, inadequate provision of trade and market intelligence, and weak capacity of the public administration to coordinate and implement trade and industrial policies. Based on these observations, the authors make a number of policy recommendations, arguing that SMEs' participation in GVCs can be aided by effectively operationalizing an existing legislative provision for extending incentives, discounts, concessions, and facilities to firms that produce under contracting and/or subcontracting arrangements for export-oriented firms. The government needs to support human resource development for SMEs by providing technical and managerial education and vocational training. Imparting SMEs, or their human resources, with the skills necessary for accessing and processing trade- and market-related information would be effective for their participation in GVCs. The government should help establish contact between SMEs interested in exporting and intermediaries such as exporters and freight forwarders. Effective operation of a duty drawback system also would aid SME export competitiveness. Operationalization of the sole special economic zone of the country and construction of more such zones would promote the participation of SMEs in GVCs.

Global Value Chain Participation of Automotive SMEs in India

In chapter 13, Sudan analyzes the role of SMEs engaged in GVCs in the Indian automotive sector by conducting a case study of parts-supplying SME subcontractors for Maruti Suzuki India Limited (MSIL) and how their role could be enhanced by government support. The study reveals that GVC participation benefits SMEs modestly, but restructuring production through subcontracting can facilitate economic, industrial,

functional, human, and technical upgrading. The author finds that one of the most serious challenges for SMEs is a lack of ability to upgrade and deliver products as per expectations of MSIL, the lead firm, to meet the required quality, supply standards, and delivery times due to increasingly stringent quality requirements. A lack of knowledge on the part of SMEs about the opportunity to gain benefits from GVC participation results in limited participation. Based on these findings, he recommends, among others, that the government should support SMEs by providing financial incentives to invest in appropriate technology and strengthen national innovation systems to develop their R&D capacity. The government also should extend necessary support to SMEs for developing new alliances and comprehensive networks of upstream and downstream partners through information flows. Skills development programs should focus on imparting specific technical and business skills to collaborate with domestic and overseas partners. Further, the government should facilitate the acquisition of quality certifications. He adds that institutional arrangements to implement logistics-related reforms must be evolved to facilitate greater SME participation in GVCs.

Impacts of Global Value Chain Participation on Coffee Farmers in Indonesia

In chapter 14, Rifin and Naully analyze the benefits to coffee farmers in Indonesia for participating in value chains through cooperatives by comparing the experiences of the members of two cooperatives. One cooperative exports coffee beans directly and indirectly through an exporter, while the other exported coffee beans in the past but currently focuses on the domestic market. Both cooperatives began exporting after being invited to participate in trade expos. Both obtained benefits from exporting, and these benefits are transmitted to their members through higher prices and better services, such as the procurement of farm inputs. The cooperatives also find that direct export is more beneficial than indirect export because a better price is charged and higher value-added coffee is sold through direct export. While one cooperative has continued to export, the other stopped exporting because of the failure in the negotiations with foreign buyers on the prices. The authors recommend that the government provide the cooperatives with financial resources to be able to purchase coffee beans from the farmers and build storage facilities, so that the cooperatives can participate in value chains through exporting directly.

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2

The Determinants of Participation in Global Value Chains: A Cross-Country, Firm-Level Analysis

*Shujiro Urata and Youngmin Baek**

2.1 Introduction

The world has been witnessing active construction of global value chains (GVCs) in recent decades. According to the World Bank (2020), the share of GVC trade in world trade increased rapidly from approximately 40% in the early 1990s to over 50% in 2007, before it declined somewhat after the global financial crisis in 2007–2008. Multinational corporations (MNCs) fragmented the production process into various stages of production and located these stages of production in various countries and locations where a particular stage can be conducted most efficiently, or at least cost-effectively, in order to achieve an efficient production system. Specifically, a production stage that requires labor-intensive operation is located in a low-wage country, while a production stage that requires high-skilled labor is located in a country where high-skilled labor is abundantly available.

GVCs have been actively formed in sectors that require several production stages such as machineries and textiles and apparel. GVCs take various forms involving both MNCs' affiliated and nonaffiliated firms. Active construction of GVCs has been made possible by a sharp decline in the cost of transportation and communication, which in turn

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is attributable to not only technological progress in transportation and communication services but also liberalization in trade and investment policies and deregulation in these sectors. Low transportation costs make it easier for MNCs to ship parts and components from one stage to another, while low communication costs enable MNCs to communicate with the firms involved in GVCs efficiently.

In East Asia, construction of GVCs began in the latter half of the 1980s. Faced with a sharp appreciation of the Japanese yen, Japanese MNCs actively set up their production base in Southeast Asian countries such as Thailand, where production costs were significantly lower than in Japan. Initially, GVCs had a rather simple production arrangement involving a few production stages. With the passage of time, MNCs began to construct GVCs with complicated production networks, as they learned to manage GVCs effectively through accumulating experience and as they found great opportunities to expand GVCs by exploiting diverse wage differentials among countries in East Asia, which were attributable to wide differences in the level of economic development among them. Although we realize that GVCs go beyond the production process to include research and development (R&D), marketing, logistics, and other activities, our analysis of GVCs focuses on the production process mainly because of data availability.

GVCs began to attract the attention of firm managers and policy makers, as participation and involvement in GVCs brings benefits to firms and countries. For the firms, involvement in GVCs expands business opportunities in foreign countries, or more specifically import sources and export destinations, which enables involved firms to increase efficiency and productivity. Moreover, involved firms can expect to acquire technology and management know-how through business interactions among the firms participating in GVCs. For the countries, the greater the involvement in GVCs by their firms, the higher the countries can expect economic growth to be. Because of these benefits that may be realized through GVCs, firms and countries are eager to find ways to get involved in GVCs.

In light of these developments regarding GVCs, the objective of this chapter is to identify the factors related to firm and country characteristics that determine the probability and the level of GVC participation by firms using enterprise surveys conducted by the World Bank. We pay particular attention to small and medium-sized enterprises (SMEs) mainly for three reasons. One is their importance in regard to economic activities in many countries. In many countries, SMEs account for more than 95% in terms of the number of firms, and more than 70% and 50% in terms of employment and value-added, respectively. Nurturing competitive SMEs would contribute to the realization of

sustainable and inclusive economic growth. Another reason is their important role in supplying parts and components to large assembling firms in GVCs. GVCs involving various stages of production provide SMEs, whose scope of operation is limited because of their small size, with business opportunities to exploit their competitive advantage. The third reason for our focus on SMEs is their dynamism. Although they may be small in number, there are creative and competent SMEs that would grow and contribute to the economic development and growth of the countries. These SMEs with their great potentiality can successfully realize their potential by getting involved in GVCs. We would like to identify the obstacles that prevent SMEs from participating in GVCs and make suggestions and recommendations for overcoming these obstacles based on our findings.

Studies on GVC participation have been conducted using mainly two different approaches. One uses transaction data and the other uses firm-level data. The former is divided into two approaches, one using international trade data and the other using international, inter-industry, input-output data. Studies using international trade data examine the magnitude of trade in parts and components to evaluate the importance of GVCs by recognizing that the formation of GVCs leads to active trade in parts and components. These studies, which include Athukorala (2011) and Obashi and Kimura (2018), are performed at aggregate and sectoral levels. Studies using international input-output tables, which have been constructed by several organizations, including the Organisation for Economic Co-operation and Development (OECD), World Input-Output Data, and the Eora database¹ include Timmer et al. (2014) and Baldwin and Lopez-Gonzalez (2015). These studies consider backward and forward inter-industry, international linkages to measure the extent of GVC participation at sectoral levels. Studies using firm-level data can be divided into two types: one using the information about a firm's GVC participation and the other using a firm's data on imports and exports. The former generally utilizes the information from the survey asking about a firm's GVC participation. The other approach assumes that a firm participates in GVCs if it imports inputs and exports output. We review some studies using these approaches in the next section. In this study, we take the latter approach, that is, a firm-level approach, to find out about the GVC participation of a number of countries by using the World Bank's Enterprise Surveys and attempt to identify the determinants of firms' GVC participation.

¹ For the Eora database, see <https://worldmrio.com/>.

Our study extends earlier studies such as Harvie, Narjoko, and Oum (2010) and Wignaraja (2013) in terms of country coverage and issue coverage in that, unlike earlier studies, which analyzed firm characteristics for the determination of a firm's GVC participation, we analyze country characteristics as well. An examination of country characteristics is useful for drawing policy recommendations.

2.2 Brief Literature Review

This section reviews studies that examined the determinants of GVC participation by firms to set the stage for our analysis. Harvie, Narjoko, and Oum (2010) is one of the early studies on the issue with a focus on SMEs. The authors investigated the characteristics of SMEs participating in GVCs (the term "production networks" is used in their paper) by utilizing the results of a survey conducted on firms in Cambodia, Indonesia, the Lao People's Democratic Republic (Lao PDR), Malaysia, the People's Republic of China (PRC), the Philippines, Thailand and Viet Nam in 2009. The sample used for the analysis contained 780 firms with fewer than 200 employees. They stated that a firm participates in GVCs if it satisfies the following two conditions: (1) it supplies to any tier in a GVC; and (2) it either imports intermediate inputs or exports some of its products. Harvie, Narjoko, and Oum (2010) conducted an econometric analysis and found that high productivity, foreign ownership, favorable financial access, active innovation activity, and positive and challenging managerial and entrepreneurial attitudes are important for SMEs in participating in GVCs. They did not find firm size to be an important factor for SMEs' GVC participation, but it is found to be important for SMEs to upgrade their position in GVCs.

Wignaraja (2013) examined the factors affecting participation in GVCs by SMEs in five ASEAN countries: Indonesia, Malaysia, the Philippines, Thailand, and Viet Nam. The author conducted a firm-level econometric analysis using the World Bank's Enterprise Survey data covering 5,900 manufacturing enterprises from 2006 (Malaysia and Thailand) and 2008 (for the rest). Specifically, he performed a probit estimation to explain GVC participation, which is captured by two binary variables. One binary variable takes a value of 1 if a firm is engaged in exporting directly or indirectly, and 0 otherwise. The other binary variable takes unity if a firm is a sustained exporter. Independent variables included firm size, foreign ownership, general managers' educational background and business experience, workers' educational background, ownership of foreign licenses, International Organization for Standardization (ISO) certificates, patents, access to credit, and firm

age. The sample was divided into two groups, one including all firms and the other only SMEs (firms with fewer than 100 employees). Estimation results show that regressions applied to all firms in GVCs performed better than those applied to only sustained exporters. The results indicate that in all the regressions, firm size and foreign ownership are significantly positive, while firm age is significantly negative. Managers' educational background is found to be significantly positive for the regression applied to all firms in GVCs. Workers' educational background and ownership of foreign licenses, ISO certificates, and patents are found to be significantly positive for the regression applied to all firms and SME firms in GVCs. Access to finance is found to be positive and statistically significant for all firms and SMEs in GVCs.

Arudchelvan and Wignaraja (2015) analyzed the characteristics of SMEs involved in GVCs in Malaysia. Using the data obtained from a survey of 234 exporters and importers in Malaysia, the authors conducted a probit estimation to identify the characteristics of SMEs participating in GVCs. A firm is considered to participate in GVCs if the firm responds positively to the question "Is your firm part of a regional/global supply chain?" Their analysis found that firm size, licensing of foreign technology, and R&D investment are positively associated with GVC participation, while firm age, foreign ownership, and labor productivity are not correlated with statistical significance.

Lu et al. (2018) used the ratio of foreign value-added to total exports (i.e., foreign value-added ratio) to measure the level of GVC participation at firm level and identify their determinants by conducting an econometric analysis for PRC firms. The data are constructed by merging a detailed PRC transaction-level customs data set and a PRC industrial firm-level survey data set from 2000 to 2006. The sample size is in excess of 200,000. The main interest of the authors was the impact of productivity and financial constraint on GVC participation. They included a number of control variables, including firm size, R&D, firm age, market concentration, processing trade, state-owned enterprises (SOEs), foreign firms, and Hong Kong, China–Macau, China–Taipei, China firms. They divided firms into continuous exporters and first-time exporters. They found that productivity increases GVC participation, while financial constraints reduce it. They also found that financial constraints affect first-time exporters but not continuous exporters. As for the impacts of control variables, the authors found that firm size, R&D, market concentration, processing trade, SOEs, foreign firms, and Hong Kong, China–Macau, China–Taipei, China firms have positive impacts on a firm's GVC participation, while firm age has a negative impact.

Before closing this section, let us very briefly review the studies that investigated the determinants of GVC participation by countries

using the country-level data derived from international input–output tables. In the country-level studies, two definitions were used as proxy variables for GVC participation: (1) backward participation, the share of foreign value-added embodied in the gross exports of a country; and (2) forward participation, the share of domestic value-added embodied in exports of foreign countries in the gross exports of a country. Kowalski et al. (2015) analyzed the determinants of GVC participation both in terms of backward and forward participation using the data for 57 countries (OECD TiVA database) and 187 countries (Eora database). They found that openness to trade and investment, as well as improvements of logistics and customs, intellectual property protection, infrastructure, and institutions can play an important role in promoting GVC participation. Ignatenko, Raei, and Mircheva (2019) conducted an econometric analysis of the determinants of GVC participation (backward participation) by countries by using the Eora database, which covers 189 countries, within a gravity model framework. They confirmed the findings of standard gravity literature in that economic size promotes GVC participation, while distance discourages it. In addition, other structural factors, including a common border, common colonial heritage, common language, common currency, free trade agreements, and a stable exchange rate relationship, promote GVC participation. They also found that institutional features such as contract enforcement, rule of law, human capital, and the quality of infrastructure play important roles in determining GVC participation.

2.3 Global Value Chain Participation by Firms

Let us examine the pattern of engagement in foreign trade for the sample firms.² Among 38,966 sample firms, 17,743, or 45.5%, are not engaged in foreign trade (column 1, Table 2.1);³ 24.4% are engaged in imports but not exports (column 2); 9.5% are engaged in exports⁴ (sum of columns 3 and 4) but not imports; and 20.7% are engaged in both imports and exports (sum of columns 5 and 6)—and we call these “GVC firms.” This share goes down to 13% if we exclude indirect exports.⁵ These figures indicate that a sizable portion of the firms are not engaged in foreign trade. They also show that indirect export plays an important role in

2

A list of sample countries is presented in Appendix Table A2.1.

3

A detailed classification of the sample firms in terms of output sales and input procurement is presented in Appendix Table A2.2.

4

Exports include both direct and indirect exports.

5

See Appendix Table A2.2.

connecting firms with export markets. The proportion of GVC firms in the total number of firms (GVC firm ratio) is found to increase with firm size: firms with fewer than 4 employees (5.8%), 5–19 employees (9.0%), 20–99 employees (18.9%), 100–199 employees (33.7%), and more than 200 employees (47.5%). These findings indicate that SMEs, here defined as those with fewer than 199 employees, face greater obstacles to participating in GVCs.

Table 2.1: Pattern of Engagement in Foreign Trade for the Sample Firms

		1	2	3	4	5	6	GVC Firm (5+6)	Total
Sales	Domestic	o	o	x	o	x	o	x/o	
	Exports	x	x	o	o	o	o	o	
Inputs	Domestic	o	o	o	o	o	o	o	
	Imports	x	o	x	x	o	o	o	
Firm size (number of employees)	1–4	329	155	8	12	1	30	31	535
	5–19	8,203	4,000	196	534	142	1,130	1,272	14,205
	20–99	6,738	3,631	281	1,192	361	2,391	2,752	14,594
	100–199	1,334	843	124	491	233	1,187	1,420	4,212
	200+	1,139	869	155	681	552	2,024	2,576	5,420
Total		17,743	9,498	764	2,910	1,289	6,762	8,051	38,966
Firm size (number of employees)	1–4	1.9	1.6	1.0	0.4	0.1	0.4	0.4	1.4
	5–19	46.2	42.1	25.7	18.4	11.0	16.7	15.8	36.5
	20–99	38.0	38.2	36.8	41.0	28.0	35.4	34.2	37.5
	100–199	7.5	8.9	16.2	16.9	18.1	17.6	17.6	10.8
	200+	6.4	9.1	20.3	23.4	42.8	29.9	32.0	13.9
Total		100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Firm size (number of employees)	1–4	61.5	29.0	1.5	2.2	0.2	5.6	5.8	100.0
	5–19	57.7	28.2	1.4	3.8	1.0	8.0	9.0	100.0
	20–99	46.2	24.9	1.9	8.2	2.5	16.4	18.9	100.0
	100–199	31.7	20.0	2.9	11.7	5.5	28.2	33.7	100.0
	200+	21.0	16.0	2.9	12.6	10.2	37.3	47.5	100.0
Total		45.5	24.4	2.0	7.5	3.3	17.4	20.7	100.0

GVC = global value chain.

Source: World Bank, Enterprise Surveys.

The number of GVC firms in the sample differs among the regions (Table 2.2).⁶ Asia has the largest number of GVC firms, registering 2,670 firms, followed by the Americas (2,154), Europe (1,694), and Africa (1,519). Oceania has the smallest number with only 14 firms. Of all the sample firms, 20.7% are GVC firms, as indicated earlier. There are substantial variations concerning the proportion of GVC firms in the total

Table 2.2: Global Value Chain Firms by Region

Region	Subregion	Number of Firms			Share of GVC Firms (%)	GVC Participation Index
		GVC	Non-GVC	Total		
Africa	Northern Africa	469	1,737	2,206	21.3	0.0738
	Sub-Saharan Africa	1,050	4,558	5,608	18.7	0.0446
Total		1,519	6,295	7,814	19.4	0.0529
Americas	Latin America	2,154	4,710	6,864	31.4	0.0474
	Total	2,154	4,710	6,864	31.4	0.0474
Asia	Central Asia	56	473	529	10.6	0.0248
	Eastern Asia	171	1,625	1,796	9.5	0.0169
	Southeastern Asia	933	3,694	4,627	20.2	0.0771
	Southern Asia	844	9,009	9,853	8.6	0.0252
	Western Asia	666	2,077	2,743	24.3	0.0662
	Total	2,670	16,878	19,548	13.7	0.0425
Europe	Eastern Europe	778	2,273	3,051	25.5	0.0651
	Northern Europe	427	168	595	71.8	0.2627
	Southern Europe	489	544	1,033	47.3	0.1287
	Total	1,694	2,985	4,679	36.2	0.1043
Oceania	Melanesia	14	47	61	23.0	0.0887
	Total	14	47	61	23.0	0.0887
World	Total	8,051	30,915	38,966	20.7	0.0529

GVC = global value chain.
Note: GVC index is computed as (exports)/(sales)×(imports/sales).
Source: World Bank, Enterprise Surveys.

⁶ In this chapter, we adopt the United Nations classification to define the regions. See Appendix Table A2.1 for the list of the sample countries and areas.

number of firms (hereafter “GVC firm ratio”) across regions. The highest GVC firm ratio is recorded by Europe at 36.2%, which is followed by the Americas (31.4%), Oceania (23.0%), and Africa (19.4%). Asia has the lowest ratio at 13.7%. Among the Asian subregions, Western Asia and Southeastern Asia show high GVC firm ratios at 24.3% and 20.2%, respectively, while Central Asia, Eastern Asia, and Southern Asia have substantially lower GVC ratios at 10.6%, 9.5%, and 8.6%, respectively. It should be noted that the relatively low GVC firm ratio observed in Asia may be unexpected, as Asia, particularly Eastern and Southeastern Asia, is regarded as a region where a large number of MNCs have constructed GVCs.⁷ To examine the degree of GVC participation, we computed a GVC participation index.⁸ An examination of the GVC participation index across the regions indicates a similar pattern observed by the GVC firm ratios; that is, a very high GVC participation index for the firms in Europe, particularly Northern Europe. Among Asian subregions, Southeastern and Western Asia show a relatively high level of GVC participation indices.

Table 2.3 shows the GVC participation of firms for the Asian sample countries. Among them, Lebanon has the highest GVC participation ratio at 47.8%, while Azerbaijan has the lowest ratio at 0.8%. GVC participation ratios for Eastern, Southeastern, and Southern Asian countries show wide variations and may be grouped as follows: Malaysia and Viet Nam (above 30%); the Philippines, Bangladesh, and Cambodia (22%–25%); Pakistan, Sri Lanka, and the Lao PDR (11%–13%), Indonesia, the PRC, Myanmar, Thailand, and India (below 10%). The low GVC participation for Thailand is surprising, as the Thai economy is highly dependent on trade and foreign direct investment (FDI). GVC participation index shows a similar pattern to GVC participation ratios, as the correlation coefficient between these two variables is as high as 0.812.

Sectoral shares of GVC firms and the proportion of GVC firms in the total number of firms (GVC firm ratio) by sector are shown for the entire sample (world) and for Asia in Table 2.4. For the entire sample, garments (15.3%), food (14.7%), chemicals (10.6%), fabricated metals (9.8%), plastics and rubber (8.3%), machinery and equipment (8.0%),

⁷ This unexpected and counterintuitive finding may reflect possible sampling biases in the World Bank’s Enterprise Surveys. A detailed comparison of the sample firms in the surveys with those in national surveys needs to be conducted to examine this issue. Indeed, according to UNCTAD (2018), which reports the findings based on world input–output tables, South and East Asia have the highest level of GVC participation, particularly in the form of backward linkages. The sampling biases possibly present in our data are dealt with by including country and sector fixed effects in our estimation conducted in section 2.6.

⁸ A GVC index is computed as $(\text{exports}/\text{total sales}) \times (\text{procurements from foreign countries}/\text{total procurements})$.

Table 2.3: Global Value Chain Participation of Firms in Asian Countries

Country or Area	Subregion	Number of Firms			Share of GVC Firms (%)	GVC Participation Index
		GVC	Non-GVC	Total		
Lebanon	Western Asia	97	106	203	47.8	0.1403
Jordan	Western Asia	86	96	182	47.3	0.2399
Malaysia	Southeastern Asia	208	333	541	38.4	0.0551
Israel	Western Asia	62	107	169	36.7	0.1276
Viet Nam	Southeastern Asia	242	427	669	36.2	0.1527
Palestine	Western Asia	48	101	149	32.2	0.1168
Turkey	Western Asia	304	723	1,027	29.6	0.0553
Timor-Leste	Southeastern Asia	14	42	56	25.0	0.0922
Philippines	Southeastern Asia	239	737	976	24.5	0.1330
Bangladesh	Southern Asia	264	913	1,177	22.4	0.1125
Cambodia	Southeastern Asia	28	99	127	22.0	0.1935
Armenia	Western Asia	23	88	111	20.7	0.0500
Kyrgyz Republic	Central Asia	15	86	101	14.9	0.0526
Georgia	Western Asia	13	88	101	12.9	0.0297
Pakistan	Southern Asia	101	698	799	12.6	0.0304
Uzbekistan	Central Asia	15	112	127	11.8	0.0121
Sri Lanka	Southern Asia	42	317	359	11.7	0.0511
Nepal	Southern Asia	28	215	243	11.5	0.0419
Lao PDR	Southeastern Asia	16	126	142	11.3	0.0522
Indonesia	Southeastern Asia	103	944	1,047	9.8	0.0204
PRC	Eastern Asia	161	1,515	1,676	9.6	0.0170
Myanmar	Southeastern Asia	33	321	354	9.3	0.0788
Tajikistan	Central Asia	10	102	112	8.9	0.0303
Kazakhstan	Central Asia	16	173	189	8.5	0.0153
Mongolia	Eastern Asia	10	110	120	8.3	0.0143
Yemen	Western Asia	16	196	212	7.5	0.0109
Thailand	Southeastern Asia	50	665	715	7.0	0.0119
Afghanistan	Southern Asia	8	123	131	6.1	0.0133
India	Southern Asia	401	6,743	7,144	5.6	0.0086
Iraq	Western Asia	16	454	470	3.4	0.0063
Azerbaijan	Western Asia	1	118	119	0.8	0.0003

GVC = global value chain, Lao PDR = Lao People's Democratic Republic, PRC = People's Republic of China.

Source: World Bank, Enterprise Surveys.

and textiles (7.7%) account for a large proportion of the total number of GVC firms, with each exceeding 7% of the total. A similar pattern is observed for the sample firms in Asia, with the notable exception of electronics, which is recorded to account for 8.8% of the total. The GVC firm ratios differ among sectors. High GVC firm ratios are observed for precision instruments (34.2%), garments (29.8%), leather (28.4%), other transport equipment (28.0%), chemicals (27.9%), and machinery and equipment (25.9%), each accounting for more than a quarter of the firms in each sector. Turning to the case of Asia, one finds that the GVC firm ratio is lower than the world average, as seen before. The GVC firm ratio exceeds 25% in three sectors: garments (29.4%), leather (28.3%), and precision instruments (25.6%). The GVC participation index at the sectoral level shows a similar pattern to that observed for the GVC firm ratios.

Table 2.4: Sectoral Distribution of Global Value Chain Firms

		World			
		# of GVC Firms	GVC Firm Ratio (%)	Sectoral Share (%)	GVC Participation Index
15	Food	1,181	16.1	14.7	0.0245
16	Tobacco	30	17.3	0.4	0.0458
17	Textiles	623	23.7	7.7	0.0727
18	Garments	1,233	29.8	15.3	0.1449
19	Leather	230	28.4	2.9	0.0912
20	Wood	145	14.5	1.8	0.0335
21	Paper	83	17.2	1.0	0.0370
22	Publishing, printing, and recorded media	149	11.4	1.9	0.0231
23	Refined petroleum products	22	22.4	0.3	0.0615
24	Chemicals	856	27.9	10.6	0.0427
25	Plastics and rubber	668	23.8	8.3	0.0570
26	Nonmetallic mineral products	323	11.8	4.0	0.0214
27	Basic metals	175	13.7	2.2	0.0279
28	Fabricated metal products	790	20.3	9.8	0.0460
29	Machinery and equipment	641	25.9	8.0	0.0470
31	Electronics (31 and 32)	380	24.2	4.7	0.0755

continued on next page

Table 2.4 continued

		World			
		# of GVC Firms	GVC Firm Ratio (%)	Sectoral Share (%)	GVC Participation Index
33	Precision instruments	88	34.2	1.1	0.1013
34	Motor vehicles	139	13.8	1.7	0.0249
35	Other transport equipment	21	28.0	0.3	0.1245
36	Furniture	274	14.8	3.4	0.0341
Total		8,051	20.7	100.0	0.0529

		Asia			
		# of GVC Firms	GVC Firm Ratio (%)	Sectoral Share (%)	GVC Participation Index
15	Food	300	9.5	11.2	0.0179
16	Tobacco	4	2.9	0.1	0.0079
17	Textiles	244	15.9	9.1	0.0514
18	Garments	538	29.4	20.1	0.1651
19	Leather	114	28.3	4.3	0.0933
20	Wood	26	7.0	1.0	0.0161
21	Paper	27	8.7	1.0	0.0256
22	Publishing, printing, and recorded media	29	6.1	1.1	0.0126
23	Refined petroleum products	5	8.3	0.2	0.0199
24	Chemicals	259	17.0	9.7	0.0313
25	Plastics and rubber	206	12.5	7.7	0.0355
26	Nonmetallic mineral products	147	8.7	5.5	0.0161
27	Basic metals	63	6.2	2.4	0.0120
28	Fabricated metal products	156	10.1	5.8	0.0281
29	Machinery and equipment	150	12.3	5.6	0.0216
31	Electronics (31 and 32)	236	19.7	8.8	0.0627
33	Precision instruments	30	25.6	1.1	0.0759
34	Motor vehicles	69	8.9	2.6	0.0167
35	Other transport equipment	4	10.0	0.1	0.0453
36	Furniture	63	12.1	2.4	0.0363
Total		2,670	13.7	100.0	0.0425

GVC = global value chain.

Note: GVC index is computed as (exports)/(sales)×(imports/sales).

Source: World Bank, Enterprise Surveys.

2.4 Hypotheses

This section presents the hypotheses to be tested concerning the determinants of GVC participation by firms. Previous studies have found various characteristics of the firms that participate in GVCs by undertaking an econometric approach, which regresses a firm's GVC participation (dependent variable) on a set of independent variables (firm characteristics). We adopt the same approach but extend earlier studies in several ways. First, we extend the country coverage to include all the countries available from the World Bank's Enterprise Surveys. Second, we examine the determinants of not only the probability of GVC participation but also the level of GVC participation by firms. Third, we attempt to identify similarities and differences in the firm characteristics between SMEs and large firms in their GVC participation by explicitly considering firm sizes. Earlier studies mostly focused on SMEs. Fourth, we consider country characteristics explicitly in the analysis. Such analysis would provide useful information for policy makers, as many policies are generally formulated and implemented at the national government level. In the remaining part of this section, we first discuss the hypotheses concerning firm characteristics and then turn to those concerning country characteristics.

2.4.1 Firm Characteristics⁹

Productivity

A firm's productivity is an important factor in its participation in GVCs. This observation is supported by both theoretical and empirical studies. The theory of heterogeneous firms developed by Melitz (2003) shows that only highly productive firms can become exporters by overcoming sunk export market entry costs such as market research and advertising. In other words, productive firms self-select into the export market. A number of empirical studies have supported the prediction of the Melitz model. Amiti and Konings (2007) and Mallick and Yang (2013) showed that more productive firms can become exporters in their studies of Indonesia and India, respectively. Many empirical studies have focused on firms' exports not on imports mainly because of data availability. Examining US data, Bernard et al. (2007) found that importers have similar characteristics to exporters. Indeed, they found that firms that simultaneously export and import register high labor productivity.

⁹ Harvie, Narjoko, and Oum (2010) and Wignaraja (2013) provide good discussions on the relationships between characteristics of firms and GVC participation.

In their studies of GVC participation by firms, both Harvie, Narjoko, and Oum (2010) and Lu et al. (2018) found a positive impact of labor productivity with statistical significance. Based on these earlier studies, we expect positive impact of labor productivity on GVC participation by firms.

Firm Size

SMEs face greater difficulty in participating in GVCs than large firms for several reasons. First, SMEs are in a disadvantageous situation vis-à-vis production and sales due to their small-scale production and sales, which make it difficult for SMEs to exploit the benefits arising from scale economies. Second, SMEs are more constrained in terms of the availability of various resources, including financial and human resources, that are required to deal with fixed costs, such as obtaining market information for participating in GVCs. In the case of financial resources, for example, lenders such as banks prefer to deal with large firms, which tend to borrow large amounts of funds, given that the cost of processing a loan application is more or less the same regardless of the size of the loan. Moreover, credit risk tends to be higher for SMEs than larger firms. Previous studies, including Wignaraja (2013) and Lu et al. (2018), found a positive relationship between firm size and GVC participation. Accordingly, we expect firm size to have a positive impact on GVC participation.

Firm Age

One can hypothesize a positive relationship between firm age and GVC participation. Old firms are competitive as they have survived in tough competition. Old firms have accumulated experiences such as obtaining useful information about possible procurement sources of parts and components and sales destinations of their output, which would help them participate in GVC networks. One could alternatively postulate the opposite relation, that is, a negative correlation between firm age and GVC participation. This is because young firms tend to be more agile than old firms in adopting new production systems such as GVCs, in order to survive and grow in the market. Wignaraja (2013) and Lu et al. (2018) found a significantly negative relationship, while Harvie, Narjoko, and Oum (2013) did not find any statistically significant relationship.

Foreign Ownership

Foreign ownership of a firm is likely to be positively correlated with GVC participation, as one of the main objectives of MNCs establishing a foreign affiliate is to construct GVCs. MNCs interested in export-oriented GVCs set up a production base in developing countries, where products

are assembled with imported parts and components and then exported. Having discussed the high likelihood of a positive correlation between foreign ownership and GVC participation, there are cases where such a relationship may not take place. For example, MNCs with a motive of expanding local sales set up an affiliate that does not export but sells locally, indicating that not all firms with foreign ownership participate in GVCs. Earlier studies, including Harvie, Narjoko, and Oum (2010) and Wignaraja (2013), found a positive relationship between foreign ownership and GVC participation. We expect foreign ownership to have a positive correlation.

Government Ownership

Government ownership is expected to have a negative impact on GVC participation as firms owned by the government tend to suffer from inefficiency and low productivity due to a lack of competition and soft budget constraints. Very few studies have examined this relationship. In their study of the PRC, Lu et al. (2018) found a positive impact of SOEs on GVC participation. This unexpected finding may be due to a special characteristic of the PRC's economic system of state capitalism, under which SOEs may be given special treatment in terms of engaging in international trade. A detailed examination of the issue is warranted.

Technological Level and Workers' Skill

Participation in GVCs requires possession of a high technological capability and management skills, because a firm is expected to perform satisfactorily by meeting a high technical level and by managing the complex and sophisticated operations, which is demanded by MNCs. Specifically, ownership of foreign technical licenses and a highly qualified workforce facilitate a firm's participation in GVCs. Harvie, Narjoko, and Oum (2010) and Wignaraja (2013) found a statistically positive relationship between a firm's technological level and workers' skill, on the one hand, and GVC participation on the other. We therefore expect to find a similar positive relationship between these variables.

Access to Finance

Access to finance is an important factor for overcoming sunk trade costs, which was discussed earlier in relation to productivity. In addition to the sunk costs, exporters need trade finance to pay for variable costs including costs of intermediate goods and labor, because the receipt from the export sales tends to lag for a relatively long period compared to domestic sales. Empirical evidence supports the importance of availability of finance for exports. For example, Manova (2013) found that financial constraint hinders export by examining

a large panel of bilateral trade for 27 industries in the period 1985–1995 covering 107 countries. As for the studies on GVC participation by firms, Harvie, Narjoko, and Oum (2013) and Lu et al. (2018) found a significantly negative impact of financial constraint on GVC participation. Wignaraja (2013) found that access to credit makes it easier for SMEs and all firms to participate in GVCs. Harvie, Narjoko, and Oum argue that financial constraint is particularly severe for SMEs because of their disadvantage vis-à-vis large firms, resulting from market imperfection such as incomplete information. Based on these earlier studies, we expect access to finance to have a positive impact on GVC participation.

2.4.2 Country Characteristics

For analyzing a favorable country environment for participating in GVCs, we mainly draw findings from the earlier studies using input–output data, which were discussed earlier. In addition, studies on the determinants of FDI location provide useful information, because a large number of GVCs have been constructed through FDI by MNCs.¹⁰

Openness to Trade and Foreign Direct Investment

Restrictions on imports discourage GVC participation, because they make it difficult for firms to practice efficient procurement and they reduce the incentive to export. Openness to FDI promotes GVC participation among firms, because in an open FDI environment MNCs are attracted to undertake FDI and to construct GVCs. Kowalski et al. (2015) found that tariff protection reduces GVC participation, while FDI openness increases it. Ignatenko, Raei, and Mircheva (2019) found that membership in preferential trade agreements promotes GVC participation. Based on the results from the earlier studies, we expect openness to trade and FDI to have a positive impact on GVC participation.

Education

Following our discussions on the importance of a high level of technological know-how and skill among workers in participating GVCs, we argue that the availability of people with a high educational level is an important factor for a firm in the country in participating in GVCs.

¹⁰ See, for example, Urata and Kawai (2000) for the case of the locational determinants of Japanese FDI.

Kowalski et al. (2015) found that a high share of tertiary graduates in the total number of workers has a positive impact on value-added created through GVCs. Ignatenko, Raei, and Mircheva (2019) also showed that human capital has a positive impact on GVC participation. Following the findings from previous research, we expect education to have a positive impact on GVC participation.

Infrastructure

Well-developed infrastructure facilitates business activities including international trade and FDI. Indeed, the availability of well-developed infrastructure such as the transportation system has been argued to have contributed to an expansion of trade and FDI in the PRC, as it increases physical connectivity in the country and region. Both Kowalski et al. (2015) and Ignatenko, Raei, and Mircheva (2019) found that infrastructure, and particularly its quality, plays an important role in GVC participation. Kowalski et al. showed that a good-quality electricity supply is particularly important for developing countries. Urata and Kawai (2000) found that good infrastructure has a positive impact on attracting Japanese FDI in their study of the locational determinants of Japanese outward FDI. We expect infrastructure to have a positive impact on GVC participation.

Logistics

The availability of efficient and reliable logistics enables firms to participate in GVCs as they reduce trade cost. The importance of well-developed and well-functioning logistics has increased for firms engaged in GVCs, because they enable MNCs that have developed a complex system of GVCs to maximize their benefits by saving delivery time. Kowalski et al. (2015) found that a high logistics performance in customs increases GVC participation. We expect good logistics to have a positive impact on GVC participation.

Governance

A reliable, fair, and transparent business environment is key for active business activities, including international trade and FDI. Without it, businesses cannot perform efficiently. Kowalski et al. (2015) found that institutional quality and intellectual property protection are important factors for GVC participation, particularly in developing countries. Ignatanko, Raei, and Mircheva (2019) found that rule of law and contract enforcement have a positive impact on GVC participation. Based on the findings of these earlier studies, we expect governance to play an important role in GVC participation.

2.5 Methodology and Data

We perform two kinds of regression analyses for two dependent variables: GVC participation ratio and GVC participation index. The set of independent variables, which are used for the estimation, is the same and is shown in Appendix Table A2.3. They include those on firm characteristics and those on country characteristics.

Beginning with firm characteristics, we have nine variables. Labor productivity is measured by sales revenue divided by the number of employees. Firm size is measured by the number of employees. A firm with fewer than 200 employees is classified as an SME, while a firm with more than 200 employees is classified as a large firm. Firm age is the number of years in operation. Foreign ownership is the share of equity held by foreign companies. Government ownership is the share of equity held by the government. Quality certification is the ownership of internationally recognized quality certification. Skilled labor is the proportion of skilled labor in total labor (skilled labor share). Financial access is measured by the proportion of external funds in a firm's total purchase of fixed assets. We expect the coefficients on labor productivity, firm size, foreign ownership, quality certification, skilled labor, and financial access to be positive, and that on government ownership to be negative. The expected sign of the estimated coefficient on firm age is not determined a priori.

The values of these independent variables for GVC firms and non-GVC firms are shown in Table 2.5 and their difference is tested by t-test. The results of the t-test indicate that GVC firms have higher values than non-GVC firms for all the variables except skilled labor. Specifically, GVC firms have higher labor productivity, a larger size, a longer operation period, higher foreign and government ownership ratios, a higher share of quality certificate holding, greater access to finance, and a lower skilled labor share than non-GVC firms.

Turning to country characteristics, we have five variables. Openness to trade and FDI are measured by simple average tariff rates (nonagricultural products, most favored nation applied) and FDI share (inward FDI stock as % of GDP), respectively. Education is measured by gross enrollment ratio for secondary school. Electricity consumption measured by electricity consumption (kilowatts per hour) per capita is a proxy for hard infrastructure. An abundant supply of electricity is required for business operation, particularly in manufacturing. Logistics performance is taken from the logistics performance index, which is obtained from an assessment of quality of trade and transport-related infrastructure (1 = low to 5 = high). Governance is measured by political risk, which is computed by taking the first principal component of six

**Table 2.5: Sample Firm Characteristics:
Global Value Chain vs Non-Global Value Chain Firms**

	GVC Firms	Non-GVC Firms	GVC Firms – Non-GVC Firms	t-statistic
Labor_productivity	9.37	8.51	0.85	29.77***
Firm_size	4.53	3.34	1.19	71.06***
Firm_age	30.42	24.11	6.31	30.22***
Foreign_ownership	19.55	3.88	15.68	54.10***
Government_ownership	1.23	0.63	0.60	6.79***
Quality_certification	0.52	0.26	0.26	44.81***
Skilled_labor	62.82	63.12	–0.30	–0.91
Financial_access	33.60	27.56	6.04	8.78***

GVC = global value chain.

Note: *** Indicates statistical significance at 99% level.

Source: Computed by the authors.

political risk-related variables, i.e., voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law, and control of corruption. The value for governance is constructed in such a way that a high value indicates better governance. The expected signs of the estimated coefficients for all the variables (trade and FDI openness, education, electricity consumption, and governance) are positive.

For the estimation of GVC ratio, we conduct a probit estimation (equation 1) and for GVC participation index we conduct a tobit estimation (equation 2), as follows.

For the estimation of GVC participation ratio (probit estimation):

$$\begin{aligned}
 \Pr(GVC_{ict} = 1|Z_{ict}) = & \Phi(\alpha + \beta_1 Labor_productivity_{ict} + \\
 & \beta_2 Firm_size_{ict} + \beta_3 Firm_age_{ict} + \\
 & \beta_4 Foreign_ownership_{ict} + \\
 & \beta_5 Government_ownership_{ict} + \\
 & \beta_6 Quality_certification_{ict} + \beta_7 Skilled_labor_{ict} + \\
 & \beta_8 Financial_access_{ict} + \gamma_1 Tariffs_{ct} + \gamma_2 FDI_share_{ct} + \\
 & \gamma_3 Education_{ct} + \gamma_4 Electricity_consumption_{ct} + \\
 & \gamma_5 Logistics_performance_{ct} + \gamma_6 Governance_{ct} + \eta_c + \\
 & \delta_k + \mu_t + \varepsilon_{ict})
 \end{aligned}
 \tag{1}$$

For the estimation of GVC participation index (tobit estimation):

$$\begin{aligned}
 GVCindex_{ict}^* &= GVCindex_{ict}^*, \text{ if } 0 < GVCindex_{ict}^* < 1 \\
 GVCindex_{ict}^* &= 0, \text{ if } GVCindex_{ict}^* \leq 0 \\
 GVCindex_{ict}^* &= 1, \text{ if } GVCindex_{ict}^* \geq 1 \\
 GVCindex_{ict}^* &= \alpha + \beta_1 Labor_productivity_{ict} + \beta_2 Firm_size_{ict} + \\
 &\quad \beta_3 Firm_age_{ict} + \beta_4 Foreign_ownership_{ict} + \\
 &\quad \beta_5 Government_ownership_{ict} + \beta_6 Quality_certification_{ict} \\
 &\quad \beta_7 Skilled_labor_{ict} + \beta_8 Financial_access_{ict} + \\
 &\quad \gamma_1 Tariffs_{ct} + \gamma_2 FDI_share_{ct} + \gamma_3 Education_{ct} + \\
 &\quad \gamma_4 Electricity_consumption_{ct} + \\
 &\quad \gamma_5 Logistics_performance_{ct} + \gamma_6 Governance_{ct} + \\
 &\quad \eta_c + \delta_k + \mu_t + \varepsilon_{ict},
 \end{aligned} \tag{2}$$

where i is firm, k is sector, c is country, and t is time.

In the analysis, we use the data obtained from three data sets from the World Bank, namely the Enterprise Surveys, Global Development Indicators, and Logistics Performance Index. We also use the data obtained from the Political Risk Services' International Country Risk Guide. We cover 111 countries during the 2009–2018 period, for which the data from the World Bank's Enterprise Surveys are available. We use one survey result for one country for the year, for which the largest number of observations is available during the sample period. A description of the data and data construction are presented in Appendix Tables A2.1 and A2.3.¹¹

2.6 Estimation Results

We estimate equation (1) with probit estimation and equation (2) with tobit estimation separately.¹² The results of the estimation are shown in Tables 2.6 and 2.7. Table 2.6A shows the results of probit and tobit estimations for GVC participation and GVC participation index, covering all the firms in the world. Tables 2.6B (GVC participation) and 2.6C (GVC participation index) report the results with SME dummy variables, to

¹¹ See Appendix Table A2.4 for more information about correlation coefficients among the variables.

¹² We conducted the Heckman two-stage correction method to correct for a potential selection bias. In the estimation, a binary variable of a firm's application for an import permit is used for a firm-level selection variable. The inverse Mills ratio, which is computed from the estimation, is not statistically significant (Appendix Table A2.5). This finding justified our approach of estimating two equations separately.

show the differences in the impacts of explanatory variables between SMEs and large firms. Tables 2.7A, 2.7B, and 2.7C, which correspond to Tables 2.6A, 2.6B, and 2.6C, show the results for the firms in Asia only.¹³

The results in Table 2.6A show that the estimated coefficients for labor productivity, firm size, foreign ownership, and quality certification are positive and statistically significant in all regressions for both GVC participation and GVC participation index. These findings, which are consistent with our expectation and with earlier studies, indicate that high labor productivity, a large firm size, high foreign ownership, and the presence of high technological capability enable firms not only to participate in GVCs but to increase the level of GVC participation.

Table 2.6A: Regression Results: Global Value Chain Participation (Probit Estimation) and Global Value Chain Index (Tobit Estimation) for All Firms

World	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Probit							
Variables	GVC Participation							
Labor_productivity	0.057*** (0.006)	0.058*** (0.009)	0.056*** (0.005)	0.067*** (0.005)	0.083*** (0.006)	0.046*** (0.005)	0.064*** (0.005)	0.064*** (0.005)
Firm_size	0.356*** (0.009)	0.340*** (0.013)	0.297*** (0.008)	0.282*** (0.008)	0.274*** (0.008)	0.296*** (0.008)	0.288*** (0.008)	0.286*** (0.008)
Firm_age	0.001* (0.001)	0.002** (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.003*** (0.001)	0.004*** (0.001)	0.004*** (0.001)
Foreign_ownership	0.008*** (0.000)	0.008*** (0.001)	0.010*** (0.000)	0.009*** (0.000)	0.010*** (0.000)	0.009*** (0.000)	0.009*** (0.000)	0.010*** (0.000)
Government_ownership	-0.003** (0.001)	-0.001 (0.002)	-0.001 (0.001)	-0.000 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	0.001 (0.001)
Quality_certification	0.408*** (0.025)	0.427*** (0.036)	0.330*** (0.023)	0.375*** (0.023)	0.320*** (0.023)	0.344*** (0.024)	0.328*** (0.024)	0.357*** (0.023)
Skilled_labor	0.000 (0.000)	0.001 (0.001)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Financial_access		0.001*** (0.000)						

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¹³ We conducted an analysis for several sectors, including garments and machineries, and the results are basically similar to those for all the sectors and thus they are not reported or analyzed.

Table 2.6A continued

World	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Probit							
Variables	GVC Participation							
Tariffs			−0.059*** (0.003)					
FDI_share				0.003*** (0.000)				
Education					0.006*** (0.001)			
Electricity_consumption						0.212*** (0.011)		
Logistics_performance							0.090*** (0.020)	
Governance								0.102*** (0.020)
Constant	−3.949*** (0.325)	−3.894*** (0.457)	−2.418*** (0.084)	−3.195*** (0.078)	−3.869*** (0.098)	−4.495*** (0.111)	−3.309*** (0.097)	−3.083*** (0.082)
LR chi2	9,877.51	4,556.96	7,338.86	7,016.41	6,783.71	6,984.86	6,304.69	6,773.69
Prob > chi2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Country dummy	Yes	Yes	No	No	No	No	No	No
Sector dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Left-censored								
Right-censored								
Observations	28,476	11,199	28,315	28,434	27,035	26,382	25,751	26,750
Pseudo R2	0.3386	0.3293	0.2538	0.2411	0.247	0.257	0.241	0.248

World	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	Tobit							
Variables	GVC Index							
Labor_productivity	0.015*** (0.002)	0.012*** (0.003)	0.016*** (0.002)	0.021*** (0.002)	0.027*** (0.002)	0.014*** (0.002)	0.021*** (0.002)	0.019*** (0.002)
Firm_size	0.117*** (0.003)	0.095*** (0.004)	0.112*** (0.003)	0.108*** (0.003)	0.102*** (0.003)	0.110*** (0.003)	0.108*** (0.003)	0.103*** (0.003)
Firm_age	−0.001*** (0.000)	−0.001** (0.000)	0.000* (0.000)	0.000** (0.000)	0.000* (0.000)	0.000 (0.000)	0.000* (0.000)	0.000* (0.000)
Foreign_ownership	0.003*** (0.000)	0.002*** (0.000)	0.004*** (0.000)	0.004*** (0.000)	0.004*** (0.000)	0.004*** (0.000)	0.004*** (0.000)	0.004*** (0.000)

continued on next page

Table 2.6A continued

World	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	Tobit							
Variables	GVC Index							
Government_ownership	-0.001*** (0.000)	-0.001** (0.001)	-0.001 (0.000)	-0.000 (0.000)	-0.001 (0.000)	-0.001* (0.000)	-0.001 (0.000)	0.000 (0.000)
Quality_certification	0.110*** (0.008)	0.094*** (0.010)	0.089*** (0.009)	0.111*** (0.009)	0.089*** (0.009)	0.100*** (0.009)	0.097*** (0.009)	0.105*** (0.009)
Skilled_labor	0.000 (0.000)	0.000* (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000* (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Financial_access		0.000* (0.000)						
Tariffs			-0.024*** (0.001)					
FDI_share				0.001*** (0.000)				
Education					0.002*** (0.000)			
Electricity_consumption						0.067*** (0.004)		
Logistics_performance							0.011 (0.008)	
Governance								0.030*** (0.007)
Constant	-1.341*** (0.119)	-1.090*** (0.142)	-0.859*** (0.033)	-1.217*** (0.032)	-1.453*** (0.039)	-1.590*** (0.044)	-1.172*** (0.039)	-1.113*** (0.033)
LR chi2	9,839.06	4,639.12	7,191.65	6,819.88	6,406.2	6,695.59	6,088.67	6,444.46
Prob > chi2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Country dummy	Yes	Yes	No	No	No	No	No	No
Sector dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Left-censored	22,617	7,779	22,438	22,511	21,467	20,827	20,450	21,207
Right-censored	262	121	258	22,511	236	251	229	210
Observations	28,559	11,232	28,315	261	27,035	26,382	25,751	26,750
Pseudo R2	0.373	0.3861	0.2755	0.2594	0.2605	0.2727	0.2593	0.2666

FDI = foreign direct investment, GVC = global value chain.
Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.
Source: Computed by the authors.

Table 2.6B: Regression Results with SME Dummy Variables:
Global Value Chain Participation for All Firms

World	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Probit							
Variables	GVC Participation							
Labor_productivity	0.047*** (0.011)	0.037** (0.016)	0.051*** (0.011)	0.055*** (0.011)	0.065*** (0.012)	0.042*** (0.012)	0.059*** (0.012)	0.058*** (0.011)
Firm_size	0.292*** (0.031)	0.282*** (0.041)	0.259*** (0.029)	0.253*** (0.029)	0.250*** (0.030)	0.277*** (0.031)	0.259*** (0.030)	0.253*** (0.030)
Firm_age	0.002* (0.001)	0.002 (0.001)	0.005*** (0.001)	0.005*** (0.001)	0.005*** (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.005*** (0.001)
Foreign_ownership	0.007*** (0.001)	0.007*** (0.001)	0.010*** (0.001)	0.009*** (0.001)	0.009*** (0.001)	0.009*** (0.001)	0.009*** (0.001)	0.010*** (0.001)
Government_ownership	-0.002 (0.002)	-0.001 (0.003)	-0.001 (0.002)	-0.000 (0.002)	-0.002 (0.002)	-0.002 (0.002)	-0.002 (0.002)	0.000 (0.002)
Quality_certification	0.277*** (0.051)	0.313*** (0.070)	0.182*** (0.048)	0.209*** (0.048)	0.186*** (0.050)	0.163*** (0.050)	0.211*** (0.052)	0.185*** (0.049)
Skilled_labor	0.001 (0.001)	0.002 (0.001)	0.000 (0.001)	0.001 (0.001)	0.000 (0.001)	0.000 (0.001)	-0.000 (0.001)	0.001 (0.001)
Financial_access		0.002** (0.001)						
Tariffs			-0.035*** (0.007)					
FDI_share				0.003*** (0.001)				
Education					0.004*** (0.001)			
Electricity_consumption						0.149*** (0.026)		
Logistics_performance							-0.104** (0.043)	
Governance								0.005 (0.036)
SME	-0.582** (0.231)	-0.704** (0.321)	-0.051 (0.234)	-0.322 (0.222)	-0.551** (0.251)	-0.751** (0.294)	-1.024*** (0.268)	-0.256 (0.227)
SME*Labor_productivity	0.013 (0.012)	0.027 (0.018)	0.007 (0.012)	0.014 (0.012)	0.023* (0.013)	0.005 (0.013)	0.006 (0.013)	0.007 (0.012)
SME*Firm_size	0.081** (0.033)	0.083* (0.045)	0.039 (0.031)	0.032 (0.031)	0.020 (0.032)	0.011 (0.033)	0.030 (0.033)	0.029 (0.032)

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Table 2.6B continued

World	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Probit							
Variables	GVC Participation							
SME*Firm_age	−0.001 (0.001)	0.000 (0.002)	−0.001 (0.001)	−0.001 (0.001)	−0.001 (0.001)	−0.001 (0.001)	−0.000 (0.001)	−0.001 (0.001)
SME*Foreign_ownership	0.002** (0.001)	0.002* (0.001)	−0.000 (0.001)	−0.000 (0.001)	0.001 (0.001)	0.000 (0.001)	0.000 (0.001)	−0.000 (0.001)
SME*Government_ownership	−0.002 (0.003)	0.001 (0.004)	0.001 (0.002)	0.001 (0.002)	0.002 (0.003)	0.002 (0.002)	0.002 (0.002)	0.001 (0.002)
SME*Quality_certification	0.164*** (0.056)	0.145* (0.078)	0.186*** (0.053)	0.208*** (0.053)	0.170*** (0.055)	0.227*** (0.056)	0.147** (0.057)	0.215*** (0.055)
SME*Skilled_labor	−0.001 (0.001)	−0.001 (0.001)	−0.001 (0.001)	−0.001 (0.001)	−0.001 (0.001)	−0.001 (0.001)	0.000 (0.001)	−0.001 (0.001)
SME*Financial_access		−0.001 (0.001)						
SME*Tariffs			−0.028*** (0.007)					
SME*FDI_share				−0.001 (0.001)				
SME*Education					0.002* (0.001)			
SME*Electricity_consumption						0.075*** (0.028)		
SME*Logistics_performance							0.245*** (0.047)	
SME*Governance								0.113*** (0.036)
Constant	−3.464*** (0.386)	−3.350*** (0.540)	−2.343*** (0.228)	−2.895*** (0.218)	−3.367*** (0.250)	−3.810*** (0.285)	−2.440*** (0.257)	−2.825*** (0.223)
LR chi2	9,904.89	4,576.65	7,374.12	7,041.71	6,810.45	7,017.28	6,354.7	6,807.85
Prob > chi2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Country dummy	Yes	Yes	No	No	No	No	No	No
Sector dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	28,476	11,199	28,315	28,434	27,035	26,382	25,751	26,750
Pseudo R2	0.340	0.331	0.255	0.242	0.248	0.258	0.243	0.249

FDI = foreign direct investment, GVC = global value chain, SMEs = small and medium-sized enterprises. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

Source: Computed by the authors.

Table 2.6C: Regression Results with SME Dummy Variables:
Global Value Chain Index for All Firms

World	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Tobit							
Variables	GVC Index							
Labor_productivity	0.004 (0.004)	0.002 (0.004)	0.008** (0.004)	0.009** (0.004)	0.015*** (0.004)	0.009** (0.004)	0.012*** (0.004)	0.011*** (0.004)
Firm_size	0.088*** (0.009)	0.071*** (0.010)	0.085*** (0.010)	0.085*** (0.010)	0.076*** (0.010)	0.085*** (0.010)	0.085*** (0.010)	0.075*** (0.010)
Firm_age	-0.001*** (0.000)	-0.001*** (0.000)	-0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Foreign_ownership	0.002*** (0.000)	0.002*** (0.000)	0.004*** (0.000)	0.004*** (0.000)	0.004*** (0.000)	0.004*** (0.000)	0.004*** (0.000)	0.003*** (0.000)
Government_ownership	-0.002*** (0.001)	-0.002*** (0.001)	-0.001* (0.001)	-0.001 (0.001)	-0.001* (0.001)	-0.001* (0.001)	-0.001** (0.001)	-0.001 (0.001)
Quality_certification	0.037** (0.016)	0.035* (0.019)	-0.002 (0.017)	0.010 (0.017)	0.012 (0.018)	-0.001 (0.018)	0.013 (0.018)	0.008 (0.017)
Skilled_labor	0.001** (0.000)	0.001** (0.000)	0.001* (0.000)	0.001** (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.001** (0.000)
Financial_access		0.000 (0.000)						
Tariffs			-0.014*** (0.002)					
FDI_share				0.002*** (0.000)				
Education					-0.000 (0.000)			
Electricity_consumption						0.018* (0.009)		
Logistics_performance							-0.077*** (0.015)	
Governance								-0.016 (0.013)
SME	-0.391*** (0.072)	-0.387*** (0.085)	-0.206** (0.081)	-0.345*** (0.079)	-0.550*** (0.088)	-0.721*** (0.103)	-0.654*** (0.094)	-0.329*** (0.077)
SME*Labor_productivity	0.014*** (0.004)	0.014*** (0.005)	0.011** (0.004)	0.015*** (0.004)	0.016*** (0.005)	0.007 (0.005)	0.011** (0.005)	0.011** (0.004)
SME*Firm_size	0.040*** (0.010)	0.038*** (0.012)	0.033*** (0.011)	0.030*** (0.011)	0.030*** (0.011)	0.028** (0.011)	0.028** (0.011)	0.033*** (0.011)
SME*Firm_age	0.001** (0.000)	0.001** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.001* (0.000)	0.001** (0.000)	0.001*** (0.000)	0.001** (0.000)

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Table 2.6C continued

World	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Tobit							
Variables	GVC Index							
SME*Foreign_ownership	0.001*** (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.001** (0.000)	0.000 (0.000)	0.000 (0.000)	0.001** (0.000)
SME*Government_ownership	0.001 (0.001)	0.003** (0.001)	0.001 (0.001)	0.001* (0.001)	0.002* (0.001)	0.002* (0.001)	0.002** (0.001)	0.002* (0.001)
SME*Quality_certification	0.093*** (0.018)	0.076*** (0.022)	0.115*** (0.019)	0.129*** (0.020)	0.098*** (0.020)	0.128*** (0.020)	0.106*** (0.021)	0.122*** (0.020)
SME*Skilled_labor	-0.001** (0.000)	-0.000 (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001** (0.000)	-0.001* (0.000)	-0.001 (0.000)	-0.001*** (0.000)
SME*Financial_access		-0.000 (0.000)						
SME*Tariffs			-0.013*** (0.003)					
SME*FDI_share				-0.000 (0.000)				
SME*Education					0.002*** (0.001)			
SME*Electricity_consumption						0.061*** (0.010)		
SME*Logistics_performance							0.115*** (0.017)	
SME*Governance								0.054*** (0.013)
Constant	-1.038*** (0.135)	-0.803*** (0.159)	-0.685*** (0.079)	-0.931*** (0.077)	-0.986*** (0.088)	-0.981*** (0.099)	-0.638*** (0.090)	-0.836*** (0.076)
LR chi2	9,962.27	4,713.6	7,341.71	6,945.1	6,547.87	6,848.66	6,256.75	6,583.94
Prob > chi2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Country dummy	Yes	Yes	No	No	No	No	No	No
Sector dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Left-censored	22,617	7,779	22,438	22,511	21,467	20,827	20,450	21,207
Right-censored	262	121	258	261	236	251	229	210
Observations	28,559	11,232	28,315	28,434	27,035	26,382	25,751	26,750
Pseudo R2	0.3777	0.3923	0.2813	0.2642	0.2662	0.279	0.2665	0.2724

FDI = foreign direct investment, GVC = global value chain, SMEs = small and medium-sized enterprises.
Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.
Source: Computed by the authors.

Table 2.7A: Regression Results: Global Value Chain Participation (Probit Estimation) and Global Value Chain Index (Tobit Estimation) for Firms in Asia

Asia	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Probit							
Variables	GVC Participation							
Labor_ productivity	0.054*** (0.009)	0.060*** (0.015)	0.058*** (0.008)	0.072*** (0.008)	0.076*** (0.008)	0.059*** (0.009)	0.054*** (0.009)	0.074*** (0.008)
Firm_size	0.348*** (0.013)	0.335*** (0.021)	0.338*** (0.012)	0.321*** (0.012)	0.314*** (0.012)	0.335*** (0.013)	0.338*** (0.013)	0.335*** (0.013)
Firm_age	0.002** (0.001)	0.004** (0.002)	0.003** (0.001)	0.003** (0.001)	0.003** (0.001)	0.003** (0.001)	0.002 (0.001)	0.002* (0.001)
Foreign_ ownership	0.012*** (0.001)	0.012*** (0.001)	0.012*** (0.001)	0.012*** (0.001)	0.012*** (0.001)	0.011*** (0.001)	0.011*** (0.001)	0.012*** (0.001)
Government_ ownership	-0.004* (0.002)	-0.000 (0.004)	-0.004** (0.002)	-0.005** (0.002)	-0.008*** (0.003)	-0.006*** (0.002)	-0.005** (0.002)	-0.003 (0.002)
Quality_ certification	0.365*** (0.038)	0.387*** (0.061)	0.352*** (0.037)	0.391*** (0.036)	0.370*** (0.037)	0.356*** (0.038)	0.329*** (0.038)	0.365*** (0.038)
Skilled_labor	-0.000 (0.001)	0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)
Financial_ access		0.001* (0.001)						
Tariffs			-0.073*** (0.007)					
FDI_share				0.006*** (0.001)				
Education					0.002* (0.001)			
Electricity_ consumption						0.200*** (0.022)		
Logistics_ performance							0.285*** (0.037)	
Governance								0.484*** (0.055)
Constant	-3.833*** (0.334)	-3.800*** (0.476)	-2.321*** (0.140)	-3.371*** (0.129)	-3.459*** (0.219)	-4.336*** (0.198)	-3.724*** (0.162)	-2.492*** (0.144)
LR chi2	4,090.12	1,630.09	3,722.41	3,698.28	3,200.81	3,508.49	3,356.29	3,617.27
Prob > chi2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

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Table 2.7A continued

Asia	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Probit							
Variables	GVC Participation							
Country dummy	Yes	Yes	No	No	No	No	No	No
Sector dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Left-censored								
Right-censored								
Observations	15,696	4,959	15,655	15,773	15,094	14,542	14,160	14,913
Pseudo R2	0.3299	0.3222	0.3039	0.2978	0.281	0.305	0.301	0.310

Asia	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	Tobit							
Variables	GVC Index							
Labor_ productivity	0.020*** (0.004)	0.018*** (0.006)	0.022*** (0.004)	0.027*** (0.004)	0.032*** (0.004)	0.027*** (0.004)	0.025*** (0.004)	0.025*** (0.004)
Firm_ size	0.146*** (0.006)	0.128*** (0.008)	0.150*** (0.006)	0.145*** (0.006)	0.141*** (0.006)	0.148*** (0.006)	0.150*** (0.006)	0.142*** (0.006)
Firm_ age	−0.000 (0.000)	0.000 (0.001)	−0.000 (0.001)	−0.000 (0.001)	−0.000 (0.001)	−0.000 (0.001)	−0.000 (0.001)	−0.000 (0.001)
Foreign_ ownership	0.006*** (0.000)	0.005*** (0.000)	0.006*** (0.000)	0.006*** (0.000)	0.006*** (0.000)	0.006*** (0.000)	0.006*** (0.000)	0.006*** (0.000)
Government_ ownership	−0.002* (0.001)	−0.000 (0.001)	−0.002** (0.001)	−0.003*** (0.001)	−0.004*** (0.001)	−0.003*** (0.001)	−0.003** (0.001)	−0.002* (0.001)
Quality_ certification	0.134*** (0.017)	0.117*** (0.024)	0.119*** (0.017)	0.133*** (0.017)	0.133*** (0.017)	0.130*** (0.017)	0.117*** (0.018)	0.124*** (0.017)
Skilled_ labor	−0.000 (0.000)	−0.000 (0.000)	−0.000 (0.000)	−0.000 (0.000)	−0.001*** (0.000)	−0.001** (0.000)	−0.001** (0.000)	−0.000 (0.000)
Financial_ access		0.000 (0.000)						
Tariffs			−0.023*** (0.003)					
FDI_ share				0.003*** (0.000)				
Education					−0.001** (0.001)			
Electricity_ consumption						0.030*** (0.010)		

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Table 2.7A *continued*

Asia	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	Tobit							
Variables	GVC Index							
Logistics_ performance							0.053*** (0.017)	
Governance								0.190*** (0.023)
Constant	-1.670*** (0.156)	-1.425*** (0.196)	-1.100*** (0.066)	-1.480*** (0.064)	-1.498*** (0.107)	-1.543*** (0.092)	-1.472*** (0.078)	-1.033*** (0.065)
LR chi2	4,378.42	1,832.21	3,930.35	3,935.55	3,382.22	3,747.03	3,654.57	3,835.16
Prob > chi2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Country dummy	Yes	Yes	No	No	No	No	No	No
Sector dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Left-censored	13,661	3,943	13,580	13,661	13,198	12,579	12,376	12,933
Right-censored	154	69	151	154	131	149	149	129
Observations	15,773	4,970	15,655	15,773	15,094	14,542	14,272	14,913
Pseudo R2	0.3581	0.3641	0.3264	0.3219	0.3055	0.3293	0.3302	0.3378

FDI = foreign direct investment, GVC = global value chain.
 Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.
 Source: Computed by the authors.

Table 2.7B: Regression Results with SME Dummy Variables:
Global Value Chain Participation for All Firms in Asia

Asia	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Probit							
Variables	GVC Participation							
Labor_productivity	0.065*** (0.015)	0.060** (0.024)	0.057*** (0.015)	0.064*** (0.015)	0.070*** (0.015)	0.066*** (0.017)	0.058*** (0.018)	0.074*** (0.015)
Firm_size	0.290*** (0.039)	0.288*** (0.057)	0.295*** (0.039)	0.286*** (0.039)	0.274*** (0.040)	0.302*** (0.041)	0.309*** (0.041)	0.284*** (0.040)
Firm_age	0.003 (0.002)	0.004 (0.003)	0.002 (0.002)	0.002 (0.002)	0.002 (0.002)	0.002 (0.002)	0.002 (0.002)	0.002 (0.002)
Foreign_ownership	0.011*** (0.001)	0.011*** (0.002)	0.011*** (0.001)	0.011*** (0.001)	0.011*** (0.001)	0.010*** (0.001)	0.010*** (0.001)	0.011*** (0.001)
Government_ownership	-0.003 (0.003)	-0.003 (0.004)	-0.005* (0.003)	-0.006** (0.003)	-0.009*** (0.003)	-0.006** (0.003)	-0.006** (0.003)	-0.002 (0.003)
Quality_certification	0.133* (0.071)	0.196* (0.111)	0.143** (0.069)	0.190*** (0.069)	0.229*** (0.073)	0.155** (0.075)	0.139* (0.075)	0.163** (0.072)
Skilled_labor	0.001 (0.001)	0.002 (0.002)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	-0.000 (0.001)	-0.000 (0.001)	0.001 (0.001)
Financial_access		0.001 (0.001)						
Tariffs			-0.055*** (0.013)					
FDI_share				0.005*** (0.002)				
Education					-0.000 (0.002)			
Electricity_consumption						0.095** (0.041)		
Logistics_performance							0.186*** (0.063)	
Governance								0.494*** (0.071)
SME	-0.312 (0.317)	-0.446 (0.489)	-0.135 (0.345)	-0.404 (0.314)	-0.610* (0.359)	-1.277*** (0.433)	-0.646* (0.372)	-0.407 (0.322)
SME*Labor_productivity	-0.016 (0.018)	-0.000 (0.029)	0.001 (0.018)	0.012 (0.017)	0.009 (0.018)	-0.010 (0.020)	-0.006 (0.020)	0.001 (0.018)
SME*Firm_size	0.074* (0.044)	0.078 (0.068)	0.053 (0.044)	0.047 (0.043)	0.048 (0.045)	0.041 (0.046)	0.034 (0.046)	0.068 (0.045)
SME*Firm_age	-0.001 (0.002)	0.000 (0.003)	0.001 (0.002)	0.001 (0.002)	0.001 (0.002)	0.002 (0.002)	0.001 (0.002)	0.000 (0.002)

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Table 2.7B continued

Asia	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Probit							
Variables	GVC Participation							
SME*Foreign_ ownership	0.001 (0.001)	0.000 (0.002)	0.001 (0.001)	0.001 (0.001)	0.001 (0.002)	0.001 (0.001)	0.001 (0.002)	0.002 (0.002)
SME*Government_ ownership	-0.001 (0.004)	0.010 (0.007)	0.001 (0.004)	0.002 (0.004)	0.005 (0.005)	0.001 (0.004)	0.002 (0.004)	-0.002 (0.005)
SME*Quality_ certification	0.300*** (0.080)	0.244* (0.126)	0.276*** (0.078)	0.263*** (0.078)	0.181** (0.082)	0.260*** (0.084)	0.242*** (0.085)	0.261*** (0.082)
SME*Skilled_labor	-0.002 (0.001)	-0.002 (0.002)	-0.002* (0.001)	-0.003* (0.001)	-0.003** (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.003* (0.001)
SME*Financial_ access		-0.000 (0.001)						
SME*Tariffs			-0.024* (0.014)					
SME*FDI_share				0.001 (0.002)				
SME*Education					0.004 (0.002)			
SME*Electricity_ consumption						0.145*** (0.044)		
SME*Logistics_ performance							0.138** (0.067)	
SME*Governance								-0.011 (0.053)
Constant	-3.551*** (0.429)	-3.467*** (0.624)	-2.161*** (0.322)	-3.036*** (0.299)	-2.925*** (0.382)	-3.357*** (0.406)	-3.201*** (0.352)	-2.139*** (0.309)
LR chi2	4,113.03	1,640.76	3,749.08	3,720.82	3,221.41	3,541.67	3,379.04	3,639.04
Prob > chi2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Country dummy	Yes	Yes	No	No	No	No	No	No
Sector dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	15,696	4,959	15,655	15,773	15,094	14,542	14,160	14,913
Pseudo R2	0.332	0.324	0.3061	0.2996	0.282	0.308	0.303	0.312

FDI = foreign direct investment, GVC = global value chain, SMEs = small and medium-sized enterprises.
Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.
Source: Computed by the authors.

Table 2.7C: Regression Results with SME Dummy Variables:
Global Value Chain Index for All Firms in Asia

Asia	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Tobit							
Variables	GVC Index							
Labor_ productivity	0.016** (0.006)	0.011 (0.009)	0.015** (0.006)	0.014** (0.006)	0.021*** (0.006)	0.024*** (0.007)	0.022*** (0.007)	0.016*** (0.006)
Firm_size	0.108*** (0.016)	0.091*** (0.020)	0.113*** (0.016)	0.115*** (0.016)	0.104*** (0.017)	0.119*** (0.017)	0.123*** (0.017)	0.104*** (0.016)
Firm_age	-0.000 (0.001)	-0.000 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)
Foreign_ ownership	0.005*** (0.000)	0.004*** (0.000)	0.005*** (0.000)	0.005*** (0.000)	0.006*** (0.000)	0.005*** (0.000)	0.005*** (0.000)	0.004*** (0.000)
Government_ ownership	-0.002 (0.001)	-0.002 (0.002)	-0.003** (0.001)	-0.003** (0.001)	-0.004** (0.002)	-0.003** (0.001)	-0.003*** (0.001)	-0.002 (0.001)
Quality_ certification	0.000 (0.029)	-0.004 (0.040)	-0.012 (0.029)	-0.004 (0.029)	0.034 (0.031)	0.007 (0.031)	-0.005 (0.032)	-0.001 (0.029)
Skilled_labor	0.001 (0.001)	0.001 (0.001)	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)	0.000 (0.001)
Financial_access	0.000 (0.000)							
Tariffs	-0.007 (0.005)							
FDI_share	0.002*** (0.001)							
Education	-0.003*** (0.001)							
Electricity_ consumption	-0.034** (0.017)							
Logistics_ performance	-0.019 (0.026)							
Governance	0.193*** (0.029)							
SME	-0.416*** (0.130)	-0.489*** (0.176)	-0.217 (0.147)	-0.475*** (0.135)	-0.677*** (0.156)	-0.997*** (0.185)	-0.651*** (0.160)	-0.482*** (0.132)
SME*Labor_ productivity	0.007 (0.007)	0.011 (0.011)	0.010 (0.008)	0.019** (0.008)	0.016** (0.008)	0.004 (0.009)	0.004 (0.009)	0.014* (0.007)

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Table 2.7C continued

Asia	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Tobit							
Variables	GVC Index							
SME*Firm_size	0.051*** (0.018)	0.057** (0.024)	0.046** (0.019)	0.040** (0.019)	0.045** (0.019)	0.037* (0.019)	0.032 (0.020)	0.050*** (0.019)
SME*Firm_age	0.000 (0.001)	0.000 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.002 (0.001)	0.001 (0.001)	0.001 (0.001)
SME*Foreign_ownership	0.002*** (0.001)	0.001 (0.001)	0.001** (0.001)	0.001*** (0.001)	0.001* (0.001)	0.001** (0.001)	0.002*** (0.001)	0.002*** (0.001)
SME*Government_ownership	0.001 (0.002)	0.007** (0.003)	0.002 (0.002)	0.002 (0.002)	0.001 (0.002)	0.002 (0.002)	0.002 (0.002)	0.001 (0.002)
SME*Quality_certification	0.175*** (0.033)	0.161*** (0.046)	0.178*** (0.034)	0.184*** (0.034)	0.130*** (0.036)	0.161*** (0.036)	0.157*** (0.037)	0.164*** (0.034)
SME*Skilled_labor	-0.001 (0.001)	-0.001 (0.001)	-0.001** (0.001)	-0.001** (0.001)	-0.001** (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001* (0.001)
SME*Financial_access		0.000 (0.001)						
SME*Tariffs			-0.023*** (0.006)					
SME*FDI_share				0.001 (0.001)				
SME*Education					0.003*** (0.001)			
SME*Electricity_consumption						0.093*** (0.019)		
SME*Logistics_performance							0.110*** (0.029)	
SME*Governance								-0.011 (0.022)
Constant	-1.337*** (0.188)	-1.063*** (0.239)	-0.899*** (0.137)	-1.107*** (0.128)	-0.938*** (0.169)	-0.800*** (0.170)	-0.966*** (0.149)	-0.655*** (0.125)
LR chi2	4,439.24	1,869.18	4,022.58	4,010.63	3,447.95	3,833.95	3,727.29	3,912.7
Prob > chi2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Country dummy	Yes	Yes	No	No	No	No	No	No
Sector dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

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Table 2.7C *continued*

Asia	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Tobit							
Variables	GVC Index							
Left-censored	13,661	3,943	13,580	13,661	13,198	12,579	12,376	12,933
Right-censored	154	69	151	154	131	149	149	129
Observations	15,773	4,970	15,655	15,773	15,094	14,542	14,272	14,913
Pseudo R2	0.3631	0.3715	0.3341	0.328	0.3115	0.337	0.3368	0.3446

FDI = foreign direct investment, GVC = global value chain, SMEs = small and medium-sized enterprises.
Standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Source: Computed by the authors.

The estimated coefficients of firm age show an interesting pattern. They are positive and statistically significant in the case of GVC participation, but they show negative signs in some estimations in the case of GVC participation index. These somewhat inconsistent results may indicate that old firms have a higher chance of participating in GVCs, as they can overcome obstacles with accumulated business experience, but this experience may not be so important for increasing the level of GVC participation. Indeed, there may be some cases where relatively young firms are more successful in increasing their GVC engagement after they joined GVCs, because they tend to be more aggressive in their business behavior. Government ownership shows expectedly negative signs and they are statistically significant in some cases.

Skilled labor is found unexpectedly to have negative relationships in the case of GVC participation and GVC participation index, although the relationships are not stable or statistically significant. This finding may reflect the strategy of MNCs that they assign unskilled labor-intensive tasks in developing countries in their GVC framework.

Financial access is found to be significantly positive, indicating the importance of financial access in participating in GVCs and increasing the level of participation in GVCs. Because of the limited number of observations, financial access is included in only one model specification. This finding is consistent with our expectation and with the earlier studies.

It should be noted that our regression results do not necessarily indicate a causal relationship between explanatory variables and dependent variables. There is possible two-way causality between dependent variables and some explanatory variables. For example, high labor productivity may be achieved by participating in GVCs, while high

labor productivity enables a firm to participate in GVCs. The problem of two-way causality, or endogeneity, cannot be dealt with appropriately by using cross-country data, which are used in our analysis. Panel data are required to deal with the problem appropriately and an analysis using a panel data set is a future research agenda.

Turning to the results on the country characteristics, we find that all the estimated coefficients are positive and statistically significant except for logistics performance in the case of GVC index. The estimated sign on logistics performance is expectedly positive but not significant. These findings are mostly consistent with those from the earlier studies and confirm the importance of openness to trade and FDI inflows, availability of educated workers, well-developed infrastructure, efficient logistics (except for the case of increasing GVC involvement), and good governance for firms to participate in and increase involvement in GVCs. These findings have important policy implications for the government, which we will discuss in the last section.

We examined whether the effects of explanatory variables on GVC participation are different for SMEs vis-à-vis large firms by introducing SME dummy variables and interacting explanatory variables with them. The results of the estimation for GVC participation and GVC participation index are shown in Tables 2.6B and 2.6C, respectively. The results show that SMEs have a lower probability of GVC participation and a lower level of GVC participation than large firms, as indicated by the negative and statistically significant estimated coefficients on the SME dummy variable. Having high technological capability is more important in participating and increasing the level of GVC participation for SMEs than for large firms. Firm size and foreign ownership tend to be more important for SMEs in participating and increasing participation in GVCs than for large firms. High labor productivity, a long operation period, and government ownership are important for SMEs in increasing the level of GVC participation. Having a high proportion of skilled labor does not contribute much to increasing GVC participation. Indeed, skilled labor is more important for large firms in increasing the level of GVC participation. The result of financial access concerning SMEs is not consistent with our expectation, as the estimated coefficient on the interaction term between financial access and the SME dummy turns out to be negative, albeit insignificant. One possible reason for this may be the inappropriate proxy for financial access. A further investigation is warranted on this issue.

Turning to country-specific attributes, we find that a high level of openness to trade, availability of educated people, good infrastructure, efficient logistics, and good governance have greater impacts on GVC participation and the level of GVC participation for SMEs than for

large firms. We do not find any significant differences in the patterns concerning the impacts of openness to FDI on GVC participation, either in terms of probability or the level, between SMEs and large firms.

The results of the estimation using the data for the firms in Asia are shown in Tables 2.7A, 2.7B, and 2.7C. The results are very similar to those obtained by using the data for all the firms in the world, and thus we only discuss the results that are different from those obtained by using all the firms in the world. Beginning with Table 2.7A, we find the estimated coefficients on firm age become insignificant in the case of GVC index. Government ownership becomes significantly negative for most estimations in the case of GVC participation, indicating that government ownership makes it more difficult for a firm to participate in GVCs in Asia, compared to the case of all firms in the world. Estimated coefficients on education turn out to be significantly negative in the case of GVC participation index, which is inconsistent with our expectation.

As for the results of the estimation using SME dummy variables, we find that for SMEs firm age is not important for increasing the level of GVC participation for Asian SMEs, unlike the case of SMEs across the world.

2.7 Concluding Comments

This chapter attempted to identify the factors related to firm and country characteristics that determine a firm's participation in GVCs and the level of GVC participation. We conducted an econometric analysis by using the data obtained from the World Bank's Enterprise Surveys, which cover 111 countries and 38,966 firms for the 2009–2018 period. Our analysis is performed by using the data for all the firms in the world and those in Asia only.

We found that 8,051 firms, i.e., 20.7% of the entire sample, are GVC firms that are engaged both in importing inputs and exporting, which is the definition of a GVC firm adopted in this study. As regards firm characteristics determining a firm's GVC participation, our investigation shows the importance of high labor productivity, a large firm size, foreign ownership, and high technological capability for a firm to participate in GVCs and to increase the level of engagement in GVC networks. High technological capability is particularly important for SMEs. A large firm size is found to increase the level of GVC participation for SMEs. A long operation period is found to be important for increasing the level of GVC participation for SMEs across the world, but not for SMEs in Asia. For SMEs in Asia, foreign ownership is found to be important for increasing GVC participation. In terms of the attributes of countries, those with a high level of openness to trade and FDI, an abundance of educated

people, well-developed infrastructure, efficient logistics, and good governance are found to make it easier for firms to participate in GVCs and to increase the level of GVC participation. These attributes, except for the openness to FDI, are particularly important for SMEs.

Although there are some differences in the analyses using the data covering all the firms in the world and those covering firms in Asia only, indicating the need to conduct further investigation to identify the differences among the countries, we found a number of important factors in common for a firm to participate in GVCs and to increase the level of GVC participation, as noted above. Based on these findings, we can provide several recommendations for firms and governments in order for a firm to participate in GVCs and to increase GVC participation. For firms, developing and improving technological capability is very important, particularly so for SMEs. Closely related to this point, increasing labor productivity contributes significantly to achieving these two objectives. Attracting foreign investment is also useful, as it brings not only technology but also overseas procurement and sales networks. For governments, we strongly recommend providing and improving education, and building and improving the quality of infrastructure, logistics, and governance. These policies are especially important for SMEs. The importance of providing technical assistance to firms, especially SMEs, should also be noted. In order for the government to achieve these objectives, appropriate policies, which in many cases include difficult policy reform, need to be formulated and implemented with strong political leadership and determination, as well as appropriate international cooperation with international organizations and foreign donors. We should also add the importance of achieving and maintaining an open trade and FDI environment for firms to participate in GVCs and to increase the level of GVC participation. Unilateral trade and FDI liberalization, as well as joining bilateral and multilateral free trade agreements, would be very effective for achieving these objectives.

Finally, we would like to point out the study's shortcomings, which would lead to a possible future research agenda. We analyzed the data covering 111 countries in order to grasp a broad picture of GVC participation in the world, and thus we did not give attention to the issues related to specific countries. As such, this study should be complemented by country studies. Another drawback, which is due to the shortage of data, is the inability to examine the causal relationship between firm attributes and GVC participation. One example is the relationship between labor productivity and GVC participation, whose causal relationship could go both ways. To overcome this drawback, we need to undertake a panel data analysis, for which appropriate data are required.

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Appendix

Appendix Table A2.1: Sample Countries and Areas and Number of Sample Firms

No	Country/Area	Region	Year	2009	2010	2011	2012	2013
			Subregion\Total	2,308	4,867	1,186	2,915	11,251
1	Afghanistan	Asia	Southern Asia					
2	Albania	Europe	Southern Europe					95
3	Angola	Africa	Sub-Saharan Africa		80			
4	Argentina	Americas	Latin America and the Caribbean		689			
5	Armenia	Asia	Western Asia					111
6	Azerbaijan	Asia	Western Asia					119
7	Bangladesh	Asia	Southern Asia					1,177
8	Belarus	Europe	Eastern Europe					
9	Bosnia and Herzegovina	Europe	Southern Europe					109
10	Botswana	Africa	Sub-Saharan Africa		62			
11	Brazil	Americas	Latin America and the Caribbean	1,301				
12	Bulgaria	Europe	Eastern Europe					101
13	Burkina Faso	Africa	Sub-Saharan Africa	67				
14	Burundi	Africa	Sub-Saharan Africa					
15	Cambodia	Asia	Southeastern Asia					
16	Cameroon	Africa	Sub-Saharan Africa					
17	Chad	Africa	Sub-Saharan Africa					
18	Chile	Americas	Latin America and the Caribbean		683			
19	Colombia	Americas	Latin America and the Caribbean		640			
20	Costa Rica	Americas	Latin America and the Caribbean		257			
21	Côte d'Ivoire	Africa	Sub-Saharan Africa	120				
22	Croatia	Europe	Southern Europe					111
23	Czechia	Europe	Eastern Europe					96
24	Democratic Republic of the Congo	Africa	Sub-Saharan Africa					238
25	Djibouti	Africa	Sub-Saharan Africa					47
26	Dominican Republic	Americas	Latin America and the Caribbean					

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Table A2.1 *continued*

No	Country/Area	Region	Year	2009	2010	2011	2012	2013
			Subregion\Total	2,308	4,867	1,186	2,915	11,251
27	Ecuador	Americas	Latin America and the Caribbean					
28	Egypt	Africa	Northern Africa					1,806
29	El Salvador	Americas	Latin America and the Caribbean					
30	Estonia	Europe	Northern Europe					77
31	Eswatini	Africa	Sub-Saharan Africa					
32	Ethiopia	Africa	Sub-Saharan Africa					
33	Gabon	Africa	Sub-Saharan Africa	23				
34	Gambia	Africa	Sub-Saharan Africa					
35	Georgia	Asia	Western Asia					101
36	Ghana	Africa	Sub-Saharan Africa					369
37	Greece	Europe	Southern Europe					
38	Guatemala	Americas	Latin America and the Caribbean		289			
39	Guinea	Africa	Sub-Saharan Africa					
40	Honduras	Americas	Latin America and the Caribbean					
41	Hungary	Europe	Eastern Europe					91
42	India	Asia	Southern Asia					
43	Indonesia	Asia	Southeastern Asia					
44	Iraq	Asia	Western Asia			470		
45	Israel	Asia	Western Asia					169
46	Jamaica	Americas	Latin America and the Caribbean		70			
47	Jordan	Asia	Western Asia					182
48	Kazakhstan	Asia	Central Asia					189
49	Kenya	Africa	Sub-Saharan Africa					
50	Kyrgyz Republic	Asia	Central Asia					101
51	Lao People's Democratic Republic (Lao PDR)	Asia	Southeastern Asia					
52	Latvia	Europe	Northern Europe					101
53	Lebanon	Asia	Western Asia					203
54	Lesotho	Africa	Sub-Saharan Africa					
55	Liberia	Africa	Sub-Saharan Africa					
56	Lithuania	Europe	Northern Europe					94

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Table A2.1 continued

No	Country/Area	Region	Year	2009	2010	2011	2012	2013
			Subregion\Total	2,308	4,867	1,186	2,915	11,251
57	Malawi	Africa	Sub-Saharan Africa					
58	Malaysia	Asia	Southeastern Asia					
59	Mali	Africa	Sub-Saharan Africa					
60	Mauritania	Africa	Sub-Saharan Africa					
61	Mauritius	Africa	Sub-Saharan Africa	128				
62	Mexico	Americas	Latin America and the Caribbean		967			
63	Moldova	Europe	Eastern Europe					101
64	Mongolia	Asia	Eastern Asia					120
65	Montenegro	Europe	Southern Europe					43
66	Morocco	Africa	Northern Africa					104
67	Mozambique	Africa	Sub-Saharan Africa					
68	Myanmar	Asia	Southeastern Asia					
69	Namibia	Africa	Sub-Saharan Africa					
70	Nepal	Asia	Southern Asia					243
71	Nicaragua	Americas	Latin America and the Caribbean					
72	Nigeria	Africa	Sub-Saharan Africa					
73	North Macedonia	Europe	Southern Europe					112
74	Pakistan	Asia	Southern Asia					799
75	Palestine	Asia	Western Asia					149
76	Panama	Americas	Latin America and the Caribbean		101			
77	Papua New Guinea	Oceania	Melanesia					
78	Paraguay	Americas	Latin America and the Caribbean					
79	People's Republic of China (PRC)	Asia	Eastern Asia				1,676	
80	Peru	Americas	Latin America and the Caribbean		668			
81	Philippines	Asia	Southeastern Asia					
82	Plurinational State of Bolivia	Americas	Latin America and the Caribbean					
83	Poland	Europe	Eastern Europe					155
84	Republic of Kosovo	Europe	Southern Europe					67

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Table A2.1 *continued*

No	Country/Area	Region	Year	2009	2010	2011	2012	2013
			Subregion\Total	2,308	4,867	1,186	2,915	11,251
85	Romania	Europe	Eastern Europe					169
86	Russian Federation	Europe	Eastern Europe				1,239	
87	Serbia	Europe	Southern Europe					106
88	Sierra Leone	Africa	Sub-Saharan Africa					
89	Slovakia	Europe	Eastern Europe					90
90	Slovenia	Europe	Southern Europe					82
91	Solomon Islands	Oceania	Melanesia					
92	South Sudan	Africa	Sub-Saharan Africa					
93	Sri Lanka	Asia	Southern Asia			359		
94	Sudan	Africa	Northern Africa					
95	Sweden	Europe	Northern Europe					
96	Tajikistan	Asia	Central Asia					112
97	Tanzania	Africa	Sub-Saharan Africa					335
98	Thailand	Asia	Southeastern Asia					
99	Timor-Leste	Asia	Southeastern Asia					
100	Togo	Africa	Sub-Saharan Africa					
101	Trinidad and Tobago	Americas	Latin America and the Caribbean		81			
102	Tunisia	Africa	Northern Africa					213
103	Turkey	Asia	Western Asia					1,027
104	Uganda	Africa	Sub-Saharan Africa					366
105	Ukraine	Europe	Eastern Europe					691
106	Uzbekistan	Asia	Central Asia					127
107	Venezuela	Americas	Latin America and the Caribbean		68			
108	Viet Nam	Asia	Southeastern Asia	669				
109	Yemen	Asia	Western Asia		212			
110	Zambia	Africa	Sub-Saharan Africa					353
111	Zimbabwe	Africa	Sub-Saharan Africa			357		

No	Country/Area	Region	Year	2014	2015	2016	2017	2018
			Subregion\Total	8,963	3,040	2,306	488	1,642
1	Afghanistan	Asia	Southern Asia	131				
2	Albania	Europe	Southern Europe					
3	Angola	Africa	Sub-Saharan Africa					

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Table A2.1 continued

No	Country/Area	Region	Year	2014	2015	2016	2017	2018
			Subregion\Total	8,963	3,040	2,306	488	1,642
4	Argentina	Americas	Latin America and the Caribbean					
5	Armenia	Asia	Western Asia					
6	Azerbaijan	Asia	Western Asia					
7	Bangladesh	Asia	Southern Asia					
8	Belarus	Europe	Eastern Europe					318
9	Bosnia and Herzegovina	Europe	Southern Europe					
10	Botswana	Africa	Sub-Saharan Africa					
11	Brazil	Americas	Latin America and the Caribbean					
12	Bulgaria	Europe	Eastern Europe					
13	Burkina Faso	Africa	Sub-Saharan Africa					
14	Burundi	Africa	Sub-Saharan Africa	60				
15	Cambodia	Asia	Southeastern Asia			127		
16	Cameroon	Africa	Sub-Saharan Africa			98		
17	Chad	Africa	Sub-Saharan Africa					68
18	Chile	Americas	Latin America and the Caribbean					
19	Colombia	Americas	Latin America and the Caribbean					
20	Costa Rica	Americas	Latin America and the Caribbean					
21	Côte d'Ivoire	Africa	Sub-Saharan Africa					
22	Croatia	Europe	Southern Europe					
23	Czechia	Europe	Eastern Europe					
24	Democratic Republic of the Congo	Africa	Sub-Saharan Africa					
25	Djibouti	Africa	Sub-Saharan Africa					
26	Dominican Republic	Americas	Latin America and the Caribbean			109		
27	Ecuador	Americas	Latin America and the Caribbean				102	
28	Egypt	Africa	Northern Africa					
29	El Salvador	Americas	Latin America and the Caribbean			403		
30	Estonia	Europe	Northern Europe					

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Table A2.1 *continued*

No	Country/Area	Region	Year	2014	2015	2016	2017	2018
			Subregion\Total	8,963	3,040	2,306	488	1,642
31	Eswatini	Africa	Sub-Saharan Africa			57		
32	Ethiopia	Africa	Sub-Saharan Africa		359			
33	Gabon	Africa	Sub-Saharan Africa					
34	Gambia	Africa	Sub-Saharan Africa					76
35	Georgia	Asia	Western Asia					
36	Ghana	Africa	Sub-Saharan Africa					
37	Greece	Europe	Southern Europe					308
38	Guatemala	Americas	Latin America and the Caribbean					
39	Guinea	Africa	Sub-Saharan Africa			24		
40	Honduras	Americas	Latin America and the Caribbean			91		
41	Hungary	Europe	Eastern Europe					
42	India	Asia	Southern Asia	7,144				
43	Indonesia	Asia	Southeastern Asia		1,047			
44	Iraq	Asia	Western Asia					
45	Israel	Asia	Western Asia					
46	Jamaica	Americas	Latin America and the Caribbean					
47	Jordan	Asia	Western Asia					
48	Kazakhstan	Asia	Central Asia					
49	Kenya	Africa	Sub-Saharan Africa					447
50	Kyrgyz Republic	Asia	Central Asia					
51	Lao People's Democratic Republic (Lao PDR)	Asia	Southeastern Asia					142
52	Latvia	Europe	Northern Europe					
53	Lebanon	Asia	Western Asia					
54	Lesotho	Africa	Sub-Saharan Africa			75		
55	Liberia	Africa	Sub-Saharan Africa				74	
56	Lithuania	Europe	Northern Europe					
57	Malawi	Africa	Sub-Saharan Africa	134				
58	Malaysia	Asia	Southeastern Asia		541			
59	Mali	Africa	Sub-Saharan Africa			99		
60	Mauritania	Africa	Sub-Saharan Africa	46				
61	Mauritius	Africa	Sub-Saharan Africa					

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Table A2.1 continued

No	Country/Area	Region	Year	2014	2015	2016	2017	2018
			Subregion\Total	8,963	3,040	2,306	488	1,642
62	Mexico	Americas	Latin America and the Caribbean					
63	Moldova	Europe	Eastern Europe					
64	Mongolia	Asia	Eastern Asia					
65	Montenegro	Europe	Southern Europe					
66	Morocco	Africa	Northern Africa					
67	Mozambique	Africa	Sub-Saharan Africa					283
68	Myanmar	Asia	Southeastern Asia			354		
69	Namibia	Africa	Sub-Saharan Africa	134				
70	Nepal	Asia	Southern Asia					
71	Nicaragua	Americas	Latin America and the Caribbean			110		
72	Nigeria	Africa	Sub-Saharan Africa	820				
73	North Macedonia	Europe	Southern Europe					
74	Pakistan	Asia	Southern Asia					
75	Palestine	Asia	Western Asia					
76	Panama	Americas	Latin America and the Caribbean					
77	Papua New Guinea	Oceania	Melanesia		23			
78	Paraguay	Americas	Latin America and the Caribbean				117	
79	People's Republic of China (PRC)	Asia	Eastern Asia					
80	Peru	Americas	Latin America and the Caribbean					
81	Philippines	Asia	Southeastern Asia		976			
82	Plurinational State of Bolivia	Americas	Latin America and the Caribbean				118	
83	Poland	Europe	Eastern Europe					
84	Republic of Kosovo	Europe	Southern Europe					
85	Romania	Europe	Eastern Europe					
86	Russian Federation	Europe	Eastern Europe					
87	Serbia	Europe	Southern Europe					
88	Sierra Leone	Africa	Sub-Saharan Africa				77	

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Table A2.1 *continued*

No	Country/Area	Region	Year	2014	2015	2016	2017	2018
			Subregion\Total	8,963	3,040	2,306	488	1,642
89	Slovakia	Europe	Eastern Europe					
90	Slovenia	Europe	Southern Europe					
91	Solomon Islands	Oceania	Melanesia		38			
92	South Sudan	Africa	Sub-Saharan Africa	88				
93	Sri Lanka	Asia	Southern Asia					
94	Sudan	Africa	Northern Africa	83				
95	Sweden	Europe	Northern Europe	323				
96	Tajikistan	Asia	Central Asia					
97	Tanzania	Africa	Sub-Saharan Africa					
98	Thailand	Asia	Southeastern Asia			715		
99	Timor-Leste	Asia	Southeastern Asia		56			
100	Togo	Africa	Sub-Saharan Africa			44		
101	Trinidad and Tobago	Americas	Latin America and the Caribbean					
102	Tunisia	Africa	Northern Africa					
103	Turkey	Asia	Western Asia					
104	Uganda	Africa	Sub-Saharan Africa					
105	Ukraine	Europe	Eastern Europe					
106	Uzbekistan	Asia	Central Asia					
107	Venezuela	Americas	Latin America and the Caribbean					
108	Viet Nam	Asia	Southeastern Asia					
109	Yemen	Asia	Western Asia					
110	Zambia	Africa	Sub-Saharan Africa					
111	Zimbabwe	Africa	Sub-Saharan Africa					

Source: World Bank, Enterprise Surveys.

Appendix Table A2.2: Patterns of Sales and Procurements for the Sample Firms

		1	2	3	4	5	6	7	8	9	10
Sales	Domestic	o	o	x	x	x	o	o	o	x	x
	Direct exports	x	x	o	o	x	o	o	x	o	o
	Indirect exports	x	x	x	o	o	x	o	o	x	o
Inputs	Domestic inputs	o	o	o	o	o	o	o	o	o	o
	Imports	x	o	x	x	x	x	x	x	o	o
Firm size (number of employees)	1–4	329	155	4	0	4	5	2	5	0	0
	5–19	8,203	4,000	81	17	98	246	68	220	64	22
	20–99	6,738	3,631	158	36	87	691	153	348	221	50
	100–199	1,334	843	94	8	22	317	70	104	165	33
	200+	1,139	869	119	20	16	482	90	109	429	54
Total		17,743	9,498	456	81	227	1,741	383	786	879	159
Firm size (number of employees)	1–4	1.9	1.6	0.9	0.0	1.8	0.3	0.5	0.6	0.0	0.0
	5–19	46.2	42.1	17.8	21.0	43.2	14.1	17.8	28.0	7.3	13.8
	20–99	38.0	38.2	34.6	44.4	38.3	39.7	39.9	44.3	25.1	31.4
	100–199	7.5	8.9	20.6	9.9	9.7	18.2	18.3	13.2	18.8	20.8
	200+	6.4	9.1	26.1	24.7	7.0	27.7	23.5	13.9	48.8	34.0
Total		100	100	100	100	100	100	100	100	100	100
Firm size (number of employees)	1–4	61.5	29.0	0.7	0.0	0.7	0.9	0.4	0.9	0.0	0.0
	5–19	57.7	28.2	0.6	0.1	0.7	1.7	0.5	1.5	0.5	0.2
	20–99	46.2	24.9	1.1	0.2	0.6	4.7	1.0	2.4	1.5	0.3
	100–199	31.7	20.0	2.2	0.2	0.5	7.5	1.7	2.5	3.9	0.8
	200+	21.0	16.0	2.2	0.4	0.3	8.9	1.7	2.0	7.9	1.0
Total		45.5	24.4	1.2	0.2	0.6	4.5	1.0	2.0	2.3	0.4
		11	12	13	14	15	16	GVC	Non-GVC	Total	
Sales	Domestic	x	o	o	o	x	x				
	Direct exports	x	o	o	x	x	x				
	Indirect exports	o	x	o	o	x	x				
Inputs	Domestic inputs	o	o	o	o	o	o				
	Imports	o	o	o	o	o	x				

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Table A2.2 *continued*

		11	12	13	14	15	16	GVC	Non-GVC	Total
Firm size (number of employees)	1–4	1	17	2	11	0	0	31	504	535
	5–19	56	533	220	377	0	0	1,272	12,933	14,205
	20–99	90	1,396	431	564	0	0	2,752	11,842	14,594
	100–199	35	791	225	171	0	0	1,420	2,792	4,212
	200+	69	1,445	331	248	0	0	2,576	2,844	5,420
Total		251	4,182	1,209	1,371	0	0	8,051	30,915	38,966
Firm size (number of employees)	1–4	0.4	0.4	0.2	0.8	–	–	0.4	1.6	1.4
	5–19	22.3	12.7	18.2	27.5	–	–	15.8	41.8	36.5
	20–99	35.9	33.4	35.6	41.1	–	–	34.2	38.3	37.5
	100–199	13.9	18.9	18.6	12.5	–	–	17.6	9.0	10.8
	200+	27.5	34.6	27.4	18.1	–	–	32.0	9.2	13.9
Total		100	100	100	100	–	–	100	100	100
Firm size (number of employees)	1–4	0.2	3.2	0.4	2.1	0.0	0.0	5.8	94.2	100
	5–19	0.4	3.8	1.5	2.7	0.0	0.0	9.0	91.0	100
	20–99	0.6	9.6	3.0	3.9	0.0	0.0	18.9	81.1	100
	100–199	0.8	18.8	5.3	4.1	0.0	0.0	33.7	66.3	100
	200+	1.3	26.7	6.1	4.6	0.0	0.0	47.5	52.5	100
Total		0.6	10.7	3.1	3.5	0.0	0.0	20.7	79.3	100

Source: World Bank, Enterprise Surveys.

Appendix Table A2.3: Basic Statistics

	Variable	Definition of Variables	Observations	Mean	Std. Dev.
Firm level	GVC_participation	GVC participation dummy, see the main text for the definition	38,966	0.207	0.405
	GVC_index	GVC index, see footnote 7 for the definition	38,966	0.053	0.169
	Labor_productivity	Logarithm of labor productivity based on value added	32,358	8.689	2.119
	Firm_size	Logarithm of total employees	38,850	3.582	1.422
	Firm_age	Number of years in operation	38,564	25.409	16.702
	Foreign_ownership	The share of equity owned by foreign firm (%)	37,855	7.152	23.789
	Government_ownership	The share of equity owned by government (%)	37,867	0.752	6.998
	Quality_certification	Ownership of internationally recognized quality certification	38,476	0.317	0.465
	Skilled_labor	Proportion of skilled labor to total labor	35,242	63.059	24.824
	Financial_access	Proportion of external funds to purchase fixed assets	15,336	29.355	39.002
Country level	Tariffs	Simple average tariff rates (nonagricultural products, MFN applied)	105	8.340	4.330
	FDI_share	Foreign Direct Investment share (inward FDI stock as % of GDP)	109	44.731	44.208

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Table A2.3 continued

	Variable	Definition of Variables	Observations	Mean	Std. Dev.
	Education	Gross enrollment ratio for secondary school (%)	103	73.918	26.738
	Electricity_consumption	Logarithm of electric power consumption (kWh per capita)	83	7.251	1.226
	Logistics_performance	Logistics performance index Quality of trade and transport-related infrastructure (1=low to 5=high)	89	2.461	0.565
	Governance	1st principal component of six political risks (Voice and Accountability, Political Stability and Absence of Violence, Government Effectiveness, Regulatory Quality, Rule of Law, Control of Corruption)	86	-0.252	0.736

	Variable	Definition of Variables	Min	Max	Data Source
Firm level	GVC_participation	GVC participation dummy, see the main text for the definition	0	1	Enterprise Surveys
	GVC_index	GVC index, see footnote 7 for the definition	0	1	
	Labor_productivity	Logarithm of labor productivity based on value added	-4.160	20.581	
	Firm_size	Logarithm of total employees	0	10.309	
	Firm_age	Number of years in operation	0	218	

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Table A2.3 continued

	Variable	Definition of Variables	Min	Max	Data Source
	Foreign_ownership	The share of equity owned by foreign firm (%)	0	100	
	Government_ownership	The share of equity owned by government (%)	0	99	
	Quality_certification	Ownership of internationally recognized quality certification	0	1	
	Skilled_labor	Proportion of skilled labor to total labor	0	100	
	Financial_access	Proportion of external funds to purchase fixed assets	0	100	
Country level	Tariffs	Simple average tariff rates (nonagricultural products, MFN applied)	0.7	22	World Tariff Profiles (World Trade Organization)
	FDI_share	Foreign Direct Investment share (inward FDI stock as % of GDP)	2.992	310.599	United Nations Conference on Trade and Development (UNCTAD)
	Education	Gross enrollment ratio for secondary school (%)	11	133	World Development Indicators (World Bank)
	Electricity_consumption	Logarithm of electric power consumption (kWh per capita)	3.784	9.509	
	Logistics_performance	Logistics performance index Quality of trade and transport-related infrastructure (1=low to 5=high)	2	4	

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Table A2.3 continued

	Variable	Definition of Variables	Min	Max	Data Source
	Governance	1st principal component of six political risks (Voice and Accountability, Political Stability and Absence of Violence, Government Effectiveness, Regulatory Quality, Rule of Law, Control of Corruption)	-1.955	1.641	Political Risk Services International Country Risk Guide (PRS)

FDI = foreign direct investment, GDP = gross domestic product, GVC = global value chain, MFN = most favored nation.

Sources: World Bank, Enterprise Surveys, World Trade Organization, United Nations Conference on Trade and Development, World Development Indicators, Political Risk Services International Country Risk Guide.

Appendix Table A2.4A: Correlation Coefficients
for Firm-Level Variables

	Labor _productivity	Firm_size	Firm_age	Foreign _ownership
Labor_productivity	1			
Firm_size	0.131	1		
Firm_age	0.129	0.286	1	
Foreign_ownership	0.167	0.210	0.052	1
Government_ownership	-0.006	0.134	0.086	-0.012
Quality_certification	0.193	0.431	0.168	0.121
Skilled_labor	-0.077	-0.038	-0.039	0.003
Financial_access	0.013	0.045	0.073	-0.060
	Government _ownership	Quality _certification	Skilled _labor	Financial _access
Labor_productivity				
Firm_size				
Firm_age				
Foreign_ownership				
Government_ownership	1			
Quality_certification	0.066	1		
Skilled_labor	0.045	-0.019	1	
Financial_access	0.007	-0.015	-0.049	1

Source: Computed by the authors.

Appendix Table A2.4B: Correlation Coefficients
for Country-Level Variables

	Tariffs	FDI_share	Education	Electricity _consumption	Logistics _performance	Governance
Tariffs	1					
FDI_share	−0.231	1				
Education	−0.508	−0.015	1			
Electricity_ consumption	−0.559	0.158	0.845	1		
Logistics_ performance	−0.305	−0.054	0.475	0.425	1	
Governance	−0.454	0.018	0.564	0.533	0.489	1

FDI = foreign direct investment.
Source: Computed by the authors.

Appendix Table A2.5A: Results of Heckman
Sample Selection Model for All Firms

	(1)		(2)		(3)		(4)	
World	Heckman Sample Selection Model							
Variables	GVC Index	Selection	GVC Index	Selection	GVC Index	Selection	GVC Index	Selection
Application_ importpermit		0.620*** (0.030)		0.478*** (0.040)		0.667*** (0.028)		0.651*** (0.028)
Labor_ productivity	-0.005** (0.002)	0.050*** (0.006)	-0.003 (0.003)	0.053*** (0.009)	-0.005*** (0.002)	0.049*** (0.005)	-0.003* (0.002)	0.060*** (0.005)
Firm_size	0.021*** (0.004)	0.336*** (0.009)	0.020*** (0.005)	0.322*** (0.013)	0.020*** (0.004)	0.279*** (0.008)	0.017*** (0.004)	0.264*** (0.008)
Firm_age	-0.001*** (0.000)	0.001 (0.001)	-0.001*** (0.000)	0.002* (0.001)	-0.001*** (0.000)	0.004*** (0.001)	-0.001*** (0.000)	0.004*** (0.001)
Foreign_ ownership	0.001*** (0.000)	0.008*** (0.000)	0.001*** (0.000)	0.008*** (0.001)	0.002*** (0.000)	0.009*** (0.000)	0.002*** (0.000)	0.009*** (0.000)
Government_ ownership	-0.001*** (0.000)	-0.003** (0.001)	-0.001*** (0.000)	-0.001 (0.002)	-0.001* (0.000)	-0.001 (0.001)	-0.001 (0.000)	0.000 (0.001)
Quality_ certification	0.005 (0.008)	0.386*** (0.025)	0.002 (0.011)	0.412*** (0.037)	-0.025*** (0.008)	0.310*** (0.023)	-0.019** (0.009)	0.356*** (0.023)
Skilled_labor	0.000* (0.000)	-0.000 (0.000)	0.000 (0.000)	0.001 (0.001)	0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)
Financial_ access			-0.000 (0.000)	0.001** (0.000)				
Tariffs					-0.008*** (0.001)	-0.061*** (0.003)		
FDI_share							0.001*** (0.000)	0.003*** (0.000)
Education								
Electricity_ consumption								
Logistics_ performance								
Governance								
inverse Mills ratio	0.026 (0.016)		0.019 (0.024)		0.019 (0.017)		0.016 (0.017)	

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Table A2.5A continued

	(1)		(2)		(3)		(4)	
World	Heckman Sample Selection Model							
Variables	GVC Index	Selection	GVC Index	Selection	GVC Index	Selection	GVC Index	Selection
Constant	−0.036 (0.146)	−4.068*** (0.334)	0.010 (0.177)	−4.018*** (0.460)	0.188*** (0.049)	−2.398*** (0.085)	0.078 (0.057)	−3.194*** (0.079)
Country dummy	Yes	Yes	Yes	Yes	No	No	No	No
Sector dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Wald chi2	3,038.84		1,939.6		1,855.73		1,860.17	
Prob > chi2	0.000		0.000		0.000		0.000	
Observations	28,559	28,559	11,232	11,232	28,315	28,315	28,434	28,434
Selected obs.	5,942		3,453		5,877		5,923	
Nonselected obs.	22,617		7,779		22,438		22,511	
World	(5)		(6)		(7)		(8)	
	Heckman Sample Selection Model							
Variables	GVC Index	Selection	GVC Index	Selection	GVC Index	Selection	GVC Index	Selection
Application_ importpermit		0.705*** (0.029)		0.647*** (0.030)		0.641*** (0.030)		0.669*** (0.029)
Labor_ productivity	−0.001 (0.002)	0.074*** (0.006)	−0.001 (0.002)	0.039*** (0.005)	−0.001 (0.002)	0.057*** (0.005)	−0.002 (0.002)	0.056*** (0.005)
Firm_size	0.014*** (0.004)	0.256*** (0.008)	0.015*** (0.004)	0.279*** (0.008)	0.013*** (0.004)	0.270*** (0.008)	0.013*** (0.004)	0.266*** (0.008)
Firm_age	−0.001*** (0.000)	0.004*** (0.001)	−0.001*** (0.000)	0.003*** (0.001)	−0.001*** (0.000)	0.004*** (0.001)	−0.001*** (0.000)	0.004*** (0.001)
Foreign_ ownership	0.002*** (0.000)	0.009*** (0.000)	0.002*** (0.000)	0.009*** (0.000)	0.002*** (0.000)	0.009*** (0.000)	0.002*** (0.000)	0.009*** (0.000)
Government_ ownership	−0.001 (0.000)	−0.001 (0.001)	−0.001 (0.000)	−0.001 (0.001)	−0.001 (0.000)	−0.001 (0.001)	−0.001 (0.000)	0.001 (0.001)
Quality_ certification	−0.026*** (0.009)	0.298*** (0.024)	−0.014 (0.009)	0.322*** (0.024)	−0.014 (0.009)	0.311*** (0.024)	−0.015* (0.009)	0.338*** (0.024)
Skilled_labor	−0.000 (0.000)	−0.000 (0.000)	0.000 (0.000)	−0.000 (0.000)	0.000 (0.000)	−0.000 (0.000)	0.000 (0.000)	−0.000 (0.000)
Financial_ access								

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Table A2.5A continued

World	(5)		(6)		(7)		(8)	
Variables	Heckman Sample Selection Model							
	GVC Index	Selection	GVC Index	Selection	GVC Index	Selection	GVC Index	Selection
Tariffs								
FDI_share								
Education	0.000 (0.000)	0.007*** (0.001)						
Electricity_consumption			-0.002 (0.004)	0.225*** (0.012)				
Logistics_performance					-0.034*** (0.007)	0.086*** (0.021)		
Governance							-0.006 (0.007)	0.120*** (0.020)
inverse Mills ratio	0.014 (0.016)		0.018 (0.018)		0.006 (0.018)		0.007 (0.017)	
Constant	0.002 (0.064)	-3.960*** (0.100)	0.096 (0.077)	-4.583*** (0.113)	0.211*** (0.064)	-3.294*** (0.098)	0.118** (0.056)	-3.059*** (0.084)
Country dummy	No	No	No	No	No	No	No	No
Sector dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Wald chi2	1,643.23		1,841.27		1,729.41		1,602.02	
Prob > chi2	0.000		0.000		0.000		0.000	
Observations	27,035	27,035	26,382	26,382	25,751	25,751	26,750	26,750
Selected obs.	5,568		5,555		5,301		5,543	
Nonselected obs.	21,467		20,827		20,450		21,207	

FDI = foreign direct investment, GVC = global value chain.
Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

Appendix Table A2.5B: Results of Heckman Sample Selection Model for All Firms in Asia

Asia	(1)		(2)		(3)		(4)	
Variables	Heckman Sample Selection Model							
	GVC Index	Selection	GVC Index	Selection	GVC Index	Selection	GVC Index	Selection
Application_importpermit		0.868*** (0.046)		0.751*** (0.068)		0.876*** (0.045)		0.883*** (0.044)
Labor_productivity	−0.004 (0.003)	0.048*** (0.009)	−0.005 (0.005)	0.058*** (0.015)	−0.001 (0.003)	0.049*** (0.009)	−0.002 (0.003)	0.060*** (0.008)
Firm_size	0.011 (0.006)	0.326*** (0.013)	0.005 (0.009)	0.315*** (0.021)	0.010 (0.007)	0.318*** (0.013)	0.015** (0.006)	0.304*** (0.012)
Firm_age	−0.002*** (0.000)	0.002* (0.001)	−0.002*** (0.001)	0.004** (0.002)	−0.002*** (0.000)	0.002** (0.001)	−0.002*** (0.000)	0.002** (0.001)
Foreign_ownership	0.002*** (0.000)	0.011*** (0.001)	0.002*** (0.000)	0.011*** (0.001)	0.002*** (0.000)	0.011*** (0.001)	0.002*** (0.000)	0.011*** (0.001)
Government_ownership	−0.000 (0.001)	−0.004* (0.002)	−0.000 (0.001)	−0.002 (0.004)	−0.001 (0.001)	−0.005** (0.002)	−0.001 (0.001)	−0.006** (0.002)
Quality_certification	−0.018 (0.015)	0.336*** (0.038)	−0.036 (0.022)	0.363*** (0.062)	−0.052*** (0.015)	0.326*** (0.037)	−0.058*** (0.016)	0.358*** (0.037)
Skilled_labor	0.000 (0.000)	−0.000 (0.001)	−0.000 (0.000)	0.000 (0.001)	−0.000* (0.000)	−0.000 (0.001)	−0.000 (0.000)	−0.000 (0.001)
Financial_access			0.000 (0.000)	0.001* (0.001)				
Tariffs					0.009*** (0.003)	−0.061*** (0.007)		
FDI_share							0.000 (0.000)	0.006*** (0.001)
Education								
Electricity_consumption								
Logistics_performance								
Governance								
inverse Mills ratio	−0.003 (0.022)		−0.048 (0.035)		−0.007 (0.023)		0.000 (0.022)	

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Table A2.5B continued

Asia	(1)		(2)		(3)		(4)	
Variables	Heckman Sample Selection Model							
	GVC Index	Selection	GVC Index	Selection	GVC Index	Selection	GVC Index	Selection
Constant	0.106 (0.168)	−4.050*** (0.349)	0.310 (0.221)	−4.055*** (0.482)	0.206*** (0.075)	−2.380*** (0.143)	0.260*** (0.085)	−3.287*** (0.132)
Country dummy	Yes	Yes	Yes	Yes	No	No	No	No
Sector dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Wald chi2	1,029.88		559.37		666.21		636.12	
Prob > chi2	0.000		0.000		0.000		0.000	
Observations	15,773	15,773	4,970	4,970	15,655	15,655	15,773	15,773
Selected obs.	2,112		1,027		2,075		2,112	
Nonselected obs.	13,661		3,943		13,580		13,661	

Asia	(5)		(6)		(7)		(8)	
Variables	Heckman Sample Selection Model							
	GVC Index	Selection	GVC Index	Selection	GVC Index	Selection	GVC Index	Selection
Application_ importpermit		0.951*** (0.046)		0.853*** (0.047)		0.864*** (0.048)		0.915*** (0.046)
Labor_ productivity	0.002 (0.003)	0.066*** (0.009)	0.006* (0.003)	0.050*** (0.009)	0.005 (0.004)	0.048*** (0.009)	−0.006* (0.003)	0.062*** (0.009)
Firm_ size	0.007 (0.006)	0.296*** (0.013)	0.010 (0.007)	0.318*** (0.013)	0.006 (0.007)	0.318*** (0.013)	0.011* (0.006)	0.316*** (0.013)
Firm_ age	−0.002*** (0.000)	0.002** (0.001)	−0.002*** (0.000)	0.002** (0.001)	−0.002*** (0.000)	0.002 (0.001)	−0.002*** (0.000)	0.002 (0.001)
Foreign_ ownership	0.003*** (0.000)	0.011*** (0.001)	0.002*** (0.000)	0.010*** (0.001)	0.002*** (0.000)	0.010*** (0.001)	0.002*** (0.000)	0.011*** (0.001)
Government_ ownership	−0.001 (0.001)	−0.009*** (0.003)	−0.001 (0.001)	−0.006*** (0.002)	−0.001 (0.001)	−0.005** (0.002)	−0.001 (0.001)	−0.004 (0.002)
Quality_ certification	−0.056*** (0.016)	0.338*** (0.038)	−0.032** (0.016)	0.326*** (0.039)	−0.035** (0.016)	0.307*** (0.039)	−0.045*** (0.016)	0.335*** (0.039)
Skilled_ labor	−0.001* (0.000)	−0.001 (0.001)	−0.000 (0.000)	−0.001 (0.001)	−0.000 (0.000)	−0.001 (0.001)	−0.000 (0.000)	−0.001 (0.001)

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Table A2.5B continued

Asia	(5)		(6)		(7)		(8)	
	Heckman Sample Selection Model							
Variables	GVC Index	Selection	GVC Index	Selection	GVC Index	Selection	GVC Index	Selection
Financial_ access								
Tariffs								
FDI_share								
Education	-0.003*** (0.000)	0.000 (0.001)						
Electricity_ consumption			-0.083*** (0.009)	0.190*** (0.023)				
Logistics_ performance					-0.100*** (0.014)	0.218*** (0.038)		
Governance							0.011 (0.020)	0.472*** (0.056)
inverse Mills ratio	-0.017 (0.022)		-0.006 (0.024)		-0.021 (0.024)		-0.004 (0.022)	
Constant	0.371*** (0.117)	-3.379*** (0.226)	0.801*** (0.115)	-4.220*** (0.201)	0.554*** (0.102)	-3.496*** (0.166)	0.323*** (0.076)	-2.442*** (0.148)
Country dummy	No	No	No	No	No	No	No	No
Sector dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Wald chi2	598.02		768.31		672.13		564.36	
Prob > chi2	0.000		0.000		0.000		0.000	
Observations	15,094	15,094	14,542	14,542	14,272	14,272	14,913	14,913
Selected obs.	1,896		1,963		1,896		1,980	
Nonselected obs.	13,198		12,579		12,376		12,933	

FDI = foreign direct investment, GVC = global value chain.
Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

3

What Matters for the Global Value Chain Entry and Exit of Manufacturing SMEs in the Philippines?

*Adrian R. Mendoza**

3.1 Introduction

Since the 1980s, international trade has been increasingly organized inside global value chains (GVCs), where fragmented production activities are carried out by firms in scattered locations. This international unbundling of production has opened up various opportunities not only for large multinational corporations (MNCs) but also for small and medium-sized enterprises (SMEs) in developing countries. There are several ways through which GVCs have facilitated the foreign market entry of SMEs. The disintegration of production into geographically dispersed activities has allowed input manufacturers to specialize in stages where entry barriers are not very high. In fact, the World Bank and the Organisation for Economic Co-operation and Development (OECD) (2015) reported that the GVC participation of SMEs in low-income countries is concentrated in labor-intensive and low value-adding functions. In certain cases, SMEs with strategic advantages (e.g., ownership of special assets, resources, knowledge, or skills) gain faster

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access to production networks as partners or acquired subsidiaries of MNCs (Dunning and Lundan 2008).¹ Other SMEs are “born global,” being already trade-oriented from the very start. While some SMEs participate directly in international markets, many others export and import indirectly through larger manufacturers and traders that already have established foreign linkages. For instance, SMEs usually supply raw materials and inputs to export-oriented industries. They also participate in downstream stages as local distributors and retailers of multinational brands. With the emergence of e-commerce and modern logistics, technology-enabled SMEs have also adopted new business models that have allowed them to export to and import from a larger number of foreign partners.

GVCs offer various growth and learning opportunities for participating SMEs. For instance, importing may increase productivity through the use of cheaper and better-quality inputs (Wagner 2011). Depending on their absorptive capacity, firms may also benefit from technology transfers and knowledge spillovers from other value chain participants.² Lead firms may assist SMEs in adopting new processes and product designs in order to comply with stringent international standards (WTO 2016). Due to scale economies, large GVC transactions may also allow SMEs to increase output and lower production costs. SMEs that actively participate in GVC trade may also learn about regulations and consumer tastes in foreign markets. In addition, they may gather new insights into the input sources, production techniques, and marketing practices of other firms. SMEs may also be encouraged to innovate in order to remain competitive in their niche functions. Successful innovators may grow in scale and/or scope and eventually upgrade to more complex and higher value-adding GVC activities.

However, realizing these potential benefits is not without constraints. Due to their small size and limited capabilities, small and medium-sized firms are often insecure about their ability to approach international markets (OECD 2008). Based on a review of evidence from developing countries, the World Trade Organization (WTO [2016]) also noted that the trade participation of SMEs is mainly restricted by their limited knowledge about foreign operations, costly requirements of

¹ SMEs may also internationalize through foreign direct investments and other business arrangements with foreign partners (e.g., mergers and joint ventures). However, compared to traditional trade transactions, these advanced forms of internationalization are less common for SMEs in developing countries since they entail huge fixed costs (WTO 2016).

² Damijan and Kostevc (2015) and Castellani and Fassio (2017) find that this effect is more relevant to SMEs than bigger firms.

product standards and quality certifications, burdensome customs and border procedures, inefficient logistics and transport networks, tariff and nontariff trade regulations, and limited access to credit. This is partly traced to the fact that market surveillance, learning administrative procedures in foreign countries, completing documentary requirements, and complying with international product standards entail huge sunk costs that disproportionately burden SMEs (OECD 2013).

Despite the shifted focus of trade analysis from countries and industries to firm-level transactions, micro-studies on the factors affecting the success or failure of SMEs inside GVCs remain largely unexamined. In fact, the WTO (2016) noted that the GVC participation of SMEs, especially in developing countries, is neither well documented nor well understood due to inconsistent definitions of firm size, data limitations, and gaps in the measurement of GVC trade. In addition, Lu and Beamish (2001) argued that SMEs are not simply smaller counterparts of large establishments. Often, the resources, ownership, and organization in small firms are very different from the complex structures of big enterprises, especially MNCs. Hence, empirical findings based on large establishments may not necessarily apply to SMEs. Nevertheless, existing firm-level studies provide useful insights that may improve our understanding of the nature of the GVC linkages of SMEs. For instance, the new “new trade theory” (NNTT) suggests that huge sunk entry costs preclude extremely low-productivity (and possibly small) firms from entering domestic and foreign markets (Roberts and Tybout 1997; Bernard and Jensen 1999; Melitz 2003). To the extent that size is associated with productivity, these findings explain why SMEs might be expected to participate less, and only indirectly, in large-scale GVC transactions. In this regard, it is interesting to analyze how some SMEs were able to internationalize despite the limitations set by their size, experience, and networks.

Against this background, this chapter analyzes firm-level data from the Philippines with the goal of contributing to the still small empirical literature on the nature and drivers of SMEs’ participation in GVCs. In particular, this research is motivated by the following key questions:

- (1) What are the characteristics of Philippine SMEs inside GVCs?
- (2) What determines the GVC entry of Philippine SMEs?
- (3) What are the factors that affect the exit of SMEs from GVCs?
- (4) Are there systematic differences in the characteristics of SMEs that survived and exited GVCs?
- (5) What is the role of MNCs in the GVC participation and survival of Philippine SMEs?
- (6) What is the role of policy in the GVC entry and exit of SMEs?

These questions are explored using a rich micro data set that combines the annual establishment surveys and censuses in the Philippines from 1996 to 2012 and the firm-level export and import transactions compiled by the Philippine Statistics Authority (PSA) from 1991 to 2012. Our statistical analyses mostly focused on the years after the global recession (2008, 2009, 2010, and 2012) due to missing data on key variables in earlier surveys.

3.2 SMEs in the Philippines

In the Philippines, firm size is defined in two ways: The PSA categorizes establishments based on employment, while the Department of Trade and Industry (DTI) follows the Magna Carta for Micro, Small and Medium Enterprises that classifies businesses according to asset size.³ For comparability purposes, this study adopts the employment-based grouping, which is the usual basis of international classifications. In the PSA definition, enterprises are grouped into four categories: micro (1–9 employees), small (10–99 employees), medium (100–199 employees),

Table 3.1: Distribution of Philippine Establishments by Employment Size

Year	Total (no.)	Share (%)			
		Micro	Small	Medium	Large
1995	495,057	90.89	8.05	0.55	0.49
2000	821,060	91.07	8.18	0.37	0.36
2006	783,165	91.96	7.33	0.36	0.33
2010	777,687	91.28	7.97	0.37	0.39
2015	900,914	89.53	9.59	0.43	0.45
2018	1,003,111	88.45	10.58	0.49	0.48

Source: Philippine Statistics Authority.

³ According to the latest DTI definition, establishments are grouped as: micro (up to ₱3,000,000 worth of fixed assets), small (₱3,000,001–₱15,000,000), medium (₱15,000,001–₱100,000,000) and large (₱100,000,001 or higher). One major weakness of the asset criterion is the need for periodic adjustments of the cutoffs due to inflation.

and large (200 or more employees). In this study, “SMEs” and “MSMEs” (micro, small, and medium-sized enterprises) are used synonymously to refer to establishments with fewer than 200 workers.

SMEs are important drivers of the Philippine economy. As summarized in Table 3.1, SMEs take up the largest share in the population of all businesses in the country. In 2 decades, the number of SMEs documented by the PSA more than doubled. However, there is little dynamism in terms of size distribution, with the share of SMEs in total establishments remaining stable at 99.5%. In sharp contrast, large enterprises typically account for less than 0.5% of all businesses.

In 2018, SMEs accounted for 99.52% of the 1,003,111 businesses in the PSA’s updated List of Establishments (LE).⁴ Out of this share, 99.04% are microenterprises and small firms, while only 0.49% are medium-sized enterprises. As indicated in Table 3.2, this highly skewed distribution can be observed across all major industries. Most notably, large employers represent less than 1% of the top three most populous sectors in terms of number of establishments (i.e., wholesale and retail trade and repair of motor vehicles and motorcycles; accommodation and food service activities; and manufacturing). Incidentally, 72.38% of all SMEs are found in these three sectors.⁵ Since wholesaling and retailing are important steps in the distribution process, the foregoing discussion suggests that SMEs play an important role of linking the production sector to the final consumers.

The average employment of all establishments in the 2018 LE was only nine workers, confirming our earlier observation that small and medium-sized businesses dominate Philippine industries. In fact, SMEs host 63.19% of the total number of employees documented in the LE. SMEs also account for a significant portion of the country’s aggregate output. In 2016, 35.7% of gross domestic product (GDP) originated from SME activities (OECD and ERIA 2018). Out of this share, 20.5%

⁴ The List of Establishments (LE) is a database of establishments that are operating in the Philippines at the time of updating. An establishment, which is the statistical unit of the LE, is defined by the PSA as “an economic unit, which engages, under a single ownership or control, i.e. under a single legal entity, in one or predominantly one kind of economic activity at a single fixed physical location” (PSA 2013).

⁵ Based on the 2009 Philippine Standard Industrial Classification, some common examples of activities in wholesale trade include wholesaling of agricultural raw materials and live animals; food, beverages, and tobacco; household goods; and machinery and equipment. In retail trade, many establishments are retail sellers in nonspecialized stores (e.g., *sari-sari*, groceries, and convenience stores) and retail sellers of manufactured goods (e.g., textile and wearing apparel, household equipment, computer and telecommunication devices, automotive fuel) in specialized stores.

Table 3.2: Distribution of Philippine Establishments by Sector and Size, 2018

Sector	No. of Firms	Share by Size (%)			
		Micro	Small	Medium	Large
Agriculture, Forestry, and Fishing	8,679	67.25	28.94	1.81	1.99
Mining and Quarrying	850	57.88	35.53	2.47	4.12
Manufacturing	117,468	88.19	9.94	0.91	0.96
Electricity, Gas, Steam, and Air-Conditioning Supply	1,298	36.83	48.77	7.55	6.86
Water Supply; Sewerage, Waste Management, and Remediation Activities	1,466	46.18	48.50	3.34	1.98
Construction	4,507	51.12	38.05	5.01	5.81
Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles	462,349	92.38	7.26	0.24	0.13
Transport and Storage	11,200	64.86	31.35	2.06	1.73
Accommodation and Food Service Activities	144,640	86.70	13.00	0.23	0.07
Information and Communication	29,687	92.37	6.65	0.52	0.47
Financial and Insurance Activities	46,216	81.82	17.42	0.36	0.40
Real Estate Activities	11,595	81.74	17.03	0.68	0.54
Professional, Scientific, and Technical Activities	15,974	85.24	13.55	0.65	0.56
Administrative and Support Service Activities	18,713	75.20	16.15	2.53	6.11
Education	18,079	50.36	45.98	2.16	1.50
Human Health and Social Work Activities	28,824	90.47	8.07	0.69	0.77
Arts, Entertainment, and Recreation	15,393	89.36	10.15	0.22	0.27
Other Service Activities	66,173	94.90	5.06	0.03	0.02
Total	1,003,111	88.45	10.58	0.49	0.48

Source: Philippine Statistics Authority.

is attributed to small establishments, 10.3% is traced to medium-sized firms, and only 4.9% is contributed by microbusinesses. SMEs in manufacturing represent 6.87% of total output. Two interesting observations are worth noting. First, the contribution of SMEs to GDP has not changed significantly from a decade ago, indicating a lack of strong growth drivers in this segment. Second, the fact that 99.5% of establishments only contributed a third of Philippine GDP suggests that SME productivity is very low.

In line with the national pattern, SMEs dominate the production sector in all regions. However, SMEs are unevenly distributed across the country. Close to 53% of SMEs are found in the most industrialized regions, such as the National Capital Region (NCR) where Manila is located, Central Luzon, CALABARZON, and Central Visayas. These regions also account for 69.19% of the total SME employment in the country. The largest SMEs are also concentrated in these areas. As shown in Table 3.3, SMEs in the NCR, as , Central Visayas, and Northern Mindanao have 5.6–8 workers on average, while the rest of the country employ fewer. On the other hand, Ilocos, Cagayan Valley, MIMAROPA, Bicol, Eastern Visayas, and the Autonomous Region in Muslim Mindanao (ARMM) have the largest ratio of SMEs to large establishments; that is, large businesses in these regions are relatively scant compared to SMEs. Most notably, SMEs outnumber large businesses 907 to 1 in ARMM. The SMEs in these areas are also relatively smaller than those in industrial hubs. For instance, SMEs in ARMM employ an average of four workers only. It is interesting to note that these regions host some of the poorest provinces in the country. The picture emerging from the foregoing discussion is that relatively “smaller” SMEs seem to be the most common employers in the poor countryside. This highlights the importance of SME development as a major strategy for job creation, poverty reduction, and inclusive growth.

The Philippines has a long history of policy support for SME development. The country’s approach to SME development has been motivated by increasing domestic competitiveness and promoting more equitable distribution of productive activities, both across sectors and across regions. Considered a landmark legislation for SME development, the Republic Act (RA) 6977 or the Magna Carta for Small Enterprises was passed in 1991 to consolidate all government programs related to SMEs (OECD and ERIA 2018). This law created the SME Development (SMED) Council and the Small Business Guarantee and Finance Corporation (SBGFC). The SMED Council was designated as the primary agency responsible for SME development “by way of facilitating and closely coordinating national efforts to promote the

Table 3.3: Regional Distribution of Philippine SMEs, 2018

Region	Number of SMEs	Number of SME Employees	Average SME Employment	SMEs per Large Establishment
Philippines	998,342	5,714,262	5.7	209.3
National Capital Region	203,312	1,621,685	8.0	104.9
Cordillera Administrative Region	20,417	88,753	4.3	416.7
Region I (Ilocos Region)	50,807	236,856	4.7	725.8
Region II (Cagayan Valley)	30,718	134,074	4.4	877.7
Region III (Central Luzon)	116,073	605,056	5.2	301.5
Region IV-A (CALABARZON)	148,196	824,283	5.6	182.7
Region IV-B (MIMAROPA)	23,919	110,874	4.6	724.8
Region V (Bicol Region)	40,444	191,111	4.7	577.8
Region VI (Western Visayas)	61,590	318,467	5.2	319.1
Region VII (Central Visayas)	70,395	449,775	6.4	131.1
Region VIII (Eastern Visayas)	30,749	140,269	4.6	768.7
Region IX (Zamboanga Peninsula)	33,177	139,313	4.2	495.2
Region X (Northern Mindanao)	37,274	207,600	5.6	270.1
Region XI (Davao Region)	58,459	317,316	5.4	258.7
Region XII (SOCCSKSARGEN)	44,822	197,331	4.4	379.8
Region XIII (Caraga)	19,823	98,696	5.0	396.5
Autonomous Region in Muslim Mindanao	8,167	32,803	4.0	907.4

SME = small and medium-sized enterprise.
Source: Philippine Statistics Authority.

viability and growth of small and medium enterprises.”⁶ On the other hand, the law mandated the SBGFC to “provide, promote, develop, and widen the reach of various alternative modes of financing for small enterprises.” The corporation may guarantee up to 100% of the loans obtained by qualified SMEs, local or regional SME associations, and private voluntary organizations or cooperatives. The law also directed all lending institutions to allocate 5% of their total loan portfolios to SMEs.

Since its implementation, the law has been amended at least twice, once in 1997 through RA 8289 and once in 2008 through RA 9501, to adjust the asset-based definition of firm size, expand the scope of the functions of the SMED Council and the SBGFC, and institutionalize the formulation of a periodic medium-term development plan for the SME sector. In particular, the SMED Council was renamed the MSMED Council to explicitly incorporate microenterprises. The Small Business Corporation (SBC) was also formed to replace the SBGFC. The new agency was tasked to implement comprehensive MSME policies and programs in areas such as finance, information services, training, and marketing.⁷ RA 9501 also increased the earmarked loans to MSMEs from 5% to 8% of the total loan portfolios of lending institutions. In addition, the law explicitly encouraged credit to eligible export and import traders.

There is a wide range of other policies and programs initiated by various government agencies to improve SMEs’ access to finance. For example, several state-run financial institutions⁸ teamed up in 2003 to create the SME Unified Lending Opportunities for National Growth (SULONG) Program, which provided funds for export financing, working capital, and investments in equipment, buildings, and warehouses

⁶ In particular, the SMED Council was tasked to support SMEs through direct interventions such as trainings, labor management guidance, a relief system for distressed enterprises, and technical assistance regarding product research and development, commercialization of technologies, marketing, distribution, and access to credit.

⁷ As of 2016, the SBC is the national government’s third-largest provider of financing for SMEs. With a lending portfolio of ₱3 billion, it serves 10,000 clients in 65 provinces across the country. In 2017, the SBC launched the Pondo sa Pagbabago at Pag-asenso (P3) program (or Fund for Change and Progress in English). According to the SBC website, this program has already released ₱1.8 billion to 61,204 microenterprises as of 2018. See <https://www.sbgfc.org.ph/about-us/history>.

⁸ Land Bank of the Philippines, the Development Bank of the Philippines, SBC, Quedan and Rural Credit Corporation, Philippine Export-Import Credit Agency, and the National Livelihood Support Fund.

(Aldaba 2012).⁹ To enhance the existing credit guarantee system in the country, the central bank also established in 2008 the Credit Surety Fund that pools contributions from cooperatives in good standing, nongovernment organizations, local governments, and other partner institutions (BSP 2018a). This fund aims to increase the creditworthiness of MSMEs that lack the necessary credentials (e.g., collateral and good credit track records) to obtain bank loans.¹⁰ In addition to public and private financial institutions, microfinance organizations also play an important role in extending credit to MSMEs. They usually collaborate with private, multilateral, and government agencies to provide lending facilities that are more accessible to micro- and small businesses (DTI 2013).¹¹

Despite the myriad of government programs to improve credit access, many studies note that MSMEs still consider financing as a major constraint to growth and survival. In fact, the Philippines' SME loans reached only 3.1% of GDP in 2014, much lower than Thailand's 36.6%, Malaysia's 22.4%, and Indonesia's 7.2% (ADB and ADBI 2015). As of June 2018, Philippine SMEs account for only 6.6% of the total loaned amount by the banking system (BSP 2018b). Aldaba (2012) also noted that the majority of SMEs still rely on internal resources and informal credit for their current financing requirements, while only 15%–21% use bank loans. This partly reflects the huge transaction costs faced by both small businesses and banks in processing MSME-related financing. On the one hand, MSMEs are constrained by the lack of collateral, stringent documentary requirements, restrictive loan repayment and restructuring rules, high interest rates, and limited financial packages in the countryside, among other things. On the other hand, banks have concerns about the risks of lending to MSMEs, especially those whose proposed projects do not qualify as bankable or viable. Banks also have a general aversion to processing numerous small transactions.

The Department of Science and Technology is the lead agency for improving SMEs' technological access. In particular, the Small Enterprises Technology Upgrading Program (SETUP) is a nationwide

⁹ *Sulong* literally means “move forward” in English.

¹⁰ The fund effectively serves as a guarantor that first assesses the loan and surety proposals of qualified member MSMEs and then endorses successful applications to the target banks.

¹¹ Within the banking system, 151 banks reported having extended a total amount of ₱15.4 billion to 1.5 million microenterprises as of June 2018. Outside the banking system, cooperatives have 6.4 million member-depositors and ₱162.4 billion in outstanding loans as of 2015 while microfinance NGOs have 4.3 million clients and ₱28.6 billion in outstanding loans as of 2017 (BSP 2018b).

effort to help SMEs adopt “technological innovations to improve their products, services, and operations and increase their productivity and competitiveness.” According to its official website,¹² the program aims to improve the efficiency and capabilities of SMEs through the following key strategies: a) infusion of appropriate technologies to improve products, services, and/or operations; b) human resource training, technical assistance, and consultancy services; c) design of functional packages and labels; d) assistance in the attainment of product standards including testing; e) a database management system; and f) provision of assistance for technology acquisition.¹³

Although increasing foreign market access has been a key objective of SME policy in the Philippines since the 1980s, the exporting and importing activities of micro- and small businesses remain limited. According to the DTI (2019), 60% of all exporters in the Philippines are in the small and medium category. Collectively, these SMEs contributed 25% to the country’s total export revenues in 2016. To increase the international participation of SMEs, the current Micro, Small and Medium Enterprise Development Plan 2017–2022 explicitly pushes for “more globally competitive SMEs that are regionally integrated, resilient, sustainable, and innovative, thereby performing as key drivers of inclusive Philippine economic growth” (MSMED Council 2018). In particular, the plan targets increasing SME employment to 8.284 million and the contribution to value added from 50% to 55% by 2022. To close the gap between these goals and the most recent numbers (5.717 million SME employees as of 2018 and a 35.7% share in value added as of 2016), the government plans to roll out programs and projects that are anchored in five major strategies: improving the business climate, increasing access to finance, enhancing management and labor capacities, improving access to technology and innovation, and expanding access to markets. Currently, the DTI is the main government institution in charge of supporting the internationalization of SMEs. Through its various bureaus and attached agencies, the DTI pushes for greater SME participation in global markets through programs such as export promotion, trade fairs, one-stop shops to reduce red tape, technical

¹² See http://setup.dost.gov.ph/program_setup.php.

¹³ However, whether the program achieved its goals is another issue. For instance, the state auditors who reviewed the program in 2018 observed that a) many MSMEs that received SETUP funding failed and were unable to repay; b) much of the equipment bought for the program remained unutilized and not properly stored; and c) there was inadequate monitoring and a lack of thorough evaluation of important decision factors such as the financial capacity of the beneficiaries and the agency’s preparedness in handling the SETUP equipment (Buan 2019).

assistance on doing business in free trade areas, and e-commerce (OECD and ERIA 2018).¹⁴ Flagship programs such as the Philippine Export Competitiveness Program, the Regional Interactive Platform for Philippine Exporters, and the Export Pathways Program support SMEs through assistance in innovation, product designs, capacity building, and compliance with market requirements. In addition, there are so-called *Negosyo* or business support centers that help SMEs by providing information on training, financing, marketing, and e-commerce, among others. These centers also provide a physical venue where SMEs can connect to potential buyers such as large domestic and multinational corporations.

3.3 Philippine SMEs in Global Value Chains: Some Stylized Facts

This study adopts the definition of GVC-connected establishments used in Mendoza (2019). In particular, GVC operation is described as the production of a final good (or service) through fragmented stages performed by firms that are spatially dispersed but connected by complementary backward and forward trade linkages. Accordingly, producers involved in this process are referred to as “GVC firms.” Table 3.4 summarizes the description and provides some examples of the GVC typology adopted from Mendoza (2019).

In this study, SEZ+ is defined as a city or municipality that hosts a special economic zone (SEZ). This criterion is included since many industrial parks in the Philippines are actually created to attract investments from MNCs and other export-oriented enterprises. Mendoza (2019) argues that the ordering of firm types broadly corresponds to the strength of each group’s GVC integration. This suggests that partially internationalized manufacturers (Types 2 and 3) have relatively weaker GVC linkages than the subset of firms that both export and import (Types 4 and 5). Accordingly, the “true” participants in globally fragmented production are most likely involved in Type 4 and 5 transactions. Table 3.4 also suggests that Type 5 traders may be regarded

¹⁴ In particular, the Bureau of Micro, Small, and Medium Enterprises Development is designated as the lead office to assist the MSMED Council in its policy-making functions. The Center for International Trade Expositions and Missions is tasked to promote information and market access, while the Philippine Trade Training Center offers training on business management and entrepreneurial development. Further, the Product Development and Design Center and the Bureau of Export Trade Promotion provide technical support aimed at improving product quality, supplier capability, and overall competitiveness.

**Table 3.4: Description and Examples of Common Activities
in Different Firm Types**

Type	Trade Activities	Common Production Activities
Type 1	Not importing, not exporting	Manufacturer of locally sold banana and cassava chips, manufacturer of purified tube ice, manufacturer of locally sold fruit preserves and candies (e.g., mango, pineapple, and durian), manufacturer of locally sold fruit and alcoholic beverages (e.g., calamansi juice and tubâ)
Type 2	Importing, not exporting	Manufacturer of animal feed, manufacturer of fertilizers, flour miller that sells to local bakeshops, manufacturer of locally sold plastic kitchenware, manufacturer of liquefied petroleum gas, manufacturer of locally sold plywood that used imported materials
Type 3	Not importing, exporting	Exporter of coconut-based products, exporter of dried mangoes, exporter of processed seafood, exporter of semi-processed ores, exporter of rattan-based furniture
Type 4	Importing and exporting, outside SEZ+	Exporter of branded breads and snacks that used imported flour, exporter of garments and apparel that used imported textiles, exporter of furniture that used imported wood and paint
Type 5	Importing and exporting, inside SEZ+	Manufacturer of printed circuit boards, manufacturer of wire harnesses, manufacturer of metal parts for electronics assembly, manufacturer of camera parts and components, manufacturer of hard disk drives, manufacturer of semiconductors

SEZ+ = city or municipality that hosts a special economic zone.

Source: Mendoza (2019).

as the “archetypal GVC firms,” since manufacturers in economic zones such as semiconductor and automotive assemblers are usually deeply embedded in production networks that are organized by large MNCs.¹⁵

The proposed classification improves the identification of GVC-linked SMEs in several ways. First, no arbitrary lower bound for size, revenue, or trade transactions is imposed here, given that even small establishments can potentially join GVCs. In fact, many value chain operations rely on the efficient networking of producers in a multilevel

¹⁵ The emphasis on two-way trade as the key identifier of more intensive GVC participation follows directly from the concept of backward and forward linkages in the intercountry input–output literature. Given that production networks are designed to link the activities of geographically distant manufacturers, it is not unusual for a typical GVC supplier to import in order to export; that is, they mainly use imported materials to perform a particular stage of production, then reexport the semifinished output for further processing in a different country.

setup where bigger firms collect, consolidate, and process the inputs from lower-tier suppliers. Hence, the exclusion of firms below an arbitrary cutoff may fail to capture GVC-related activities where SMEs are able to participate, either directly or indirectly, due to supposedly lower entry barriers. Second, this typology is inclusive enough to cover the GVC activities of typical firms in developing countries, especially SMEs that may not be captured by classifications based on the ability to attract foreign direct investments and perform large-scale trade transactions.

To operationalize the proposed typology, this study utilizes firm-level data on export revenues, import costs, and location. The SEZ+ indicator is developed from the list of manufacturing and agro-industrial economic zones of the Philippine Economic Zone Authority as of July 2016.¹⁶ The exports and imports data are obtained from the PSA's panel of trade transactions from 1991 to 2012.¹⁷ Information on direct and indirect exports from the PSA's Annual Establishment Survey of Philippine Business and Industry and Census of Philippine Business and Industry conducted from 1996 to 2012 is also used as an additional identifier of trading activities.¹⁸ The analysis focuses on manufacturers to increase the probability that the transactions being analyzed capture the flow of raw materials, parts, and components within GVCs instead of the traditional trade in final goods. However, the statistical analyses are mostly limited to the years 2008–2012 due to insufficient data on important variables (such as foreign equity participation and capital stock) prior to 2008. Nevertheless, this subset already contains 19,271 observations from 9,860 Philippine establishments in the manufacturing sector.¹⁹

¹⁶ For simplicity, the coverage of the Philippine Economic Zone Authority list is assumed to be invariant throughout the sample, although economic zones are actually established in different years. This is necessary to make sure that changes in GVC incidence rates reflect the dynamics in participation rather than mere creation of new SEZs.

¹⁷ Only non-oil trade transactions are included to make sure that the goods being traded are used as actual components of the final products.

¹⁸ This study benefited from the data-cleaning exercise conducted at the PSA under the Escaping the Middle Income Trap research program, which is an international research consortium organized to study the “middle-income country trap” phenomenon. The consortium is composed of the Rotterdam School of Management of the Erasmus University, Rotterdam; the University of the Philippines; and the Asian Institute of Technology in Thailand.

¹⁹ In this study, the terms “establishment,” “firm,” “producer,” “supplier,” and “manufacturer” are used interchangeably.

**Table 3.5: Distribution of the Sampled
Manufacturers by Firm Type, 1996–2012**

Year	No. of Firms	Share by Firm Type (%)				
		Type 1	Type 2	Type 3	Type 4	Type 5
1996	3,112	63.08	4.05	16.55	8.35	7.97
2001	2,982	64.02	8.12	3.39	9.99	14.59
2003	3,336	63.28	9.20	2.85	8.90	15.74
2006*	7,956	62.03	9.16	9.36	7.42	12.04
2008	5,722	51.85	11.87	12.27	8.34	15.68
2009	4,782	50.79	11.31	12.71	8.55	16.62
2010	4,843	52.96	10.72	12.80	7.95	15.57
2012*	3,924	56.47	8.36	14.58	6.73	13.86

*Census year.

Source: Author’s calculation based on data from the Philippine Statistics Authority.

The distribution of Philippine manufacturers in Table 3.5 shows that the combined shares of Type 2 to 5 firms in all manufacturing generally increased after the mid-1990s, a period characterized by intensified global fragmentation of production due to more liberal trade policies and major advances in communication and transportation technologies. Most notably, the share of Type 5 traders almost doubled from 7.97% in 1996 to 13.86% in 2012, peaking at 16.62% in 2009. In addition, the data also indicate that two-way trade has become more prevalent than either pure exporting or pure importing. This may be an indication of more trading activities inside production networks where exporting and importing are complementary. Nevertheless, there is still a significant fraction of local producers with no international transactions. This suggests that SEZs do not seem to have facilitated the large-scale entry of domestic producers into international operations. Despite the decreasing trend, 56.47% of Philippine manufacturers remained purely domestic-oriented in 2012.

In terms of international activities, the clear pattern suggested by Table 3.6 is that SMEs are prevalent in Type 1 businesses while large manufacturers are more common in Type 4 and 5 transactions. This implies that most SMEs are involved in purely domestic-oriented operations, while large manufacturers are usually involved in exporting and/or importing activities. For Type 1 activities, the risk

Table 3.6: Risk Ratio of SMEs
to Large Manufacturers by Firm Type and Year

Year	Type 1	Type 2	Type 3	Type 4	Type 5
1996	2.67	0.46	0.54	0.18	0.16
2001	2.35	0.78	0.93	0.31	0.21
2006*	4.72	1.27	0.61	0.29	0.18
2008	2.73	1.76	0.80	0.56	0.43
2009	3.08	1.34	0.84	0.53	0.26
2010	3.39	1.44	0.73	0.41	0.24
2012*	2.42	1.11	0.63	0.40	0.27

*Census year.

Source: Author’s calculation based on data from the Philippine Statistics Authority.

ratio²⁰ is consistently above 1, indicating a very high likelihood that manufacturers with purely domestic operations are small or medium, rather than large. However, there is a declining trend in the risk ratios as we move away from Type 1. This indicates that the “relative risk” of being an SME is very low when we are looking at manufacturers with more complex trade transactions. As expected, the risk ratios for Types 4 and 5 are below unity. This is consistent with the observation in WTO (2016) that manufacturing SMEs in developing countries are underrepresented in GVCs. This also corroborates the existing empirical literature showing that firms that export and/or import are bigger, more capital- and skills-intensive, and more productive than non-exporting firms within the same industry (Bernard et al. 2012; Melitz and Redding 2014).

Across major manufacturing sectors, Table 3.7 shows that the risk ratios of SMEs to large manufacturers in Type 1 are consistently above 1, both in 1996 and 2012. This confirms our earlier observation that manufacturers with purely domestic operations are relatively smaller than exporters and importers. In contrast, the relative risks for Types 4 and 5 are generally low, indicating that SMEs are less likely than large firms to engage in simultaneous exporting and importing. Nevertheless,

²⁰ Computed as $RR_{it} = \frac{n_{SME,it} / \sum_{i=1}^5 n_{SME,it}}{n_{LARGE,it} / \sum_{i=1}^5 n_{LARGE,it}}$, where RR_{it} is the risk ratio of SMEs versus large manufacturers for Type i in year t ; $n_{SME,it}$ and $n_{LARGE,it}$ are the numbers of SMEs and large manufacturers under Type i in year t , respectively; $i = 1, \dots, 5$. An $RR_{it} > 1$ suggests an “increased risk” of SMEs being Type i .

**Table 3.7: Risk Ratio of SMEs to Large Manufacturers
by Firm Type and Sector, 1996 vs. 2012**

Sector	1996					2012				
	1	2	3	4	5	1	2	3	4	5
All Sectors	2.67	0.46	0.54	0.18	0.16	2.42	1.11	0.63	0.40	0.27
Food, Beverages, and Tobacco	1.71	0.25	0.46	0.21	0.09	1.66	0.46	0.57	0.28	0.25
Textiles, Garments, and Leather	4.54	0.45	0.46	0.14	0.11	2.18	1.38	0.56	0.49	0.25
Wood and Furniture	2.00	0.73	1.08	0.15	0.15	1.89	0.95	1.88	0.26	0.21
Paper and Printing	2.47	0.57	0.30	0.11	0.17	1.73	1.94	0.22	0.31	0.20
Petroleum	2.25	–	–	0.00	0.00	–	–	0.25	0.25	–
Chemicals and Pharmaceuticals	2.67	0.78	0.59	0.14	0.95	1.71	0.78	0.52	0.39	0.69
Rubber and Plastics	2.70	0.29	0.68	0.34	0.29	4.08	1.03	0.92	0.40	0.32
Nonmetals	2.14	0.15	0.71	0.05	0.37	3.14	0.50	0.74	0.25	0.28
Basic and Fabricated Metals	1.81	0.22	0.84	0.21	0.16	3.56	1.00	0.91	0.24	0.26
Electronics and Electrical Equipment	4.17	2.39	0.69	0.30	0.26	3.53	12.41	0.79	1.06	0.61
Machinery and Equipment	5.08	–	0.46	0.00	0.12	1.80	–	0.89	0.23	0.58
Motor Vehicles and Transport Equipment	2.73	0.12	0.39	0.12	0.31	2.92	2.31	1.02	0.77	0.35
Others	12.04	–	0.78	0.36	0.27	5.05	–	0.51	0.84	0.39

Source: Author’s calculation based on data from the Philippine Statistics Authority.

it is interesting to note that the risk ratios are not zero for Types 2 to 5. This means that it is still possible for SMEs to participate in various trade and GVC-oriented activities.

A closer look at the merged trade and survey data set reveals that compared to large manufacturers, the group of SMEs with matched trade records exported fewer products to a smaller number of destinations. Similarly, SMEs import a less diverse range of products

from fewer sources than large establishments (see Table 3.8). These figures suggest that the extensive margin of the trade activities of SMEs might be narrower than that of large firms. This may also reflect the fact that SMEs’ capabilities and networks are too limited to perform large-scale trade transactions. In terms of top products, the major export items of SMEs are traditional and relatively low-tech, such as tin, animal and vegetable fats and oils, alcohol, soap, metals, fruit and nuts, yarns and textile fabrics, and furniture. A similar pattern was observed for imports. In particular, the main foreign purchases of SMEs are food and agro-based products (e.g., bovine meat, wheat, foodstuff for animals, animal and vegetable fats and oils, and maize), paper and cardboard, metals, and chemical products (e.g., polymers of ethylene, inorganic chemicals, insecticides).²¹ In terms of trading partners, both SMEs and large enterprises have the US and East Asia and Southeast Asia as major export destinations and import sources, although the transactions are expectedly asymmetric in size.

**Table 3.8: Number of Traded Products
and Trading Partners: SMEs vs. Large Manufacturers**

Year	Exports				Imports			
	SMEs		Large Manufacturers		SMEs		Large Manufacturers	
	Markets	Products	Markets	Products	Sources	Products	Sources	Products
1996	82	608	145	1,070	60	1,884	124	3,479
2001	108	990	165	1,349	83	2,430	123	3,987
2006	152	2,139	179	1,905	92	4,437	117	5,225
2008	149	1,862	165	16,31	94	4,214	115	4,857
2009	133	1,675	164	1,638	82	3,947	111	4,591
2010	147	1,557	187	1,497	82	3,778	111	4,684
2012	136	1,464	197	2,010	76	3,386	111	4,738

Source: Author’s calculation based on data from the Philippine Statistics Authority.

²¹ In contrast, the top exports of large manufacturers came from medium- to high-tech sectors such as electronics-related parts and components, electrical power machinery, automatic data processing machines, auto parts, and motorcycles. Large firms also have a more diversified set of top imports, such as petroleum, electronics-related parts and components, natural rubber, plastics, machinery and equipment, automotives and parts, motorcycles, metal products, and milk products.

What explains the differences between the trading profiles of SMEs and large manufacturers? The large body of firm-level evidence accumulated over the last 2 decades formed the foundation of two core features of the NNTT: first, that firms are highly heterogeneous; and second, that exporters are systematically different from nonexporters. In the presence of sunk entry costs, bigger and more productive firms tend to self-select into international markets. For example, aspiring exporters and importers have to incur the costs of doing market research, adapting to foreign regulations and standards, marketing and promotion, and contracting with foreign partners. Similarly, numerous studies provide evidence that importing is positively related to productivity improvements.

Previous empirical investigations often demonstrate firm heterogeneity by comparing the characteristics of the average exporter and importer and the average nontrading firm. Table 3.9 summarizes the simple pairwise comparisons of the average Type 1 firms against the other groups of manufacturers in the pooled 2008–2012 sample. Separate analyses are made for the subset of SMEs and the subset of large manufacturers.²² The results of the separate t-tests for small and medium-sized firms suggest that, on average, SMEs with exporting and importing activities generally have superior attributes (e.g., employment size, average wage, capital–labor ratio, and research and development [R&D] intensity) than their purely domestic counterparts. Across all characteristics, the differentials generally increase as we move closer to Type 5, suggesting that two-way traders in SEZ+ are the most dissimilar producers from the typical domestic-oriented SMEs. Table 3.9 also shows that SMEs with foreign transactions have better performance indicators (e.g., revenues and productivity) than domestic-oriented establishments. In general, the picture emerging from the above findings is that GVC-oriented SMEs (Types 4 and 5) typically outperform those in domestic-oriented production (Type 1) in many important dimensions. In addition, compared to Type 2 and 3 SMEs that are only partially internationalized, small and medium-sized establishments in two-way trade have superior attributes, such as size, capital intensity, revenues, and productivity.

While the t-tests for the subset of SMEs are broadly consistent with the results in Mendoza (2019), which used the overall sample, the

²² Although not shown here due to space constraints, pairwise t-tests between SMEs and large firms are also conducted for each attribute and type. Except for the capital intensity of Type 4 firms and the labor productivity of Type 5 firms, the results show that the average large manufacturer is significantly better than the typical SME in every characteristic and firm type at $\alpha = 5\%$.

Table 3.9: Test of Equality of Means: Type 1 vs. Type 2–5 Firms

Characteristics	Unit	Type 1	Type 2	Type 3	Type 4	Type 5
SMEs						
Age (as of 2012)	years	16.12	20.71***	15.08	22.12***	13.87
Employees	persons	39.70	63.82***	63.18***	84.59***	89.22***
Wage	'000/person	64.71	94.82***	86.44***	116.10***	131.01***
Capital–Labor Ratio	'000/person	249.73	347.74***	325.40**	451.15***	681.08***
R&D Intensity	%	0.06	0.05	0.22***	0.13**	0.15***
Revenues	million	52.21	136.94***	127.70***	250.50***	238.70***
Labor Productivity	'000/person	347.74	518.95***	731.58***	884.77***	1,035.53***
TFP	ln	5.25	5.58***	5.51***	5.68***	5.78***
Large Manufacturers						
Age (as of 2012)	years	23.12	26.85***	17.04	26.54	16.01
Employees	persons	547.60	433.90	851.73***	623.36*	969.56***
Wage	'000/person	114.57	99.32	111.87	141.95***	133.15***
Capital–Labor Ratio	'000/person	527.35	544.55	645.60	598.26	907.81**
R&D Intensity	%	0.90	0.05	0.13	0.14	0.15
Revenues	million	1,062.54	765.75	2,268.44***	3,193.29***	2,472.92***
Labor Productivity	'000/person	977.96	721.34	2,042.12	1,470.37**	1,094.27
TFP	ln	5.83	5.82	5.98***	5.98***	6.05***

R&D = research and development, SME = small and medium-sized enterprise, TFP = total factor productivity.

*p < 0.10, **p < 0.05, *** p < 0.01.

Notes: All monetary amounts are in pesos and expressed in constant 2000 prices using the gross domestic product deflator.

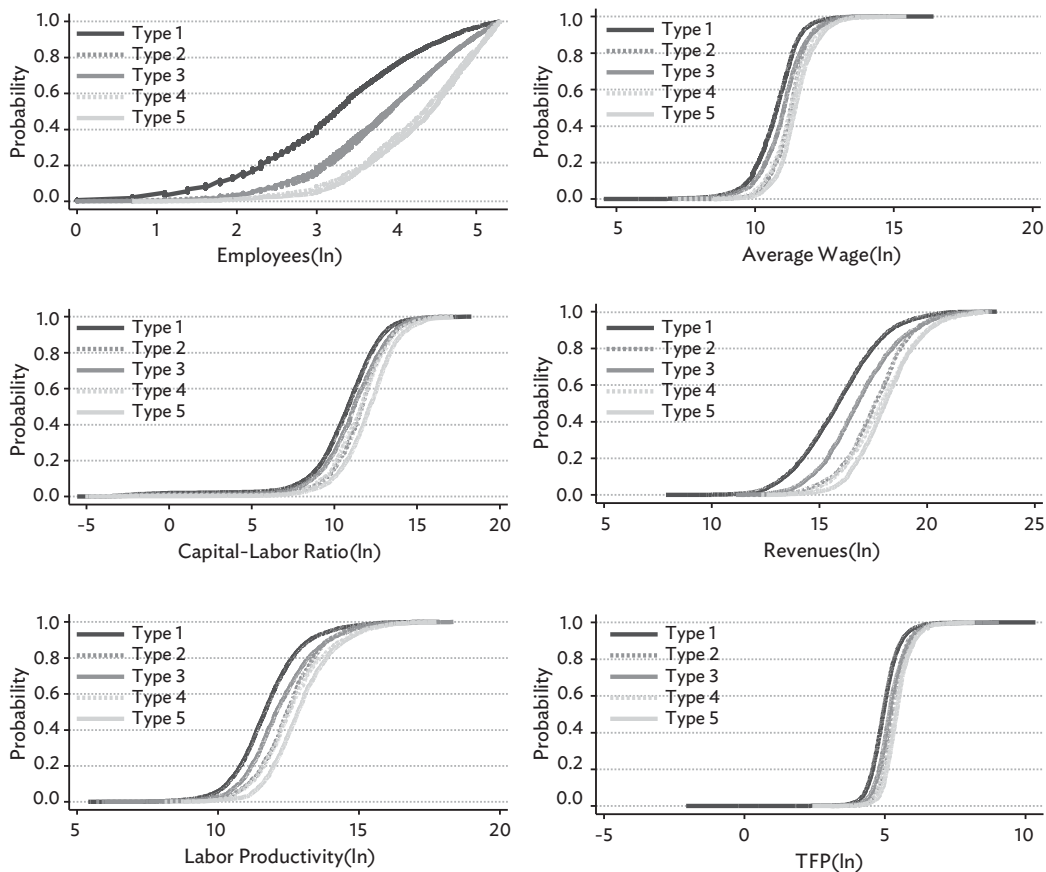
TFP is estimated using the approach of Levinsohn and Petrin (2003).

The null hypothesis for the left-tailed t-test is that the mean values for a particular firm type are greater than or equal to the mean values for the baseline category (Type 1).

Source: Author's calculation based on data from the Philippine Statistics Authority.

results for large manufacturers are mixed. Across attributes, large Type 4 and 5 firms appear to be the most distinct groups from their Type 1 counterparts. However, the results are weaker for large Type 3 exporters. There is also no strong evidence that large Type 2 importers are significantly better than purely domestic-oriented large producers. This suggests that the earlier evidence of heterogeneity among Philippine manufacturers may be driven by the wide disparity in the characteristics of SMEs across types.

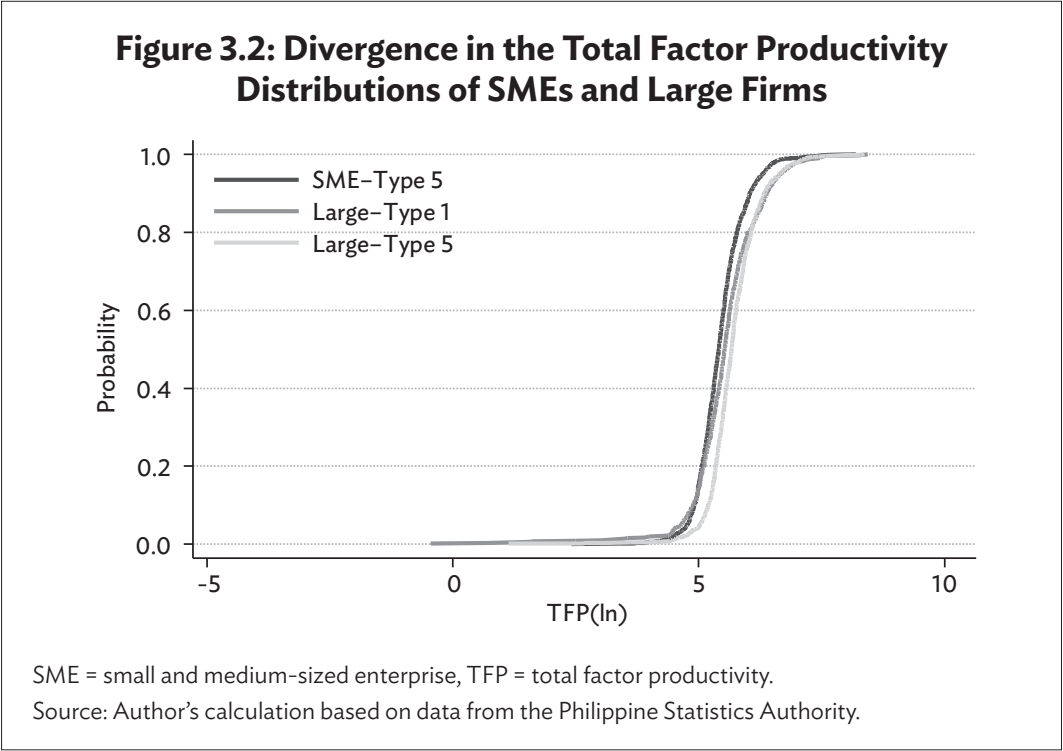
Figure 3.1: Divergence in the Empirical Cumulative Distributions of Different SME Types



SME = small and medium-sized enterprise, TFP = total factor productivity.
Source: Author’s calculation based on data from the Philippine Statistics Authority.

Following Delgado, Fariñas, and Ruano (2002), the succeeding discussion extends the previous analysis by examining the divergence of different SME types along the distributions of the firm characteristics in question. In particular, the empirical cumulative distributions (ECDs) of the various categories are plotted to check whether Type i firms stochastically dominate Type $i - 1$ manufacturers; that is, whether the ECD of Type i does not cross and lies to the right of the ECD of Type $i - 1$, $i = 2, 3, 4, 5$. Therefore, the ECDs can be used to graphically validate the two key propositions of the NNTT that firms are not homogeneous (i.e., they follow a certain distribution) and that manufacturers with stronger GVC linkages have better characteristics (i.e., the distribution of Type i stochastically dominates the distribution of Type $i - 1$).

Figure 3.1 consistently shows that the various firm categories systematically diverge across all characteristics, with small and medium-sized manufacturers with foreign transactions always lying to the right of Type 1 SMEs. This lends further support to the view that international activities, whether exporting or importing or both, often involve huge entry costs that only manufacturers with superior attributes can afford to pay. This also suggests that the probability of being connected to GVCs versus otherwise is higher when we are looking at bigger and more productive SMEs chosen at random. In other words, larger values of a specific attribute are more likely associated with Type 4 and 5 SMEs than Type 1 to 3 SMEs. Another interesting pattern is that the ECDs of Type 2 to 4 SMEs often cross, suggesting that the stochastic ordering may not be conclusive for these groups. However, the graphs show that Type 5 SMEs are normally ranked higher than all other groups. This confirms our earlier observation that Type 5 SMEs tend to have features that are the most distinct from their Type 1 counterparts. These findings are comparable with the results of related studies showing that two-way traders have better attributes than firms that only import or only export or do not trade at all (e.g., Muûls and Pisu 2009; Seker 2012). To the extent that larger, more capital-intensive, and more productive firms tend to self-select into exporting and importing, these findings imply that GVC participation involves bigger sunk entry costs that only self-selecting superior producers can afford to pay. This may partly explain



the declining trend in the relative risks shown in Tables 3.5 and 3.6; that is, only a few SMEs have enough capability to perform complex Type 4 and 5 transactions.

Although not shown here, the ECDs for large manufacturers do not point to the stochastic dominance of a particular firm type. This suggests that large firms appear to be more alike even if they have varying degrees of GVC participation. Comparing this to our previous findings for SMEs, the foregoing results suggest that the self-selection effect may be stronger for small and medium-sized firms than for large manufacturers. A similar result in Máñez-Castillejo, Rochina-Barrachina, and Sanchis-Llopis (2010) suggests that the productivity threshold proposed by Melitz (2003) is only binding for smaller firms. Using Spanish data, they found that the productivity distributions of large manufacturers, whether exporting or not, stochastically dominate exporting SMEs. This is partially corroborated by our own evidence from Philippine data. As shown in Figure 3.2, the TFP distribution of the most productive SMEs (Type 5) is only comparable to that of Type 1 large establishments and is strictly dominated by Type 5 large traders.

Table 3.10 summarizes the non-parametric Kolmogorov-Smirnov (KS) tests for equality of distributions to formally verify the divergence between the TFP distributions of SMEs and large manufacturers. Following Delgado, Fariñas, and Ruano (2002), the two-sided tests simply analyze whether the different groups of firms belong to the same distribution or not. Additionally, the one-sided tests check the relative positions of the ECDs, i.e., if $D_i(a_t) \leq D_{i-1}(a_t)$, with strict inequality for some values of a_t , where $D_i(a_t)$ is the ECD of Type i firms for a particular attribute a_t . For a particular pair of adjacent firm types, rejecting the two-sided test but not the one-sided test confirms the stochastic dominance of the “higher-order” category. The stepwise KS tests were implemented to empirically check our hypothesis that the ordering of the firm types generally coincides with their supposed degree of GVC integration. Note that the KS tests are performed separately for each year t in the sample since this procedure requires the tested observations to be independent.

The KS tests for TFP generally validate the divergence suggested by the t-tests and the ECDs above. In particular, the results in Table 3.9 show that Type 2 SMEs stochastically dominate Type 1 SMEs across all years studied. However, the KS tests show no clear ordering between Type 2 and 3 SMEs. This is consistent with our previous observation that their ECDs in Figure 3.2 often cross, suggesting that neither of the two is strictly dominant over the other. Further, the tests show that Type 4 SMEs stochastically dominate their Type 3 counterparts. This confirms that SMEs in two-way trading are more productive than those that only export or only import. Finally, there is some evidence that Type 5 SMEs dominate their Type 4 counterparts. This proves that the two groups are

Table 3.10: Stepwise Kolmogorov–Smirnov Tests of the Total Factor Productivity Distributions of Different Firm Types

	2008	2009	2010	2012
Two-Sided Test				
SME Type 1 vs. SME Type 2	0.3379***	0.3011***	0.3451***	0.3086***
SME Type 2 vs. SME Type 3	0.0055	0.0484	0.0021	0.0836
SME Type 3 vs. SME Type 4	0.2469***	0.2128***	0.2321***	0.1344**
SME Type 4 vs. SME Type 5	0.1022**	0.0954**	0.0959*	0.1096
SME Type 5 vs. Large Type 1	0.2153***	0.2017***	0.1503**	0.0983
Large Type 1 vs. Large Type 2	0.0083	0.0794	0.1474	0.1493
Large Type 2 vs. Large Type 3	0.2281***	0.1679*	0.1751*	0.1080
Large Type 3 vs. Large Type 4	0.0848	0.1205	0.0848	0.0378
Large Type 4 vs. Large Type 5	0.0891	0.1113	0.0823	0.1451
One-Sided Test				
SME Type 1 vs. SME Type 2	-0.0008	-0.0032	0.0021	-0.0030
SME Type 2 vs. SME Type 3	-0.1434***	-0.1093	-0.1532	-0.1134**
SME Type 3 vs. SME Type 4	0.0000	-0.0221	-0.0046	-0.0255
SME Type 4 vs. SME Type 5	-0.0089	-0.0236	-0.0218	-0.0096
SME Type 5 vs. Large Type 1	-0.0127	-0.0149	-0.0195	-0.0812
Large Type 1 vs. Large Type 2	-0.2315***	-0.1636	-0.1528	0.1493
Large Type 2 vs. Large Type 3	-0.0107	-0.0200	-0.0354	-0.0701
Large Type 3 vs. Large Type 4	-0.0576	-0.0196	-0.0352	-0.1060
Large Type 4 vs. Large Type 5	-0.0459	-0.0584	-0.0303	-0.0305

SME = small and medium-sized enterprise.

Source: Author's calculation based on data from the Philippine Statistics Authority.

distinct from each other.²³ Comparing Type 1 large firms to Type 5 SMEs reveals that the former stochastically dominated the latter from 2008 to 2010. This implies that the productivity of purely domestic-oriented large firms is comparable to, or even slightly better than, the most productive category of SMEs. Lastly, comparisons between different categories of large manufacturers yield mixed results. This confirms that large establishments across types tend to be less differentiated. What, then, determines the sorting of large firms into different types? This is an interesting question worth examining in future research.

²³ However, the two-sided tests indicate that this distinction appeared to have weakened in 2010 and 2012.

**Table 3.11: Multinomial Logit Model for
the Characteristics of SMEs in Global Value Chains**

Dependent Variable:	Type 2	Type 3	Type 4	Type 5
Type 2 last period	162.89*** (30.93)	1.65 (1.49)	190.41*** (11.80)	138.84*** (11.72)
Type 3 last period	2.53*** (2.92)	40.85**** (28.03)	80.97*** (9.82)	47.72*** (9.15)
Type 4 last period	256.62*** (13.96)	79.71*** (10.94)	13,577.67*** (17.33)	148.93*** (7.46)
Type 5 last period	257.51*** (12.99)	88.15*** (10.72)	129.22*** (6.40)	11,893.80*** (17.29)
Lagged employees (ln)	1.21** (2.40)	1.14* (1.93)	1.63*** (4.49)	1.48*** (3.72)
Lagged capital intensity (ln)	1.06* (1.95)	1.01 (0.19)	1.05 (1.23)	1.08 (1.57)
Lagged TFP (ln)	1.34** (2.01)	1.47*** (3.11)	2.06*** (3.87)	1.77*** (3.04)
Lagged R&D spending (dummy)	1.06 (0.27)	1.86*** (3.66)	1.37 (1.30)	1.70** (2.17)
Lagged foreign equity share	1.00 – (0.45)	1.01*** (5.00)	1.00 (1.10)	1.01*** (5.78)
Industry control	Yes	Yes	Yes	Yes
Region control	Yes	Yes	Yes	Yes
Year control	Yes	Yes	Yes	Yes
Number of observations	6,026			
Log likelihood	–3,308.49			
Pseudo R-squared	0.62			
Wald χ^2	10,660.50***			

R&D = research and development, SME = small and medium-sized enterprise, TFP = total factor productivity.
*p < 0.10, **p < 0.05, *** p < 0.01.

Notes: Numbers in parentheses are z-statistics associated with robust standard errors.

Source: Author’s calculations based on data from the Philippine Statistics Authority.

Finally, Table 3.11 summarizes the relative risk ratios from the multinomial logistic regression for the determinants of SMEs’ participation in GVCs. The explanatory variables are lagged to reduce endogeneity problems. Note that if the relative risk ratio is significantly

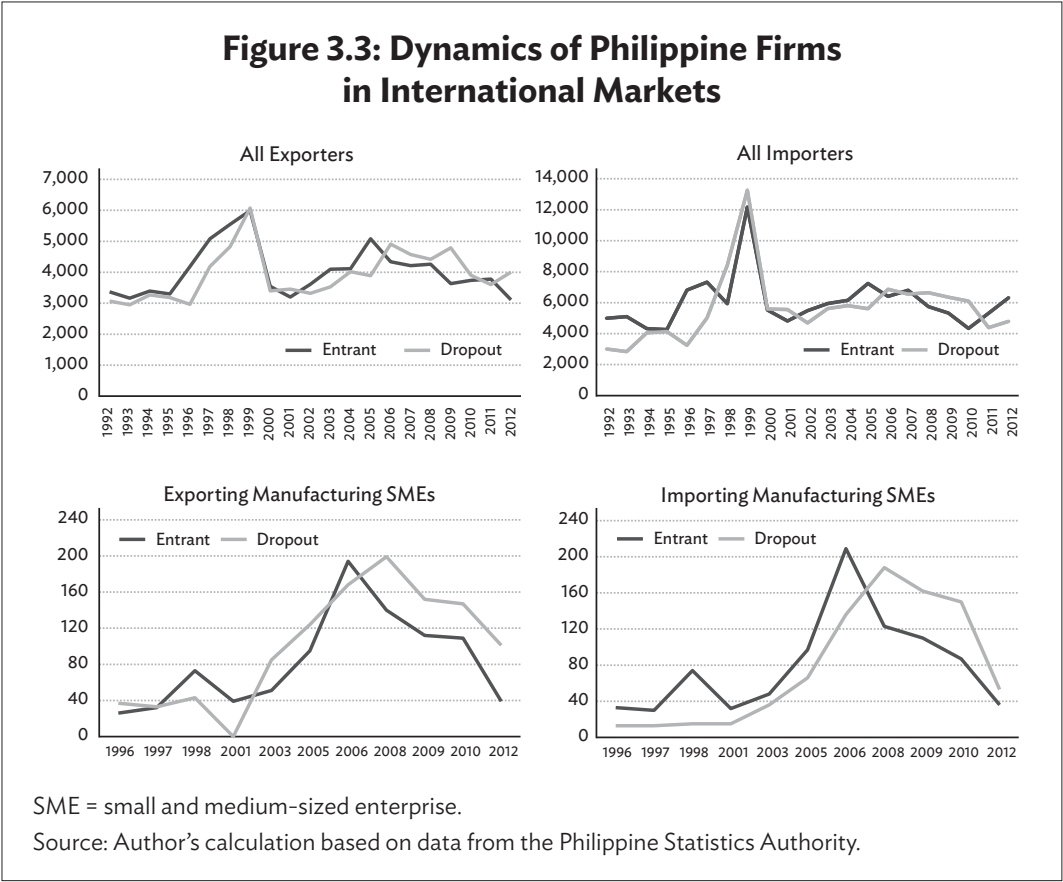
higher (lower) than 1, an increase in the variable of interest, *ceteris paribus*, increases (decreases) the odds of participating in a particular type of GVC activity instead of being purely domestic oriented. The results validate the hypothesis that all forms of past exporting and importing experience significantly contribute to the likelihood of a firm being in Type 4 or 5 in the current period. The heterogeneity literature commonly interprets this as the existence of sunk participation costs. In other words, firms that have hurdled the entry barriers in the last period will no longer be burdened by the same participation constraint in the current period. The results also formalize our previous findings that larger and higher-productivity SMEs are more likely to enter GVCs when there are huge entry barriers. However, R&D intensity and foreign ownership are significant contributors to Type 3 and 5 participation only. Interestingly, capital intensity is not significant when other firm-level characteristics are controlled for. This suggests that SMEs' participation in GVCs may be more labor- than capital-intensive.

3.4 Entry and Exit of Philippine SMEs in Global Value Chains

This section begins with a description of the dynamics of Philippine exporters and importers. Figure 3.3 illustrates the historical trend in firms' entry into and exit from international operations between 1992 and 2012. An entrant is defined as a firm present in t but not in $t - 1$, while a dropout at time t is present in $t - 1$ but not in the current period. Net entry is simply the difference between the number of entrants and the number of dropouts at time t . Note that this simple definition does not make a distinction regarding whether firms have a previous history of entry and exit.²⁴

The top left panel shows that the number of export entrants increased through 1999 but suddenly dropped in the succeeding 2 years. After the dot-com crisis in 2001, the number of entering exporters consistently increased up to 2005 but declined from 2006 to 2012. From 1992 to 2005, export entrants normally exceeded the number of dropouts, albeit by a small margin. However, net entry has been generally negative since 2006 due to the continuous decline of export entrants and the above average number of dropouts. From 1991 to 2012, the cumulative net entry was only 2,406 or 5.83% of all recorded entrants during the 22-year period.

²⁴ See Balaoing-Pelkmans (2017) for a more elaborate classification of entrants into and dropouts from the export market.

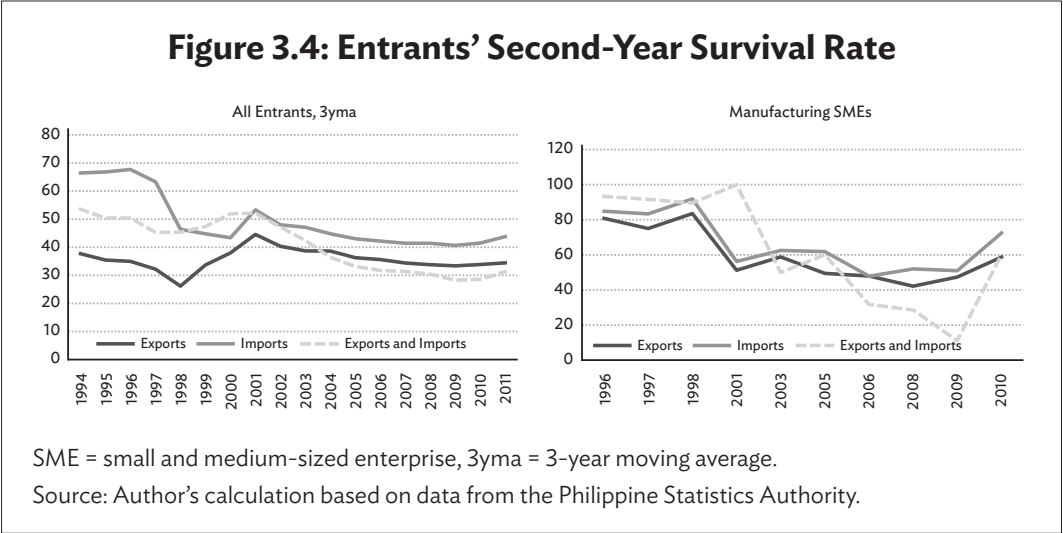


Unless this has been reversed in more recent years, this trend points to a serious erosion of the country's export base and aggregate trade performance. Using the same data set, Balaoing-Pelkmans (2017) also observed that not only has the share of new entrants in total exporters been declining in recent years, but many of these firms also belong to the subset of one-time exporters or those firms that immediately exit a year after entry. For importers, the top right panel indicates that there were more entrants than dropouts prior to 1997 and from 2002 to 2005. Similarly to exports, net entry was generally negative from 2006 to 2011. However, in 2012, the firms that started to import outnumbered those that stopped direct sourcing from abroad. From 1991 to 2012, the net entry to importing was 7,777 or 6.16% of all import entrants during the period.

The bottom panels show the entry and exit of traders with matched information from the firm-level data. Unlike the top panels, these are not necessarily the "universal" demographics since they only capture the trade participation of SMEs sampled in the manufacturing surveys. In line with the trend for all traders, the graphs show that, for both exports and imports, the number of sampled SMEs that started to

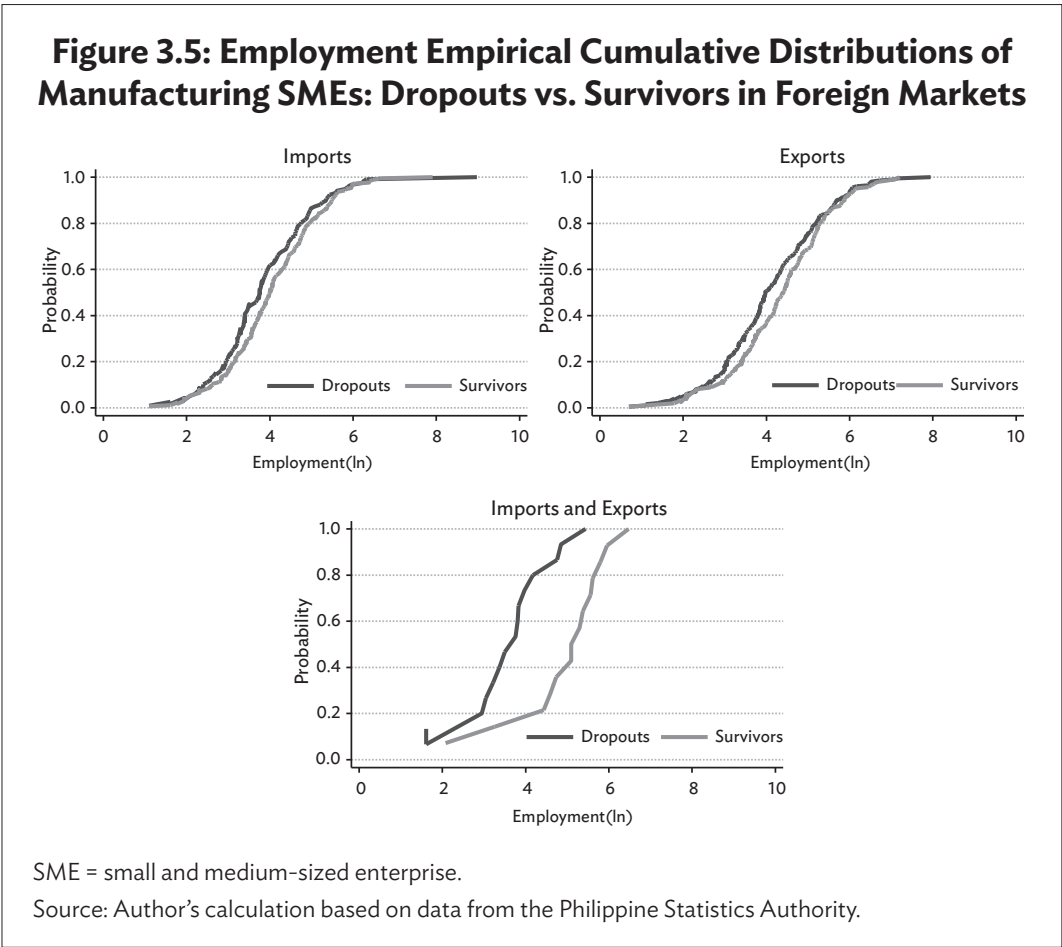
export or import has been declining since 2008. Further, the number of sampled dropouts has outnumbered the sampled entrants starting in 2008. One possible explanation behind this trend is that small businesses were more badly hit by the great recession in 2008–2009. SMEs probably took longer to recover after the crisis as they grappled with low demand, restricted credit access, and a limited safety net. The lingering global uncertainty after the crisis may have also made small firms more cautious. Less competitive SMEs might also be the ones kept out of foreign operations in the face of more liberal market policies pursued by the Philippines during the period coinciding with major trade agreements (e.g., the Association of Southeast Asian Nations [ASEAN] Free Trade Area). To the extent that these trends reflect the trading dynamics of the entire population of SMEs in manufacturing, the patterns above suggest that the erosion of the country’s export and import base may be partly traced to the negative net entry of SMEs in international operations. This may also explain why Philippine SMEs continue to make disproportionately low contributions to total exports and imports despite their dominance in terms of number.

Figure 3.4 shows the percentages of firms that survived in year t after entering foreign markets in $t - 1$. The graphs indicate that the second-year survival rate is generally higher for entrants in importing than in exporting. This suggests that it may be easier to continue importing than to keep exporting due to the higher costs of the latter. In addition, below-par export entrants have a high risk of exit in the face of strong foreign competition. Interestingly, the persistence of the sampled manufacturing SMEs in exporting or importing is higher than the overall survival rate. This is consistent with the earlier observation by Balaoing-



Pelkmans (2017) that the export survival rate of manufacturers is higher than the overall average. It can also be observed that the second-year survival rates have declined after 2000, although there was a slight reversal in 2010. After 2003, the proportion of new two-way traders that maintained the same status in their second year fell below the survival rates for all export and import entrants. This is consistent with our proposition that it is more difficult to engage in simultaneous exporting and importing since it requires more complex capabilities. Finally, it is worth noting that manufacturing SMEs that entered exporting and importing simultaneously in the midst of the global financial crisis also seemed more badly hit than other types of traders, with only one survivor out of the nine documented entrants in 2008. This reflects the fact that firms integrated into GVCs are more sensitive to global demand and supply shocks.

A closer look at manufacturing SMEs from 2008 to 2012 shows that survivors are mainly different from dropouts in terms of employment size. As illustrated in Figure 3.5, the employment distributions of survivors in importing, exporting, and two-way trading stochastically



dominate the respective distributions of dropouts. This suggests that among SMEs that entered foreign markets, the larger ones are more likely to survive after their first year. Interestingly, there is no similar compelling evidence for other firm attributes such as capital intensity and productivity. One possible explanation is that SMEs are not highly heterogeneous in these dimensions to begin with.

What factors affect these SMEs' entry into and exit from international operations? Following Baldwin and Yan (2017), the probability of GVC entry or exit is modeled as a function of lagged firm-level determinants. In particular, letting $ENTRY_{jt}(v_{jt-1}) = P(G_{jt} \geq 4 | G_{jt-1} < 4; V_{jt-1} = v_{jt-1})$, the probability of GVC entry can be expressed as:

$$ENTRY_{jt}(v_{jt-1}) = \frac{\exp(v'_{jt-1}\beta)}{1 + \exp(v'_{jt-1}\beta)} \quad (1)$$

Similarly, letting $EXIT_{jt}(v_{jt-1}) = P(G_{jt} < 4 | G_{jt-1} \geq 4; V_{jt-1} = v_{jt-1})$, the probability of GVC exit can be modeled as:

$$EXIT_{jt}(v_{jt-1}) = \frac{\exp(v'_{jt-1}\gamma)}{1 + \exp(v'_{jt-1}\gamma)} \quad (2)$$

where $v_{jt} = (x_{jt}, y_{jt}, z_{jt})$; x_{jt} is the vector of firm characteristics such as age, size, productivity, innovativeness, foreign equity ownership, and past international experience; y_{jt} is the vector of macro-level policy variables; z_{jt} is the vector of industry fixed effects; and β and γ are vectors of coefficients. SMEs that are in GVCs in periods $t - 1$ and t are dropped from the entry regressions; SMEs not in GVCs in periods $t - 1$ and t are excluded from the exit model.

The results of the logistic regressions for GVC entry are summarized in Table 3.12. Interestingly, the estimates consistently show that age is negatively related to the probability of entering GVCs, holding other things constant. This suggests that younger SMEs are more likely than older ones to engage in two-way trading. According to Love, Roper, and Zhou (2016), age may be positively related with inflexible strategies or sclerotic behavior (i.e., the "liability of ageing"). For instance, older SMEs that have already established a strong presence in domestic markets may find it less attractive to go through the costly process of entering GVCs.

The estimates also point to a positive contribution of lagged TFP to the probability of SMEs' entry into GVCs. This is consistent with the argument that highly productive firms self-select into production

**Table 3.12: Determinants of Manufacturing
SMEs’ Entry into Global Value Chains**

	1	2	3	4
Lagged age	−0.035*** (0.009)	−0.037*** (0.010)	−0.037*** (0.009)	−0.037*** (0.010)
Lagged employment (ln)	0.151 (0.134)	0.124 (0.139)	0.117 (0.141)	0.117 (0.141)
Lagged TFP (ln)	0.367** (0.157)	0.370** (0.157)	0.372** (0.158)	0.372** (0.158)
Lagged foreign ownership (dummy)	0.595*** (0.226)	0.596*** (0.227)	0.596*** (0.227)	0.596*** (0.227)
Lagged R&D spending (dummy)	0.281 (0.277)	0.301 (0.278)	0.293 (0.277)	0.293 (0.277)
Lagged SEZ+ indicator	0.984*** (0.250)	0.965*** (0.250)	0.965*** (0.249)	0.965*** (0.249)
Lagged importer status (dummy)	1.018*** (0.214)	1.035*** (0.213)	1.033*** (0.213)	1.033*** (0.213)
Lagged exporter status (dummy)	−0.072 (0.253)	−0.073 (0.253)	−0.072 (0.253)	−0.072 (0.253)
Financial institutions access index		15.845* (8.716)		
Simplicity of customs procedure			2.172* (1.146)	
Tariff rate (weighted average)				−0.205* (0.108)
Industry controls	Yes	Yes	Yes	Yes
No. of observations	5,155	5,155	5,155	5,155
Wald’s χ^2	195.25***	206.56***	212.95***	212.84***
Goodness-of-fit χ^2	4,869.77	4,740.57	4,694.84	4,695.40
Pseudo R-squared	0.098	0.101	0.101	0.101

R&D = research and development, SEZ = special economic zone, SME = small and medium-sized enterprise, TFP = total factor productivity.

* p < 0.10, ** p < 0.05, *** p < 0.01.

Numbers in parentheses are robust standard errors.

Source: Author’s calculations based on data from the Philippine Statistics Authority, International Monetary Fund, World Economic Forum, and World Bank.

networks when there are huge entry costs. Choosing highly qualified producers is also important for lead firms given that even small errors by incompetent suppliers may cause serious supply chain disruptions. The results also indicate that past importing experience increases the likelihood of GVC entry, partly through its productivity-enhancing effect. The dummy for past importing also represents the sunk costs associated with this activity. Firms that import not only benefit from the superior quality and technology embedded in foreign inputs, they also learn how to navigate foreign markets. This finding is in line with the findings in Damijan and Kostevc (2015) and Castellani and Fassio (2017) that importing allows SMEs to “dress up” for their eventual export market entry. Interestingly, after controlling for importing, the positive effect of past exporting activities on SMEs’ entry into GVCs becomes insignificant. One possible explanation is that there are sunk costs common to both activities; hence, controlling for both effectively makes the other redundant. This finding is also consistent with the general lack of empirical support for learning by exporting.

Foreign-owned manufacturing SMEs are more likely to participate in GVCs. In fact, this has the largest marginal effect among all statistically significant variables. There are several reasons why multinational linkages could facilitate an SME’s internationalization. First, Jongwanich and Kohpaiboon (2008) suggested that foreign-owned firms are better able to overcome the sunk entry costs than purely domestic producers. This is not surprising given that affiliates and subsidiaries often receive technology transfers, loans, and technical support from parent companies. For instance, MNCs may assist their local partners in complying with international product standards. Second, having access to MNCs’ extensive network of exporters and importers means that local manufacturers may skip the costly search for foreign buyers and suppliers. In fact, lead MNCs may facilitate the matching themselves if the transactions involve key inputs. Lastly, Baldwin (2014) suggested that cross-border movements of goods and investment intertwine because foreign direct investment is increasingly used as an instrument of the global unbundling of production. In other words, MNCs put up foreign affiliates and subsidiaries precisely to build a pool of suppliers for their globally dispersed value chains.

In connection with foreign ownership, the results also show that SEZs are a major gateway into international production networks. This is not surprising given that many economic zones in the Philippines are created to attract large MNCs, hoping that their backward linkages will stimulate greater GVC participation among local firms. There are several ways in which SEZs may facilitate the GVC entry of SMEs. First, the relocation of foreign MNCs and their original suppliers (i.e.,

follow sourcing) may generate new demand for the inputs produced by SMEs. Second, the various fiscal and nonfiscal incentives²⁵ offered to SEZ locators may also encourage local firms to start trading. Lastly, transactions inside industrial parks may create demonstration effects and knowledge spillovers that SMEs may use to facilitate their own foreign market entry. Interestingly, lagged employment size becomes insignificant after controlling for lagged TFP and foreign ownership. In other words, among foreign-owned SMEs with similar productivity profiles, the larger SMEs are not necessarily the ones that join production networks.

Table A3.1 in the Appendix suggests that the GVC entry of large manufacturers is driven by factors not exactly similar to the determinants of SMEs' participation in GVCs. For large firms, lagged R&D dummy and past exporting experience are highly significant, lagged employment is weakly significant, and lagged age and lagged TFP are not significant. Foreign ownership, past importing activities, and proximity to SEZs are important for both SMEs and large establishments. These three variables can be classified as universal factors that positively contribute to the GVC participation of any establishment. On the other hand, age and productivity seem to be the variables that uniquely determine the entry of Philippine SMEs into production networks. This is consistent with our previous argument that the TFP threshold for foreign market participation postulated in Melitz (2003) is only binding for smaller firms because they are less productive to begin with. Large businesses tend to be above this threshold regardless of whether they are domestic- or foreign-oriented. In terms of policy, this finding suggests that SMEs, especially promising start-ups, will benefit from productivity-enhancing programs and interventions. Following the growth literature, this means providing massive support to stimulate R&D and innovation activities among small businesses, widen technological and information access, and boost human capital through technical training and continuing education. At the same time, SMEs wanting to internationalize will benefit from a deeper access to foreign networks, investments, inputs, technology, and information. To this end, more liberal investment policies, lower input tariffs, and logistics and information and communication technology development should be pursued.

Due to data limitations, the response of SMEs' participation in GVCs to policy changes was analyzed using several macro-level variables. Model 2 in Table 3.12 adds the International Monetary Fund's financial institutions access index as a proxy for the ease of credit access in the

²⁵ For example, corporate income tax holidays, tax- and duty-free importation of raw materials, machineries, and equipment, and simplified customs procedures.

Philippines. Intuitively, internationalization may require financing for new skills, physical and technological investments, market research, and networking. Model 3 adds the score for the Philippines in the World Economic Forum's subindex for the simplicity of customs procedure as a proxy of trade facilitation. In theory, making customs procedures and administrative regulations simpler and less costly for SMEs should encourage them to increase their participation in foreign markets. Model 4 includes the average tariff rate of the Philippines as a proxy for the openness of the country's trade policy. The estimated coefficients for the three variables yield the expected signs, although they are weakly significant. This is not surprising given that the indicators lack variability across time and especially across firms. The proxies for ease of access to finance and efficient trade facilitation have positive coefficients, indicating that improvements in these areas may help reduce the barriers to GVC entry. Conversely, the average tariff rate has a negative sign since a less restrictive trade policy should encourage more SMEs to participate in production networks. Given that GVC firms typically import in order to export, lower tariff rates mean greater access to cheaper and better-quality inputs, and potentially higher output and profits.

Interestingly, these policy variables are not significant in the large firm regressions. Given the imperfections of our proxies, this does not necessarily mean that the GVC entry of large establishments will not benefit from improvements in credit access, trade openness, and trade facilitation. Instead, what these results suggest is that, although SMEs face the same barriers as large businesses, they are often disproportionately affected by both positive and negative changes in the policy environment. For instance, the OECD and ERIA (2018) noted that, while well-functioning financial markets benefit all firms, access to finance (or the lack of it) is more important for smaller enterprises. Put differently, financial constraints are more detrimental to the growth of SMEs than large firms. This is partly because small establishments usually operate within harsher business conditions. In the presence of information asymmetries, lending to SMEs also entails larger transaction costs due to the need to conduct more rigorous appraisal and monitoring. This, in turn, may result in higher borrowing rates, or worse, credit rationing. Within the context of GVC participation, a survey by the Asian Development Bank (ADB) that covered Philippine firms noted that improvements in nonfinancial aspects such as product quality and human capital are the critical factors required to successfully integrate SMEs into GVCs (ADB and ADBI 2015). For instance, supplying to competitive foreign markets is almost impossible for firms unable to hurdle the costly process of securing quality certifications. However, the study also identified access to finance as the most pressing factor

in enabling SMEs to address their nonfinancial problems. In a survey of Philippine SMEs in production networks, Aldaba et al. (2010) also found that firms rank financing as the most important type of assistance they need in order to overcome the constraints to their business operations. Nevertheless, ADB and the ADB Institute (2015) also emphasized the importance of promoting financial literacy since the credit access problem may be exacerbated by SMEs' preconceptions that they cannot comply with the tedious and costly requirements of external financing.

Similarly, inefficient logistics, cumbersome administrative and regulatory procedures, complex documentation, and numerous customs formalities tend to disproportionately burden small firms. This is because SMEs often lack the financial and human resources to deal with the costly, highly technical, and time-consuming processes associated with exporting and importing. In general, López-González and Sorescu (2019) argued that, among various trade facilitation reforms, "measures such as streamlining of procedures, automation of the border process, simplification of fees, and consultations with traders" appear to benefit SMEs more than larger firms. They also found that the trade facilitation environment in export destinations or in import sources matter as much as the domestic condition. This highlights the importance of harmonized international reforms in trade facilitation measures. In this regard, multilateral efforts such as the WTO's Trade Facilitation Agreement may provide the common guiding principles to ensure coherence and uniformity. Among the measures in the Trade Facilitation Agreement, the International Trade Centre (2018) identified the following as the most important for SMEs: publication and availability of information in a timely manner and in a less complex format and language; enquiry points where traders can file information requests; advance ruling (e.g., on tariff classification, customs valuation method, and admissibility of goods); single window; risk management; publication of release times; limiting mandatory use of customs brokers; and expedited shipments. In general, these measures seem to promote easy access to information, as well as streamlining and automation of procedures. In the Philippines, specific programs on SME trade facilitation are not well defined in the current Micro, Small and Medium Enterprise Development Plan 2017–2020. The OECD and ERIA (2018) also commented that the country's trade facilitation initiatives for SMEs are often fragmented. Nevertheless, the Philippines made recent progress, with TRADENET.gov.ph finally going live on 31 December 2019. TradeNet is the country's online platform that connects the National Single Window to the ASEAN Single Window. The platform hopes to reduce communication costs by 10% by linking 78 trade regulatory agencies and simplifying the documentary process for around 7,400 products (Laforga 2020).

Table 3.13: Determinants of Manufacturing SMEs’ Exit from Global Value Chains

	1	2	3
Lagged age	−0.000 (0.012)	−0.000 (0.012)	−0.000 (0.012)
Lagged employment (ln)	−0.270** (0.119)	−0.297** (0.120)	−0.302** (0.120)
Lagged TFP (ln)	−0.289 (0.212)		
Lagged productivity (ln)		−0.165* (0.087)	
Lagged unit labor cost (ln)			0.178* (0.106)
Lagged foreign ownership (dummy)	−0.732*** (0.205)	−0.737*** (0.208)	−0.775*** (0.204)
Lagged R&D spending (dummy)	−0.103 (0.282)	−0.066 (0.283)	−0.090 (0.283)
Lagged SEZ+ indicator	−0.144 (0.203)	−0.088 (0.208)	−0.099 (0.208)
Industry controls	Yes	Yes	Yes
No. of observations	1,098	1,085	1,085
Wald’s χ^2	55.26***	55.56***	55.36***
Goodness-of-fit χ^2	1,073.57	1,063.52	1,063.73
Pseudo R-squared	0.062	0.065	0.064

R&D = research and development, SEZ = special economic zone, SME = small and medium-sized enterprise, TFP = total factor productivity.

* p < 0.10, ** p < 0.05, *** p < 0.01.

Numbers in parentheses are robust standard errors.

Source: Author’s calculations based on data from the Philippine Statistics Authority, International Monetary Fund, World Economic Forum, and World Bank.

Finally, Table 3.13 suggests that there is some asymmetry in the factors that affect the GVC entry and exit of SMEs. Age, TFP, and nearness to SEZs are not significant deterrents to GVC exit, although they are important determinants of entry. Moreover, foreign ownership significantly reduces the likelihood that firms will stop two-way trading. This suggests that stable linkages with MNCs may be the most important factor in staying connected to GVCs. Especially during bad times, lead

firms may assist their key suppliers by extending financial and managerial support, trainings, and technological upgrading. Unlike arm's-length suppliers, affiliates and subsidiaries of MNCs cannot just exit since they usually perform specialized functions that are integral to value chain operations. For captive suppliers, the decision to cease production is not theirs to make but is determined at the headquarters. Interestingly, controlling for foreign ownership made lagged TFP insignificant, indicating that higher productivity makes no additional contribution to the survival of foreign-owned SMEs. However, the results indicate that larger SMEs are less likely to exit production networks, other things held constant. This is consistent with our previous finding that survivors and dropouts from foreign markets are primarily distinguished by size and not necessarily by productivity level. This result also implies that since SMEs tend to specialize in labor-intensive functions, their ability to stay competitive may depend on having a large and highly efficient workforce. True enough, the regressions obtained intuitive but weakly significant effects when TFP was replaced by labor productivity and unit labor cost.

3.5 Concluding Remarks

This chapter explored firm-level data from the Philippines to uncover new stylized facts about the participation of manufacturing SMEs in production networks. The empirical analysis shows that manufacturing SMEs are weakly connected to foreign markets, especially GVCs. Compared to large manufacturers, SMEs also trade fewer products with a smaller set of foreign partners. The evidence also suggests that self-selection into exporting and importing may be more relevant for SMEs than for large manufacturers. The logistic regressions partly support this view, with TFP being a significant contributor to the GVC entry of SMEs but not of large manufacturers. In general, the factors driving GVC entry are not exactly similar for small and large manufacturers. For large firms, employment size and R&D are significant. Conversely, age and TFP seem to be the variables that uniquely determine the entry of Philippine SMEs into production networks. Foreign ownership, past importing activities, and proximity to economic zones can be considered universal factors important to all establishments. The regressions also indicate that SMEs may be disproportionately affected by changes in the policy environment. Finally, the results highlight some asymmetries in the factors that affect the GVC entry and exit of manufacturing SMEs. Only size and foreign ownership make significant positive contributions to survival.

The above results have important policy implications. First, the empirical support for SME heterogeneity calls for a more nuanced

approach to industrial and export policy. This requires a deeper understanding of the structures and compositions of different sectors to ensure that the interventions are designed according to the specific need of a particular industry. Given that SMEs are not simply smaller versions of large establishments, programs and projects targeted at big firms may not necessarily apply to SMEs. Similarly, interventions that work for large businesses may generate mixed results for SMEs. Thus, it may be imperative for policy makers to always make a distinction between SMEs and large firms when formulating export promotion, competitiveness, and trade facilitation policies. Given that superior SMEs normally self-select into international operations, the government should pay more attention to programs that can help weaker SMEs acquire the capabilities necessary to overcome the barriers to GVC participation. Since small firms have limited access to financial and technological resources, policy should focus more on building an institutional infrastructure (e.g., the policy framework assembled in the MSME Development Plan) that will support the growth of small local manufacturers with international potential. In the words of Mayer and Ottaviano (2007), do not waste time helping the incumbent superstars “but instead nurture the superstars of the future.” However, given that even large GVC suppliers in the Philippines are concentrated in unsophisticated activities, a more appropriate strategy would be to help graduate existing GVC firms to better functions and pave the way for the eventual GVC entry and long-run upgrading of promising SMEs. This may include specific policy support to help local producers overcome the various fixed costs identified above. Nevertheless, proactive policy is still important to ensure that big manufacturers operate within a stable business environment, both domestic and abroad. The ideal scenario may be characterized by an efficient networking of domestic producers in a multilevel setup where bigger GVC firms collect, consolidate, and process the inputs from lower-tier small suppliers. The wider access to these indirect channels of exporting and importing where entry costs are lower may stimulate a greater GVC participation of local SMEs. This may also result in higher domestic value added to GVC trade. It is also worth noting that while multinational linkages may facilitate greater GVC integration, the government should still adopt a more strategic trade and investment policy that will promote diversification outside labor-intensive activities and toward more sophisticated and higher-value-adding GVC activities.

In terms of exit and survival, the results suggest that local SMEs connected to GVCs need to develop new competencies other than their multinational linkages and labor advantage. In particular, the positive but insignificant contributions of TFP and R&D to survival indicate

that SMEs must exert purposeful effort to build stronger technological capabilities, nurture innovative tendencies, increase absorptive capacity, and boost overall productivity. These are important steps in making sure that SMEs not only survive but also eventually move up the value chain. While survival is a necessary short-run objective, SMEs should strive to fully capture the long-term benefits of global integration by upgrading to complex GVC activities where technologies and inputs are more sophisticated and value creation is larger.

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Appendix

Table A3.1: Determinants of Large Manufacturers’
Global Value Chain Entry and Exit

	Entry	Exit
Lagged age	−0.001 (0.013)	−0.008 (0.011)
Lagged employment (ln)	0.393* (0.221)	−0.163 (0.132)
Lagged TFP (ln)	−0.269 (0.345)	0.074 (0.265)
Lagged foreign ownership (dummy)	0.782** (0.322)	−0.620* (0.337)
Lagged R&D spending (dummy)	0.769** (0.356)	0.302 (0.286)
Lagged SEZ+ indicator	0.899** (0.432)	0.221 (0.265)
Lagged importer status (dummy)	1.228*** (0.350)	
Lagged exporter status (dummy)	−1.179*** (0.345)	
Industry controls	Yes	Yes
No. of observations	1,210	849
Wald’s χ^2	55.56***	38.38***
Goodness-of-fit χ^2	1,248.03	802.68
Pseudo R-squared	0.1274	0.0570

R&D = research and development, SEZ = special economic zone, TFP = total factor productivity.

* p < 0.10, ** p < 0.05, *** p < 0.01.

Numbers in parentheses are robust standard errors.

Source: Author’s calculations based on data from the Philippine Statistics Authority.

4

Human Capital and Participation in Global Value Chains: Evidence from SMEs in Indonesia

Vutha Hing, Shandre Thangavelu, and Dionisius A. Narjoko

4.1 Introduction

The structure of world production now consists of highly integrated global and complex networks of firms involved in the production of intermediate parts and components, assembly, and distribution of the final outputs to consumers worldwide, commonly known as global value chains (GVCs)¹ (De Backer, De Lombaerde, and Iapadre 2018). As a consequence, the exchange of goods and services leads to a global production network. In the past decade, global supply chain trade has accounted for over 50% of goods trade and almost 70% of service trade (Gurriá 2015).

¹ Gereffi, Humphrey, and Sturgeon (2005) put forward the term “global value chains or GVC” to describe the new global production configuration in which countries source goods and services from several countries within an established network of firms that lead firms coordinate. Different disciplines use different terminologies for this phenomenon. For example, economists like Arndt and Kierzkowski (2001) and Grossman and Rossi-Hansberg (2008) defined such a production process as “production fragmentation,” while economic geographers like Henderson et al. (2002) and Coe, Dicken, and Hess (2008) conceptualized it as a “global production network.” This chapter acknowledges the differences in the underlying concepts of value chains. Nevertheless, we use these terminologies interchangeably.

The rise² of GVCs is transforming global trade and investment in several key dimensions. Baldwin (2012) asserted that GVCs are transforming developing countries in terms of creating linkages between global and domestic trade and industrial structure. The less developed countries are able to participate in the global production value chain based on their comparative and competitive advantages. Cadestin et al. (2018) also supported the new thinking of “bringing industrial policy into global value chains” based on the ground that GVCs provide a fast and easy path to industrialization and development. Although there is no consensus, growing evidence suggests that participating in GVCs offers a wide range of economic benefits in terms of increasing trade and investment, as well as enhancing competitiveness and growth (UNCTAD 2013; OECD 2013; Cattaneo et al. 2013; World Bank 2020). These benefits have led to a popular trend whereby almost all countries aspire to join GVCs.

The prevalence of GVCs is also changing the role of firms, including small and medium-sized enterprises (SMEs), in international trade. Firms no longer strive to develop integrated industries but rather to link with value chain actors, specialize in a specific task or stage in the GVC, and move up value chains. Such a business strategy can in turn bring them substantial gains, including, among others, enhanced efficiency and productivity (Kang et al. 2010; Miroudot, Lanz, and Ragoussis 2009) and the potential transfer of technology and knowledge (De Backer, De Lombaerde, and Iapadre 2018; Cattaneo et al. 2013). GVCs offer SMEs a new platform to connect to foreign partners that could eventually help them to upgrade their products and boost their productivity and output growth (González et al. 2019). However, the critical challenge is that only a small proportion of SMEs manage to join production networks effectively. According to the World Trade Organization (2016), about 10% of manufacturing SMEs and 3.5% of services are involved in supply chain activities. The level of integration for large firms is significantly higher (26.7% for the manufacturing sector and 36% for services). This raises the fundamental question of which factors help SMEs to join GVCs.

This chapter examines the performance of SMEs in terms of linkages with GVCs. In particular, we examine the factors that affect

² Technological progress, advances in the transport and logistic sector that lead to a significant decline in trade costs, more liberal policies toward freer trade and investment flows, and the opening up of emerging economies, especially the People’s Republic of China and India, drive the rapid proliferation of GVCs (Baldwin 2013; Humphrey and Schmitz 2002; De Backer, De Lombaerde, and Iapadre 2018; Amador and Cabral 2016; Baldwin 2012; Athukorala 2011).

the participation of SMEs in GVCs in the Indonesian manufacturing sector using firm-level data. Further, we look closely at human capital development and its impact on SMEs' participation in GVCs. The chapter examines firm dynamics using firm-level data from Indonesia's Annual Manufacturing Survey in 1996 and 2006.

The empirical research examining the effects of SMEs on GVC activities in developing countries remains limited. Some recent studies, including Abe (2015); Harvie, Narjoko, and Oum (2010b); and Wignaraja (2012), have examined the challenges and opportunities for SMEs in GVCs, as well as empirically assessed the factors shaping SMEs' role in production networks. However, the major limitation of some prior studies rests on their research methods and sources of data. Some relied on perception from a survey of a limited number of firms to draw an argument that the low GVC participation of SMEs is mainly due to their lack of business networks, limited financial and human capital resources, lack of production and distribution competence, and difficulties in complying with complex trade procedures. The findings from studies of this sort provide insights into SMEs' challenges, yet they lack rigorous and econometric techniques to explain these relationships. Others, such as Harvie, Narjoko, and Oum (2010a) and Wignaraja (2012), applied an appropriate method to assess the determinants of SMEs' participation in GVCs. Nevertheless, these studies did not focus on Indonesian SMEs and on quantifying the impact of human capital on SMEs' participation in GVCs. This chapter, therefore, aims to fill this gap by focusing on the effect of human capital and other firm-level characteristics on SMEs' participation in GVCs in Indonesia.

4.2 Theoretical Background and Literature Review

The literature on SMEs and GVCs can be grouped into two broad categories. The first strand of literature focuses on conceptualizing SMEs' engagement in production networks. The framework by Harvie (2010) is one among a few that elaborate the possible roles of SMEs in production networks and the factors determining their business outcomes. SMEs can join the production process at various levels. They can be lower- or higher-tier suppliers according to their resources and psychological factors. Resource factors, which include, among others, financial resources, technology, market access, and skilled labor, essentially influence SMEs' capacities. Psychological factors relate to corporate norms, such as self-efficacy, business culture, desire, and commitment. The external environment, such as government policies

and domestic and overseas market conditions, can also have an effect on SMEs' trajectory in production networks. Also highly relevant to the SME–GVC nexus is the WTO (2016) illustration of alternative trajectories for SMEs to engage in GVCs. According to this report, SMEs can participate in GVCs by either exporting goods or services directly to firms overseas or supplying inputs to local firms that produce for exporting. Studies refer to this mode of engagement as “forward GVC participation.” Alternatively, SMEs can participate in value chain activities by sourcing inputs from foreign suppliers to produce goods and services for domestic consumption and exports. Such a mode of integration reflects upstream linkages with foreign partners and is known as “backward GVC participation.”

It is worth noting that these two concepts have different focuses. Harvie's 2010 framework, on the one hand, articulates how firm capacities, the corporate culture, and the national business environment influence SMEs' behavior in value chain activities. The WTO (2016) definitional concept, on the other hand, specifically focuses on measuring firms' participation in GVCs. Notwithstanding, several empirical studies have used these concepts as the basis for designing empirical specifications. For example, Harvie, Narjoko, and Oum (2010a) applied Harvie's framework to draw an econometric specification for assessing the determinant factors of SMEs' participation in production networks. Thanh, Narjoko, and Oum (2009) also used the framework as a guideline for designing a country-specific case study on SME integration. The production networks in the study by Cadestin et al. (2018) followed the definition of SME participation in GVCs from the WTO (2016) and merged the WTO–OECD's Trade in Value-Added (TiVA) with enterprise data to map the participation of multinational enterprises in GVCs. González (2017) followed the same procedure to map the GVC participation of SMEs in the Association of Southeast Asian Nations (ASEAN).

The second strand of literature emphasizes the empirical investigation of the factors affecting SMEs' integration into GVCs. Some studies have used pooled firm-level data from various countries, while others have specifically examined a country case study. Harvie, Narjoko, and Oum (2010a); Wignaraja (2013); Duval and Utoktham (2014) and Arudchelvan and Wignaraja (2016) are a few examples of studies on SMEs' participation in GVCs using multi-country firm-level data. Despite using different datasets, these studies adopted similar econometric specifications and explanatory variables. Specifically, Wignaraja (2012) used the World Bank Enterprise Survey (WBES) to investigate the factors influencing SMEs' participation in supply chains for five ASEAN economies. The firm-specific factors included firm size,

year of establishment, type of ownership, technological capabilities, access to finance, education and skills of employees, and education and experience of executives. He tested several hypotheses, one of which was that a higher level of human capital correlates positively with joining supply chain trade. The findings supported the hypothesis that human capital is vital in supply chains. Having workers with a high level of education increases the probability of a firm joining supply chain trade. Other firm-specific factors, such as size, technological capacities, and access to credit, were also important for SMEs to join GVCs.

Duval and Utoktham (2014) used the WBES from 122 countries to conduct a similar empirical assessment. They defined SMEs as participating in a production network if they engaged in direct exports or indirect exports (supplying goods and services to domestic firms that produce for exporting). Their empirical results suggested that technology, international quality certification, access to finance, and foreign ownership increase the probability of SMEs' participating in international production networks. They chose the proportion of unskilled workers as a proxy for human capital and generally found no significant effect on SMEs' participation in value chains.

Harvie, Narjoko, and Oum (2010b) constructed a dataset from an SME survey in seven ASEAN countries to identify the challenges facing SMEs and then to assess the determinants of SMEs' participation in production networks. They examined the direct and indirect effects of SMEs' activities in production networks. The study found that productivity, foreign ownership, and access to financial institutions significantly determines the participation of SMEs in production networks. SMEs that were active in the innovation process also increased their likelihood of engaging in production networks. Interestingly, proximity to special economic zones and ports, size, and age appeared to have no effect on SMEs' participation in production networks. Skill intensity, which the study measured using the ratio of non-production workers to production workers, denoted the human capital resources of firms. However, the results were quite unstable across specifications, and, in general, human capital resources appeared to be insignificant. The findings highlighted the importance of technology and know-how, foreign connection through ownership, and the adoption of new business ideas for SMEs to be competitive and participate successfully in production networks.

The recent study by Chuc, Anh, and Thai (2019) quantified the factors that help Vietnamese SMEs participate effectively in production networks based on a survey of 208 enterprises. The estimation also accounted for skill intensity, which the study defined as the share of workers with higher education in the total number of workers, and

training expenditure. Like earlier studies, the coefficients of size, foreign ownership, and productivity were positive and statistically significant. The authors found that skills have a positive and significant association with the propensity to join production networks, but such an effect does not happen for investment in training. The findings also indicated that SMEs that have a better connection with foreign markets and more active industry and business associations are relatively more likely to join GVCs. Also using micro-level data from Vietnamese manufacturing firms is the work by Thangavelu (2014). Despite quantifying the productivity spillovers of horizontal and backward foreign direct investment linkages, this study highlighted the importance of investment in human capital in helping local firms to improve their efficiency and productivity, which consequently increases their probability of linking with foreign firms and production networks.

Empirical research on Indonesian SMEs in GVCs is scarce in the existing literature. Machmud and Siregar (2009) compared the characteristics of SMEs joining production networks based on data from a survey of 105 firms. They found that SMEs in production networks are generally bigger, use modern production methods, are more open to international business, and have a higher percentage of workers with a high level of education. Although most of these results are consistent with the theoretical prediction, it is hard to draw a conclusive statement due to the problem of sampling and the absence of empirical procedures to quantify the effects. Anas, Mangunsong, and Panjaitan (2017) used descriptive statistics from an SME survey to portray the nature of Indonesian SMEs in the ASEAN economic integration. They also applied the probit estimation approach to assess the impact of free trade agreements (FTAs) on exports and imports. The results indicated that exporting and importing SMEs are more likely to understand ASEAN economic integration better and have business relationships with foreign partners. The study also found that FTAs have encouraged firms to export and import. The research by Thangavelu, Nuryartono, and Findlay (n.d.) differs from the other two studies in the sense that it used a large dataset from the Indonesian Annual Manufacturing Survey (IAMS) for its empirical estimation. Despite focusing primarily on the impact of service activities on the productivity of the manufacturing sector, the findings implied that the servicification of manufacturing activities helps to foster Indonesian firms' participation and moving up in value chains. Human capital is one of the fundamental factors that drive service activities, and therefore the development of skills for workers will be critical to support and develop new service linkages and the productive capacity of the Indonesian manufacturing sector in global and regional production value chains (Thangavelu, Nuryartono, and Findlay, n.d.).

4.3 Overview of Indonesian SMEs

4.3.1 SMEs in the Indonesian Economy

The latest statistics on the contribution of SMEs³ to business establishments, employment, gross domestic product (GDP), and exports prove that these enterprises are critical for Indonesia’s economy. The consistent provision for SME development in the Indonesian government’s 5-year development plans as well as considerable program support for SMEs have also magnified their significance in the economic trajectory and social inclusion. According to statistics from the Ministry of Co-operatives and SMEs, which Table 4.1 presents, Indonesia

Table 4.1: Key Characteristics of Indonesian Enterprises by Firm Size, 2017

	% of Total Enterprises	% of Employment	% of GDP	% of Exports	Labor Productivity*
A. MSMEs	99.99	97.3	57.08	14.17	\$44,133
Microenterprises	98.92	90.8	30.06	1.26	\$8,400
Small enterprises	0.99	3.5	12.54	2.48	\$41,460
Medium-sized enterprises	0.08	3	14.49	10.44	\$82,540
B. Large enterprises	0.01	2.7	42.92	85.83	\$266,328

GDP = gross domestic product, MSMEs = micro, small, and medium-sized enterprises.

* The figure refers to the average GDP per employee for 2013, cited in OECD (2018).

Note: Microenterprises are those with assets below Rp50 million or sales below Rp300 million; small enterprises are firms with assets of Rp50 million to Rp500 million or sales between Rp300 million and Rp2.5 billion; and medium-sized enterprises are firms with assets between Rp500 million and Rp5 billion or sales between Rp2.5 billion and Rp50 billion.

Source: Ministry of Co-operatives and SMEs.

³ There is no single official definition of SMEs in Indonesia. Although the country has a legal SME definition in Law No. 20/2008 that differentiates MSMEs by sales turnover and net assets, other public administrations, such as the Central Board of Statistics (BPS), use employment criteria to define SMEs. This chapter adopted the SME definition in Law No. 20/2008. Precisely, micro-enterprises are those with assets below Rp50 million or sales below Rp300 million; small enterprises are firms with assets of Rp50 million to Rp500 million or sales between Rp300 million and Rp2.5 billion; and medium-sized enterprises are firms with assets between Rp500 million and Rp5 billion or sales between Rp2.5 billion and Rp50 billion. Although many official statistics disaggregate microenterprises, the term “SMEs” in this chapter often includes microenterprises.

had 62.93 million enterprises in 2017, of which 99.99% were SMEs. Microenterprises were predominant, accounting for 98.92% of the total establishments. In terms of economic activities, the wholesale and retail trade sector accounted for 46% of non-agricultural Indonesian SMEs in 2016, followed by the manufacturing sector and hospitality and catering services, each representing 17% of the total (OECD 2018). Undoubtedly, the dominance of establishments has made SMEs the biggest source of employment in Indonesia. About 97% of occupations in 2017 were in SMEs, and the remaining 2.7% were in large enterprises. Again, the largest proportion of employment was in microenterprises.

The contribution of SMEs to national outputs is not as dominant as that of employment. SMEs contributed about 57% to the GDP in 2017 compared with 42.9% from large enterprises. This outcome reflects a significant gap in labor productivity. The average value added per employee at the current price in 2013 for SMEs was \$44,133, which was six times lower than that of large enterprises. The lowest productivity was in microenterprises, with a productivity level that increased with the size of enterprises. SMEs' participation in export activities was significantly lower. The share of microenterprises in the total exports was 1.26%, 2.48% for small enterprises, and 10.44% for medium-sized enterprises. Large enterprises accounted for the remaining 86% of exports. The underrepresentation of SMEs in export activities is actually a common pattern in most developing countries, since exporting requires significant initial investment in foreign market research, business networks with foreign partners, and product standards and compliance. These require financial resources and technical capabilities, which are often the major constraints facing SMEs.

4.3.2 SME Development Policies

The Indonesian government has adopted a number of strategic directions for SME development. The key directive is the Law on Micro, Small, and Medium Enterprises (MSMEs), which was enacted in 2008 and which formally sets the definition of SMEs and mandates the Ministry of Co-operatives and SMEs to lead policy coordination. The law also puts forward a series of policy measures, including, among other things, access to finance, business information, business support infrastructure, and business licensing, to enhance SMEs' contribution to economic growth. Apart from the Law on MSMEs, the National Medium Term Development Plan 2014–2019, the 5-year policy direction for all ministries and government agencies to formulate their respective strategic plans, envisions the improvement of the productivity and competitiveness of SMEs. Relevant to SMEs are the strategies proposed

to support SMEs' development objectives. They include (1) improving human resources quality, (2) enhancing access to finance, (3) increasing the value added of SMEs' products and their international presence, (4) strengthening partnerships and networks, and (5) improving rules and regulations.

The strategic programs and actions aiming to support the aforementioned strategies are diverse, and various ministries and public institutions manage them. For example, the Finance and Development Supervisory Agency, in cooperation with Bank Indonesia, implemented the so-called Kredit Usaha Rakyat (KUR) program in 2007 and manages it. It is by far the largest microcredit program in Indonesia and provides business loans to SMEs at a lower interest rate, with a backing loan in 2014 reaching Rp49.5 trillion (OECD 2018). The establishment of the SME Productivity Center under the supervision of the Ministry of Manpower and Transmigration also aimed to improve the productivity of SME workforces through the provision of technical training. Also relevant to human resources for SMEs are the entrepreneurship and management training programs that many other ministries and public institutions provide.

SME internationalization strategies primarily aim to promote SMEs' exports and participation in GVCs. The programs supporting SME internationalization are diverse in focus and management. For example, Indonesia Eximbank introduced export financing to help firms acquire export credit, export guarantees, and export insurance services. Besides, Indonesia Eximbank administers export-oriented training on export regulations, customs procedures, packaging, and online marketing as well as a coaching program for new exporters (OECD 2018). The Ministry of Trade, on the other hand, is in charge of nonfinancial aspects of internationalization. Key measures include the provision of export market information, product design and packaging for exporting, and export training. The Ministry of Trade also created the ASEAN Economic Community Center in September 2015 as a venue to provide business counseling and market intelligence services for Indonesian firms that are striving to increase their exports to the ASEAN region.

Besides generic export support programs, the Indonesian government has introduced a number of specific measures to promote SMEs' integration into global production networks. The local content requirement that the Indonesian Investment Coordinating Board has imposed in certain sectors (machinery, motor vehicles, food, beverages, etc.) is among the policy directions aiming to promote the sourcing of domestic inputs in the production for exports and hence enhancing the participation in value chains. Moreover, the Indonesian Investment

Coordinating Board has recently introduced a matchmaking program through events and a website to enable local SMEs to be potential suppliers of multinational corporations.

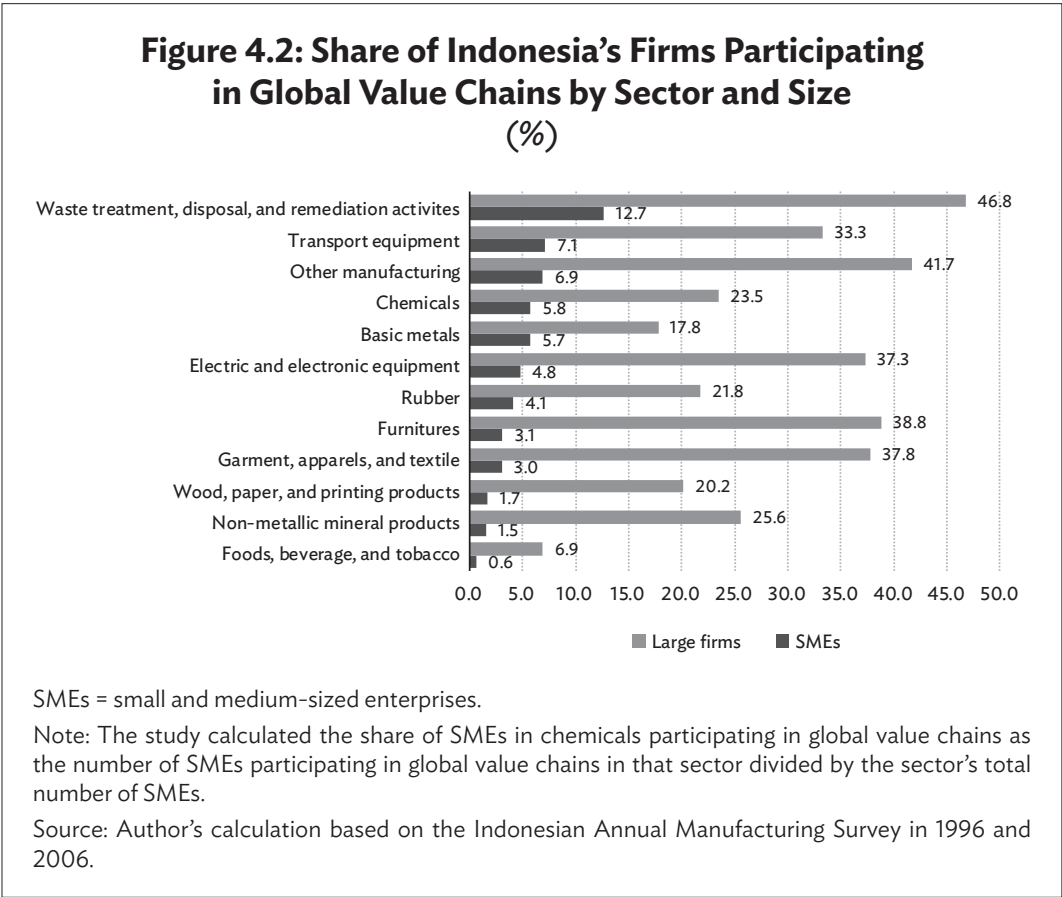
4.3.3 SMEs’ Participation in Global Value Chains

This section highlights the extent to which SMEs join GVCs. It then compares the characteristics of the SMEs that are effectively participating in them (denoted as GVC SMEs) with those that are not (denoted as non-GVC SMEs). As a later section will discuss in detail, the chapter defines GVC SMEs as those that source raw material from abroad and produce outputs for exporting. Figure 4.1 suggests that not many Indonesian SMEs are effectively linked with global production networks, and this is manifest in a significantly low GVC participation ratio (4.1%). The level of integration in value chain activities for SMEs is comparable to the average for all manufacturing firms but significantly



behind that for large firms (25.6%). Small enterprises have an even greater disadvantage when it comes to international transactions and are hardly able to connect to GVCs. Medium-sized firms, on the contrary, are better able to link with production networks, with a participation ratio that is about twice as high as that for all firms. The pattern appears to show that the GVC participation ratio increases when firms are bigger, which indicates the significance of economies of scale to overcome the cost of entry into GVCs.

It should be noted that the extent of GVC participation varies notably across sectors. Figure 4.2 clearly shows that SMEs in the waste treatment and disposal sector are the most integrated into GVCs, with a participation rate of 12.7%. The sector with the second-highest percentage of SMEs in GVCs is transport equipment (7.1%), followed by other manufacturing (6.9%), chemicals (5.8%), and basic metals (5.7%). For the electric and electronic sector, despite having dynamic production networks linking various types of firms from different countries, only 5% of Indonesian SMEs could integrate into the networks. With even lower linkages with value chain activities are SMEs in the garment, lower linkages with value chain activities are SMEs in the garment,



apparel, and textile (3.1%), non-metallic mineral products (1.5%), and food, beverage, and tobacco (0.6%) industries.

Also interesting is the fact that, even within the same sector, GVC integration differs according to the size of enterprises. For example, 38% of large enterprises in the garment and textile sector had upstream and downstream linkages with foreign partners compared with only 3% of SMEs in this sector. In the electric and electronic sector, the GVC participation ratio is 37.3% for large firms versus 5% for SMEs.

Table 4.2 compares the average value of the firm characteristic variables of GVC SMEs with those of non-GVC SMEs and clearly indicates the significant existence of heterogeneity. The notable differences are not unique to Indonesia, as Antràs (2015); Bernard and Jensen (2004); Bernard et al. (2012); Harvie, Narjoko, and Oum (2010a); and Wignaraja (2013) highlighted similar facts for other countries. Overall, GVC firms are larger, more productive, more capital-intensive, and more innovative than non-GVC firms. On average, GVC SMEs have 191 employees compared with 65 for non-GVC SMEs, yet the former type of firm is younger, as the fewer years of operation show. About 38% of SMEs are foreign-owned compared with just 2.6% of non-GVC SMEs. The average value of sales per employee for GVC firms is \$94.72 million, which is about twice as high as that for non-GVC

Table 4.2: Comparison of SMEs’ Characteristics

	GVC SMEs	Non-GVC SMEs	Statistically Different
Size (no. of employees)	191	65	Yes ***
Age (year)	10.5	12.5	Yes ***
Share of foreign ownership (%)	37.9	2.6	Yes ***
Access to finance (%)	25.9	13.9	Yes ***
Skill intensity (% of skilled workers)	26.4	21.9	Yes ***
Share of firms providing a formal training program (%)	49.7	21.6	Yes ***
Capital intensity (value of fixed assets per employee, \$’000)	1,147.4	1,001.7	Yes ***
Labor productivity (sales per employee, \$’000)	94,720.3	42,618.0	Yes ***
Expenditure on research and development (\$’000)	3.8	1.2	Yes ***

GVC = global value chain, SMEs = small and medium-sized enterprises.
Source: Author’s calculation based on the Indonesian Annual Manufacturing Survey in 1996 and 2006.

firms. The gap in capital intensity between the two types of SMEs is smaller.

Moreover, GVC firms tend to have more formal training programs for staff and borrow more loans for investment than non-GVC firms. Table 4.2 also indicates that GVC SMEs employ significantly more skilled workers than non-GVC firms (49.7% versus 21.6%). The differences for all the variables are statistically significant. Although the t-test results provide some insights into the potential relationship of SME characteristics and participation in GVCs, they cannot explain the direction of causality. The econometric analysis in the following section remedies this methodological shortcoming.

4.4 Econometric Specification and Data Source

4.4.1 Econometric Specification

To estimate the effects of human capital and other SME characteristics on GVC participation, this chapter adopts the Roberts and Tybout (1997) theoretical model of the determinants of exporting, which stipulates that an SME participates in a GVC ($Pr(gvc_{it} = 1)$) if its expected revenue (π_{it}) is greater than its current costs (c_{it}) plus its sunk cost of entry. Therefore, it is possible to express the GVC participation equation for SMEs as follows:

$$Pr(gvc_{it}) = \begin{cases} 1 & \text{if } \pi_{it} > c_{it} + N(1 - gvc_{it-1}) \\ 0 & \text{otherwise} \end{cases} \quad (1)$$

where gvc_{it} is a dummy variable of firm i joining a GVC at time t and the term $N(1 - gvc_{it-1})$ denotes the sunk cost of GVC entry, which equals 0 if the firm had joined a GVC at time $t - 1$ and 1 otherwise. Since firm characteristics, such as size, age, ownership, capital, training and skills, productivity, and innovation, largely influence firm revenue and costs and because our firm-level data lack historical relevant information to capture the sunk cost, we can write our econometric specification to estimate the effects of human capital on SMEs' participation in GVCs as follows:

$$\begin{aligned} gvc_{isrt} = & \alpha_0 + \beta_1 \ln size_{isrt} + \beta_2 size_{sqr_{isrt}} \\ & + \beta_3 \ln age_{isrt} + \beta_4 for_{own_{isrt}} + \beta_5 acc_{fin_{isrt}} \\ & + \beta_6 training_{isrt} + \beta_7 skill_{isrt} + \beta_8 \ln cap_{isrt} \\ & + \beta_9 \ln prod_{isrt} + \beta_{10} \ln R\&D_{isrt} + \beta_{11} reg_exp_{isrt} \\ & + time + region + industry + \varepsilon_{isrt} \end{aligned} \quad (2)$$

where subscript i denotes the firm, s is the sector, r is the region, and t refers to time. We discuss the definition and measurement of the variables below.

- *GVC participation* (gvc_{isrt}): This is a dummy variable with the value 1 if firm i in sector s at time t from region r joins a GVC and 0 otherwise. Conceptually, SMEs can participate in GVCs in two different ways. They can engage in GVCs either by exporting intermediate goods or services directly to firms overseas or by supplying inputs to local firms that produce for exporting. The WTO (2016) calls this measure a “seller-related or supply-side” approach and labels this mode of engagement forward GVC participation. Alternatively, SMEs can participate in GVCs by sourcing inputs from foreign suppliers to produce goods and services for domestic consumption and exports. This mode of participation is known as backward GVC participation. It reflects the upstream linkages with foreign partners to source inputs for production (WTO 2016).

This chapter focuses on firms’ productive capacity and their ability to link both upstream and downstream within production networks as a proxy for SMEs’ participation in GVCs. The argument by Antràs (2019) stating that, when a firm both imports and exports, it is natural to conclude that this firm participates in a GVC, inspired our selection of a conceptional definition. In the IAMS questionnaire, there are two questions capturing information on imports and exports. The first asks about the source of raw material purchase in terms of quantity and value. It is possible to calculate the percentage of imported raw material simply as a ratio of the value of imported raw materials to the total value of raw materials. We can consider SMEs that source raw material from abroad to have upstream linkages with foreign partners. The second enquires about the percentage of outputs that the company exports, which we interpret as the firm’s linkage with foreign buyers. Therefore, we can classify SMEs that source raw material from abroad and produce outputs for exporting as participating in a GVC. This means that gvc_{isrt} equals 1 if a firm has both a ratio of imported raw material and a percentage of exports greater than 0 and 0 otherwise.

- *Size* ($size_{isrt}$): Like most firm heterogeneity literature, for example Sjöholm (2003); Bernard and Jensen (2004); Jinjarak, Mutuc, and Wignaraja (2014); and Harvie, Narjoko, and Oum (2010a), we measure firm size using the total number of employees.
- *Age* (age_{isrt}): This refers to the number of years in operation. In the IAMS, question 9 asks for the “starting year of commercial

production,” and the respondents provide the answer as a specified year. To obtain the age of a firm, we subtract the firm’s operating year from the year of the survey and then add one.

- *Foreign ownership* (for_own_{isrt}): This is a dummy variable with the value 1 if the establishment is foreign owned and 0 otherwise. We define foreign-owned firms as those for which foreign individuals, companies, or organizations own 10% or more of their capital stake.
- *Access to finance* (acc_fin_{isrt}): This variable takes the value 1 if a firm has a credit line/loan from a financial institution and 0 otherwise.
- *Human capital* ($hcap_{isrt}$): We use two separate measures to capture various aspects of human capital in enterprises.
 - o The first variable is skill intensity within a firm ($skill_{isrt}$), which we measure as the share of skilled workers in the total number of employees. We follow Kasahara, Liang, and Rodrigue (2016) to measure skills based on educational attainment. Skilled production workers refer to production workers with at least senior high school education, while skilled non-production workers refer to this type of workers with a college degree. Thus, we calculate the share of skilled workers as the sum of skilled production and skilled non-production workers divided by the total number of employees.
 - o The second variable reflects firms’ training program for employees ($training_{isrt}$). It takes the value 1 if a firm provides formal training to its employees and 0 otherwise.
 - o Since the quality and ability of workers within an enterprise is the fundamental resource for success, we hypothesize that SMEs with higher quality of human capital are more likely to engage effectively in GVCs.
- *Labor productivity* ($prod_{istj}$): We use the ratio of the total annual sales to the total number of employees for this variable. Like most firm heterogeneity empirics, this paper hypothesizes that labor productivity is positively associated with GVC participation.
- *Capital intensity* ($capint_{isrt}$): The measure of capital intensity varies slightly. Some studies, for example Farole and Winkler (2012) and Rodríguez-Pose et al. (2013), used the value of machinery, vehicles, and equipment as a proxy, while others, such as Aggarwal and Steglich (2018), measured capital intensity based on fixed assets. We observe considerable missing data for the value of building and machinery in our dataset and decide to

use fixed assets instead. Precisely, we measure capital intensity as the value of fixed assets per employee.

- *Research and development ($R\&D_{isrt}$)*: We use the annual expenditure on research and development and production engineering as a proxy for this variable. Firms' ability to innovate and upgrade their production capability would help them to link rather easily with foreign partners. Thus, we hypothesize that SMEs with higher expenditure on research and development are more likely to participate in GVCs.
- *Regional knowledge (reg_exp_{isrt})*: We follow Sjöholm (2003) to capture the export spillover effect on the propensity to join a GVC. We measure it as the average percentage of output that each region exports. We anticipate that regions that export a greater share of outputs are relatively likely to have more SMEs participating in GVCs.
- As previously mentioned, the level of SMEs' integration into GVCs varies across time, sector, and region. To account for time, industry, and region variation, we include time, industry, and region dummy variables in our estimation.

4.4.2 Data

The data that we use for our empirical estimation come from IAMS, which the Indonesian Central Bureau of Statistics manages. It has conducted the IAMS annually since 1975 with manufacturing establishments employing 20 staff members or more using a predefined questionnaire. The questions cover a broad range of business operation topics from general information, workers' wages and education attainment, and itemized incomes and expenditures to imports of raw materials and export share.

An important note on the IAMS dataset is that only the 1996 and 2006 rounds contained questions on employees' training and educational attainment, research and development, and business constraints and prospects. These allow us to construct human capital variables that align well with the human capital concept and empirics. On this ground, we choose the IAMS in 1996 and 2006 as a source of data. Altogether, there are a total of 52,456 enterprises, of which 22,997 are from the 1996 survey and 29,468 are from the 2006 survey. We define SMEs according to the Indonesian 2008 Law on MSMEs, which classifies the sizes of enterprises according to the net assets or annual revenues. Based on the revenue criteria, we define SMEs as those with annual revenues less than Rp50 billion. This definition classifies 93% of enterprises as SMEs and the remaining 7% as large firms. Since we are interested in

the factors that facilitate SMEs' joining of GVCs, we drop large firms from our sample. We also exclude observations with missing data for any variable. Such a data-cleaning procedure leaves us with 41,227 observations for estimation.

The final note on data processing is that we redefine the regional and sectoral coverages at a more aggregate level. Specifically, we group the provinces in which enterprises were located into seven geographic regions: Java, Kalimantan, the Maluku Islands, the Lesser Sunda Islands, Western New Guinea, Sulawesi, and Sumatra. We group manufacturing activities, which we originally coded at the five-digit level using the International Standard Industrial Classification (ISIC), into a two-digit classification before we categorize them further into a more aggregate sector based on the similarity of economic activities. This gives us 11 sectors: foods, beverages, and tobacco; garments, apparel, and textiles; wood, paper, and printing products; chemicals; rubber; non-metallic mineral products; basic metals; electric and electronic equipment; transport equipment; furniture; and other manufacturing.

4.4.3 Estimation Methods

We estimate equation (2) using two econometric methods. The first estimation applies the linear probability model (LPM), which assumes that all regressors are exogenous and coefficients are the marginal effects. The second estimator is the probit model, which is suitable for a binary choice. Several empirics on firm heterogeneity, for example Roberts and Tybout (1997); Sjöholm (2003); Roberts and Tybout (1997); Harvie, Narjoko, and Oum (2010a); and Wignaraja (2012), have applied the probit model to quantify the decision to participate in exporting and GVC activities. In all the estimations, we control sector, time, and region fixed effects.

To show that our baseline results are robust, we implement several robustness checks. First, we change the measure of GVC participation and distinguish backward GVC participation from forward GVC participation. Second, we adopt an employment-based definition of SMEs and reestimate equation (2) using the LPM and probit model. Third, we introduce an instrumental variable as an alternative strategy to address the endogeneity concern. We suspect that skill intensity is endogenous and thus instrument it with two variables, namely the number of educational institutions in each region and the average ratio of skilled workers in each industry in a given year and region. We estimate the instrumental variable (IV) regression using the most commonly used estimator, two-stage least square (2SLS).

4.5 Empirical Results and Discussion

4.5.1 Baseline Results

Table 4.3 shows the baseline empirical results from the linear probability framework (column 1) and the probit method (column 2).⁴ The table reports the standard errors in parentheses. With the exception of age, all the coefficients have the expected sign and are statistically significant. Our results seem stable across different specifications, reflecting the robustness of the estimates.

The size coefficients are positive and strongly significant in both specifications. This means that larger SMEs are more likely to participate in value chain activities. The finding supports the prior hypothesis about the importance of the scale of economy to overcome the fixed cost of entry into GVCs. The coefficient of firm size square is positive and significant, implying that SMEs have to be very large to engage effectively in production networks.

The effect of enterprise age highlights that older SMEs tend not to join GVC activities, compared with younger SMEs, as the age coefficient is negative and significant under the probit estimation Our results are similar to those of Sjöholm (2003); Harvie, Narjoko, and Oum (2010a); Wignaraja (2012); and Aggarwal and Steglich (2018), who found negative and statistically significant coefficients. On the one hand, Wignaraja (2012) speculated that younger firms are more flexible and quicker to capture new technologies and understand new markets, which in turn help to facilitate their integration into production networks. Sjöholm (2003), on the other hand, attributed this finding to import substitution policies that encourage older enterprises to focus more on the domestic market than on export activities. We try to explore the reason behind the negative association between age and participation in GVCs by looking at expenditure on research and development and actual investment among firms with different years of operation from our database. The scatterplots suggest that younger SMEs tend to have more capital investment and greater expenditures on research and development, reflecting their superior capacity, which could lead them to relative success in GVC integration.

The ownership structure appears to have a positive and significant effect on SMEs’ decision to join GVCs. More precisely, from column (1),

⁴ We examine the potential multicollinearity problem in our regression model. The correlation matrix is available from the author(s). The correlation suggests that the explanatory variables are weakly correlated. The highest correlation is between the skill and the size variable, with a value of 0.3179.

Table 4.3: Estimation Results for SMEs’ Decision to Participate in Global Value Chains

Probability of Participating in GVCs	(1) LPM	(2) Probit
Firm size	0.0134*** (0.000241)	0.470*** (0.0279)
Firm size squared	0.000000790*** (0.0000000595)	0.000000556 (0.000000438)
Age	−0.00424 (0.00509)	−0.0772*** (0.0170)
Foreign ownership	0.248*** (0.0284)	0.925*** (0.0410)
Access to finance	0.0131* (0.00559)	0.140*** (0.0365)
Formal training	0.0159*** (0.00161)	0.230*** (0.0312)
Skill intensity	0.0302*** (0.00404)	0.414*** (0.0579)
Labor productivity	0.00632*** (0.000786)	0.130*** (0.0141)
Capital intensity	0.000921 (0.000470)	0.0114*** (0.00276)
Research and development	0.0105* (0.00496)	0.0158 (0.0210)
Export spillover	0.00129*** (0.000250)	0.0563 (0.0452)
Constant	−0.122*** (0.0151)	−6.918*** (0.900)
Year FE	Yes	Yes
Region FE	Yes	Yes
Sector FE	Yes	Yes
Observation	41,227	41,209
Adj. R-sq./pseudo R-sq.	0.1722	0.3231

FE = fixed effect, GVC = global value chain, LPM = linear probability model, SME = small and medium-sized enterprise.

Standard errors in parentheses; * p<0.05; ** p<0.01; *** p<0.001.

Source: Author’s calculation based on the Indonesian Annual Manufacturing Survey in 1996 and 2006.

foreign-owned SMEs are 25% more likely to engage in value chains than their domestic-owned counterparts. The results suggest that foreign ownership provides better networks with foreign partners, access to technology and management experiences, and learning from exporting from parent companies (Sjöholm 2003; Wignaraja 2015; Srinivasan and Archana 2011). The coefficients of access to loans are positive and statistically significant in both models, implying that SMEs that borrow money from financial institutions for capital investment are relatively more likely to be GVC firms.

The estimated coefficients for training and skills are positive and statistically significant in both estimations, leading us to conclude that SMEs that have better-quality human capital, which we measure as having a formal training program and a larger share of skilled workers, are more likely to engage effectively in GVCs. The importance of human capital in shaping firms' behavior in international trade is not uncommon in the empirical literature. For example, Wignaraja (2012) revealed that having a high school-educated workforce increases the potential for SMEs to join supply chains, while Aggarwal and Steglich (2018) found that skill intensity increases the probability of firms participating in value chains. Similarly, ADB and ADBI (2015) and Thangavelu, Nuryartono, and Findlay (n.d.) asserted that skills and training are among the critical factors that contribute significantly to firms' success in GVCs.

To establish the robustness of human capital effects, the new results allow us to check the sensitivity of the estimation. We follow Aggarwal and Steglich (2018) and measure skill intensity in terms of the ratio of wages and salaries to total sales. We then introduce another alternative proxy, which Thangavelu (2014) used, measuring the quality of labor via the average wage of a firm under the assumption that firms with higher average labor costs per worker employ more skilled labor. Table 4A.1 in the Annex provides the results of the estimation for alternative skill variables. The signs and magnitudes of all the variables are positive and statistically significant, indicating that human capital is critical for SMEs to join GVCs.

Other firm attributes also play an important role in shaping SMEs' outcome in GVCs. Specifically, more productive and capital-intensive firms appear to have a higher probability of GVC participation. The findings are in accordance with the theoretical prediction and support the well-known self-selection hypothesis in the firm heterogeneity literature. Since integration into production networks requires considerable initial investment, only SMEs with higher productivity and larger capital are able to offset the entry cost and self-select to enter into value chain activities. We observe a positive coefficient for expenditure

on research and development, implying that SMEs that spend more on research and development have a higher chance of linking to production networks. Finally, the sign of the export spillover variable is positive in the LPM model but not in the probit estimation, indicating that it is not robust.

4.5.2 Sensitivity Analysis

To check whether the baseline results are robust to several alternative measurements, this section introduces two sensitivity analyses. First, it alters the dependent variable proxy. We define GVC SMEs as those that engage in both importing and exporting activities. This definition is highly restrictive and fails to capture SMEs that link with either upstream supply chains or downstream supply chains. To capture firms involved in different modes of value chain activities, we construct separate GVC participation variables according to firms' commercial transactions. More precisely, we define SMEs that source intermediate inputs from foreign suppliers as backward GVC participation. This variable takes the value 1 if SMEs import raw material from abroad and 0 otherwise. Another measure is called forward GVC participation, which captures value chain involvement through exporting goods or services directly to firms overseas. Disaggregating by the mode of value chain participation, 15.2% of Indonesian SMEs deal with forward GVC and 18.3% engage in backward GVC participation. We estimate equation (2) separately for backward GVC participation and forward GVC participation and validate the results with the previous estimates.

Columns (1) and (2) in Table 4.4 report the results for backward GVC participation using the LMP and probit methods, respectively, while columns (3) and (4) contain the estimates for forward GVC participation. Similar to the baseline model, the goodness of fit for our alternative estimations is acceptable and the results are generally stable across different estimation methods for each dependent variable. The signs of the coefficients of size and foreign ownership are positive and statistically significant for all the specifications. Regardless of the mode of GVC engagement, size and ownership structure are important factors facilitating SMEs' participation in GVCs. The effect of age and access to finance varies according to the mode of GVC participation. For backward GVC participation, SMEs with more years of operation seem to have a higher GVC participation propensity; the sign is the opposite for forward GVC participation. Similarly, while access to finance does not matter for backward GVC participation, it is important for SMEs that engage in exporting activities. This is perhaps due to the fact that entry into export markets involves a significant cost, and therefore the

Table 4.4: Estimation Results for SMEs' Backward and Forward Global Value Chain Participation

	Backward GVC Participation		Forward GVC Participation	
	(1) LPM	(2) Probit	(3) LPM	(4) Probit
Firm size	0.0449*** (0.00316)	0.237*** (0.0156)	0.107*** (0.00822)	0.570*** (0.0163)
Firm size squared	0.000000400*** (7.18e-08)	0.000000151 (0.000000329)	0.000000561*** (0.000000121)	-0.000000630 (0.000000331)
Age	0.00518 (0.00298)	0.0295** (0.00919)	-0.0301** (0.0104)	-0.167*** (0.00978)
Foreign ownership	0.294*** (0.0294)	0.865*** (0.0361)	0.267*** (0.00615)	0.729*** (0.0369)
Access to finance	0.00172 (0.0176)	-0.00935 (0.0233)	0.0242*** (0.00372)	0.103*** (0.0235)
Formal training	0.0316*** (0.00466)	0.155*** (0.0190)	0.0476*** (0.00767)	0.218*** (0.0192)
Skill intensity	0.0909*** (0.0257)	0.439*** (0.0343)	0.0356* (0.0182)	0.138*** (0.0359)
Labor productivity	-0.0106 (0.00736)	-0.0670*** (0.00758)	0.0261*** (0.0000275)	0.151*** (0.00820)
Capital intensity	0.000412 (0.000694)	0.00150 (0.00160)	0.00282** (0.000940)	0.0141*** (0.00168)
Research and development	0.0243 (0.0140)	0.0801*** (0.0166)	-0.00110 (0.00488)	-0.0297 (0.0165)
Export spillover	0.00524*** (0.000153)	0.0499* (0.0204)	0.0126*** (0.000103)	0.0578*** (0.0170)
Constant	-0.162 (0.0977)	-3.222*** (0.407)	-0.932*** (0.0858)	-6.411*** (0.393)
Year FE	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Observation	41,227	41,209	41,222	41,222
Adj. R-sq./pseudo R-sq.	0.1270	0.1368	0.2246	0.2388

FE = fixed effect, GVC = global value chain, LPM = linear probability model, SME = small and medium-sized enterprise. Standard errors in parentheses; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Source: Author's calculation based on the Indonesian Annual Manufacturing Survey in 1996 and 2006.

ability to finance exports through bank loans or other sources of capital enables SMEs to join GVCs relatively easily.

Also differing according to the mode of GVC participation are the effects of labor productivity, capital intensity, and research and development. For example, we find that labor productivity has a negative effect on backward GVC participation but a positive and significant effect on forward GVC participation. The result still supports the self-selection hypothesis that high-productivity SMEs choose to focus more on export markets. Similarly, more capital-intensive SMEs have a higher probability of GVC participation, and the magnitude is much stronger for forward GVC participation. As expected, the training and skill variables turn out to be significant with the correct sign, indicating the important role of human capital in helping SMEs to join supply chains, through either upstream or downstream linkages. Thus, a higher level of human capital is important for SMEs to join supply chains successfully, and these results hold regardless of the different measures of GVC participation.

Next, our sensitivity check involves a new estimation using an alternative definition of SMEs based on employment, which classifies enterprises with fewer than 100 employees as SMEs. This classification gives us a somewhat different distribution of firms, with SMEs accounting for 79% of the total Indonesian manufacturing firms. Table 4A.2 in the Annex presents the results from the estimation using the LMP and probit methods. In general, the signs and magnitude of most coefficients are stable and consistent with the baseline results.

4.5.3 Addressing Endogeneity Concerns

In our econometric specification, we suspect that the skill intensity variable is endogenous due to reverse causality. The preceding analysis proves that having a workforce with a higher skill level helps SMEs to integrate into GVCs. However, the relationship would be the opposite in that GVC SMEs are inclined to hire higher-quality and skilled workers. Another potential source of endogeneity in our model is omitted variables. SMEs connecting with value chains might possess an exceptional corporate culture and leadership. Our data could not capture these factors, and as a result the error terms incorporate them. Clearly, exceptional leadership and skill intensity are correlated in the sense that firms with such management tend to hire more skilled human resources.

In the presence of endogeneity, ordinary least square (OLS) estimation is biased. To address the endogeneity concerns, we apply the IV method to estimate equation (2) using the two-stage least-

square (2SLS) estimator—the most common strategy that researchers use to address the endogeneity problem (Wooldridge 2016; Bascle 2008). Despite its superiority to the OLS estimator, the selection of IV proves to be very challenging. Weak and invalid instruments can cause less-efficient estimations than OLS. Good instruments must satisfy two conditions: first, they must correlate strongly with the endogenous variables (relevance condition); and second, they must be unrelated to the error term (exogeneity condition). We opt for two variables to instrument skill intensity: 1) the number of high school and vocational training providers in each region; and 2) the average ratio of skilled workers for each sector in a given year and region. We select the instruments based on the widely recognized GVC framework in which higher skills of human capital are crucial for countries and firms to integrate into GVC. We believe that the quantity of educational institutions along with the availability of skills in a given region might indirectly affect firms' GVC strategy via their direct impact on firms' ability to hire a skilled workforce. We are not yet sure whether these IVs are valid and will conduct a series of tests after the estimation.

Table 4.5 presents the results of the IV estimation. To check whether the estimates are robust across different SME definitions, we estimate equation (2) twice: one for the default definition of SMEs based on the value of sales (column 1); and another for the employment-based definition (column 2). Before discussing the results, we adopt two standard tests to check whether our instruments are valid. The instrument relevance test aims to measure instruments' strength. Ideally, there must be a strong fit between the endogenous regressor and the instruments, which first-stage F-statistics greater than 9.08 prove (Stock and Yogo 2002; Bascle 2008). The value of the first-stage F-statistics of our 2SLS regression is 385.49, implying that our instruments are strong and thus satisfying the relevance condition. Next, we perform the instrument exogeneity test, in which the null hypothesis is that the instrumental variables are exogenous. Since the p-value is 0.1559, we cannot reject the exogeneity of our instruments and thus we can argue that the instruments satisfy the exogeneity condition.

The results from the 2SLS regression are not only similar to the baseline estimation but also stable across all the specifications using different definitions of SMEs. Except for the coefficient of size, which appears to be strongly positive for specification (1) and negative but insignificant for specification (2), other firm characteristics, including foreign ownership, access to finance, training and skill, labor productivity, capital intensity, and research and development, have

Table 4.5: Results for SMEs’ Decision to Participate in Global Value Chains Using the 2SLS Estimator

	Sale-Based Definition of SMEs	Employment-Based Definition of SMEs
	2SLS	2SLS
Firm size	0.00462* (0.00258)	-0.00558 (0.00372)
Firm size squared	0.000000838*** (4.01e-08)	0.00000456*** (0.000000789)
Age	-0.00224* (0.00106)	-0.00148* (0.000743)
Foreign ownership	0.231*** (0.00582)	0.190*** (0.00568)
Access to finance	0.0156*** (0.00238)	0.00758*** (0.00185)
Formal training	0.00719* (0.00292)	0.00829*** (0.00228)
Skill intensity	0.124*** (0.0267)	0.0493* (0.0198)
Labor productivity	0.00223a) (0.00138)	0.00284** (0.000944)
Capital intensity	0.000932*** (0.000165)	0.000251* (0.000126)
Research and development	0.0110*** (0.00190)	0.00652*** (0.00173)
Export spillover	0.00203 (0.00172)	0.00163 (0.00127)
Instruments	2	2
Year FE	Yes	Yes
Region FE	Yes	Yes
Industry FE	Yes	Yes
Observation	39,726	32,677
Adj. R-sq.	0.149	0.085
First-stage F-statistic	385.49	334.901
Exogeneity test—p-value	0.1559	0.0875

2SLS = two-stage least-squares, FE = fixed effect, SMEs = small and medium-sized enterprises.

Standard errors in parentheses; * p<0.05; ** p<0.01; *** p<0.001.

a Significant at the 10% level.

Source: Author’s calculation based on the Indonesian Annual Manufacturing Survey in 1996 and 2006.

positive and significant impacts on SMEs' propensity to participate in GVCs. Like the baseline results, younger SMEs are more likely to be involved in value chain activities. In summary, the results from the alternative method allow us to conclude that the positive relationship between human capital and GVC participation is robust.

4.6 Conclusion

In this chapter, we examined the role of SMEs in GVC activities in the Indonesian economy using micro-level data. We carefully studied the effects of human capital and other firm attributes on Indonesian SMEs in GVC participation. The results suggest that integrating into upstream and downstream value chains is undoubtedly difficult for Indonesian SMEs, as the extremely low GVC participation ratio shows. Effective integration into global production networks requires SMEs to have superior capability and certain key fundamentals in addition to a locality that is conducive to peer learning. In particular, the size of an enterprise matters as it gains from economies of scale and helps to offset the cost of entry into production networks. We also found evidence that linkage with value chain activities requires SMEs to have a higher level of human capital, better foreign networks (i.e., in terms of foreign ownership and location to an export hub), and superior production capacity, which we measured using higher productivity, more assets, and more investment in research and development.

We also assessed the effect of human capital and other firm attributes on different modes of GVC participation. Interestingly, several variables have robust and expected results. Most importantly, whether they involve backward or forward GVC linkages, firm resources and capabilities, as well as their size, foreign networks, productivity, human capital, and location, are critical for SMEs to integrate into value chain activities. Further, we applied the IV method to address the endogeneity problem in our model and found that the results are robust. Fundamentally, a higher quality of human capital helps SMEs to integrate successfully into GVCs.

The chapter highlights the importance of SMEs in GVC activities and in particular in creating employment as well as forward and backward linkages. The potential of the domestic capacity to absorb key technologies and knowledge is critically dependent on the competitiveness and efficiency of domestic SMEs. It seems to be very important for the Indonesian economy to create stronger linkages to GVC activities and move up the value chain activities. In particular, the study also highlights the importance of agglomerative effects, and

SMEs in a cluster with multinational corporations (MNCs) tend to learn faster and are more efficient in participating in GVCs. Thus, policies are necessary to design industry strategies to create agglomerative effects either through cluster strategies or through a strategy for special economic zones, such as incubators and science parks.

In addition, the study highlights the importance of human capital as a critical factor in creating linkages for SMEs to participate in both manufacturing and service GVCs. This will be a critical factor for Indonesia to be regionally and globally competitive. The following might be important policy considerations for developing human capital for SME development:

- (a) Designing forward-looking educational institutions and improving the skills of workers will be critical for Indonesia to create competitive and sustainable economic growth in the long run. The formal education system could be a good backbone for building lifelong education and learning skills for SMEs and workers.
- (b) The government could set up SME training funds that SMEs could use to develop the skills of their workers. They could also use the funds to develop the skills and training of middle management, which is critical to absorb and implement best practices in human resources and international standards and practices.
- (c) The government could also set up incubators and innovation funds that will increase the research and knowledge collaborations between SMEs and universities. This will create linkages and spillovers in learning new innovation and technologies for SMEs. The innovation fund could also reduce the cost of research and development for SMEs.
- (d) The government could also consider MNC–SME mentorship schemes in which it can create a network between MNCs and SMEs for closer discussions and sharing of knowledge. In some cases, it could encourage MNCs to mentor SMEs on best practices in human resources, marketing, and networking that will create strong linkages between MNCs and SMEs.
- (e) Apart from building the quality of general education, which is a prerequisite condition for human capital development, the government might consider aggressively expanding technical and vocational training programs to sharpen the skills of the workforce that are of great use in value chain

production. Our finding also suggests the importance of in-house formal training. The large-scale expansion of technical training services by the SME Productivity Center that the Ministry of Manpower and Transmigration operates could be another policy option for the Indonesian government to enhance human resources quality.

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Annex

Table 4A.1: Estimation Results for SMEs' Decision to Participate in Global Value Chains Using Alternative Variables for Skill Intensity

Probability of Participating in GVCs	Skill (Wage/Sale)		Skill (Wage per Employee)	
	LPM	Probit	LPM	Probit
Firm size	0.0138*** (0.000542)	0.501*** (0.0297)	0.0155*** (0.00000365)	0.494*** (0.0277)
Firm size squared	0.000000804** (8.28e-08)	0.000000533 (0.000000460)	0.000000779*** (5.65e-08)	0.000000410 (0.000000438)
Age	-0.00376 (0.00509)	-0.0782*** (0.0181)	-0.00480 (0.00521)	-0.0960*** (0.0168)
Foreign ownership	0.251*** (0.0364)	0.954*** (0.0426)	0.252*** (0.0290)	0.943*** (0.0409)
Access to finance	0.0148** (0.00539)	0.167*** (0.0377)	0.0131* (0.00545)	0.143*** (0.0366)
Formal training	0.0167*** (0.00348)	0.236*** (0.0330)	0.0180*** (0.00162)	0.253*** (0.0310)
Skill intensity	0.00185*** (0.000437)	0.0837*** (0.0197)	0.00442*** (0.000349)	0.158*** (0.0265)
Labor productivity	0.0105*** (0.0000284)	0.265*** (0.0212)	0.00617*** (0.000747)	0.117*** (0.0149)
Capital intensity	0.000916** (0.000323)	0.0114*** (0.00294)	0.000934* (0.000442)	0.0111*** (0.00276)
Research and development	0.0111** (0.00429)	0.00774 (0.0214)	0.0107* (0.00512)	0.0133 (0.0211)
Export spillover	0.000758*** (0.000133)	0.0571 (0.0479)	0.00135*** (0.000262)	0.0587 (0.0436)
Constant	-0.151*** (0.0225)	-8.173*** (0.958)	-0.157*** (0.0138)	-8.088*** (0.880)
Year FE	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes	Yes
Observation	38,107	38,090	41,196	41,178
Adj. R-sq./pseudo R-sq.	0.1751	0.3355	0.1713	0.3216

FE = fixed effect, GVC = global value chain, LPM = linear probability model, SMEs = small and medium-sized enterprises.

Standard errors in parentheses, * p<0.05; ** p<0.01; *** p<0.001.

Source: Author's calculation based on the Indonesian Annual Manufacturing Survey in 1996 and 2006.

Table 4A.2: Estimation Results for SMEs’ Decision to Participate in Global Value Chains Using an Alternative Employment-Based Definition of SMEs

Probability of Participating in GVCs	(1) LPM	(2) Probit
Firm size	−0.00329 (0.00314)	0.501*** (0.117)
Firm size squared	0.00000490*** (0.000000385)	0.00000192 (0.0000209)
Age	−0.00190 (0.00309)	−0.0556* (0.0237)
Foreign ownership	0.206*** (0.0307)	1.013*** (0.0652)
Access to finance	0.00631*** (0.00167)	0.139* (0.0547)
Formal training	0.0116*** (0.000313)	0.287*** (0.0469)
Skill intensity	0.0209*** (0.000895)	0.487*** (0.0833)
Labor productivity	0.00452*** (0.000301)	0.116*** (0.0200)
Capital intensity	0.000252*** (0.0000609)	0.00657 (0.00414)
Research and development	0.00533 (0.00324)	0.0114 (0.0430)
Export spillover	0.000910*** (0.000161)	0.0290 (0.0398)
Constant	−0.0474***	−6.493***
Year FE	Yes	Yes
Region FE	Yes	Yes
Industry FE	Yes	Yes
Observation	41,227	41,209
Adj. R-sq./pseudo R-sq.	0.1033	0.2687

FE = fixed effect, GVC = global value chain, LPM = linear probability model, SMEs = small and medium-sized enterprises.

Standard errors in parentheses; * p<0.05; ** p<0.01; *** p<0.001.

Source: Author’s calculation based on the Indonesian Annual Manufacturing Survey in 1996 and 2006.

5

Trade, Global Value Chains, and SMEs in Thailand: A Firm-Level Panel Analysis

Upalat Korwatanasakul and Sasiwimon Warunsiri Paweenawat

5.1 Introduction

Small and medium-sized enterprises (SMEs) are significant contributors to economic activity and employment worldwide and Thailand is no exception. SMEs represent the vast majority of firms and employ the bulk of the domestic workforce. According to the Office of SMEs Promotion (OSMEP) (2019), there were approximately 3 million companies considered SMEs, which accounted for 99.8% of the total number of companies, in 2018. Moreover, SMEs generate 14 million jobs, equal to 86% of the total employment. Over the last year, the number of SMEs and their consequent employment grew by 1% and 4.7%, respectively. SMEs also contributed enormously to Thailand's gross domestic product (GDP) as they accounted for 45% of the national GDP, or around \$215 billion. Despite SMEs' important economic contributions, their participation in international trade and global value chains (GVCs) remains limited. In 2018, the export volume of SMEs made up only 29% of the total export or \$76 billion, while showing small growth at 0.5% (OSMEP 2019). In contrast, large domestic firms and multinational enterprises (MNEs) dominate GVCs and therefore benefit largely from new opportunities emerging from their participation.

The spread of GVCs coupled with the rapid development of new technologies present opportunities and challenges to SMEs. On the one hand, participation in GVCs can benefit SMEs in terms of (1) capabilities and competitiveness enhancement, (2) product quality improvement, (3) financial stability, and (4) market expansion. By being involved in GVCs, SMEs can be exposed to new business partners, especially leading global firms. Through this interaction, SMEs can increase their productivity by

meeting international standards and requirements while continuously improving product quality through knowledge and technology transfer. On the other hand, SMEs’ involvement in GVCs can be hindered by requirements including (1) the ability to meet international standards, (2) greater managerial and financial resources, and (3) the protection of in-house intellectual property (UNCTAD 2010). These requirements are difficult to satisfy as SMEs face constraints in terms of economies of scale, access to finance and information, and technological capacity (Korwatanasakul 2019; Korwatanasakul and Intarakumnerd 2020).

Against this backdrop, this study aims to address two research questions that disentangle the relationship between GVC participation and SMEs. First, what are firms’ characteristics that determine GVC participation? Second, does GVC participation enhance SMEs’ performance (e.g., total revenues) and competitiveness? This study tries to identify the determinants of GVC participation based on firm characteristics and also examines the relationship between GVC participation and performance at the firm level based on the augmented production function. The main estimation method for both analyses is a panel fixed-effect regression using panel data from the Office of Industrial Economics, Ministry of Industry, Thailand for the period 2004–2014. Our results show that SMEs are involved less in both backward and forward GVC participation than larger firms (non-SMEs). This study also finds that GVC participation, both backward and forward, is positively associated with firms’ performance. Our results imply that SMEs found difficulties in participating in GVCs, but GVC participation can help firms (both SMEs and large firms) increase their revenues. Therefore, policies aimed at helping local SMEs to smoothly enter GVCs would be the priority.

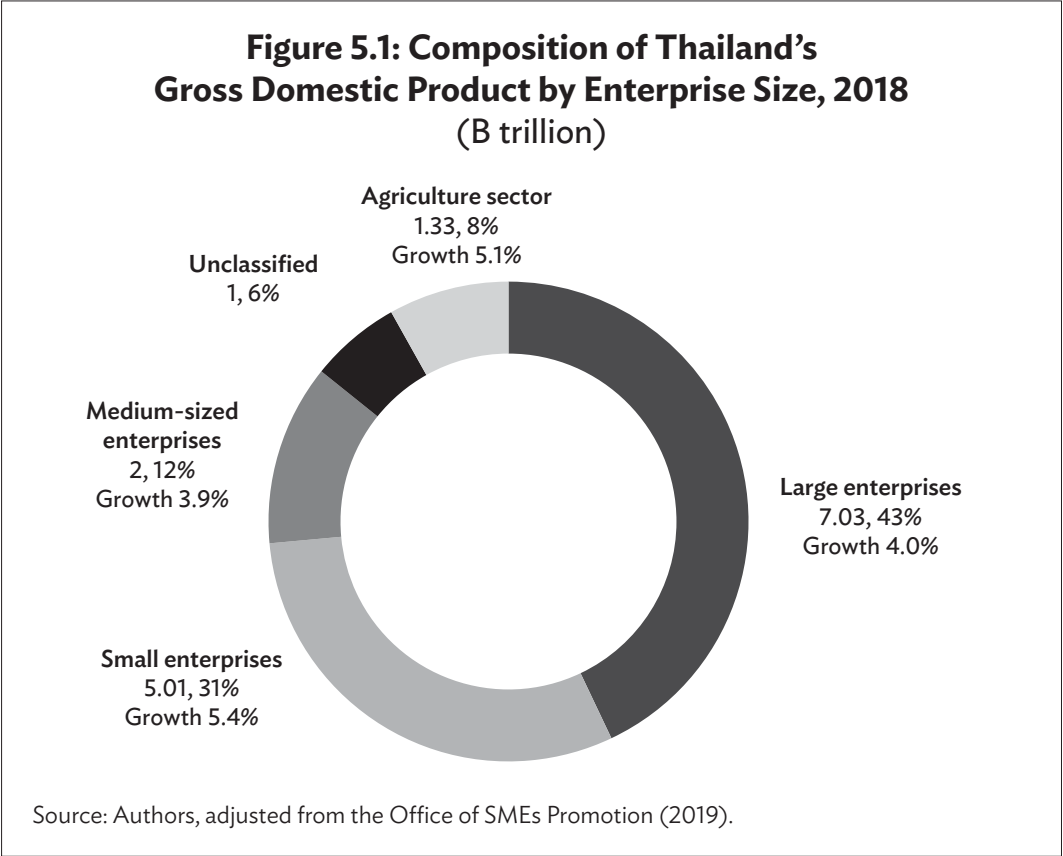
5.2 SMEs in Thailand

5.2.1 SMEs and the Thai Economy

SMEs¹ contributed about 45% of the total GDP or B7 trillion (\$215 billion) to the Thai economy in 2018, which was even larger than the economic contribution of large enterprises (Figure 5.1). In addition, Figure 5.1 shows that small enterprises accounted for a higher share of GDP (31%) than medium-sized enterprises (12%). Therefore, SMEs, especially small firms, are a main driving force of the country’s economy. Table 5.1 compares the breakdowns of national

¹ For the definition of SMEs, see Table 5.4.

GDP and SME-generated GDP by economic sector in 2018. The share of each sector was similar between the two breakdowns, except that of the wholesale and retail sector. The wholesale and retail sector contributed to a larger share of GDP when considering the breakdown of SME-generated GDP (31.4%), while the share of this sector in the national GDP was 15.9%. Hence, SMEs are more economically active in the wholesale and retail sector. The service sector manifested the largest economic contribution both in terms of national GDP and SME-generated GDP. In contrast, the role of the manufacturing sector was larger at the national level. The pattern of economic contributions of SMEs is clearer when further breaking down GDP by economic sector and enterprise size (Table 5.2). First, the role of large enterprises was more prominent than that of SMEs in the manufacturing sector as large firms contributed 64% of the GDP generated in the sector. Second, in terms of the wholesale and retail sector, medium-sized enterprises' economic contributions (B1.88 trillion or \$55 billion, 72%) were significantly greater than the combined contributions of medium-sized and large enterprises (B0.72 trillion or \$22 billion). Last, a similar level of contributions between SMEs and large enterprises toward the



**Table 5.1: National and SME-Generated
Gross Domestic Product, by Economic Sector, 2018**

	National GDP		SME-Generated GDP	
	Share	Growth	Share	Growth
Agriculture	8.1	5.1	na	na
Manufacturing	26.8	3.0	22.6	3.1
Wholesale and retail	15.9	7.3	31.4	7.6
Services	41.0	4.3	39.1	4.6
Other	8.2	1.8	6.9	2.5

GDP = gross domestic product, SMEs = small and medium-sized enterprises, na = not applicable.

Note: Other sectors include mining, construction, power generation, and water utilities.

Source: Authors, adjusted from the Office of SMEs Promotion (2019).

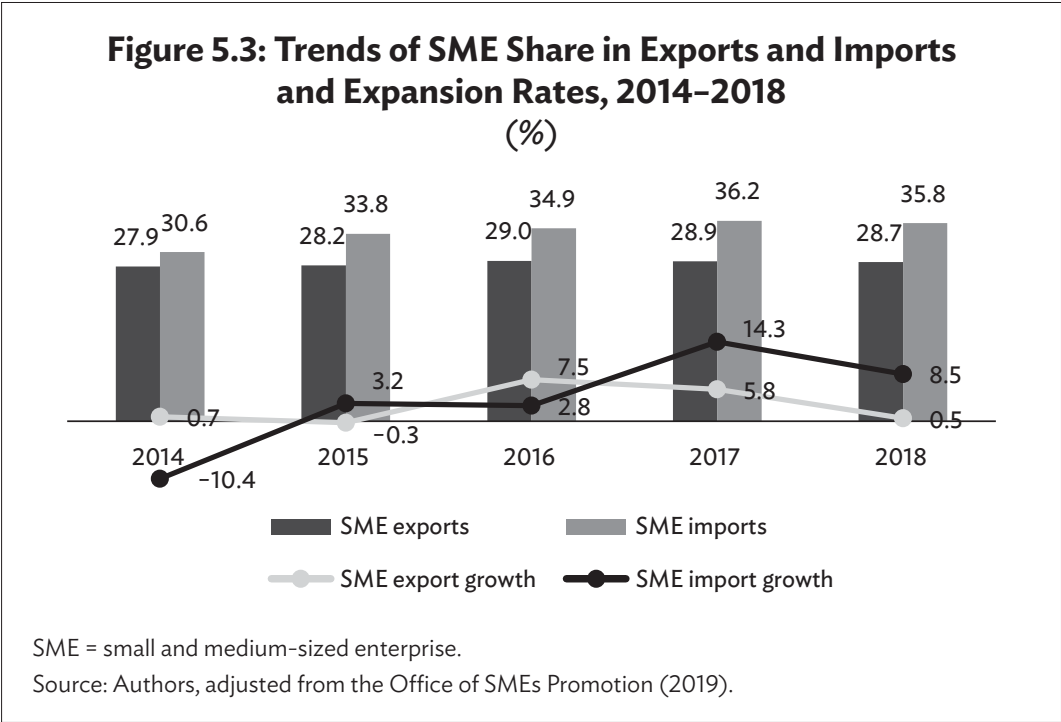
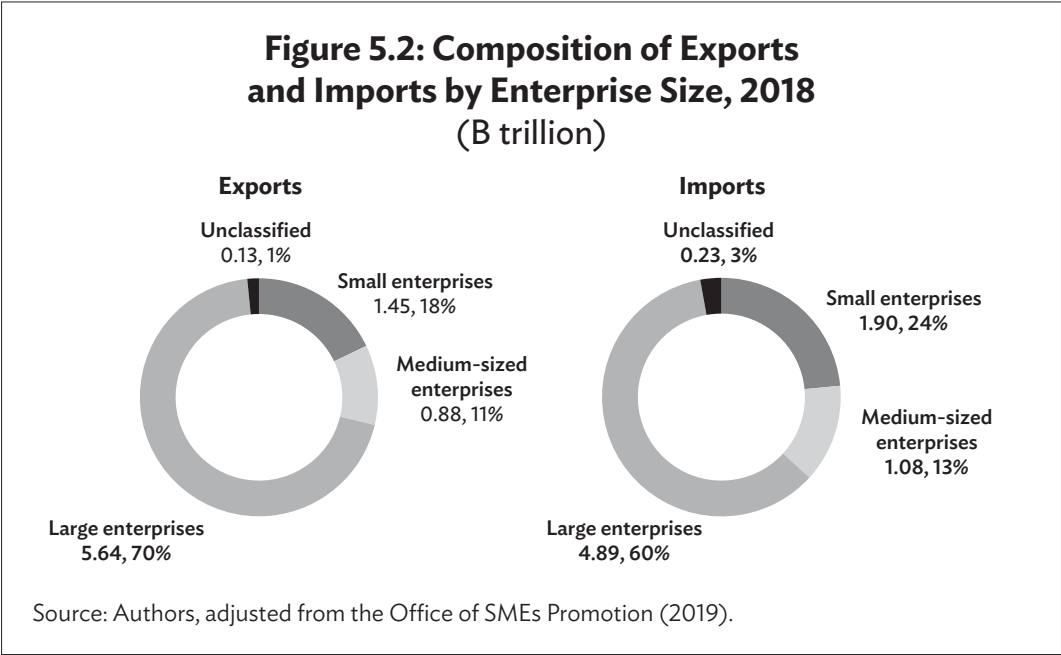
**Table 5.2: Thailand’s Gross Domestic Product Breakdown
by Key Economic Sector and Enterprise Size, 2018
(B trillion)**

	Manufacturing		Wholesale and Retail		Services	
	Value	Share	Value	Share	Value	Share
Small enterprises	0.64	15%	1.88	72%	2.21	39%
Medium-sized enterprises	0.94	22%	0.32	12%	0.53	9%
Large enterprises	2.78	64%	0.40	15%	2.99	52%
Total	4.37	100%	2.60	100%	5.74	100%

Source: Authors, based on the Office of SMEs Promotion (2019).

sectoral GDP indicated that both SMEs and large enterprises were equally important in the service sector.

In terms of international trade and GVCs, SMEs seem to have very limited involvement. Figure 5.2 shows that, in 2018, SMEs’ shares of exports and imports were only 29% and 37%, respectively. The export and import shares of SMEs have leveled off during the past 5 years. Even though there appears to have been a positive expansion trend or growth in imports in 2017, both imports and exports experienced growth contraction in 2018 (Figure 5.3). The contraction of trade is predicted to be prolonged due to the United States–People’s Republic of China trade war and coronavirus outbreak.



In 2018, there were 3 million business enterprises in Thailand, of which 99.8% were SMEs (Table 5.3). SMEs were concentrated in either the trading business (wholesale and retail sector) or service sector (Figure 5.4). This is consistent with the SMEs’ GDP contribution presented in Tables 5.1 and 5.2. As regards the breakdown of SME concentration by region, Figure 5.5 indicates that the northeast region accounted for the highest concentration

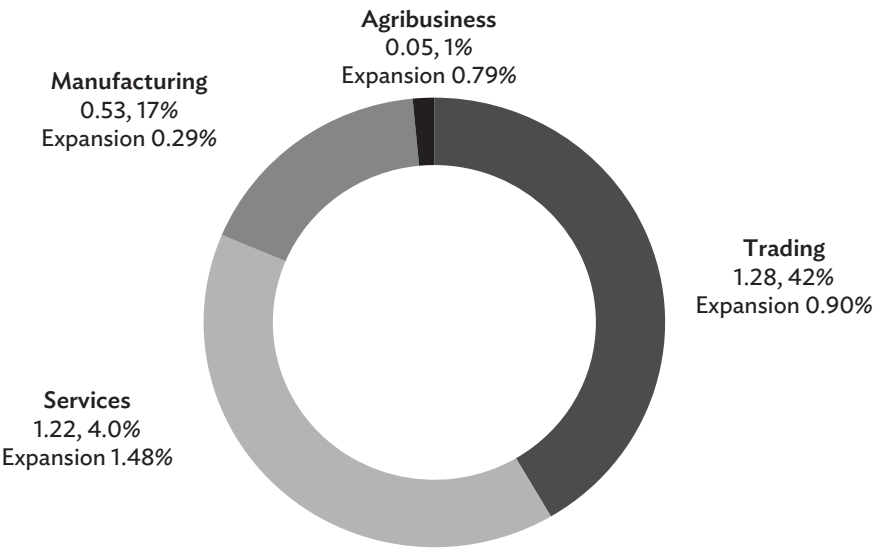
of SMEs, while the east region showed the lowest concentration. As the east region is not highly populated and is promoted as an area of special economic zones, generally for foreign medium-sized and large enterprises, this may explain the low concentration of SMEs in this region. However, the share of SMEs in each region was not significantly different. In other words, SMEs were distributed evenly throughout the country.

Table 5.3: Breakdown of the Number of Enterprises by Business Sector, 2018

	Small Enterprises	Medium-Sized Enterprises	SMEs	Large Enterprises	Total
Trading	1,275,470	4,087	1,279,557	2,493	1,282,050
Services	1,219,347	5,216	1,224,563	1,756	1,226,319
Manufacturing	522,886	4,599	527,485	2,152	529,637
Agribusiness	45,948	269	46,217	54	46,271
Total	3,063,651	14,171	3,077,822	6,455	3,084,277

SME = small and medium-sized enterprise.
Source: Authors, based on the Office of SMEs Promotion (2019).

Figure 5.4: Number of SMEs by Business Sector, 2018 (million)



SME = small and medium-sized enterprise.
Source: Authors, adjusted from the Office of SMEs Promotion (2019).

In terms of the number of jobs, SMEs employed 14 million people in 2018, which accounted for 86% of total employment. Over the last year, SME employment grew by 4.7%. Figure 5.6 shows the SME employment by business sector in 2018. The employment was heavily concentrated in the service sector (43%), while the agribusiness sector had the lowest concentration of SME employment (1%). By comparing Figure 5.4 with Figure 5.6, we can see that the patterns of SME concentration (Figure 5.4) and SME employment concentration (Figure 5.6) by business sector are slightly different. Figure 5.4 shows the concentration of SMEs is similar between the trading business and the service sector, whereas the concentration of SME employment is larger in the service sector than the trading business sector. This may have some policy implications for the government when considering implementing any SME policies that may affect income distribution or employment across different business sectors. In terms of regional distribution, the SME employment breakdown by region indicated that the largest concentration of SME employment was in the Bangkok metropolitan area (Figure 5.7). The distributions of SMEs (Figure 5.5) and SME employment (Figure 5.7) by region were quite similar, but the concentration of SME employment was biased toward the central region, including the Bangkok metropolitan area. Implementing any SME-related policies may have slightly different effects on income or other welfare distributions across different regions.

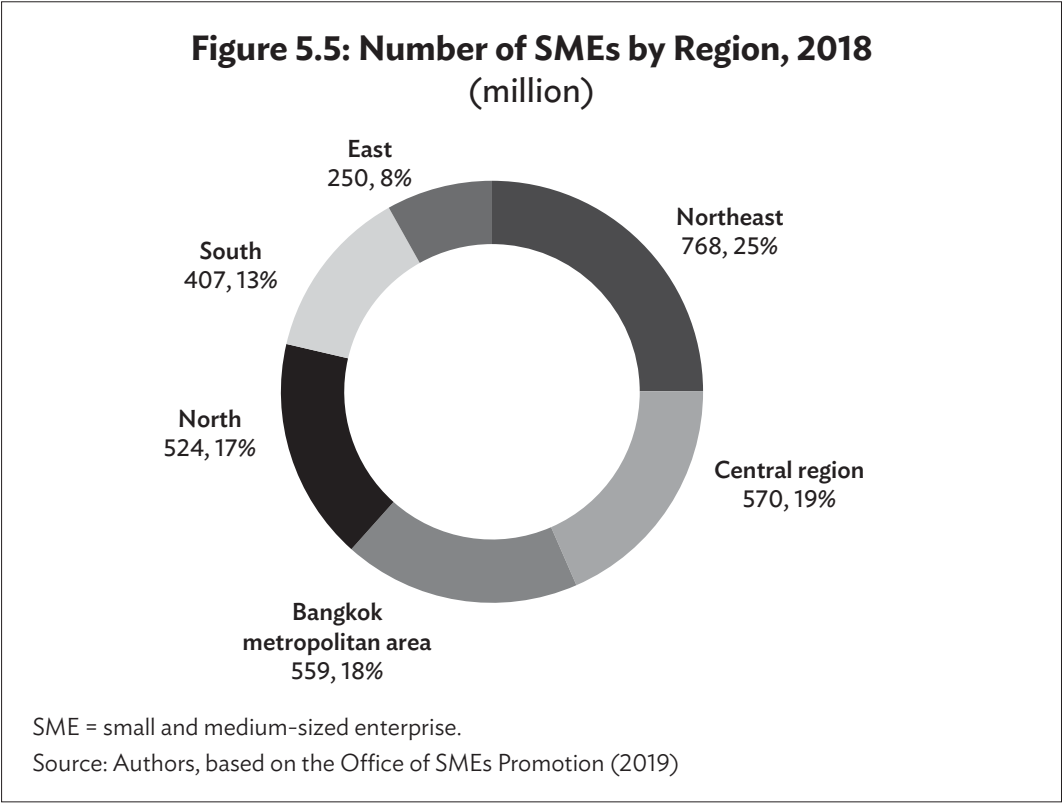
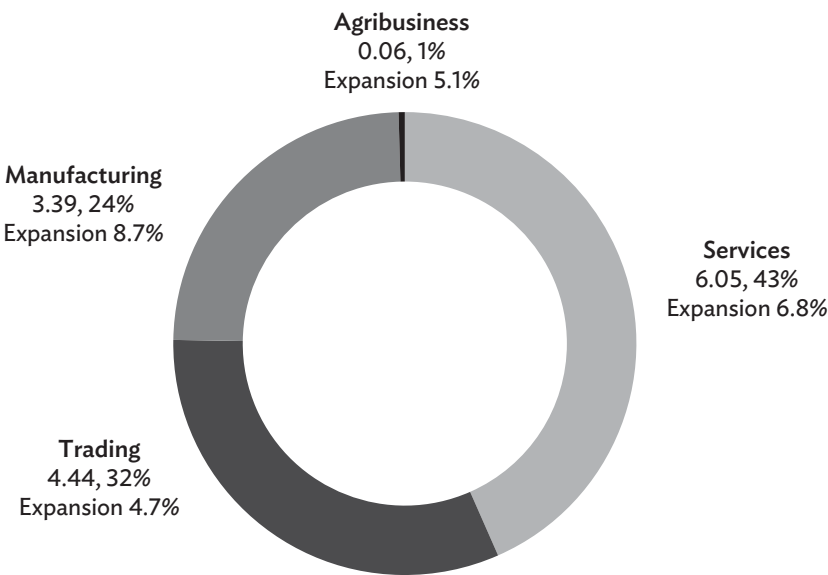
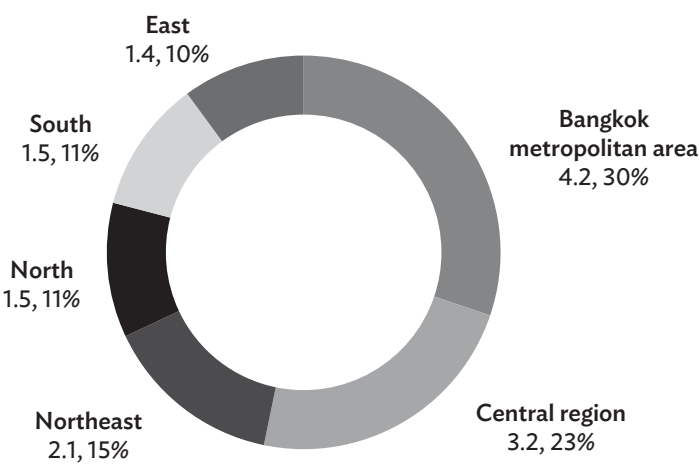


Figure 5.6: SME Employment by Business Sector, 2018
(millions of persons)



SME = small and medium-sized enterprise.
Source: Authors, adjusted from the Office of SMEs Promotion (2019).

Figure 5.7: SME Employment by Region, 2018
(millions of persons)



SME = small and medium-sized enterprise.
Source: Authors based on the Office of SMEs Promotion (2019).

5.2.2 SME Promotion Policies

Owing to the significant contributions of SMEs in terms of GDP and employment, the Government of Thailand considered SME investment promotion as one of the main national strategies to solve structural economic and social problems and further boost the Thai economy after the 1997 financial crisis. In 2000, the government pushed forward the idea of an SME investment promotion policy by enacting the SME Promotion Act BE2543. The act, together with the ministerial regulation on SMEs' number of employees and the value of total fixed assets BE2545 issued by the Ministry of Industry in 2002, established the official definition and classification of SMEs. The business sector, the number of employees, and the value of total fixed assets were the criteria of the classification (Table 5.4). To reflect the reality of the modern economy, the government in 2019 introduced a new definition and classification of SMEs (effective January 2020). The modifications have been made in three areas: enterprise category, classification criteria, and sector grouping. First, a new category of "micro-sized enterprises" was created. Second, the classification criterion of total fixed assets was replaced by annual revenue, while the classification details of the number of employees were adjusted. Third, the service sector and the trading sector (wholesale and retail) were combined and subject to the same criteria. Details of the classification are presented in Table 5.5.

The product of the SME Promotion Act was the establishment of OSMEP in 2001. It is a governmental agency responsible for developing the SME promotion master plan and the promotion action plan by coordinating the work among different ministries and agencies. So far, OSMEP has delivered four 5-year SME promotion master plans since 2002. Each master plan is tailored to reflect the current economic situation of each time period and prepare SMEs for current and future opportunities and challenges. The first plan (2002–2006) focused on economic recovery, infrastructure improvement, and enhancement of SMEs' competitiveness, especially SMEs in the export and service sectors, while the second plan (2007–2011) emphasized preparing SMEs for knowledge-based and highly dynamic business opportunities (Turner et al. 2016). Balanced and sustainable growth with a strong emphasis on SMEs in the technology and innovation industry was the guiding concept for the third plan (2012–2016). The current SME promotion master plan is the fourth one and was implemented in 2017.

The fourth master plan (2017–2021) underlines the significance of SMEs as a competitive growth engine and an inclusive growth mechanism and aims to raise GDP created by SMEs to achieve at least 50% of total GDP by 2021. The vision of this plan is to make doing business easier for

Table 5.4: 2002 Definition of SMEs

Sector	Small Enterprises		Medium-Sized Enterprises	
	Fixed Assets (B million)	Employees (no. of persons)	Fixed Assets (B million)	Employees (no. of persons)
Manufacturing	≤ 50	≤ 50	> 50 and ≤ 200	51 – 200
Services	≤ 50	≤ 50	> 50 and ≤ 200	51 – 200
Wholesale	≤ 50	≤ 25	> 50 and ≤ 100	26 – 50
Retail	≤ 30	≤ 15	> 30 and ≤ 60	16 – 30

SME = small and medium-sized enterprise.
Source: Authors, based on the ministerial regulation on SMEs’ number of employees and the value of total fixed assets BE2545, Ministry of Industry, Government of Thailand (2002).

Table 5.5: 2019 Definition of SMEs

Sector	Microenterprises		Small Enterprises		Medium-Sized Enterprises	
	Annual Revenue (B million)	Employees (no. of persons)	Annual Revenue (B million)	Employees (no. of persons)	Annual Revenue (B million)	Employees (no. of persons)
Manufacturing	≤ 1.8	≤ 5	≤ 100	≤ 50	> 100 and ≤ 500	> 50 and ≤ 200
Services, wholesale, and retail	≤ 1.8	≤ 5	≤ 50	≤ 30	> 50 and ≤ 300	> 30 and ≤ 100

SME = small and medium-sized enterprise.
Notes:
1. If the number of employees meets the criterion of one enterprise category, but annual revenue meets the criterion of another enterprise category, the criteria of annual revenue determine the enterprise category.
2. Microenterprises are part of small enterprises.
Source: Authors, based on the ministerial regulation on SMEs’ classification BE2562, Ministry of Industry, Government of Thailand (2019).

SMEs; increase the competitiveness of the existing SMEs (Smart SME); and help new SMEs (e.g., tech start-ups, creative start-ups, and cultural start-ups) become high-value start-ups. Based on this vision, OSMEP developed three strategies: (1) issue-based development and support programs for SMEs, (2) business or industry-specific competitiveness enhancement, and (3) the development of systematic growth-driven mechanisms for SMEs.

The first strategy puts emphasis on the creation of an ecosystem that helps increase overall SMEs’ competitiveness and capability. Policy

areas covered under this strategy include technology and innovation upgrading, ease of financial accessibility (e.g., a measure of exchange rate risk prevention, a revival fund for SMEs, low-interest loans for capital investment or transformation loans), business-to-government and international market penetration, and entrepreneurship development programs.

With regard to the second strategy, OSMEP tailors its policies to support different groups of SMEs based on the nature of their business and industry, such as high-value start-ups and traditional SMEs, among others. Policies to promote high-value start-ups entail the development of research and development (R&D), creative and design centers, start-up accelerator programs, ease of access to credits, relaxation of rules and regulations, and promotion of incentive programs. In contrast, policies to promote traditional SMEs focus on enhancing competitiveness, local market development, credit access improvement (e.g., local economy loans), and technology and product quality upgrading. The second strategy also supports the creation of SME clusters and networks, which help SMEs to smoothly participate in regional and global value chains.

Last, the development of systematic growth-driven mechanisms for SMEs was proposed as a third strategy. This strategy aims to promote more efficient and effective SME support programs by developing tools to support SMEs' efficiency, revising rigid laws and regulations that may hinder the growth of SMEs, and devising more attractive incentive programs. Table 5.6 summarizes the visions, strategies, and policies described in the fourth SME promotion master plan.

Even though the current SME promotion plan did not have explicit strategies regarding GVC participation, the promotion plan proposed a few goals, objectives, and policy plans in terms of export enhancement under the first and second strategies. By 2021, OSMEP aims to accomplish two goals: achieving 30% of the national export volumes and raising the average annual export values of SMEs to B100 million (\$3.1 million) per enterprise. To this end, OSMEP, with the cooperation of three other government agencies (Department of International Trade Promotion of the Ministry of Commerce, Board of Investment of the Office of the Prime Minister, and National Science and Technology Development Agency of the Ministry of Science and Technology), set the objectives to raise SMEs' capabilities with regard to international market penetration, SME overseas investment, and involvement in large enterprises' supply chains. The corresponding policy plans were mainly in line with Thailand's industry 4.0 policy that heavily promoted the utilization of technology and innovation, such as e-commerce, market intelligence, and product and services upgrading, among others. E-commerce was considered a channel to help SMEs

Table 5.6: The Fourth SME Promotion Master Plan

Goal	
To raise GDP created by SMEs to achieve at least 50% of the total GDP by 2021	
Vision	
<ol style="list-style-type: none">1. To improve the ease of doing SME business2. To increase the competitiveness of the existing SMEs (Smart SME)3. To support start-ups in becoming high-value start-ups	
Strategies	Policies
1. Issue-based development and support programs for SMEs	<ol style="list-style-type: none">1. Technology and innovation upgrading2. Ease of financial accessibility, e.g., a measure of exchange rate risk prevention, a revival fund for SMEs, low-interest loans for capital investment (transformation loans), among others3. Business-to-government and international market penetration4. Entrepreneurship development programs
2. Business or industry-specific competitiveness enhancement	<p>High-value start-ups</p> <ol style="list-style-type: none">1. The development of research and development, creative and design centers2. Start-up accelerator programs3. Ease of access to credits4. Relaxation of rules and regulations5. Promotion of incentive programs <p>Traditional SMEs</p> <ol style="list-style-type: none">1. Competitiveness enhancement2. Local market development3. Credit access improvement, e.g., local economy loan4. Technology and product quality upgrading
3. Development of systematic growth-driven mechanisms for SMEs	<ol style="list-style-type: none">1. Development of tools to support SMEs' efficiency2. Revision of rigid laws and regulations3. Creation of more attractive incentive programs

GDP = gross domestic product, SME = small and medium-sized enterprise.
Source: Authors, based on the Office of SMEs Promotion (2017) and Wasi, Sa-ngimnet, and Monchaitrakul (2019).

penetrate the international market, while market intelligence was expected to help SMEs access comprehensive and necessary data and information regarding foreign markets and overseas investment, such as rules and regulations, trade statistics, and foreign trading and business partners. Moreover, incentive programs were put in place to directly and indirectly support SMEs. So-called “internationalization grants” helped SMEs participate in overseas business promotion events such as

business matching and product road shows, among others. There was also an incentive program given to large enterprises that involved SMEs in their supply chains. This program indirectly helped SMEs to become part of GVCs.

5.3 Literature Review

GVCs have gained momentum in the emerging international trade and development literature. A large body of research has comprehensively examined the relationship between GVCs and productivity gains at country and industry level. However, little is known about the link between GVCs and firms' performance and competitiveness, especially in the context of SMEs and developing countries, due to the lack of comprehensive data and, in turn, limited empirical research.

Since the late 2000s, the awareness of the role of SMEs in GVCs and the concern over the uneven benefits generated from GVC participation have been raised among international organizations such as the United Nations Conference on Trade and Development and the Organisation for Economic Co-operation and Development. The first wave of studies was limited to case studies either by specific firms or by sector to explore the role of SMEs in the GVCs, the benefits of GVC participation, and the barriers preventing SMEs from joining GVCs. The studies cover a wide range of industries and countries, including the automotive industry in Japan, the scientific and precision instrument industry in Australia, the software industry in Turkey, and the textile industry in Taipei, China. In general, the studies (e.g., Chen 2019; OECD 2008) found that SMEs can get involved in GVCs through the following roles: as an original equipment manufacturer or subcontractor, as an original brand manufacturer, or as an intermediate trader and supplier. The studies (e.g., APEC Study Center 2017; OECD 2008) also revealed some key benefits of GVC participation, including product upgrading, product specialization and niche market positioning, productivity and efficiency enhancement, market expansion, acquisition of knowledge, and innovation engagement. Nevertheless, SMEs may not be able to enjoy those benefits due to (1) inadequate knowledge, technology, and innovation capacity; (2) the lack of managerial, financial, and human resources; (3) difficulties in complying with international standards and requirements; (4) limited economies of scale, productivity, and price competitiveness; and (5) manufacturing inflexibility and difficult bargaining position against a few large global firms (e.g., Hatsukano and Tanaka 2014; Korwatanasakul 2019; Korwatanasakul and Intarakumnerd 2020; Kotturu and Mahanty 2017; OECD 2007, 2008).

Among the limited amount of literature on SMEs and GVCs, current debates in the literature can be categorized into the following three areas:

Quantification of SMEs' GVC participation. More recent studies (e.g., Cusolito, Safadi, and Taglioni 2016; Miao and Fortanier 2018; OECD 2019) have focused on how to measure domestic and foreign value-added components at firm level. By combining firm-level data with the Trade in Value Added (TiVA) database, the studies provide descriptive analysis of how firms of different sizes engage in GVCs. They found that GVC participation is heterogeneous between SMEs and larger firms in terms of trade patterns and their impact and that SMEs participate in GVCs largely through indirect exports supplied to larger exporting domestic or multinational firms. As the findings show that firms with different sizes or production functions engage differently in GVCs, this raises an interesting concern toward country-level and industry-level analyses of GVC participation.

Determinants of GVC participation in the context of SMEs. Arudchelvan and Wignaraja (2015) and Vidavong, Thipphavong, and Suvannaphakdy (2017) examined the firm characteristics that possibly determine SME participation in GVCs by utilizing a cross-sectional probit regression with firm-level survey data. The common finding was that firm size, measured by the number of employees, is positively associated with SMEs' likelihood of engaging in GVCs. Arudchelvan and Wignaraja (2015) also found that technology and R&D are positively related to GVC participation, whereas Vidavong, Thipphavong, and Suvannaphakdy (2017) observed a contradictory result showing a negative relationship between R&D and participation. Other characteristics such as the number of trained employees and the value of a firm's export positively determine the likelihood of SMEs' participation in GVC (Vidavong, Thipphavong, and Suvannaphakdy 2017).

Relationship between GVC participation and SMEs' performance. Studies in this area estimated the impact of GVC participation on different indicators of SMEs' performance, including the competitiveness gap between SMEs and large firms, the propensity to export, labor productivity, and profits. Although GVC participation was measured differently, the studies found overall a positive link between GVC participation and SMEs' performance.

On the one hand, Boffa, Jansen, and Solleder (2017) examined the relationship between GVC participation and the competitiveness of SMEs at the country level. Their main estimation method is generalized two-stage least squares estimation using a combination of firm-level and TiVA data. They found that GVC participation in terms of imports to

export and domestic value added returning home is positively correlated with SMEs' competitiveness. On the other hand, López González (2017) and Vidavong, Thipphavong, and Suvannaphakdy (2017) conducted their analyses at firm level by utilizing cross-sectional regression and firm-level survey data. López González (2017) proxied GVC participation by share of foreign intermediates and share of foreign ownership, while using propensity to export and labor productivity as indicators of SMEs' performance. Both proxies were found to be positively related to both performance indicators. In the study of Vidavong, Thipphavong, and Suvannaphakdy (2017), GVC participation is a dummy variable, taking a value of 1 for an SME participating in GVCs, and 0 for a nonparticipating SME. They found a positive relationship between GVC participation and SMEs' profits.

To summarize, what has been discovered so far is the following. First, SMEs can be involved in GVCs as a contractor or supplier of indirect exports to gain benefits from international production networks. However, GVCs also impose several challenges to SMEs. Second, firms with different sizes heterogeneously participate in GVCs; therefore, the results of the analyses at country and industry level may not reflect the reality and may produce wrong policy implications. Third, a limited number of previous studies have found that firm size plays a significant role in determining GVC participation and that the participation is likely to positively contribute to aspects of SMEs' performance such as productivity and profit. Nevertheless, most findings were based on a cross-sectional analysis with a small number of observations and therefore may face the problem of endogeneity and biased estimation. Table 5.7 summarizes the different methodologies used in previous studies.

In addition, data availability is often lacking at the firm level, even in advanced economies, and is considered a significant technical issue in the study of GVCs. Most studies have had no choice but to use the available aggregate data sources to examine the relationship between GVC participation and the broad market outcomes. The lack of availability of GVC data therefore led to analytical limitations, including restrictive levels of analysis.

To address the aforementioned gaps and limitations, our study focuses on the determinants of GVC participation and the relationship between the participation and firms' performance at the firm level by utilizing firm-level panel data from 2004 to 2014. To the best of our knowledge, our study is the first to employ firm-level panel data in the analyses. This study contributes to more solid findings on the impact of GVC participation on firms' performance in terms of total revenues at the firm level and provides relevant policy recommendations that can help support SMEs in smoothly integrating into GVCs.

Table 5.7: Summary of Selected Previous Studies

Authors	Area of Study	Estimation Method	Data	Sample	GVC Variables
Arudchelvan and Wignaraja (2015)	Determinants of GVC participation in the context of SMEs	Cross-sectional probit regression	2012 ADB and ADBI firm-level survey data (Malaysia)	207 firms	A dummy variable takes on the value of 1 if the firm responds positively to the question “Is your firm part of a regional/global supply chain?” and 0 otherwise.
Vidavong, Thipphavong, and Suvannaphakdy (2017)	Determinants of GVC participation in the context of SMEs	Cross-sectional probit regression	Firm-level survey data (Lao PDR)	135 firms	A dummy variable takes a value of 1 for an SME participating in GVC, and 0 for a nonparticipating SME.
	Relationship between GVC participation and SMEs’ performance	Cross-sectional regression	Firm-level survey data (Lao PDR)	135 firms	A dummy variable takes a value of 1 for an SME participating in GVC, and 0 for a nonparticipating SME.
Boffa, Jansen, and Solleder (2017)	Relationship between GVC participation and SMEs’ performance	Two-year panel regression: generalized two-stage least squares	Firm-level and TiVA data	64 countries	<ul style="list-style-type: none"> Imports to export Domestic value added returning home
López González (2017)	Relationship between GVC participation and SMEs’ performance	Cross-sectional regression	Firm-level and TiVA data	22,601 firms	<ul style="list-style-type: none"> Share of foreign intermediates Share of foreign ownership

ADB = Asian Development Bank, ADBI = Asian Development Bank Institute, GVC = global value chain, Lao PDR = Lao People’s Democratic Republic, SME = small and medium-sized enterprise, TiVA = Trade in Value-Added.
Source: Authors.

5.4 Data and Methodology

5.4.1 Data

The firm-level panel data set used in this study combines 11 rounds of the annual survey on Thailand’s industries conducted by the Office of Industrial Economics of the Ministry of Industry. The main objective

of this survey is to collect information on manufacturing establishments in Thailand covering all regions, including Bangkok and metropolitan areas (Samutprakarn, Pathum Thani, and Nonthaburi), the central region, the northern region, the northeastern region, and the southern region. This survey provides detailed information on production, sales, imports and exports, investment, human resources, technology and innovation, and a future production plan.

Our data set is a balanced panel that covers 1,259 firms (including SMEs and non-SMEs) for each year (2004–2014), spanning 21 industries in the manufacturing sector (based on the two-digit International Standard Industrial Classification level [15–37]). The firm information had been collected from the same set of firms and industries for 11 years, and we therefore observe no data attrition. We classify SMEs according to the 2002 official definition of SMEs (Table 5.4), which better reflects our data than the 2019 definition. SMEs in the manufacturing sector are defined as firms with fewer than 201 employees or a value of total fixed assets equal to or less than B200 million (approximately \$6.5 million).

Table 5.8: Summary Statistics

Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
Share of imported inputs (%)	12,736	0.062	0.163	0	0.987
Share of revenue from exports (%)	9,113	0.216	0.340	0	1
ln(Total revenue)	9,113	18.95	2.143	5.044	26.90
SME (dummy)	12,794	0.827	0.378	0	1
Research and development (dummy)	12,794	0.061	0.239	0	1
Share of foreign ownership (%)	12,794	9.924	24.39	0	100
ln(Labor productivity)	11,870	0.452	1.560	−15.12	8.391
ln(Value of total capital)	12,579	17.11	2.756	0	25.30
ln(Labor input)	12,562	4.865	1.474	0	20.22
ln(Cost of intermediate goods)	8,338	18.319	2.181	4.664	26.252

SME = small and medium-sized enterprise.
Source: Authors.

SMEs account for over 80% of all observations, which reflects the reality of SMEs in Thailand presented in sections 5.1 and 5.2. Table 5.8 provides summary statistics.

5.4.2 Methodology

Determinants of Global Value Chain Participation

First, this study investigates what factor determines the degree of GVC participation by following the equation of Arudchelvan and Wignaraja (2015):

$$GVC_{it} = \beta_0 + \beta_1 SME_{it} + \beta_2 X_{it} + \epsilon_{it},$$

where GVC_{it} represents the degree of GVC participation of firm i in year t . A firm can participate in GVCs through either backward or forward participation, which reflects the upstream or downstream link in the chain (Korwatanasakul, Baek, and Majoe forthcoming). Typical GVC participation refers to backward GVC participation, where an individual firm imports foreign input to produce its intermediate or final goods and services to be exported. Conversely, forward GVC participation occurs when feeding intermediate goods or services to other firms for further processing. Share of imported input and share of revenues from exports are used as proxies for backward GVC participation and forward GVC participation, respectively. Share of imported input is calculated by dividing costs of imported input by total cost. Share of revenues from exports indicates the percentage of total revenue that comes from exports. SME_{it} is a dummy variable, taking a value of 1 for an SME, and 0 otherwise. X_{it} includes a set of control variables, which are R&D, share of foreign ownership, and labor productivity. R&D is a dummy variable, taking a value of 1 if a company has a budget for R&D on either product or process development, and 0 otherwise. Share of foreign ownership indicates the percentage of the ownership held by foreign investors or firms. Labor productivity is defined as the value added per worker and is calculated from a product value minus costs, including for raw material, fuel and energy, and subcontracting (World Bank 2019). e_{it} is the disturbance term. Industry and year fixed effects are imposed in the estimation to control for unobserved heterogeneity across industrial groups and times. Variances among different industries and time periods (e.g., differences in production technologies, heterogeneous policy interventions in a specific industry and time period) may influence both variables SME_{it} and GVC_{it} . Applying fixed effects can help reduce endogeneity problems caused by measurement error and omitted variables.

Global Value Chain Participation and Firms' Performance

To estimate the impacts of GVC participation on firms' performance, the Cobb-Douglas production function is used and the GVC participation index is incorporated into the function. Our empirical model is specified as follows:

$$\ln Y_{it} = \beta_0 + \beta_1 K_{it} + \beta_2 L_{it} + \beta_3 M_{it} + \beta_4 GVC_{it} + \beta_5 SME_{it} + \beta_6 X_{it} + e_{it},$$

where $\ln Y_{it}$ is the firms' performance proxied by total sales of firm i in year t . K_{it} represents capital input captured by the value of total capital; L_{it} refers to labor input captured by the payment to employees; and M_{it} is the intermediate goods proxied by the cost of intermediate goods.² GVC_{it} represents the degree of GVC participation proxied by the share of imported inputs and share of revenue from exports. SME_{it} is a dummy variable, taking a value of 1 for an SME, and 0 otherwise. X_{it} refers to a set of control variables related to a firm's characteristics, including R&D, share of foreign ownership, and labor productivity. Industry and year fixed effects are also imposed in the estimation. e_{it} is the disturbance term.

5.5 Empirical Results and Policy Discussion

5.5.1 Determinants of GVC Participation

The estimation results of Table 5.9 indicate the set of determinants of GVC participation. The SME variable shows a statistically significant negative effect on GVC participation, both backward (columns 1–4) and forward (columns 5–8) participation, and its coefficients are robust across different model specifications. As SMEs have limited knowledge, technology, and innovation capacity, it is difficult for them to participate in GVCs. SMEs, therefore, have a lower degree of GVC participation than larger firms (non-SMEs). Our results are fairly consistent with the findings of previous studies (e.g., Arudchelvan and Wignaraja 2015; Vidavong, Thipphavong, and Suvannaphakdy 2017), which argued that firm size, measured by the number of employees, is positively associated with the possibility of participating in GVCs.

² The cost of intermediate goods is estimated from all the available cost information in our data set: The cost of intermediate goods is equal to the total cost minus other costs such as fuel and energy costs, subcontracting costs, and depreciation expenses for plant and equipment.

Table 5.9: Determinants of Global Value Chain Participation

Dependent Variables		Backward GVC Participation (Share of Imported Inputs)			
Independent Variables		1	2	3	4
SMEs		-0.0513*** (0.00428)	-0.0496*** (0.00430)	-0.0375*** (0.00435)	-0.0342*** (0.00454)
Research and development			0.0299*** (0.00695)	0.0217*** (0.00687)	0.0197*** (0.00703)
Share of foreign ownership				0.00127*** (8.41e-05)	0.00116*** (8.70e-05)
ln(Labor productivity)					0.00644*** (0.00102)
Constant		0.170*** (0.00737)	0.166*** (0.00745)	0.134*** (0.00732)	0.131*** (0.00763)
Observations		12,736	12,736	12,736	11,818
R-squared		0.088	0.090	0.122	0.124
Dependent Variables		Forward GVC Participation (Share of Revenue from Exports)			
Independent Variables		5	6	7	8
SMEs		-0.122*** (0.00901)	-0.116*** (0.00905)	-0.0899*** (0.00913)	-0.0922*** (0.00969)
Research and development			0.113*** (0.0146)	0.0971*** (0.0144)	0.107*** (0.0152)
Share of foreign ownership				0.00272*** (0.000150)	0.00274*** (0.000158)
ln(Labor productivity)					0.00419* (0.00253)
Constant		0.354*** (0.0131)	0.337*** (0.0132)	0.268*** (0.0132)	0.274*** (0.0137)
Observations		9,113	9,113	9,113	8,463
R-squared		0.103	0.111	0.150	0.156

GVC = global value chain, SME = small and medium-sized enterprise.
Notes: Robust standard errors are in parentheses. * p < 0.05, ** p < 0.01, *** p < 0.001. All models control for industry and year fixed effects. Backward GVC participation and forward GVC participation are proxied by share of imported inputs and share of revenue from exports, respectively.
Source: Authors.

In terms of the control variables, R&D, share of foreign ownership, and labor productivity are statistically significant and positively affect GVC participation, both backward and forward participation. Their estimated coefficients are robust across different model specifications. Firms with a budget for R&D would have a higher quality of products and services and a more efficient production process. This translates into firms' higher competitiveness in getting involved in GVCs. This is similar to the finding of Arudchelvan and Wignaraja (2015) but contradicts that of Vidavong, Thipphavong, and Suvannaphakdy (2017). Furthermore, knowledge and technology transfer would take place in firms with a higher level of foreign ownership. The firms would have access to new technology and innovation, management know-how, and international networks and would therefore be quick to participate in GVCs. Lastly, firms with higher labor productivity can produce more efficiently and be more competitive in participating in such GVCs (e.g., Arudchelvan and Wignaraja 2015; Bernard and Bradford Jensen 1999; Clerides, Lach, and Tybout 1996).

5.5.2 Global Value Chain Participation and Firms' Performance

Table 5.10 shows the estimation results of the effect of GVC participation on firms' performance captured by total revenue. Our results indicate that GVC participation, both backward and forward participation, has a statistically significant positive relationship with firms' performance. By getting involved in GVCs, firms are required to adjust to international standards and requirements, while absorbing new knowledge and technology regarding product and production process development. Therefore, firms involved in GVCs would be more competitive in the domestic market and be able to expand their business to the international market. This, in turn, leads to higher revenue. Total capital, labor input, intermediate goods, and labor productivity are also statistically significant and robust across different specifications. All four factors contribute to higher total revenue among firms. Firms with more capital can invest more in new technology and production equipment to feed better products and services that can generate more revenues. Moreover, firms with greater intermediate goods, more labor, and higher labor productivity would be able to take advantage of economies of scale that reduce the cost of production and increase the revenue. In contrast, SMEs have a statistically significant negative effect on firms' performance as SMEs are too small to enjoy the aforementioned benefits of economies of scale. Our results are consistent with previous studies such as Vidavong, Thipphavong, and Suvannaphakdy (2017) and Wignaraja (2013). Even though the share of foreign ownership is

statistically significant in column 2, its coefficients are very small and therefore negligible in both specifications (columns 1 and 2). R&D is not statistically significant in either specification (columns 1 and 2). These variables do not explain the variation in firms' revenue but the variation in firms' GVC participation (see section 5.4.1).

5.5.3 Policy Discussion

Our results imply that being an SME is associated with a lower degree of GVC participation, but GVC participation can help firms (both SMEs and non-SMEs) increase their revenues as well as their opportunity to be part of international production networks and further proceed to greater value-added operation (Paweenawat 2019). Moreover, a lower degree of GVC participation, especially in terms of backward GVC participation, implies that SMEs have a lower chance of upgrading their technology and products because of limited access to foreign quality input and technology. This becomes a vicious cycle since SMEs cannot participate in GVCs or move up a value chain without upgrading their technology and products. In terms of forward GVC participation, it may be difficult to draw any policy implications as our data cannot capture implicit forward GVC participation where local Thai firms feed their intermediate goods to MNEs located in Thailand. Nevertheless, the more relevant question for SMEs that have already participated in GVCs should be where they are in the value chain and how they can upgrade to a higher one. Taking the example of the Thai automotive and electronics industries, these two large industries are not listed among the top industries in terms of multiplier effect generation or the impact on other domestic industries (Korwatanasakul 2019). Moreover, local suppliers (usually SMEs) are mostly located in lower tiers since they do not have sufficient technological capacities to meet the global standard level to design and manufacture modules for original equipment manufacturers. This is because industrial upgrading takes place mainly in MNEs, and technology transfer from these suppliers is hardly observed. Only a few local suppliers under licensing agreements with global automakers could achieve the required technological sophistication and upgrade to Tier 1. In other words, local suppliers find it difficult to upgrade to higher tiers or higher positions in the value chains and remain competitive without technological assistance from foreign companies (Korwatanasakul and Intarakumnerd 2020).

As discussed in section 5.3, SMEs may find it difficult to enter GVCs for several reasons, e.g., a lack of ability to meet international standards, a lack of managerial and human capital resources, limited access to credit and loans, and limited access to information and innovation, among others. Therefore, any policies that can practically address

Table 5.10: The Effect of Global Value Chain Participation on Firms’ Performance
(total revenue)

Dependent Variable	Firms’ Performance (Total Revenue)	
Independent Variables	Backward GVC Participation	Forward GVC Participation
GVC participation	0.518*** (0.0380)	0.0392** (0.0171)
ln(Value of total capital)	0.0198*** (0.00463)	0.0237*** (0.00464)
ln(Labor input)	0.770*** (0.0163)	0.785*** (0.0156)
ln(Labor productivity)	0.746*** (0.0168)	0.760*** (0.0162)
ln(Cost of intermediate goods)	0.188*** (0.0139)	0.174*** (0.0131)
SMEs	−0.0572*** (0.0190)	−0.0602*** (0.0193)
Share of foreign ownership	0.000281 (0.000190)	0.000719*** (0.000207)
Research and development	0.0284 (0.0191)	0.0304 (0.0194)
Constant	11.09*** (0.192)	11.24*** (0.183)
Observations	5,583	5,583
R-squared	0.965	0.963

GVC = global value chain, SMEs = small and medium-sized enterprises.
Notes: Robust standard errors are in parentheses. * p < 0.05, ** p < 0.01, *** p < 0.001. All models control for industry and year fixed effects. Backward GVC participation and forward GVC participation are proxied by share of imported inputs and share of revenue from exports, respectively.
Source: Authors.

these challenges faced by SMEs will help local SMEs to enter GVCs smoothly. For example, the government can empower SMEs through a mix of policy tools such as promoting SMEs’ digital capabilities, easing access to commercial bank credit, giving corporate tax incentives, and providing high-quality business support services, among others. With

these empowerment initiatives, Thai SMEs will be able to engage in the upgrading of GVCs.

5.6 Conclusion

This study addressed the gaps in the literature through empirical analysis of the determinants of GVC participation and the relationship between GVC participation and firms' performance for the case of a developing country, namely Thailand. First, this study investigated what factors determine the degree of GVC participation. Second, based on the Cobb-Douglas production function, this study examined the relationship between GVC participation and firms' revenues. Both analyses utilized a panel fixed-effect regression employing unique panel firm-level data for the period 2004–2014. The analyses also separately examined the effects of forward and backward GVC participation on firms' performance. Our results show that SMEs have a lower degree of engagement in both backward and forward GVC participation. Moreover, this study finds that GVC participation, both backward and forward, is positively associated with firms' performance. Hence, policies aimed at helping local SMEs to enter GVCs smoothly would be the priority. One possible caveat in our analysis may come from the problem of endogeneity due to the reverse causality between GVC participation and total revenue. Therefore, our empirical results must be interpreted with care. However, this study is an initial stepping-stone for contributing to more solid findings on the impact of GVC participation on firms' performance at the firm level. Future research may improve on the methodology to deal with the endogeneity issue.

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6

Firm Size and Participation in the International Economy: Evidence from Bangladesh

*Ben Shepherd**

6.1 Introduction

Bangladesh has seen rapid growth over recent years, with aggregate gains translating into significant improvements in individual well-being: growth in real gross national income per capita in purchasing power parity terms averaged 4.7% per year between 2000 and 2017. Income growth has been accompanied by a significant reduction in poverty, with the \$1.90/day poverty headcount ratio declining from 34.8% in 2000 to 14.8% in 2016 (World Bank, World Development Indicators).

A key feature of Bangladesh's development model has been integration in the world economy, as it has sought, with great success, to become a manufacturing platform in sectors such as ready-made garments. Bangladesh is a leading exponent of the value chain development model (Baldwin 2011), relying heavily on imported intermediates to be competitive in labor-intensive final products. There is great interest in this model all around the region and elsewhere, so it is important to have a clear sense of how it has worked and which firms have been able to benefit from trade in which ways.

At the same time, policy makers around the world are becoming increasingly interested in the question of the extent to which smaller businesses can gain from trade, and in particular inclusion in global value chains (GVCs). The reason for this interest is that in most economies, small and medium-sized enterprises (SMEs) account for the bulk of employment, and can even constitute a significant share

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of exporting firms by number. This is particularly true in Bangladesh, where SMEs account for over 99% of all industrial firms, and 85% of industrial sector employment; however, their small size means that, despite their overwhelming number, they only contribute around 25% of total manufacturing value added (Hela uz Zaman and Jahirul Islam 2019).

In terms of the sectoral distribution of activity, the World Bank (2019) finds that the bulk of micro (87%) and small (94%) firms are in non-manufacturing services, typically trading. By contrast, around 50% of medium-sized enterprises are involved in industrial activities. Size, therefore, represents a potential barrier for entry into industrial activities, including manufacturing, but on a numerical basis, there is nonetheless a substantial number of Bangladeshi SMEs engaged in manufacturing activities, as a subset of the industry aggregate: 831,000 microenterprises, 31,000 small enterprises, and 3,000 medium-sized enterprises. The Enterprise Surveys data used in this chapter show that within manufacturing, small and microenterprises are concentrated in the food, apparel, and electronics sectors, while medium-sized enterprises are very heavily concentrated in apparel, with only small numbers of firms engaged in other types of manufacturing activities.

To trade economists, the policy focus on SMEs can sometimes appear misplaced. It is well established using data for many countries that it is large firms that account for the lion's share of exports by value, as they tend to be more productive and are therefore better able to absorb the additional costs associated with entering foreign markets (see Bernard et al. 2007 for a review of the evidence). Moreover, there is clear evidence that exporters tend to be larger and more productive than other firms before they enter foreign markets, and that the gains from exporting itself are in fact more limited than had previously been assumed in much of the development literature (Bernard and Jensen 1999). Even though bilateral trade is dominated by large firms, it is nonetheless important to understand how trade dynamics, and GVC participation, affect smaller firms as well, taking account of the different ways in which that may happen.

While there is now a large literature on the firm-level determinants of trade behavior (see Bernard et al. 2007 for a review), it only partially deals with the question of firm size. As noted, there is extensive evidence showing that exporting firms tend to be larger and more productive than other firms. The Organisation for Economic Co-operation and Development (OECD) (2018) analyzes the available data for member countries systematically and shows that the proportion of exports accounted for by SMEs is typically lower than their proportion of value added in the economy as a whole, which shows the general tendency

in place, albeit with substantial variation across countries. But there is relatively little evidence on the role of SMEs per se, particularly in developing economies. An exception is Wignaraja (2012), who uses firm-level data for five Association of Southeast Asian Nations (ASEAN) member states to show that, while larger firms do indeed account for the bulk of GVC integration, the share of SMEs has been growing over time. One contribution of the present chapter is to build on this emerging evidence base to examine the links between firm size and international engagement more closely, paying attention to the possibility of causation operating in both directions. A second contribution is to extend the literature on the firm-level determinants of trade behavior to include Bangladesh, where the literature is currently very thin.

I investigate two hypotheses, drawing in part on previous work by Wignaraja (2012) for ASEAN. First, I examine the possibility that SMEs participate in the global economy differently from larger firms by examining the impact of firm size on the propensity to export directly, export indirectly (through a third party, like a wholesaler), and import intermediate inputs. The output of this exercise is an indication of the extent to which firm size mediates the relationship between production behavior and international integration. Second, I examine the possibility that SMEs react differently to international integration from larger firms, by looking at interactions between firm size and two indicators of international engagement (imports of intermediates and foreign ownership) in determining export behavior. The output of this exercise is an indication of the extent to which international engagement has different outcomes for SMEs as compared with larger firms.

6.2 Data and Descriptive Analysis

The World Bank has conducted three firm-level Enterprise Surveys in Bangladesh, in 2007, 2011, and 2013. The combined data set is available in panel format, covering approximately 1,300 firms once the sample is limited to manufacturing only.¹ This sample is smaller than most rigorous surveys of firms conducted by national statistical offices, but it has the advantage of being freely available to researchers and capturing a range of information not typically included in government surveys. I therefore use this data set to examine the integration of SMEs with international markets in the Bangladeshi context.

¹ The survey also includes service firms, but crucial data points are typically either not available or are apparently poorly recorded. Examples include the variables capturing export behavior, as well as the cost of intermediate inputs.

Table 6.1 provides a list of variables used in the analysis along with definitions and sources, Table 6.2 provides summary statistics, and Table 6.3 presents a correlation matrix.

Table 6.1: Variables, Definitions, and Sources

Variable	Definition	Source
Exporter Direct	Dummy variable equal to unity if the firm directly exported some of its production.	Enterprise Surveys
Exporter Indirect	Dummy variable equal to unity if the firm indirectly exported some of its production, e.g., through a wholesaler or distributor.	Enterprise Surveys
Foreign	Dummy variable equal to unity if the firm is owned at least 10% by a foreign investor.	Enterprise Surveys
GDP Deflator	GDP deflator.	World Development Indicators
Importer	Dummy variable equal to unity if the firm directly imported any of its intermediate inputs.	Enterprise Surveys
ISO	Dummy variable equal to unity if the firm has an internationally recognized quality certification, such as ISO 9001.	Enterprise Surveys
Log(Capital)	Logarithm of the value of the firm's equipment and land and buildings, deflated by the GDP deflator.	Enterprise Surveys; World Development Indicators
Log(Capital/Empl.)	Logarithm of capital per worker, calculated as the total value of the firm's equipment and land and buildings deflated by the GDP deflator, divided by the total number of employees.	Enterprise Surveys; World Development Indicators
Log(Electricity)	Logarithm of the value of electricity used by the firm, deflated by the GDP deflator.	Enterprise Surveys; World Development Indicators
Log(Employees)	Logarithm of the total number of employees of the firm.	Enterprise Surveys
Log(Exports)	Logarithm of the percentage of sales that are exported directly or indirectly multiplied by sales, deflated by the GDP deflator.	Enterprise Surveys; World Development Indicators
Log(Inputs)	Logarithm of the value of intermediate inputs used by the firm, deflated by the GDP deflator.	Enterprise Surveys; World Development Indicators
Log(Value Added)	Logarithm of the value of total sales less intermediate inputs, deflated by the GDP deflator.	Enterprise Surveys; World Development Indicators
Log(Value Added/Empl.)	Logarithm of value added divided by the total number of employees.	Enterprise Surveys; World Development Indicators

GDP = gross domestic product, ISO = International Organization for Standardization.

Source: Enterprise Surveys; World Development Indicators.

Table 6.2: Summary Statistics

Variable	Obs.	Mean	Std. Dev.	Min.	Max.
Exporter Direct	1,295	0.371	0.483	0.000	1.000
Exporter Indirect	1,295	0.102	0.303	0.000	1.000
Foreign	1,294	0.027	0.162	0.000	1.000
GDP Deflator	1,295	118.220	19.847	106.471	164.259
Importer	1,137	0.400	0.490	0.000	1.000
ISO	1,253	0.227	0.419	0.000	1.000
Log(Capital)	1,249	16.167	2.574	9.148	22.247
Log(Capital/Empl.)	1,247	11.465	1.868	5.684	18.200
Log(Electricity)	1,262	12.550	2.127	7.721	19.497
Log(Employees)	1,292	4.711	1.617	1.386	9.306
Log(Exports)	554	18.629	1.640	12.674	22.454
Log(Inputs)	1,200	16.281	2.466	8.862	22.151
Log(Value Added)	1,216	16.416	2.245	11.480	22.572
Log(Value Added/Empl.)	1,213	11.730	1.242	8.717	17.744

GDP = gross domestic product, ISO = International Organization for Standardization.
Source: Author’s calculations.

Table 6.3: Correlation Matrix

	Exporter Direct	Exporter Indirect	Foreign	GDP Deflator	Importer	ISO	Log (Capital)
Exporter Direct	1.000						
Exporter Indirect	−0.807	1.000					
Foreign	0.074	−0.052	1.000				
GDP Deflator	0.137	−0.076	−0.058	1.000			
Importer	0.325	−0.299	0.104	0.095	1.000		
ISO	0.029	−0.058	0.197	0.126	0.158	1.000	
Log(Capital)	0.012	0.026	0.094	0.072	0.163	0.197	1.000
Log(Capital/Empl.)	−0.163	0.191	0.051	−0.050	−0.093	0.075	0.759
Log(Electricity)	0.106	−0.062	0.088	−0.083	0.203	0.092	0.426
Log(Employees)	0.254	−0.240	0.060	0.174	0.367	0.172	0.323
Log(Exports)	0.263	−0.221	0.066	0.254	0.281	0.051	0.361
Log(Inputs)	0.151	−0.089	0.077	−0.049	0.267	0.094	0.450
Log(Value Added)	0.204	−0.185	0.033	0.352	0.290	0.112	0.395
Log(Value Added/Empl.)	0.021	−0.010	−0.014	0.276	0.024	−0.019	0.194

continued on next page

Table 6.3 *continued*

	Log (Capital/ Empl.)	Log (Electricity)	Log (Employees)	Log (Exports)	Log (Inputs)	Log (Value Added)	Log (Value Added/ Empl.)
Exporter Direct							
Exporter Indirect							
Foreign							
GDP Deflator							
Importer							
ISO							
Log(Capital)							
Log(Capital/ Empl.)	1.000						
Log(Electricity)	0.098	1.000					
Log(Employees)	-0.371	0.466	1.000				
Log(Exports)	-0.048	0.376	0.584	1.000			
Log(Inputs)	0.127	0.590	0.457	0.465	1.000		
Log(Value Added)	-0.026	0.329	0.602	0.826	0.297	1.000	
Log(Value Added/Empl.)	0.306	-0.018	-0.167	0.488	-0.050	0.687	1.000

GDP = gross domestic product, ISO = International Organization for Standardization.

Source: Author's calculations.

The first step in analyzing the data descriptively is to track export behavior by firm type. Specifically, I am interested in the proportion of firms in different size groups that export directly and indirectly. The categories used to sort firms are not mutually exclusive: some firms engage in exports both directly and indirectly. Those firms are counted in both sums. To compute the relevant statistics, I use the data as defined earlier and take counts, using employment-based cutoffs for firm types: small (< 99 employees); medium sized (100–250 employees); and large (> 250 employees). These thresholds are based on the national definitions used in Bangladesh,² but they omit the accompanying conditions on total assets, as there is good reason to believe that this variable is poorly recorded in the Enterprise Surveys data. For ease of interpretation in this descriptive exercise, I limit consideration to the most recent year of

² For details, see bdnews24.com (2011).

data available (2013). However, all estimations conducted below use the full sample, for all available years.

Figure 6.1 shows results of the analysis. In line with the previous literature, the data clearly suggest that firm size is an important determinant of export behavior. There is a clear positive association between the number of employees and propensity to export. In an extension of previous work, the data show that this association is relevant both for indirect and direct exports. However, the role of firm size seems to be stronger in relation to the latter. The clear implication of the data is that SMEs are less likely to engage in all forms of export activity than large firms. An important caveat is that the Enterprise Surveys data are known to overrepresent large firms and exporters, so the propensities reported should be taken as indicative of general trends in the data only.

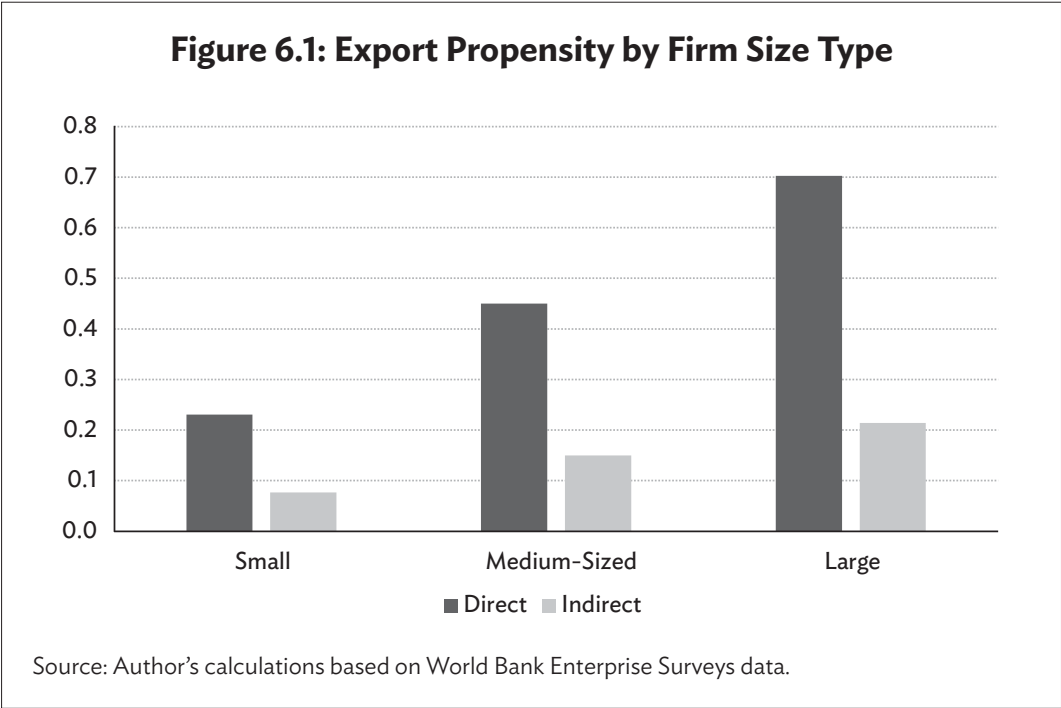
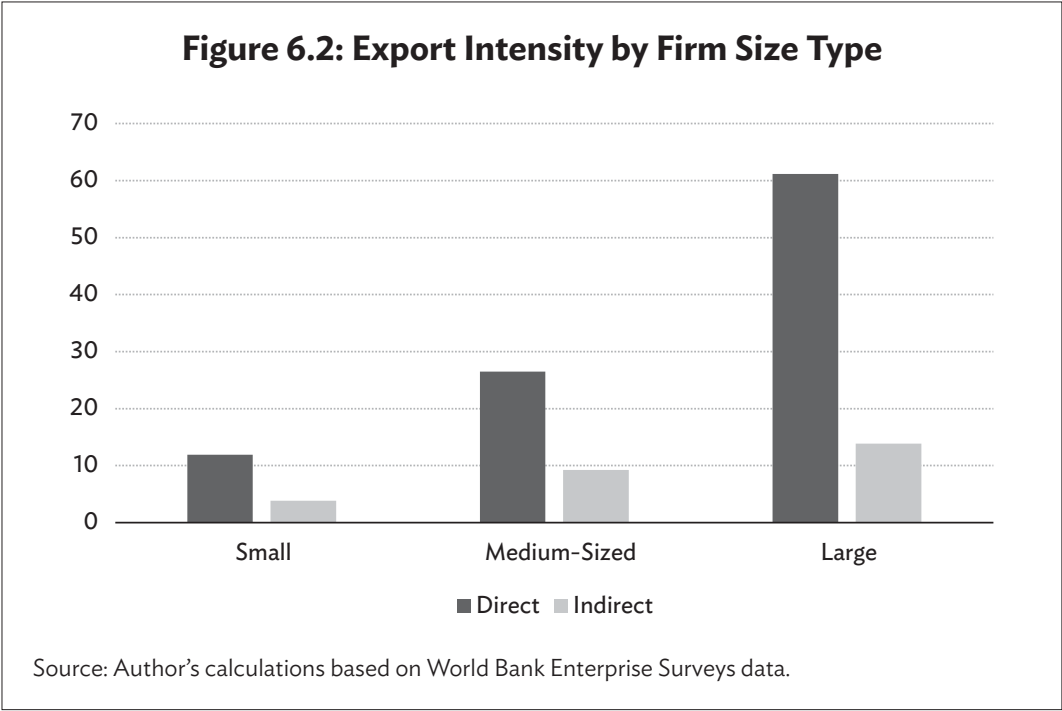


Figure 6.1 examines the extensive margin of exporting, or export propensity. Figure 6.2, by contrast, focuses on the intensive margin, namely the average percentage of sales that are exported, conditional on exporting. Again, the data clearly show that there is a similar association between firm size and export intensity to what was seen for export



propensity. Large firms are more likely to enter export markets and tend to export more relative to total sales when they do.

The descriptive analysis suggests that international engagement is relatively limited among SMEs in Bangladesh, at least as far as export behavior is concerned. However, that finding does not mean that SMEs are not relevant to the engagement of Bangladesh's external sector as a whole, or indeed that trade is of little importance to Bangladeshi SMEs. On the one hand, export propensity and intensity figures are still both substantially larger than zero, which means that there are important numbers of firms actively engaged with the international economy in Bangladesh. On the other, it is important to distinguish between small and medium-sized firms: Over 50% of the latter group are engaged in exports either directly or indirectly. While the number is smaller than for large firms—which is over 90%—it is still high and suggests that larger SMEs are indeed highly engaged with the world economy.

Naturally, a descriptive analysis is useful for highlighting broad tendencies in the data and identifying simple associations. Thus far, it has not been possible to say anything about mechanisms or links between different kinds of observed effects. The next section turns to that question, using fully specified econometric models.

6.3 Econometric Models and Results

The descriptive analysis provided a first snapshot of the participation of Bangladeshi SMEs in the international economy. This section develops fully specified econometric models that seek to explain export behavior, taking account of the indirect exports that are more common among smaller firms, in terms of firm-specific factors such as productivity, size, and capital intensity. The explanatory variables of most interest are indicators of the extent to which a firm is engaged with the international economy in an inward sense, namely as an importer of intermediate goods, and a recipient of inward foreign direct investment (FDI). The maintained hypothesis is that engagement in these two ways has the potential to boost exports, after controlling for other factors. The actions of exporting, importing, and receiving inward FDI can be understood as observable proxies for GVC participation, which typically includes a mixture of these three processes.

6.3.1 Productivity Estimates

A necessary precursor to examining the international integration of SMEs in Bangladesh is to obtain estimates of total factor productivity (TFP) at the firm level. TFP is a key determinant of the ability to enter international markets and is used as a standard control variable in most firm-level econometric work associated with trade. However, estimating TFP is by no means straightforward. It is simple to write down a production function, such as Cobb–Douglas, augmented by a TFP parameter. Obtaining consistent and unbiased econometric estimates, however, requires the application of substantial technique. Simultaneity plagues simple approaches. For instance, ordinary least squares (OLS) estimates of a production function will suffer from this problem if there are unobserved shocks to TFP and the firm responds by changing a nonsticky variable, such as labor demand.

A variety of methods have been developed in the literature to deal with this problem. Levinsohn and Petrin (2003) provide an approach that is commonly used in developing countries, as it only requires data on intermediate inputs to control for unobservable shocks, at the cost of some assumptions on decision timing and functional form. I adopt their approach here. Akerberg, Caves, and Frazer (2015) note that the Levinsohn and Petrin (2003) approach may not identify labor demand in empirically relevant circumstances and propose a correction, which I also apply as a robustness check.

Table 6.4 presents results, with standard errors based on 1,000 bootstrap replications. As the proxy variables, I use intermediate

Table 6.4: Production Function Estimation Results

	LP	ACF
Log(Employees)	0.710***	1.002***
	(0.000)	(0.000)
Log(Capital)	0.003	-0.054
	(0.957)	(0.383)
N	1,152	207

ACF = Akerberg, Caves, and Frazer (2015); LP = Levinsohn and Petrin (2003).
Source: Author’s calculations.

input use and electricity purchases, both of which are widely observed in these data. Both estimators have difficulty with the data on capital stock. While the series represents the best available data in this data set, it is clearly subject to problems of accuracy. For instance, firms may be unable to properly estimate the value of land or plant and equipment; alternatively, they may be concerned about doing so because of perceived tax or regulatory obligations. It is contrary to expectations that the capital variable has a statistically insignificant coefficient in both columns of Table 6.4, which in turn gives rise to concerns as to the accuracy of the TFP estimates produced in this way. Nonetheless, I proceed with them as the best available data, while noting that sample size is much larger for the more flexible Levinsohn and Petrin (2003) estimator. I use both estimates of TFP and also a simple measure of labor productivity (value added per worker) as a robustness check in the chapter’s main regressions, discussed in the next section.

6.3.2 Trade Models

Standard trade theory suggests that export behavior can be understood as the net outcome of two firm-level decisions. The first is whether or not to enter foreign markets, known as “export propensity.” The second is how much to sell overseas, conditional on having entered. This setup is consistent with models styled after Melitz (2003) or Chaney (2008), which emphasize the existence of both an extensive and an intensive margin of trade.

This way of thinking about trade outcomes—as the expression of two separate decisions—has important implications for the estimation of firm-level models that have exports as a dependent variable. There is extensive empirical work suggesting that the majority of firms do not

export, which means that there is the clear potential for sample selection bias if only an intensive margin model is estimated. Similarly, estimating only an export propensity model as a binary choice outcome—exporting versus not exporting—loses much of the richness in the data and does not allow for overall trade impacts to be estimated.

Thankfully, there is a simple and well-established econometric technique that makes it possible to estimate both models simultaneously. Heckman (1979) shows that sample selection can be understood as an omitted variable problem, in which bias in the intensive margin equation arises from not accounting for the probability that a given firm exports at all. The fix is straightforward: estimate a binary choice model such as a probit with exporting as the outcome, and include the estimated inverse Mills ratio from that equation as an explanatory variable in the intensive margin equation. While the model can be estimated in two stages as this intuitive explanation suggests, standard practice is now to estimate both models together by maximum likelihood.

Against this background, I estimate a Heckman sample selection model of exports. As the dependent variable, I calculate total exports, namely direct and indirect (through a wholesaler or distributor). The reason for summing these two types of exports is that many SMEs participate indirectly in the world economy through intermediary firms. The dependent variable therefore takes the broadest possible account of the ways in which these firms can interact with world markets.

In addition to standard controls—productivity, capital intensity, and size—I include two measures of GVC participation: a dummy for direct imports of intermediate goods, and a dummy for foreign ownership, defined on the basis of a 10% threshold. The model therefore shows how these two variables impact export behavior, taking account of the two-step decision process set out earlier. Finally, I include fixed effects by year and by sector, where I group the standard Enterprise Surveys data into four sectors—food, clothing, machinery, and chemicals—so as to ensure a sufficient number of observations in each. I am unable to include firm fixed effects, as relatively few firms are observed in all three periods, so parameters become difficult to identify.

Ideally, a Heckman sample selection model should be overidentified, with one variable that appears in the selection equation but not the outcome equation. The rationale for this approach is that if the two sets of variables are the same, the model is only identified due to the nonlinearity of the inverse Mills ratio, which can cause estimated standard errors to be unduly large when there is nonetheless a strong correlation with the explanatory variables. In this case, I use a dummy variable indicating whether or not a firm has an international quality certification, such as ISO 9001. Compliance with technical norms and standards primarily impacts firm fixed costs of market entry, and so can

be expected to have a significant impact on export propensity (selection) but not intensity (outcome) (Shepherd 2015).

Table 6.5 presents regression results. Each numbered model consists of two equations, marked selection (probit first stage; export propensity) and outcome (OLS second stage; export intensity), but they are estimated simultaneously by maximum likelihood rather than in two separate steps. The three models use different measures for productivity, namely Levinsohn and Petrin (2003) and Akerberg, Caves, and Frazer (2015), as discussed above, as well as a naïve measure of labor productivity, as opposed to TFP, namely value added per worker.

All three models perform very similarly, due to the fact that the three measures of productivity are very closely correlated. This result is due to the poor estimation of the impact of capital on the production function, discussed earlier. Nonetheless, the models fit the data well, as evidenced by strong pseudo- R^2 s, and coefficients that are appropriately signed, and typically statistically significant at the 1% level. In terms of the control variables, productivity, firm size, and capital intensity are all robustly associated with greater export propensity and intensity, although there is some variation across models. Importantly, the ISO dummy has the expected positive sign, and a statistically significant coefficient at the 1% level, which means that the attempt to overidentify the model and improve the accuracy of estimates has been successful.

The two variables of primary interest are the dummy for importing intermediate inputs and the dummy for inward FDI. Both have positive and statistically significant coefficients in all three outcome equations. However, only the importing dummy also has a statistically significant coefficient in the selection equations. The conclusion is therefore that engagement with the international economy in ways that is typical of GVC participation can indeed boost imports, although the nature of the engagement matters: importing intermediates increases the probability of exporting, as well as the value of exports conditional on entry. By contrast, accepting inward FDI primarily impacts the value of exports conditional on entry.

In line with the framework presented earlier, these findings confirm that in Bangladesh, as elsewhere, firm size is an important determinant of export behavior: Larger firms are more likely to enter foreign markets and tend to export more when they do. But the results do not directly say anything about the impact of GVC participation, as proxied by direct imports of intermediates and foreign ownership, in interaction with firm size. Indeed, interpreting the results in Table 6.5 in other than a qualitative sense is not straightforward because of the relationship between the outcome and selection equations, and the nonlinearity of the latter. To summarize the overall impact of variables like importer and foreign on direct exports, it is necessary to carefully specify and

calculate marginal effects. In what follows, I consider the effect of direct imports and foreign ownership on the expected value of exports, taking account of the selection effect. I focus on model 1, given that differences across specifications are very minor. To differentiate effects by firm size category, I calculate marginal effects for the three size categories identified earlier based partly on the national classification, namely: small (< 99 employees); medium (100 to 250 employees); and large (> 250 employees). I present marginal effect estimates and 95% confidence intervals graphically, with 95% confidence intervals based

Table 6.5: Trade Model Regression Results

	LP		ACF		VA/Empl.	
	Outcome	Selection	Outcome	Selection	Outcome	Selection
TFP	0.937*** (0.000)	0.225** (0.049)	0.937*** (0.000)	0.225** (0.049)	0.937*** (0.000)	0.225** (0.049)
Log(Employees)	0.751*** (0.000)	0.459*** (0.000)	0.971*** (0.000)	0.512*** (0.000)	1.020*** (0.000)	0.523*** (0.000)
Log(Cap/Empl)	0.054*** (0.002)	0.111*** (0.005)	0.001 (0.974)	0.098** (0.034)	0.051*** (0.004)	0.110*** (0.006)
Importer	0.139** (0.043)	0.357*** (0.000)	0.139** (0.043)	0.357*** (0.000)	0.139** (0.043)	0.357*** (0.000)
Foreign	0.253*** (0.007)	0.411 (0.216)	0.253*** (0.007)	0.411 (0.216)	0.253*** (0.007)	0.411 (0.216)
ISO		0.479*** (0.000)		0.479*** (0.000)		0.479*** (0.000)
Constant	-0.964** (0.040)	-8.156*** (0.000)	-0.964** (0.040)	-8.156*** (0.000)	-0.964** (0.040)	-8.156*** (0.000)
Observations	1,031		1,031		1,031	
Pseudo-R2	0.746		0.746		0.746	
Sector fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Wald test	0.11		0.11		0.11	

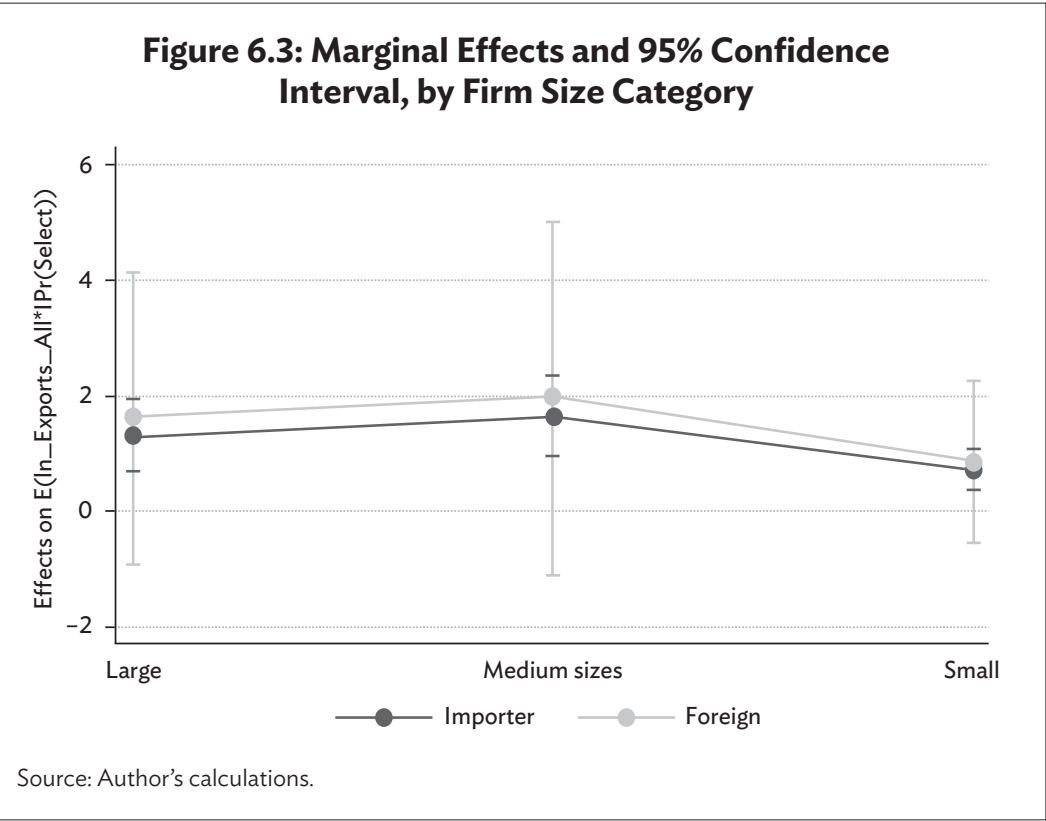
ACF = Akerberg, Caves, and Frazer (2015); ISO = International Organization for Standardization; LP = Levinsohn and Petrin (2003); TFP = total factor productivity; VA = value added. Statistical significance is indicated as follows: * (10%), ** (5%), and *** (1%).

Notes: The dependent variable is log(exports) and estimation is via the Heckman sample selection model. Robust standard errors corrected for clustering by sector are reported in parentheses below parameter estimates. The Wald test is of the null hypothesis of independent equations.

Source: Author’s calculations.

on standard errors calculated using the delta method. Apart from the variables of interest, other variables are assumed to be at their average levels as defined by the three size groups.

Figure 6.3 presents results. It is immediately obvious that the point estimates are very close for the two variables, but that confidence intervals are much larger for the foreign ownership dummy. None of the size categories shows a statistically significant marginal effect of foreign ownership. However, all three size categories show significant effects for imports of intermediates, with the point estimate being largest for medium firms and smallest for small firms. However, the estimated confidence intervals are overlapping, which means that while there are indications of different effects by firm size, those differences are not statistically significant. While there is substantial uncertainty around the estimates, it is important to keep the quantitative estimates in perspective. Exponentiating shows that the effect of importing intermediates is to increase the expected value of exports by 110% for small firms, 431% for medium firms, and 281% for large firms. These differences are of clear economic significance, even with the attendant uncertainty. The data therefore provide some indication that the effect of engagement with the international economy varies according to firm size and is smallest for small firms.



6.4 Conclusion and Policy Implications

This chapter analyzed the export behavior of Bangladeshi manufacturing firms, paying particular attention to the links between GVC participation and export propensity and intensity. GVC participation cannot be observed directly, so I have used direct imports of intermediate goods and the presence of foreign ownership as observable proxies. In line with the previous literature, mostly from other countries, I find that firm size is positively associated with export performance, even after controlling for productivity and capital intensity. There is clear evidence in the data that importing intermediates and welcoming foreign investment are associated with superior export performance at the extensive and intensive margins (importing) and intensive margin only (foreign investment). These findings are consistent with a mechanism where these two types of GVC participation serve to reduce the costs associated with exporting, so participation in internationalized production in turn promotes greater outward engagement with world markets through exporting.

In an extension to previous work, I look at the impact of imported intermediates and foreign ownership on export behavior across the firm size distribution. I find substantial evidence that the net effect of these two types of GVC participation is to boost exports for firms of all sizes, thereby including SMEs as well as larger firms, with a particularly strong and precisely estimated effect for direct imports of intermediates. However, the size of the effects varies with firm size and is smaller for small firms, albeit with doubt as to the statistical significance of the difference. In economic terms, however, the conclusion to be drawn is therefore that small firms are less able than their larger peers to take advantage of the opportunities offered by GVC participation, as measured by these two observable proxies.

In policy terms, this chapter's results are important for two reasons. First, I present evidence from a developing country where, although exports are dominated by larger firms in value terms, there is nonetheless substantial participation by smaller firms in a numerical sense, and this performance can be boosted by facilitating access to imported intermediates and foreign investment. Second, the fact that the trade effects of GVC participation are smallest for small firms means that there is a need to better understand the mechanisms that may be at work. One issue might be absorptive capacity, while another could be capacity or financial constraints, which make it more difficult for smaller firms to expand production in response to market opportunities. While the Enterprise Surveys data do not make it possible to examine these mechanisms explicitly, they nonetheless provide a useful first

picture of the landscape of SME exports in Bangladesh, taking account of direct and indirect exports. Given the policy attention given to this issue, an important point that should not be lost from sight is that opening to the international economy by facilitating imports of intermediates as well as inward FDI holds the potential for small firms to benefit by increasing exports, although issues such as capacity constraints need to be investigated further. Economic openness is therefore an important part of the policy tool kit for expanding exports by SMEs.

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7

Driving SME Participation in Global Value Chains: Evidence From India

Ketan Reddy and Subash Sasidharan

7.1 Introduction

Advancements in the field of information and communication technology (ICT) concomitant with lower coordination costs¹ have altered the pattern of international trade, giving rise to the notion of global value chains (GVCs).² Consequently, the production process encompassing the notion of GVCs can be experienced everywhere.³ In addition, the fragmentation of the production process has enabled firms to integrate into GVCs through specializing in a specific task or fragment of the production chain (Baldwin and Yan 2014). Hence, participating in GVCs provides avenues for firms, especially from developing countries, to gain from trade. With the advent of GVCs, a firm no longer has to produce a product in its entirety (Escaith and Inomata 2013). Rather, small firms can now internationalize and enhance their efficiency by participating in supply chains⁴ via specializing in facets of the supply chain in which the firms enjoy a comparative advantage (Giovannetti, Marvasi, and Sanfilippo 2015). Moreover, the ability of GVCs to connect

¹ Baldwin (2013) termed this “the second great unbundling,” i.e., production activities no longer need to be undertaken in close proximity due to lower coordination costs.

² According to Heuser and Mattoo (2017), a global value chain comprises “the full range of activities that are required to bring a product from its conception, through its design, its sourced raw materials, and intermediate inputs, its marketing, its distribution, and its support to the final consumer.”

³ The manufacturing of Boeing airplanes, Apple’s iPhone, Nutella hazelnut spread, and New Balance running shoes are some present-day examples of GVCs.

⁴ In this study, the terms global value chains, supply chains, and production chains are used interchangeably.

firms, workers, and consumers across the globe provides a stepping stone for firms to internationalize.

In the present-day paradigm of international trade, participation in GVCs is no longer a large-firm story. Trading in tasks and intermediates has paved the way for small firms to internationalize directly or indirectly into the supply chains (Giovannetti, Marvasi, and Sanfilippo 2015). As a result, there is a rise in the participation level of small firms in GVCs. Slaughter (2013) finds that a typical United States (US) multinational enterprise (MNE) sources inputs worth \$3 billion or more from more than 6,000 US small and medium-sized enterprises (SMEs), i.e., nearly 25% of inputs are purchased from SMEs. Hence, through GVCs, SMEs can now act as suppliers of parts and components to lead firms. The buyer–supplier relationships with lead firms allow SMEs to further specialize in a specific set of activities, while at the same time gaining access to large regional and global markets through new niches for the supply of new products and services to these lead firms (Giovannetti, Marvasi, and Sanfilippo 2015; Del Prete, Giovannetti, and Marvasi 2016). Additionally, interaction with lead firms also allows for greater flow of information between the lead firms and SMEs, which in turn leads to improvement in the management practices of SMEs along with improvement in their technology and skill levels (ADB and ADBI 2016). This notion is reinforced by a report by the Organisation for Economic Co-operation and Development (OECD 2008), which found that SMEs benefited from participating in GVCs. Further, SMEs that managed to integrate into GVCs achieved a sense of stability and expanded their business activities. Even firms operating at the periphery of GVCs reaped growth benefits associated with GVC participation. These findings highlight that the perceived benefits associated with GVC participation are not limited to large firms alone.

Given the gains associated with GVC participation for SMEs, it becomes pivotal to examine the factors that restrict the GVC participation of these SMEs. One such factor shaping the participation of SMEs along the value chain is the role of finance. In this context, a strand of literature related to firm internationalization highlights the role of sunk costs as a key factor that dissuades firms from participating in foreign markets. These costs include expenditure on research and development, market research, advertising, rent for land, and wage bills, among others (Lu et al. 2018; Greenaway, Guariglia, and Kneller 2007). In addition to these costs, meeting stringent international quality standards also adds to the expenditure of a firm due to costs associated with enhancing its product and the production process (World Trade Organization 2014; Criscuolo and Timmis 2017; OECD 2007). Hence, a financially constrained firm might find it challenging to participate in GVCs.

The problem of financial constraints may be more severe for SMEs since SMEs have a greater dependence on internal sources of finance to

meet these costs. Further, it is well established in the literature that SMEs have restricted access to formal sources of finance such as banks, capital markets, and other forms of credit, thereby impeding their participation in GVCs (Harvie, Narjoko, and Oum 2010; Cusolito, Safadi, and Taglioni 2016). This is a severe problem, especially for SMEs from developing economies where capital markets are still underdeveloped, and there exists a problem of information asymmetry (Harvie, Narjoko, and Oum 2013; Ghosh 2006). A recent ADBI survey of four countries⁵ highlights access to finance as a crucial factor in the successful integration of SMEs in the GVC (ADB and ADBI 2016). Further, a study by the World Bank shows that 70% of micro, small, and medium-sized enterprises (MSMEs) in emerging economies lack access to credit markets (IFC 2013). Similarly, OECD (2008); Harvie, Narjoko, and Oum (2010, 2013); and Kuzmishin and Kuzmishinova (2016) also report financial access as a key factor shaping SMEs' integration into GVCs.

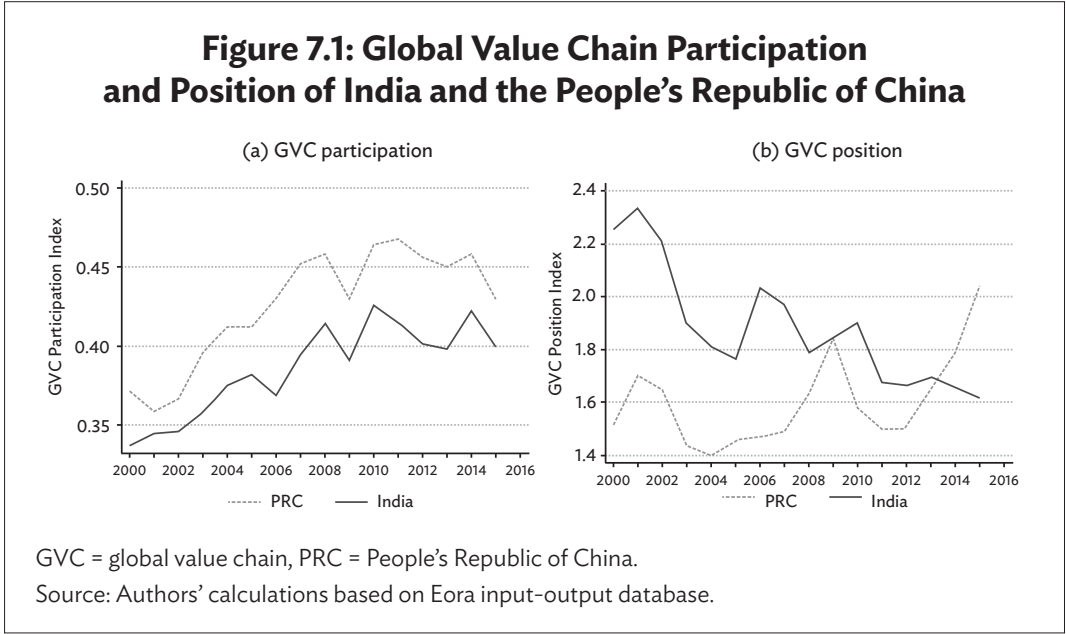
With the rapid rise in the GVC phenomenon, the literature on GVCs has also been flourishing, mainly emphasizing the productivity aspects of firm GVC participation. However, the literature related to the role of GVCs and financial constraints is mostly thin. Moreover, the role of SMEs in contributing to the growth of output, employment, exports, and wealth, especially for developing countries, is well established in the literature (Giovannetti, Marvasi, and Sanfilippo 2015; Harvie, Narjoko, and Oum 2013). However, to our surprise, the literature emphasizing the importance of SMEs in the context of GVCs has not received much attention. Thus, this chapter addresses this gap by examining the role of financial constraints in shaping the participation of Indian SMEs in GVCs. To achieve this objective, we make use of a rich panel of 888 India SMEs obtained from the Centre for Monitoring Indian Economy (CMIE). Prowess database over the period 2006–2016. Further, by correcting for endogeneity arising from reverse causation and from self-selection, our empirical findings discern a negative impact of financial constraints on the GVC participation of Indian SMEs.

7.2 Institutional Background

To examine the role of financial constraints on SMEs' participation in GVCs, we take the case of India. For our study, India presents itself as an ideal setting for numerous reasons. First, it is one of the fastest (if not *the* fastest) growing economies in the world with an extensive array of manufacturing firms. India's manufacturing sector contributes close to 59% of its total

⁵ The countries surveyed were Kazakhstan, Papua New Guinea, the Philippines, and Sri Lanka.

exports (Government of India 2012), yet its contribution to global trade is still far behind compared to other developing countries. Further, SMEs play a significant role in the Indian manufacturing sector, producing more than 6,000 products and contributing around 8% of the gross domestic product (GDP) of the country (Charan and Kishinchand 2016). Second, despite being a labor-abundant country, India has failed to integrate itself into GVCs, unlike the People’s Republic of China (PRC), which established its foothold through specialization in labor-intensive goods (Veeramani, Aerath, and Gupta 2018). Figure 7.1 compares the GVC participation⁶ and the GVC position of India with that of the PRC. From panel (a), we can see that the GVC participation of India has been on the rise. However, it is considerably below that of the PRC. Interestingly, from panel (b), we see that during the early 2000s, India’s participation was more pronounced at the upstream end of the value chain than that of the PRC, with the PRC establishing its foothold in the global market via midstream activities (manufacturing, assembly, and processing trade). However, of late, the PRC has been moving up the ladder, and this upward shift provides India with an opportunity to use its labor endowment and aggressively integrate into the value chain in the midstream activities. This, however, requires greater integration of the manufacturing sector and SMEs.



⁶ GVC participation is measured as the sum of countries’ backward and forward integration, while the GVC position denotes the difference between the former and the latter. A higher foreign value-added highlights the downstream nature of the industry, whereas a higher indirect value-added implies more upstream participation (Montalbano, Nenci, and Pietrobelli 2018).

Table 7.1: Contribution of MSMEs to India’s Gross Value Added and Gross Domestic Product at Current Prices

Year	Share of MSMEs in GVA (%)	Share of MSMEs in GDP (%)
2011–2012	33.35	30.00
2012–2013	32.82	30.40
2013–2014	32.71	30.20
2014–2015	32.21	29.70
2015–2016	32.03	29.20

GDP = gross domestic product; GVA = gross value added; MSMEs = micro, small, and medium-sized enterprises.
Source: Central Statistics Office, Ministry of Statistics and Programme Implementation.

Third, SMEs’ role in driving growth, innovation, and employment generation across the globe is well established in the literature (Beck, Demirguc-Kunt, and Levine 2015; Ayyagari, Demirguc-Kunt, and Maksimovic 2011), and the same holds in the case of India. Table 7.1 highlights the contribution of MSMEs to India’s gross value added (GVA) and GDP from 2011 to 2016. The contribution of MSMEs has been consistently around 32% and 30% in the GVA and GDP of the country, respectively (Government of India 2019). Moreover, the MSME Annual Report points out that MSMEs employ 80.5 million people (Government of India 2016). Further, the International Finance Corporation (IFC 2013) points out that SMEs contribute around 45% of manufacturing output and close to 36% of the total value of exports. Additionally, the 73rd Round of the National Sample Survey (NSS) on Unincorporated Non-Agricultural Enterprises in Manufacturing, Trade and Other Services Sectors (Excluding Constructions) reports that out of 63.392 million establishments, only 4,000 are large enterprises (CII 2018). These descriptive statistics highlight the significant role played by MSMEs in driving the growth of the Indian economy.

Given the importance of MSMEs, numerous policy initiatives⁷ are undertaken by the government to boost the growth of MSMEs.⁸ For example, the government allocated ₹5 billion under the Interest

⁷ For details, see Ministry of Micro, Small and Medium Enterprise webpage (<https://msme.gov.in/all-schemes>).

⁸ See Make in India webpage (<http://www.makeinindia.com/msme>).

Subvention Scheme for Incremental Credit to MSMEs. Further, the allocation of ₹5.97 billion under the credit support program for offering seamless credit guarantees to micro- and small enterprises has been set up.⁹ Moreover, the previous financial year witnessed the government making a budgetary allocation of ₹37.9 billion for credit support, capital, and interest subsidies and innovations of Indian MSMEs. Further, the recent government initiatives of Make in India (2015) and the proposed investment of ₹100 trillion in infrastructure development¹⁰ provide a perfect platform for Indian MSMEs to participate in GVCs and transform India's manufacturing sector into a global manufacturing hub. Given this backdrop, India makes an ideal testing ground for our analysis.

7.3 Stylized Facts

This section presents some stylized facts regarding key firm characteristics of Indian SMEs. Our analysis consists of 888 firms corresponding to 3,504 firm-year observations. In Figure 7.2, we plot the number of SMEs participating in GVCs over the years. The number of SMEs participating in GVCs rose from 2006 to 2014. Further, the number of SMEs participating in GVCs¹¹ experienced an increase of 490% between 2006 and 2016. From the figure, we can also see a jump in the number of SMEs from 2011 to 2012. According to the Ministry of MSMEs, 2012 recorded the highest growth rate of 18.45%, well above the average of 11% experienced earlier (Government of India 2015). This is also the year that witnessed a tremendous rise in the number of filed Entrepreneurs Memorandums in India.¹² This increase in the number of SMEs could be an outcome of the Public Procurement Bill (in effect from 1 April 2012), which made it mandatory for public sector units and other government bodies to increase their procurement from MSMEs to 20% of their requirements within 3 years, opening up huge investment opportunities for the SMEs in the country.

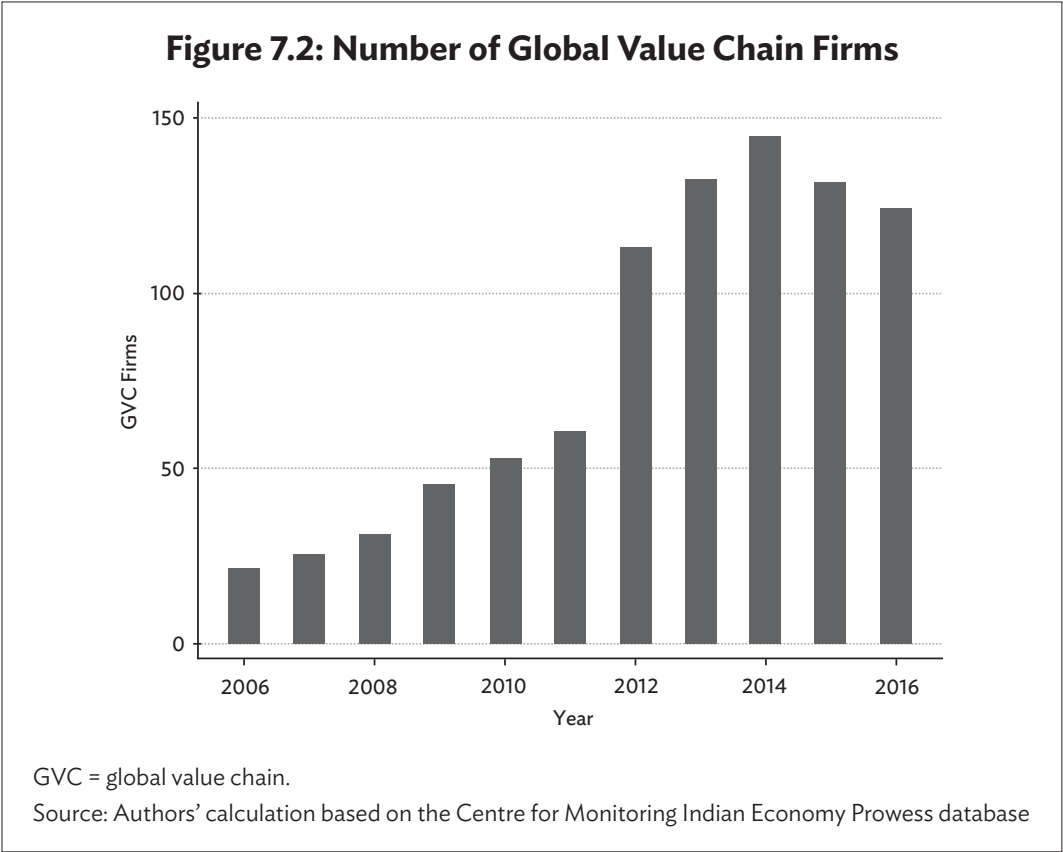
Further, in this chapter, we define GVC firms as two-way trading firms; hence, firms that only import or only export and firms that are

⁹ See, e.g., MSME press release (<https://pib.gov.in/PressReleasePage.aspx?PRID=1562299>).

¹⁰ The Prime Minister of India, in his independence speech in 2019, announced an investment package of ₹100 trillion for infrastructure development in the country.

¹¹ In this study, we define a GVC firm as a firm involved in exporting and importing activities simultaneously. Refer to section 7.4.2 for more details.

¹² According to the MSME Development Act 2006, all MSMEs are required to file their Entrepreneurs Memorandum.



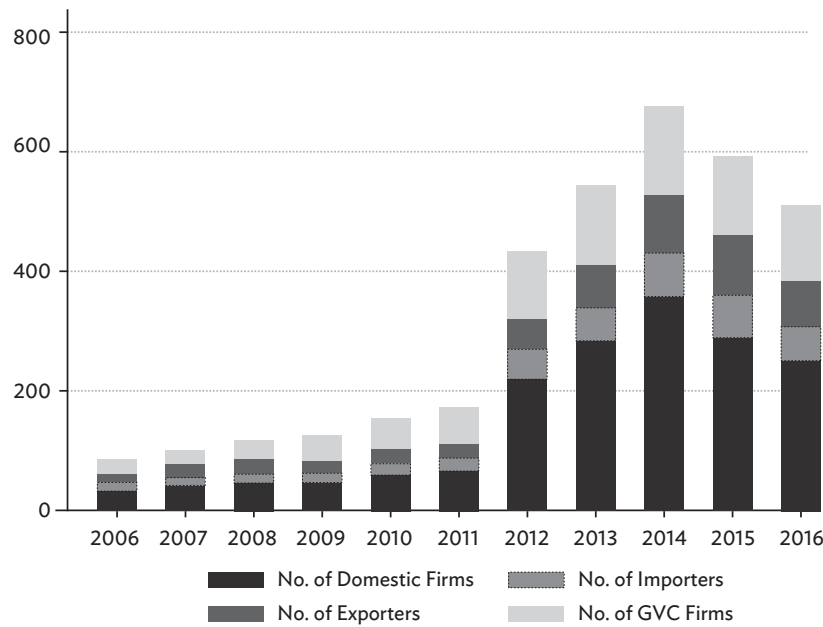
purely domestic firms are considered non-GVC firms. In Figure 7.3, we distinguish between all four types of SMEs and plot their composition over the years. From the graph, the rise of both the GVC firms and domestic firms is evident. Additionally, at the beginning of our sample period, the number of exporting and importing firms was at a similar level (15 and 14, respectively), but by the end of 2016 our sample has more SMEs participating in exporting activities compared to importing.¹³

In Figure 7.4, we plot the contribution of each firm type to the overall SME sales in Indian manufacturing. Though the number of domestic firms is the highest in our sample, sales of GVC firms outperform all other types of SMEs in our sample. This is consistent throughout the sample period, as GVC SME sales to overall SME sales are highest every single year.

Despite SMEs' noteworthy contributions, the small firms have to overcome various obstacles to participate in global markets. In this regard, multiple studies have put forward the importance of availability

¹³ The sample consists of 255 GVC firms, 188 exporting firms, 155 importing firms, and 542 domestic firms.

Figure 7.3: Distribution of Global Value Chain and Non- Global Value Chain SMEs over the Years



GVC = global value chain, SME = small and medium-sized enterprise.
Source: Authors’ calculation based on the Centre for Monitoring Indian Economy Prowess database.

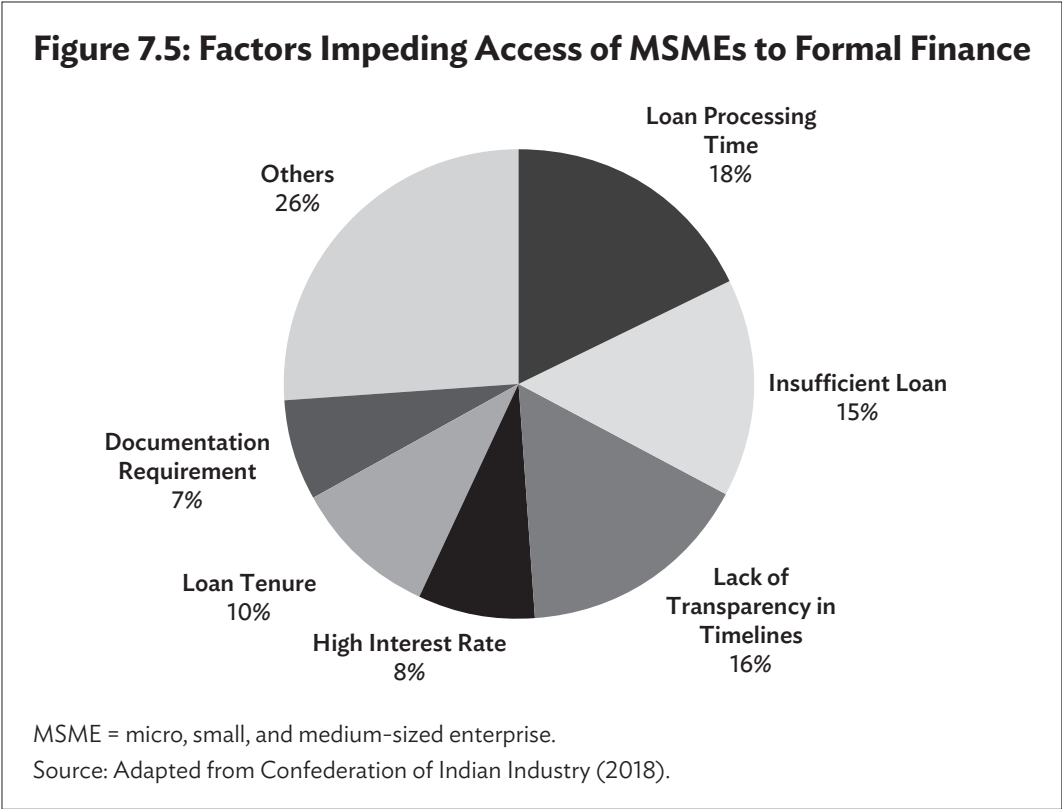
Figure 7.4: Contribution of Various SMEs to Total SME Sales



GVC = global value chain, SME = small and medium-sized enterprise.
Source: Authors’ calculation based on the Centre for Monitoring Indian Economy Prowess database.

and accessibility of finance as a critical factor in the growth of small firms (Charan and Kishinchand 2016). Figure 7.5 highlights the various hurdles faced by Indian MSMEs in obtaining formal finance. The time factor and the level of loans available for SMEs are the two major factors impeding SMEs’ access to formal finance. Further, the Federation of Indian Chambers of Commerce and Industry and Grant Thornton surveyed Indian SMEs with a view to understanding the current level of SME engagement in GVCs and to gauge the environment surrounding their participation. The survey ranked regulatory compliance and availability of finance as the two most pressing concerns for SMEs’ integration into GVCs. Similarly, Charan and Kishinchand (2016), in a survey of Indian SMEs located in Bangalore, India, report that across different development stages of an SME’s life cycle, the availability of collateral, high lending rates, procedural complications, and the time factor in obtaining a loan are the key challenges in SMEs obtaining finance.

A report by the Confederation of Indian Industry (2018) states that the estimated MSME demand for total credit is ₹45 trillion, of which almost 44% is financed through informal channels. Further, 25% of borrowing by SMEs is either invisible or through personal borrowings. The dominance of informal finance as a vital source of finance for small firms



is due to the lack of established credit history and sufficient collateral, which prevents banks from lending credit (ADBI 2014). Further, the high-risk perception of the banks in lending to SMEs drives these firms toward informal sources of finance. With the informal channels charging exorbitant interest rates and with limited personal resources, it makes overcoming such constraints a Herculean task for SMEs.

7.4 Data and Variables

7.4.1 Data Source

To examine the role of financial constraints in the GVC participation of Indian SMEs, we use firm-level data procured from the Prowess database. Prowess is a proprietary database maintained by the CMIE. The database provides rich information on firm-level characteristics such as exports, sales, a firm's investment in plant and machinery, total assets, the wage bill of the firm, and ownership of the firm, among others, drawn from the firm's profit and loss accounts and balance sheets. The companies in the database account for more than 70% of the economic activity in the organized industrial sector in India (Topalova and Khandelwal 2011). This database is extensively used for micro-level analysis of Indian firms (see, e.g., Topalova and Khandelwal 2011; De and Nagaraj 2014). Further, firms in the Prowess database represent about 50% of India's exports and nearly 60% of imports.

In 2006, the MSME Development Act, 2006, was introduced to foster the development and competitiveness of MSMEs. This study focuses on SMEs operating in the manufacturing sector. In accordance with the MSME Development Act, 2006, a microenterprise is an enterprise where the investment in plant and machinery does not exceed ₹2.5 million. If the investment is greater than ₹2.5 million but less than ₹50 million, then the enterprise is classified as a small firm. Medium-sized enterprises are firms with investment greater than ₹50 million but less than ₹100 million in plant and machinery.¹⁴ As a part of our data-cleaning process, we exclude all sample firms with missing information on sales and assets. Further, we keep only those firms that are consistently small and medium-sized firms throughout the sample,¹⁵ i.e., firms switching from small to medium or medium to large or small are dropped from the sample. Further, all variables (except dummy

¹⁴ See Ministry of Micro, Small and Medium Enterprise webpage (<https://msme.gov.in/know-about-msme>).

¹⁵ Given the scale of a micro-firm, they are unlikely to participate in GVCs. Hence, we drop all the micro-firms in the sample.

variables; refer to Table 7.3) are winsorized at the 1% and 99% level to deal with the outliers in the sample. Our final sample is an unbalanced panel of 888 SMEs,¹⁶ corresponding to a total of 3,504 firm-year observations.¹⁷

Table 7.2 reports the coverage of SMEs across industries in our sample. It also highlights the number of SMEs participating in GVCs at the beginning and end of our sample period (i.e., 2006–2016).

Table 7.2: Global Value Chain Distribution of Firms by Industry Classification

NIC Code	Sector	GVC Firms		
		Obs.	2006	2016
10, 11, 12	Food, beverages, and tobacco	475	0	2
13, 14, 15	Textiles, wearing apparel, and leather	330	2	9
16, 17, 18	Wood, paper products, and printing	109	0	0
19, 20, 21	Coke, chemicals, and pharmaceuticals	718	6	26
22	Rubber and plastics	260	2	5
23, 24	Nonmetallic mineral products, basic metal	399	1	7
25, 31	Fabricated metal products, except machinery and equipment, furniture	142	0	3
26	Computers and electronics	151	3	11
27	Electricals	288	2	15
28, 29 30	Machinery and equipment, Motor vehicles and transport equipment	497	5	30
32	Other manufacturing	135	0	16
Total		3,504	21	124

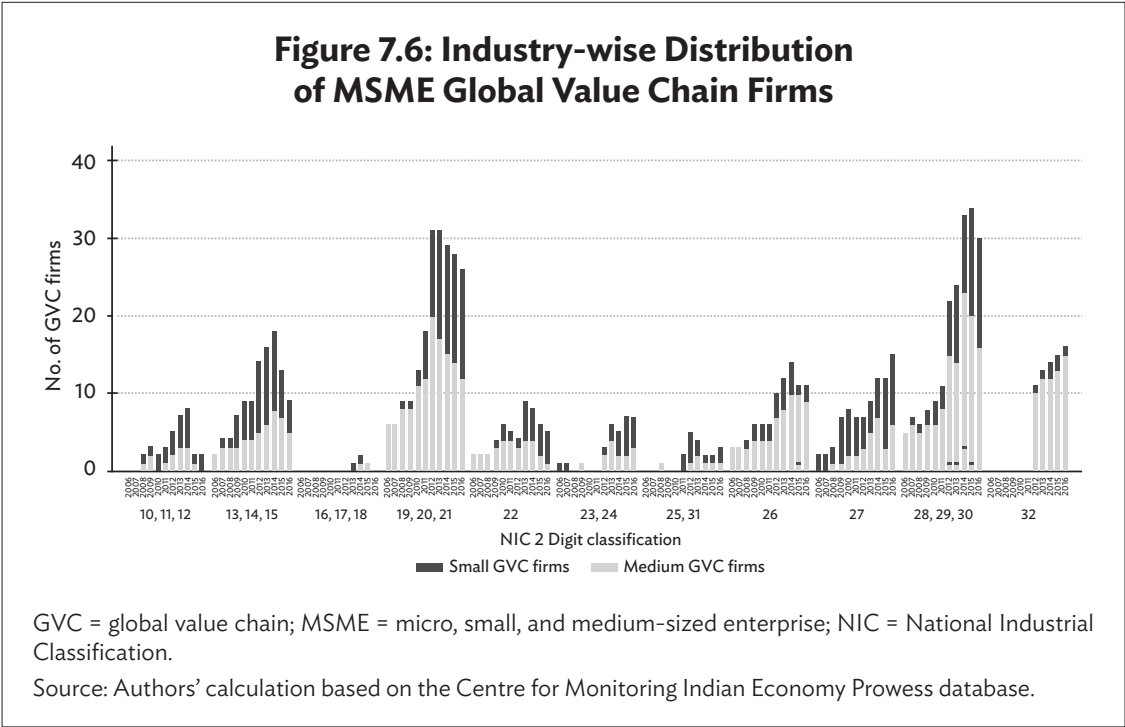
GVC = global value chain, NIC = National Industrial Classification.

Source: Authors’ calculation based on the Centre for Monitoring Indian Economy Prowess database.

¹⁶ Alternatively, a widely used way of defining MSMEs is based on employment, with 46 out of 132 countries defining a microenterprise as having 1–9 employees, a small enterprise as having 10–49 employees, and a medium-sized enterprise as comprising 50–249 employees (IFC 2013). The World Bank Enterprise Surveys also employ a similar methodology (<https://www.enterprisesurveys.org/methodology>).

¹⁷ The CMIE Prowess database provides us with information on 4,138 manufacturing firms. Hence, upon restricting the sample to the MSME definition set out by the MSME Development Act, 2006, the number of firms is reduced to 888 in the sample. This represents around 22% of the firms reported in the database for the manufacturing sector. An important caveat to note is that the CMIE Prowess database provides information on only those firms with annual reports and thereby excludes all informal firms.

We can see that the number of firms participating in GVCs experienced a substantial increase from 21 firms in 2006 to a total of 124 firms in 2016 (except for wood, paper products, and the printing industry). Interestingly, Table 7.2 depicts that SMEs from the wood, paper products, and printing industries have zero participation in GVCs. However, a closer look at the distribution of SME GVCs across industries and years, as portrayed in Figure 7.6, shows that two SMEs were a part of GVCs in 2014. However, they had exited the market by 2016. Further, we see that machinery, motor vehicles, and the transport equipment industry had the highest participation in GVCs, followed by the coke, chemicals, and pharmaceutical industries. Further, as is evident from the figure, the participation of firms across industries (except National Industrial Classification categories 16–18) has grown since 2006.



7.4.2 Variable Description

In this study, following Baldwin and Lopez-Gonzalez (2015) and Baldwin and Yan (2014), we define a GVC firm as a firm that both imports intermediate inputs and exports intermediate or finished products, i.e., a GVC firm is a firm that is simultaneously engaged in

both importing and exporting activities. Therefore, our GVC variable is a binary variable that takes the value 1 if a firm is a two-way trader and 0 otherwise.¹⁸

In our analysis, the main variable of interest is the measure of financial constraint. Though there exists a large literature relating the financial constraints of a firm to firm performance and global market participation, there is a lack of consensus on its measurement since the financial constraints faced by a firm are not directly observable. Hence, we resort to three different measures to capture the financial constraints firms face. Traditionally, the literature on financial constraints makes use of unidimensional measures such as those of the liquidity and leverage of a firm to proxy its financial constraints (Greenaway, Guariglia, and Kneller 2007; Stiebale 2011; Nagaraj 2014). These two measures indicate the availability of internal funds with a firm. In this study, we measure firm liquidity as the difference between a firm's current assets and its liabilities taken as a proportion of the total assets of the firm. Similarly, the ratio of a firm's debt to total assets gives us the leverage of the firm. In accordance with the existing literature, we expect a positive impact of firm liquidity and a negative impact of firm leverage on the decision of an SME to participate in GVCs. As mentioned earlier, both these firm measures are unidimensional in nature and hence may not proxy the true essence of the financial constraints faced by the firm. Hence, to overcome this constraint, we resort to an index-based measure, which encompasses multiple firm-specific attributes while proxying for the financial constraints of the firm. Here, we employ one of the widely used index-based measures of Whited and Wu (2006). We use a dummy variable WWID that takes a value 1 if the WWID value is above its median, and 0 otherwise. We expect a negative relationship between WWID and

¹⁸ The recent literature on GVCs has witnessed studies capturing GVC participation at firm level (Upward, Wang, and Zheng 2013; Koopman, Wang, and Wei 2014; Kee and Tang 2016). These studies capture GVCs by making a distinction between processing and ordinary trade (Kee and Tang 2016; Lu et al. 2018). Such a distinction, however, is not feasible with the data set at our disposal, which restricts us from constructing a more refined measure of firm GVC participation.

GVC participation.¹⁹ We use the Whited and Wu index (WWID) as a robustness measure.

While estimating our model, we control for a host of firm-specific variables that are likely to have an impact on an SME's decision to participate in GVCs. First, following the new trade theory of Melitz (2003), it is well accepted that more productive firms may self-select to participate in international markets. This follows as these firms may have the necessary resources to overcome the costs associated with entry into global markets (Lu et al. 2018). Hence, we control for firm productivity²⁰ measured using the semi-parametric methods of Levinsohn and Petrin (2003).²¹ Second, to take into account the scale effect of the firm, we control for firm size. In India, the size of a firm is officially defined on the basis of its assets. Hence, we measure firm size as the log of total assets of the firm (De and Nagaraj 2014). Further, though our sample is restricted to firms belonging to MSME categories, there still exists enough variation across MSMEs. Therefore, we include the size of the firm in our empirical model, as we believe that it could still be an important determinant of an SME's decision to participate in GVCs. In addition to size, we control for foreign ownership and the business group affiliation of the firm. The rationale for controlling

¹⁹ The construction of the Whited and Wu index is as follows:

$$WWI = -0.091 * CF - 0.062 * DIV + 0.021 * SIZE \\ - 0.044 * SG + 0.102 * ISG - 0.035 * DEBT$$

WWI denotes the Whited and Wu (2006) index; *CF* is the cash flow of the firm, measured by its log of profit after tax, depreciation, and amortization; *DIV* is a binary variable that equals 1 if the firm pays a dividend, and zero otherwise; *SIZE* is the log of total assets, while *SG* is the sales growth. *ISG* captures the industry sales growth, which is calculated at two-digit National Industrial Classifications.

²⁰ Also referred to as total factor productivity (TFP).

²¹ For estimation of firm productivity, we use the following variables.

Firm output measured as log of sales adjusted for change in inventory.

Prowess does not have information on the number of workers employed by a firm, but it reports the firm's expenditure on wages. Hence, we obtain employment information for a firm by deflating the wage bill by the average industry wages. Here, the average industry wage is obtained from the Central Statistical Organization's Annual Survey of Industry database.

Capital stock is constructed using the perpetual inventory method, which revalue the capital at a historical cost to a base year. The revaluation factor is constructed following Srivastava (1994).

A firm's intermediate input is proxied by its expenditure on power and fuel. All the variables used in the estimation are deflated with appropriate industry-specific deflators

foreign ownership and business group affiliation is that, first, foreign firms have better access to resources, information, and technological know-how (Rigo 2017), and second, firms affiliated with a business group enjoy better networking ties owing to the business and government ties of the business group (De and Nagaraj 2014).²² Hence, we expect foreign ownership and business group affiliation to have a positive effect on the GVC participation of SMEs. For our empirical analysis, we use a dummy variable to capture both these measures. We also control for age of the firm as the literature finds that older firms experience lower sunk costs and hence find it easier to participate in international markets (Minetti and Zhu 2011; Nagaraj 2014).

Table 7.3 presents the descriptive statistics of our sample. In our sample, 25% of the observations correspond to GVC firms. Further, out of 888 SMEs, our sample consists of 255 firms that participated in GVCs between 2006 and 2016. On average, a firm in the sample is 28 years

Table 7.3: Summary Statistics of Key Firm Characteristics

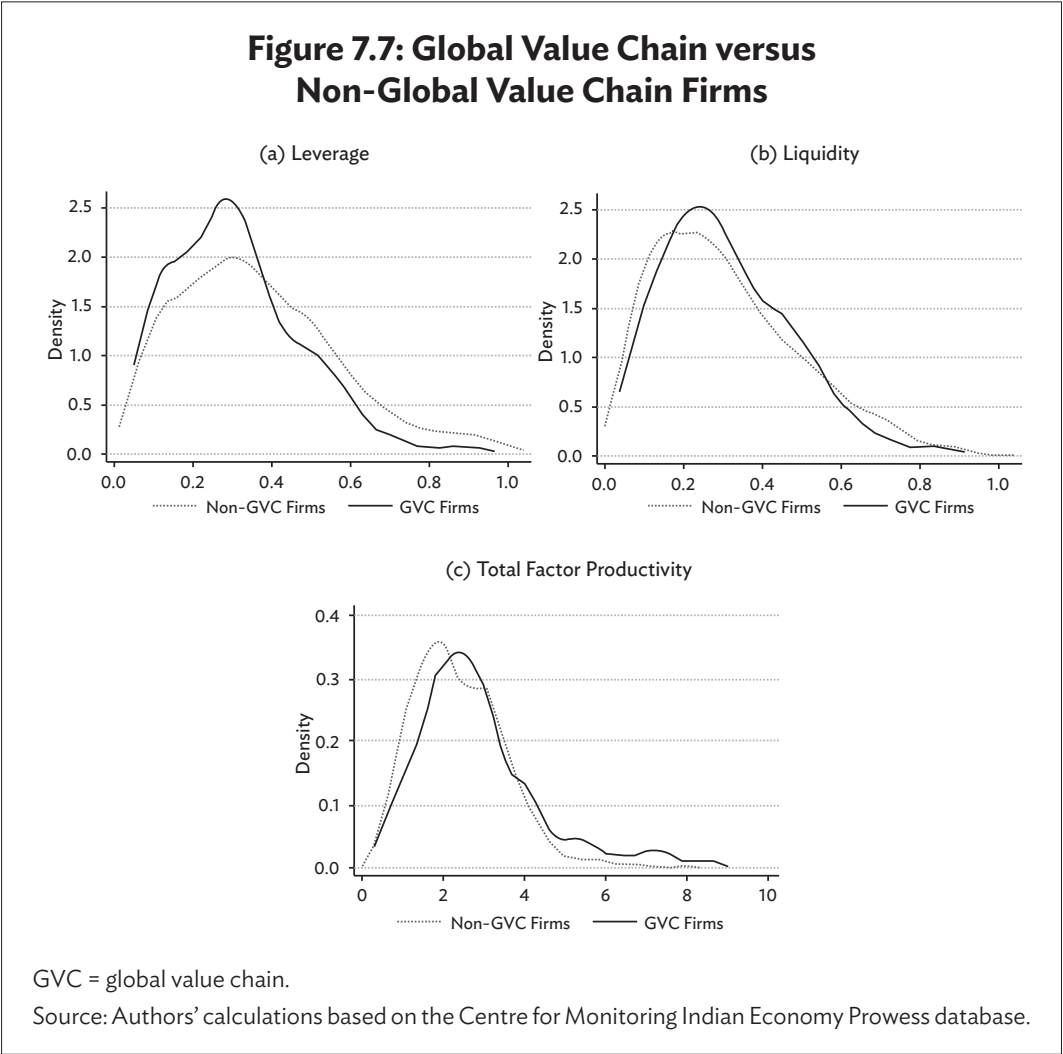
All Firms				GVC Firms				Non-GVC Firms				X ² Dif t-test
Variable	Obs.	Mean	Std. Dev.	Variable	Obs.	Mean	Std. Dev.	Variable	Obs.	Mean	Std. Dev.	
Sales	3,504	537.4	1,353.3	Sales	881	840.2	2,174.7	Sales	2,623	435.7	904.8	404.4***
TFP	3,504	2.520	1.265	TFP	881	2.860	1.512	TFP	2,623	2.406	1.149	0.454***
Age	3,504	28.14	19.51	Age	881	26.09	15.29	Age	2,623	28.82	20.69	-2.734***
Size	3,504	5.287	1.108	Size	881	5.826	1.125	Size	2,623	5.106	1.041	0.720***
Foreign	3,504	0.013	0.113	Foreign	881	0.028	0.166	Foreign	2,623	0.008	0.087	0.020***
Group	3,504	0.123	0.328	Group	881	0.168	0.374	Group	2,623	0.108	0.31	0.060***
Leverage	3,504	0.328	0.254	Leverage	881	0.277	0.195	Leverage	2,623	0.345	0.268	-0.068***
Liquidity	2,897	0.198	0.260	Liquidity	698	0.250	0.196	Liquidity	2,199	0.182	0.276	0.068***
WWI	2,820	0.083	0.054	WWI	759	0.086	0.043	WWI	2,061	0.081	0.058	0.002**
GVC	3,504	0.251	0.434									

GVC = global value chain, TFP = total factor productivity, WWI = Whited and Wu index.
Standard errors in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1.
Notes: (a) A t-test for the null hypothesis tests that the mean values of a variable are equal for GVC and non-GVC firms. (b) The number of observations for liquidity and WWI falls due to non-availability of data for certain variables used in its construction.

²² According to Chang and Hong (2000), a business group is a gathering of independent firms operating under the administrative and financial control of a larger house.

old, and only 1.2% of the sample firms have foreign promoters share, and almost 13% share a business group affiliation. Further, the average productivity of an SME in the sample is 2.50. We can also see that GVC firms have higher liquidity and lower leverage than non-GVC firms. GVC firms are also more productive than non-GVC firms. Also, foreign ownership and business group affiliation are more prominent for GVC firms than non-GVC SMEs. Table 7.3 also reports the results of the t-test, which tests for the equality between firm characteristics of GVC and non-GVC SMEs. The difference between the two is statistically significant, as indicated by the results of the t-test.

To further illustrate the significance of financial constraints across SMEs, we plot the density function of firm liquidity, leverage, and firm productivity across GVC and non-GVC firms. Figure 7.7 presents the density plots. From panels (a), (b), and (c) in Figure 7.7, we can see that GVC firms are less leveraged and more liquid than non-GVC firms.



Further, the TFP of GVC firms is higher than that of non-GVC firms. Figure 7.7 confirms the hypothesis that lower financial constraints are associated with greater GVC participation.

7.5 Empirical Strategy

The main objective of this study is to examine the role of financial constraints of small firms in shaping their participation along the value chain. We examine this relationship using a panel probit regression.

$$\Pr(GVC_{it}) = \Phi(\beta_1 FC_{i,t-1} + \beta_2 TFP_{i,t-1} + \beta_3 Size_{it} + \beta_4 Age_{it} + \beta_5 Foreign_{it} + \beta_6 BG_{it} + \delta_t + \gamma_j + \epsilon_{it}) \quad (1)$$

GVC_{it} is our binary dependent variable and captures the GVC status of a firm at time t expressed as a function of the firm's financial constraint at time $t - 1$. The coefficient of (β_1) is our main variable of interest, and, as mentioned earlier, $FC_{i,t-1}$ represents the three measures of financial constraints (leverage, liquidity, and the Whited and Wu index). In our specification, Φ is the standard normal cumulative distribution function. Further, we include a number of firm-specific controls, including productivity (TFP), size ($Size$), foreign ownership ($Foreign$), and business group (BG) affiliation along with the time (δ_t) and industry dummies (γ_j). To address the potential simultaneity problem, we lag our measures of financial constraints.²³

7.5.1 Endogeneity Concerns

While examining the effect of financial constraints on SME participation in GVCs, our empirical model is not free from endogeneity concerns. In our empirical model, there are two plausible sources of endogeneity: selection bias and reverse causality. The issue of selection bias follows from the seminal work of Melitz (2003), which points to the self-selection of more productive firms into the export markets. In addition to self-selection, participating in supply chains also signals information about a firm's financial status to various sources of formal finance, thereby affecting the probability of a firm receiving funding from an external source (Minetti and Zhu 2011). Failure to account

²³ Since the number of observations is only 3,504, a higher lag will lead to a greater loss of observations. Therefore, we restrict ourselves to using the first lag of the financial constraint variable.

for these biases will lead to inconsistent estimates from our empirical model.

To overcome these issues, we correct for the two sources of endogeneity. First, we make use of an instrument probit (IV-probit) estimation procedure. We use mean industry liquidity as an instrument for firm liquidity and mean industry leverage as an instrument firm leverage. The respective instruments are computed as the mean of the financial constraint measure (liquidity and leverage), excluding the financial constraints of the specific firm under observation, belonging to the same industry and year. The logic behind using these measures as instruments is the idea that firms from a particular industry would have similar financial needs and would face similar financial obstacles. At the same time, the investment decision of a firm to participate in the global market is not dependent on the financial constraints faced by its competitors. Hence, by taking the industry average and excluding the specific firm, we take into consideration the financial constraints of a firm's competitor (Buch et al. 2014).

Second, we employ a two-step probit selection model to correct for the issue of self-selection.²⁴ Also known as the Heckprobit model, it requires a selection and an outcome restriction. The validity of this model, similarly to the Heckman model, rests upon a valid exclusion restriction necessary in the first-stage estimation. Following Montalbano, Nenci, and Pietrobelli (2018), we use firm size as the exclusion restriction for generating the Mills ratio, incorporated in the outcome equation as an additional regressor, and the exclusion restriction variable is excluded from the same (Wolffolds and Siegel 2019). We then complement this with an instrumental variable approach. Hence, by correcting for multiple sources of endogeneity, our empirical strategy enables us to correct for the bias in our estimates.

7.6 Results and Discussion

In Table 7.4, we present the results of our probit regression model, where we do not correct for any of the endogeneity concerns, as discussed earlier. While estimating our empirical model, we proceed in a phased manner. We first estimate equation 1 using the leverage of the firm as our measure of financial constraint. Columns 1–3 report the marginal effects of the same. Similarly, the results in columns 4–6 correspond to the liquidity of the firm, and, finally, columns 7–9 present the results of

²⁴ The two-step probit selection model is analogous to the two-step Heckman (1979) model.

the probit regression using WWID as the financial constraint measure. Across all specifications, the impact of leverage is negative and significant at a 1% level. The marginal effects in columns 1–3 imply that with an increase in leverage of the firm, the probability of the firm participating in a GVC reduces by 7%–8%. In columns 4–6, the impact of liquidity is positive and significant. Similarly, the impact of WWID is negative and significant (columns 7–9) across the three specifications.

Table 7.4: Probit Estimates –Impact of Financial Constraints on Global Value Chain Participation

Variables	(1) GVC	(2) GVC	(3) GVC	(4) GVC	(5) GVC
L.Leverage	–0.0776*** (0.0282)	–0.0784** (0.0310)	–0.0827** (0.0381)		
L.Liquidity				0.0397* (0.0232)	0.0545* (0.0291)
L.WWID					
Age	–0.0402*** (0.0137)	–0.0185 (0.0140)	0.00991 (0.0208)	–0.0231** (0.0117)	–0.0102 (0.0102)
Foreign	0.280** (0.119)	0.279 (0.183)	0.270** (0.123)	0.287* (0.155)	0.268 (0.275)
Business group	0.0361 (0.0276)	0.0239 (0.0312)	0.0326 (0.0399)	0.0447 (0.0524)	0.0325 (0.0565)
Size	0.0304*** (0.00875)	0.0510*** (0.0117)	0.0596*** (0.0127)	0.0403** (0.0162)	0.0475** (0.0224)
L.TFP	0.00371 (0.00661)	0.0144* (0.00844)	0.00954 (0.0131)	0.00894 (0.0123)	0.0149 (0.0163)
Observations	2,563	2,563	2,510	2,001	2,001
Year dummy	No	Yes	Yes	No	Yes
Industry dummy	No	No	Yes	No	No
Variables	(6) GVC	(7) GVC	(8) GVC	(9) GVC	
L.Leverage					
L.Liquidity	0.0957* (0.0534)				

continued on next page

Table 7.4 continued

Variables	(6)	(7)	(8)	(9)
	GVC	GVC	GVC	GVC
L.WWID		−0.0711** (0.0290)	−0.0868*** (0.0278)	−0.0763*** (0.0253)
Age	0.0200 (0.0260)	−0.00989 (0.0291)	−0.0214 (0.0283)	0.0147 (0.0299)
Foreign	0.182 (0.164)	0.247 (0.166)	0.207 (0.163)	0.144 (0.163)
Business group	0.0684 (0.0498)	0.115* (0.0604)	0.0840 (0.0591)	0.0974* (0.0587)
Size	0.0930*** (0.0155)	0.117*** (0.0176)	0.134*** (0.0176)	0.119*** (0.0185)
L.TFP	−0.00875 (0.0189)	0.00179 (0.0152)	0.00874 (0.0147)	−0.0149 (0.0224)
Observations	1,954	2,107	2,107	2,066
Year dummy	Yes	No	Yes	Yes
Industry dummy	Yes	No	No	Yes

GVC = global value chain, TFP = total factor productivity, WWI = Whited and Wu index.
Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
Notes: (a) Size, age, and TFP are measured in logs. (b) All the columns report the marginal effects. (c) Since we use lagged measure of financial constraint and TFP, the number of observations in the regression falls.

The results from our probit regressions indicate that SMEs that are financially constrained find it difficult to participate in GVCs. The coefficient of our study is comparable to that of Lu et al. (2018), which finds a 0.4% fall in the GVC participation of PRC firms for a unit standard deviation change in a firm’s financial constraint measure. In terms of control variables, the coefficient of size is positive and significant, highlighting that within the narrowly defined classification of firms, size still plays a crucial role in a firm’s decision to participate in GVCs. This corroborates the findings of Greenaway, Guariglia, and Kneller (2007), who report that large firms are more likely to participate in GVCs. The other control variables have expected signs, except for age, where we find younger SMEs participating in GVCs. This, however, is not contrary to the literature, since studies find that young firms are more competitive and have greater incentive to innovate and remain competitive, and therefore participate to a greater extent in global markets (Eck and Huber

2016). The coefficients, though, perform humbly in terms of significance. In summary, our probit estimates discern a negative impact of financial constraints on SMEs' decision to integrate into the supply chain.

In the following analysis, we assuage the concerns of reverse causality by using an instrumental variable (IV) approach. Table 7.5 presents the results of our IV-probit model. We note that the impact of all three measures of financial constraints is in line with our results from probit estimations and the existing literature. Our analysis discerns a negative and statistically significant impact of leverage and WWID on SME participation in GVCs.

Table 7.5: Instrumental Variable-Probit – Impact of Financial Constraints on Global Value Chain Participation

	(1)	(2)	(3)	(4)	(5)	(6)
	GVC	GVC	GVC	GVC	GVC	GVC
L.Leverage	-3.378*** (0.847)	-2.679*** (0.831)				
L.Liquidity			3.143*** (0.757)	3.096*** (0.809)		
L.WWID					-0.211*** (0.0744)	-0.252*** (0.0714)
First Stage						
L.Industry Leverage	0.218** (0.086)	0.194** (0.087)				
L.Industry Liquidity			0.234*** (0.086)	0.220** (0.087)		
L(2) WWID					0.460*** (0.025)	0.460*** (0.025)
F-Stat	11.44	10.07	18.06	11.46	83.74	36.08
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummy	No	No	No	No	No	No
Year dummy	No	Yes	No	Yes	No	Yes
Observations	2,563	2,563	2,001	2,001	1,325	1,325

GVC = global value chain, WWID = Whited and Wu index.

Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Notes: (a) Size, age, and total factor productivity are measured in logs. (b) All the columns report the marginal effects.

Further, higher liquidity with an SME fosters its participation in the supply chain. Moreover, the results from our first-stage IV-probit estimations portray the relevance of the instrument used, as is evident from the significance of the instruments. Further, across all

Table 7.6: Impact of Financial Constraints on Global Value Chain Participation –Two-Step Probit Selection Model

	(1)	(2)	(3)	(4)	(5)	(6)
	GVC	GVC	GVC	GVC	GVC	GVC
L.Leverage	−4.764*** (0.095)	−4.560*** (0.235)				
L.Liquidity			4.122*** (0.241)	4.081*** (0.264)		
L.WWID					−0.368* (0.213)	−0.458** (0.206)
Mills	2.059*** (0.165)	1.559*** (0.382)	0.785*** (0.278)	0.658** (0.296)	−1.343*** (0.256)	−1.285*** (0.233)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummy	No	No	No	No	No	No
Year dummy	No	Yes	No	Yes	No	No
Observations	2,563	2,563	2,001	2,001	1,325	1,325
First Stage						
L.Industry Leverage	−0.205*** (0.0707)	−0.179*** (0.0672)				
L.Industry Liquidity			0.115** (0.0537)	0.104* (0.0533)		
L(2) WWID					−0.0682** (0.0284)	−0.0816*** (0.0273)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummy	No	No	No	No	No	No
Year dummy	No	Yes	No	Yes	No	No
Observations.	2,563	2,563	2,001	2,001	1,325	1,325

GVC = global value chain, WWID = Whited and Wu index.
Standard errors in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1.
Notes: (a) Size, age, and total factor productivity are measured in logs. (b) All the columns report the marginal effects. (c) Since we use lagged measure of financial constraints and total factor productivity, the number of observations in the regression falls.

specifications, the first-stage F-Stat is greater than 10; hence, following Staiger and Stock's (1997) rule of thumb,²⁵ we can discern that our instruments do not suffer from the problem of being weak instruments.

As discussed earlier, our model suffers from the problem of self-selection. To account for this, we employ a two-stage probit selection model. In addition, we augment this setup with an IV approach to further tackle the issue of reverse causality. Similarly, to our earlier analysis, we use industry averages of liquidity and leverage as instruments in our analysis. Table 7.6 presents our empirical findings. Across all specifications, the Mills ratio is significant, highlighting the problem of self-selection in the model. Our findings highlight a negative impact of financial constraints on the participation of Indian manufacturing SMEs in GVCs. Further, the results of our control variables are qualitatively similar to our earlier findings.

7.7 Robustness

To underscore the soundness of our findings, we run a battery of robustness checks. Here, firm size in India is defined based on the total assets of the firm (De and Nagaraj 2014). Hence, in this analysis, we deviate from the original classification of firms, where firms are classified as SMEs based on their investment in plant and machinery. Instead, we classify firms into five quantiles (Q1–Q5) based on their asset size for each industry and year. Such a classification makes our findings comparable across the size distribution of the firm.

Table 7.7 presents the findings of the IV-probit estimates. Our results indicate that the negative impact of leverage and WWID²⁶ on a firm's decision to participate in GVCs is prominent among small (Q1 and Q2) and medium (Q3 and Q4) firms. The relationship ceases to hold only for the firms in Q5. However, liquidity remains positively significant for firms across all specifications.

The Government of India has recently passed a new bill that redefines MSMEs based on the turnover of the firm. The new classification defines a *microenterprise* as one with a turnover of up to ₹50 million. Firms with turnovers of between ₹50 million and ₹750 million are classified as *small firms*, and firms with turnovers in the range of ₹750 million–₹2,500 million are defined as *medium-sized firms*.

²⁵ Staiger and Stock (1997) suggested that instruments can be considered weak instruments if the F-Stat reported in the first stage is less than 10.

²⁶ We do not report the results of WWID due to space constraints. These are available upon request to the authors.

Table 7.7: Impact of Financial Constraints
on Global Value Chain Participation by Firm Size

Variables	Q1	Q1	Q2	Q2	Q3
	(1)	(2)	(3)	(4)	(5)
	GVC	GVC	GVC	GVC	GVC
L.Leverage	-4.361*** (0.526)		-1.469*** (0.313)		-0.843*** (0.225)
L.Liquidity		0.369* (0.215)		0.0776 (0.176)	
Controls	Yes	Yes	Yes	Yes	Yes
First Stage					
L.Industry Leverage	0.331*** (0.098)		0.618*** (0.073)		0.819*** (0.084)
L.Industry Liquidity		0.870*** (0.066)		1.050*** (0.068)	
F-Stat	11.12	38.64	40.08	48.77	48.58
Controls	Yes	Yes	Yes	Yes	Yes
Observations	3,978	4,183	4,436	4,653	4,502
Variables	Q3	Q4	Q4	Q5	Q5
	(6)	(7)	(8)	(9)	(10)
	GVC	GVC	GVC	GVC	GVC
L.Leverage		-0.479*** (0.160)		-0.00568 (0.146)	
L.Liquidity	0.352** (0.170)		0.643*** (0.166)		0.369* (0.193)
Controls	Yes	Yes	Yes	Yes	Yes
First Stage					
L.Industry Leverage		0.971*** (0.082)		1.033*** (0.079)	
L.Industry Liquidity	1.025*** (0.061)		1.065*** (0.062)		0.838*** (0.072)
F-Stat	57.48	65.60	60.20	79.78	32.43
Controls	Yes	Yes	Yes	Yes	Yes
Observations	4,771	4,553	4,824	4,512	4,818

GVC = global value chain.
Standard errors in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1.
Notes: (a) Size, age, and total factor productivity are measured in logs. (b) We do not include industry fixed effects as the instruments are constructed at industry level. (c) All the columns report the marginal effects. (d) Since we use lagged measure of financial constraints and total factor productivity, the number of observations in the regression falls.

Table 7.8: Impact of Financial Constraints on Global Value Chain Participation– SMEs Defined Based on Turnover

	(1)	(2)	(3)	(4)	(5)	(6)
	GVC	GVC	GVC	GVC	GVC	GVC
L.Leverage	−3.881*** (1.271)	−5.847*** (1.666)				
L.Liquidity			1.041*** (0.400)	0.395 (0.650)		
L.WWID					−0.171 (0.194)	−0.165 (0.159)
First Stage						
L.Industry Leverage	0.212* (0.123)	0.174 (0.124)				
L.Industry Liquidity			0.652*** (0.076)	0.765*** (0.141)		
L(2) WWID					0.566*** (0.053)	0.574*** (0.053)
F-Stat	8.53	3.60	13.68	9.11	16.53	10.60
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,193	1,193	1,310	1,310	545	545
Industry dummy	No	No	No	No	No	No
Year dummy	No	Yes	No	Yes	No	Yes

GVC = global value chain, SME = small and medium-sized enterprise, WWID = Whited and Wu index. Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
Notes: (a) Size, age, and total factor productivity are measured in logs. (b) We do not include industry fixed effects as the instruments are constructed at industry level. (c) All the columns report the marginal effects. (d) Since we use lagged measure of financial constraint and total factor productivity, the number of observations in the regression falls.

In this analysis, we define firms as MSMEs based on the redefined definition proposed by the Government of India. Our sample based on this definition consists of 677 firms corresponding to a total of 1,956 firm-year observations. Similarly, to our earlier findings, we find that financial constraints faced by SMEs act as an impeding factor in their participation in global markets as a GVC firm. The findings of our analysis (Table 7.8) are qualitatively similar to the analysis carried out based upon the original definition of SMEs in India. Hence, we find that

financial constraints can have a significant negative impact on SMEs’ decision to participate in GVCs.

Additionally, we also use an alternate definition of GVCs to posit the robustness of our findings. In this regard, we define GVC firms as earlier, i.e., firms that simultaneously export and import, but with the restriction that a firm must export at least 10% of its sales. A similar restriction has been imposed in the literature when defining a GVC firm (Del Prete, Giovannetti, and Marvasi 2017). Following this definition, the number of GVC firms falls to 18% of the sample. Table 7.9 reports the results of

Table 7.9: Impact of Financial Constraints on Global Value Chain Participation – Alternate Global Value Chain Definition

	(1)	(2)	(3)	(4)	(5)	(6)
	GVC-R	GVC-R	GVC-R	GVC-R	GVC-R	GVC-R
L.Leverage	-1.727*** (0.663)	-1.557** (0.716)				
L.Liquidity			2.241*** (0.681)	2.244*** (0.735)		
L.WWID					-0.207*** (0.0662)	-0.229*** (0.0662)
First Stage						
L.Industry Leverage	0.218** (0.086)	0.194** (0.087)				
L.Industry Liquidity			0.234*** (0.086)	0.220** (0.087)		
L(2)WWID					0.428*** (0.026)	0.425*** (0.027)
F-Stat	11.44	10.07	18.06	11.46	83.74	36.08
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,563	2,563	2,001	2,001	1,325	1,325
Industry dummy	No	No	No	No	No	No
Year dummy	No	Yes	No	Yes	No	Yes

GVC = global value chain, WWID = Whited and Wu index.
Standard errors in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1.
Notes: (a) GVC-R is defined as a two-way trader firm, which exports at least 10% of its sales. (b) Size, age, and total factor productivity are measured in logs. (c) We do not include industry fixed effects as the instruments are constructed at industry level. (d) All the columns report the marginal effects. (e) Since we use lagged measure of financial constraint and total factor productivity, the number of observations in the regression falls.

our estimation. We find a negative and significant impact of leverage and WWID on SMEs' participation in GVCs. Hence, our robustness analysis substantiates our findings and highlights the robustness to alternative definitions of SMEs and GVCs.

7.8 Policy Discussions

As one of the fastest-growing economies across the globe and with its target of achieving a \$5 trillion economy by 2025, the MSME segment has the potential of acting as a catalyst in driving India toward this target. The recent Make in India initiative and the Digital India revolution provide MSMEs with multiple avenues to gain access to better knowledge, technical know-how, and alternate avenues of finance backed by technology and big data models that cater to their potential of becoming global leaders. However, such a transition would require significant policy initiatives from the government. The government, in its 2020–2021 union budget, announced ₹10 billion for the export promotion scheme for MSMEs. The Government of India has also proposed the commencement of the National Logistics Policy, launched to make MSMEs competitive. Further, by relaxing lending norms, the government is making efforts toward enhancing the economic and financial sustainability of MSMEs. These policies have the potential of stimulating the productivity and output of MSMEs and aid the participation of this segment in GVCs. However, given the wide variety of firms under the umbrella of MSME classification, a single-fit policy for all might not work and could instead create more disruptive inefficiencies.

Within the GVC framework, the participation of Indian SMEs is fuelled via the buyer-driven supply chain, where Indian SMEs participate through the supply of intermediates. Hence, a policy aimed at enabling these SMEs to become direct beneficiaries of such participation would reap greater benefits. In this regard, based on the findings of our analysis, the key focus of the policy makers should be on easing the financial constraints faced by Indian SMEs. In this context, the present policy initiatives, such as that of the establishment of the public credit registry, would reduce the dependence of SMEs on informal sources of finance. Further, the recently launched Micro Units Development Refinance Agency Limited (MUDRA) scheme is an attempt by the Government of India to extend formal and affordable credit to SMEs in the country. Despite such policies, SMEs in the country have found it difficult to overcome financial obstacles, highlighting a greater need for financial intermediation for SMEs. An important aspect to take into account here is that any policy aimed at improving the financial condition of firms

would have a positive implication for MSMEs as well as large firms. However, a key difference between large firms and MSMEs is that the former have access to interfirm trade credit, whereas MSMEs do not.²⁷ Hence, financial policy reforms will have a greater implication for SMEs than for large firms. Further, alternate channels of finance, especially that of non-banking financial companies, have seen a rise over the past few years. Their less stringent yet robust scoring methodology has enabled MSMEs to obtain support from non-banking financial companies (Government of India 2018). Also, as mentioned earlier, the Interest Subvention Scheme for Incremental Credit to MSMEs would reduce the effective rate of interest for MSMEs, easing their access to finance. Hence, financial instruments combined with a broad range of funding mechanisms and international investment remain the most popular policy instruments in fostering firm participation in GVCs (Kergroach 2019).

Second, initiatives like MUDRA and the public credit registry highlight the government's drive to bring SMEs under the umbrella of formal finance. However, a major hurdle in this context remains the lack of necessary information on resources available to SMEs. Hence, mapping of relevant financial institutions (including microfinance institutions and fintech firms) and their schemes available for MSMEs would create greater awareness among MSMEs and would be a step forward in reducing the information asymmetry.

Third, Indian SMEs encompass a wide variety of firms. As presented in Figure 7.3, almost 60% of SMEs are domestic firms, with the remaining 40% having access to global markets.²⁸ Moreover, within this division, the need for finance of domestic firms would be different from that of firms that already have access to foreign markets, especially given that trading firms would be aware of the process and requirements of international standards, which might not be the case for domestic firms. Hence, policy makers need to consider this differential need for SMEs that do not trade and frame policies accordingly.

Fourth, as shown in our descriptive analysis, among all the SMEs participating in GVCs, firms from the pharmaceutical and automotive industries are the ones that participate most in GVCs. This points toward the strong linkages of Indian SMEs in these sectors, so policy makers can promote greater engagement of these industries through effective use of free trade agreements, which would facilitate trade

²⁷ In our sample of manufacturing firms, data on trade receivables are available only for large firms, thereby highlighting the absence of trade credit for SMEs in the sample.

²⁸ These firms are involved in either exporting, importing, or both (GVCs).

among intermediates and in turn would aid Indian SMEs' participation in the global markets. In summary, given the prominence of SMEs in the Indian manufacturing sector, it becomes important to engage these enterprises in GVCs, thereby stimulating growth, innovation, and employment generation in the economy.

7.9 Conclusion

In this chapter, we examined how the financial constraints of firms shape the GVC participation of Indian SMEs. To answer this question, we obtain firm-level data from the CMIE Prowess database, and we classify firms as *small* and *medium-sized* enterprises based on their investment in plant and machinery, following the MSME Development Act 2006. Consequently, we have a rich panel of 888 SMEs belonging to Indian manufacturing over the period 2006–2016. Further, the empirical strategy employed in the current study accounts for endogeneity arising from reverse causality and self-selection. To assuage these concerns, we use an instrumental variable approach and complement it with a two-step probit selection model. Our findings reveal that financial constraints are a significant barrier that Indian SMEs face to participating in GVCs. Our results are robust to alternative definitions of SMEs and GVCs.

Despite a battery of robustness checks, our analysis is not free from limitations. First, the lack of data differentiating between processing and ordinary trade prevents us from constructing more refined measures of GVCs at firm level as suggested by Upward, Wang, and Zheng (2013); Koopman, Wang, and Wei (2014); and Kee and Tang (2016). Second, informal channels of credit play a pivotal role in assuaging the impact of financial constraints. However, the absence of data on SMEs receiving trade credit prevents us from undertaking such an analysis. For future work, it would be interesting to untangle the interfirm linkages between large firms and SMEs, which in turn may have an impact on the GVC participation of firms involved. Data constraints, however, restrict our study from undertaking such an analysis.

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8

Determinants of the Export Performance of SMEs in the Kyrgyz Republic

Kamalbek Karymshakov

8.1 Introduction

Participation of local firms in global value chains (GVCs) in a developing country context has become increasingly important for improving export performance, increasing added value, and raising income (OECD 2012; Gereffi and Sturgeon 2013; Bamber et al. 2014). However, social and economic conditions in developing countries along with the capacity of firms may not be favorable to making use of this opportunity. Local human capital development, sufficiency of infrastructure, industry maturity level, and experience in managerial skills corresponding to adapting to the challenges caused by participation in GVCs may condition successful integration of local producers into GVCs (Pietrobelli 2008; Bamber et al. 2014). Enterprises in developing countries face different challenges in the process of being integrated into GVCs. These issues are related to constraints in access to finance, a lack of managerial skills, difficulties in finding a qualified labor force, certification requirements, limited economies of scale, deficiency in information access, and evaluation for strategy development, among others (Harvie and Charoenrat 2015; Fernandez-Stark, Frederick, and Gereffi 2012). Given these challenges, increasing participation of local firms in international markets and increasing their export remain important conditions for participation in GVCs.

The Kyrgyz Republic as a developing country in Central Asia also faces these challenges. Its historical background and social and economic issues of the transition period have been reflected in the priority of ensuring the private sector participates effectively in GVCs. In the Kyrgyz economy, small and medium-sized enterprises (SMEs) play the role of drivers of private sector development. In the last 5 years, almost

40% of gross domestic product (GDP) was generated by SMEs (K-News 2018). However, despite their potential, participation has not been sufficient for effective integration into GVCs (see, e.g., Vandenberg and Khan 2015). According to an evaluation of private sector development in this country, the institutional environment, infrastructure development, and optimization of government regulation systems are priority issues (World Bank 2019). The importance of SMEs in the economy and their issues in regard to export performance make the Kyrgyz Republic an interesting case study.

Given the general objectives in terms of economic integration and export performance in the Kyrgyz Republic, on the one hand, and the challenges of integrating into GVCs in the transition period context, on the other, understanding the basic factors affecting firms' export activity is important. From this standpoint, it is highly relevant to analyze factors that explain firm engagement in international markets and increase their export. Most of the empirical literature on export performance in the case of the postcommunist countries is limited—with less focus on Central Asian countries—or includes broad discussions of export performance based on macroeconomic evaluations (see, e.g., Cieřlik 2014; Cieřlik, Biegańska, and Środa-Murawska 2016). In light of such a gap in the knowledge about the Central Asian context, this study aims to examine factors affecting the export performance of SMEs in the case of the Kyrgyz Republic. The research of factors associated with exporting activities of SMEs is consistent with the long-term objectives of integration into GVCs and the economic development of the Kyrgyz Republic.

8.2 SMEs in the Kyrgyz Republic

Although the term SMEs is well known, the definition diverges across countries. In the Kyrgyz Republic, the definition of SMEs follows the Government Decree from 1998, with amendments in 2002, which defines SMEs by the number of employees and annual turnover amount.¹ The National Statistical Committee of the Kyrgyz Republic provides information about SMEs based on this classification. According to this classification, two different criteria are used for two subgroups by number of workers and annual turnover. Table 8.1 provides this classification based on number of workers.

Following this definition, SMEs in the Kyrgyz Republic can be referred to as enterprises with up to 200 employees and up to 50 employees in nonservice and service sectors, respectively. However,

¹ Government of the Kyrgyz Republic (1998), with amendments from 29 August 2002.

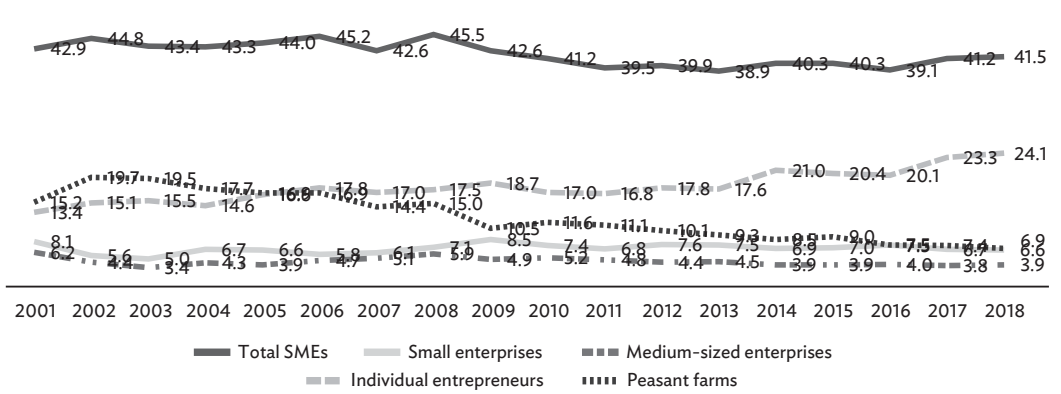
Table 8.1: Definition of SMEs in the Kyrgyz Republic by Employee Number

	Agriculture, Hunting and Forestry, Fish Farming, Construction, Mining, Manufacturing, Production and Distribution of Energy, Gas, and Water	Trade and Repair Services, Hotels and Restaurants, Transport and Communication, Finance, Education, Health Care, and Other Services
Large enterprises	201 and more	51 and more
Medium-sized enterprises	from 51 to 200	from 16 to 50
Small enterprises	up to 50	up to 15
Microenterprises	up to 15	up to 7

SMEs = small and medium-sized enterprises.
Source: Government of the Kyrgyz Republic (1998), with amendments from 29 August 2002.

the National Statistical Committee of the Kyrgyz Republic, as well as the SMEs defined in the standard above-mentioned definition, reports peasant farms and individual entrepreneurs. The main argument of such an approach is that agricultural farmers based on household production activities and individual entrepreneurs represent a significant part of entrepreneurship in the country, which cannot be neglected even though they are entrepreneurs without hired employees (Tilekeyev 2019, 2). Therefore, the information about SMEs below includes peasant farms and individual entrepreneurs.

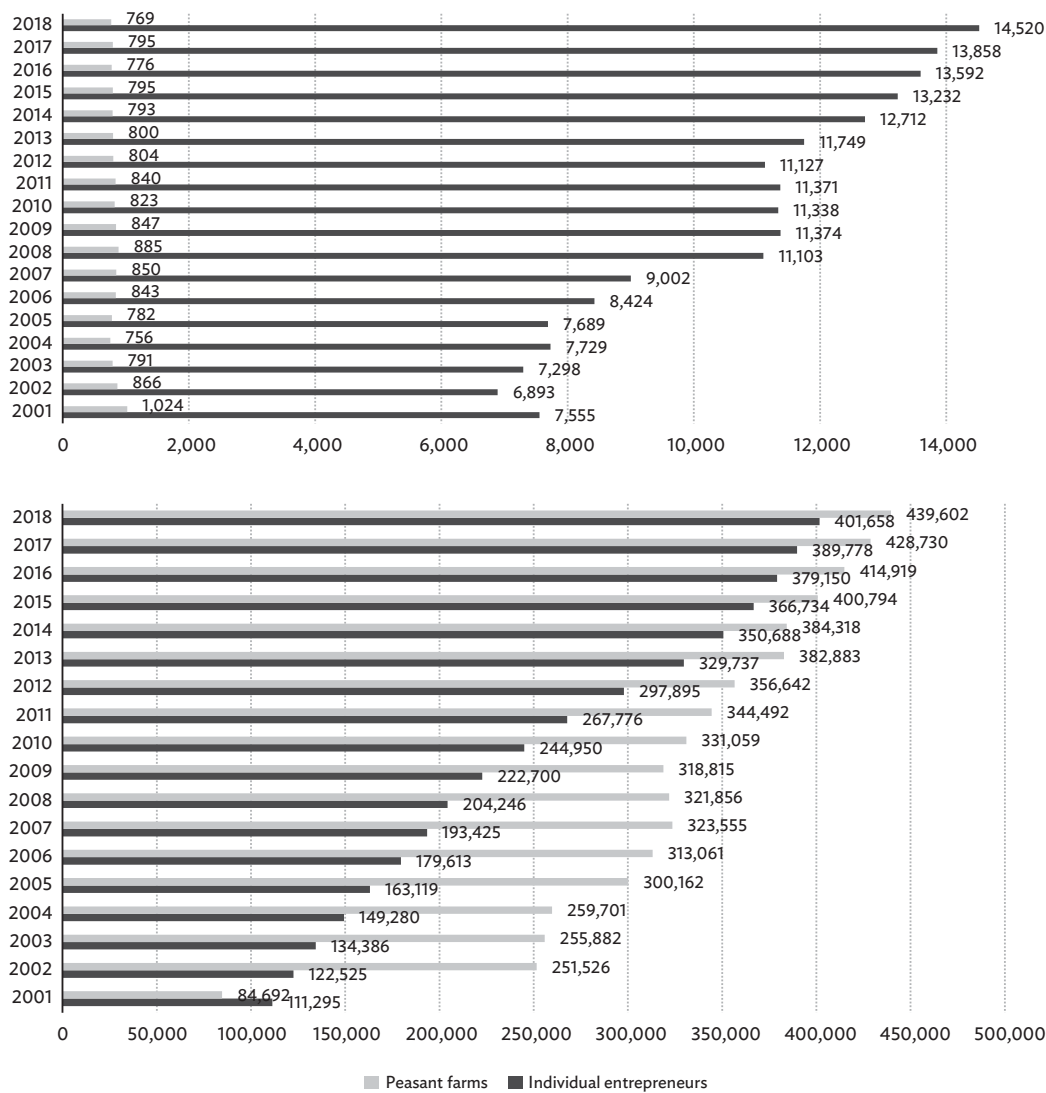
Figure 8.1: Share of SMEs in GDP, 2001–2018 (%)



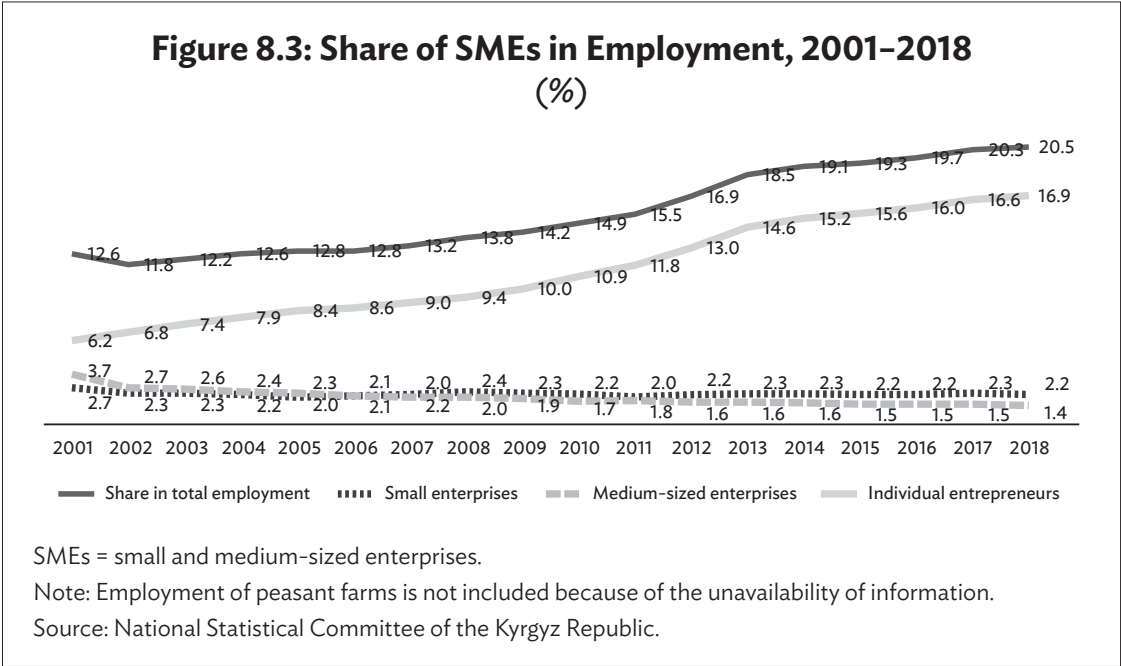
SMEs = small and medium-sized enterprises.
Source: National Statistical Committee of the Kyrgyz Republic.

SMEs play an important role in the economy of the Kyrgyz Republic. According to official statistics, the share of SMEs in GDP over the last 20 years has been above 40%, ranging from 45.8 in 2008 to 41.5 in 2018 (see Figure 8.1), which is generally higher than other countries in Central Asia (Holzhacker and Skakova 2019, 6). Among SMEs, the highest contribution to GDP is related to activities of individual entrepreneurs—around 24%—while the share of peasant farms shows a decreasing tendency. The contribution of SMEs has been constantly around 4%–7% each.

Figure 8.2: Number of SMEs in the Kyrgyz Republic, 2001–2018



SMEs = small and medium-sized enterprises.
Source: National Statistical Committee of the Kyrgyz Republic.



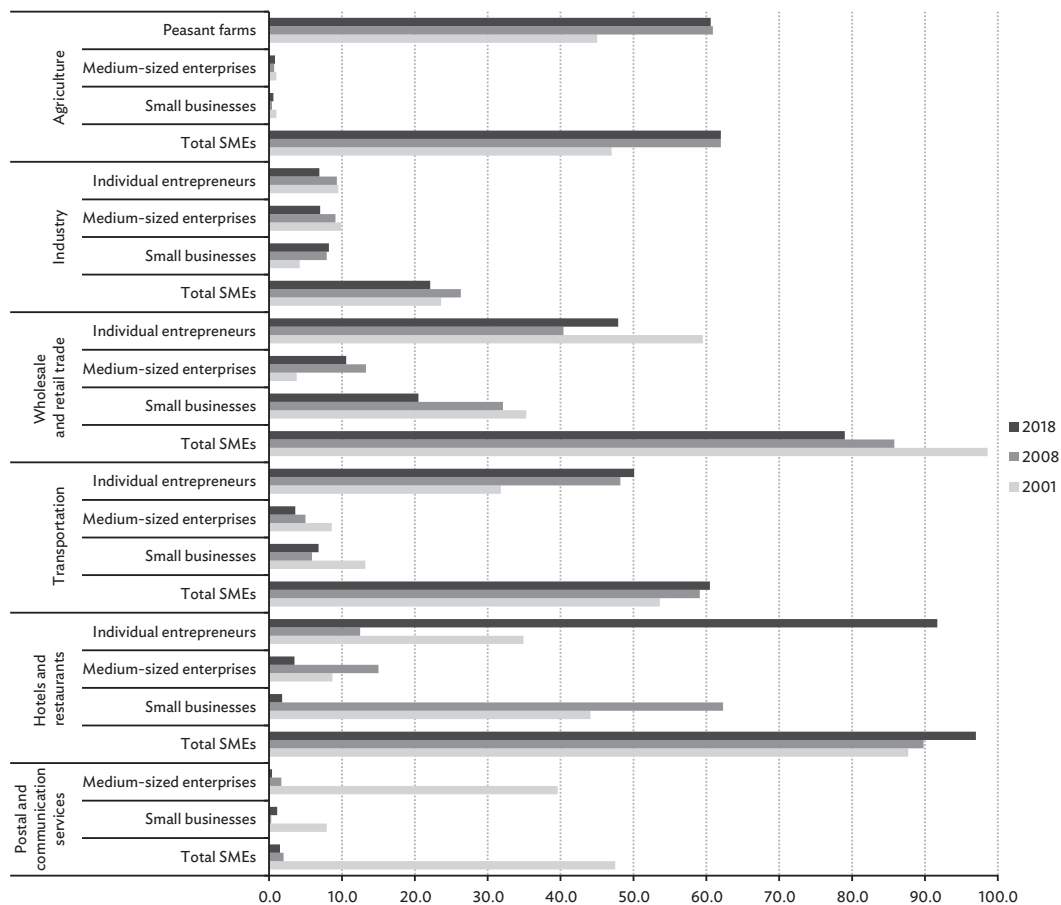
Statistical data on the number of SMEs in Figure 8.2 show that individual entrepreneurs and peasant farms have been showing stable growth since the early 2000s. In 2018, peasant farms accounted for around 439,000 SMEs and individual entrepreneurs for about 401,000. Small enterprises have been increasing too, though at a slower growth rate, from 11,000 in 2008 to 14,500 in 2018. However, the number of medium-sized enterprises is limited. Moreover, in the past 5 years, it has shown a decreasing tendency, and in 2018 there were 769 medium-sized enterprises.²

SMEs are also an important source of job creation. The share of SMEs in 2018, excluding peasant farms, in total employment was 20.5% (Figure 8.3). It should be noted that the stable growth of employment among SMEs was related to the growth of individual entrepreneurs, which in 2018 accounted for 16.9% of total employment.

It can be seen from the description of trends that there is a large disparity in the growth of the number of individual entrepreneurs and that of SMEs. One of the fundamental factors affecting this trend is the taxation and registration practices in the Kyrgyz Republic. One of the

² However, Holzhaacker and Skakova (2019, 7) note that the contribution of SMEs to GDP is underestimated because of the considerable share of informal economy in the Kyrgyz Republic.

Figure 8.4: Share of SMEs in Production Volume of Sectors of the Economy of the Kyrgyz Republic (%)



SMEs = small and medium-sized enterprises.

Note: Employment of peasant farms is not included because of the unavailability of information.

Source: National Statistical Committee of the Kyrgyz Republic.

tax regimes set in the Tax Code is that of patent-based taxes.³ Being in two different forms (voluntary and mandatory), the patent system is applied to individuals involved in specific activities determined by the legislation. Those individuals using the patent tax are required to pay profit and sales tax. Therefore, it creates a favorable environment for

³ In the term patent-based taxes, “patent” does not refer to the patents of intellectual property or some innovation activities. Rather, this term refers to a special tax regime where individuals may engage in entrepreneurial activities without other registration processes if these business activities are included in the list of patent-based activities.

individual entrepreneurs unless their turnover exceeds Som8 million (or approximately \$114,000). Beyond this threshold, they are not under the patent regime conditions and have to pay value-added and other taxes. Moreover, under the patent system, bookkeeping is not required for entrepreneurs.

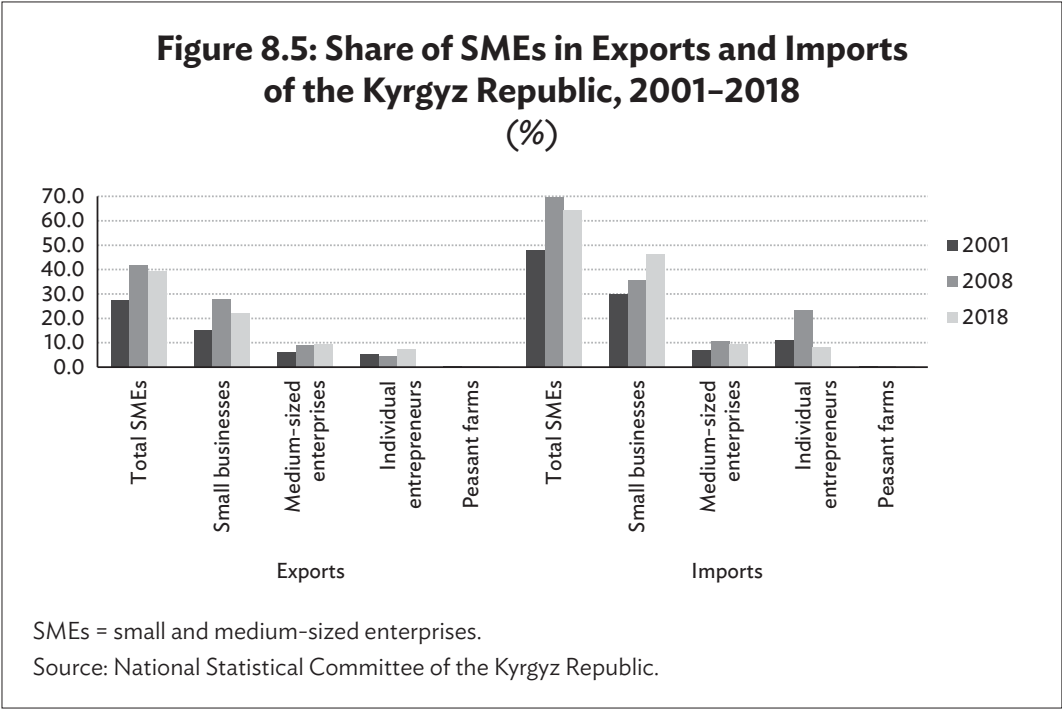
This situation has two consequences. First, those under the patent system are motivated to show turnover below the threshold value, which means some part of their activity remains informal. Second, for entrepreneurs working under the advantageous conditions of patent regime transition into the upper size of enterprises (small, medium sized, and large), the tax burden is increased. Because of this, individual entrepreneurs and microenterprises are growing, while the number of small, medium-sized, and large firms is stagnating (Sahovic 2019).

If we compare the contributions of SMEs in employment and value added (GDP) in the Kyrgyz economy, it can be seen that the growing number of employees in SMEs does not result in a growth in the share of SMEs in GDP. This can be explained by the fact that an increasing number of individual entrepreneurs is not associated with increased productivity (Hasanova 2019). However, as mentioned, contributions to GDP can be underestimated given the considerable number of informal economic activities, which is widespread among individual entrepreneurs.

The distribution of activities of SMEs across sectors of the economy indicates that they dominate in the agriculture, wholesale and retail trade, and hospitality sectors. In particular, agriculture is almost fully represented by peasant farms, which account for 60% of the total agricultural production. Individual entrepreneurs have the highest share in trade, transportation, and hotels and restaurants. In particular, in the hotels and restaurants sector, they generate almost 97% of production. However, in the industry sector, SMEs make the lowest contribution, at about 21%.

The contribution of SMEs to the economy and productivity growth has a direct relationship with their participation in external trade activities. Successful application of new technologies and processing of completed goods necessitates import of goods and services, while participation in export increases value added.

SMEs in the Kyrgyz Republic constituted 39.3% of total export in 2018 and 64.2% of import. Both in export and import, small enterprises have a higher share of 22% and 46%, respectively. The main export items of SMEs are agricultural products (fruits, vegetables, and cotton) and textile products. The main export destinations of SMEs in the Kyrgyz Republic are countries of the Eurasian Economic Union (EEU). Although the Kyrgyz Republic's membership of the EEU was expected



to increase the exporting potential for producers in the country, recent challenges indicate that potential issues in this direction undermined these expected benefits. Thus, Hasanova (2019) notes that after gaining membership, the share of individual entrepreneurs and peasant farms exporting to EEU countries increased considerably, while the share of SME exports to EEU countries decreased.

Increasing integration in GVCs is necessary for participation in external trade activities in order to result in increased added value for SMEs. Although there is no systematic survey on measuring the integration of the Kyrgyz Republic’s SMEs into GVCs, Holzhacker and Skakova (2019, 11) state that participation in GVCs had a decreasing tendency. Total GVC participation in 2017 was estimated to be 44.9%, while in 2011 it was 52.4%.⁴

An overview of the current state of SMEs in the Kyrgyz Republic shows that they make an important contribution to production and employment. However, there is no evidence that the constant growth in the number of SMEs has generated analogous growth in productivity. Moreover, the growth of SMEs is mainly related to individual

⁴ Holzhacker and Skakova (2019, 11) note that the GVC participation index reflects the sum of the share of foreign value added in gross exports and the share of domestic value added in third countries’ gross exports.

entrepreneurs and peasant farms, while the growth in the number of small enterprises has been comparatively limited. An analogous conclusion can be derived for their external trade and participation in GVCs. The development of the SME sector based on individual entrepreneurship does not provide a strong perspective of competitiveness among SMEs in export markets.

Corresponding government policies aimed at developing the efficiency and competitiveness of SMEs are necessary. There have been different government policy actions over the past 20 years aimed at SMEs, though their implementation and efficiency have been questioned. For instance, in 2007, the law “On State Support of Small Business” was adopted.⁵ However, its implementation was not effective. Recent support for SMEs in the Kyrgyz Republic was expressed in different programs related to the development of the private sector and government regulation. Thus, in the government program for private sector development for 2015–2017,⁶ no policy for SMEs was specified, but the main objectives of the program, such as the construction of effective dialogue between the government and the private sector, were indirectly related to SMEs. In contrast, with amendments to the Tax Code in 2015, several measures toward decreasing the tax administration burden concerning SMEs were accepted. Thus, the frequency of reporting to the tax administration was reduced, the tax payment period for small entrepreneurship was changed, and an electronic system for tax reporting was introduced.

Though several actions in terms of changes in legislation and government regulations have been carried out, government policy specifically targeting SMEs arguably was not implemented (Hasanova 2019). Recently, the government initiated the Program for Development and Support of SMEs for 2019–2023.⁷ Expected results of the program include to reduce the size of the informal economy, increase the contribution of SMEs to GDP and employment, and increase public–private partnership programs.⁸

In this program, two main problems for SME development are underlined: access to infrastructure (electricity, roads, water supply, etc.) and government regulatory burden. Along with these problems, several other issues have been raised by policy makers and private sector

⁵ The law of the Kyrgyz Republic from 25 May 2007 No. 73 “On State Support of Small Business.”

⁶ Approved by Government Decree of the Kyrgyz Republic No. 129 of 18 March 2015.

⁷ For more information, see Government of the Kyrgyz Republic (2019).

⁸ According to the latest information, however, this program has not been approved.

representatives. Therefore, the issues hindering SME development can be briefly summarized as follows:

- Institutional inefficiency related to poor law enforcement and regulatory burden.
- Limited access to financial resources for SMEs. Interest rates are high and SMEs have very limited opportunity to attract long-term cheap financial resources.⁹
- Lack of infrastructure. The geographic location of the Kyrgyz Republic necessitates the availability of corresponding infrastructure that creates conditions for the development of the private sector. The development of transportation corridors with alternative transportation modes is an important policy direction. In particular, recently debated government policies on trade logistic centers and certification are important for expanding the exporting potential of local producers (Hasanova 2019).
- Ineffective tax administration and patent system that do not create incentives for micro-SMEs to transform into small and medium-sized enterprises.
- Shortage of skilled labor force and a lack of skills among entrepreneurs.

8.3 Literature Review

The engagement of the majority of enterprises in developing countries in GVCs can be characterized by the export of primary goods or goods with a low level of processing (Pietrobelli 2008). One of the important challenges for local producers in a developing country context is that increasing participation in GVCs is a difficult task given the social and economic conditions in these countries. For most firms, the main market for which are local and national markets only, access to international markets is limited. Although increasing export and participation in GVCs of firms are different concepts, they are closely interrelated, and increasing the export potential can be considered important for SMEs in increasing their participation in GVCs. Therefore, from the standpoint of firm behavior, it is important to examine which factors affect engagement in international markets and increase the exports of SMEs. Under the assumption that increasing exports and participation in international markets are associated with higher value chain participation, understanding these determinants may provide evidence

⁹ See, for instance, “*The Times of Central Asia*.”

for identification of basic factors that are important for the participation of firms in GVCs.

Earlier literature on export performance notes external and internal factors (Aaby and Slater 1989). The former includes social and political conditions, while internal characteristics mainly consist of firm size, experience in exporting activities, and managerial characteristics (Baldauf, Cravens and Wagner 2000). Firm size is expected to make a positive contribution to export performance (Singh 2009). A firm's experience is noted to have a positive impact on the engagement of firms in international markets (Brouthers and Nakos 2005). However, some empirical studies argue that a firm's experience does not necessarily have a positive effect on export. On the contrary, younger firms facing cost disadvantages and obstacles to accessing resources in the national market compared to firms with longer experience may look for opportunities in international markets (Kirpalani and Macintosh 1980; Cooper and Kleinschmidt 1985). Some empirical studies assert that experience is not a prerequisite for a firm to be successful in regional or global export markets (D'Angelo et al. 2013). Along with these firm characteristics, the innovation activity of firms has been found to be an important determinant of their competitive advantage in international markets and, therefore, export performance (Basile 2001; Golovko and Valentini 2011).

The importance of internal factors is explored within the resource-based view on the determinants of export performance. According to this view, a higher export performance of a firm can be explained by acquiring and exploiting the unique resources of the firm (Andersen and Kheam 1998; Dhanaraj and Beamish 2003). However, taking into consideration conditions in the emerging economies, Singh (2009) notes that the resource-based view is limited in explaining the exporting behavior of firms in emerging economies. Because they operate in different environments with scarce resources, other factors such as business group affiliation can be important.

Therefore, following empirical literature, general firm level and other environmental factors may condition the export performance of firms, although different environmental characteristics in developing countries may result in other factors being relatively important. However, a review of recent literature shows that there are no systematic empirical studies on SMEs and their participation in global value chains in the case of the Kyrgyz Republic. A few studies focus on innovation activity and a general description of GVC participation (see, e.g., Karymshakov, Sulaimanova, and Aseinov 2019; Tilekeyev 2019). In light of this gap in the literature, the main objective of this study is to examine factors affecting the export performance of SMEs in the Kyrgyz Republic.

8.4 Data and Methodology

8.4.1 Data Source

This study is based on the data from the Enterprise Survey supported by the European Bank for Reconstruction and Development, the European Investment Bank, and the World Bank Group. The survey includes questions about enterprises' organizational information, production, sales, obstacles, and innovation activities. In this study, two waves of the survey are used: 2013 and 2019. The former was implemented within the fifth wave of the Business Environment and Enterprise Performance Survey and included 270 enterprises. The latter wave was collected in the Kyrgyz Republic between December 2018 and July 2019 and included 360 enterprises. Out of the total sample, 115 enterprises are observed in both waves. For the purpose of measuring the involvement of firms in GVCs, firms' characteristics should be taken into account. SMEs in the service sector are primarily focused on local consumers. Moreover, the participation of firms in services in international trade is different to that of firms in manufacturing industries. For instance, a trading company that is classified in services is engaged in trading products that are produced by manufacturers, not by the trading company. Therefore, most empirical papers on GVC participation mainly focus on the manufacturing sector (Urata and Baek 2020). Following this argument, in this study the data set is limited to manufacturing industries.

Detailed analysis of GVC participation necessitates analysis of firms that engage both in importing inputs and exporting goods. However, in the final sample of the data set used in this study, only 30 observations are indicated with both import and export information. Taking into consideration this small number, the empirical analysis in this study is based on the exporting status of firms. Therefore, it is assumed that firms' export increases their participation in value chains.

After data analysis and cleaning out missing values for some variables, the total final sample consists of 194 observations, of which 83 are from the 2013 wave and 111 from the 2019 wave. This can be seen as a relatively small sample size and, indeed, can be interpreted as a potential limitation of this study. However, this survey is the only available data set containing detailed information at firm level. Therefore, using this data set to understand the export performance of firms in the Kyrgyz Republic context is important.

For estimation purposes, firms will be classified by their size. The firm size criteria used in this study follow definitions given in the survey. Thus, the small firm category includes micro-firms with fewer than five

employees, small firms with between 5 and 19, medium-sized enterprises with 20 to 99, and large firms with more than 100.

8.4.2 Methodology

The main objective of this study is to examine factors that have an impact on the activity of firms in local and national or international markets. The analysis is based on data from the 2013 and 2019 waves of the Enterprise Survey.

The survey questionnaire includes questions related to the export activity of firms, in particular about shares of sales to national markets, indirect export, and direct export. These questions help us to understand the extent to which SMEs engage in international markets. From the perspective of value chains, it is assumed that selling products to international markets demonstrates higher value for producers and indicates a growing tendency of enterprises. Thus, our first outcome variable is the dummy variable that equals 1 if an enterprise exports (both directly and indirectly) and takes the value of 0 if it sells in national markets only.

Because of the dummy variable characteristic of the dependent variable we use a binary response probit model. Formally, the model is given as follows (Wooldridge 2009):

$$P(y_i = 1|x_i) = G(\beta_0 + \beta_1x_1 + \dots + \beta_kx_k) = G(\beta_0 + x\beta) \quad (1)$$

$$G(z) = \Phi(z) \equiv \int_{-\infty}^z \phi(v)dv \quad (2)$$

$$\phi(z) = (2\pi)^{-1/2}\exp(-z^2/2), \quad (3)$$

where G is the standard normal cumulative distribution function (cdf) and $\phi(z)$ indicates standard normal density, y_i is the discrete dependent variable, taking values of 0 or 1, indicating whether a firm exports or not, and x_i is the set of explanatory variables.

The second outcome variable is the share of exports in the total sales of a firm, values of which range from 0 to 100. To analyze determinants of sales in each of these options, the tobit model is applied (Wooldridge 2010):

$$z = w\delta + u, \quad (4)$$

where z is the dependent variable indicating the share of export sales. In terms of export, both indirect export and direct export sales are taken into account. w is a vector of exogenous variables.

A detailed description of the variables is given in Table 8.2. Following the earlier literature on export performance and firm growth, the set of covariates used in the analysis covers managerial characteristics such as years of experience and gender of the top manager.

Another group of explanatory variables is firm characteristics that reflect location and years since establishment. Because of the regional disparity in the emerging country development context and insufficient infrastructure for transport and communication, firms located in large cities may have advantages in selling their product throughout the country. In order to encompass this potential effect, a dummy variable of whether the firm is located in a large city is used. Large cities are defined as those with a population of over 1 million. Years since establishment is included following the earlier literature indicating a possible negative effect on export performance (Kirpalani and Macintosh 1980; Cooper and Kleinschmidt 1985). Indeed, the net effect of firm experience is ambiguous, because firms with more years of experience can be expected to be successful in exporting, but this positive performance may diminish over time given the new challenges in international markets.

The organizational structure of firms may have an important impact on their performance. Hence, a variable indicating the participation of foreign capital in the ownership structure is included among the factors. One of the important aspects of local producers being involved in exporting activities is the accordance with quality standards required for international trade. Indeed, given the attempt of the Kyrgyz government to successfully integrate into the regional economy and increase export volume quality control and assurance it is considered an important policy direction (UNECE 2015). Following this, a dummy variable indicating whether firms have internationally recognized quality certification is used among the explanatory variables.

The empirical literature emphasizes that labor productivity is an important determinant of a firm's engagement in GVCs (Urata and Baek 2020). Labor productivity may be expected to have a positive impact on the export of firms. Thus, labor productivity is used in the set of explanatory variables and measured through sales divided by the number of employees.

External factors have an important influence on the performance of firms. Although different external factors may have a considerable impact, bearing in mind the focus of this study—manufacturing industries and recent reports on private sector development—two potential determinants can be mentioned: access to electricity and the availability of financial resources. In particular, increasing production of manufacturing industries is accompanied by higher electricity consumption. Because of this, responses to the question “How much of an obstacle is electricity to operations of this establishment?” is used

to approximate access to electricity. Also, the total number of open lines of credit and outstanding loans is used to indicate the position of enterprises in terms of the availability of financial resources.

Generally, the performance of enterprises varies by sector of the economy. The growth dynamics and export performance of enterprises may depend on the technology level required for production. It may take a longer time and more resources for firms operating in industries with a high technology level to expand to the national and international level, while it can be less costly for firms in less capital-intensive industries with a low technology level to expand to new markets. We follow the classification of industries by EUROSTAT used by Grodzicki (2014) and use different categories for sectors with a low technology level and those with a medium or high technology level.

Along with the fact that these characteristics can be considered important determinants of the export performance of enterprises, the magnitude of these effects may vary by firm size. Therefore, estimations are performed for the total sample consisting of two waves of the survey and for each wave of the survey distinctively. As mentioned, given the focus of this chapter on manufacturing industries, one of the potential limitations of this study is the relatively small sample size. The number of observations may not be enough for understanding the underlying characteristics and differences of SMEs and large firms in their export performance. Taking into consideration this potential issue, each sample is estimated by its total size (model 1), model 1 is extended with the inclusion of the dummy variable of whether the firm is an SME (model 2), and model 3 represents estimations of the SME subsample only.

Table 8.2: Description of Variables

Dependent variable	
Export	0 – firm does not have export sales, 1 – firm has export sales
Share of export	Share of export in total sales
Explanatory variables	
Manager characteristics	
Gender	0 – manager is male, 1 – manager is female
Experience	The years of experience of the top manager in the sector
Firm characteristics	
Years since establishment	Years since establishment of the firm

continued on next page

Table 8.2 *continued*

Explanatory variables	
Foreign capital participation in the ownership structure	Firm has private foreign individuals or companies as owner (0 – no, 1 – yes)
Quality certificate	Does establishment have an internationally recognized quality certification? (0 – no, 1 – yes)
Number of credit lines	Total number of open lines of credit and outstanding loans
Access to electricity	How much of an obstacle is electricity to operations of this establishment? 0 – no obstacle; 1 – minor obstacle; 2 – moderate obstacle; 3 – major obstacle; 4 – very severe obstacle
Innovation in process	During the last three years, has this establishment introduced any new or significantly improved methods for the production or supply of products or services? (0 – no, 1 – yes)
Labor productivity	Productivity of labor as the ratio of sales to number of employees
Manufacturing industries with medium and high technology levels	Firm operates in industry with medium and high technology level following EUROSTAT classification (Grodzicki 2014) (0 – no, 1 – yes). These sectors are chemicals, rubber, plastics, fuel, basic metals and fabricated metal, machinery, electrical and optical equipment, transport equipment
Large city	Firm is located in a city with a population of over 1 million (0 – no, 1 – yes)
SME	Firm is small or medium sized (0 – no, 1 – yes)

SME = small and medium-sized enterprise.

Source: Enterprise Surveys. <https://www.enterprisesurveys.org/en/data>.

One may argue that the availability of two waves of the survey would make it suitable for panel data estimations. However, the number of observations with available variables valid for both years of the survey is very limited. Therefore, empirical estimations are focused on cross-sectional estimation techniques.

8.4.3 Descriptive Statistics

Descriptive statistics of variables used in the estimation are given in Table 8.3. The distribution of the estimation samples by exporting status shows that most companies sell their product in national markets, and only 31.44% of firms based on pooled data (total of 2013 and 2019 survey data) have export activities. It should be noted that this share increased from 27.71% in 2013 to 34.23% in 2019. This share is lower

for SMEs and accounts for 23.53% in terms of the pooled data. From these data it can be argued that, compared to large firms, SMEs have a relatively lower engagement in international markets. Another indicator of firms’ engagement in international markets in this research is the

Table 8.3: Descriptive Statistics

	Total (2013 and 2019 Waves)		2013 Wave		2019 Wave	
	Total Sample	SMEs	Total Sample	SMEs	Total Sample	SMEs
Observation	194	153	83	71	111	82
Dependent variable						
Export (1 = firm is exporting, 0 = no; in %)	31.44	23.53	27.71	23.94	34.23	23.17
Share of export sales (% of total sales, mean)	15.05	10.74	13.49	11.54	16.22	10.03
Firm and manager characteristics	Mean	Mean	Mean	Mean	Mean	Mean
Experience of the manager	18.43	17.65	18.41	18.24	18.44	17.13
Years since establishment	23.60	20.73	20.61	20.49	25.84	20.94
Number of credit lines	0.39	0.32	0.20	0.17	0.53	0.45
Access to electricity	1.42	1.44	1.34	1.35	1.48	1.52
Labor productivity	899,340.6	823,319.8	848,024.2	804,004.0	937,712.3	840,044.4
	%	%	%	%	%	%
Female manager	23.20	23.53	21.69	21.13	24.32	25.61
Foreign participation	19.07	18.30	19.28	19.72	18.92	17.07
Certificate	24.74	18.95	26.51	22.54	23.42	15.85
Innovation in process	38.14	36.60	38.55	35.21	37.84	37.80
Manufacturing industries with medium and high technology level	40.72	40.52	38.55	39.44	42.34	41.46
Location in large city	34.54	33.99	43.37	42.25	27.93	26.83
SME	78.87		85.54		73.87	

SMEs = small and medium-sized enterprises.
Source: Enterprise Surveys. <https://www.enterprisesurveys.org/en/data>.

share of exports in the total sales of firms. Generally, about 85% of sales of pooled data belong to national markets. The share of export in total sales showed an increasing trend from 13.49% in 2013 to 16.22% in 2019. In both years of the survey, SMEs have a lower share of export sales compared to the total sample.

In terms of managerial characteristics, female managers account for about 23%. The SME subsample shows almost the same share of female managers as in the total sample in both waves of the survey. In terms of years of experience, pooled data statistics indicate that managers have 18.43 years of experience. However, in both years of the survey, managers of SMEs have slightly less experience than managers in the total sample, although the difference between the total sample and SMEs is not large. In almost all samples, managers have experience in the range of 17–18 years.

As regards firms' establishment history, firms in pooled data are 23.6 years old on average. It can be stated that, on average, SMEs are younger. Based on the pooled data, SMEs have been established for 20 years, while it is about 23.6 years for the total sample. This difference is much larger in the 2019 survey data: The total sample has been established for 25 years, while it is 20.9 years for SMEs—a difference of more than 4 years. Based on these statistics, large firms appear to have a longer history of establishment. To some extent, this can be explained by the post-Soviet background of the Kyrgyz Republic, which had a long social and economic transition period after 1990. Therefore, the emergence of the private sector along with the transition policies took place in the 1990s. Most large firms have roots in old state-owned enterprises that were reorganized into large firms with private sector participation after privatization processes, while small firms mostly emerged through the creation of entrepreneurial skills and population activities at later stages of the transition period.

The participation of foreign capital in the ownership structure of firms is one of the important determinants of entrepreneurs' performance. In general, foreign participation in the ownership of firms according to pooled data accounts for 19.07%. According to the total sample data, this share does not vary significantly over the survey years. From 2013 to 2019, foreign participation slightly decreased for both samples. Thus, this share for the total sample was 19.28% in 2013 and accounted for 18.92% in 2019. Also, according to 2019 data, the share of foreign participation among SMEs decreased to 17.07% from 19.72% in 2013.

The number of credit lines used to approximate the availability of financial resources shows that, generally, SMEs have a lower number of credit lines. In terms of the other variables related to firm characteristics, there is no large difference by survey waves and sample types. Process

innovation by firms does not demonstrate large variation by survey years and is in the range of 35%–38%. SMEs have a slightly lower share of innovation activity than in the total sample. Analogously, location in large cities does not indicate significant differences, although in 2013, the survey data share of firms located in large cities was relatively higher.

8.5 Estimation Results

Marginal effects from the probit model estimation results are presented in Table 8.4. Results are presented for pooled data and by survey waves (2013 and 2019), with each being estimated based on the total

Table 8.4: Estimation Results for Probit Models on Probability of Exporting (Marginal Effects)

	Total (2013 and 2019 Waves)			2013 Wave		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Gender of CEO (1 = if female)	–0.0495 (0.0736)	–0.0459 (0.0718)	–0.140* (0.0811)	–0.131 (0.124)	–0.138 (0.119)	–0.232* (0.132)
Experience of CEO (in years)	0.00189 (0.00239)	0.00191 (0.00230)	0.00227 (0.00262)	0.00259 (0.00340)	0.00232 (0.00331)	0.00386 (0.00360)
Years since establishment	0.00260 (0.00198)	0.000677 (0.00210)	–0.00427 (0.00352)	–0.00889 (0.00777)	–0.00969 (0.00765)	–0.00925 (0.00795)
Foreign capital participation in the ownership structure	0.155** (0.0730)	0.136* (0.0716)	0.0963 (0.0781)	0.147 (0.117)	0.153 (0.115)	0.0883 (0.117)
Certificate for export	0.275*** (0.0609)	0.230*** (0.0631)	0.183** (0.0719)	0.160 (0.105)	0.130 (0.106)	0.0815 (0.113)
Number of credit lines	0.0995** (0.0438)	0.0718* (0.0430)	0.0796 (0.0578)	0.0855 (0.111)	0.0490 (0.109)	0.0567 (0.118)
Access to electricity	0.0281 (0.0192)	0.0301 (0.0187)	0.0295 (0.0202)	0.0144 (0.0321)	0.0154 (0.0313)	0.0312 (0.0335)
Innovation in process	–0.0794 (0.0673)	–0.0815 (0.0652)	–0.0308 (0.0716)	–0.0459 (0.111)	–0.0657 (0.109)	0.00613 (0.115)
Labor productivity	3.35e–08 (2.07e–08)	2.90e–08 (2.04e–08)	1.83e–08 (2.09e–08)	–3.42e–09 (3.96e–08)	–5.62e–09 (4.10e–08)	–7.12e–09 (3.53e–08)
Manufacturing industries with medium and high technology level	–0.0589 (0.0644)	–0.0680 (0.0633)	–0.143** (0.0696)	–0.0635 (0.101)	–0.0752 (0.100)	–0.203* (0.105)
Large city	–0.0377 (0.0673)	–0.0404 (0.0662)	–0.0462 (0.0744)	–0.0931 (0.106)	–0.0911 (0.104)	–0.0720 (0.111)

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Table 8.4 *continued*

	Total (2013 and 2019 Waves)			2013 Wave		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
SME		−0.206*** (0.0708)			−0.216* (0.122)	
2019 year	0.0113 (0.0637)	−0.00223 (0.0623)	−0.0277 (0.0659)			
Observations	194	194	153	83	83	71
	2019 Wave					
	Model 1	Model 2	Model 3			
Gender of CEO (1 = if female)	−0.00457 (0.0889)	0.00697 (0.0880)	−0.0580 (0.102)			
Experience of CEO (in years)	0.00157 (0.00324)	0.00181 (0.00308)	−0.00212 (0.00394)			
Years since establishment	0.00337* (0.00201)	0.00158 (0.00220)	0.000607 (0.00319)			
Foreign capital participation in the ownership structure	0.137 (0.0922)	0.107 (0.0909)	0.120 (0.101)			
Certificate for export	0.375*** (0.0723)	0.325*** (0.0762)	0.302*** (0.0885)			
Number of credit lines	0.0873** (0.0443)	0.0629 (0.0437)	0.0711 (0.0719)			
Access to electricity	0.0254 (0.0240)	0.0267 (0.0232)	0.0176 (0.0261)			
Innovation in process	−0.1000 (0.0846)	−0.0917 (0.0814)	−0.0442 (0.0913)			
Labor productivity	6.84e−08** (3.01e−08)	5.96e−08** (2.95e−08)	4.33e−08 (3.44e−08)			
Manufacturing industries with medium and high technology level	−0.0334 (0.0803)	−0.0374 (0.0774)	−0.0958 (0.0898)			
Large city	0.00481 (0.0850)	0.00664 (0.0846)	−0.0312 (0.0956)			
SME		−0.166** (0.0829)				
2019 year						
Observations	111	111	82			

CEO = chief executive officer, SME = small and medium-sized enterprise.
 Standard errors in parentheses. * p < 0.05, ** p < 0.01, *** p < 0.001.
 Source: Author’s calculations, based on Enterprise Surveys. <https://www.enterprisesurveys.org/en/data>.

sample (model 1 and model 2) and SMEs (model 3) only. Total sample estimations are performed with and without the inclusion of the SME dummy variable. The dependent variable in these estimations is the dummy variable indicating whether a firm exports goods or not.

Empirical findings indicate that generally managerial characteristics do not have a significant impact on the exporting status of firms. Only the results of the SME subsample in pooled data, and 2013 data show that SME firms with a male manager have a higher probability of exporting than those with a female manager.

Foreign participation in the ownership structure of firms has a positive effect on their involvement in international markets. This finding is confirmed only in two waves of pooled data estimations. It shows a positive impact on estimations when SMEs are controlled too. These results indicate that foreign capital is an important determinant of firms' export performance. Having foreign capital participation in the ownership structure of a firm increases the probability of firms selling products in international markets by approximately 15 percentage points.

Having a certificate of quality significantly increases the probability of exporting. This strong positive effect exists both in total sample and SME subsample estimations, especially in 2019 survey data. These findings support the argument that a fundamental policy goal is to increase the capacity of SMEs and support their attempt to implement certification procedures. Given the current integration process within the EEU and attempts to increase export volume, correspondence with quality control and assurance is an important determinant for export.

The number of credit lines has a statistically significant impact in the case of the total sample of two waves and 2019 wave estimations only, though this is not valid when controlled for SMEs. This may be related to the small sample size. However, from the standpoint of total sample results, this finding to some extent confirms the argument that the availability of financial resources is an important determinant for export performance.

Labor productivity has the expected positive sign, but statistically significant effects are observed only in 2019 survey data estimations. This limited evidence may be related to the small sample size. Nevertheless, based on these findings, it can be argued that labor productivity increases the probability of firms exporting goods.

Other explanatory variables (access to electricity, innovation of firms, and location in a large city) do not have a statistically significant effect on the exporting status of firms. This can probably be for a few reasons. First, the sample size used for estimations may be limited in terms of reflecting this information. Second, the low level of occurrence

of some activities, such as the possible low intensity of innovation among firms, may produce significant results.

Manufacturing industries with a medium or high technology level indicate a negative effect compared to industries with a low technology level, which is significant for SMEs in pooled data and 2013 wave estimations. This finding may be related to the fact that for SMEs, the adoption of new technology for production in these industries is relatively costly, given the financial and other constraints they usually face in a developing country context. Moreover, the competitive environment in industries with a high technology level in international markets can be strong. Because of this, SMEs in sectors of the economy that necessitate the use of a medium or high level of technology may demonstrate lower engagement in international markets. Conversely, those sectors with a low technology level may be more convenient for SMEs' engagement and for increasing their exporting potential.

The inclusion of the SME dummy variable as given in model 2 shows a statistically significant negative impact. This implies that compared to large firms, SMEs have a lower probability of exporting. This is expected given the general lower tendency of SMEs to engage in the export of goods. Moreover, in manufacturing industries, larger firms have better prospects for expanding production.

Estimation results from the tobit model on shares of export sales are given in Table 8.5. Generally, estimation results are in line with the probit model on the exporter status. Gender of the manager and years since firm establishment show a negative impact on increasing the share of export in total sales. Putting it differently, firms with a male manager have a higher probability of having a higher share of export sales than those with a female manager. Also, firms that have been established for longer demonstrate a lower probability of increasing their share of export sales. This latter finding to some extent supports previous arguments that firm experience may have been negatively associated with export performance. This may be explained by the possible impact of those manufacturing firms that have a longer history of establishment originating since the beginning of the transition period in the Kyrgyz Republic but currently do not demonstrate a competitive position in international markets.

The SME dummy has a strong negative sign, suggesting that SMEs demonstrate a lower probability than large firms in the level of export engagement. Innovation in process demonstrates a statistically significant negative impact in results of total sample estimations. This can be explained by the fact that, while being costly for firms, the impact of innovation may provide returns at least in the medium term, but not immediately. Also, labor productivity does not show a

**Table 8.5: Estimation Results for Tobit Models
on Share of Exports in Total Sales (Marginal Effects)**

	Total (2013 and 2019 Waves)			2013 Wave		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Gender of CEO (1 = if female)	−4.066 (4.258)	−3.935 (3.935)	−9.219** (4.436)	−7.140 (8.051)	−7.455 (7.331)	−11.347 (7.810)
Experience of CEO (in years)	0.092 (0.122)	0.104 (0.119)	0.172 (0.141)	0.096 (0.203)	0.086 (0.194)	0.199 (0.207)
Years since establishment	0.133 (0.104)	0.006 (0.099)	−0.280* (0.155)	−0.552 (0.414)	−0.587 (0.412)	−0.629 (0.433)
Foreign capital participation in the ownership structure	10.153** (4.037)	9.534*** (3.647)	3.210 (3.734)	9.958 (7.012)	10.029 (6.736)	4.660 (7.037)
Quality certificate	12.077*** (3.277)	9.398*** (3.354)	7.277* (3.732)	9.011 (5.811)	7.000 (5.922)	4.739 (6.084)
Number of credit lines	3.847** (1.640)	2.805* (1.531)	2.329 (1.515)	1.796 (5.606)	−0.018 (5.390)	−1.702 (5.765)
Access to electricity	1.097 (1.039)	1.221 (0.989)	1.040 (1.008)	0.954 (1.881)	0.986 (1.804)	0.778 (1.896)
Innovation in process	−6.662* (3.410)	−6.724** (3.338)	−2.858 (3.336)	−4.377 (5.297)	−4.995 (5.065)	−2.154 (5.212)
Labor productivity	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	−0.000 (0.000)	−0.000 (0.000)	−0.000 (0.000)
Manufacturing industries with medium and high technology level	−2.707 (3.852)	−3.440 (3.671)	−7.477* (4.222)	−1.245 (6.022)	−2.201 (5.589)	−8.922 (5.958)
Large city	−0.511 (3.479)	−0.772 (3.307)	−2.863 (3.519)	−4.509 (5.356)	−4.074 (5.196)	−4.335 (5.314)
SME		12.681*** (3.773)			−12.211** (5.905)	
2019 year	0.088 (3.780)	−0.810 (3.653)	−1.899 (3.631)			
Observations	194	194	153	83	83	71
	2019 Wave					
	Model 1	Model 2	Model 3			
Gender of CEO (1 = if female)	−4.033 (5.402)	−3.295 (5.051)	−8.618 (5.610)			

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Table 8.5 *continued*

	2019 Wave		
	Model 1	Model 2	Model 3
Experience of CEO (in years)	0.103 (0.141)	0.137 (0.137)	0.032 (0.155)
Years since establishment	0.154 (0.119)	0.021 (0.113)	-0.078 (0.132)
Foreign capital participation in the ownership structure	8.813 (5.593)	7.783 (4.967)	4.076 (4.703)
Quality certificate	15.137*** (4.220)	12.498*** (4.484)	10.247** (4.567)
Number of credit lines	3.756** (1.707)	2.943* (1.595)	2.186 (1.437)
Access to electricity	0.609 (1.212)	0.745 (1.170)	0.468 (0.997)
Innovation in process	-6.800 (4.166)	-6.747 (4.102)	-2.533 (3.661)
Labor productivity	0.000* (0.000)	0.000 (0.000)	0.000 (0.000)
Manufacturing industries with medium and high technology level	-2.188 (5.069)	-2.632 (4.920)	-5.896 (5.423)
Large city	2.547 (4.801)	2.195 (4.550)	-0.736 (4.441)
SME		-11.806** (4.944)	
2019 year			
Observations	111	111	82

CEO = chief executive officer, SME = small and medium-sized enterprise.

Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Source: Author's calculations, based on Enterprise Surveys. <https://www.enterprisesurveys.org/en/data>.

strong positive influence. Based on these findings, there is not enough evidence to argue that innovation and labor productivity increase the level of export. Nevertheless, in interpreting empirical results, one should take into consideration the potential issue of the relatively small sample size.

In line with previous results, foreign capital participation and the number of credit lines have a strong positive impact on the share of export sales. In line with probit model results, industries with a medium or higher technology level show a negative sign in the sample of SMEs, though at a lower level of statistical significance and only in the case of pooled data.

8.6 Conclusions

This study aimed to examine factors affecting firms' export in the case of the Kyrgyz Republic. The empirical analysis is based on two waves of the Enterprise Survey (2013 and 2019).

Estimation results indicate that one of the important determinants of export performance of SMEs is correspondence with quality standards reflected by having a certificate of quality. This factor is significant both in terms of being an exporter and the level of export. Also, increasing participation of foreign capital in the ownership of firms is associated with a higher involvement of firms in international markets. The availability of financial resources is found to be positively associated with exporting status and the share of exports.

Increasing the export production and competitiveness of firms in international markets is associated with improvements in labor productivity. This argument is supported by empirical findings, though this is limited to one survey wave only. This finding underlines the importance of measures oriented toward increasing labor productivity for firms' objective of being successful in international markets. Estimation results confirm that industries with a low technology level are more convenient for SME expansion. However, it can also be argued that SMEs do not have enough capability to adopt medium or high technology in their production process, which may lead to concern over the long-term sustainability of their competitiveness in international markets.

Although this study attempted to examine basic determinants of firms in explaining their export performance, the main assumption is that if a firm sells product in international markets, then its participation in value chains is increasing. However, given the limited data, this study does not use detailed information about the participation of firms in stages of production. Further analysis based on detailed information about firm participation in production processes would allow proper discussions on the movement along the value chain. Another potential limitation of this study is its relatively small sample size, given its narrow focus. Therefore, in interpreting empirical results, one should take into

account its special focus on manufacturing firms and the potential issue of sample size.

The findings of this study have several policy implications for increasing participation of firms in GVCs. First, the implementation of quality control and assurance processes for SMEs is an important determinant for their export activities. However, most SMEs may not have enough experience and technology to correspond to these requirements. This may have a serious negative impact on their exporting prospects. Therefore, government policy to provide information about quality requirements, infrastructure to implement these processes, and support with the transfer of new technology that would facilitate correspondence with quality requirements are necessary measures for the medium term. In particular, gaining knowledge about exporting activities (standards and regulations, markets) can be targeted through the SME support programs.

Second, the participation of foreign investment in firms' ownership structure and the availability of financial resources are important for leveraging value chains. Government policy oriented toward attracting foreign investment and improving the general investment climate should be associated with transferring knowledge and skills for local producers in carrying out partnerships with foreign firms. Enhancing access to financial resources for SMEs should be among the priorities of government policy objectives. Given the importance of medium-technology and high-technology-level industries for upgrading to national and international markets, financial services can be specified within these sectors of the economy.

Third, improvements in the capacity of firms to transform with new production technologies with a higher level of participation in product processes should be associated with increasing labor productivity. Here, it is important to support technology transfer with a focus on new production techniques that would allow the increase of labor productivity. Along with this, the development of soft infrastructure for SMEs that would improve the quality of workers would make a positive contribution to labor productivity.

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Appendix

Table A8.1: Estimation Results for Probit Models on Probability of Exporting (Coefficient Estimates)

	Total (2013 and 2019 Waves)			2013 Wave		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Gender of CEO (1 = if female)	−0.173 (0.258)	−0.168 (0.263)	−0.558* (0.329)	−0.435 (0.417)	−0.478 (0.421)	−0.868* (0.519)
Experience of CEO (in years)	0.00660 (0.00837)	0.00699 (0.00844)	0.00906 (0.0105)	0.00861 (0.0114)	0.00803 (0.0116)	0.0144 (0.0137)
Years since establishment	0.00912 (0.00701)	0.00247 (0.00767)	−0.0170 (0.0141)	−0.0296 (0.0264)	−0.0336 (0.0273)	−0.0345 (0.0305)
Foreign capital participation in the ownership structure	0.542** (0.263)	0.496* (0.267)	0.384 (0.316)	0.490 (0.400)	0.531 (0.409)	0.330 (0.440)
Quality certificate	0.964*** (0.243)	0.840*** (0.251)	0.728** (0.303)	0.533 (0.364)	0.451 (0.377)	0.304 (0.425)
Number of credit lines	0.349** (0.159)	0.262 (0.160)	0.317 (0.234)	0.285 (0.372)	0.170 (0.380)	0.212 (0.442)
Access to electricity	0.0983 (0.0683)	0.110 (0.0696)	0.118 (0.0819)	0.0477 (0.107)	0.0535 (0.109)	0.117 (0.127)
Innovation in process	−0.278 (0.238)	−0.298 (0.241)	−0.123 (0.286)	−0.153 (0.370)	−0.228 (0.379)	0.0229 (0.429)
Labor productivity	1.17e−07 (7.36e−08)	1.06e−07 (7.56e−08)	7.29e−08 (8.38e−08)	−1.14e−08 (1.32e−07)	−1.95e−08 (1.42e−07)	−2.66e−08 (1.32e−07)
Manufacturing industries with medium and high technology level	−0.206 (0.227)	−0.248 (0.233)	−0.569** (0.287)	−0.211 (0.339)	−0.261 (0.351)	−0.759* (0.417)
Large city	−0.132 (0.236)	−0.148 (0.242)	−0.184 (0.297)	−0.310 (0.359)	−0.316 (0.364)	−0.269 (0.417)
SME		−0.751*** (0.274)			−0.748* (0.447)	
2019 year	0.0397 (0.223)	−0.00815 (0.228)	−0.110 (0.263)			
Constant	−1.349*** (0.304)	−0.500 (0.433)	−0.666 (0.430)	−0.189 (0.635)	0.626 (0.808)	−0.0983 (0.766)
Observations	194	194	153	83	83	71
Pseudo R2	0.186	0.218	0.181	0.0978	0.126	0.129

Table A8.1 *continued*

	2019 Wave		
	Model 1	Model 2	Model 3
Gender of CEO (1 = if female)	−0.0189 (0.369)	0.0300 (0.380)	−0.284 (0.497)
Experience of CEO (in years)	0.00651 (0.0135)	0.00780 (0.0133)	−0.0104 (0.0194)
Years since establishment	0.0140 (0.00856)	0.00682 (0.00952)	0.00297 (0.0156)
Foreign capital participation in the ownership structure	0.567 (0.389)	0.461 (0.395)	0.585 (0.497)
Quality certificate	1.553*** (0.388)	1.401*** (0.394)	1.476*** (0.509)
Number of credit lines	0.362* (0.192)	0.271 (0.193)	0.348 (0.355)
Access to electricity	0.105 (0.101)	0.115 (0.102)	0.0858 (0.128)
Innovation in process	−0.414 (0.356)	−0.395 (0.357)	−0.216 (0.448)
Labor productivity	2.84e-07** (1.31e-07)	2.57e-07* (1.33e-07)	2.12e-07 (1.71e-07)
Manufacturing industries with medium and high technology level	−0.138 (0.333)	−0.161 (0.335)	−0.468 (0.443)
Large city	0.0199 (0.352)	0.0286 (0.365)	−0.153 (0.467)
SME		−0.716* (0.374)	
2019 year			
Constant	−1.801*** (0.444)	−1.029* (0.593)	−1.169** (0.576)
Observations	111	111	82
Pseudo R2	0.329	0.355	0.319

CEO = chief executive officer, SME = small and medium-sized enterprise.
Standard errors in parentheses. * p < 0.05, ** p < 0.01, *** p < 0.001.
Source: Author’s calculations, based on Enterprise Surveys. <https://www.enterprisesurveys.org/en/data>.

**Table A8.2: Estimation Results for Tobit Models
on Share of Exports in Total Sales (Coefficient Estimates)**

	Total (2013 and 2019 Waves)			2013 Wave		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Gender of CEO (1 = if female)	-15.28 (16.18)	-14.83 (14.99)	-45.90** (22.51)	-30.09 (34.45)	-31.55 (31.37)	-55.64 (38.73)
Experience of CEO (in years)	0.344 (0.461)	0.392 (0.451)	0.856 (0.711)	0.403 (0.865)	0.365 (0.827)	0.975 (1.026)
Years since establishment	0.500 (0.394)	0.0219 (0.373)	-1.395* (0.779)	-2.325 (1.729)	-2.483 (1.718)	-3.083 (2.102)
Foreign capital participation in the ownership structure	38.15** (15.29)	35.95** (13.85)	15.98 (18.70)	41.97 (30.73)	42.44 (29.90)	22.85 (35.16)
Quality certificate	45.38*** (13.03)	35.43*** (13.15)	36.23* (18.95)	37.98 (24.75)	29.62 (25.27)	23.24 (29.45)
Number of credit lines	14.46** (6.319)	10.57* (5.866)	11.60 (7.788)	7.572 (23.79)	-0.0769 (22.81)	-8.347 (28.26)
Access to electricity	4.121 (3.923)	4.605 (3.749)	5.177 (5.038)	4.019 (7.897)	4.172 (7.574)	3.817 (9.239)
Innovation in process	-25.03* (12.87)	-25.35** (12.70)	-14.23 (16.72)	-18.45 (22.09)	-21.14 (21.32)	-10.56 (25.46)
Labor productivity	5.12e-06 (4.40e-06)	3.95e-06 (4.25e-06)	3.93e-06 (5.59e-06)	-3.68e-06 (6.73e-06)	-4.21e-06 (7.47e-06)	-3.93e-06 (5.66e-06)
Manufacturing industries with medium and high technology level	-10.17 (14.52)	-12.97 (13.88)	-37.23* (21.29)	-5.249 (25.43)	-9.314 (23.65)	-43.75 (29.56)
Large city	-1.920 (13.08)	-2.909 (12.48)	-14.26 (17.47)	-19.00 (22.67)	-17.24 (22.15)	-21.26 (26.20)
SME		-47.81*** (14.46)			-51.67* (26.09)	
2019 year	0.331 (14.21)	-3.050 (13.70)	-9.443 (18.00)			
Constant	-73.55*** (20.39)	-16.89 (24.53)	-32.60 (31.14)	-8.859 (50.34)	46.36 (51.63)	12.38 (57.66)
Observations	194	194	153	83	83	71
Pseudo R-squared	0.0431	0.0546	0.0484	0.0294	0.0392	0.0338

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Table A8.2 continued

	2019 Wave		
	Model 1	Model 2	Model 3
Gender of CEO (1 = if female)	-14.24 (19.28)	-11.63 (17.99)	-44.71 (29.64)
Experience of CEO (in years)	0.365 (0.498)	0.485 (0.487)	0.163 (0.807)
Years since establishment	0.545 (0.425)	0.0756 (0.401)	-0.402 (0.684)
Foreign capital participation in the ownership structure	31.12 (19.56)	27.47 (17.34)	21.15 (24.51)
Quality certificate	53.46*** (16.03)	44.11*** (16.59)	53.16** (24.38)
Number of credit lines	13.26** (6.119)	10.39* (5.703)	11.34 (7.630)
Access to electricity	2.152 (4.300)	2.628 (4.160)	2.426 (5.194)
Innovation in process	-24.02 (14.88)	-23.81 (14.68)	-13.14 (19.13)
Labor productivity	1.02e-05 (6.37e-06)	8.11e-06 (6.41e-06)	1.30e-05 (1.12e-05)
Manufacturing industries with medium and high technology level	-7.728 (18.02)	-9.288 (17.49)	-30.58 (28.70)
Large city	8.996 (16.91)	7.746 (16.05)	-3.817 (23.01)
SME		-41.66** (17.48)	
2019 year			
Constant	-76.81*** (21.46)	-30.00 (28.51)	-56.69 (34.62)
Observations	111	111	82
Pseudo R-squared	0.0668	0.0778	0.0808

CEO = chief executive officer, SME = small and medium-sized enterprise.
Standard errors in parentheses. * p < 0.05, ** p < 0.01, *** p < 0.001.
Source: Author’s calculations, based on Enterprise Surveys. <https://www.enterprisesurveys.org/en/data>.

Global Value Chain Participation and Firms' Innovations: Evidence from SMEs in Viet Nam

Duc Anh Dang and Vuong Anh Dang

9.1 Introduction

For emerging and developing countries, small and medium-sized enterprises (SMEs)¹ account for a large part of employment (WTO 2016). The fragmentation of production has created opportunities for SMEs in developing countries to access global markets as components or service providers, without having to build the entire value chain of a product. Even if they cannot participate directly in global value chains (GVCs), they can benefit from subcontracting to larger firms or foreign companies (Dang 2019). Despite their importance for developing economies, the effects of an economy's engagement with GVCs on SME performances are understudied. Only recently have some studies quantitatively estimated the impacts of engagement with GVCs on employment (e.g., Banga 2016; Jakubik and Kummritz 2017; Shen and Silva 2018). However, the question of how the participation of an economy in GVCs impacts SMEs' innovation has not been explored.

Economic literature has not provided a clear prediction about the effects of the participation of an economy in GVCs through foreign investment on domestic SMEs' innovation. On the one hand, an economy's integration into GVCs may positively affect SMEs' innovation. First, SMEs may have to compete with imported substitution products produced by foreign firms. Second, foreign firms may also compete with

¹ The definition of SMEs in this study is based on the World Bank classification. The World Bank divides firms into three groups: micro, small, and medium scale. Micro-firms have up to 10 employees, small firms have up to 50 employees, and medium-scale firms have up to 300 employees.

SMEs in using inputs such as employees, pushing up market wages, and increasing the production costs of SMEs (Dang 2019). All of these may force SMEs to innovate and technologically upgrade to increase their competitiveness and reduce production costs. Third, SMEs can obtain both technology and management skills when they get involved in GVCs developed by foreign firms (Gyeke-Dako et al. 2017; MacGarvie 2006), which contribute to higher productivity and demand for innovation. On the other hand, because most SMEs may never access GVCs through trading activities or linkages with foreign firms, an increase in GVC participation by an economy may not affect SMEs' innovation decisions.

Viet Nam is an interesting case study for examining the relationship between GVCs and SMEs because of its economic structure, more than 96% of which comprises SMEs (VCCI and USAID 2016). Moreover, Viet Nam has emerged as an Asian manufacturing powerhouse (Nakamura 2016). Participation in GVCs, especially through foreign investment, has enabled Viet Nam to grow and play an important role in the process of structural transformation, contributing to the moving up the ladder of value chains (Hollweg, Smith, and Taglioni 2017). All of these will affect significantly the development and innovation of SMEs.

This study examines the firm-level impacts of Vietnamese participation in GVCs on SMEs, spanning the period between 2007 and 2015. Using the methodology of fixed-effects estimation, this study is the first to estimate the effects of engagement with GVCs, which is proxied by foreign value added in exports, on SMEs' innovation using firm-level data in developing countries. We find that foreign value added in gross exports correlates negatively with SMEs' decision to introduce new products but is positively associated with their decision to improve existing products. These relationships are more profound for firms in industrial zones and nonexporting firms. This implies that the production linkages with lead or foreign firms could be more important to the domestic SMEs' innovation than their direct trading activities. We also consider some potential mechanisms through which foreign value added in exports may affect domestic SMEs' innovation. We find that the foreign value added in exports leads to domestic SMEs achieving higher sales and having more subcontracts, which may help them have more resources to innovate.

However, these correlations may not be causal due to potential biases caused by measurement errors or omitted variables. To address these potential problems, we use the domestic value added of the People's Republic of China (PRC) in gross exports to the world as an instrument for foreign value added in gross exports in Viet Nam. To reaffirm the findings from the instrumental variable (IV) estimation, we implement some tests on the validity of the variable. The results confirm

that foreign value added in exports estimated by the IV approach does have effects on SMEs' innovation.

In terms of contributions to the literature, our chapter provides the first empirical evidence that an economy connecting to the GVC may affect SMEs' innovation in an emerging market economy. This can provide lessons for other developing countries with similar contexts. We also explore how it affects firms differently depending on the size distribution as small and medium-scale firms are regarded as carrying an important momentum for growth and job creation in developing countries.

9.2 Conceptual Framework

For developing countries, SME involvement in the GVC could be either through trading activities or engaging with lead or multinational firms. As SMEs normally find it difficult to trade directly with the global market, their direct and/or indirect production linkages with lead or foreign firms play an important role in improving the domestic SMEs' productivity and demand for innovation.

We briefly discuss why an economy's connection to GVCs through foreign investment could affect SMEs' performance and innovation within an industry. This discussion guides the later empirical framework and analysis.

First, by supplying to local affiliates of foreign firms or lead firms, which in turn supply inputs to multinational enterprises (MNEs), domestic SMEs may have more incentive to improve the quality of their products and services to satisfy a higher requirement from MNEs (Newman et al. 2018). Also, they can innovate through adopting advanced technology or imitating better practices used by foreign firms. These benefits for SMEs depend on the degree to which MNEs transfer knowledge, the sectors, and whether linkages are upstream or downstream (OECD and UNIDO 2019). Similarly, domestic SMEs may make use of the knowledge and expertise of workers previously working for MNEs for improving their productivity (ADB 2015). Görg and Strobl (2005) found that domestic firms where their owners had worked in foreign firms before were more productive than their counterparts without that experience.

The second channel refers to the competition from foreign firms with domestic SMEs for using local resources. Foreign firms not only consume imported intermediate goods but also use local inputs, especially labor, to produce exports. As Sinani and Meyer (2004) indicate, foreign firms may offer higher wages and attract skilled labor from domestic firms. In such cases, foreign firms may exhaust human

resources in local companies. Domestic SMEs, therefore, are forced to replace lost workers through the use of more modern technology.

From another perspective, SMEs may have to compete with products produced by foreign firms that increase pressures on SMEs for innovation. Moreover, as Aitken and Harrison (1999) suggest, domestic firms' market share can decrease with the appearance of large foreign firms. Therefore, less efficient SMEs will exit the market and more efficient and innovative SMEs will survive.

The third channel is that an economy's engagement in the GVC may be complementary to the production structure of SMEs in the sense that it supplements necessary inputs, which may lead to an increase in firms' productivity (and profitability), giving them more resources for their innovation. However, the extent to which SMEs can benefit depends on how they are involved in the GVC. If they cannot access GVCs, the increased participation of the economy in such chains may not affect SMEs' innovation decisions.

9.3 Vietnamese SMEs in Global Value Chains

Viet Nam has been successful in attracting foreign direct investment (FDI). Recently, the share of the FDI sector in Vietnamese exports reached 70%, which has brought huge benefits to Viet Nam in terms of growth and jobs. Moreover, through foreign investments, Viet Nam is engaged in global and Asian supply chains (IMF 2016). However, participation in GVCs has been driven largely by foreign-owned firms. Vietnamese domestic firms have not been successful in gaining benefits from the participation of the economy in GVCs through developing linkages with foreign firms. Most local firms are small and only serve the domestic market. This is represented by low domestic value added and a weak supplier base in Viet Nam (Government of Viet Nam 2019).

One of the things that hinder SMEs from linking and securing business with foreign firms is the shortage of workforce skills. In addition, there are no formal information channels through which to obtain information on FDI sourcing strategies; therefore, potential domestic suppliers who lack business connections are disadvantaged in terms of linkage opportunities. Moreover, most domestic SMEs do not interact directly with global buyers but mainly through lead firms with their headquarters located outside Viet Nam. On the demand side, foreign firms are confronted with a lack of competitive local suppliers who can meet quality standards. There are also information asymmetry and coordination failures in connecting buyers and suppliers, even

though there is motivation for both foreign firms and domestic SMEs to create their linkages (Asya et al. 2017).

Recognizing this challenge, the Vietnamese government has put their effort into setting up a policy framework for supporting industries that aim to upgrade the capabilities and technology of domestic firms to promote their relationships with FDI and allow them to enter foreign markets (Government of Viet Nam 2019). The government has also revised and upgraded its SME policy, such as by issuing the Law on SME Support for strengthening the domestic private sector. At the same time, the government has put in place many programs to encourage investment in improving SME competitiveness, ranging from technological upgrading and innovation to market development, training, and skills as well as financial packages. However, while SME support programs are expected to address the constraints that firms face in Viet Nam, there is a lack of monitoring and evaluation systems to assess the outcomes and impacts of these programs (Asya et al. 2017).

9.4 Empirical Methodology

9.4.1 Data Description

In this section, we describe the main firm variables we use in our analysis and the GVC data we match to the firm surveys.

Innovation Data

The main SMEs' innovation data used in this study come from the 2007–2015 rounds of the Small and Medium Scale Manufacturing Enterprise survey. These surveys are implemented biannually to evaluate the characteristics of the Vietnamese business environment.² The surveys are carried out in 10 provinces: Ho Chi Minh City (HCMC), Ha Noi, Hai Phong, Long An, Ha Tay, Quang Nam, Phu Tho, Nghe An, Khanh Hoa, and Lam Dong. The random sample is stratified by ownership types, including household businesses, private firms, cooperatives, and limited liability and joint-stock enterprises. These surveys include only manufacturing firms with fewer than 300 employees. In total, the panel data cover the micro-information on about 2,500 businesses

² The surveys have been carried out in collaboration between the Central Institute for Economic Management of the Ministry of Planning and Investment of Viet Nam, the Institute of Labor Science and Social Affairs of the Ministry of Labor, Invalids and Social Affairs of Viet Nam, the Development Economics Research Group of the University of Copenhagen, and the United Nations University World Institute for Development Economics Research.

in 22 manufacturing industries, including food products, textiles, basic metals, other nonmetallic products, wearing apparel, and wood processing.

The surveys have a detailed section that includes information about SMEs’ innovation. In our empirical work, we use several proxies to measure whether innovations are implemented by SMEs, such as the application of new technology, improvement of existing products, or the introduction of new products. The questions asked are as follows: Has the firm introduced new product groups? Has the firm introduced new production processes/new technology since the last survey? And, has the firm made any improvements in existing products or changed specification since the last survey? Firms either answer “Yes” or “No.” We construct binary variables that take a value of 0 or 1, where 0 corresponds to “No” and 1 to “Yes.”

Table 9.1 shows a description of SMEs’ innovation. We also provide a summary of the innovations by different types of firms. As indicated in the table, the share of firms introducing new products decreased from 4.8% in

Table 9.1: SMEs’ Innovation Summary

	2007	2009	2011	2013	2015	Average
Firms introduce new products (:=1)	0.048	0.029	0.044	0.007	0.294	0.080
Micro-firms	0.035	0.020	0.038	0.004	0.294	0.077
Small and medium-scale firms	0.080	0.046	0.057	0.014	0.295	0.087
Firms introduce new technology (:=1)	0.157	0.136	0.132	0.066	0.050	0.108
Micro-firms	0.089	0.075	0.084	0.052	0.032	0.066
Small and medium-scale firms	0.318	0.255	0.242	0.101	0.104	0.210
Firms have product improvement (:=1)	0.448	0.407	0.384	0.167	0.133	0.308
Micro-firms	0.375	0.317	0.338	0.131	0.109	0.250
Small and medium-scale firms	0.618	0.582	0.492	0.262	0.206	0.448
Number of observations	2,091	2,508	2,386	2,445	2,134	11,564

SMEs= small and medium-sized enterprises.
Note: Mean values. Micro-firms have up to 10 employees.
Source: Authors’ calculations from the Viet Nam Small and Medium Enterprise Survey 2007–2015.

2007 to 0.7% in 2013 and increased sharply to 29.4% in 2015. Such a sharp increase could be due to the establishment of the National Technology Innovation Fund in 2014 or the Viet Nam Inclusive Innovation Project in 2013 to improve the technological and innovative capacity of SMEs by helping them develop and acquire new technology and innovations (CIEM et al. 2016). During the same period, SMEs decreased their investment in technological improvement. The proportion of enterprises adopting new technologies declined by 10.7 percentage points between 2007 and 2015, from 15.7% in 2007 to 5% in 2015. The decrease in the adoption of new technology was mainly due to a decline in the adoption rates of small and medium-scale firms. The proportion of firms investing in product improvement also fell in the same period, from 44.8% in 2007 to 13.3% in 2015, mainly because of a decline among small and medium-scale firms.

Global Value Chain Data

We use foreign value added in gross exports as proxies for Viet Nam’s integration into GVCs. The Trade in Value Added (TiVA) database updated by the Organisation for Economic Co-operation and Development and the World Trade Organization in 2018 provides the source for those data from 2005 to 2016.³ In TiVA, the foreign value added in gross exports reflects the foreign value added content of intermediate imports embodied in gross exports (which is other countries’ domestic value added in intermediates used in exports). This measure is suitable for studying countries whose manufacturing sectors are based on imported parts and components or active in downstream activities in the chain (Pahl and Timmer 2019).

Using concordance matrices, we match data collected from TiVA with the SME surveys in 2007–2015 for 16 manufacturing industries and then use them to analyze the effects of increasing GVC participation of Viet Nam’s economy on SMEs’ innovation across all sectors.

Table 9.2 shows the pattern of foreign value-added exports in the manufacturing sector. As can be seen, the share of foreign value-added exports is about 45% and remained almost unchanged in 2007–2015. The sectors with the largest source of foreign value-added exports are fabricated metal products and machinery and equipment. The figures show the highest growth in the share of foreign value-added exports in the machinery equipment sector, from 51% in 2007 to 59% in 2015;

³ There are some limitations in the TiVA data sets. As Nenci (2014) points out, because of the high level of sector aggregation, the results may be interpreted wrongly if not complemented by additional evidence (Sturgeon 2015). However, it is the best available data set that we have so far.

and a decline in the share of basic metal, from 54% in 2007 to 47% in 2015. The share of foreign value-added exports in the textiles, wearing apparel, and leather products sector increased from 42% in 2007 to 46% in 2013 and decreased to 45% in 2015. This shows the volatility in the domestic value content of Vietnamese exports in these sectors. However, in general, although the manufacturing sector accounts for a large share of exports, there is no improvement of domestic value-added contributions to the value added of exports over time.

Table 9.2: Foreign Value Added in Exports by Sectors

	2007	2009	2011	2013	2015	Average
All	0.45	0.47	0.45	0.44	0.45	0.45
Agriculture	0.30	0.34	0.31	0.29	0.31	0.32
Food products, beverages, and tobacco	0.36	0.39	0.37	0.33	0.37	0.36
Textiles, wearing apparel, and leather products	0.42	0.43	0.44	0.46	0.45	0.44
Wood and wood products	0.48	0.49	0.47	0.54	0.48	0.49
Paper products and printing	0.45	0.47	0.45	0.43	0.45	0.45
Chemicals	0.48	0.51	0.45	0.43	0.45	0.46
Rubber and plastics	0.51	0.54	0.53	0.50	0.53	0.52
Other nonmetallic mineral products	0.36	0.39	0.36	0.29	0.34	0.35
Basic metals	0.54	0.57	0.51	0.51	0.47	0.52
Fabricated metal products	0.58	0.63	0.58	0.56	0.58	0.59
Machinery and equipment	0.51	0.54	0.53	0.58	0.59	0.55
Motor vehicles	0.51	0.55	0.52	0.47	0.53	0.52
Other transport	0.53	0.59	0.55	0.47	0.55	0.53
Other manufacturing	0.48	0.51	0.49	0.43	0.48	0.48
Recycling	0.20	0.30	0.22	0.23	0.22	0.23
Services	0.28	0.30	0.27	0.26	0.27	0.28
Number of observations	2,091	2,508	2,386	2,445	2,134	11,564

Source: Authors' calculations from the Organisation for Economic Co-operation and Development–World Trade Organization, Trade in Value Added (TiVA) database. <https://www.oecd.org/sti/ind/measuring-trade-in-value-added.htm> (accessed 1 December 2019) and Viet Nam Small and Medium Enterprise Survey 2007–2015.

9.4.2 Empirical Model

Our empirical model is represented by the following econometric specification:

$$y_{ijt} = \alpha + \beta FVA_{jt-1} + X'_{ijt}\Gamma + \lambda_i + \theta_t + \varepsilon_{ijt} \quad (1)$$

where y_{ijt} is the firm-level innovations of firm i in industry j at time t , and FVA_{jt-1} is the foreign value added in gross exports in industry j at time $t-1$. β is the coefficient of our interest that shows the correlation between foreign value added in gross exports and SMEs' innovations. The main variable is lagged by one period to reduce potential simultaneity biases. Also, it reflects the possibility that SMEs' innovations may not respond instantly to GVC participation. The term X is a vector of other firm characteristics, which include firm employment, firm age, industrial zone dummy, and dummies for SME ownership (which are private firms, firms with state capital, and firms with foreign capital). λ_i and θ_t are firm and year dummy fixed effects, where year dummies capture time-specific factors that are common to all firms, while firm dummies control for firm-specific characteristics. Standard errors are clustered by industry levels. Also, we use linear probability models to avoid the incidental parameter problem.

A challenge in estimating equation (1) comes from potential endogeneity between outcome variables and the foreign value added in exports variable. The first source of this endogeneity could be due to omitted variable biases. It is possible that unobserved characteristics of firms, which are correlated with the foreign value added in exports variable, affect a firm's innovation.

Using firm-level fixed effect estimation will get rid of the time-invariant characteristics of firms that act as confounding factors in our analysis. In addition, by incorporating a vector of other firm characteristic variables, we may reduce the possibility that our coefficient of interest is contaminated by the influence of other time-varying variables on firms' innovation. Of course, some omitted variable biases remain.

Another possible source of endogeneity is measurement error. Our main variable of interest is at the industrial level, and our dependent variable is at the firm level. From a firm's perspective, the foreign value added in exports measure is an aggregation of imports into sectors, including those without direct relevance to the firm. This all means that the main variable is measured with error, and this error will be embodied in the error term leading to a downward bias in the ordinary least squares (OLS) estimates.

Instrumental Variable Strategy

To address concerns of potential biases, we instrument for the level of foreign value added in industrial exports using the PRC domestic value added in gross exports. The PRC is the main trading partner of Viet Nam, and Viet Nam imports a substantial amount of intermediate and capital goods from the PRC. At the same time, Viet Nam's exports also have to compete with exports from the PRC, especially with low-skilled products in the world market. This measure, therefore, is expected to be correlated with the level of imports into that sector in Viet Nam as it will pick up the general trend in the export of these goods to the world. Moreover, it is less likely to have direct impacts on Vietnamese firm innovation. Our first-stage specification is as follows:

$$FVA_{jt} = \omega + \delta DVA_{jt}^{China} + X'_{ijt}\pi + \mu_i + \sigma_t + \epsilon_{ijt} \quad (2)$$

where the variable DVA_{jt}^{China} is the PRC domestic value added in gross exports of industry j and year t . X is a vector of the same variables in equation (1) such as firm employment, firm age, an industrial zone dummy, and dummies for firm ownership (which are private firms, firms with state capital, and firms with foreign capital). We also control for firm and year fixed effects, so the specification captures firm characteristics and common global time trends that affect all countries in the region.

Moreover, to reduce the possibility that estimates are influenced by the exit and entry of firms rather than within-firm variations, we restrict the sample to those firms that are present at least twice in this period.

9.5 Empirical Results

We first present the OLS results as a benchmark. In Table 9.3, we report an OLS regression with the different SMEs' innovation outcomes as the dependent variables. The main independent variable is foreign value added as a share of exports. All models include time dummies. To deal with potential contamination of the models by unobservable firm characteristics that may correlate with both foreign value-added variable and innovation outcomes, we use fixed effects estimation to account for potential time-invariant firm-specific omitted variables that may bias our results.

The results in column (1) show that a higher foreign value added as a share of exports is associated with a lower probability of SMEs introducing new products. However, it increases the probability of firms improving existing products as shown in column (2). We find no evidence that a firm's introduction to new technology is associated with

Table 9.3: Foreign Value Added in Exports and SMEs’ Innovation
(ordinary least squares estimates)

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Firms Introduce New Products	Firms Improve Existing Products	Firms Introduce New Technology	Firms Introduce New Products	Firms Improve Existing Products	Firms Introduce New Technology
Foreign value added as a share of exports	−0.388*** (0.100)	0.584*** (0.099)	0.066 (0.079)	−0.403*** (0.101)	0.559*** (0.095)	0.037 (0.081)
Ln (employment)				0.009 (0.005)	0.060*** (0.009)	0.041*** (0.010)
Firm age				−0.000 (0.000)	−0.001 (0.001)	−0.001* (0.000)
Firms in industrial zones				0.044* (0.021)	−0.001 (0.029)	0.017 (0.024)
Firms with foreign capital				0.044 (0.046)	0.070 (0.206)	0.420 (0.365)
Firms with state capital				0.124 (0.110)	0.011 (0.166)	0.017 (0.110)
Observations	11,562	11,562	11,562	11,500	11,545	11,545
R-squared	0.183	0.108	0.026	0.174	0.184	0.112
Number of firms	3,259	3,259	3,259	3,259	3,258	3,258
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year dummy effects	Yes	Yes	Yes	Yes	Yes	Yes

SMEs = small and medium-sized enterprises.
*** Significant at the 1% level, ** significant at the 5% level, * significant at the 10% level.
Note: Standard errors that are robust to heteroskedasticity and clustered at the industry level are reported in parentheses.
Source: Authors’ calculations from Viet Nam Small and Medium Enterprise Survey 2007–2015.

foreign value added in exports. We check the robustness of our results by including other firm characteristics such as firm employment, firm age, industrial zone dummies, and dummies for firm ownerships that are likely to influence firm innovation. Our results are robust to the inclusion of these firm characteristics. Controlling for these variables in the regressions, we still find that our results for the relationship between foreign value added and firm innovation are almost the same. The magnitude of the coefficient in column (4) shows that an

additional 1 percentage point of foreign value added in exports lowers the probability of firms introducing new products by 0.4. At the same time, it increases the probability of firms improving current products by 0.56. One possible explanation is that SMEs may choose to concentrate on improving their existing products to satisfy increased requirements from MNEs rather than develop their new products. Large firms tend to improve existing products and introduce new technology more than small ones as indicated in columns (5) and (6). The result in column (4) also indicates that SMEs in industrial zones have a higher probability of introducing new products. SMEs with foreign and state capital tend to innovate more but the coefficients are not statistically significant.

9.5.1 Heterogeneity

SMEs may have different incentives to innovate when they are engaged in GVCs, depending on their sizes. On the one hand, smaller firms may find it hard to innovate when they face the pressure of increasing imports. Larger SMEs are more likely to innovate because they generally have more resources with which to do so. On the other hand, small firms could be more flexible in allocating resources to the most innovative ideas to cope with more competitive pressures. By contrast, larger companies with many product lines may be more reluctant to innovate as they have to consider distributing their resources to change many of their products and services. To test these contradicting possibilities, we run separate regression for different firm sizes. The regressions exploring the relationship between foreign value added in exports and firm innovation with firm sizes, estimated using a linear probability model and the same specification as for the regressions presented in Table 9.3, are presented in Table 9.4.⁴ These results confirm that the impacts of foreign value added in exports differ according to firm size. They indicate that the impacts of foreign value added in exports on firm innovation are more profound among micro-firms and support the hypothesis that smaller firms are more flexible and ready to innovate than larger ones. The findings in columns (1) and (2) also show that micro-firms may prioritize the improvement of existing products over the introduction of new products when they face an increasing level of foreign value-added imports.

We examine whether exporting SMEs that have directly linked to the GVC may innovate more. The results are shown in Table 9.5. The

⁴ To save space, we do not report all estimated coefficients.

**Table 9.4: Foreign Value Added in Exports
and SMEs’ Innovation by Firm Sizes**
(ordinary least squares estimates)

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Micro-firms			Small and Medium-Scale Firms		
	Firms Introduce New Products	Firms Improve Existing Products	Firms Introduce New Technology	Firms Introduce New Products	Firms Improve Existing Products	Firms Introduce New Technology
Foreign value added as a share of exports	−0.405*** (0.127)	0.512*** (0.155)	0.107 (0.092)	−0.216 (0.129)	0.416** (0.146)	−0.127 (0.176)
Other variables	Yes	Yes	Yes	Yes	Yes	Yes
Observations	8,165	8,165	8,165	3,380	3,380	3,380
R-squared	0.213	0.095	0.012	0.137	0.152	0.077
Number of firms	2,602	2,602	2,602	1,309	1,309	1,309
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year dummy effects	Yes	Yes	Yes	Yes	Yes	Yes

SMEs = small and medium-sized enterprises.
*** Significant at the 1% level, ** significant at the 5% level, * significant at the 10% level.
Notes: Micro-firms have up to 10 employees. Standard errors that are robust to heteroskedasticity and clustered at the industry level are reported in parentheses. Other variables include firm employment, firm age, industrial zone dummy, and dummies for firm ownerships (which are private firms, firms with state capital, and firms with foreign capital).
Source: Authors’ calculations from Viet Nam Small and Medium Enterprise Survey 2007–2015.

results in columns (1) to (3) indicate that foreign value added does not correlate with innovation by exporting SMEs. However, it significantly correlates with the improvement of existing products by nonexporting SMEs as indicated in column (5). This demonstrates that trade linkages may not be the main channel of SMEs’ innovation.

SMEs in an industrial zone are more likely to receive knowledge transfers from MNEs. We also run a separate regression to SMEs located in industrial zones and those that are not. The results are reported in Table 9.6. In the regressions in columns (2) and (5), we find a positive and significant relationship between foreign value added and SMEs’ improvement of existing products for firms that are in industrial zones

Table 9.5: Foreign Value Added in Exports and Innovation by Exporting SMEs
(ordinary least squares estimates)

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Exporting firms			Nonexporting firms		
	Firms Introduce New Products	Firms Improve Existing Products	Firms Introduce New Technology	Firms Introduce New Products	Firms Improve Existing Products	Firms Introduce New Technology
Foreign value added as a share of exports	−0.302 (0.738)	0.453 (0.528)	0.075 (0.778)	−0.401*** (0.106)	0.553*** (0.100)	0.093 (0.083)
Other variables	Yes	Yes	Yes	Yes	Yes	Yes
Observations	709	709	709	10,836	10,836	10,836
R-squared	0.184	0.191	0.069	0.191	0.106	0.028
Number of firms	312	312	312	3,164	3,164	3,164
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year dummy effects	Yes	Yes	Yes	Yes	Yes	Yes

SMEs = small and medium-sized enterprises.
 *** Significant at the 1% level, ** significant at the 5% level, * significant at the 10% level.
 Notes: Standard errors that are robust to heteroskedasticity and clustered at the industry level are reported in parentheses. Other variables include firm employment, firm age, industrial zone dummy, and dummies for firm ownerships (which are private firms, firms with state capital, and firms with foreign capital).
 Source: Authors’ calculations from Viet Nam Small and Medium Enterprise Survey 2007–2015.

Table 9.6: Foreign Value Added in Exports and Innovation by SMEs in Industrial Zones
(ordinary least squares estimates)

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Firms in Industrial Zones			Firms Not in Industrial Zones		
	Firms Introduce New Products	Firms Improve Existing Products	Firms Introduce New Technology	Firms Introduce New Products	Firms Improve Existing Products	Firms Introduce New Technology
Foreign value added as a share of exports	−0.096 (0.372)	2.010*** (0.517)	−0.688 (0.683)	−0.428*** (0.100)	0.513*** (0.101)	0.092 (0.081)
Other variables	Yes	Yes	Yes	Yes	Yes	Yes
Observations	597	597	597	10,948	10,948	10,948
R-squared	0.150	0.152	0.108	0.191	0.111	0.029
Number of firms	343	343	343	3,187	3,187	3,187
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year dummy effects	Yes	Yes	Yes	Yes	Yes	Yes

SMEs = small and medium-sized enterprises.
 *** Significant at the 1% level, ** significant at the 5% level, * significant at the 10% level.
 Notes: Standard errors that are robust to heteroskedasticity and clustered at the industry level are reported in parentheses. Other variables include firm employment, firm age, and dummies for firm ownerships (which are private firms, firms with state capital, and firms with foreign capital).
 Source: Authors’ calculations from Viet Nam Small and Medium Enterprise Survey 2007–2015.

and those that are not. However, the magnitude of the main coefficient is much higher for the SMEs in industrial zones than for those that are not. This confirms the above prediction that SME linkages to GVCs are through their connection to large and foreign firms.⁵ At the same time, a higher share of foreign value added in exports results in a lower probability of introducing new products for SMEs that are not in industrial zones, as shown in column (4).

9.5.2 Instrumental Variable Estimates

The possible endogeneity bias that may arise from omitted time-varying variables and measurement errors leads us to carry out IV estimation, which takes into account unobserved time-varying factors that may simultaneously correlate with the foreign value-added variable and SMEs' innovation. We estimate equation (1) using fixed effects regression with an IV, which is the PRC domestic value added in gross exports. All IV estimations include time dummies to account for changes over time in the economic environment. At the same time, we add firm characteristics to control for time-varying effects that may bias the results. Robust standard errors are clustered at the industry level.

We report the IV estimates in Table 9.7. As seen in the lower panel, the first-stage coefficient is negative and statistically significant. It shows that the higher value of the PRC's domestic value added in exports creates greater competitive pressure on Vietnamese exports in the world market so that Viet Nam will import less intermediate goods to produce exports. This leads to a decrease in the share of foreign value added in Vietnamese exports. The F-statistic of excluded instruments in all specifications is well above the critical values (10) identified by Staiger and Stock (1997). This indicates that the problem of weak instruments is not our concern.

In line with the results presented above, the findings, shown in the upper panel of Table 9.7, confirm the effect of foreign value added in exports on SMEs' innovation. The estimated effect in column (1) is statistically significant and indicates that a one percentage point increase in foreign value added in exports results in a decrease in the probability of SMEs introducing new products by 0.63, which is larger than the fixed effects estimate. In contrast, it increases the probability of SMEs improving existing products by 1.65 as indicated in column (2). The larger foreign value added in export coefficients indicates that not

⁵ SMEs that could directly export may have less of a relationship with FDI firms than other SMEs in industrial zones. In our sample, only 17% of SMEs in industrial zones directly export.

Table 9.7: Foreign Value Added in Exports and SMEs’ Innovation
(instrumental variable estimates)

Variables	(1)	(2)	(3)
	Firms Introduce New Products	Firms Improve Existing Products	Firms Introduce New Technology
Foreign value added as a share of exports	−0.633*** (0.237)	1.653*** (0.596)	0.176 (0.270)
First-stage estimation	Dependent variable: Foreign value added as a share of exports		
PRC’s domestic value added as a share of exports	−0.78*** (0.13)	−0.78*** (0.13)	−0.78*** (0.13)
Other variables	Yes	Yes	Yes
Observations	11,538	11,538	11,538
R-squared	0.184	0.104	0.031
Number of firms	3,251	3,251	3,251
Firm fixed effects	Yes	Yes	Yes
Year dummy effects	Yes	Yes	Yes
F-statistics for an excluded instrument: 33.46			

PRC = People’s Republic of China, SMEs = small and medium-sized enterprises.
*** Significant at the 1% level, ** significant at the 5% level, * significant at the 10% level.

Notes: Standard errors that are robust to heteroskedasticity and clustered at industry level are reported in parentheses. Other variables include firm employment, firm age, industrial zone dummy, and dummies for firm ownerships (which are private firms, firms with state capital, and firms with foreign capital). In the first stage of the fixed effects instrumental variable regression of foreign value added in exports, (a) the PRC’s domestic value added in exports is used as an instrument for Viet Nam’s foreign value added in exports; and (b) the F-statistics for an excluded instrument in all regressions is larger than 10, implying that the instrument is strong (see Staiger and Stock 1997).

Source: Authors’ calculations from Viet Nam Small and Medium Enterprise Survey 2007–2015.

controlling for unobservables and measurement errors will lead to an underestimation of the true size of the effect of foreign value added in exports on SMEs’ innovation.

In Table 9.8, we estimate the impacts of foreign value added in exports separately for different types of firm sizes using IV estimation. The results are different with what we found from OLS estimates in Table 9.4. Columns (1) and (4) indicate that the effects of foreign value added in exports are more pronounced for small and medium-scale firms. In addition, small and medium-scale firms tend to have more improvement in existing products than micro-firms as they face a

Table 9.8: Foreign Value Added in Exports and SMEs’ Innovation by Firm Sizes
(instrumental variable estimates)

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Micro-firms			Small and Medium-Scale Firms		
	Firms Introduce New Products	Firms Improve Existing Products	Firms Introduce New Technology	Firms Introduce New Products	Firms Improve Existing Products	Firms Introduce New Technology
Foreign value added as a share of exports	−0.733*** (0.268)	1.267 (0.803)	0.075 (0.159)	−0.857* (0.439)	1.392** (0.567)	−0.470 (0.388)
Other variables	Yes	Yes	Yes	Yes	Yes	Yes
Observations	7,866	7,866	7,866	3,057	3,057	3,057
R-squared	0.211	0.090	0.012	0.129	0.145	0.075
Number of firms	2,303	2,303	2,303	986	986	986
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year dummy effects	Yes	Yes	Yes	Yes	Yes	Yes
F-statistics for an excluded instrument from (1) to (3): 24.60						

F-statistics for an excluded instrument from (4) to (6): 25.67

SMEs = small and medium-sized enterprises.
*** Significant at the 1% level, ** significant at the 5% level, * significant at the 10% level.
Notes: Micro-firms have up to 10 employees. Standard errors that are robust to heteroskedasticity and clustered at the industry level are reported in parentheses. Other variables include firm employment, firm age, industrial zone dummy, and dummies for firm ownerships (which are private firms, firms with state capital, and firms with foreign capital). In the first stage of the fixed effects instrumental variable regression of foreign value added in exports, (a) the PRC’s domestic value added in exports is used as an instrument for Viet Nam’s foreign value added in exports; and (b) the F-statistics for an excluded instruments in all regressions are larger than 10, implying that the instrument is strong (see Staiger and Stock 1997).
Source: Authors’ calculations from Viet Nam Small and Medium Enterprise Survey 2007–2015.

higher level of foreign value added in exports, as presented in columns (2) and (5).

Table 9.9 presents the results of our analysis of the impacts of foreign value added in exports on innovation by SMEs in industrial zones. As F-statistics for an excluded instrument from (1) to (3) is 6.94, it shows that the instrument may be weak. Therefore, we may need to be more cautious to interpret the results in columns (1) to (3). The IV estimates in columns (1) and (4) indicate that a higher foreign value added in exports leads to a lower probability of introducing new products for both firms in industrial zones and those that are not, although only the coefficient

**Table 9.9: Foreign Value Added in Exports
and Innovation by SMEs in Industrial Zones**
(instrumental variable estimates)

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Firms in Industrial Zones			Firms Not in Industrial Zones		
	Firms Introduce New Products	Firms Improve Existing Products	Firms Introduce New Technology	Firms Introduce New Products	Firms Improve Existing Products	Firms Introduce New Technology
Foreign value added as a share of exports	−0.589 (1.226)	3.355 (2.077)	−0.751 (2.919)	−0.655** (0.255)	1.619** (0.629)	0.164 (0.255)
Other variables	Yes	Yes	Yes	Yes	Yes	Yes
Observations	396	396	396	10,859	10,859	10,859
R-squared	0.148	0.142	0.108	0.190	0.101	0.028
Number of firms	142	142	142	3,098	3,098	3,098
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year dummy effects	Yes	Yes	Yes	Yes	Yes	Yes
F-statistics for an excluded instrument from (1) to (3): 6.94						
F-statistics for an excluded instrument from (4) to (6): 31.92						

SMEs = small and medium-sized enterprises.

*** Significant at the 1% level, ** significant at the 5% level, * significant at the 10% level.

Notes: Standard errors that are robust to heteroskedasticity and clustered at the industry level are reported in parentheses. Other variables include firm employment, firm age, and dummies for firm ownerships (which are private firms, firms with state capital, and firms with foreign capital). In the first stage of the fixed effects instrumental variable regression of foreign value added in exports, (a) the PRC’s domestic value added in exports is used as an instrument for Viet Nam’s foreign value added in exports; and (b) the F-statistics for excluded instruments from (4) to (6) regressions are larger than 10, implying that the instrument is strong (see Staiger and Stock 1997).

Source: Authors’ calculations from Viet Nam Small and Medium Enterprise Survey 2007–2015.

of the main variable in column (4) is statistically significant. However, the magnitudes of coefficients in columns (1) and (4) are quite similar. In addition, although the coefficient is not statistically significant,⁶ the result in column (2) indicates that firms in industrial zones have about twice as big a probability of improving existing products as those not in industrial zones. This confirms the previous OLS estimates that the impacts of foreign value added in exports are more significant to the improvement of existing products by SMEs in industrial zones.

⁶ The weak instruments in columns (1) to (3) may lead IV estimates to have larger standard errors and bias than OLS estimates (Staiger and Stock 1997)

Table 9.10 shows the IV estimates separately for exporting and nonexporting firms. In line with the OLS findings in Table 9.5, the results in columns (1) to (3) reveal that foreign value-added in exports does not impact the innovation of exporting SMEs. However, it results in a lower probability of introducing new products but a higher probability of improving existing products for nonexporting SMEs.

9.5.3 Testing for Potential Mechanisms

One of the channels through which foreign value added in exports may affect domestic SMEs’ innovation is that SMEs have to compete with foreign firms in attracting employees, thereby pushing up market wages and increasing the production costs. That leads to a higher demand for

Table 9.10: Foreign Value Added in Exports and Innovation by Exporting SMEs
(instrumental variable estimates)

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Exporting Firms			Nonexporting Firms		
	Firms Introduce New Products	Firms Improve Existing Products	Firms Introduce New Technology	Firms Introduce New Products	Firms Improve Existing Products	Firms Introduce New Technology
Foreign value added as a share of exports	-1.421 (1.678)	2.164 (1.326)	-0.378 (1.057)	-0.604** (0.236)	1.504** (0.626)	0.209 (0.275)
Other variables	Yes	Yes	Yes	Yes	Yes	Yes
Observations	585	585	585	10,737	10,737	10,737
R-squared	0.169	0.176	0.068	0.190	0.099	0.027
Number of firms	188	188	188	3,065	3,065	3,065
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year dummy effects	Yes	Yes	Yes	Yes	Yes	Yes
F-statistics for an excluded instrument from (1) to (3): 17.98						
F-statistics for an excluded instrument from (4) to (6): 23.94						

SMEs = small and medium-sized enterprises.

*** Significant at the 1% level, ** significant at the 5% level, * significant at the 10% level.

Notes: Standard errors that are robust to heteroskedasticity and clustered at the industry level are reported in parentheses. Other variables include firm employment, firm age, industrial zone dummy, and dummies for firm ownerships (which are private firms, firms with state capital, and firms with foreign capital). In the first stage of the fixed effects instrumental variable regression of foreign value added in exports, (a) the PRC’s domestic value added in exports is used as an instrument for Viet Nam’s foreign value added in exports; and (b) the F-statistics for excluded instruments in all regressions are larger than 10, implying that the instrument is strong (see Staiger and Stock 1997).

Source: Authors’ calculations from Viet Nam Small and Medium Enterprise Survey 2007–2015.

Table 9.11: Potential Mechanisms

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	OLS estimates			IV estimates		
	Ln(Real Wage)	Ln(Revenue)	Firms Have Subcontract	Ln(Real Wage)	Ln(Revenue)	Firms Have Subcontract
Foreign value added as a share of exports	0.363 (0.724)	7.742*** (1.388)	0.125 (0.109)	0.945 (2.290)	24.484*** (5.539)	0.221* (0.120)
Other variables	Yes	Yes	Yes	Yes	Yes	Yes
Observations	10,952	11,545	11,544	10,813	11,539	11,538
R-squared	0.071	0.195	0.015	0.025	0.065	0.014
Number of firms	3,245	3,258	3,258	3,106	3,251	3,251
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year dummy effects	Yes	Yes	Yes	Yes	Yes	Yes
F-statistics for an excluded instrument (4) to (6): 33.75						

IV = instrumental variable, OLS = ordinary least squares, SMEs = small and medium-sized enterprises.
 *** Significant at the 1% level, ** significant at the 5% level, * significant at the 10% level.

Notes: Standard errors that are robust to heteroskedasticity and clustered at the industry level are reported in parentheses. Other variables include firm employment, firm age, industrial zone dummy, and dummies for firm ownerships (which are private firms, firms with state capital, and firms with foreign capital). In the first stage of the fixed effects IV regression of foreign value added in exports, (a) the PRC’s domestic value added in exports is used as an instrument for Viet Nam’s foreign value added in exports; and (b) the F-statistics for excluded instruments in all regressions are larger than 10, implying that the instrument is strong (see Staiger and Stock 1997).

Source: Authors’ calculations from Viet Nam Small and Medium Enterprise Survey 2007–2015.

innovation. We test for this transmission mechanism by examining the effect of foreign value added in exports on real wages. Another channel is that a higher level of foreign value added in exports leads to increases in total exports, possibly resulting in an increase in SME sales. Thus, domestic SMEs may have more resources for their innovation. We also test whether foreign value added in exports is associated with a higher probability of SMEs having subcontracts that help domestic SMEs acquire the knowledge and expertise required for improving their productivity and innovation.

The results for both OLS and IV estimations are reported in Table 9.11. In columns (1) and (4), the estimated coefficients for foreign value added in exports are positive and show that foreign value added in exports increases wages. The effects of foreign value added in exports on wages

may be either through higher demand for labor or more competition from larger firms in attracting labor, which increases wages. However, the coefficients are not statistically significant. As shown in columns (3) and (6), foreign value added in exports increases the probability of firms having subcontracts but the coefficients are only statistically significant in column (6).

The results in columns (2) and (5) indicate that foreign value added in exports has positive effects on SMEs' revenue and the coefficients are statistically significant. This shows that higher innovation may come from a higher level of resources as SMEs are involved directly or indirectly in GVCs. This is consistent with the hypothesis that foreign value added in exports complements the development of domestic SMEs.

9.6 Conclusion

The main objective of this study was to estimate the effect of the Vietnamese economy's linking to GVCs on the innovation of SMEs in the manufacturing sector in Viet Nam. In this chapter, we explored the relationship between foreign value added in exports and SMEs' innovation in Viet Nam between 2007 and 2015. Using data from the Viet Nam Small and Medium Enterprise survey, we tested whether a higher share of foreign value added in exports is more or less likely to make SMEs innovate. To address the potential biases from omitted variables, we used the PRC domestic value added in gross exports to the world as an instrument for foreign value added in gross exports in Viet Nam.

We find that foreign value added in gross exports correlates negatively with SMEs' decision to introduce new products but is positively associated with their decision to improve existing products. These relationships are more profound for firms in industrial zones and nonexporting firms. These findings imply that the production linkages with lead or foreign firms may be more important to the domestic SMEs' innovation than direct trading activities. The study also seeks to examine the channel through which an economy's participation in the GVC may affect SMEs' innovation. We find evidence that an economy's participation in the GVC leads to domestic SMEs achieving higher sales and having more subcontracts, which may help them have more resources to innovate.

As SMEs tend to improve existing products when the economy is more involved in GVCs, the government could use policies to incentivize SMEs to demand better technology, thereby improving the innovation system and creating a favorable environment in which to transfer new technology. These policy packages may include access to finance for those who invest in learning and adopting better technologies.

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10

Impact of Global Value Chains on the Performance of SMEs in Sri Lanka: Evidence from Sri Lanka

N.P. Ravindra Deyshappriya and B.C.H. Maduwanthi

10.1 Introduction

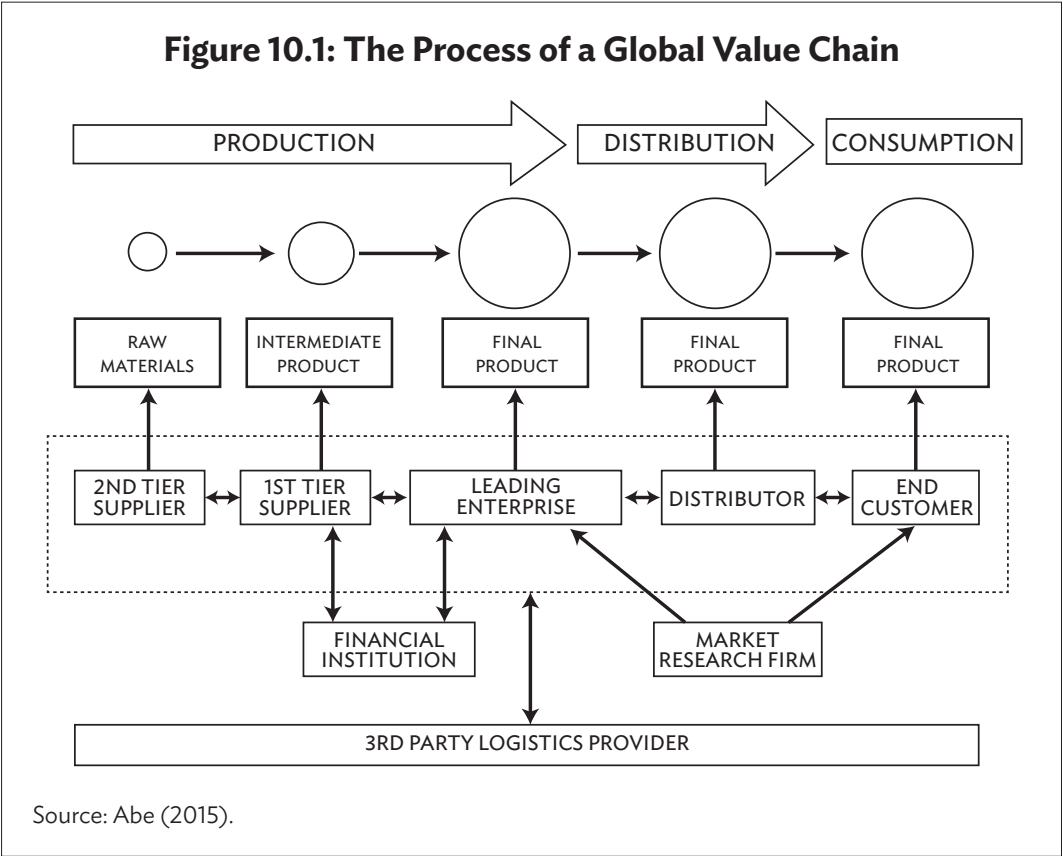
10.1.1 Global Value Chains and SMEs: Concepts and Definitions

Global value chains (GVCs) have been a growing concept in the global economy with the development of globalization. Since globalization is a common concept for all countries, GVCs are also linked with every country at different capacities, irrespective of country status. Moreover, Harvie and Charoenrat (2015) highlighted in particular that the development of information and communication technology, transportation technology, and complex production processes has created a suitable environment for firms to engage with value chains across borders. However, there is no unique and well-recognized definition of GVCs, and different scholars have defined and explained the concept of GVCs by considering different aspects. According to the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP 2009), a GVC refers to the full range of cross-border, value-added business activities that are required to bring a product or service from the conception, design, sourcing raw materials, and intermediate input stages to production, marketing, distribution, and supply of the final consumer. In addition, Porter (1985) explains that value chains provide a way to identify firms' source of differentiation and the fundamental factors that drive it. Similarly, the United Nations

Conference on Trade and Development (UNCTAD 2013) elaborated a value chain as a fragmentation of the production process, and the international dispersion of tasks and activities within these value chains has led to the emergence of a borderless production system. Moreover, Asia-Pacific Economic Cooperation (APEC 2010) described a GVC as a value chain that operates in more than one economy.

As Figure 10.1 indicates, there are two main steps in a GVC: production and distribution. Therefore, a GVC is a collection of numerous producers and suppliers, distributors, and business service providers. The figure illustrates the process of a GVC, how raw materials are converted into a final product, and also the distribution process of final products.

As Abe (2015) has highlighted, there are three key drivers of GVCs: (1) resource endowments, (2) market access, and (3) efficiency maximization. Resource endowments may include advanced infrastructure, land, and other limited resources; low-cost labor; and locational benefits (Feenstra 1998; Kimura and Ando 2005). As Christopher (2011) emphasized, efficiency maximization includes supply chain concepts such as just-in-time movement of goods, zero



inventory, outsourcing and offshoring, and production agglomeration (Ronkainen, Halsall, and Heineman 2010; Kotler and Keller 2011). As Abe (2015) elaborated, factors such as low entry barriers, an enabling business environment, symmetric distribution of market information, and advanced logistic systems are crucial to ensure better market access.

Abe (2015), ESCAP (2009), and Gereffi, Humphrey, and Sturgeon (2005) identified four main types of GVCs: (1) an international supply market that requires minimal relationships among buyers and sellers and where transactions are made between buyers and sellers across borders; (2) international supply markets where leading producers have the controlling power over the international network of subsidiaries, affiliates, and suppliers; (3) a buyer-driven network where large retailers, brand manufacturers, and marketers play the central role in the GVC; and (4) integrated firms where hierarchical governance systems are implemented and produce all major products in-house.

Small and medium-sized enterprises (SMEs) play a crucial role in every economy, irrespective of their development status. Their contributions to the economy are multidimensional: output growth, employment generation, poverty alleviation, economic empowerment, and export growth can be considered among them (Harvie 2002; Asasen, Asasen, and Chuangcham 2003). As Abe et al. (2012) indicated, SMEs account for more than 95% of private enterprises in Asia and have generated more than 50% of employment. In Sri Lanka in particular, as of 2014, SMEs made up nearly 90% of enterprises (over 1 million SMEs), contributed 52% to the country’s gross domestic product, and produced 45% of its employment.

**Table 10.1: Number of Persons Engaged
and Percentage Distribution of SMEs in Economic Sectors**

Scale of the Establishment	People Engaged		Sector-wise Distribution (%)		
	No.	%	Industry	Trade	Service
Total	3,003,119	100	100	100	100
Micro	1,338,675	44.6	29.7	68.1	44.6
Small	529,751	17.6	14.0	16.8	22.6
Medium-sized	386,756	12.9	16.7	5.5	13.9
Large	747,937	24.9	39.6	9.5	18.9

SMEs= small and medium-sized enterprises.
Note: The definitions of types of SMEs are provided in Table 10.2.
Source: Created by authors based on Ministry of Industry and Commerce, Government of Sri Lanka (2016).

Table 10.1 indicates the number of people engaged in each type of SME and the sector-wise percentage distribution of SMEs. The total number employees in microenterprises is 1.3 million, which is 45% of the total, although enterprises at the micro scale represented almost 92% of the establishments. The large-scale business sector represents almost 25% of employment, although it accounts for only 0.2% of the establishments.

Countries define SMEs according to different bases and dimensions. In the United States (US), the definition of SMEs varies by industry as well. SMEs in the manufacturing sector have 500 or fewer employees, while those in the trade and wholesale sectors have 100 or fewer employees. In contrast, SMEs in the mining, quarrying, and oil and gas extraction sectors can have up to 1,500 employees, while SMEs in silver ore mining can have 250 employees (Ward 2018). The Industry of Canada (2017) identified four types of SMEs based on the number of employees. Industries with 1–4, 5–99, and 100–499 employees are defined as micro, small, and medium-sized industries, respectively, while industries with more than 500 are considered large industries. The People’s Republic of China (PRC) has considered the number of employees, annual revenue, and assets in defining SMEs. In the European Union, a similar system is used to define SMEs. A business with a headcount of fewer than 250 is classified as medium sized, fewer than 50 as small, and fewer than 10 as micro. The European system also takes into account the turnover rate and balance sheet of a business. In fact, the European Commission (2005) considers three dimensions—the number of employees, the annual turnover, and the total balance sheet—in classifying SMEs.

However, it is crucial to focus on the Sri Lankan definition of SMEs as the current study is based on SMEs in Sri Lanka. As indicated in Table 10.2, Sri Lanka has also considered two dimensions—the number

Table 10.2: SME Classification in Sri Lanka

Company Category	Manufacturing Sector		Service Sector	
	Number of Employees	Annual Turnover (million)	Number of Employees	Annual Turnover (million)
Micro	1–10	≤ SLRe15	1–10	≤ SLRe15
Small	11–50	≤ SLRe16–250	11–50	≤ SLRe16–250
Medium sized	51–300	≤ SLRe251–750	51–200	≤ SLRe251–750

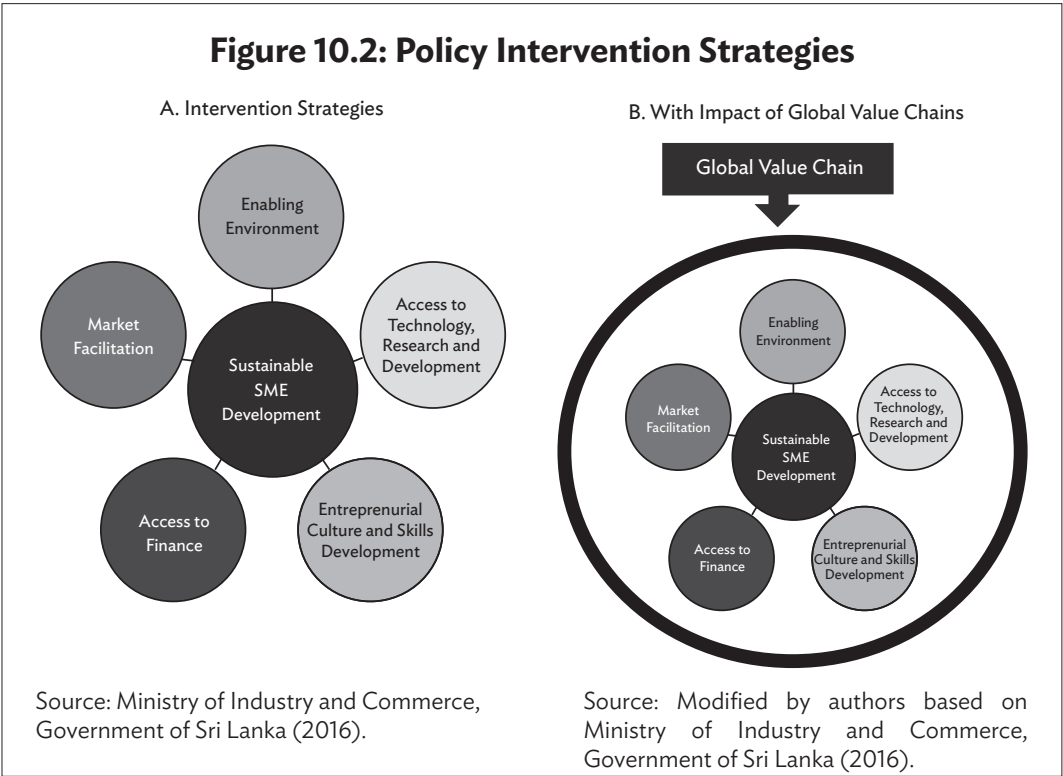
Source: Ministry of Industry and Commerce, Government of Sri Lanka (2002).

of employees and annual turnover—in order to classify SMEs into micro, small, and medium-sized categories. Under the present SME policy framework in Sri Lanka, SMEs are defined based on the number of employees and annual turnover. In order to qualify as an SME, an enterprise must employ fewer than 300 people and generate an annual turnover of less than \$4.41 million.

Sri Lanka has also identified slightly different thresholds in terms of the number of employees for manufacturing and service sectors. The current study applied the SME classification indicated in Table 10.2.

10.1.2 Problem Statement and Objectives

The national policy adopted to promote SME development was documented by the Ministry of Industry and Commerce in 2016. The idea for this took root in 2002 with a task force comprising government officials, business leaders, and members of chambers and industry laying down a white paper. Their vision was to help SMEs to be globally competitive by fostering an entrepreneurial culture and adopting socially and environmentally sustainable practices. Figure 10.2A illustrates the intervention strategies of the policy. Factors such as an enabling environment, access to research and development, an entrepreneurial culture, skills and development, access to finance, and market facilitation are the key intervention strategies.



and market facilitation have been recognized as the determinants of sustainable SME development.

However, the policy has not included the impact of linking with GVCs, which affects sustainable SME development and all the other five dimensions in Figure 10.2A. In fact, linking with GVCs has become a novel concept for most SMEs in Sri Lanka. Thus, the impact of GVCs on SMEs has not been considered by either policy makers or researchers. Under this scenario, the current study examines the impact of GVCs on the performance of SMEs in Uva Province and Central Province of Sri Lanka. Accordingly, Figure 10.2A can be changed by incorporating the impact of GVCs, as illustrated in Figure 10.2B. Hence, the study aims to provide appropriate suggestions and policy implications to enrich the existing SME Development Strategic Plan in Sri Lanka while highlighting the benefits of getting involved with GVCs. The specific objectives of the study are as follows.

- (1) To recognize and profile the SMEs in Uva Province and Central Province of Sri Lanka.
- (2) To examine the economic impact of GVCs on the performance of SMEs in Uva Province and Central Province of Sri Lanka.
- (3) To recognize potential local business sectors and their intention in linking with GVCs.
- (4) To identify key challenges and key success factors in relation to linking with GVCs.

10.2 Literature Review

10.2.1 Challenges faced by SMEs in Sri Lanka

A large number of empirical studies have identified key challenges faced by SMEs in general. However, a study performed by the International Finance Corporation (IFC) observed that 77% of Sri Lankan SMEs out of all the SMEs included in the study highlighted the need for medium- and long-term loans for their businesses. Among them, only 53% of SME holders had access to bank loans, and out of this 53%, only 29% of SMEs successfully secured their financial requirements (Nanayakkara 2011). However, Attygalle et al. (2014) argued that the government has formed special banks such as Lankaputhra Development Bank to provide loans for SMEs while other banks such as the People's Bank, Sanasa Bank, and the Regional Development Bank also provide such loan schemes. In contrast, Gamage (2003) highlighted that SMEs face severe difficulties in accessing loans as banks and financial institutions ask for heavy collateral and also charge higher interest rates. Abeyratne (2006) conducted a survey in Monaragala district in order to analyze the key challenges faced by SMEs. The study identified 27% of SME

holders in Monaragala district as having been negatively affected by unsupportive government policies. In contrast, only 16% of SMEs in Monaragala district mentioned any financial difficulties they faced. This is mainly due to the availability of informal financial institutions that provide loans without any collateral with repayment collected on a daily or weekly basis. However, interest rates attached to these loan schemes are extremely high and the borrowers do not even know the interest rate. In addition to financial constraints highlighted by the authors, nonfinancial barriers such as a lack of technology and managerial skills also hinder the efficiency and performance of SMEs.

In fact, most SMEs perform at the micro and medium level and have not linked up with high-tech industries and value chains. Similarly, Esim (2001) pointed out that SMEs in Sri Lanka do not receive updated information about market opportunities and marketing skills. Further, in addition to the lack of access to market opportunities, SMEs in Sri Lanka also suffer from insufficient know-how to market their products in domestic and international markets (Esim 2001).

One of the key issues in Sri Lanka is the absence of a clear policy that a typical small or medium-scale entrepreneur can use as a guide (Athukorala 2017). Thailand has an SME promotional plan, and the Philippines has launched an SME development plan with aggressive field administration. The Association of Southeast Asian Nations got together and launched a blueprint for the region's SMEs that got traction, but Sri Lanka could not latch on to this. Athukorala (2017) further stressed that it would take approximately 258 days to complete the business registration process together with a cost of 5% of the land value, which is not conducive to fostering entrepreneurship. The lack of business development services, inadequate research and development facilities, the lack of quality certification at district level, and the linkage to export markets not being readily available come up as key issues, while the biggest issue is the difficulty in gaining access to concessionary finance. Another point Athukorala (2017) highlighted is that SMEs pay on average 28 types of taxes, which are highly complex and time-consuming. Similarly to Athukorala (2017), Priyanath and Premaratne (2014) also criticized the policy framework related to SMEs in Sri Lanka.

The government SME development programs do not help SMEs with access to sufficient and reliable information that leads to more rational decision-making, safeguarding transactions from opportunism, and selecting a suitable governance mechanism. SME development programs have neglected to support formal governance, a result of which is a high possibility that SMEs in Sri Lanka have greater transaction costs, which impedes the growth of SMEs (Priyanath and Premaratne

2014). Vijayakumar (2013) highlighted that there is only very poor growth in SMEs, in terms of mean value of assets, value of turnover, and mean value of number of employees, as well as growth stages of SMEs. The Central Bank Annual Report of 2016 cites a World Bank study that states that firms aged 25 years or more are only 50%–90% larger than firms less than 5 years old. Vision 2025 has identified several steps to address this problem, such as gradation of microenterprises to SMEs. These will include introducing policies to increase project-based lending vs. collateral-based lending; removing taxes that prevent expansion; encouraging knowledge sharing between SMEs and research and development institutions; enhancing brand value; and increasing access to markets and access to credit. The ultimate aim is to integrate SMEs into the formal sector. The key policy challenge is translating vision into policy and practice.

10.2.2 Impact of Linking with Global Value Chains on SME Development

During the past few years, the organization of production has undergone significant changes with its extension to the global platform. GVCs have influenced the production process, which is determined by sourcing inputs from lower sources of suppliers, finding more opportunities in new marketplaces, and available strategic partnership options (OECD 2007). Extending SMEs into GVCs is not just a matter of internationalization but goes beyond that. Therefore, restructuring the production level at the global level is more essential for SMEs, especially in expanding their business opportunities and market outreach. It is a fact that cross-border business activities are challenging and a costly step for SMEs. Most SMEs claim that insufficient resources and capabilities, as well as inadequate confidence in reaching out to international markets, are major obstacles to touching the global business atmosphere. Furthermore, grasping foreign business opportunities, maintaining control over foreign intermediaries, and accessing export distribution channels are also challenging for SMEs (OECD 2007). Although there are a few obstacles, overcoming them and participating in GVCs may bring possible benefits to SMEs. Enterprises that have successfully integrated into one or more value chains have been able to obtain stability or expand their businesses. It is evident that participation in the activities of GVCs can produce benefits for domestic economies (OECD 2012).

Participation in GVCs provides opportunities to suppliers and individuals to acquire new competencies and skills. The trade, investment, and knowledge flows that underpin GVCs lead to fast learning, innovation, and industrial upgrading. GVCs have provided

instantaneous access to new information, opening up new market opportunities and bringing a technological learning atmosphere through linked transactions and investments. Local enterprises can enhance their performance in their own markets by combining national and international intermediate inputs and by creating economies of specialization that can leverage cross-border complementarities and allow the enterprises to benefit from knowledge and technology spillovers (OECD 2012).

Yuhua and Bayhaqi (2013) highlighted the benefits to SMEs of macro- and micro-level participation in global production networks, which include (1) enhancing technical capacity; (2) increasing demand for existing products and services leading to optimal utilization of production capacity and improvement of production efficiency; (3) enabling SMEs to raise equity finance from foreign investors and acquire competent human resources through prestige and credibility created through the global production network; and (4) uncovering a steady and sustainable way to enter into internationalization, which may not be impossible for SMEs. Moreover, participation of SMEs in global production networks may provide, among others, the following benefits: (1) fast-growing economies identify SME sectors as one of the positive and influencing factors in economic growth; (2) GVCs create a number of job opportunities for the local community; (3) SMEs can expand their exports to foreign markets and allow them to create a tank of foreign reserves necessary for the growth of developing economies; and (4) consequently GVCs provide a solid platform for the sustainable economic growth and development of local economies and businesses through SME sector participation (Yuhua and Bayhaqi 2013).

However, no studies have been conducted to examine the impact of GVCs on SMEs in Sri Lanka. The current study believes that incorporating with GVCs will be crucial to overcome the challenges related to the Sri Lankan SME industry. Since no previous studies have systematically addressed the impact of GVCs on SMEs in Sri Lanka, the present study attempts to fill the gaps in both the literature and policy framework.

10.3 Methodology

10.3.1 Study Area and Data Collection Procedures

The study mainly focuses on four districts (Badulla, Monaragal, Matale, and Nuwara Eliya) located in Uva Province and Central Province. In particular, the selected districts represent rural and estate sectors where most of the lower-income groups and marginalized groups are located.

Moreover, the government has started a special program to enhance the profile of the SMEs in both Uva Province and Central Province in order to reduce poverty through providing better employment opportunities. Moreover, districts such as Colombo and Gampaha located in the western province feature both medium- and large-scale industries rather than SMEs. Furthermore, it is easy to find two groups, one that engaged with GVCs and one that did not, in both Uva Province and Central Province, and this allows the impacts of GVCs on SMEs’ performance across both groups to be compared.

The study will be mainly based on primary data, although some secondary data may be collected from the desk review. The proposed study uses the following data collection tools to collect required data.

- (1) Enterprise survey with SME holders
- (2) Focus group discussions (FGDs)
- (3) Key informant interviews (KIIs)

Table 10.3 elaborates the data collection procedure in detail. The study collected relevant quantitative data from 329 SME holders located across the four districts of two provinces by applying the snowball sampling technique. Moreover, four FGDs and eight KIIs were also conducted to collect qualitative data required for the study.

Table 10.3: Details of the Survey, Focus Group Discussions, and Key Informant Interviews

Provinces	Districts	No. of Divisional Secretariat Divisions Selected	Total	FGDs	KIIs
Uva Province	Badulla	DS 1	18	1	2
		DS 2	18		
		DS 3	15		
		DS 4	18		
		DS 5	15		
	Monaragala	DS 1	17	1	2
		DS 2	17		
		DS 3	16		
		DS 4	19		
		DS 5	12		

continued on next page

Table 10.3 *continued*

		No. of Divisional Secretariat Divisions			
Provinces	Districts	Selected	Total	FGDs	KIIs
Central Province	Matale	DS 1	18	1	2
		DS 2	14		
		DS 3	15		
		DS 4	16		
		DS 5	16		
	Nuwara Eliya	DS 1	19	1	2
		DS 2	16		
		DS 3	23		
		DS 4	12		
		DS 5	15		
Total			329	4	8

DS = Divisional Secretariat, FGD = focus group discussion, KII = key informant interview.

Source: Created by authors.

10.3.2 Data Analysis

Both econometric and descriptive analyses are incorporated to accomplish the objectives of the study. Moreover, qualitative information collected through FGDs and KIIs is used to validate the quantitative findings and also to provide in-depth analysis on GVC and SME development in the context of Sri Lanka.

Econometric Analysis

An econometric analysis was employed to quantify the impact of engaging with GVCs on SME development. The following empirical model was estimated to accomplish the main objectives of the study. The empirical model is aligned with the econometric model used by Vidavong (2019) in the context of the Lao People’s Democratic Republic and also empirical studies by Dikova et al. (2015) and Biesebroeck (2005). Logarithmic values of all continuous variables were taken to reduce unnecessary variation of the variables. Similarly, profits of firms were considered as a proxy for the performance of SMEs. Moreover, a dummy variable was assigned to measure the impacts of GVCs on SMEs’ performance, as the dummy variable allows comparison of the impacts across two groups: SMEs that are engaged with GVCs and SMEs not engaged with GVCs.

$$\begin{aligned} \ln Profit_i = & \beta_0 + \beta_1 GVC_i + \beta_2 (GVC_i \times \ln SL_i) \\ & + \beta_3 (GVC_i \times \ln TR_i) + \beta_4 (GVC_i \times \ln RD_i) \\ & + \beta_5 \ln EX_i + \beta_6 \ln TR_i + \beta_7 \ln RD_i + \beta_8 \ln K_i \\ & + \beta_9 \ln L_i + \beta_{10} \ln HC_i + \beta_{11} \ln AGE_i + \beta_{12} TYPE_i + U_i \quad (1) \end{aligned}$$

The variables indicated in the empirical model are explained in Table 10.4 below.

Table 10.4: Operationalization and Explanation of Variables

Variable Name	Explanation	Expected Sign
Profit	Annual profit of the firm after tax	
GVC	Dummy variable for global value chain GVC = 1 for SMEs that are engaged in GVC GVC = 0 for SMEs that are not engaged in GVC	Positive when GVC = 1
lnSL	Log of annual sales revenue	Positive
lnTR	Log of number of employees who are trained annually	Positive
lnRD	Log of share of R&D expenditure in total revenue	Positive
lnK	Log of total capital of the firm	Positive
lnL	Log of number of workers	Positive
lnHC	Log of the level of education of SME holder	Positive
lnAGE	Log of age of SME holder	Positive
TYPE	Dummy variable for type of SME TYPE = 1 for small TYPE = 0 for otherwise (medium and large)	Negative when TYPE = 1

GVC = global value chain, R&D = research and development, SME = small and medium-sized enterprise.
Source: Created by authors.

Summary statistics related to each variable (without logarithm) are presented in Table 10.5 below.

In addition to the econometric analysis, a descriptive analysis is also used in support of the objectives of the research.

Table 10.5: Summary Statistics of Variables

Variables	Units of Variables	Number of Observations	Maximum	Minimum	Mean
Profit	Sri Lanka rupee	329	275,000	17,500	185,000
GVC	Dummy variable	329	1	0	0.49
SL	Sri Lanka rupee	329	552,402	39,142	209,231
TR	Number of employees	329	120	1	24
RD	Sri Lanka rupee	329	120,000	15,000	35,000
K	Sri Lanka rupee	329	120,0000	95,000	1
L	Number of employees	329	375	2	68
HC	Years of schooling	329	19	1	13
AGE	Years	329	69	20	52

Source: Created by authors based on survey data.

10.4 Results and Discussion

10.4.1 Profiling the SMEs in Uva Province and Central Province of Sri Lanka

Profiling the identified enterprises in four districts is important in order to understand the salient features and composition of SMEs. This allows for a comprehensive understanding of existing SMEs, which in turn enables evaluation of their performance, limitations, challenges, etc. Therefore, this section profiles the SMEs based on gender, age structure, educational attainment of the entrepreneurs, source of capital, average monthly income of the SMEs, and number of workers employed.

Participation in Global Value Chains and Profit of SMEs

The SMEs that export their products or services as a final or intermediate product or service are considered to be SMEs participating in GVCs. Enumerators asked respondents whether they engage with such a process, and the respondents were classified accordingly as GVC or non-GVC SMEs. Table 10.6 clearly indicates the percentage and number of SMEs that are classified as GVC and non-GVC SMEs across four districts.

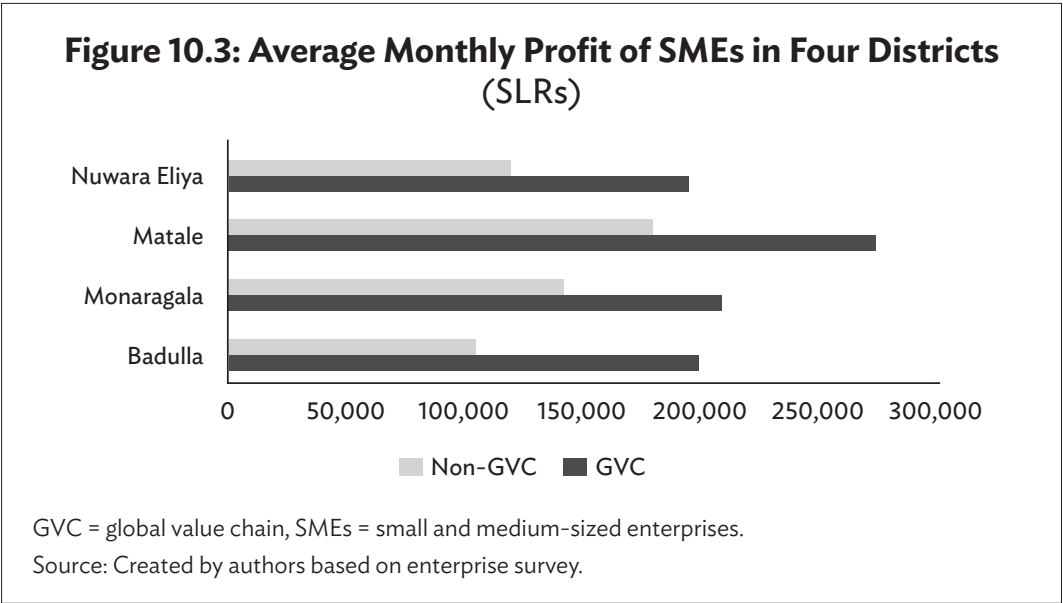
Table 10.6: Distribution of Global Value Chain and Non-Global Value Chain SMEs across the Districts

Districts	GVC	Non-GVC	Total
Badulla	35 (41.7%)	49 (58.3%)	84 (100%)
Monaragala	28 (34.6%)	53 (65.4%)	81 (100%)
Matale	51 (64.6%)	28 (35.4%)	79 (100%)
Nuwara Eliya	47 (55.3%)	38 (44.7%)	85 (100%)

GVC = global value chain, SMEs = small and medium-sized enterprises.
Source: Calculated by authors based on enterprise survey.

According to Table 10.6, Matale and Nuwara Eliya districts are the districts where more than 50% of SMEs engage with GVCs. In particular, 64.6% and 55.3% of SMEs in Matale and Nuwara Eliya, respectively, engage with GVCs. However, SME participation in GVCs is significantly lower in both Badulla (41.7%) and Monaragal (34.6%) than in Matale and Nuwara Eliya. In fact, Badulla and Monaragala districts are extremely remote and lack infrastructure, information, and financial facilities compared to the other two districts considered.

Furthermore, profit is the key variable and was assigned as the dependent variable of the model. The profit was calculated by subtracting the cost of all inputs and taxes from sales revenue. Figure 10.3 compares the average monthly profit of GVC and non-GVC SMEs across four



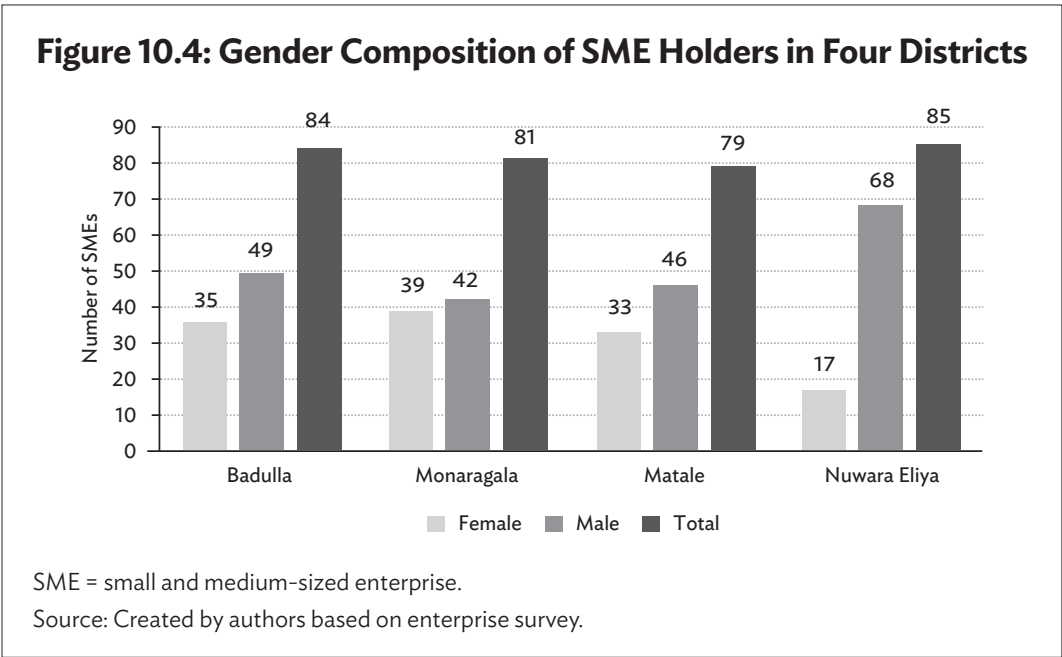
districts. The figure clearly shows that SMEs linked with GVCs achieve a higher average profit than non-GVC SMEs. In general, SMEs in Matale district achieve the highest average profit followed by Monaragala. Interestingly, the average profit levels of SMEs that are engaged in GVCs are considerably higher than that of the average profit for SMEs in all four districts, which is SLRs178,125.

Moreover, as Figure 10.3 illustrates, the difference in profit of both GVC and non-GVC SMEs is more substantial in Matale and Badulla districts, while Nuwara Eliya district has the lowest profit related to GVC SMEs.

Gender Composition of SME Holders

Figure 10.4 depicts the gender composition of SMEs in the four districts of Uva Province and Central Province. On average, the number of female entrepreneurs is lower than that of males and this trend is more pronounced in Nuwara Eliya district, where our survey captured only 17 female-headed SMEs (20%) as compared to 68 SMEs run by males. In fact, the majority of women in Nuwara Eliya district are employed in the plantation sector, where there are only limited opportunities for them to become entrepreneurs. However, the gender gap in SME ownership is comparatively low in both Monaragala and Badulla districts where 39 (48.1%) and 35 (41.7%) SMEs, respectively, are run by women.

According to the survey results, in Badulla district, the majority of agriculture-based SMEs (72.0%) are run by men, while the majority of



industry-based SMEs are run by women (56.8%). However, an opposite trend is seen in Monaragala, where a majority of women operate agriculture-based micro SMEs (53.3%), while the majority of industrial SMEs are run by men (54.9%). In contrast, the gender composition for SMEs in Nuwara Eliya district is extremely male-skewed, and the majority of SMEs in all three sectors (agriculture, industry, and service) are owned by men, while the proportion headed by women is very low.

Table 10.7 indicates that according to the survey findings, 62.3% of businesses are run by men, while only 37.7% are owned by women, thereby showing a significant gender gap in the four districts.

Table 10.7: Gender Composition of SME Holders by Type of Business

Type of Business	Sex				Total
	Female		Male		
Agriculture, farming, and dairy	27	(27.3%)	72	(72.7%)	99
Arts and crafts	8	(23.5%)	26	(76.5%)	34
Apparel and bags	39	(70.9%)	16	(29.1%)	55
Auto parts and maintenance	1	(12.5%)	7	(87.5%)	8
Food and beverages	23	(40.4%)	34	(59.6%)	57
Hotels and homestay	5	(35.7%)	9	(64.3%)	14
Cement and metalwork	9	(37.5%)	15	(62.5%)	24
Furniture	4	(33.3%)	8	(66.7%)	12
Salons and spas	2	(28.6%)	5	(71.4%)	7
Household items	4	(57.1%)	3	(42.9%)	7
Other	2	(16.7%)	10	(83.3%)	12
Total	124	(37.7%)	205	(62.3%)	329

SME = small and medium-sized enterprise.
Source: Created by author based on enterprise survey.

Age Structure of SME Holders

Table 10.8 summarizes the age composition of SME holders in the four districts based on the main economic sectors. It is apparent from the table that the average age of SME holders is between 40 and 50 years for any type of SME. The mode (29) indicates that a majority of agriculture-related SME holders in Badulla district are younger than those in the other districts.

Table 10.8: Age Composition of SME Holders in Four Districts (years)

Districts	Type of SME	Age			
		Mean	Mode	Maximum	Minimum
Badulla	Agriculture	40.65	29	61	20
	Industry	44.33	39	72	24
	Service	44.67	52	55	28
Matale	Agriculture	44.68	31	76	25
	Industry	41.77	36	69	22
	Service	–	–	–	–
Monaragala	Agriculture	45.61	32	66	21
	Industry	43.00	39	73	26
	Service	48.80	31	67	31
Nuwara Eliya	Agriculture	42.78	50	57	22
	Industry	42.60	54	59	23
	Service	40.44	43	59	28

SME = small and medium-sized enterprise.
Source: Calculated by author based on enterprise survey.

Similarly, the large age gap between the maximum and minimum ages clearly indicates that the enterprise survey has representatively captured the views of entrepreneurs whose ages range from young adults to seniors.

Educational Attainment of SME Holders

The enterprise survey recorded the educational attainment of SME holders based on years of education. The average number of years of education of agriculture-related SMEs varies between 10 and 13 years, with Nuwara Eliya and Monaragala districts accounting for the lowest educational level. Similarly, the survey revealed that the SME operators in Nuwara Eliya district have the lowest educational qualifications, followed by those in Monaragala.

Additionally, it is interesting to note that agriculture-related SMEs in the Matale district have the highest average number of years of education (14), which is significantly higher than that of the other three districts.

Table 10.9: Educational Attainments of SME Holders in Four Districts
(years of education)

Districts	Type of SME	Years of Schooling			
		Mean	Mode	Maximum	Minimum
Badulla	Agriculture	13	14	19	8
	Industry	13	12	19	0
	Service	13	14	15	11
Matale	Agriculture	14	14	19	12
	Industry	12	14	15	4
	Service	–	–	–	–
Monaragala	Agriculture	10	14	15	0
	Industry	12	12	18	5
	Service	11	12	14	7
Nuwara Eliya	Agriculture	10	12	18	0
	Industry	10	12	18	0
	Service	12	12	14	7

SME = small and medium-sized enterprise.
Source: Calculated by author based on enterprise survey.

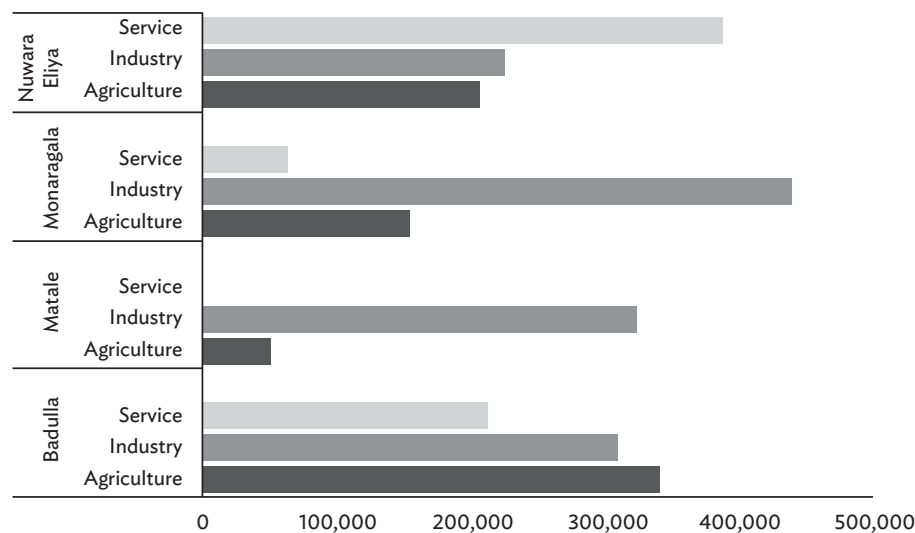
Average Income of SME Holders

Figure 10.5 illustrates the average monthly income of the three types of SME holders in the four districts. It should be noted that information related to income could be extremely subjective; hence, the data presented in this regard should be used with caution.

It was revealed that the incomes of industry-related SMEs were higher in Monaragala district than in the other two SME sectors. Income from industry-related SMEs was reported as being the second highest in the other three districts. Agriculture-related SMEs in Badulla district seem to be performing better as their income is the highest among the three SME sectors. However, the monthly incomes of agriculture-related SMEs in other districts were revealed to be significantly lower than in Badulla district.

According to the survey findings, service-related SMEs in Nuwara Eliya district earn almost double the monthly income of agriculture and industrial SMEs. In contrast, the income of service-related SMEs located in Monaragala district is significantly lower, while those in Matale attached to the service sector did not reveal their income levels.

Figure 10.5: Average Monthly Income of SME Holders in Four Districts (SLRs)



SME = small and medium-sized enterprise.
Source: Created by author based on enterprise survey.

Table 10.10: Average Income of SME Holders by Type of Business (SLRs)

Type of Business	Mean Income (Monthly)
Agriculture, farming, and livestock	224,904.88
Arts and crafts	86,006.94
Apparel and bags	298,193.88
Auto parts and maintenance	68,750.00
Food and beverages	552,422.22
Hotels and homestay	973,076.92
Cement and metalwork	87,295.45
Furniture	182,727.27
Salons and spas	79,714.29
Household items	39,142.86
Other	273,408.33

SME = small and medium-sized enterprise.
Source: Calculated by author based on enterprise survey.

Average Income of SME Holders by Type of Business

Table 10.10 indicates the monthly average income of SMEs by type of business. According to the findings, hotels and homestays account for the highest average monthly income (SLRs973,076) followed by food and beverages (SLRs552,422). In contrast, businesses such as those making household items have the lowest monthly income.

10.4.2 Impact of Global Value Chains on SMEs
in Uva Province and Central Province of Sri Lanka

The impact of GVCs on SMEs’ performance is measured using econometric analysis. Prior to the econometric analysis, correlations among the independent variables were tested to see whether there are higher correlations that may lead to multicollinearity. Table 10.11 illustrates the correlation analysis, which clearly highlights that there is no significantly higher correlation among the independent variables. Hence, the selected variables can be incorporated as the independent variables of the econometric analysis.¹

Table 10.11: Correlation among the Independent Variables

	lnSL	lnTR	lnRD	lnK	lnL	lnHC	lnAGE
lnSL	1	0.6574	0.6022	0.4316	0.3972	0.2342	0.5327
lnTR	0.6574	1	0.5723	0.3521	0.2314	0.341	0.2973
lnRD	0.6022	0.5723	1	0.4376	0.5319	0.3429	0.4251
lnK	0.4316	0.3521	0.4376	1	0.2351	0.3598	0.4519
lnL	0.3972	0.2314	0.5319	0.2351	1	0.4732	0.3481
lnHC	0.2342	0.341	0.3429	0.3598	0.4732	1	0.3401
lnAGE	0.5327	0.2973	0.4251	0.4519	0.3481	0.3401	1

Source: Calculated by author based on enterprise survey.

Table 10.12 indicates the estimated results for the empirical model mentioned in equation (1) in the methodology section. Three models were estimated by adding independent variables gradually in order to

¹ This observation is supported by the estimated variance inflation factor being 4.46 from the regression in Table 10.12, while the commonly agreed threshold for the presence of multicollinearity is greater than 10.

Table 10.12: Impact of Global Value Chains on Performance of SMEs

Variable Name	Model 1	Model 2	Model 3
GVC	0.8091*** (0.1321)	0.7863*** (0.2314)	0.7231*** (0.2256)
lnK	0.7732*** (0.2124)	0.6352** (0.2931)	0.6733** (0.3167)
lnL	0.2341*** (0.0814)	0.2031** (0.0987)	0.2122** (0.0923)
lnHC	0.0813** (0.0387)	0.0736** (0.0352)	0.0675 (0.1064)
lnSL		0.8056** (0.2787)	0.7863** (0.3848)
lnTR		0.0245** (0.0109)	0.0271 (0.0324)
lnRD		0.0223* (0.0116)	0.0127 (0.0267)
lnAGE		0.8201 (0.8971)	0.7861 (0.9171)
TYPE		-0.1897*** (0.0621)	-0.2787** (0.1072)
GVC x lnSL			0.2018** (0.0827)
GVC x lnTR			0.0626 (0.7871)
GVC x lnRD			0.0876** (0.0372)
Constant	12.7161*** (0.9781)	8.8971*** (0.8181)	6.6371*** (0.8761)
Number of Observations	329	329	329
R2	0.4582	0.5672	0.7762
Prob on F	0.0000	0.0000	0.0000

SMEs = small and medium-sized enterprises.
*** 1% significance level, ** 5% significance level, * 10% significance level.
Note: Standard errors are in parentheses.
Source: Estimated by authors.

check the robustness of the relationship between GVCs and the profit of SMEs.

The key variable, GVC, and another three independent variables (capital, labor, and human capital) were included in model 1. Model 2 incorporated additional variables such as sales revenue, number of

annually trained workers, expenditure on research and development, age of the firm, and type of SME. Finally, model 3 can be considered the complete model, which measures both direct and indirect impacts of GVCs on the profit of SMEs along with the impacts of other characteristics of firms. Specifically, interaction terms included in the third model estimate the indirect effect of GVCs through the sale revenue, training, and research and development of firms.

It is worth highlighting that the estimated coefficients for GVCs in all three models are positive and statistically significant at the 1% level. This implies that SMEs that have engaged with GVCs achieve a higher profit than SMEs that have not. Specifically, this relationship is consistent even when the models are controlled by other characteristics of firms. In fact, SMEs that have engaged with GVCs have a higher potential to enhance competitiveness, productivity, and also economies of scale while reducing production costs. Moreover, GVCs allow SMEs to link with a broader network in the international business arena, which is crucial for SMEs that are in the growing stage. Scholars such as Harvie, Narjoko, and Oum (2010), Yuhua (2014), and Arudchelvan and Wignaraja (2015) also indicated that SMEs participating in GVCs can increase their profit through higher competitiveness and production cost efficiency. Moreover, Pietrobelli and Rabellotti (2011) confirmed that GVCs benefit SMEs through production expansions and new information, and in turn the profit of SMEs also increases. Therefore, it is apparent from the estimated results that engaging with GVCs essentially increases the profit of SMEs in Sri Lanka, which ensures future development of such SMEs.

Apart from the direct impact of GVCs, the indirect effects of GVCs are also taken into account by incorporating interaction terms. As model 3 indicates, both interaction terms—(GVC \times lnSL) and (GVC \times lnRD)—have a positive coefficient and are also statistically significant at the 5% level. This reflects the fact that SMEs that have engaged with GVCs have higher sales revenue and research and development capabilities than those that have not. Therefore, GVCs increase the profit of Sri Lankan SMEs through enhancing sales revenue and research and development activities, and this is in line with the empirical findings of Vidavong (2019).

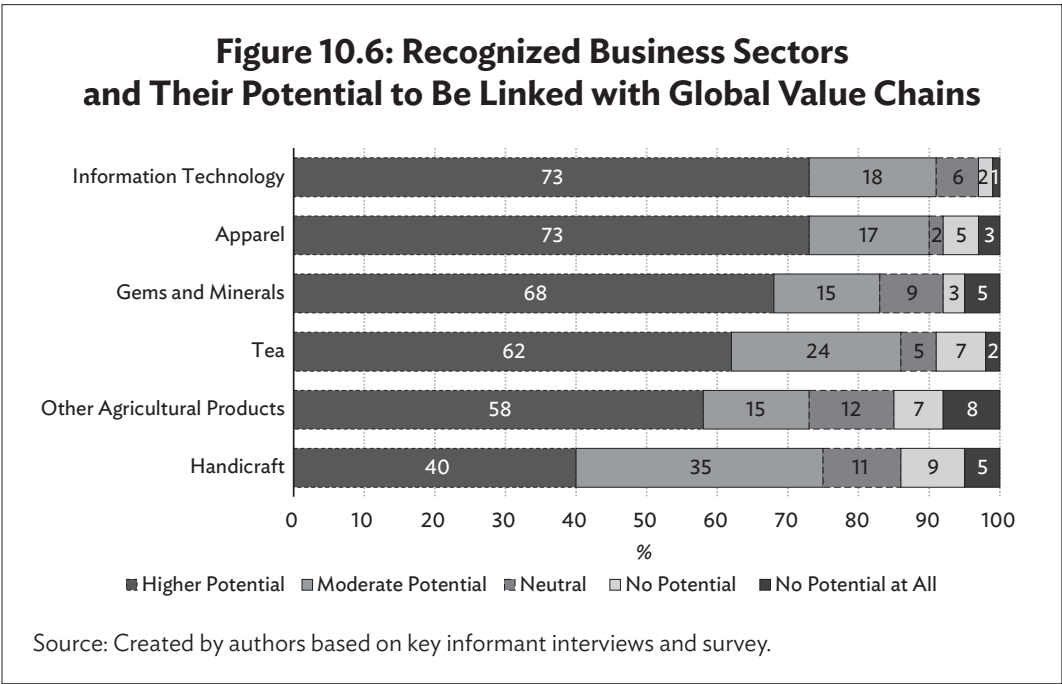
In addition to the key findings, the estimated models also confirm that factors such as capital assets, number of workers, and sales revenue of firms also positively affect the profit of SMEs. More specifically, a 1% increase in capital and labor may increase the profit of the SMEs considered by 0.67% and 0.21%, respectively. Human capital has also been recognized as a factor in the profit of SMEs when the model is not controlled for interaction terms. In addition, considering the estimated coefficient for the variable TYPE (−0.2787), it is apparent that the profits

of small-scale SMEs are significantly lower than those of medium- and large-scale SMEs. The estimated models are statistically significant at the 1% level overall and also have a higher R² value in model 3 (0.7762), representing a higher level of goodness of fit.

10.4.3 Recognizing Potential Local Business Sectors and Their Intention to Link with Global Value Chains

Potential Local Business Sectors

It is recognized that Sri Lanka has only a limited number of SMEs that have linked with GVCs. However, there are numerous business sectors that have a higher potential to be linked with GVCs. The study initially conducted KIIs with relevant experts in the field to explore business sectors that can be easily linked with GVCs. Figure 10.6 indicates the recognized business sectors that can be connected with GVCs, and the figure also illustrates the magnitude of the potential in relation to each recognized business sector based on a five-point Likert scale.



According to the KIIs, five main business sectors (information technology, apparel, gems and minerals, tea, and other agricultural products, and handicraft), were recognized as the sectors with the most potential. As Figure 10.6 illustrates, the information technology sector and the apparel sector seem to be the sectors with the highest

potential for GVCs. More than 70% of the respondents confirmed that these two sectors have “higher potential,” while less than 5% indicated “no potential” to link with GVCs. Moreover, 68% and 62% of the respondents mentioned that both the gems and minerals and the tea sectors, respectively, have a higher potential to link with international markets.

A government officer in Badulla district said:

We have the best gems and also a world-famous tea brand – Ceylon Tea. I don’t think we have capitalized on the opportunities that come from such world-popular brand names yet. In particular, tea should be promoted as a value-added product that can be easily marketed internationally. Although some companies have already started, there are ample opportunities still available for new firms and they can make use of these opportunities to get into GVCs. (KII – 01, 12 October 2019)

In addition to tea, other agricultural products (e.g., organic fruits and vegetables), and value-added products (e.g., banana chips and tomato pulp and sauce) can also be linked with GVCs. In particular, during the harvesting season, bananas and tomatoes can be stored at low cost, and also fruit pulps and sauce can be prepared with the available technology in the country. These semi-value-added products can then be linked with GVCs efficiently to ensure better earning opportunities for such entrepreneurs.

An organization of greenhouse farmers in Badulla district said:

We have more than 150 farmers and they produce high-quality cucumbers and bell peppers. They also use more advanced technology for their cultivation and also to build their greenhouses. Currently, more than 50% of the output of our organization is purchased by SriLankan Catering of SriLankan Airlines. We have the potential to double our capacity, if demand can be ensured. (FGD – 02, 14 October 2019)

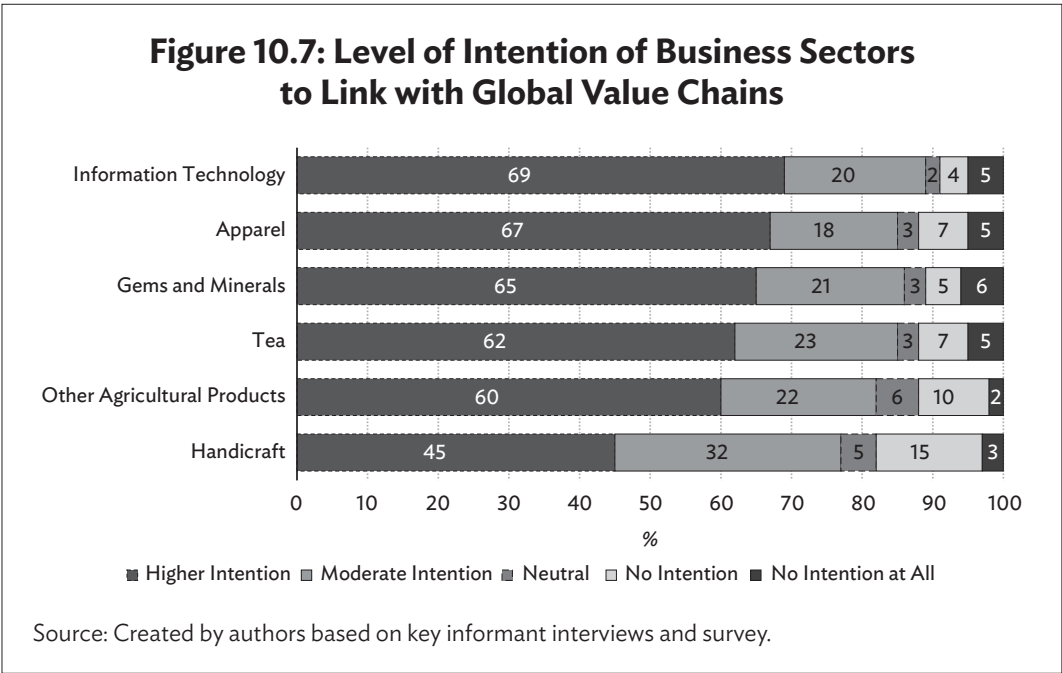
It is apparent from the above statement that SMEs in the agriculture sector also have higher potential to access GVCs. Moreover, the KIIs and survey also emphasized the potential to link handicraft-related SMEs to GVCs.

Intention of Potential Business Sectors
to Link with Global Value Chains

The study explores the intention of recognized business sectors to link with GVCs. Figure 10.7 illustrates the level of intention of each business sector to link with GVCs. According to Figure 10.6, 69% of information technology-related SMEs and 67% of apparel-related SMEs reported that they have a “higher intention” related to linking with GVCs. In particular, SMEs in the information technology sector have a greater intention to expand their services internationally and link with GVCs in order to achieve the benefits of a globalized world. Similarly, the apparel sector in which Sri Lanka has comparative advantages compared to other regional counterparts has also been searching for global opportunities. In fact, their greater intention to link with GVCs is justifiable considering both the quality of Sri Lankan apparel and the higher demand from international markets.

An owner of a garment factory in Monaragala district said:

In our district, we have both human and physical resources required for garment and apparel industries. We have a good and efficient supply chain in a local market and some medium-level garment factories export their production through intermediaries. Since we have the capacity, technology, and also skilled labor, we have also been looking for some opportunities to reach the global market. (FGD – 03, 22 October 2019)



In addition, entrepreneurs in business sectors such as gems and minerals, and tea, and other agricultural products have also shown a greater desire to engage with GVCs. More specifically, 65%, 62%, and 60% of SME holders, respectively, in the gems and minerals, tea, and other agricultural product sectors have reported that they have higher intentions to link with GVCs.

10.4.4 Challenges and Key Success Factors Related to Coping with Global Value Chains

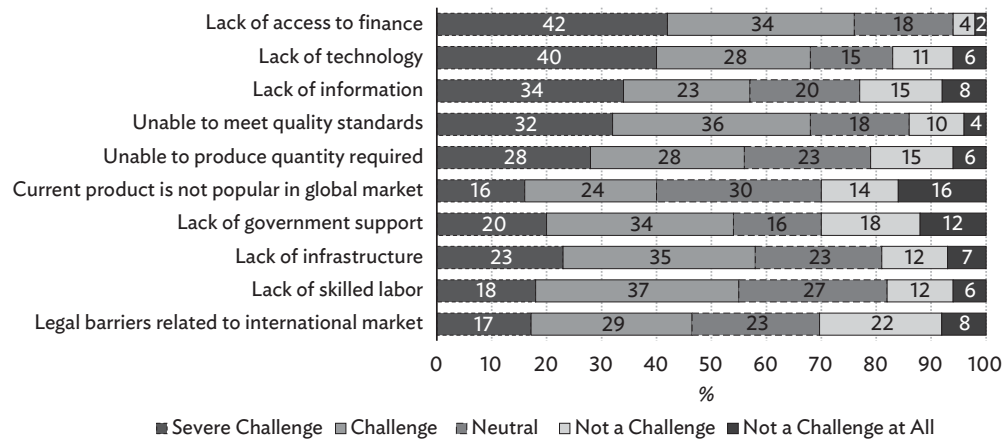
Challenges Related to Linking with Global Value Chains

Although SMEs can earn ample benefits through joining GVCs, there are a number of barriers that hinder SMEs' participation in GVCs. The current study recognized 10 main challenges that SMEs face when they attempt to link with GVCs, and Figure 10.7 illustrates how SME holders have ranked these challenges based on their severity. As Figure 10.8 shows, lack of access to finance, lack of technology, and lack of information can be recognized as the three key challenges. More specifically, 42% of the respondents who recognized lack of access to finance as a challenge have marked it as a "severe challenge," while 34% recognized it as a "challenge." Moreover, 40% and 34% of SME holders, respectively, recognized lack of technology and lack of information as "severe challenges" when expanding their business globally. In fact, access to finance has been a critical issue in relation to expansion of SMEs even in the local market. Most of the government and private commercial banks are reluctant to provide financial facilities to SMEs, indicating that financing SMEs is a risk to banks. Furthermore, most of the microfinance institutions functioning in Sri Lanka have imposed higher but hidden interest rates on their loans, and consequently SMEs may end up in a debt trap.

A dairy sector SME holder in Badulla district said:

I started this business using the inheritance from my parents. Now the business is running smoothly but I need financial support to expand this business further. I discussed this with a few banks and their procedures and standards are too high for us to afford. Although microfinance institutions are willing to finance us, I know their interest rates are too high and a few of my fellow businessmen have had very bad experiences with their loan schemes. (15 October 2019)

Figure 10.8: Key Challenges that SMEs Face When Expanding Their Business Globally



SMEs = small and medium-sized enterprises.
Source: Created by authors based on key informant interviews and survey.

In addition, both outdated technology and a lack or asymmetric distribution of information essentially restrict SMEs’ participation in GVC.

A food processing sector SME holder in Nuwara Eliya district said:

It is very difficult for us to expand our production without having the required technology. The global market needs high-quality products and also at a competitive price. However, how can we increase quality and reduce production costs when outdated technology is used? We don’t even have cool room facilities to store fruits and vegetables. Hence, there should be a proper and long-term mechanism to enhance technology related to food processing. (23 October 2019)

In addition to the three key challenges, inability to meet the quality standards of the international market, inability to meet the production capacity demanded by the global market, unpopularity of the product in the market, lack of government support, lack of infrastructure, lack of skilled labor, and legal barriers are also recognized as barriers to SMEs going global. Among these challenges, being unable to meet the quality

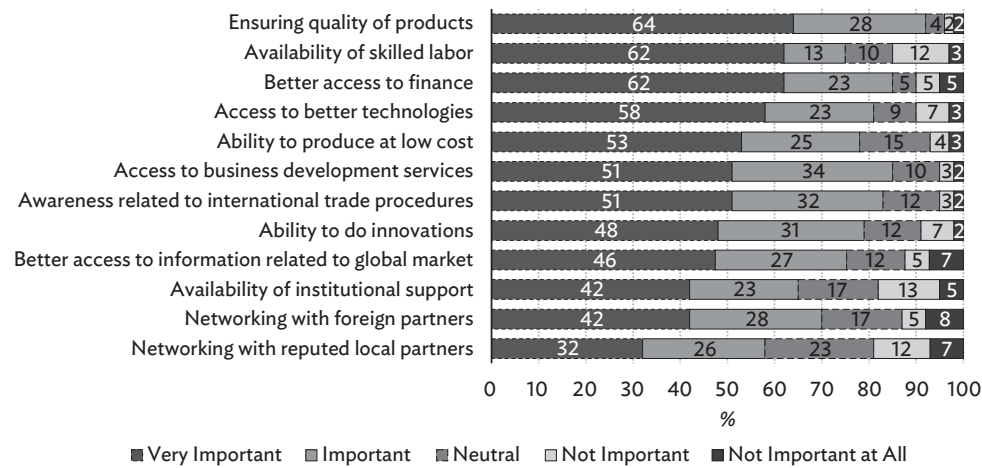
standards and the quantity demanded by the international market are also mainly due to a lack of technology. Hence, it is apparent that these challenges are linked with each other, and the final impact might therefore be much more adverse than expected. Furthermore, it seems that government support has also not been sufficient to overcome the challenges attached with SMEs. SMEs need to expand their business in the global arena. In fact, the government of Sri Lanka has been implementing different strategies highlighted in section 10.1.1 in order to promote SMEs at the national level. However, there is no proper mechanism or policy implementation in relation to linking SMEs with GVCs. Moreover, there is a lack of coordination between government policies, policy makers, and implementers. For instance, a recent policy formulation called Enterprise Sri Lanka was launched to provide low-interest rate loans for SMEs through government commercial banks. However, the commercial banks still avoid providing loans to SMEs, saying that Enterprise Sri Lanka has not been implemented yet.

Key Success Factors Related to Joining Global Value Chains

In addition to the barriers related to joining GVCs, it is crucial to recognize key success factors that stimulate the process of linking SMEs with GVCs. The survey conducted in the current study recognized 12 success factors that every SME should focus on in order to ensure they link up with a GVC. Figure 10.9 indicates all recognized success factors along with their level of importance.

As Figure 10.9 visualizes, ensuring a higher level of quality, the availability of skilled labor, and access to better finance have become the most crucial success factors that can push SMEs into linking with GVCs. In particular, 64% of SME holders stressed that the quality of products was “very important,” while 62% equally recognized that having skilled labor and better access to finance were also “very important.” In fact, the global market is highly competitive and therefore the quality of products and services plays a major role when competing with homogeneous products from different countries. Moreover, most of the successful SMEs in Sri Lanka have better access to finance and also have productive and skilled workers. Better access to finance fulfills all types of financial requirements of firms while skilled labor sustains an efficient production process. In addition, access to better technologies and the ability to produce at low cost are also recognized as “very important” by 58% and 53% of respondents, respectively. In fact, technological improvements are always linked with the success of businesses in different ways. On the one hand, advanced and appropriate technology plays a major role in ensuring both quality and quantity of outputs; on the other, technological development makes the distribution process

Figure 10.9: Key Success Factors that Promote SMEs’ Link with Global Value Chains



SMEs = small and medium-sized enterprises.
Source: Created by authors based on key informant interviews and survey.

more efficient. Similarly, the ability to produce at low cost is also very important in order to compete with other suppliers in the global market.

Moreover, business development services (BDSs) also play a vital role when SMEs look for global opportunities. BDSs enhance SMEs’ awareness related to global opportunities while providing necessary guidance and instructions on the process of GVCs. Similarly, BDSs generate networking opportunities for SMEs at both local and global levels. Therefore, according to the findings of the survey, 51% and 34% of SME holders have reported that access to BDSs is “very important” and “important,” respectively.

An apparel sector SME holder in Monaragala district said:

Actually, the BDS given ... was highly important for me to make my business more successful. They enriched us in many aspects such as how to register a business, how to access financial opportunities, what the available advanced technologies are, currently available global opportunities, the legal background of the international market, and import and export procedures. Therefore, BDSs are a main success factor in relation to SMEs that are willing to go global. (22 October 2019)

In addition to the above highlighted success factors, awareness related to international trade procedures, the ability to produce innovations, better access to information related to global markets, institutional support, and networking with both local and international partners were also recognized as “very important” factors by more than 30% of respondents on average.

10.5 Conclusions and Recommendations

The current study focused on the impact of GVCs on the performance of SMEs in Uva Province and Central Province of Sri Lanka. Moreover, the study examined potential local business sectors that can be linked with GVCs and also key challenges and main success factors in relation to linking SMEs with GVCs. A mixed research method that combined both quantitative and qualitative data and analytical tools was employed to accomplish the research objectives. More specifically, 329 SMEs were surveyed to collect quantitative data, while four FGDs and eight KIIs were conducted to gather qualitative information. A regression equation based on three different models was econometrically estimated to quantify the impact of linking with GVCs on the performance of SMEs while descriptive analysis was employed in relation to other objectives of the study. According to the survey findings, over 60% of the 200 entrepreneurs were men. It is felt that the patriarchal values still prevail in these provinces. Nevertheless, there are signs of change with several initiatives of multiple organizations targeting the empowerment of women. The average age of SME holders is between 40 and 50 years. SME holders in Nuwara Eliya district have the lowest educational qualifications followed by Monaragala, while SME holders in Badulla and Matale have the highest educational attainment. According to the survey findings, over 80% of the SMEs in each district are at a micro level. Badulla district accounts for the largest number of micro-level SMEs followed by Monaragala. There are a larger number of industry sector SMEs than agriculture and service sector ones. According to the survey findings, about 80% of micro-level SMEs in Matale district are industry related, while 71.8% and 56.4% are in Monaragala and Badulla, respectively. The study recognized 10 main types of business, including agriculture, farming and dairy industry, food and beverages, arts and craft, and apparel and bag production.

The econometric analysis found that SMEs that are linked with GVCs have a higher level of profit than SMEs that are not. Therefore, there is a positive relationship between linking with GVCs and SMEs’ performance and this relationship is consistent even when the models are controlled by other firm characteristics. Apart from the direct impact of GVCs on SMEs’ performance, the study also observed that linking with

GVCs indirectly increases the performance of SMEs through enhancing the sales revenue and research and development activities of SMEs. In addition to the key findings, the estimated models confirmed that factors such as capital assets, number of workers, sales revenue of firms, human capital, and types of SMEs also affect the performance of SMEs. The descriptive analysis recognized five main business sectors—information technology, apparel, gems and minerals, tea, and other agricultural products, and handicraft—as the sectors with the most potential to link with GVCs. Moreover, among these five business sectors, SMEs in business sectors such as information technology, apparel, and gems and minerals have a greater intention to link with GVCs. Furthermore, the study recognized a total of 10 key challenges that SMEs face when they attempt to link with GVCs. Challenges such as a lack of access to finance, lack of technology, lack of information, inability to meet quality standards, and inability to produce the quantity required were recognized as the most critical challenges. In addition to key challenges, the survey also identified 12 key success factors that stimulate the process of linking SMEs with GVCs. As the survey highlighted, factors such as ensuring the quality of products, the availability of skilled labor, better access to finance, access to better technologies, the ability to produce at low cost, and access to BDSs increase the potential to link SMEs with GVCs.

The findings of the study strongly indicate that government, nongovernment organizations, and policy makers should encourage SMEs to participate in GVCs by allowing them to grow as internationally competitive entrepreneurs. First, it is essential to recognize new SMEs that are interested in linking with GVCs and also SMEs that are already involved with GVCs. Then, it is recommended to ensure a solid public-private partnership in order to inculcate an entrepreneurial culture in the society and to provide advanced technological know-how. Advanced technological know-how can be attracted through foreign direct investment and therefore both Uva Province and Central Province should facilitate to access to such investments efficiently. Moreover, local and international training for SME holders can also be an option to enhance technological know-how. Financial facilities and also access to them should be improved through the help of both state-owned and private banks and financial institutions. In particular, recognized SME sectors such as information technology, apparel, gems and minerals, tea, and other agricultural products, and handicraft should be prioritized when providing financial facilities. Additionally, SMEs should be enriched with symmetric and efficient information and awareness regarding GVCs and production networks, required infrastructure, appropriate BDSs, and training programs to develop human capital capabilities to enhance the SMEs' potential to link with GVCs.

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Annex A10.1

List of Participants

Focus Group Discussion – Badulla

	Name	Institute	Designation
1	LR Lankathilake	Rawana Agro Ltd	Managing Director
2	RM Kulatunga	Industrial Development Board	Deputy Director
3	N Hennayaka	Uva Community Development Center	Program Coordinator
4	Gamini Bandara	Isuru Prajamandalaya	Member
5	RM Dayarathne	Uva Provincial Council	Assistant Director
6	S Attanayaka	Isuru Prajamandalaya	Chairman
7	Nadeshan Suresh	Uva Shakthi Foundation	Director

Focus Group Discussion – Monaragala

	Name	Institute	Designation
1	VGR Wasantha Kumara	Industrial Development Board	Manager
2	KM Jayalath Bandara	Chrysalis	Project Coordinator
3	CMN Dissanayake	Local Governance Department, Monaragala	Deputy Local Governance Commissioner
4	Chamika Madushan	Welfare Development Center – Thelulla	Officer-in-Charge
5	KM Karunarathna	Praja Mandala	Bursar
6	DM Mallika Siriwardana	Praja Mandala – Badalkumbura	Vice-Secretary
7	HN Lalani Nishanthi	Star Baby Kids	Entrepreneur
8	AM Ramya Kumari	AMRK Motors	Entrepreneur

Focus Group Discussion – Matale

	Name	Institute	Designation
1	M Nagalingam	Praja Mandala	Entrepreneur
2	DG Upeksha Niranchala	Member of Praja Mandala	Entrepreneur
3	HM Malkanthie	District Secretariat Office	Enterprise Development Officer
4	Chamarika Madurani	District Secretariat Office	District Coordinator – National Enterprise Development Authority
5	KS Sangeetha	District Secretariat Office	Development Officer
6	PA Anjala	Divisional Secretariat Office	Assistant Divisional Secretary
7	Dasanayake	Pradesiya Sabha, Ambagamuwa korale	Development Officer
8	EA Senavirathna	Praja mandala	President

Focus Group Discussion – Nuwara Eliya

	Name	Institute	Designation
1	Nuwan Suraweera	Nuwan Agro foods	Entrepreneur
2	PGM Jayalal	Industrial Development Board	Manager
3	Devinda Abeyrathna	Araliya Green Hills Hotel	Asst. Food and Beverage Manager
4	Ravi Samaraweera	Matale	Ecofeel, Entrepreneur
5	Sashika Kamaladasa	Strategic Inspiration	Consultant
6	BM Raheem	Berendina Development Services	Senior Manager – Plantation Program
7	MRK Herath	Pradesiya Sabha Nuwara Eliya	Development Officer

Annex A10.2

Key Informant Interviews

List of Participants

	Name	Location	Institute	Designation
1	RD Kumarawansa	Badulla	Chamber of Commerce	Secretary
2	DMJU Dharmarathna	Badulla	Small Business Development Unit – Badulla	Training Officer
3	CMN Dissanayaka	Monaragala	Local Governance Department, Monaragala	Deputy Local Governance Commissioner
4	VGRW Kuamara	Monaragala	Industrial Development Board	Manager
5	Sajeewa	Matale	District Secretariat Office	Director Planning
6	Chamarika Madurani	Matale	District Secretariat Office	District Coordinator – National Enterprise Development Authority
7	PD Chandana Lal Karunaratne	Nuwara Eliya	Municipal Council	Mayor – Nuwara Eliya
8	ERLB Atampawela	Nuwara Eliya	Divisional Secretariat Office	Divisional Secretary

11

Connecting Cambodia's SMEs to Regional Value Chains: “Bridging Gaps” and “Missing Links”

Kha Sok, Runsinarith Phim, Socheat Keo, and Veara Kim

11.1 Introduction

Seven years ago, one of this chapter's authors was engaged in an interview with an operations manager at Liwayway (Cambodia), the Cambodian subsidiary of the Philippine company behind the iconic Oishi snack foods brand and owner of other production plants throughout Asia, including the Philippines, Indonesia, Viet Nam, Thailand, Myanmar, India, and the People's Republic of China (PRC). The Cambodian factory commenced operations at the end of 2012 in the Phnom Penh Special Economic Zone, a Japanese–Cambodian joint venture and an ideal representative of the Japan-pioneered special economic zones with great liberal business environments, effective administrative procedures, and efficient infrastructure capacity. The factory imported automated machinery and equipment from Viet Nam and the Philippines, employed hundreds of local workers, and produced different kinds of snack foods under the brand name Rinbee, which serves both domestic and overseas markets including Japan; the Republic of Korea; and Hong Kong, China; among others.

The decision to open a factory in Cambodia was driven mostly by the firm's operation diversification program while taking advantage of the country's proximity to the firm's plants in neighboring countries, relatively inexpensive labor, pro-trade and pro-investment government policies, and the increasingly connected region in which

Cambodia is located. The two main challenges facing Liwayway (Cambodia) were a lack of labor equipped with the right skills and difficulties in sourcing locally produced raw materials. Some middle managers and quality control positions were filled by Filipino expatriates. Although Cambodia is rich in agricultural products, the country's local producers were insufficiently equipped with appropriate technology and know-how for semi-processing, and this presented challenges in filling the factory's demand needs. For example, Cambodia has palm nuts, but local producers lacked the refining technology to make edible palm oil. A lack of information about potential domestic partners also made any effort to connect with them challenging.

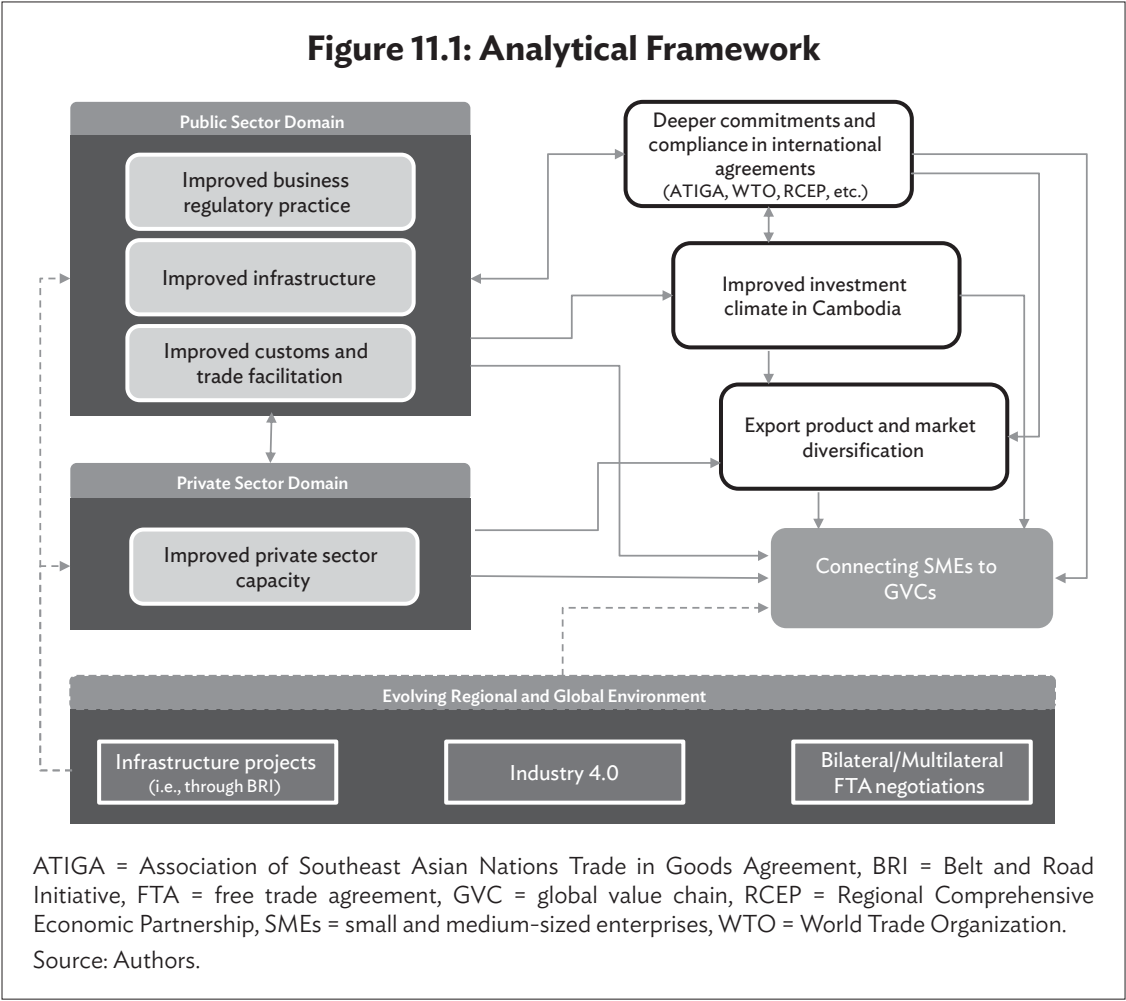
These challenges highlighted the insufficient integration of domestic business into global value chains (GVCs). Against this context, the research in this chapter aims to build a more comprehensive understanding of the status quo of small and medium-sized enterprises (SMEs) in Cambodia and what has worked (the "bridging gaps") and what has not (the "missing links") in terms of promoting their GVC participation.

11.2 Research Methodology

11.2.1 Analytical Framework

Figure 11.1 presents our analytical framework. The blue-shaded boxes represent the analytical boundary within which this chapter conducts assessments, to find out the extent to which the "bridging gaps" and "missing links" are attributable to Cambodia's public capacity domains in creating and improving an enabling environment for SMEs, as well as the extent to which they are attributed to SMEs' capacity to take advantage of an improved enabling environment and thus create significant backward and forward linkages with firms abroad. The results of the "bridging gaps" and "missing links" are manifested as indicated in the orange box or through selected instruments as in the black-outlined boxes.

The research also offers perspectives on (1) emerging lessons learned for successful GVC engagement through two case studies, and (2) how this integration effort and process is affected by the growing uncertain regional and global environment, which is both inspiring and alarming (dashed arrow lines).



11.2.2 Research Methodology

This qualitative study relies on the authors’ desk research, the Enterprise Surveys, the Trade in Value-Added (TiVA) database, relevant economic and survey data, and interviews with five selected SMEs and 10 experts in academia, think tanks, practitioners, and government.

The desk research comprises (1) a review of the secondary documentation including existing research, reports, and media; (2) a review of the institutional landscape, policy documents, legislative and regulatory frameworks, strategies, and incentives that aim to support the participation of SMEs in Cambodia in the GVCs; and (3) the authors’ knowledge bank (e.g., hands-on experience in a broad range of research and government support projects in Cambodia).

The World Bank's Enterprise Survey is a business-level survey of a representative sample of an economy's private sector.¹ Its 2016 database is the latest version for Cambodia. It collects information about a country's business environment, covering various issues identified as the major business constraints by each of the 373 businesses participating in the survey. Among them were included the 131 businesses that also participated in the preceding survey in 2013. Thus, the database also allows for panel analysis in this study. The TiVA online database, a joint initiative of the Organisation for Economic Co-operation and Development (OECD) and the World Trade Organization, is more commonly used to assess an economy's participation in GVCs. TiVA is the outcome of an ongoing international effort to develop measures of trade in value added. TiVA indicators are published by the OECD and based on the 2018 release of the OECD's annual Inter-Country Input-Output (ICIO) tables, which cover the period from 2005 to 2015.²

As for expert interviews, a research tool was developed using unstructured and open-ended questions.³ It is used as guidance for interviews to capture the information required by, and in line with, the analytical framework. Interviews were conducted in person and each lasted between 40 and 90 minutes, depending on the key informant and the amount and quality of information the informant could reveal. The researchers guided the discussions and asked questions relevant to the key informant's business background and knowledge.

11.3 Literature Review

A sizable body of research has examined the measurement of GVC participation. Among them, Hummels, Ishii, and Yi (2001) and Koopman et al. (2010) define GVC participation for a reference country according to when a country embeds its value added in exports both looking backward and forward. Backward participation happens when the country's domestic firms use foreign inputs for exporting activities. Forward participation happens when the country's exports are used as inputs by firms in partner countries for their own exports. Kowalski et al. (2015) provide a good contextual analysis on GVC participation and policy context in developing countries.

¹ The database can be accessed from its online portal at <https://www.enterprisesurveys.org/portal/login.aspx>.

² The TiVA online database can be accessed from <http://oe.cd/tiva>.

³ The research tool and list of interviewed stakeholders are available on request.

In the context of the Association of Southeast Asian Nations (ASEAN), the ASEAN-Japan Centre recently conducted a research project on the level of participation, relevance, impact, and patterns of GVCs across ASEAN member states. Its report on Cambodia found that the country generally has weaker GVC participation than the ASEAN average and has a high concentration of low-skilled and labor-intensive industries, resulting in minimal impacts for the economy. The report suggested that Cambodia has potentials for GVC-led export industries and needs to increase participation in higher value-added GVCs. The report noted that SMEs in Cambodia are weak in terms of entrepreneurial capacity and technology application. They operate inefficiently and face difficulties in establishing supply networks with large companies as well as the GVC-led companies created by foreign direct investment (FDI). The report suggested that greater involvement of Cambodia's SMEs in GVCs is important to ensure a more significant benefit for the country's economy.⁴

The existing literature on Cambodia's SMEs has been predominantly confined to the constraints facing SMEs in terms of governance, customers and markets, human resources, products and services, and access to finance. For example, Harner (2003) conducted field research in 2002 by interviewing 12 banks on the barriers to SME lending and found that the cost of financing was higher than the general average lending rate but also noted that the increased competition in the banking sector would contribute to lowering the financing cost. Baily (2008) reported the issues of weaknesses in the regulatory and legal framework, access to finance, and a lack of SME support activities. Chheang, Oum, and Leng (2010) surveyed 99 firms, most of which have fewer than 50 workers, and identified multiple barriers in different domains: functional barriers (management and finance), competitiveness (product and price), information, and business environment. Some studies highlighted the linkage between firms' characteristics and outcomes. Thangavelu, Oum, and Neak (2017), for example, analyzed survey data of 201 firms and found that larger firms have higher labor productivity, better access to business networks, active use of information and communication technology (ICT), more experience with multiple export markets, and skilled human capital and technological capability. These larger firms tend to have better engagement with free trade agreements and regional integration.

⁴ Section 11.4 presents a detailed discussion on the insignificance and patterns of GVC linkages in Cambodia.

11.4 Overview of Cambodia’s Economy and SMEs

11.4.1 Two Decades of Growth and Industrialization Progress

Cambodia has pursued policies and reforms to integrate itself into GVCs through promoting FDI and cross-border trade since the country’s return to a market-oriented economy in 1989. The effort has led to a significant economic transition over the last 2 decades. Since 2001, the real gross domestic product growth rate has averaged 7.7% per year and has been at least 6% every year except 2009 during the global economic slowdown (Figure 11.2).

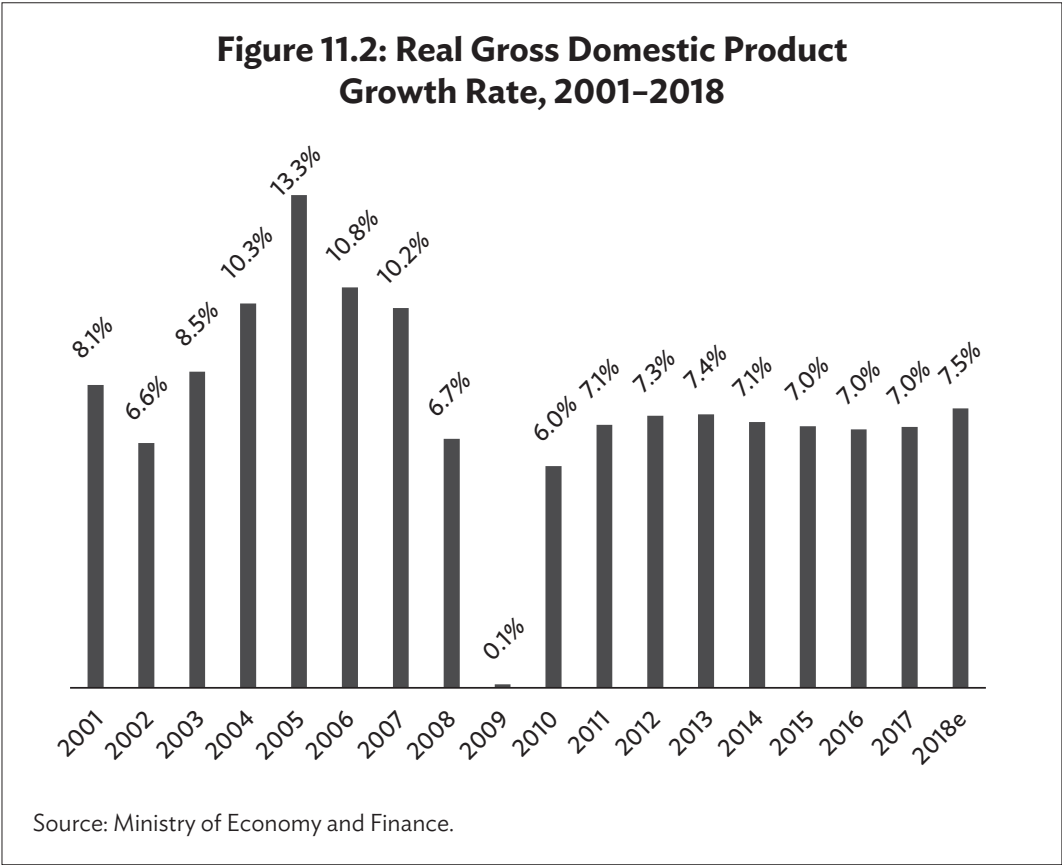
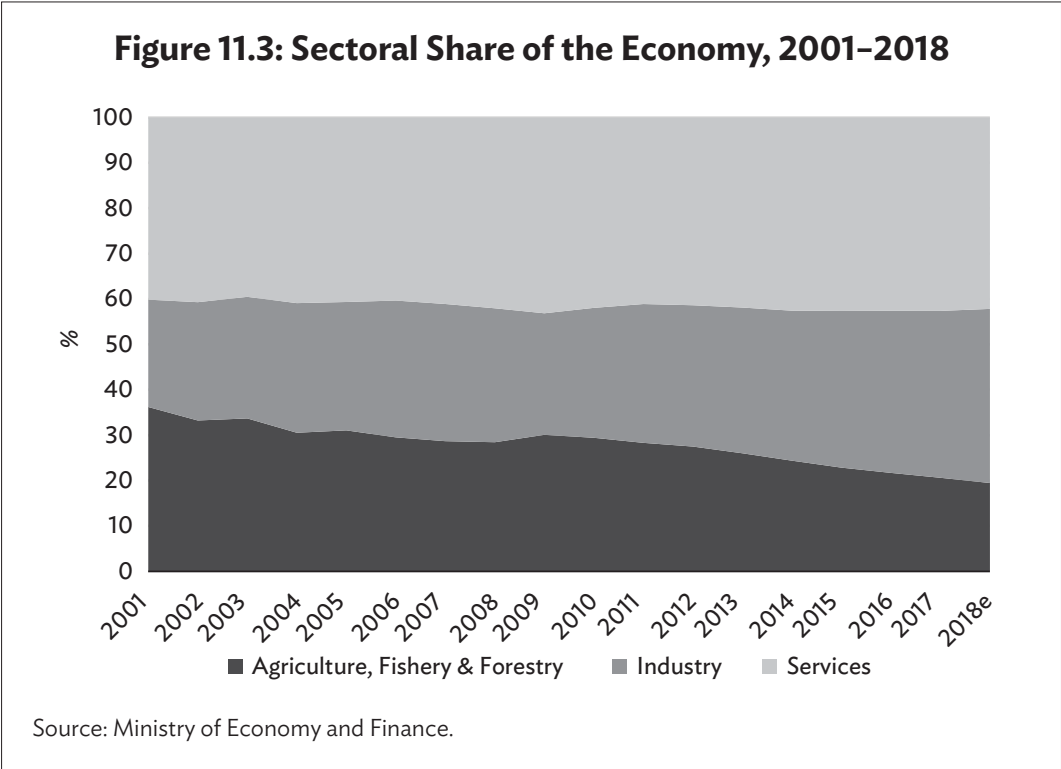


Figure 11.3 indicates that the industry sector share increased to 36% in 2018 from 22% in 2001. The service sector marginally increased to 39% from 38%, while agriculture declined by almost half to 18% from 34% during the same period.



The success in the garment and textile sector has long been a telling story of industrialization progress in Cambodia. The sector began in the mid-1990s and grew quickly to become the largest industry in Cambodia, with apparel and footwear dominating the country’s merchandise export, largely because of relatively inexpensive labor, trade preferential treatments such as the Everything But Arms (EBA) and Generalized System of Preferences, which grants Cambodia duty and quota preferential access to markets in advanced economies including the European Union, the United States, and Japan, and incentive policies such as the Qualified Investment Project (QIP). The government’s efforts to accelerate economic diversification has seen some success, with a surge in other goods export including preprocessed agricultural products, automotive parts and other light manufacturing machinery and equipment products, and bicycles. Figure 11.4 shows that the merchandise export volume grew from \$1.5 billion in 2001 to \$16.5 billion in 2017. The largest export markets include the European Union, the United States, Japan, the PRC, Canada, Singapore, Thailand, and Viet Nam.

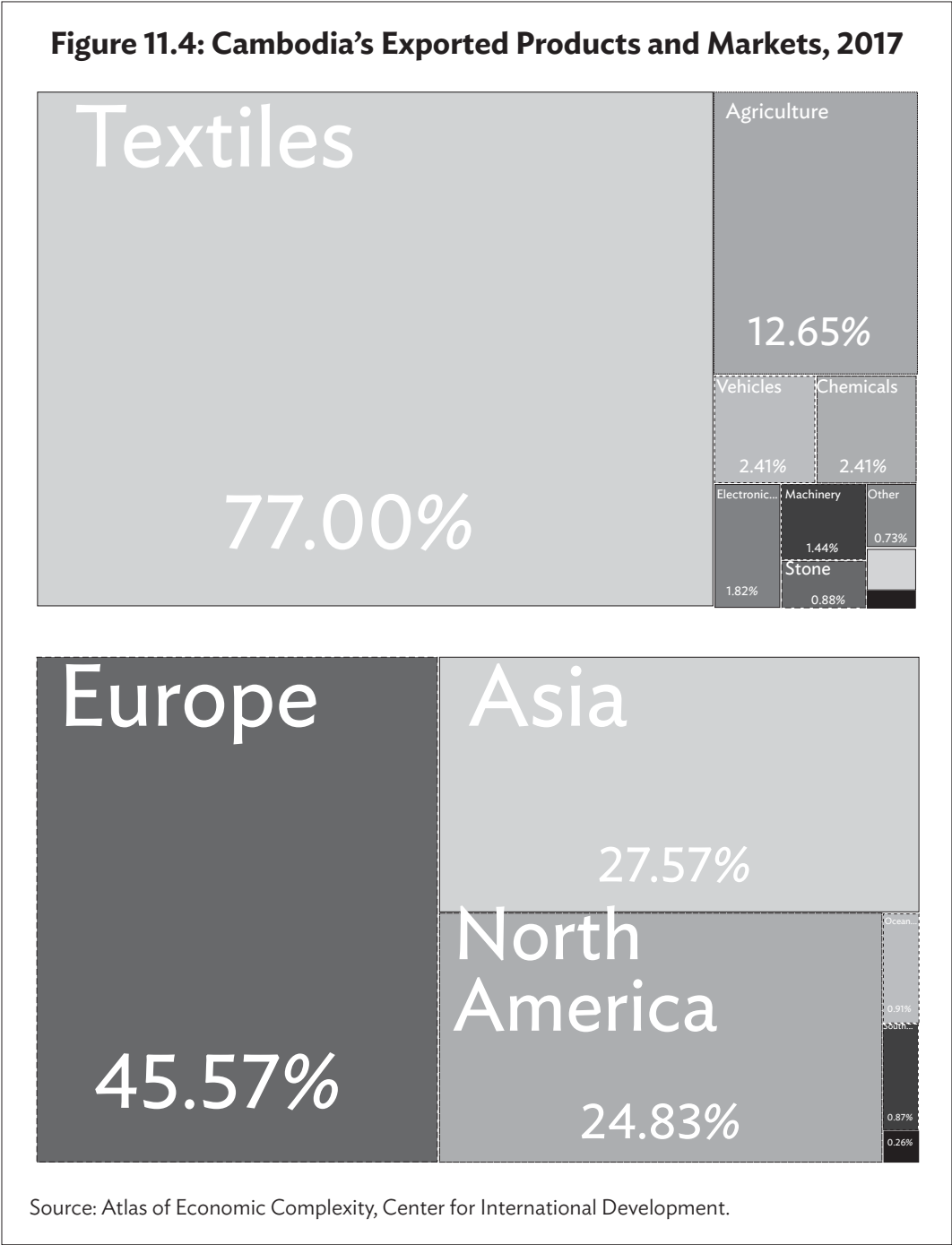
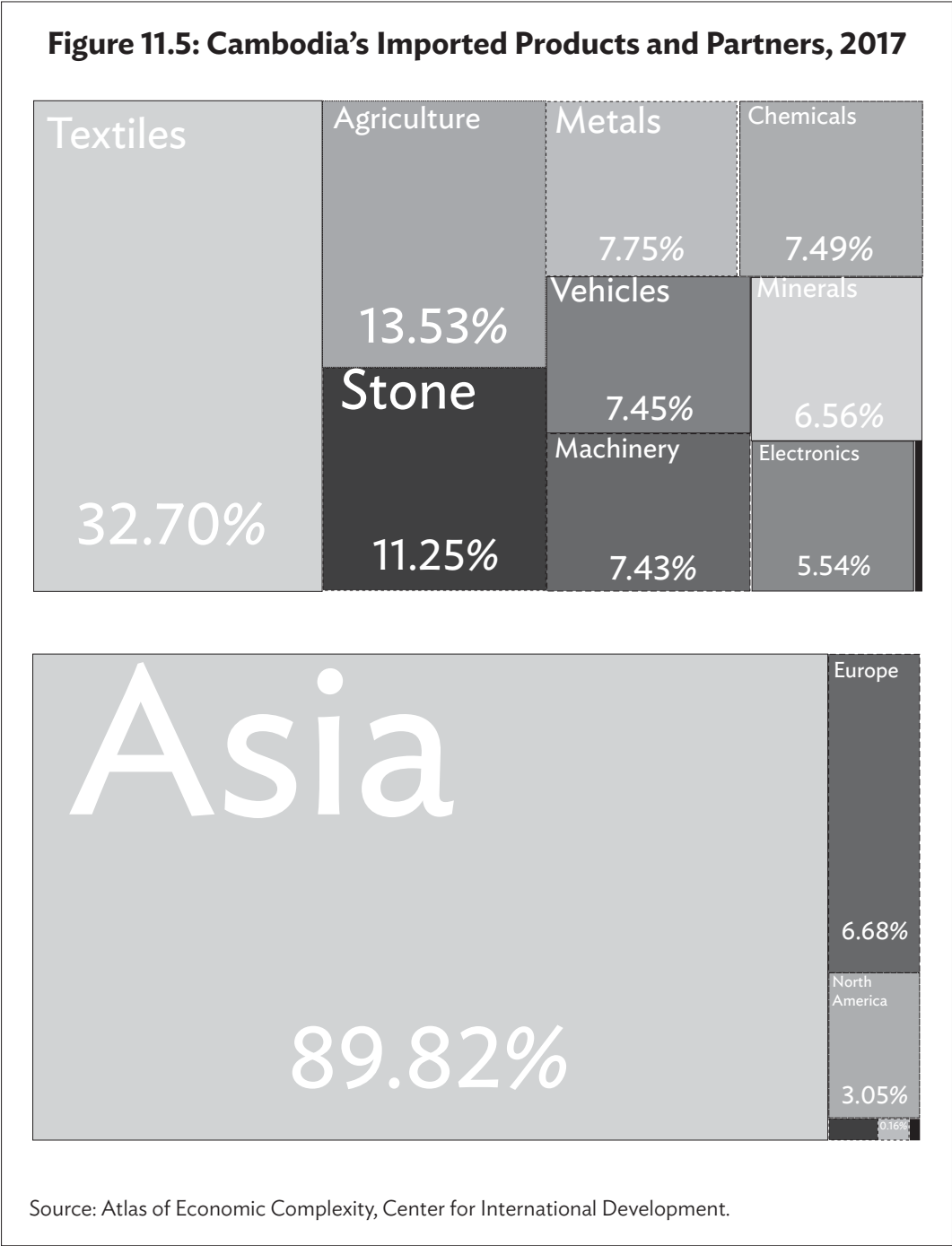


Figure 11.5 highlights the growth in import volume, from \$1.5 billion in 2001 to \$14.6 billion in 2017. Textiles and related garment industry inputs accounted for the largest share. The largest exporting countries include the PRC, Thailand, Viet Nam, Singapore, Japan, and the Republic of Korea.



The poverty rate was 13.5% in 2014, a measurement based on the \$1.90 threshold daily consumption expenditure. The rate was down from the realm of 50% in 2004. The country attained the status of a lower-middle-income country in 2015 according to the World Bank’s classification and set out an ambitious development vision of becoming an upper-middle-income country by 2030 and a high-income country

by 2050. This vision has added momentum to the government's reforms toward further industrial development and integrating further into the GVCs.

11.4.2 Significance of Private Sector and SMEs

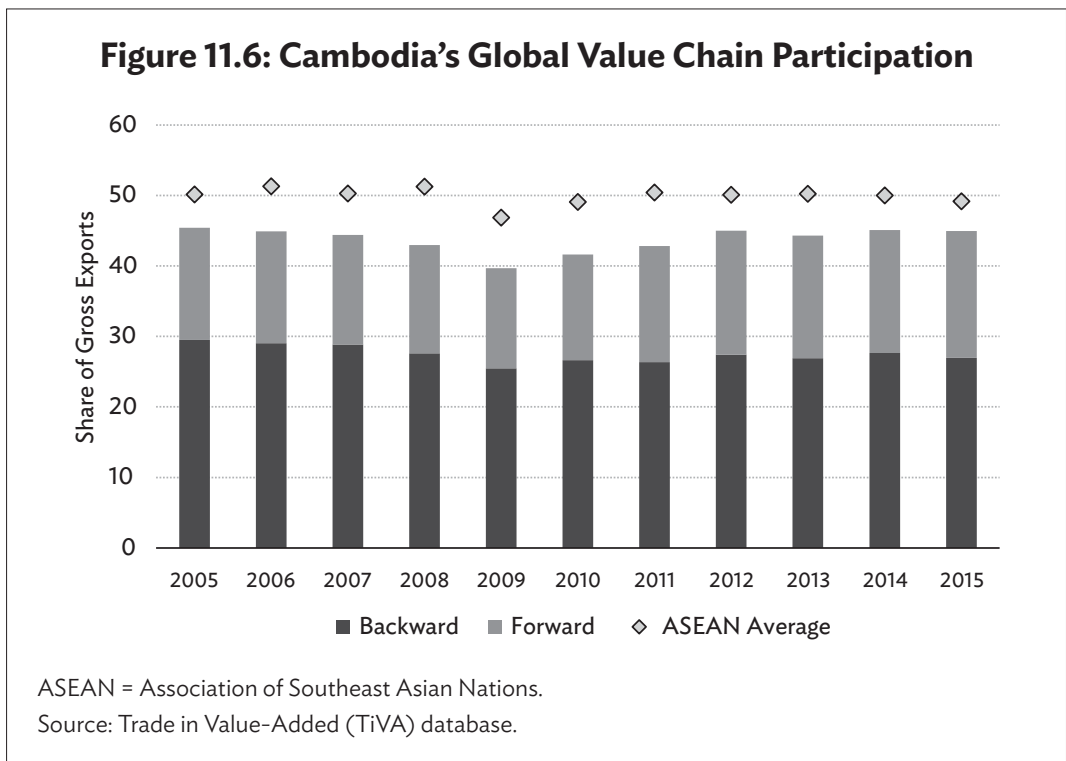
Cambodia's economy is predominantly private. The majority of private businesses are small, many of them family-run. They are the backbone of the economy. The Ministry of Industry and Handicraft noted that SMEs account for 99% of Cambodia's enterprises and contribute over 70% to employment and 58% to gross domestic product (Government of Cambodia 2018).⁵ Generally, these businesses have more issues regarding access to information than bigger businesses, both through formal and informal channels. Therefore, they are particularly affected by the lack of transparency and enforcement in the regulatory regime, and struggle with the complexity regarding regulations and standards, i.e., registration, technical measures, licensing, and export processes. They are generally of limited capacity and less productive. They are also less likely to be able to access finance, pay fewer or no taxes, and typically do not provide training for their workers, or comply with labor laws, other regulations, and standard requirements. These distortions largely explain why their significance is not reflected in their internationalization activities. The Federation of Associations for Small and Medium Enterprises in Cambodia revealed a significant absence of Cambodian-made products overseas as SMEs account for a mere 10% of exports (Sok and Poovenraj 2019).

11.4.3 Insignificant Value Chain Linkage

Figure 11.6 shows that Cambodia's overall GVC participation is below the ASEAN average.⁶ The GVC participation is broken down into backward and forward participation measures and expressed as shares

⁵ The government's SME Development Framework 2005 set out the official definition of SMEs in Cambodia. They are defined in two ways: based on the number of full-time employees (used for statistical purposes mainly), i.e., between 10 and 100; or based on total assets (excluding land), i.e., between \$50,000 and \$500,000. These definitions, however, do not perfectly map onto each other; for instance, some enterprises with fewer employees could have more than \$500,000 in assets. To the best of our knowledge, there is an ongoing effort to uniformly redefine SMEs, to make all the policy measures applicable, and for SMEs to take advantage of various incentive measures.

⁶ ASEAN in the TiVA database excludes the Lao People's Democratic Republic and Myanmar due to data unavailability.



of the country’s exports. The strong backward participation showcases the fact that the country has thus far embraced the Factory Asia growth model, relying largely on foreign value added, in combination with trade preferential treatments and inexpensive low-skilled labor to give a boost to the country’s industrialization and its exports. The weak forward participation highlights the low level of upstream activities in the country.

Sector-wise, the magnitude of Cambodia’s overall GVC engagement is limited to only a few industries. The manufacturing is mostly involved in GVCs, led by textile products, leather, and footwear; food products, beverages, and tobacco; agriculture; transportation and storage; and wholesale and retail trade (Table 11.1).

Cambodia has demonstrated the strongest connection with ASEAN as a bloc and regional economies. They include selected ASEAN member states, the PRC, Japan, the Republic of Korea, the United States, Mexico, and a few European countries (Table 11.2).

Within ASEAN, Singapore has the highest average GVC participation rate (62.8%), followed by Malaysia (58.0%), Viet Nam (53.4%), Thailand (51.5%), the Philippines (46.4%), Cambodia (43.7%), Brunei Darussalam (42.2%), and Indonesia (41.1%). The average for ASEAN stands at 49.9% (Figure 11.7).

**Table 11.1: Magnitude of Cambodia's
Global Value Chain Participation by Sector**
(% of gross export)

	Backward			Forward		
	2005	2010	2015	2005	2010	2015
Agriculture	7.7	3.3	3.6	0.7	0.5	0.7
Mining and quarrying	0.0	0.0	0.1	0.4	0.4	0.3
Manufacturing	19.2	18.5	17.9	12.5	11.1	14.1
Food products, beverages, and tobacco	2.2	1.3	1.3	5.2	3.6	4.7
Textiles, textile products, leather, and footwear	11.6	9.1	8.8	2.0	0.9	2.0
Wood and paper products and printing	0.9	1.2	0.4	0.6	0.6	0.5
Chemicals and nonmetallic mineral products	1.5	2.2	2.0	1.2	1.5	1.4
Basic metals and fabricated metal products	0.7	1.8	1.2	0.4	0.5	0.5
Computers, electronic and electrical equipment	1.0	0.8	2.2	1.3	1.6	2.5
Machinery and equipment n.e.c.	0.5	0.6	0.7	0.4	0.5	0.5
Transport equipment	0.6	0.9	0.6	0.6	0.8	1.3
Manufacturing n.e.c. repair of machinery and equipment	0.3	0.5	0.6	0.9	1.1	0.7
Electricity, gas, water supply, sewerage, waste, and remediation services	0.0	0.0	0.0	0.0	0.0	0.0
Construction	0.0	0.0	0.0	0.0	0.0	0.0
Total business sector services	2.5	4.7	5.2	2.3	2.9	2.8
Wholesale and retail trade; repair of motor vehicles	0.5	0.9	1.1	0.8	0.7	0.7
Transportation and storage	1.3	2.6	2.9	0.5	0.8	0.8
Accommodation and food services	0.5	0.5	0.7	0.5	0.4	0.5
Publishing, audiovisual, and broadcasting activities	0.0	0.0	0.0	0.0	0.1	0.0
Telecommunications	0.1	0.4	0.3	0.1	0.3	0.1
Information technology and other information services	0.0	0.0	0.0	0.1	0.1	0.1
Financial and insurance activities	0.0	0.0	0.1	0.1	0.2	0.2
Real estate activities	0.0	0.0	0.0	0.0	0.0	0.0
Other business sector services	0.1	0.2	0.2	0.2	0.3	0.3
Public administration, education, health, and other personal services	0.1	0.1	0.1	0.1	0.1	0.1

n.e.c. = not elsewhere classified.

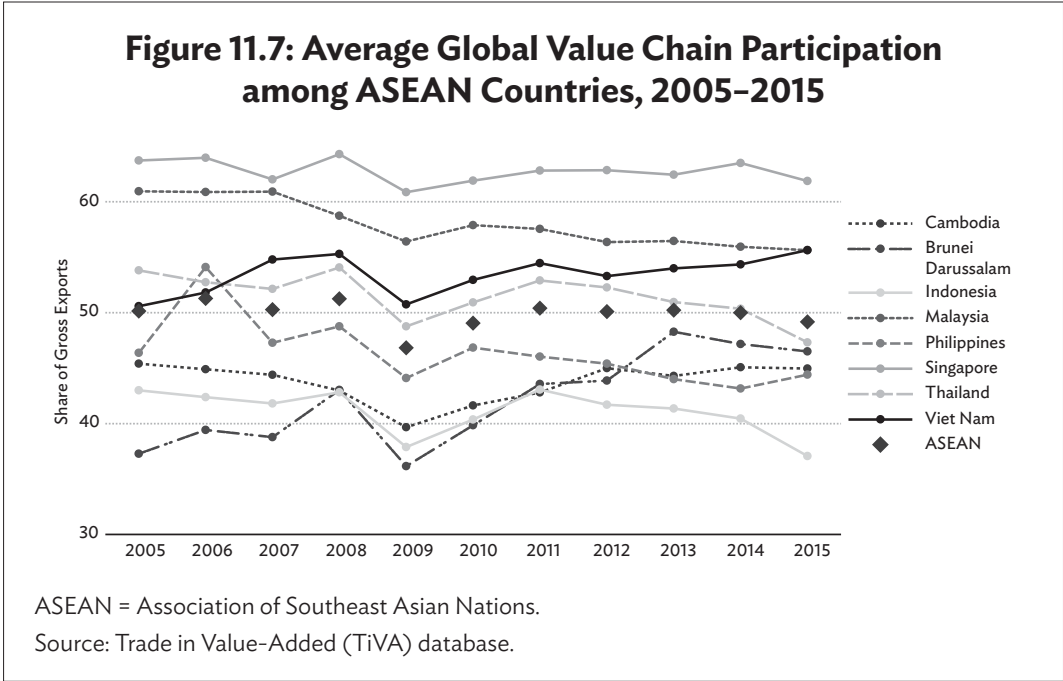
Source: Trade in Value-Added (TiVA) database.

Table 11.2: Cambodia’s Top 10 Partners
in Global Value Chain Participation

	Backward			Forward		
	2005	2010	2015	2005	2010	2015
1	PRC	PRC	PRC	VIE	VIE	VIE
2	TAP	HKG	THA	PRC	THA	THA
3	HKG	TAP	JPN	THA	PRC	PRC
4	JPN	THA	VIE	MAL	SIN	SIN
5	THA	KOR	KOR	SIN	MAL	KOR
6	VIE	JPN	TAP	SVK	HKG	USA
7	MAL	VIE	HKG	USA	USA	MAL
8	USA	USA	USA	MEX	KOR	JPN
9	FRA	MAL	SIN	FRA	GER	MEX
10	INO	INO	IND	GER	LUX	GER

FRA = France; GER = Germany; HKG = Hong Kong, China; IND = India; INO = Indonesia; JPN = Japan; KOR = Republic of Korea; LUX = Luxembourg; MAL = Malaysia; MEX = Mexico; PRC = People’s Republic of China; SIN = Singapore; SVK = Slovak Republic; TAP = Taipei,China; THA = Thailand; USA = United States; VIE = Viet Nam.

Source: Trade in Value-Added (TiVA) database.



11.4.4 Modes of SMEs' Global Value Chain Participation and Enduring "Gaps"

Evidence at both micro and macro levels reinforces the notion of limited GVC participation among SMEs in Cambodia and the implication that "gaps" exist to be linked or bridged.

Among the 71 SMEs recently surveyed by the Ministry of Industry and Handicraft, half of the firms reported having engaged in internationalization activities (Government of Cambodia 2019b). Of these, most focus on only basic forms of engagement, including importing (53%), cooperating with foreign firms (39%, through joint venture, business contract, franchising, etc.), and exporting (22%). More complex engaging activities are limited, including being subcontractors to foreigners (11%), having foreign subcontractors (11%), or investing abroad (8%).⁷ The surveyed SMEs reported that they need, or strongly need, information about various types to promote their internationalization: 86% of them need information on standards, followed by information on regulations (77%), support policies/programs (76%), trade and investment agreements and their requirements (73%), service providers (62%), and others, i.e., finding business partners (55%).

Another survey,⁸ in which this chapter's author directly interviewed 15 agro-processing SMEs, found that primary processing still makes up the majority of agro-industry and normally performs only one value-added activity (besides packaging) before selling mainly to the domestic market. Cooking, grinding, drying, roasting, and/or packaging are the most common value-added activities. It is often reported that a large proportion of Cambodia's agro-products, including cassava, maize, and cashew nuts, has been exported both formally and informally to neighboring Thailand and Viet Nam to be processed for export. The assessment concluded that limited quantity, poor quality, and the seasonality of local raw materials were the most common supply-side constraints. The most common demand-side constraints included limited information access that could lead to an informed decision regarding the market needs, access to buyers, payment terms that create high up-front costs, and certification regarding safety and standards, which was an

⁷ The added-up percentage is over 100% as some of the SMEs reported having engaged in multiple forms at the same time.

⁸ The assignment was conducted for the Overview of Agro-processing Industry project, commissioned by the second phase of the Cambodia Agricultural Value Chain (CAVAC) program. The project report was prepared and maintained as an unpublished CAVAC internal resource for their intervention program and support to SMEs in Cambodia in their commercialization and diversification.

issue affecting mostly secondary processors and exporters. Regulatory constraints were of little concern for processors focusing on the local market. Some primary processors reported aspiring to export their products, but they lack knowledge of the export process. For processors looking to expand, a lack of financing was a significant constraint.

Another survey,⁹ in which 50 domestic and foreign firms operating in Cambodia in garments, electronics, and other light manufacturing sectors were interviewed, noted that domestic firms generally have a high degree of constraint issues in meeting the requirements of foreign firms—in terms of quantity, quality, and distribution. On the one hand, there are no information facilities that indicate what the requirements are. On the other, the compliance cost itself is remarkably high, i.e., in terms of quality, safety standards, hygiene standards, and Good Manufacturing Practice certificates, among others, thereby constraining domestic business in connecting with foreign firms. Purely domestic firms reported having relatively more capacity constraint issues than those with foreign partners, due to the different degree of acquiring know-how and technical skills. The survey concluded that domestic SMEs were not in a ready state to connect to GVCs and acknowledged that an important first step was to collaborate with foreign firms so as to acquire significant know-how and technical skills. The survey also noted that there is a missing link between domestic SMEs and FDI, particularly when the FDI is a QIP. Such a project is entitled to receive investment incentives, including profit tax exemption for a specified period, or special depreciation allowance, import tariff and export tax exemptions, and value-added tax exemption. A QIP will not be able to claim back value-added tax if it sources materials locally. Other major challenges for SMEs in connection with FDI include a lack of trust and the payment terms, i.e., payment made 40 days after delivery of the goods.

A multitude of gaps also persist in the business environment. The Enterprise Survey 2016 identified major constraint issues reported by each of the 373 businesses participating in the survey (Table 11.3). These businesses are grouped into three distinct sectors: manufacturing, retail, and other services.

Constraints cited as being major or very severe include: competition in the informal sector (32.0%); crime, theft, and disorder (24.2%); inadequately educated workforce (17.6%); access to finance (16.9%); transportation (12.0%); business licensing and permits (11.1%);

⁹ This survey was on FDI–SME linkages and was part of the assignment commissioned by the International Finance Corporation. The survey report was not made available to the authors at the time of this study’s drafting. However, one of our interviewees who directly engaged in conducting the survey kindly elaborated the findings.

Table 11.3: Enterprise Survey 2016 Industry Sampling

Industry Sampling	Number	%
Manufacturing		
Food	39	10.46
Textiles	6	1.61
Garments	46	12.33
Wood	2	0.54
Paper	1	0.27
Publishing, printing, and recorded media	8	2.14
Refined petroleum product	2	0.54
Plastics and rubber	2	0.54
Nonmetallic mineral products	4	1.07
Basic metals	6	1.61
Fabricated metal products	3	0.8
Machinery and equipment	1	0.27
Electronics	1	0.27
Precision instruments	2	0.54
Furniture	5	1.34
Recycling	3	0.8
Retail		
Retail service	123	32.98
Other Services		
Construction sector	9	2.41
Services of motor vehicles	7	1.88
Wholesale	22	5.9
Hotels and restaurants	69	18.5
Transport sector	11	2.95
Information technology	1	0.27

Note: Sample size = 373. The survey did not include businesses with fewer than five employees.
Source: Enterprise Surveys database (World Bank 2016).

corruption (10.2%); customs and trade regulations (8.0%); tax rates (6.5%); tax administration (6.4%); electricity (6.1%); labor regulations (5.2%); and court system (4.0%). While the reported constraint issues have the same implications for surveyed firms of all sizes, important highlights include the following:

- Informality masks the severity of business regulation constraints.
- Manufacturing firms report labor regulation as being a more severe constraint, whereas tax administration is identified as a less severe constraint issue for manufacturing businesses than for retail and other service firms.
- Larger businesses and exporters are more likely to have issues with business regulation constraints, presumably because they deal more with business regulations than their smaller counterparts and nonexporters.
- Foreign-owned businesses (with at least 10% foreign ownership) report that all business regulation constraints are more severe than do domestic firms. This may be because the actual practice and enforcement of business regulation fails the high expectation set by foreign-owned businesses based on their understanding of the written regulatory documents.

The panel Enterprise Survey data set illustrates noticeable improvements in the constraint issues reported by 131 businesses that participated in both the 2013 and 2016 surveys (Table 11.4). That said, the extent to which the business regulatory constraints undermine the

**Table 11.4: Reporting “Major” or “Severe”
Constraint Issues, 2013 vs. 2016 (%)**

Reported Constraints	2013	↑↓	2016
Competition in the informal sector	34.8	↑	24.8
Crime, theft, and disorder	16.1	↓	18.8
Inadequately educated workforce	26.8	↑	10.7
Access to finance	22.5	↑	8.4
Transportation	14.4	↑	9.4
Business licensing and permits	3.6	↓	11.3
Corruption	57.1	↑	9.4
Customs and trade regulations	8.4	↑	4.9
Tax rates	31.3	↑	3.7
Tax administration	24.3	↑	21.8
Electricity	40.5	↑	5.3
Labor regulations	1.0	↓	4.5
Court system	17.1	↑	7.0

Note: ↑ implies reported improvements and ↓ reported deterioration.

Source: Enterprise Surveys Panel database (World Bank 2016).

business operations remains large, with high two-digit numbers being reported on half of the issues.

Constraints are also manifested in macro-level evidence. The country is 144th out of 190 economies in the World Bank's Doing Business ranking. Cambodia also ranks low across the World Bank's Governance Indicators, particularly in terms of control of corruption, rule of law, government effectiveness, and accountability. The country scored 0.49 in the World Bank's Human Capital Index, ranking 99th out of 157 countries. Transparency International places Cambodia 162nd out of 180 countries in its 2019 Corruption Perceptions Index. Cambodia ranked 98th out of 160 economies on the Logistics Performance Index 2018, performing worst at 130th for the infrastructure component. Inadequate infrastructure capacity and performance in logistics results in higher costs and subsequently affects the country's economic competitiveness, which is also reflected in the Global Competitiveness Index's 2019 edition, where Cambodia was ranked 106th out of 141 economies.

11.5 Discussion: Bridging Gaps and Missing Links

The assessment and evaluation that follows concern the "bridging gaps" and "missing links."

11.5.1 Business Environment and Regulatory Practice

While acknowledging ongoing government efforts to address the reported constraint issues, the collective observation among interviewed experts highlights an overall minimal improvement concerning business regulation and regulatory practice.

At the macro level, the recent effort includes the launch of the Cambodia Trade Integration Strategy Update (CTISU) 2019–2023 in July 2019 (Government of Cambodia 2019a). Prepared by the Ministry of Commerce, the CTISU includes action points to support SMEs operating in various sectors including agriculture and light manufacturing industries. For instance, Chapter 2 calls on the private sector to identify the export skills needs of Cambodian SMEs in such areas as market research, export marketing strategy, supply chain management, sales development (direct sales to domestic exporters; export sales to global and regional value chain actors), branding, use of electronic markets, use of social media, etc.—and then implement training programs on these skills. Other reforms include: (1) the subdecree on SME tax incentives, aiming to support SMEs in six priority sectors, related to agro-industry and food production and processing, through exemption of tax on profit, prepayment of profit tax and minimum tax, and special deductible

expenses, with a few attached conditions; (2) establishment of an SME bank with initial capital of \$100 million to increase access to financing for Cambodian SMEs with preferential conditions; (3) establishment of an entrepreneurship fund with a budget of \$5 million a year to cultivate an entrepreneurial culture and attitude and promote the capacity of both high-potential SMEs and innovative start-ups; and (4) establishment of a joint skills development fund between the government and the Asian Development Bank with a budget of \$5 million for upgrading the skills of workers employed in high-growth sectors. Whether or not these new initiatives translate into better engagement of SMEs in GVCs is too soon to say.

Interviewed SMEs have not expressed high hopes about these reform agendas, given the little detail on implementation strategies and coordination issues evolving in the reform agenda. For example, the iconic Cambodia Industrial Development Policy 2015–2025 delegates reform actions to various line ministries, but these actions are described in broad statements with few details. Delegation to multiple ministries has often led to accountability and coordination issues. Practitioners, authors included, have had long experience working with government agencies on multiple development projects and broadly agree that there are persistent challenges in terms of coordination.

Interviewees expressed mixed perceptions on the improvements in corruption practice, tax administration, and anti-competitive practice. Corruption affects the efficiency of public services, ranging from investment-related business licensing and operating permit applications and taxation to customs clearance and other services, which in turn create a strong divergence in the cost–benefit equation for many SMEs to decide on formalization. On the cost side, this includes not only the time and costs associated with registering a business, but also the ongoing compliance and administrative burdens associated with regulations, taxation, and dealing with different government authorities. Complying with these cost elements is a daunting task for businesses in addition to their trust deficit with the government. Businesses are concerned that the government wants more information about them to tax and regulate instead of aiding businesses. The benefits side includes improved access to financial services and other business development services, which are not appealing in themselves, i.e., collateral restriction and cost of financial products, hesitating to utilize business development services.

The improvement regarding access to finance receives high praise from interviewees, due to the large number of active financial institutions in the Cambodian market that create a good pool of sources of finance for SMEs. In 2018, Cambodia’s banking system consisted of

43 commercial banks (15 locally incorporated banks, 15 subsidiary banks, and 13 foreign branch banks) and 14 specialized banks (one state-owned bank and 13 private banks). There are 353 microfinance institutions (MFIs) including seven deposit-taking MFIs, 73 MFIs, and 273 rural credit institutions. Banks such as Aceda, Canadia, ABA, and Sathapana and MFIs such as Hattha Kasekar have extensive experience in lending to SMEs in Cambodia. The SME Bank was also established recently. The complexity of application procedures and the collateral requirements, however, remain obstacles for businesses in applying for loans. The cost of finance is still viewed as a "missing link." Typical interest rates on SME loans range from 11% to 16%. The loans are mostly short term, 5 years at most, because local financial institutions have limited capacity to offer longer loan tenors due to their reliance on short-term deposits. SME loans also have a strict collateral requirement, which disqualifies some SMEs that do not have access to the right sort of collateral, i.e., real estate property, vehicles, and third-party guarantees. In a related context, the growth in bank credit to the private sector has risen overall, but much was directed toward construction and real estate-related activities at a combined 35% in 2018. The share for agriculture and manufacturing is much lower, at 0.6% and 0.4%, respectively. The credit constraints undermine growth in sectors where access to finance is particularly challenging. It is hindering businesses' ability to expand, invest in new equipment and technology, gain access to foreign markets, and manage their liquidity efficiently.

11.5.2 Infrastructure and Logistics

Interviewed experts opined that electricity has seen minimal improvements, highlighting the high electricity cost and multiple power cuts the country experienced during the dry season in 2019 and previous years. Conventional electricity production such as hydropower is prone to seasonal changes in the water in the reservoir. The high electricity demand during the dry season often adds pressure to the limited energy supply resulting from increasing economic activities, i.e., growing PRC investment, frequent droughts, longer dry seasons, and the intensifying impacts of climate change. The power cuts are often crafted to avoid disruption to industrial complexes and major commercial sectors as much as possible. The situation is often grimmer for SMEs, however, frequently forcing them to shut down their production line due to a lack of lighting and air conditioning and running machinery. Some opt to use generators, which is typically more expensive than using energy from the power grid. One expert estimated 20%–30% of damage to the production process of manufacturing SMEs.

Interviewees did not express a favorable opinion toward improvement in transport infrastructure either. Certain improvements are already taking place following infrastructure development and rehabilitation efforts and new momentum, i.e., the National Logistics Master Plan. The transportation cost remains higher than in neighboring countries, however. Experts are of the view that SMEs become more affected by transport costs when they grow larger and engage more in GVC activities such as exporting and importing. The transportation fees per container of goods could cost the importers and exporters more than \$500 and \$800, respectively, when an associated unofficial fee is involved.

11.5.3 Customs and Trade Facilitation

Improvements in these areas have largely manifested in the form of streamlining and modernization of trade-related procedures. The cases in point include the introduction of the automated customs processing system called the Automated System for Customs Data (ASYCUDA) in 2008 to facilitate export, import, and goods in transit. The system is now implemented at all ports and checkpoints and covers all Single Administrative Documents and trade volume data. Cambodian customs also launched mobile apps such as the Customs Tariff and Customs Clearance Handbook apps with a view to strengthening transparency in trade-related information. Work to establish a fully operational and well-performing National Single Window (NSW) is ongoing. It is a trade facilitation automation platform for customs clearance procedures that consolidates all documentation processes into a single, ICT-based submission for importers and exporters. At the time of this study, businesses can, for instance, now use the NSW to request and exchange Rules of Origin certificates required for tariff preferences for ASEAN markets. The Ministry of Economy and Finance also launched the National Trade Repository portal in late 2015, which serves as the official source for all regulatory information relevant to traders who wish to import goods into Cambodia or export to other countries and makes information on trade legislation and policies available to a broad range of stakeholders. Following 10 years in the making, the e-commerce and consumer protection laws were approved and enacted at the end of 2019, providing a basic legal and regulatory framework for electronic transactions and signatures as well as for accessing and sharing information and data in cross-border trade transactions.

The missing links, as interviewees opined, are first that these developments have not reached out to the SMEs, which generally have less access to information than bigger companies and struggle with

increasingly complex regulations and standards (including import and export processes, technical measures, and registration). Also, the trade facilitation implementation only targets certain industries, i.e., garments, footwear, textiles, and rice, which means there is little help in terms of facilitating import and export for SMEs in such priority sectors as agro-industry and nongarment manufacturing. The absence of SME representatives in the existing trade-related public–private consultation mechanism has undermined their advocacy capacities to make new improvements in trade facilitation work in their favor.

11.5.4 Private Capacity Improvement

Having had limited success in “bridging the gaps,” as was discussed, implies greater pressure on SMEs whose capacity, as will be discussed, manifests as a “missing link” itself.

An inadequately educated workforce is validated as the remaining gap. The underlying causes are complex and interrelated. For example, the cost of schooling is a barrier to education for some children. Although primary education is free, parents must pay for uniforms, books, and school supplies, as well as informal fees. Due to their low compensation, teachers often collect informal fees for extra tuition, creating extra financial burden for children and their families. According to the Ministry of Education, Youth, and Sport, the low and declining completion rates, i.e., from 80% at primary school to 43% at lower secondary and 20% at upper secondary (Government of Cambodia 2017), reduce the supply of potential students for technical and vocational education and training and for university. A university degree, particularly in social sciences, is much preferred by students and their families to technical and vocational education and training but often does not match the demands of employers. Once completed, quality becomes another major issue. In the job markets, skills gaps and mismatches are frequently reported as issues.

The overall human resource constraints also apply to business owners and management. They can include issues such as weak corporate governance, poor financial literacy, an entrepreneurial mindset, a lack of negotiation skills, and networking, among others. These features of human capital are noted by our interviewees to be linked to the success of some SMEs in Cambodia.

Interviewed experts still observe the missing links in the production capacity, market access, financing, raw materials and finished products, information access, standards, and certificate issues. For example, they are of the view that the limited information availability continues to prevent SMEs from making informed decisions over such matters as

potential business partners and markets, raw material sources, ways to import and export, and international requirements and standards, among others. There are multiple attempts to address the issues. The cases in point include the launch in 2017 of the Business Information Center with technical support from the Asian Development Bank and the Australian government-supported Mekong Business Initiative. The Business Information Center aims to provide SMEs with a one-stop resource for up-to-date information on business laws and regulations, opportunities, and business support services. It aims to play a leading role in clearing obstacles to business incorporation and formalization. The Young Entrepreneurs Association of Cambodia administers and operates the platform. One of our interviewees noted some challenges facing the Business Information Center, including the availability and quality of up-to-date information, user journey improvement needs, and the organizational and financial capacity to run and operate the platform. The Ministry of Industry and Handicraft is currently seeking to develop a national SME information portal to provide formal and reliable information to SMEs for their development and internationalization. However, interviewees cautioned about the sustainability issue if the platform is administered by the public sector, noting that there are multiple cases where the fully developed and functioning systems fail at the closure of the donor-supported programs.

11.5.5 Representative Cases of SMEs and Underlying Successful Factors

Some SMEs have grown and engaged successfully in GVCs amid the enduring missing links (Boxes 11.1 and 11.2).

The successes of the two firms are attributed to various intertwined factors that remain a valid set of good reference examples for other SMEs. A strong entrepreneurial spirit is one and will create modern and registered businesses rather than inefficient and informal ones. Informality means little compliance with business regulations in terms of business registration, tax payment, improper bookkeeping and accounting practice, etc., and thus makes any effort by regional and global firms to connect with domestic businesses challenging. Visionary leadership is important to bring the business to a new level and to plan for future expansion beyond the domestic markets. This in turn generates a strong willingness to adapt to change and enhance business practice with improved standards and production capacity to meet growing market needs. These firms tend to be more proactive in terms of accessing needed information regarding market opportunities and embracing those opportunities. They build a strong

foundation of business networking and a working relationship with the government and development partners through which they can access firsthand information and technical support. They actively take part in regional and global trade fairs to gain more international exposure and experience in dealing with foreign buyers and suppliers as well as accessing potential overseas markets. They make themselves ready for and continue to seek opportunities to strengthen their engagement in internationalization activities through cooperation with foreign firms in different forms, i.e., joint ventures. This will result in rising productivity and production and export capacity through acquiring newer and more advanced know-how and technology, financing, marketing, and other management knowledge that will subsequently expand their GVC participation.

Box 11.1: LYLY Food Industry Co., Ltd.

LYLY's director, Keo Mom, is described as having a strong entrepreneurial spirit from a young age, despite having had a low educational background and being a woman. She felt the market opportunity when she was working low profile at foreign firms, during which she also acquired relevant knowledge and know-how. She kick-started as a first mover in the food industry by launching LYLY back in 2002, with working capital of \$100,000 from her own savings and loans from relatives. Implementing all the know-how she acquired during her service in foreign firms regarding machinery operation, staff management, and financing, among other things, she grew LYLY from a small production facility with just over 20 staff members into a big well-known cracker producer in Cambodia, employing over 200 Cambodians.

She has proactively built up a strong foundation of networking, both directly and through her affiliation with business associations, with government, development partners, and domestic and overseas business communities. This foundation has helped her business grow to the point where the Cambodian government and development partners would want to strengthen their support to make it an example of Cambodia's limited success stories of small and medium-sized enterprises (SMEs), assisting the company in terms of firsthand information access, government procedures, technical assistance, business partner matching, etc.

LYLY aims to support local industries by sourcing raw materials from Cambodian farmers and businesses as much as possible. Today, less than 20% of raw materials, including palm oil, seasoning, and milk powder, are sourced from Thailand and Malaysia, to ensure sufficient supply of quality input and

continued on next page

Box 11.1 *continued*

maintain production capacity. Machinery and technology are imported from the People's Republic of China. The factory applies the methods and strategies of 5S (in five Japanese words, i.e., seiri, seiton, seisō, seiketsu, and shitsuke, which literally mean sort, set in order, shine, standardize, and sustain) and Kaizen (continuous improvement) in the production, and it acquires quality, hygiene, and safety standards and certificates. These have been particularly critical in ensuring the company's strong foothold in domestic markets and export activities. The company exports its products to the United States, Canada, Australia, Thailand, Malaysia, and the Republic of Korea, among others.

The company's new joint venture with Japanese rice cracker maker Kameda Seika Co. has been in full operation since mid-2019, expanding its output and cultivating new markets such as Australia and New Zealand. A combination of push factors from the Japanese side, pull factors from LYLY, and the business matching and supportive role of such relevant associations and platforms as the Japan External Trade Organization, Japan International Cooperation Agency, and Cambodia-Japan Business and Investment played a critical role in materializing the venture. According to the director, it may trace back to the past cooperation activities between LYLY and these Japanese organizations as well as her firm's participation in a project run by the Asian Productivity Organization, largely with the support of Japan's Ministry of Agriculture, Forestry, and Fisheries. The director reported having often conveyed to the Japanese side through these organizations her willingness to form business partnerships with potential foreign firms. One day, she received an unexpected phone call from Kameda, telling her they had obtained her contact from the Ministry of Agriculture, Forestry, and Fisheries and expressing their interest in LYLY as Kameda was also looking to expand their production base to Cambodia. Several exchanges between the two firms followed, specifically with Kameda sending their experts and audit team to LYLY to learn about the production and financial practice before they reached an agreement. Keo Mom, on her part, welcomed the opportunity, believing that her firm would further expand by taking advantage of Kameda's expertise in quality management and capital. She noted that standards of quality and hygiene and bookkeeping and accounting practices that her firm had been improving for years with support from the government and development partners made it attractive to Kameda. A new factory was built, with Kameda taking the lead in production technology, quality and standard management, marketing, and other management aspects.

The new joint venture is highly praised by government officials as it brings newer and more advanced skills needed in processing, technology, funding, marketing, and other management knowledge that will expand the company's global value chain participation.

Source: Authors.

Box 11.2: Kirirom Food Production

Kirirom Food Production started its first factory in 2014, manufacturing dried mango. The company was rooted in the director's previous generation, which has held a strong love and passion for mango growing and business. Kirirom has grown with a vision to help create a market for the regional farmers and stabilize their incomes during the harvest season, around which period the oversupply of the fruit and lack of market opportunities had often led to a large amount of spoilage and unnecessary waste.

The factory is in Cambodia's mango heartland, the Kirirom region, which has allowed easy access to its raw materials and helps in getting around the issues of Cambodia's logistic performance and high costs. Kirirom has built a strong and dedicated "Team Buyer" that works with suppliers, either directly or through regional intermediary collectors who have sufficient storage to buy directly from farmers and properly store the collected fruits to ensure the smooth supply of raw fruits to meet the company's demand for 40–60 tons of raw mango per day. While the company concentrates on dried mango during the harvest season, it has added another production line to also process dried papayas and pineapples to take full advantage of their production facilities during the off-season (for mango). While fruits are supplied locally, the company sources sugar, the other major ingredient, from Thailand, ensuring an uninterrupted supply. The company uses about 30 tons of sugar per month.

The company has always targeted foreign markets, upgrading their products' quality, safety, and standard through the application of 5S and acquiring relevant certificates. The company has had good working experience with the government, receiving support in terms of access to information regarding market opportunities, business partners and the like, invitations to trade fairs, and government-organized and donor-supported production capacity development projects. With a growing market base in both domestic and overseas markets, the company is to build another factory, acquiring more modern equipment from abroad to increase the automation in the production.

It currently exports 80–100 tons per month to Thailand; Viet Nam; the Philippines; and Hong Kong, China in two forms: direct to end consumers, and to foreign firms that would do the repacking and relabeling before selling in their own markets or re-exporting to third markets. The company does not deal with import and export processes on its own but commissions logistic agencies to avoid the burden of complex, time-consuming processes.

Source: Authors.

11.5.6 Evolving Regional and Global Environment: Opportunities, Challenges, and Risks

Cambodia continues to enjoy strategic and economic benefits from its membership in an increasingly integrated and cohesive ASEAN community, which in itself is the hub of the economic and political-security architecture in the wider region around which GVC activities are organized. The growth prospects, demographics, and social dynamics of the Mekong subregion attract the interest of many investors from inside and outside. This subregion is an integral part of the ASEAN community and will have witnessed a speedy pace of intra- and extra-regional connectivity and integration, shaping the ways businesses operate in member countries in terms of value chain expansion, i.e., Cambodia becomes part of the alternative supply base to electronic equipment, machinery, and automotive spare parts factories in Thailand and Viet Nam. Large corporations will have a stronger interest in opening factories in Cambodia as part of their “PRC+1,” “Thailand+1,” or “Viet Nam+1” approach to take advantage of the increasingly connected region and to diversify their operation.¹⁰ As an ASEAN member state, Cambodia has benefited greatly from the connectivity development focus of the growing number of regional cooperation mechanisms in the region,¹¹ from connectivity to labor market development to cross-border trade.

Cambodia is advancing bilateral free trade agreement negotiations with its key economic partners for new markets. At a multilateral level, Cambodia has proactively worked with other regional countries to expedite negotiations on the Regional Comprehensive Economic Partnership (RCEP) and explored the opportunity to join the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CP-TPP) and the Asia-Pacific Economic Cooperation (APEC) forum. The conclusion of all these trade pacts will provide greater opportunity to SMEs in Cambodia in terms of market access. While the RCEP negotiating text had not been made available at the time of this research, the trade bloc agreement meant a single tariff offer by RCEP partners to all ASEAN member states and from ASEAN members to all RCEP partners. This means Cambodia is treated the

¹⁰ These “X Plus 1” approaches refer to strategies whereby corporations branch out from their plants in country X by opening production facilities in other regional countries, basically to diversify risk, control cost, and access new markets.

¹¹ For example, the Greater Mekong Subregion, the Ayeyawady-Chao Phraya-Mekong Economic Cooperation, the Lancang-Mekong Cooperation, the Mekong-Japan Cooperation, the Mekong-Ganga Cooperation, the Mekong-Republic of Korea Cooperation, the Lower Mekong Initiative, and the PRC-led Belt and Road Initiative.

same as Malaysia, Thailand, and others in terms of market access. The opportunity for SMEs in Cambodia is substantial if the missing links discussed in the earlier section are bridged. A similar assertion can be made in the case of other trade agreements.

Similarly, Industry 4.0 presents many opportunities. The use of newer, more advanced, and better technology has the potential to benefit businesses in all sectors. Agriculture would see a substantial improvement in productivity, diversification, commercialization, and exports, with an increased level of mechanization. The manufacturing sector would experience a greater transition toward higher value-added products. The service sector would have the highest level of ICT utilization, led by a full-fledged embrace of digital transaction and fintech. Interviewed experts are of the view that, given the remaining gaps, SMEs are not capable of embracing the arrival of the fourth industrial revolution, which brings with it such innovations and technologies as artificial intelligence, robotics, the Internet of Things, and the like. It is unclear as to whether these new technologies will replace the tasks that are currently conducted by SMEs, but our stakeholder consultation thus far indicates that businesses are on the optimistic side. One possibility is that they will unlock the full potential of digital payment and e-commerce development, which will contribute to transforming traditional businesses and manufacturing and connect them better to the GVCs. There is also a trend in which social media is playing an increasing role as an inexpensive marketing and communication tool that potentially connects SMEs to potential buyers and business partners abroad, in addition to the traditional website.

Our interviewees opined that macroeconomic stability continues to be well maintained but cautioned of uncertainty issues regarding the removal of Everything But Arms. The impact was unclear at the time of this research, but the country's attractiveness for garment and textile industry investment is likely to erode. Concern about the competition also looms large. Fierce competition with other low-wage countries producing similar products is likely to intensify given that workers in Cambodia continuously seek wage hikes. The recent free trade agreement between Viet Nam and the European Union adds even more pressure to the prospect of Cambodia's macroeconomy.

Cambodia is also at risk of overdependence on the PRC. The absence of investment diversification will make the country extremely vulnerable to disruptions from the PRC's capital control or even the consequences of the recent coronavirus disease (COVID-19) outbreak. A slowdown or reversal of FDI inflows from the PRC will significantly affect private sector growth. Cambodia's rice and tourism industries have been hit hard following the pandemic because they rely largely on the PRC market. The situation is more critical in garments and textiles

as the PRC has long been a major supplier of raw materials. It was only recently reported that as many as 180 garment factories had already suspended their operations, resulting in 150,000 job losses (Sen 2020). Though there is no formal impact assessment, the consequences of the outbreak will likely pass downstream to SMEs associated with these sectors.

11.6 Conclusion

The significance of SMEs in Cambodia has not been reflected in their GVC participation due to a multitude of constraint issues, or gaps. Certain aspects of these gaps, including the business environment and regulatory practice, customs and trade facilitation, and logistics, have been bridged. However, missing links persist, further pressuring private sector development and SMEs, whose capacity issues are among the highlighted missing links in themselves. They include the limited production capacity, lack of financing, poorly maintained supply of raw materials and finished products, absence of information on potential business and market opportunities, and standard and certification issues. These missing links will continue to hamper growth in SMEs at large and preclude them from benefiting from the opportunities presented by the evolving regional and global environment, including the dramatic development in digital technology and the growing number of regional and subregional cooperation and integration initiatives.

In terms of implications going forward, the government should galvanize reforms to both address remaining business environment issues and develop private sector capacity, and SMEs in particular. Engaging and building more trust with small business communities in a consistent, transparent, and supportive manner will improve the business formalization process, which is the first important stepping stone for SMEs in accessing adequate financing and internationalizing. Establishing a fully functioning and sustainable SME center and information portal is critical in helping SMEs to make better-informed decisions in terms of market opportunities and requirements as well as relevant administrative procedures. Facilitating business matching between local SMEs and foreign firms is equally important. This can be done through a combination of a dedicated information facility that allows firms to search for and reach out to potential partners, business matching and networking forums, and organized trade fairs. Further mobilizing donor support to help SMEs develop products that are in line with foreign firms' requirements is an important remedy. While the list of new priorities and actions seems long and daunting, bridging efforts like these must build up momentum.

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12

SMEs in Nepal: Examining Constraints on Exporting

Paras Kharel and Kshitiz Dahal

12.1 Introduction

As is the case with most developing and even developed nations (Yoshino and Taghizadeh-Hesary 2016), small and medium-sized enterprises (SMEs) in Nepal, despite encompassing a significant sphere of the national economy, face significant challenges. SMEs in Nepal have a low capital base, poor access to technology, and inadequate knowledge and information regarding business opportunities and marketing (Pandey 2004). Similarly, SMEs in Nepal also suffer from poor access to finance brought about by high interest rates, large collateral requirements, inconveniences associated with the process, a lack of information, and inadequate institutional capacity, among other things (NRB 2019).

Nepali firms, overall, are yet to significantly reap the opportunity presented by the rise of global value chains (GVCs) to start exporting or to expand exports by inserting themselves in a specific stage of production or concentrating on a particular task or set of tasks, leaving the rest of the production process to actors downstream and upstream located in other countries. At the aggregate level, one measure of participation in GVCs is the sum of the import content of gross exports (backward participation) and the proportion of gross exports that is domestically produced and is used as inputs in other countries' exports (forward participation) (see Borin and Mancini 2019; World Bank 2019). By this measure, Nepal had the second-highest GVC participation in 2015 (30.85%) among countries in South Asia (excluding Bhutan, which has a population of less than 1 million)—second only to India (35.7%).¹ Nepal's GVC participation is slightly higher than that of Cambodia, but lower than that of countries

¹ GVC indicators in this paragraph are for the year 2015 and calculated from the “WDR2020_gvc_data” data set used by the World Bank (2019).

in Southeast Asia, such as Thailand (42.7%), Malaysia (57.3%), and Viet Nam (49.4%). Nepal's GVC participation is balanced between backward and forward participation, whereas forward participation is stronger than backward participation in India, Bangladesh, Pakistan, and Sri Lanka. Nepal's forward participation is lower than that in these four South Asian countries.

In reality, Nepal's export performance is much weaker than what these indicators of GVC participation suggest. For example, Nepal's merchandise exports in 2019 were less than \$1 billion, or 3.2% of gross domestic product. These exports are by an order of magnitude lower than Cambodia's, although there is not much difference between the two countries' GVC participation by the above metrics.² The point is that there may be scope for Nepal to expand its exports even within the existing levels of backward and forward GVC participation, given the experiences of comparator countries.

The literature has documented the constraints behind Nepal's lackluster export performance, ranging from domestic supply-side constraints to market access barriers in destination markets to an inefficient transit regime.³ But they do not zoom in on SMEs, which, as evidenced by global experiences, face significant obstacles to participating in international trade, including GVCs (WTO 2016; Ganne and Lundquist 2019). This chapter examines the challenges and constraints faced by manufacturing SMEs in Nepal in GVCs, albeit with a focus on exporting. It combines the limited available secondary data, including firm-level information from the World Bank's Enterprise Survey for 2013, with insights from qualitative primary information.

When using the Enterprise Survey data set, we characterize firms that both export and import (use foreign material inputs)—a standard way of defining GVC firms—although we cannot determine whether the exports are of final or intermediate goods. However, the small sample size precludes us from delving into this category in detail. There are 38 exporting firms and 25 firms that export and import. Distinguishing between small, medium-sized, and large firms among exporting and/or importing firms entails cutting the data too thin and does not lend itself to a meaningful statistical analysis. We therefore also utilize information from in-depth qualitative interviews and discussions with the private sector and policy makers to explore in greater detail the challenges and constraints faced by manufacturing SMEs in exporting

² Nepal's exports, in terms of the absolute amount of domestic value added, are also lower than Cambodia's.

³ For example, Kharel (2014); Adhikari and Kharel (2014); Basnett and Pandey (2014); Arenas (2016); Narain and Varela (2017); and Government of Nepal (2010, 2016b).

and expanding their exports. The primary information pertains mostly to firms that use some foreign material inputs—which can be termed “GVC firms.” We discuss the constraints to sourcing material inputs, including from abroad—a precondition for being able to produce for foreign markets for many firms. On the export side, the focus is on final goods exports, which account for half of Nepal’s gross exports,⁴ leaving analysis of the constraints to joining GVCs by producing intermediate goods for future work.

12.2 In Search of Data on SMEs

Nepal’s Industrial Enterprises Act 2020 classifies firms by size based on the value of fixed assets.⁵ Nepal lacks a nationally representative survey of firms including SMEs that yields detailed information on firm characteristics spanning production, sales, employment, exports, and sourcing (including imports), among other things. As a result, there is no credible basis for estimating the contribution of SMEs to the economy. The Ministry of Finance mentions that SMEs contribute 22% to the gross domestic product and employ around 1.7 million people, without specifying the basis for the numbers (Government of Nepal 2016a). The contribution of SMEs to output, employment, and exports in the manufacturing sector is unknown.⁶

If one defines firm size in terms of persons engaged rather than value of fixed assets as in the law, it is possible to gauge the relative importance of SMEs in all establishments and all employment, in different sectors, including manufacturing (Table 12.1). From the published tables of

⁴ Calculation based on UN Comtrade data for 2016 and 2017.

⁵ Small firms have fixed capital of up to NRe150 million (\$1 equaled about NRe118 on 14 March 2020), medium-sized firms have fixed capital exceeding NRe100 million but less than NRe500 million, and large firms have fixed capital exceeding NRe500 million. There are also two other types of firms defined in the act: microenterprises and cottage enterprises. The criteria determining microenterprises include fixed capital (excluding land and buildings) of no more than NRe2 million, an annual turnover of no more than NRe10 million, and employment of no more than nine workers, including the entrepreneur. Cottage enterprises rely on traditional and/or local skills, technology, and art and culture, and are labor-intensive. In practice, cottage enterprises are mostly microenterprises or SMEs in terms of size.

⁶ The Census of Manufacturing Establishments, 2011/12, which collected more detailed information than the National Economic Census, 2017/18, enumerated firms with 10 or more employees only, and its raw data are not available in the public domain. The Survey of Small Manufacturing Establishments 2008/09 sampled firms with fewer than 10 employees in the manufacturing sector, but its raw data are not available in the public domain.

the National Economic Census (NEC) 2017/18 (Government of Nepal 2019), which includes both registered and unregistered establishments, there are 104,058 manufacturing establishments, in which 510,523 persons are engaged. Manufacturing establishments make up 11% of all establishments and close to 16% of overall employment. Nearly 98% of manufacturing establishments are small units, while 1.6% are medium-sized units, and 0.7% are large units, where we define size groups in terms of the number of persons engaged.⁷ Small, medium-sized, and large manufacturing establishments employ 53%, 13%, and 34%, respectively, of the total number of persons engaged in the manufacturing sector.

This may suggest the absence of a “missing middle” in the distribution of firms across the three size groups but the presence of a missing middle in the distribution of employment across the size groups. What is clear from the NEC data, however, is that SMEs account for two-thirds of employment in the manufacturing sector, the focus of our chapter. Moreover, establishments with fewer than 10 workers make up 95% of enterprises and 46% of people engaged.

Table 12.1: Employment in Manufacturing Establishments, 2018

	Small	Medium Sized	Large	Total
No. of establishments	101,697 (97.73)	1,629 (1.57)	732 (0.70)	104,058
Employment (persons engaged)	268,783 (52.65)	66,250 (12.98)	175,490 (34.37)	510,523
No. of establishments with fewer than 10 persons engaged	98,983 (95.12)			
Employment (persons engaged) in establishments with fewer than 10 persons engaged	233,881 (45.81)			

Note: Figures in parentheses are percentages.
Source: Authors’ calculation from Government of Nepal (2019).

⁷ Small firms engage fewer than 20 people, medium-sized firms 20–99 people, and large firms 100 or more.

12.3 A Portrait of Nepali Firms

Given the dearth of firm-level data in general and on SMEs in particular, we use the World Bank's Enterprise Survey for Nepal conducted in 2013. It is the only readily available source of fairly representative firm-level data rich enough to investigate and compare the characteristics and behavior of small, medium-sized, and large firms, although firm size is based on employment. Moreover, it also allows us to get a rough sense of the contribution of SMEs to sales and exports, which has been hitherto unknown. Firm size is one of the strata in the stratified random sampling method used in the surveys, thereby making it possible to make statistical inferences at the level of size groups. Ideally, one would also want to make statistical inferences on the differences in the characteristics of firms across different groups of international linkage status—for example, exporting (importing) and nonexporting (nonimporting) firms, and these categories within different size categories. However, this is constrained by the fact that exporting (importing) status was not used as a stratum during sampling, and due to the presence of a very small number of firms in some subgroups. We therefore present the means of different characteristics in terms of exporting and importing status, but without breaking them further into size groups and without performing tests of statistical significance.

A total of 482 firms were sampled, of which 283 were small, 147 were medium sized, and 52 were large. Firm size is defined in terms of employment: small firms have 5–19 workers, medium-sized firms 20–99 workers, and large firms 100 workers or more. The sectoral distribution was as follows: 242 in manufacturing, 112 in retail, and 128 in services. We will focus on manufacturing firms: 91 small, 105 medium sized, and 46 large. Compared to the National Economic Census (a more recent data collection exercise), this survey undersamples small firms.

Based on the surveyed manufacturing firms, one can infer that large firms contribute 52.4% of the sales of the manufacturing sector, followed by small firms (25.6%) and medium-sized firms (22%). In terms of exports, large firms again take the lead, accounting for 75% of all manufacturing exports. However, it is medium-sized firms that take second position, with a share of 21.7%. Small firms have a 3.2% share in manufacturing exports.

Table 12.A1 in the Appendix presents the characteristics of manufacturing firms as a whole, as well as small, medium-sized, and large firms separately, highlighting cases where there is a statistically significant difference between any two groups. Table 12.A2 presents the characteristics of manufacturing firms split into five groups in terms of GVC participation: (i) exporters, (ii) nonexporters, (iii) importers (report

using foreign material inputs), (iv) nonimporters (report using foreign material inputs), and (v) firms that are exporters as well as importers (report using foreign material inputs). Firm characteristics are under six broad categories: general characteristics, production, international linkages, use of the internet, innovation, and finance. In the remainder of this section, we discuss production, international linkages, and finance. Nepali firms are also compared with their counterparts in developing countries.⁸

12.3.1 Production

Small and medium-sized firms have similar levels of labor productivity, but such productivity is significantly lower than that of large firms. While Nepali large firms' average productivity is not significantly different from that of large firms in other countries, the productivity of small and medium-sized firms in Nepal is significantly lower than that of their counterparts elsewhere. Surprisingly, exporters have lower labor productivity than nonexporters. One reason for this could be the sectoral variation within manufacturing, which a simple test of means cannot take into account. The number of firms is not sufficient to compare exporters and nonexporters within manufacturing subsectors. The average productivity of exporters that also use foreign inputs is higher than that of exporters in general, but still lower than that of nonexporters. Firms that use foreign inputs have a higher productivity level than firms that do not.

Small firms are significantly less likely to have purchased fixed assets in the last 1-year period than large firms. Large firms have a significantly higher propensity to have internationally recognized quality certification than SMEs. Nepali firms in all three size groups are significantly less likely to have internationally recognized quality certification than firms elsewhere. Firms that use foreign inputs are more likely to have such certification.

In terms of production days, firms on average maintain 46 days of inventory of their most important input. Exporters, and especially exporters that use foreign inputs, tend to maintain fewer days of inventory. Compared to small firms in other countries, Nepali small firms maintain a significantly higher number of days of inventory—an additional 14.2 days on average. A likely factor behind this is the fact that the country is landlocked.

⁸ Significant differences in the rest of this section imply differences that are statistically significant at the level of at least 10%. Nepali enterprises are compared with enterprises in 67 other countries surveyed, as part of the World Bank's Enterprise Survey, in 2012, 2013, or 2014. Details of the tests are available on request.

12.3.2 International Linkages

Foreign investment in firms in the sample is very low—0.3% of firms have foreign investment. While small firms do not have any foreign investment, less than 0.2% of medium-sized firms have foreign investment. In contrast, 9.7% of large firms have foreign investment. Small firms in Nepal are significantly less likely to have foreign investment than small firms elsewhere on average, by 5 percentage points. Medium-sized firms in Nepal are also significantly less likely to have foreign investment than medium-sized firms elsewhere, by 6.5 percentage points.

On average, 10% of firms export. About 8.8% of firms export at least 10% of their sales. On average, 6.8% of firms export directly. Direct exports account for 92.4% of all manufacturing exports. Just under a third of exporters export only indirectly, with medium-sized exporting firms more likely to do so than small and large exporting firms. Only 7.3% of nonexporting firms plan to export in the next 12 months.

Overall, 10.3% of all manufacturing sales are in the form of exports. Exports account for 1.3% of all sales by small firms. The figures increase to 10% and 14.7%, respectively, for medium-sized and large firms. The pattern is similar when considering only direct exports. Compared to small and large firms elsewhere, Nepali small and large firms are on average significantly less likely to export (by 21.9 percentage points and 47.5 percentage points, respectively).

The propensity to use imported material inputs or supplies increases with firm size. The share of imports in material inputs or supplies also increases with firm size. Among firms that use imported material inputs or supplies, large firms have a significantly higher propensity to import them directly (89.1%) than small (39.8%) and medium-sized firms (52.8%). Looking at firms that export as well as use imported materials—typically classified as GVC firms in the literature—we see that they constitute 63% of exporters overall. Such GVC firms constitute 47% of small exporting firms, 77% of medium-sized firms, and 63% of large firms, although the differences in these proportions are not statistically significant.

While Nepali large and medium-sized firms are significantly more likely to use imported material inputs or supplies than their counterparts elsewhere (by at least 23 percentage points more), small Nepali firms are significantly less likely to use such imported materials than small firms in other countries (by 12 percentage points less). Nepali large firms have a significantly higher share of imported materials in the material inputs or supplies they use (by 49.7 percentage points) than large firms elsewhere.

Only 1.6% of firms use technology licensed from a foreign-owned company, excluding office software. Large (small) firms in Nepal are

significantly less likely, by 18 percentage points (9.5 percentage points), to use such technology than large (small) firms elsewhere on average. Exporters are more likely to use such technology than nonexporters, and firms that use foreign inputs are more likely to use such technology than firms that do not use foreign inputs.⁹

The impact of exporting on firms cannot be ascertained from the available survey data. The primary, mostly qualitative, information that we have—presented in greater detail in Section 12.5—provides some idea. Exporters say exporting fetches a higher price than selling to the domestic market, and their net revenues are higher. Interactions with foreign buyers make them more conscious about product trends and designs. Some producers have hired designers to design trending products after starting to export. For example, a felt producer was constantly on the lookout for the possibility of making newer products. Some carpet exporters have taken to using software to design carpets, which minimizes errors by guiding knotters on design. There is also a subtle difference between exporting directly and indirectly. Exporting directly gives manufacturers the opportunity to communicate directly with the ultimate buyers. Producers who export through intermediaries feel that the inability to interact with the ultimate buyers precludes a mutually beneficial outcome. For example, one exporter felt that designs could be enhanced with the addition or omission of certain elements and that buyers would listen to them. However, switching from indirect exports to direct exports is not easy, as the producer needs to gain a good handle on export-related procedures. Likewise, compared to exporting indirectly, exporting directly places a greater demand on the ability to source raw materials and intermediate goods, including from abroad, of the necessary—and of a consistent—quality at competitive prices.

12.3.3 Finance

As expected, smaller firms tend to have a more constrained access to finance than larger firms, be it in terms of having a checking or savings account, or having applied for a loan, or having an overdraft facility, or the collateral-to-loan ratio. Exporters are better placed than nonexporters in several of these indicators.

A greater percentage of large and medium-sized firms in Nepal have a checking or savings account than their counterparts in other countries (by 4.9–5.9 percentage points). A greater percentage of Nepali large firms have an overdraft facility than large firms elsewhere (by 30 percentage

⁹ These are not reported in Table A12.2.

points), with no significant difference in the proportions for small and medium-sized firms. Nepali firms, whether small, medium sized, or large, are more likely to have put up collateral for their most recent line of credit than firms elsewhere (by 16.5, 18.2, and 20.8 percentage points, respectively).

Among firms that had not applied for any loans, 13.2% identified the high collateral requirement as the main reason, with small firms significantly more likely (15.3%) to say so than medium-sized (3.9%) and large firms (3.3%).

Among firms that had not applied for any loans, compared to small firms in other countries, Nepali small firms are significantly less likely to identify the absence of a need for loans as the main reason for not taking any loan (by 17 percentage points). Small firms in Nepal are significantly more likely to identify the high collateral requirement as the main reason (by 10 percentage points) than small firms in other countries.

Smaller firms rely less on bank credit and more on internal funds to fund their purchase of fixed assets and to finance working capital needs than larger firms. Credit from suppliers and advances from customers are also more important for smaller firms than for larger firms in financing working capital needs. Exporters tend to be less reliant on internal funds and bank credit than nonexporters, whether for purchasing fixed assets or financing working capital needs. In particular, credit from suppliers and advances from customers are more important in financing working capital needs for exporters than nonexporters. Compared to nonexporters, exporters also rely more on owners' contributions or issuance of new equity shares for funding fixed asset purchases. This also holds true for firms that use foreign inputs compared to firms that do not.

A significantly lower proportion of financing for working capital comes from banks for small firms in Nepal than for small firms in other countries (by 10 percentage points). Correspondingly, a significantly higher percentage of financing for working capital comes from internal funds for small firms in Nepal than for small firms in other countries (by 11 percentage points).

A significantly higher percentage (40.5%) of small firms view access to finance as a major or severe obstacle to their operations than medium-sized firms (18.6%) and large firms (15.1%). Exporters view access to finance as less of a constraint than nonexporters, especially if the exporter also uses foreign inputs. Compared to small firms in other countries, a significantly higher proportion of small firms in Nepal view access to finance as a major or severe obstacle (by 16.4 percentage points).

A 2018 survey on SME financing in Nepal, carried out by Nepal Rastra Bank (NRB), the central bank, corroborates some of the above

findings and sheds further light on access to finance issues of SMEs (NRB 2019), though the study does not compare and contrast SMEs with large enterprises. It considers firms in all sectors, not just manufacturing. It uses the definition of the Industrial Enterprises Act 2016 to define SMEs, based on fixed assets, when sampling SMEs. Procedural complexity, high interest rates (12.51% is the average interest rate charged to SMEs and an additional nearly 1% service charge is also levied), and collateral requirements are identified as major problems in obtaining loans from banks and financial institutions. SMEs in general find it easier to obtain loans from savings and credit cooperatives but identify high interest rates as the chief deterrent to obtaining loans from cooperatives. The surveyed SMEs had not drawn any financing for their initial investment from the capital market, and they do not see the capital market as holding the potential to finance their activities.

12.4 Discussion and Policy Options

Drawing on the findings of previous studies, available firm-level data, and in-depth interviews and discussions with the private sector and policy makers,¹⁰ we now summarize the key issues faced by Nepali SMEs that have a bearing on their export prospects and highlight some policy options. By SMEs, we refer also to microenterprises and cottage enterprises. We structure the discussion around four broad determinants of a country's participation in GVCs, drawing on the framework presented in World Bank (2019) and WTO (2016)—endowments, market access (access to export markets and input markets), logistics and trade facilitation, and nontariff measures—followed by some cross-cutting policy issues.

¹⁰ We draw on interviews with four entrepreneurs who run export-oriented SMEs or SMEs that used to export, covering the felt industry (Shanti Shrestha, Nuptse Crafts), the apparel/hosiery industry (Sabita Maharjan, Kirtipur Hosiery), the carpet industry (Shova Gurung, Himalayan Decor Rugs), and the overall handicraft industry (Dharmaraj Shakya, former office-bearer, Federation of Handicraft Associations of Nepal). We additionally obtained the views of the private sector through a discussion program on Nepal-Bangladesh trade held in Kathmandu on 1 March 2020, organized by South Asia Watch on Trade, Economics and Environment (SAWTEE) and the Ministry of Industry, Commerce, and Supplies, Government of Nepal; discussions with officials at the Federation of Nepal Cottage and Small Industries on 2 March 2020; and a workshop for female entrepreneurs organized by SAWTEE and Manushi in Kathmandu on 6 March 2020.

12.4.1 Endowments

SMEs in some sectors are faced with a shortage of workers with the required skills. There is a limited match between the requirements of industry and human resources produced by the government-run Council for Technical Education and Vocational Training. There is a lack of industry-led training centers, and hardly any link between academic institutions, vocational training institutions, and industry. Room exists potentially for government–industry collaboration. Technical education and vocational training courses should be linked with the requirements of industrial villages being announced by subnational units under a federal system of governance recently adopted by the country. Imparting SMEs, or their human resources, with the skills necessary for accessing and processing trade- and market-related information is a felt need (as also identified in ITC [2017]).

Onerous collateral requirements of financial institutions impede SMEs' access to finance. The banking system is characterized by a high spread rate. Commercial banks had a weighted average interest rate on loans of 11.94% as of mid-January 2020, compared to a weighted average interest rate on deposits of 6.79%. As a result, inherited capital and own savings are a major source of finance for these enterprises. The bulk of SMEs have yet to access the few existing concessional loan schemes available through banks.¹¹ Most of them are unaware of the schemes, which suggests the need for better dissemination of information about such schemes. Most concessional loan schemes, which entail an interest subsidy, are not SME-specific. Moreover, such loans are mostly for agriculture. Of the NRe47 billion in outstanding concessional loans provided under nine different schemes as of mid-January 2020, nearly 96% (NRe45 billion) were for commercial agriculture and livestock development.¹² The second-ranking category was loans for women entrepreneurs, amounting to NRe1.6 billion, which potentially benefits SMEs in the nonagriculture sector (footnote 12).

There are no sizeable refinance schemes specifically for SMEs. The funding available under refinance schemes, including export refinance—wherein the central bank provides loans to banks at concessional rates and caps the interest rate the latter can charge on loans to their customers—is deemed inadequate. Smaller enterprises appear to lose out to larger firms when competing for the limited funds. The attractiveness

¹¹ See also NRB (2019).

¹² Data from Nepal Rastra Bank, Current Macroeconomic and Financial Situation (first six months of Fiscal Year 2019/20).

of export refinance, available at an interest rate of about 3%–4%, is diluted by a short maturity period. Entrepreneurs in industries such as carpets and other handicrafts deem 6 months to be too short a period for their production cycle. A lack of knowledge of the existence of refinance schemes is a problem. One exporter the researchers spoke to had found out about the export refinancing facility when a bank employee casually mentioned it to her.

Independent and rigorous evaluations of existing subsidy schemes such as the Micro, Cottage, and Small Enterprise Development Fund and the Female Entrepreneurship Development Fund are essential for improving their effectiveness. The Department of Industry is setting up a “Main Fund on Loan Flows to Micro, Cottage, and Small Industries” with a view to mobilizing and channeling finance from banks, finance companies, cooperatives, and nongovernment organizations to individuals who establish enterprises after receiving some training (NRB 2019). This has the potential to streamline funding. The central bank can consider requiring or incentivizing banks and finance companies to invest in the Fund.

Foreign direct investment is not allowed in microenterprises and cottage enterprises, which have long been on the negative list of Nepal’s foreign investment law. However, a new law,¹³ enacted in early 2019, which amended and integrated previous laws on foreign investment, allows technology transfer, including know-how sharing, even in industries on the negative list. The government’s drive to attract foreign investment should also give attention to tapping this avenue, which may help microenterprises and cottage enterprises break into export markets and/or expand exports.

There are some instances of foreign investment having helped small firms export indirectly. For example, Kirtipur Hosiery, a small firm, produced ready-made garments under the John Players and Springwood brands, then owned by Surya Nepal, which is a subsidiary of ITC India. The garments were sold in Nepal and India. The entire export process was handled by Surya Nepal. However, the firm was left in the lurch when it stopped receiving orders after the brands were sold to Reliance Retail, another Indian company, in March 2019. This points to the need for the government to continuously provide services that enable small firms to find buyers to export their products, whether directly or indirectly.

¹³ Act Amending and Unifying Laws Related to Foreign Investment and Technology Transfer, 2019.

12.4.2 Market Access

Nepali SMEs produce products that are eligible for preferential market access provided by a number of developed and developing countries under different schemes, such as in Canada, the European Union, India, Japan, the People's Republic of China, and the United States, among others. Besides supply-side constraints, a lack of knowledge of the trade preferences on offer is also impeding the utilization of preferential market access schemes.

Traders are not aware of provisions in trade agreements with neighboring countries. For example, while Nepali products face high customs duties and para-tariff barriers in Bangladesh, customs duties, if not para-tariffs, are lower for some products of export interest to Nepal due to preferential treatment provided by Bangladesh under the Agreement on South Asian Free Trade Area (SAFTA). However, the exporting community is not fully aware of the preferential market access opportunity under SAFTA. Similarly, there is a provision in the Nepal–India trade treaty for concessions in the application of additional duty (excise) on articles manufactured in small-scale units in Nepal on a par with the treatment given to similar articles manufactured in India.¹⁴ Although small enterprises stand to potentially benefit from this provision—which states that small-scale units are as defined by Nepal's Industrial Enterprises Act—the private sector in Nepal is largely unaware of it. As per discussions with exporters and former trade officials, this provision remains unused.

From our discussions with SME exporters, we surmise that a starting point for exporting directly is trade fairs. Even the trade fairs organized within Nepal see some participation of international buyers. Affiliation with the World Fair Trade Organization (WFTO)—information about which can be obtained while participating in trade fairs—also serves as an important avenue of market linkage. It is a global association of social enterprises that are said to adhere to equitable and sustainable business practices. WFTO links producers in developing countries directly to purchasers in the developed world, creating market access opportunities for the producers. To become a member, producers need to adhere to certain “fair trade” principles.¹⁵ Small firms tend to find it easier to work with buyers who follow fair trade principles than with large commercial buyers. Nuptse Crafts, which exports felt

¹⁴ Protocol to Article V of the Treaty of Trade between the Government of Nepal and the Government of India.

¹⁵ See World Fair Trade Organization website (<https://wfto.com>) for details.

products, tried to establish business with large commercial buyers who supply their items to large chain stores. However, it found commercial buyers ruthless in contract execution. Considering the labor-intensive nature of its products and the volume of orders, it was difficult for it to find the workers who could finish the orders on time. Contracts with commercial buyers have clauses that allow the buyers to deduct money for delayed delivery. After working on two orders with such buyers, the firm decided to stick to the smaller buyers who are accommodative of slight delays in delivery. Moreover, commercial buyers provide large orders, but the prices offered are quite low, while the smaller ones are open to negotiations. This case indicates that the optimal type of market access—selling to commercial (usually large) buyers or fair-trade buyers—is partly a function of an enterprise’s endowments (e.g., the capacity to meet the demands of certain types of buyers). According to Fair Trade Group Nepal, an umbrella body of organizations affiliated with WFTO, “fair trade” handicraft exports account for 20% of Nepal’s total handicraft exports.¹⁶

SMEs also export indirectly through what may be called export houses, which take orders from abroad, subcontract the work to SMEs as per the specifications received, and then ship the consignment. The role of export houses is performed by established exporters as well as freight forwarders. An option that combines exporting indirectly with the potential of getting fair trade terms is exporting through an intermediary affiliated with WFTO. Manushi, for example, is a nongovernment organization that aims to empower women by providing them with a means to achieve financial independence. It is a founding member of Fair Trade Group Nepal. One of its entities, Manushi Pvt. Ltd., sources handicraft products from affiliated producers and exports them. The government can play a role in connecting producers to such organizations. When planning the industrial villages to be set up at the subnational level, it would be worthwhile bringing on board existing export houses and intermediaries so that some production can take place with an eye to international markets.

Regular exhibitions and competitions should help establish contact between small producers and buyers, whether final or intermediary. For example, after being in the knitting and garment-manufacturing business catering to the domestic market for over 2 decades, Sabita Maharjan set up a formal enterprise (Kirtipur Hosiery) in 2009, and in 2011 received a social entrepreneurship award. Surya Nepal, a subsidiary

¹⁶ See the Fair Trade Group Nepal website (<https://www.fairtradegrouppnepal.org/content/about-us>).

of ITC India and one of the largest private sector enterprises in Nepal, was the sponsor of the Asha Awards. She then received orders to produce garments from Surya Nepal, to be sold within Nepal and exported to India. This drew in another buyer. Sherpa Adventure Gear, an adventure apparel manufacturer based in the United States, approached her to supply sweaters and other hand-knitted woolen wear.

Enterprises that produce goods with export potential or that are already selling to tourists or exporting indirectly through intermediaries may be keen to export directly. Lacking know-how on navigating the different stages of the export process, including understanding market access conditions and finding buyers, they are reluctant to take the plunge. Guidance on this score could make a vital difference. Dissemination of information on the export process in the Nepali language could help. Most SME exporters use the services of logistics companies and/or freight forwarders. Facilitating interactions between freight forwarders and SME producers could help the latter establish contacts in export markets. For example, in breaking into export markets, a carpet factory worker who became a carpet producer benefited from a freight forwarder's contacts. The two had known each other before. An arrangement for bringing into contact producers and freight forwarders should be explored for this channel to yield wider benefits. For SMEs producing handicrafts that are not in a position to overcome the fixed and variable costs of exporting directly by finding buyers on their own, setting up well-managed shopping or permanent exhibition centers specializing in Nepali products targeting foreign visitors and linking them with SME producers is one way of introducing SME products to "international buyers." A study on the spending habits and patterns of international tourists in Nepal should aid in assessing the feasibility of this approach.

As a least-developed country, Nepal is allowed under World Trade Organization rules to provide subsidies for manufacturing exports. SMEs find the process of availing themselves of the cash incentives for exports provided by the government cumbersome. This is so even after the working procedure on export was revised. A small-scale carpet exporter reported not having received the cash subsidy in the previous 3 years due to procedural difficulties. In an assessment of the effectiveness of the cash subsidy program, Defever et al. (2017) have found that the subsidy did not have a significant impact on firm-level export values, prices, quantities, or their growth rates, and was received primarily by large exporters that were already shipping eligible products. As it was the larger, established exporters that received most of the subsidy, these exporters likely drive the finding of no effect. We do not know from the study what the impact was on smaller exporters that did receive the

subsidy. While the subsidy program has undergone revisions since the period covered in the assessment (2011–2014)—most notably, exports to India now also qualify for the subsidy—a key feature of the program remains: The cash subsidy rate is applicable to the absolute value of exports of an eligible firm. Exporters consider the subsidy rate of 3%–5% insufficient.

Narain and Varela (2017) recommend redesigning the subsidy scheme to make the cash incentive applicable to only new export flows—incremental growth in exports by existing exporters, and exports of new firms—in order to better serve the government’s goal of achieving higher exports and product-market diversification. They suggest that incremental growth in exports by existing exporters be calculated for each product–destination combination for each exporter. However, for this approach to be meaningful, the subsidy will have to be provided for a reasonable number of years after the initiation of the new export flow. A subsidy for only the year when a new export flow was initiated may not have the desired effect. If the aim of the subsidy is to cover a significant part of the fixed cost of discovering a market, a subsidy provided for only the year of a new export flow may be inadequate as an incentive. Further, discovery is a constant process even within the same product–destination market. It may be worthwhile to grant the subsidy for a certain minimum number of years once a new export flow is initiated, provided export growth is positive in the subsequent years. Higher subsidy rates may be considered for SMEs given that they face greater barriers to exporting. A dedicated amount should be set aside specifically for SMEs. If export subsidies are provided to help firms discover foreign markets, there is a need to revisit the current arrangement that provides export subsidies to producers only, and not to firms that specialize in finding foreign buyers and markets for, and exporting, goods produced by others. The government should conduct regular and rigorous evaluations of the cash subsidy scheme, distinguishing between the impacts on different firm-size groups.

Both new exporters and existing exporters find exhibitions and trade fairs abroad to be an effective means of showcasing their products and finding buyers. The government provides a subsidy for participation in such events, offsetting part of the cost of participation. SMEs want the support to be scaled up to benefit more firms and to increase the frequency of participation. The government should consider allocating funds to subsidize participation in trade fairs, the provision of export intelligence, and other export promotion activities that specifically target SMEs as these firms are most likely to be constrained by the market failures that such subsidies seek to correct. Some guidance and support after participation in trade fairs abroad is also essential,

as there are instances where enterprises see brisk sales in a trade fair but do not see further exports thereafter, among others, due to a lack of knowledge of the export process and difficulty in communicating with potential buyers (language being a barrier). Consider, for example, the participation in trade fairs abroad by the proprietor of a small or cottage enterprise in far-west Nepal that specializes in the production of handmade crafts from the bijayasal tree (*pterocarpus marsupium*). Water kept in bijayasal wares (e.g., pitchers, mugs, and cups) is traditionally believed to have medicinal properties. Bijayasal products have also been identified as having export potential by a study by the Trade and Export Promotion Center, a government agency. In a trade fair in the People's Republic of China, the products sold extremely well, fetching prices four times those in Nepal, but the enterprise did not export thereafter.

Activities such as the provision of export intelligence are in the nature of public goods and services that benefit an entire industry and are more likely to generate positive spillovers than firm-specific cash incentives. A lack of access to trade and market intelligence placing Nepali SMEs with export potential at a disadvantage vis-à-vis competitors has been identified in other studies too (e.g., ITC 2017). Collaboration between the government and business associations in managing the funds should be explored. This financing must be monitored and its effectiveness assessed in comparison with the effectiveness of cash incentives provided directly to firms.

There are nontrivial tariffs on imported inputs, which are a serious impediment to deeper integration of Nepali firms into GVCs.¹⁷ Although a duty drawback scheme for exporters is in place, the private sector finds its implementation weak. Further, SMEs that import indirectly through bulk importers, because individually they do not have the volume for direct importation to be economical, are unable to benefit from the duty drawback scheme. One way around this problem could be encouraging the setting up of export (promotion) houses, which, besides enabling the sharing and/or pooling of orders received by individual firms and/or securing export orders for firms, could also make tracing imports to their usage by affiliated firms more feasible. This, however, requires a change in the legislation, since the existing duty drawback scheme does not apply to sales to export (promotion) houses, and such sales are subject to indirect taxes. A provision in the Industrial Enterprises Act 1992 that treated such sales as exports was repealed.

Taxes levied on the production of intermediate goods sold to exporters also dent price competitiveness. The recently introduced

¹⁷ See Arenas (2016), and Narain and Varela (2017). There is an average tariff of 9.3% on raw materials and 11.4% on intermediate goods (WTO 2018).

Industrial Enterprises Act 2020 provides for a refund of customs tariffs paid on imported inputs by the manufacturer of intermediate goods that are in turn used in the production of goods that are exported. This provision, however, is weaker than a provision that once existed in 1992, which stipulated that the intermediate goods manufacturer should be reimbursed for all indirect taxes levied on its production materials and all indirect taxes levied on the production of its goods, based on the quantity of subsequent exports.

12.4.3 Logistics and Trade Facilitation

The time and cost of importing and exporting through seaports in India are inflated by, *inter alia*, poor road conditions, delays and congestions in the ports, and insufficient allocation of railway rakes (and hence no fixed train schedule) for Nepal-bound cargo (ITC 2017; UNESCAP and ADB 2017). The high variability in the time and cost of transit transport erodes the competitiveness required to participate in GVCs.

Of particular importance for SMEs is the availability of efficient less-than-container-load (LCL) shipment services, as individually they do not have the volume to fill a container.¹⁸ The regime governing transit for Nepal's third-country trade via India is not supportive of LCL trade. In the ongoing negotiations between Nepal and India on revising the trade and transit treaties, Nepal should seek a provision in the transit regime that facilitates LCL trade—for example, by allowing the state-owned Nepal Transit and Warehousing Company Ltd. to consolidate cargoes at seaports to which Nepal has access.

Nepal should likewise press for provisions enabling efficient LCL trade when negotiating a protocol to the tripartite Motor Vehicles Agreement in the eastern subregion of South Asia.¹⁹ The Motor Vehicles Agreement aims for a seamless movement of cargo (and passenger) vehicles between Bangladesh, India, and Nepal for bilateral as well as third-country trade, obviating the need for loading and unloading trucks at the border, but in its current form it does not address the issue of consolidating LCL cargo.

A quarter of Nepal's merchandise exports are transported on passenger flights. SMEs export carpets, felt products, jewelry, and other handcraft items by air. In a survey of logistics companies in ITC

¹⁸ The authors thank Rajan Sharma, former president of the Nepal Freight Forwarders Association, for his helpful comments on this subsection.

¹⁹ While Bangladesh, Bhutan, India, and Nepal signed the Motor Vehicles Agreement in 2015, Bhutan did not ratify it but gave its consent to the rest to proceed with implementing it.

(2017), 70% identified limited air transport capacity as a constraint. The existing system of cargo booking among airlines operating in Nepal causes uncertainty among logistics companies about the cargo-carrying capacity. Most of them cannot book directly and instead have to book through a few logistics companies that have been nominated by airline operators as agents. Further, the infrastructure at the only international airport in Kathmandu needs to be upgraded to facilitate the movement of air cargo (ITC 2017).

E-commerce offers an opportunity for SMEs to reduce trade costs (WTO 2016) in ways beyond what is offered by the basic functions of the internet: corresponding with clients, creating a website, and conducting market research. Yet, Nepali SME exporters' use of the internet is largely confined to these basic functions. E-commerce in Nepal is still at a nascent stage, with transactions largely among domestic parties (mostly conducted on a cash-on-delivery basis) and with restrictions in place on cross-border e-payments for international trade (United Nations 2017). One of the chief obstacles to the viability of cross-border e-commerce in Nepal is the lack of convenient and efficient payment solutions: Existing regulations bar Nepali exporters from accepting payments made using credit cards and payment gateways such as PayPal. Relaxing restrictions on making and receiving cross-border payments online would be the first key step toward enabling SMEs to tap e-commerce opportunities. SMEs should also be provided with training or orientation on e-trade opportunities. Many are simply unaware of the freely accessible market intelligence websites. Expensive logistics also deter e-commerce: Using the services of international firms such as DHL and FedEx to post small packages does not make economic sense to many SMEs. This is where the issue of cargo consolidation assumes high importance.

12.4.4 Nontariff Measures

Technical regulations, consisting of technical requirements and related conformity assessment, are the most common nontariff measures that not only SMEs but also large companies find burdensome (see also ITC [2017]). These measures fall under what are known as sanitary and phytosanitary (SPS) measures, intended to protect the life and health of humans, animals, and plants, and technical barriers to trade (TBT), intended to protect the environment and public health, as well as to protect consumers from deceptive practices. And in some cases, firms have their own private standards that go beyond these mandatory SPS and TBT requirements.

The standards and quality requirements impose additional costs on producers, which are in many instances more severe for SMEs,

given their limited resources. Firms might incur additional costs to meet the specified standards as they might have to change or upgrade their production technologies. Firms also have to demonstrate that they meet the stipulated standards through what are known as conformity assessment measures, which include inspection, testing, and certification. Given the poor state of the quality infrastructure in Nepal (outdated legal and regulatory framework, poor institutional capacity, inadequate calibration and testing services, etc.), conformity assessments pose significant challenges to firms in Nepal, more so for SMEs (ADB 2019).

A case study by ADB (2019) highlights the barriers created by standards and quality requirements for firms in Nepal. Sujal Foods Pvt. Ltd., one of the biggest confectionery producers in Nepal, had to halt its exports to India, as some of the required testing services were not available in Nepal, and hence its shipments would remain stranded at the Indian border for 15–21 days, while the samples were being tested at a distant laboratory in Kolkata. In addition to time and costs, the limited shelf life of these products made it an insurmountable challenge for the confectionery maker. Significantly improving the national quality infrastructure will be crucial in enabling SMEs' meaningful participation in international trade.

Difficulties with export-related measures, i.e., Nepalese regulations on exports, also hurt SME exporters in the manufacturing sector. One such measure is the advance payment requirement for exports, which is also applicable for goods exported for promotion in trade fairs. As buyers are reluctant to make full payments before receiving the goods, this requirement constrains SMEs' ability to find new buyers (ITC 2017).

12.4.5 Cross-Cutting Policy Issues

Nepal lacks a policy on SMEs, let alone a strategy for their internationalization and participation in GVCs. The Industrial Policy and the associated Industrial Enterprises Act categorize firms into micro-, cottage, small, medium-sized, and large enterprises. However, substantive SME-specific provisions are rare. An SME-specific policy would provide a guiding framework for the government to initiate programs and schemes for building and strengthening SME capacity, including specifically the capacity to export.

Weak coordination between, and conflicting priorities of, government agencies has resulted in not all the provisions in the Industrial Policy making it to the Industrial Enterprises Act, and some provisions in the Industrial Enterprises Act being repealed by

the annual Finance Act, introduced alongside the budget. This also affects SMEs. The Department of Industry (under the Ministry of Industry) is the lead agency in the formulation of the Industrial Policy, while the Ministry of Finance is the tax- and tariff-setting agency. For example, while the Industrial Policy refers to reducing the cost of raw materials and intermediate goods, there are nontrivial tariffs on critical imported inputs used by SMEs. Overall, the weak capacity of the public administration to coordinate and implement trade and industrial policies is a critical constraint (Basnett and Pandey 2014). It should be noted, however, that the recently introduced Industrial Enterprises Act 2020 has a provision that explicitly rules out any change that reduces the concessions, exemptions, and facilities granted.

SME owners and managers need to be made aware of the available tax exemptions and concessions and other incentives and schemes. Even if on a limited scale, these could help SMEs reduce their cost of production and trade costs. Dissemination of such information could be a joint undertaking of the government and business associations such as the Federation of Nepal Cottage and Small Industries.

Although both the trade policy and the trade integration strategy acknowledge the need to integrate SMEs into GVCs and have specified policies to do so, the policies are very broad or ambiguous in nature in some instances, and are poorly implemented in others—for example, measures to integrate firms into GVCs through enhancing quality assurance infrastructure have not been realized in practice. The issue of interagency coordination is not confined to the Ministry of Finance and the Ministry of Industry, Commerce, and Supplies. It also concerns the required coordination between the Ministry of Industry, Commerce, and Supplies and the Ministry of Agriculture and Livestock Development, and between departments within a ministry. The agriculture ministry is responsible for the formulation and implementation of food safety standards, and upgrading the government-owned food laboratory, which are critical for successfully exporting food products, while strategizing for breaking into export markets and expanding exports is a mandate of the industry ministry.

The federal government has launched a special economic zone (SEZ) in Bhairahawa in Southwest Nepal adjoining India, and several more SEZs are being planned. While issues of basic infrastructure, human resources, and institutional arrangements governing SEZs have to be resolved before the Bhairahawa SEZ can be expected to deliver enterprises, jobs, and exports, attention must be paid at the outset to harnessing the potential of SEZs to help smaller enterprises participate in GVCs by supplying intermediate or semi-processed

goods to larger firms located inside SEZs. The SEZ Act treats sales by firms outside SEZs to firms inside SEZs as exports,²⁰ and such sales are thus eligible for tax exemptions and concessions afforded to direct exports. As a result, by leveling the playing field for imports and domestic supplies, the operationalization of SEZs could help alleviate a policy distortion that makes it economical for exporting firms to import certain intermediate products from abroad rather than source them domestically. In addition, for SEZs to benefit SMEs, the federal government must coordinate with provincial and municipal governments to help foster linkages between SEZs and the industrial villages being planned at the subnational level.

Data constraints are a serious impediment to understanding Nepali firms in general and SMEs in particular. There is an urgent need to significantly improve the enterprise record-keeping systems at the Department of Industry, the Department of Cottage and Small Industries, the Cottage and Small Industry Development Committee, and the Office of Company Registrar to enable the creation and updating of a database of registered firms—micro-, cottage, small, medium-sized, and large enterprises—that are currently in operation, with basic information such as value of sales, sectoral classification, number of workers, and value of investment (domestic and foreign). Raw data from existing censuses and surveys of firms should be made available to researchers. Detailed surveys and/or censuses of manufacturing firms, including SMEs, should be conducted regularly, at least once every 5 years. The surveys, or a component thereof, must enumerate a representative number of exporting firms. A panel dimension must be introduced in such surveys, to be able to track firms over time. Importantly, raw data from the new surveys must be made available to researchers in a timely manner.

12.5 Conclusions

This chapter found that Nepal lacks a concrete policy framework for SMEs, let alone a strategy for their internationalization and participation in GVCs. Although both the trade policy and the trade integration strategy acknowledge the need to integrate SMEs into GVCs and have specified policies to do so, the policies are very broad or ambiguous in nature, or poorly implemented. For example, measures to integrate firms into GVCs through enhancing quality assurance infrastructure—a crucial requirement to be able to meet the standards and technical regulations in destination markets—have not been realized in practice.

²⁰ Firms in SEZs are required to export at least 60% of their output.

Fiscal incentives, facilities, and concessions for manufacturing firms and the exporters among them are mostly not targeted at, or tailored to, the needs of SMEs. Moreover, many SMEs do not know of the existence of such provisions. Provisions in the Industrial Enterprises Act being repealed through the annual finance acts has created an unpredictable policy environment. SMEs' access to credit is severely constrained by onerous collateral requirements and a high interest rate. Most SMEs have yet to access the few existing concessional loan schemes—and are unaware of the same. Refinance schemes are not adequately funded, and the export refinance term is not for a sufficient duration. Disbursements from the export cash subsidy program appear to be going mostly to larger firms.

Other constraints holding back Nepali SMEs' participation in GVCs include an inadequately trained and/or skilled workforce, high tariffs on raw materials and intermediate goods coupled with an ineffective duty drawback system, high time and cost of transit when importing and exporting, insufficient attention to the logistics and trade facilitation needs of SMEs such as consolidating LCL cargoes, poor dissemination of information about preferential market access, inadequate provision of trade and market intelligence, and a weak capacity of the public administration to coordinate and implement trade and industrial policies. Restrictions on cross-border electronic payments prevent SMEs from seizing e-commerce opportunities. While participation in trade fairs, at times with the support of government agencies, has helped SMEs export directly, there is a need for handholding for a certain while thereafter. Helping establish contact between SME producers and existing intermediaries such as exporters and freight forwarders could help SMEs export indirectly. Technical education and vocational training courses should be linked with the requirements of industrial villages being set up at the subnational level (municipalities). Imparting SMEs, or their human resources, with the skills necessary for accessing and processing trade- and market-related information is a felt need.

SMEs' participation in GVCs can be aided by effectively operationalizing an existing legislative provision for extending incentives, discounts, concessions, and facilities to firms that produce under contracting/subcontracting arrangements for export-oriented firms. While planning the newly mooted industrial villages, it would be worthwhile bringing on board existing exporters (that also function as export houses) and other intermediaries so that some production can take place with an eye to international markets. Reimbursing duties paid on imports of raw materials used by firms to produce goods that they sell to export promotion houses, and treating such sales as exports and hence exempt from indirect taxes, would aid SMEs' export competitiveness.

In moves under way to operationalize the sole special economic zone (SEZ) of the country, and to set up more of them, attention must be paid right at the outset to drawing SMEs into SEZs and also harnessing the potential of the zones to help smaller enterprises participate in GVCs by supplying intermediate or semi-processed goods to export-oriented larger firms located inside SEZs. One strategy could be to foster linkages between SEZs and industrial villages, for which coordination between all three tiers of government is crucial.

Finally, conducting regular surveys of firms, including SMEs, with a detailed coverage of internationalization dimensions, and making such data available to researchers, would make for a better understanding of firm behavior, including with respect to GVC participation.

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Appendix A12

Table A12.1: Firm Characteristics

	All Firms	Small (S)	Mediums Sized (M)	Large (L)	Diff: S-M	Diff: S-L	Diff: M-L
General characteristics							
Mean age (years)	15.56	14.5	19.3	15.9	*		
% sole proprietorship	65.6	78.9	25.3	0	*	*	*
% with female owner	23.7	22.3	29.9	8.6		*	*
% with majority female ownership	11.0	13.6	3.2	0	*	*	
% with financials checked by external auditor	69.2	62.9	88.3	97		*	*
Production							
Mean labor productivity (NRe)	1,355,220	1,186,715	1,146,012	9,220,069		*	*
% purchasing fixed assets	31.3	27.7	40.2	68.2		*	
% with international quality certification	2.0	0.1	5.9	47.9	*	*	*
Mean days of inventory	46.1	46.4	45.5	40.7			
Mean days to manufacture	11.2	10.8	13.4	5.5		*	*
International linkages							
% with foreign investment	0.3	0	0.2	9.7		*	*
% of firms exporting	10	5.94	23.9	15.4	*		
% of firms that export at least 10% of sales	8.8	5.9	18.4	15.4			
% of firms that export directly	6.8	5.86	9.4	14.1			
% of exporters that export only indirectly	32	1.3	60.6	8.7	*		*
% of nonexporters planning to export in next 12 months	7.3	5.2	16.8	5			
Mean % of sales exported (among exporters)	52.3	69.4	36.2	67.2	*		*
Mean % of exports exported directly (among exporters)	49.7	58.5	39.4	87.7			
% of sales exported	10.3	1.3	10.1	14.7	–	–	–
Direct exports as % of sales	9.5	0.54	9.1	13.9	–	–	–
% of firms using imported raw material inputs	44.9	35.2	74.4	92.8	*	*	*
% of firms importing directly (among firms that use imported inputs)	46.8	39.8	52.8	89.1		*	*
Mean % of imports in material inputs	27.6	22.7	39.6	81.9	*	*	*

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Table A12.1 *continued*

	All Firms	Small (S)	Mediums Sized (M)	Large (L)	Diff: S-M	Diff: S-L	Diff: M-L
Mean % of directly imported inputs in total imported inputs	98.6	99.8	96.7	100	*		*
% of firms that export and import (use imported materials)	6.3	2.8	18.4	9.7			
% of firms that export directly, and use directly imported materials	1.4	0	6.2	5.7			
% of firms using licensed technology from abroad (excluding software)	1.6	0.2	6	6.7			
Internet							
% of firms using internet	36.2	26.1	68.4	96.9	*	*	*
% of firms using internet to correspond with clients via email (among firms using internet)	92.5	87.4	98.7	100			*
% of firms using internet for online purchase (among firms using internet)	12.1	8.7	17.3	10.3			
% of firms using internet for online sales (among firms using internet)	21.2	18.5	22.7	36.5			
% of firms using internet for marketing (among firms using internet)	39.0	37.1	40.8	45.9			
Innovation							
% of firms doing product innovation	12.3	8.2	23.2	52.6		*	
Mean no. of products introduced (among firms that innovated)	2.2	1.7	2.3	4.7		*	*
% of firms doing process innovation	22.9	19.5	34.2	31.1			
% of firms doing internal R&D	2.4	1.3	5.4	11.4			
% of firms doing external R&D	0.3	0	1.0	4.2			
% of firms providing formal training to employees for development/introduction of innovative products, services, processes	15.1	13.3	16.5	67.1		*	*
Finance							
% of firms having checking/savings account	86.5	82.5	99.1	100	*	*	
% of firms with overdraft facility	39.8	30.1	68.4	94.3	*	*	*

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Table A12.1 *continued*

	All Firms	Small (S)	Mediums Sized (M)	Large (L)	Diff: S-M	Diff: S-L	Diff: M-L
% of firms with line of credit	32.5	30.7	35.9	58.8			
% of firms that have had to put up collateral (among firms with line of credit)	96.6	95.7	98.8	100			
Mean collateral to credit ratio (%)	399.26	437.43	270.69	267.69	*	*	
% of firms applying for loan a year ago	24.8	19.7	40.1	49.9	*		
% of firms whose fixed asset purchase was funded at least in part by banks	19.7	16.3	19.2	68.4		*	*
% of firms whose fixed asset purchase was funded at last in part from internal sources	85.2	85.9	82.2	92.1			
Mean financing of fixed asset purchase by banks (%)	14.2	13.1	12.6	38.1		*	*
Mean financing of fixed asset purchase by internal funds (%)	71.1	75.7	61.9	59.9			
Mean working capital financed by banks (%)	6.3	3.9	12.2	31.9		*	
Mean working capital financed by internal funds (%)	79.9	83.8	67.9	62.8	*	*	
Mean working capital financed by credit from suppliers and advances from customers (%)	10.4	8.9	16.2	4.9			*
% of firms that view access to finance as a major or severe constraint to operations	35.2	40.5	18.6	15.1	*	*	

R&D = research and development.

Notes: * denotes statistically significant difference at 10% level or less; – denotes significance tests not performed since values are not means or proportions.

Source: Authors' calculations based on the World Bank's Enterprise Survey for Nepal (2013).

Table A12.2: Firm Characteristics, by Internationalization Status

	Exporter	Nonexporter	Uses Imported Materials	Does Not Use Imported Materials	Exporter and also Uses Imported Materials
No. of firms in sample (Total = 242)	38	204	146	95	25
General characteristics					
Mean age (years)	20.3	15.0	16.3	14.9	19.2
Average size (employees)	35.9	16.7	27.7	11.1	39.9
% sole proprietorship	51.1	67.2	54.1	74.9	34.4
% with female owner	34.8	22.4	29.8	18.7	54.8
% with majority female ownership	9.2	11.2	12.3	9.9	14.7
% with financials checked by external auditor	87.6	67.1	86.7	54.9	80.3
Production					
Mean labor productivity (NRe)	721,541.2	1,425,942	1,613,117	1,146,023	859,427.9
% purchasing fixed assets	59.4	28.2	35.1	28.1	73.9
% with international quality certification	2.5	2.0	4.4	0.2	3.5
Mean days of inventory	40.4	46.7	53.3	40.2	37.0
Mean days to manufacture	14.3	10.9	11.4	11.1	13.9
Internet					
% of firms using internet	75.6	31.8	62.5	15.5	78.6
% of firms using internet to correspond with clients via email (among firms using internet)	100	90.5	90.8	97.7	100
% of firms using internet for online purchase (among firms using internet)	16.8	10.8	15.5	1.3	25.6
% of firms using internet for online sales (among firms using internet)	51.6	13.0	22.8	16.3	53.2
% of firms using internet for marketing (among firms using internet)	31.6	41.1	46.5	15.3	46.8
Innovation					
% of firms doing product innovation	25.4	10.9	18.3	7.5	40.3
Mean no. of products introduced (among firms that innovated)	2.5	2.1	2.4	1.8	2.5
% of firms doing process innovation	35.6	21.5	29.0	17.9	36.8
% of firms doing internal R&D	1.2	2.5	5.1	0.1	1.9
% of firms doing external R&D	0.3	0.3	0.6	0.06	0.5

continued on next page

Table A12.2 *continued*

	Exporter	Nonexporter	Uses Imported Materials	Does Not Use Imported Materials	Exporter and also Uses Imported Materials
% of firms providing formal training to employees for development/ introduction of innovative products, services, processes	2.5	16.6	16.2	14.3	3.4
Finance					
% of firms having checking/ savings account	99.7	85.0	99.4	75.9	99.5
% of firms with overdraft facility	73.3	36.0	65.5	18.8	77.6
% of firms with line of credit	29.0	32.8	48.0	19.7	37.4
% of firms that have had to put up collateral (among firms with line of credit)	100	96.2	95.6	98.6	100
Mean collateral to credit ratio (%)	249.9	416.9	366.0	457.3	261.6
% of firms applying for loan a year ago	21.5	25.1	29.6	20.8	23.5
% of firms whose fixed asset purchase was funded at least in part by banks	15.5	20.7	32.5	6.7	19.8
% of firms whose fixed asset purchase was funded at last in part from internal sources	78.7	86.7	76.6	94.2	72.8
Mean financing of fixed asset purchase by banks (%)	11.2	14.9	21.9	6.3	14.3
Mean financing of fixed asset purchase by internal funds (%)	60.4	73.7	53.6	89.2	49.3
Mean financing of fixed asset purchase by owners' contribution or issuance of new equity shares (%)	28.5	8.3	21.3	2.9	36.4
Mean working capital financed by banks (%)	4.9	6.5	12.9	1.0	1.8
Mean working capital financed by internal funds (%)	67.6	81.3	73.5	85.2	68.2
Mean working capital financed by credit from suppliers and advances from customers (%)	20.1	9.3	10.7	10.1	20.2
% of firms that view access to finance as a major or severe constraint to operations	13.9	37.6	27.8	41.3	2.0

R&D = research and development.

Source: Authors' calculations based on the World Bank's Enterprise Survey for Nepal (2013).

13

Leveraging the Participation of SMEs in Global Value Chains of the Automotive Industry: Insights from Maruti Suzuki India Limited

Falendra Kumar Sudan

13.1 Introduction

Small and medium-sized enterprises (SMEs) are heterogeneous in terms of size and sector diversity and are defined using different criteria (e.g., employment, sales, and turnover) across countries. Generally, SMEs are defined in terms of a threshold of between 100 and 500 employees (Ayyagari, Beck, and Demirgüç-Kunt 2007). In developing countries, SMEs contribute significantly to gross domestic product (GDP) and employment generation. The SME sector has emerged as a highly vibrant and dynamic sector of the Indian economy and has contributed significantly to economic development by complementing large industries as ancillary units, promoting entrepreneurship, and generating huge employment opportunities through various schemes focusing on finance, technology, infrastructure, skills and training, competitiveness, and market assistance.

Intermediary SMEs participating in global value chains (GVCs) of the automotive industry are considered key actors in domestic production and exports, which bring value and opportunities via learning, innovation, and technological upgrading through access to advanced technology and business processes of lead firms. Local SMEs can also achieve significant success by combining domestic and foreign intermediate inputs through specialization and improved opportunities in terms of manufacturing abilities and efficiency in GVCs of the

automotive industry. SME participation in GVCs involves a certain degree of direct or indirect trade. The sample SMEs analyzed in this study do not directly export their products but export indirectly by supplying components to the lead firm that exports.

GVCs enable SMEs to specialize in specific manufacturing segments and integrate into global production chains and contribute to economic development via higher productivity and increased exports (Kowalski et al. 2015) through exports and upstream supplies to larger firms as well as access to cheaper inputs and capital goods including foreign technologies, products, and know-how. Furthermore, foreign direct investment (FDI) helps SMEs access international markets and integrate in GVCs as upstream suppliers to exporters (OECD and World Bank 2015). However, the existing potential of SMEs remains untapped in most developing countries, including India.

In India, most SMEs have a lower share of foreign goods and services to produce exports than larger firms. Moreover, dependent SMEs also have greater integration in terms of imports than independent SMEs and are better equipped to overcome import trade barriers. Therefore, robust policies are essential to address the export and import constraints faced by SMEs. The gains from GVC participation in global production networks will be more for firms in the center with greater access to foreign inputs and technologies than small firms at the periphery. SMEs also face certain risks in GVC participation due to weaker bargaining power vis-à-vis larger firms, which calls for the creation of a level playing field. Against this backdrop, the present chapter intends to analyze the role of SMEs engaged in the automotive sector in GVCs using a case study of Maruti Suzuki India Limited and how this role could be enhanced by government support.

13.2 Review of Literature

A value chain implies a “set of activities which are required to bring a product or service from conception, through the different phases of production, delivery to final consumers, and final disposal after use” (Kaplinsky and Morris 2001, 4). The global network of various organizations and firms in the value chain leads to the emergence of a GVC (Gereffi and Korzeniewicz 1994). A GVC is defined as “the full range of activities that firms and workers perform to bring a product from its conception to end use and beyond” (Gereffi and Fernandez-Stark 2011, 4). GVCs are coordinated by large multinational enterprises (MNEs) called “lead firms” (Kano 2018). Lead firms perform core activities in the value chain (Navas-Alemán 2011). Upgrading involves innovation to generate higher value added by improving processes, products, and

functions in the value chain and creates interorganizational capacity to meet buyers' demands (Pietrobelli and Rabellotti 2011). MNEs control high value-added functions, and therefore capture higher value added than suppliers (Buckley and Strange 2015).

GVC players perform better than non-GVC players (Abe 2015). SMEs experience greater stability due to better business diffusion and upgrading prospects (Navas-Alemán 2011), gain from GVC participation through upgrading (Abe 2015), and may develop their own brand to become a lead firm (Gereffi 1999). Innovative firms gain more from upgrading in GVCs by increasing productivity, employment growth, and sustainable business (Minniti and Venturini 2017), which depends on institutions and government policy. However, upgrading occurs less often in firms focused on low-value manufacturing in developing countries (Navas-Alemán 2011), due to high barriers to functional upgrading (Buckley and Strange 2015).

SMEs have less knowledge-based capital and accumulated technology to enable them to adopt emerging technologies than large MNEs (OECD and World Bank 2015) and weaker managerial skills, which act as a barrier to their effective participation in GVCs (OECD 2017). The geographic location of SMEs determines their prospects of joining GVCs (Kowalski et al. 2015). The quality of physical infrastructure and their operational efficiency along with types of preferential access to major industrialized markets also influence the participation of SMEs in GVCs (OECD and World Bank 2015). Trade and investment liberalization facilitates technological advances (Buckley and Strange 2015) and maximizes the efficiency of lead firms (Kano 2018).

Globally, industrial policies are focused on GVC integration and upgrading (UNCTAD 2018). Automotive component manufacturers rarely design and brand their own exports even in GVCs, which makes them more vulnerable than lead firms (Navas-Alemán 2011). Moving up into GVCs requires fitting into existing corporate strategies and establishing close links with lead firms (Gereffi 1999). Policy makers need to know how to upgrade SMEs' position in GVCs (Kaplinsky and Farooki 2010). In brief, coordinated actions of government, businesses, and international organizations are required to support public and private investments to gain from SMEs' participation in GVCs.

13.3 Objectives and Methodology

The selected case study has focused on the highly competitive automotive sector in India, using structured interviews with the senior management of Maruti Suzuki India Limited (MSIL) and 20 SMEs engaged in manufacturing auto components to capture information

**Table 13.1: Summary of the Characteristics
of the SMEs Selected for the Study**

Characteristics	Number of Firms	% of Firms
Size of SME		
a. Small (< ₹200 million)	10	50
b. Medium (> ₹200 million)	10	50
Age of SME		
a. Old firm (before 2000)	12	60
b. New firm (after 2000)	8	40
Foreign firms		
a. Joint venture	13	65
b. Wholly owned	4	20
Domestic firms		
a. Joint venture	2	10
b. Wholly owned	1	5
Total	20	100

SME = small and medium-sized enterprise.

Source: Compiled by author.

on the awareness and understanding of GVCs, linkages to GVCs, the relationship between the lead and suppliers, government support, and efforts to upgrade activities. A summary and detailed characteristics of interviewed SMEs are given in Table 13.1 and Annex A13, respectively. In this study, a firm is defined as a foreign firm or foreign affiliate if more than 10% of the equity is owned by a foreign firm; if less than 10% of the equity is owned by foreign firms (or more than 90% of the equity is owned by domestic firms), then the firm is classified as a domestic firm; and if 100% of the equity is owned by foreign (domestic) firms, then the firm is a wholly owned foreign (domestic) firm. The sample size of selected SMEs has been restricted to 20 by selecting an equal proportion of small and medium-sized firms, of which 17 were foreign firms (joint ventures: 65% and wholly owned: 20%) and the rest were domestic firms (joint ventures: 10% and wholly owned: 5%).

The impact of GVCs on SMEs in developing countries has not been thoroughly researched. Therefore, the present study intends to understand the process of SME participation in GVCs in the context of the automotive component industry using a case study approach

focusing on MSIL, as a lead firm, and to draw policy options to better integrate SMEs into global markets. The findings of the selected case study are specific to the automotive industry based on procurement strategies of the lead firm and are helpful in identifying the key policies for leveraging SMEs' role in GVCs.

13.4 SMEs in India

Micro-, small, and medium-sized enterprises (MSMEs) are major drivers of economic development, innovation, and employment. In India, SMEs are classified as a part of MSMEs. Generally, MSMEs are defined in terms of investment in plant, machinery, and/or equipment, the number of people employed, and the annual turnover. In India, MSMEs are collectively known as small-scale industries in terms of the number of employees under the Industries (Development and Regulation) Act of 1951; however, due to a lack of reliable data on number of employees, investment in plant and machinery and equipment was considered as a proxy. The MSME Development Act of 2006 had removed ambiguity in the criteria for classifying MSMEs by providing a comprehensive definition of an MSME based on separate investment ceilings for manufacturing and service enterprises: a microenterprise with investment of less than ₹2.5 million and ₹1 million, a small enterprise with investment of ₹50 million and ₹20 million, and a medium-sized enterprise with investment of ₹100 million and ₹50 million, respectively, in plant and machinery in the manufacturing sector and in equipment in the service sector.

In 2018, Section 7 of the MSME Development Act was amended to define a microenterprise as having an annual turnover not exceeding ₹50 million, a small enterprise as having an annual turnover of more than ₹50 million but not exceeding ₹750 million, and a medium-sized enterprise as having an annual turnover of more than ₹750 million but not exceeding ₹2.5 billion (Government of India 2018). MSMEs can be distinguished from other firms, which enables the country to use targeted policy interventions to address their special needs. In India, small firms employ less than 100 workers, while medium-sized firms employ 100–499 workers, medium-large firms employ 500–999 workers, and large firms employ 1,000 or more workers (Government of India 2014).

Table 13.2 reveals that MSMEs surged rapidly during the period 2000/01 to 2010/11, declined sharply from 2010/11 to 2018/19, but remained robust at 11.2% during the period 2000/01 to 2018/19, and contributed significantly to economic growth owing to their contribution to output, exports, and employment. The MSME

sector’s exports remained lower than its share in total exports, but the sector surged significantly despite sluggish global demand and stiff international competition. Following the MSME Development Act of 2005, the MSME sector surged robustly, which is reflected in Table 13.3. MSMEs are engaged in both formal and informal sectors of the Indian economy. There was a rapid increase in the number of registered MSMEs from 0.21 million in 2010 to 0.43 million in 2015 (Government of India 2016) and further to 3.7 million in 2018, of which

Table 13.2: Selected Parameters of MSMEs in India
(%)

Year	Compound Annual Growth Rate (CAGR)					Average Share of	
	MSMEs	Fixed Investment	MSME Output	Exports of MSME Production	MSME Employment	MSME Exports in Total Exports	MSMEs in Total GDP
2000/01 to 2010/11	15.5	22.2	20.7	13.9	15.0	31.43	24.29
2010/11 to 2018/19	5.9	7.6	10.1	67.7	2.4	39.66	33.44
2000/01 to 2018/19	11.2	17.2	17.1	33.6	9.2	35.75	30.72

GDP = gross domestic product; MSME = micro, small, and medium-sized enterprise.

Note: The data for 2000/01 to 2005/06 are related to small-scale industries. CAGRs are computed from the nominal Indian rupee value for all items except MSMEs and employment, which are measured in terms of the number of MSMEs and employees, respectively. The CAGR of fixed investment and gross output for 2010/11 to 2018/19 refers to 2010/11 to 2015/16, and the CAGR of exports for 2010/11 to 2018/19 refers to 2010/11 to 2017/18.

Source: Author’s creation based on data provided in Government of India (2013, 2016, 2017, and 2019) and data extracted from the Central Statistical Office, Ministry of Statistics and Programme Implementation.

Table 13.3: Growth of MSMEs in India
(million)

Parameter	Number of Firms			Employment		
	MSMEs	Manufacturing	Services	Total	Manufacturing	Services
Fourth All India Census of MSMEs (2006–2007)	36.2	11.5	24.7	80.6	32.1	48.5
National Sample Survey 73rd Round (2015–2016)	63.4	19.7	43.7	110.9	36.0	74.9
Compound annual growth rate (%)	6.43	6.14	6.56	3.63	1.33	4.95

MSMEs = micro, small, and medium-sized enterprises.

Source: Author’s creation based on data provided in National Sample Survey 73rd Round (2015–2016) and Fourth All India Census of MSMEs (2006–2007).

micro-, small, and medium enterprises stood at 89.6%, 10%, and 0.4%, respectively (Government of India 2019), due to changes in policy toward registered SMEs, such as the introduction of preferential treatment for registered firms after 2015.

Table 13.4 reveals that microenterprises provided significantly more employment than small and medium-sized firms. The robust performance of MSMEs after the MSME Development Act of 2005 has been attributed to several policy initiatives, including institutional and credit support, aimed at increasing the competitiveness of SMEs and integrating them into economic development strategies and plans. In India, SMEs have a huge potential to tap the latent entrepreneurial talent and provide an opportunity for inclusive growth by addressing barriers such as the high cost of maintaining high-quality standards; access to information, finance, technical and managerial skills, FDI, and technology; inadequate infrastructure and knowledge transfer to local suppliers to enter higher-value activities, promote technology and business linkages, and attract high-quality FDI; and export promotion.

Table 13.4: Status of MSMEs and Employment in India (2015–2016)

Type of Enterprise	Number of MSMEs				Employment	
	Total (million)	Share (%)	Registered (million)	Share (%)	Employment (million)	Employment (%)
Micro	63.052	99	3.489	89.55	107.62	97
Small	0.331	0.52	0.392	10.06	3.19	2.87
Medium-sized	0.005	0.48	0.015	0.39	0.17	0.13
Total	63.388	100	3.896	100	110.98	100

MSMEs = micro, small, and medium-sized enterprises.
Source: Author’s creation based on data provided in National Sample Survey 73rd Round (2015–2016).

13.5 Indian Automobile Industry: History and Recent Performance

In the late 1920s, General Motors established assembly plants in Mumbai, which was followed by assembly operations by Ford in early 1930s in Chennai, Mumbai, and Kolkata. In the early 1940s, India saw the establishment of two automobile companies, Hindustan Motors Limited in 1942 and Premier Automobiles Limited in 1944, with foreign technical

collaboration. In India, the automotive sector was heavily regulated, protected, and indigenized from the late 1940s to the early 1970s. The Indian automotive industry (IAI) had experienced slow growth and limited competition followed by some relaxation of technology acquisition in the 1980s, which led to the entry of Japanese firms.

In 1982, the Government of India and Suzuki Motor Corporation (SMC) of Japan entered a joint venture and established Maruti Udyog Limited (MUL), later renamed MSIL, which led to diverse changes in the IAI due to the introduction of Japanese standards and technologies and also incentivized domestic auto component suppliers (ACSSs) to improve their competencies. By the mid-1990s, several foreign automotive firms had entered joint ventures with Indian firms. Import restrictions were removed, and customs duties were reduced by 2002, but domestic protection still existed with a high import duty of 125% on imported used cars (SIAM 2017). In 2002, the Government of India (2002) had introduced its Auto Policy followed by the Automotive Mission Plan (AMP), 2006–2016 (Government of India 2006). These initiatives had led to technology development and increased production of small cars, which created supply chains in India to serve local assembly operations, and resulted in making India an Asian hub for auto components. Over the period, the IAI saw a significant transformation in terms of growth and profitability.

Despite less integration of the Indian manufacturing sector in GVCs (Athukorala 2019), the IAI has significantly integrated into

**Table 13.5: Production, Domestic Sale,
and Export of Passenger and Commercial Vehicles
(%)**

Year	Compound Annual Growth Rate (CAGR)					
	Passenger Vehicles			Commercial Vehicles		
	Production	Domestic Sale	Export	Production	Domestic Sale	Export
2000/01 to 2010/11	16.8	15.3	32.2	17.6	16.3	18.1
2010/11 to 2019/20	15	17.2	5.1	14.8	15.8	3.4
2000/01 to 2019/20	16	16.2	18.6	16.3	16.1	10.9

Note: CAGRs are computed from the number of vehicles.
Source: Author’s creation based on data provided in SIAM (2015, 2016, 2017, and 2019) and data extracted from the Centre for Monitoring Indian Economy (CMIE) and the Society of Indian Automobile Manufacturers.

GVCs in the past 2 decades. Upgrading in automotive GVCs occurs through investment policy, particularly FDI policy as part of industrial policy (UNCTAD 2018), which has been used to serve local markets by emphasizing local content requirements to boost assembly and local component supply. Table 13.5 shows that the compound annual growth rate (CAGR) of production of passenger and commercial vehicles has declined, while domestic sales of passenger vehicles have increased and those of commercial vehicles have declined, whereas exports of passenger and commercial vehicles declined sharply during the periods 2000/01 to 2010/11 and 2010/11 to 2019/20. The production of passenger and commercial vehicles is planned to reach 10 million and 2.35 million units in 2020/21 from 4.26 million and 1.11 million, respectively, in 2018/19 (SIAM 2019). This will lead to India become a leading manufacturer and exporter of vehicles, and it is likely that the IAI will become the third largest globally in 2020.

Table 13.6 reveals that the CAGR of aggregate turnover, exports, and imports in the auto component sector surged rapidly during the period 2000/01 to 2010/11 compared 2010/11 to 2019/20, while the CAGR of investment remained negative over the last 2 decades. In the recent past, investment in the auto component sector has experienced a declining trend, despite a surge in vehicle sales due to improved domestic and export market conditions. Imports and exports of the automotive component industry reveal an increasing trend from \$0.58 billion and \$0.26 billion in 2000/01 to \$15.17 billion and \$17.6 billion, respectively, in 2018/19. However, automotive component industry imports have remained higher than exports since 2007/08 (ACMA 2019). ACSs are projected to reach

Table 13.6: Automotive Component Industry in India
(%)

Year	Compound Annual Growth Rate (CAGR)			
	Investment	Aggregate Turnover	Exports	Imports
2000/01 to 2010/11	0.0	26.4	26.6	45.7
2010/11 to 2019/20	−3.9	2.6	8.5	8.7
2000/01 to 2019/20	−1.7	14.5	17.7	25.9

Note: CAGRs are computed from the nominal United States dollar value. CAGR of investment for 2000/01 to 2019/20 refers to 2001/02 to 2017/18, and CAGR of import for 2000/01 to 2019/20 refers to 2001/02 to 2019/20.

Source: Author’s creation based on data provided in ACMA (2016 and 2019), Government of India (2006), and IBEF (2019), and data extracted from the Centre for Monitoring Indian Economy and the Automotive Component Manufacturers Association of India.

a turnover of \$130 billion and \$200 billion, respectively, by 2021 and 2026, which is attributed to the expectation of high growth in domestic passenger and commercial vehicles (SIAM 2019).

In India, auto component players stood significantly higher at 10,000 in the unorganized sector compared to just 700 in the organized sector in 2017. However, the turnover of organized auto component players stood at 85%. In 2016, 302 auto component firms (ACFs) (41.7%) had formal research and development (R&D) activities compared to only two firms in 1991 (ACMA 2016), reflecting a significant increase in the number of automotive companies engaged in formal R&D activities and more so in domestic and foreign joint firms than wholly owned domestic firms or otherwise to maximize the benefit from each other's strengths. The National Automotive Testing and R&D Infrastructure Project had developed seven testing facilities by 2011 to develop a state-of-the-art testing, validation, and R&D infrastructure with an investment of \$388.5 million to implement global standards. Many global suppliers, such as Bosch Chassis Systems, Tenneco, and Faurecia, have developed R&D facilities to adopt global designs and develop new products in India. Increasing investments in automotive R&D also helps auto players to set up laboratories and new facilities to conduct analysis, simulation, and engineering animations. For example, Magneti Marelli entered into a joint venture with MSIL to install a new plant for the production of robotized gearboxes for automobiles.

Recently, the government has aimed to invest \$4.5 billion in upgrading products and meeting new industry regulations in ACSs under the Make in India initiative. Exports and imports of auto components are projected to reach \$80 billion and \$23 billion–\$28 billion, respectively, by 2026 (ACMA 2019). ACSs are well equipped to address the challenges of a downturn due to existing strong fundamentals and the adaptation of robust risk mitigation measures through diversification to new vehicle segments and new regions, for instance using the Association of Southeast Asian Nations free trade agreement to boost exports and strengthen the auto component aftermarket. Several foreign firms have also made substantial investments in ACSs in recent years. Moreover, a low-cost manufacturing base, additional cost advantages in terms of steel production, and supportive policies have been used effectively.

Recent automobile manufacturing policy is based on the AMP 2016–2026. The plan aims to generate an annual revenue of \$300 billion in the IAI by 2026 by contributing more than 12% to GDP and generating 65 million jobs, and India is likely to become the world's third-largest passenger vehicle market by 2021 (SIAM 2015). Other initiatives include the National Mission on Electric Mobility in 2011, the National Electric Mobility Mission Plan 2020 introduced in 2013, Faster Adoption and

Manufacturing of Hybrid and Electric Vehicles in 2015, the New Green Urban Transport Scheme in 2017, and the Draft National Automotive Policy 2018. These initiatives have aimed to remove problems pertaining to auto manufacturers. However, none of these initiatives are specifically GVC-oriented, as per the framework given by Gereffi and Sturgeon (2013).

13.6 Maruti Suzuki India Limited (MSIL)

SMC is an automobile and motorcycle manufacturer in Japan. MUL was incorporated in 1981, and SMC began its operation as a joint venture with the Indian government in 1982 by investing in MUL and started manufacturing in 1983. In the late 1990s, differences occurred over planned factory expansion, locations, and funding sources, as well as the suitability of the executive nominated by the Indian government to head the joint venture in 1997, which led to litigation by SMC against the Government of India. In 1998, the two parties settled the dispute, but it caused an interruption to the production of new car models. In 2002, SMC increased its stake in MUL to 54.2%, followed by selling off some government shares on the stock exchange in 2003. In July 2007, MUL was renamed MSIL, and the government sold all of its remaining shares. The domestic original equipment manufacturer (OEM) Tata Motors launched the small car Tata Nano in July 2009, which led to price competition, followed by the entry of Toyota and Honda, thereby requiring MSIL to gear up against the top-tier competitors.

13.6.1 Recent Performance

Table 13.7 reveals that the CAGR of revenue, net profit, and R&D investment of MSIL declined significantly during the period 2010/11 to 2018/19 compared to 2000/01 to 2010/11. Overall, the financial performance of MSIL improved steadily, except for years with production disruptions due to labor strikes.

Table 13.8 reveals that the CAGR of production, domestic sales, and exports of MSIL remained robust from 2000/01 to 2010/11. The company’s production steadily increased until 2010 but declined in 2011/12 due to a major strike in 2010/11. Domestic sales and exports of MSIL also increased significantly, except in some years. In mid-2019, MSIL became the first carmaker to introduce Bharat Stage VI-compliant cars in India (IBEF 2019).¹ MSIL is a market leader in the passenger car

¹ Bharat Stage VI is the new emission standards to which all vehicles in India have to adhere from 1 April 2020.

Table 13.7: Financial Performance of Maruti Suzuki India Limited (%)

Year	Compound Annual Growth Rate (CAGR)					
	Revenue	Net Profit	Assets	Regular Employees	Liabilities	R&D
2000/01 to 2010/11	15.7	41.9	11.5	2.2	7.2	25
2010/11 to 2018/19	5.4	9.8	13.9	9.9	11.4	1.3
2000/01 to 2018/19	11.0	25.7	12.6	5.5	9.03	13.8

R&D = research and development.

Note: CAGRs are computed from the nominal United States dollar value for all items except regular employees, which are measured in terms of the number of employees. The CAGR of net profit for 2000/01 to 2010/11 refers to 2001/02 to 2010/11.

Source: Author’s creation based on data provided in Maruti Suzuki India Limited annual report (various years).

Table 13.8: Production and Sales of Maruti Suzuki India Limited (%)

Year	Compound Annual Growth Rate (CAGR)		
	Production	Domestic Sales	Exports
2000/01 to 2010/11	13.8	12.9	24.6
2010/11 to 2018/19	2.6	5.6	–2.96
2000/01 to 2018/19	8.7	9.6	11.5

Note: CAGRs are computed from the number of units.

Source: Author’s creation based on data provided in Maruti Suzuki India Limited annual report (various years).

segment and held about 50% of the market share in 2019/20, selling 1,862,449 units in domestic and export markets (MSIL 2019).

MSIL has enhanced flexibility in product lines to enable production of multiple models in a single line and introduced platform sharing in product parts such as common chassis and core components. Currently, MSIL has two manufacturing facilities located in Gurugram and Manesar in Haryana with a combined production capacity of 1.58 million units per annum using highly efficient lean manufacturing processes. In 2017, Suzuki Motor Gujarat Private Limited (SMG), a subsidiary of SMC, was set up in Hansalpur, Gujarat to meet the increasing demand for the company’s products. SMG has an additional production capacity of 0.5 million units per annum. Therefore, the combined production

capacity of SMC and SMG stood at 2.08 million units. SMG is expected to increase its production capacity to 0.75 million units by 2020 (MSIL 2019). Several companies were set up as suppliers to MSIL, including Jai Bharat Maruti, Minda Industries, and Sona Koyo Steering Systems Ltd. A few of these companies use a proprietary technology developed by Suzuki's Japanese supplier, which held an equity stake in the Indian company.

13.6.2 Subcontracting System

The IAI has a vertically integrated pyramid style, wherein assemblers are positioned at the top, tier 1 and tier 2 ACSs in the middle, and unorganized small and tiny suppliers in the lower ranks of the value chain, which is connected through subcontracting practices. In India, the integration of ACSs through supply chains and subcontracting started with the entry of MSIL. In the initial phase, MSIL started the production of passenger cars from complete knockdown of imported components. With the rapid increase in production, it had followed a phased manufacturing program by increasing the amount of local contents from suppliers, for which SMC brought its Japanese subcontractors to India through joint ventures. Furthermore, existing Indian and foreign auto component manufacturers also became suppliers to MSIL, who also procured parts and components from other subcontractors, known as tier 2 suppliers. MSIL used its monopolistic power in the passenger car segment to develop its suppliers through subcontractors to develop its supply chains by providing technical and financial assistance.

Large production, high quality, and reduced costs and delivery time are necessary conditions for subcontracting to develop. Following economic reforms in 1991, more domestic and foreign automobile firms entered the passenger vehicle and auto component manufacturing sector in India. With the expansion in the domestic market and increased competition, subcontractors of MSIL started to supply their products to other assemblers, which led MSIL to change its procurement strategy by reducing the number of subcontractors from 400 in the 1980s to 220 in the 2000s. In 2013–2014, the supplier base of MSIL stood at 326 suppliers, including 18 joint venture companies. This increased to 444 local suppliers in 2015–2016, which provide raw materials, auto components, and consumables, and the number of plants of tier 1 suppliers stood at 564 in 2018–2019 (MSIL 2019).

Numerous ACFs supply parts and components to MSIL, working directly with tier 1 suppliers, which in turn are supplied by many tier 2 or tier 3 suppliers. For instance, Denso is a tier 1 supplier of electronic control units, fuel pumps, and injectors that imports critical parts

from Japan and primarily engages in assembly in India. Low-cost manufacturing leads to collaboration between MSIL and Denso to increase its procurement from local tier 2 suppliers to meet standards of end products and enables greater cost competitiveness for its products. The upstream segment of MSIL's value chain comprises a multitiered supply chain network.

13.6.3 Suppliers' Upgrading Program

The main upgrading activities carried out by MSIL are listed below. MSIL helps in process upgrading through various channels, including the use of new production machinery and the development of new models, which led to increased demand for SMEs engaged in auto component manufacturing, worker training, a reduction in delivery times, an improvement in quality, new management techniques, an improved production process, and increased use of information and communication technology. These initiatives have led to new learning and demonstration effects on MSIL subsidiaries and associated component firms. Since its inception, MSIL has systematically trained workers in multiple skills, strongly used information technology systems, and increased automation. MSIL considers financial strength, production flexibility, and demand sensitivity of ACSs to be an essential condition for its financial performance and production sustainability. As such, MSIL collaborates with its suppliers to ensure the quality and timeliness of supplies along with minimizing its environmental and social footprint, and uses the Comprehensive Excellence program to upgrade the performance of tier 1 suppliers in terms of quality, safety, financial capability, human resources, and risk management. In 2018–2019, 50% of supplier plants met the performance standards of the Comprehensive Excellence program. The Maruti Suzuki Suppliers Welfare Association conducted suppliers' awareness activities on the best practices to meet the company's expectations and awarded high-performing suppliers. MSIL helped tier 1 suppliers to identify fire risks, suggested mitigation measures, and carried out fire risk assessment of plants. In 2018–2019, 90% of supplier plants implemented fire safety measures (MSIL 2019). MSIL conducted a program to improve the human safety of its tier 1 suppliers, and encouraged them to adopt a safety management system and periodic reporting on it. MSIL also identified supplier plants facing acute waterlogging in the rainy season, which caused supply disruption, and helped them improve the drainage system.

MSIL's Green Procurement Guidelines help tier 2 suppliers to use the Environmental Management System. In 2018–2019, 75% of supplier plants had Occupational Health and Safety Assessment Series (OHSAS)

18001 certification and 485 suppliers had International Organization for Standardization (ISO) 14001 certification. MSIL has adopted local sourcing of components and 88% of suppliers are located within a 100-kilometer radius of its manufacturing facilities, and it facilitates the upgradation of tier 2 suppliers through the involvement of tier 1 suppliers. Tier 2 suppliers have been developed for surface and heat treatment of auto components. The Maruti Center for Excellence has provided training support to suppliers to maintain different quality standards. The Maruti Suzuki Training Academy has conducted need-based training of tier 1 suppliers in preventive maintenance and plant safety. MSIL has started up Dojo (place or way in Japanese) training centers to maintain top-quality ACSs, which have been useful for other SMEs engaged as tier 1 and 2 suppliers. The number of Dojo centers is planned to increase to 400 in 2020 (MSIL 2019). With improved production processes and greater automation, a significant reduction in delivery times has been achieved.

MSIL has resorted to significant upgrading of auto components' technological capabilities by replacing older components with more advanced parts to meet consumer demands and to compete with global suppliers, which has led to a rapid surge in auto component manufacturing. This has also been done through total quality improvements in production processes. Improving operational efficiency has been one of the key aspects of the new organizational and management techniques. With increased competition, MSIL decided to ensure quality for growth and survival, for which formal quality improvement programs have been implemented. New quality upgrading programs, such as just-in-time, total quality management, and total productivity management, have been adopted. MSIL subsidiaries and linked SMEs in auto component manufacturing have also attempted to follow such upgrading activities. The product upgrading activities of MSIL include improved product quality, the use of improved materials to enhance the product range, and reduced reworking rates. MSIL has also used functional upgrading in design, but has left marketing and attempts to improve product quality by meeting regulatory norms and consumer demands and to innovate and improvise on the existing product portfolio. MSIL's product quality improvements include upgraded features, design face-lifts, and new and improved engines.

13.7 Results of the Study

The case study is qualitative and highlights how the lead firm (i.e., MSIL) enabled the integration of Indian SMEs into the GVC by initially providing them with the ability and technological know-how to leverage

their participation in the GVC of the IAI. Several SMEs were set up as suppliers to MSIL. Most SMEs in the IAI have experienced growing competition along with MSIL in seeking new suppliers that could meet more stringent technology, investment, and quality standards.

13.7.1 Awareness and Understanding of GVCs

All the SMEs that participated in the interview have a high level of awareness of other firms and the overall structure of the IAI. Table 13.9 reveals that 45% of smaller firms at lower tiers are less aware of the benefits of GVC participation, while 85% of all firms are aware of key elements for successful participation in GVCs, including quality, flexibility, adaptability, and ability in production, including cost-efficiency and timeliness, human capital, and technology to meet international standards, and low rejection rates, which gives a competitive edge to suppliers in meeting future demand. About 80% of firms understand the value of quality, cost, and timeliness, while 90% of firms consider the significance of skills and technology to reap the benefits from GVC participation, whereas 85% of firms understand their strengths in maintaining flexibility, adaptability, and ability in production, and also value the huge financial capacity and stronger technology base of MSIL.

Table 13.9: Level of Awareness of Global Value Chains
Shown by Interviewed SMEs

Level of Awareness	No. of SMEs	% of SMEs
Awareness of other firms	20	100
Awareness of overall structure of the Indian automotive industry	20	100
Benefits of GVC participation	9	45
Elements of successful GVC participation	17	85
Value of quality, cost, and timeliness	16	80
Skills and technology	18	90
Flexibility, adaptability, and ability	17	85
Financial capacity and technology of Maruti Suzuki India Limited	20	100
High awareness of GVC concepts	11	55
Less awareness of GVC concepts	9	45

GVC = global value chain, SMEs = small and medium-sized enterprises.
Source: Compiled by author.

The senior management of MSIL has a clear understanding of GVCs in the IAI and associated concepts and processes and acknowledges the growing competition in the automotive sector and also revealed that declining import tariffs have a significant impact on the productivity and cost competitiveness of its suppliers. MSIL faces intense domestic competition with other OEMs and international OEMs in terms of the cost and quality of supply in export markets and must be highly competitive not only in relation to local OEMs, but also with other OEMs globally. MSIL's global strategy has been to expand its export markets and restructure domestic plants with new models. In recent years, MSIL has implemented major strategic changes and remained the largest car producer in India due to significant trade protection and its network of suppliers.

SMEs engaged in automotive components have mixed perspectives on participation in GVCs, which varied with the size of the firms. A total of 55% of firms with a large turnover, transnational ownership structure, and substantial experience of supplying to transnational OEMs along with a dominant automotive component product profile are more aware of GVC concepts and processes compared to 45% of firms with a lower turnover and still learning about GVC-related issues. In recent years, the intensity of the relationship between MSIL and ACSs has changed significantly and is expected to change further in the coming years with increasing competition. Smaller participating firms, comprising 45% of all firms, have few raw materials suppliers and have been suppliers to tier 1 suppliers and considered themselves part of GVCs, and therefore faced growing competition in terms of technology, investment, and quality standards, which vary substantially from firm to firm. Most sampled SMEs (80% of firms), comprising 35% of Indian subsidiaries and 45% of local firms, face substantial competitive threats from transnational firms via imported alternatives or their subsidiaries owning production technology.

13.7.2 Linkages in GVCs

Table 13.10 reveals that all participating joint venture firms of MSIL (25% of all firms) believe that the scale and scope of coordination processes had increased substantially due to which these firms became more integrated into the production processes of MSIL. Large SME suppliers (50% of all firms) have a track record of product and process research and design, and opined that building trust with SME suppliers has been a key activity of MSIL, with whom it had worked over the years to enable them to retain a supply relationship. The participation of 45% of local components suppliers' plants in GVCs has

helped maintain global standards, as well as production and logistics efficiencies.

Local suppliers (45% of all firms) in GVCs have contracted to supply components for a particular model based on price, quality, and other factors with an opt-out clause in the case of substandard supplies. All participating firms revealed that MSIL’s production depends on demand, and accordingly supply arrangements have been based on production schedules. Long-term supply and technology development relationships have been preferred by 45% of supplier firms; however, where necessary, short-term contracts have been arranged with 20% of firms. Regular coordination and personal interaction have also been emphasized to build trust with 45% of firms by MSIL.

Table 13.10: Cooperation and Types of Linkages in Global Value Chains

Cooperation and Types of Linkages in Global Value Chains	No. of SMEs	% of SMEs
Increase in scale and scope of coordination	5	25
Trust in SME suppliers by Maruti Suzuki India Limited	10	50
Global standards and efficiencies	9	45
Supply components for a particular model	9	45
Supply based on production schedules	20	100
Long-term supply and technology relationships	9	45
Short-term contracts	4	20
Regular coordination and personal interaction	9	45
Specifications of international standards	9	45
Joint ventures with local firms	5	25
Joint ventures with foreign firms	1	5

SMEs = small and medium-sized enterprises.

Source: Compiled by author.

Besides 25% of transnational participating firms, MSIL had been working to help 45% of existing local suppliers to meet international standard specifications. With the increase in production of different models for domestic and international markets, there has been a significant increase in the number of joint ventures with 25% of local participating firms and 5% of global sourcing partners. The goal was to reduce the production costs with an increased value of supplies in the

local market along with an increase in volumes. Most of the sampled SME suppliers (80% of firms consisting of Indian subsidiary firms and local suppliers) opined that the high standard requirements of MSIL have increased costs and failed to provide a premium in prices within the automotive value chain. Thus, 20% of sampled transnational firms would be able to leverage more benefits by complying with all the standards and system requirements.

13.7.3 Relationship between Lead Firm and Supplier

MSIL has been the most important business partner of all participating SMEs. Table 13.11 reveals that 45% of participating SMEs believe that transnational suppliers and joint venture firms have been the main intermediaries linked with MSIL, while 30% of participating SMEs have also learned from other suppliers to OEMs. Logistics

Table 13.11: Relationship Between Lead Firm and Supplier Firms

Relationship between Lead Firm and Supplier Firms	No. of SMEs	% of SMEs
Reasons for joining GVCs		
Transnational and joint venture firms linked with Maruti Suzuki India Limited	9	45
Lessons from other suppliers	6	30
Relationships with key suppliers	5	25
Proximity strengthened GVC participation	20	100
Conditions to join GVCs		
International standard certifications	20	100
Investment in innovation and product development	4	20
Linkages with global component firm	1	5
Obstacle in joining GVCs		
Lack of technology and innovation	8	40
Attaining international standards difficult	4	20
High price competition and quality ratings	6	30
Difficult, expensive, and complex certification	13	65
Weaknesses in technology and product development	7	35

GVC = global value chain, SMEs = small and medium-sized enterprises.
Source: Compiled by author.

firms have played a significant role in getting inputs from suppliers and delivering to MSIL. MSIL has emphasized relationships with key suppliers, mainly 25% of its participating joint venture firms and their distribution agents. The proximity of all participating SMEs to the lead firm has strengthened participation in GVCs by building some level of trust over time, while 40% of comparatively small firms believe that their size in terms of employment and investment acts as an impediment to their GVC participation due to the fact that they do not have enough sources of technology and innovation to secure long-term supply relationships.

All the suppliers have international standard certificates, which were a mandatory condition of the lead firm. Of the firms, 20% revealed that attaining these standards has been difficult for small firms engaged in low-value components, but it strengthened their position in the GVC, whereas 30% of participating SMEs have seen a high level of price competition along with acceptable MSIL quality ratings. Most participating SMEs (65% of firms) revealed that achieving international material certification was difficult, expensive, and complex. The lead firm revealed that 35% of local suppliers have weaknesses in terms of technology ownership, innovation, and product development, while 20% of firms had invested in such capability, but one firm had preferred to establish linkages with sampled global ACFs, and the rest of the participating SMEs had preferred not to do so due to poor human and technological capabilities, product development, innovation, R&D, and high-quality standards including regulatory restrictions to entering into collaborations with foreign firms and greater emphasis on indigenization.

13.7.4 Government Support

No firms were enthusiastic and optimistic about government support to improve their participation in GVCs. Table 13.12 reveals that 80% of firms believed that the government has the necessary capacity to address their genuine needs, while 65% of firms have reported that the government always remained very slow to intervene through skills development, investment incentives, technology development, and labor reforms. A total of 45% of firms were of the opinion that the government should be proactive in order to benefit OEMs and small ACFs participating in GVCs, whereas 60% of participating SMEs had gained access to government schemes, including investment incentives and export opportunities, but the main challenges of the automotive sector remained unaddressed.

**Table 13.12: Government Support
to Enhance Global Value Chain Participation**

Government Support for GVC Participation	No. of SMEs	% of SMEs
Not enthusiastic and optimistic about government support	20	100
Government has capacity to address genuine needs	16	80
Government is slow to intervene	13	65
Government should be proactive in providing support	9	45
Access to government schemes	12	60

GVC = global value chain, SMEs = small and medium-sized enterprises.
Source: Compiled by author.

13.7.5 Impact of GVC Participation

The perceptions of SMEs were ascertained to understand the impact of GVC participation on their functioning and performance. Table 13.13 reveals that 45% of firms reported lower skill intensities with GVC participation and subcontracting resulting in a small decline in industry-level wages for low- and medium-skilled workers, whereas 30% of firms perceived a positive wage effect for workers employed in less manual-intensive manufacturing jobs. There has been a significant rise in the capital intensity of production resulting from the expansion of GVCs and a decline in the labor share in income of 55% of firms, and subcontracting has led to a widening wage gap between skilled and less skilled employees. A total of 65% of firms perceived a negative effect of GVC participation in the demand for high-skilled workers, while 25% of firms perceived that higher levels of foreign value added support economic upgrading through GVC participation. SMEs engage in increased use of labor-intensive services in production other than body welding and painting, such as wire harnessing, circuit board assembly, and certain component assembly due to lower wage costs, which help them move up the value chain, as well as improve competitiveness and profitability. All SMEs perceived that GVC integration leads to more intensive use of labor-intensive services. A total of 15% of firms confirm a positive effect of skills building on value-added gains. GVCs coordinated and led by MSIL provide opportunities to upgrade technologically through participating in such networks.

In the case of 55% of firms, participation in automotive value chains has improved product quality, production capacity, productivity, competitiveness, and business expansion along with immense

Table 13.13: Perceived Impact of Global Value Chain Participation

Perceived Impact of GVC Participation	SMEs (No.)	SMEs (%)
Negative impact		
Decline in industry-level wages	9	45
Negative effect for high-skilled workers	13	65
Positive impact		
Positive wage effect	6	30
Rise in capital intensity and labor share in production	11	55
Intensive use of labor-intensive services	20	100
Positive effect of skills building	3	15
Improved productivity and competitiveness	11	55
Business expansion and research and development	11	55
Greater net output and total sales	11	55
Market extension and employment growth	11	55
Higher domestic value added and benefits	11	55
Improved productivity	5	25
Improve technology transfer	5	25
Improve access to business partners	6	30
International entrepreneurial possibilities	6	30
Subcontracting at reduced cost	7	35
Improved networking, training, and finance access	9	45
Better access to information and new markets	11	55
Technological learning and skills acquisition	11	55
Rapid learning and innovation	11	55
Attract more investment	5	25
Cheaper and better-quality inputs	5	25
Improved efficiency	5	25
Use of information and communication technology and improved transport network	6	30
Upgrading		
Support economic upgrading	5	25
Industrial upgrading	11	55
Functional upgrading to improve their profits	10	50
Functional or other upgrading	5	25
Human and technological capital upgrading	4	20

continued on next page

Table 13.13 *continued*

Perceived Impact of GVC Participation	SMEs (No.)	SMEs (%)
Challenges		
Challenges of global standards	9	45
Challenges of multinational enterprises' managerial practices	9	45
Challenges of managerial and financial resources	7	35
Challenges to innovate and protect technology	7	35

GVC = global value chain, SMEs = small and medium-sized enterprises.
Source: Compiled by author.

opportunities for alternative procurement and R&D. Similarly, 60% of older SMEs have greater net output and total sales compared to subcontractors. The impact on production, market extension, and employment growth has been significant. Improved networking, training, and finance access have been achieved by 45% of participating SMEs. A total of 50% of small participating firms without sufficient capabilities to engage in functional upgrading adopt strategies to improve their profits, and in the case of 25% of firms, the occurrence of functional or other upgrading does not necessarily improve their ability to reap higher profits. The power asymmetries between MSIL and suppliers in the IAI are huge. MSIL often use their power to increase pressure on suppliers for on-time delivery, efficiency, cost reduction, and high standards. Functional upgrading of suppliers in automotive manufacturing remains outside design and branding. Functional upgrading within design and branding occurs in MSIL, which possessed more resources, robust industry position, and better institutional support than small components suppliers. Therefore, MSIL is engaged in product, process, and functional upgrading including design and branding functions.

In the case of 55% of firms, participation in GVCs provides rapid learning, innovation, and industrial upgrading through better access to information, new markets, and opportunities for fast technological learning and skills acquisition, which results in higher domestic value added and benefits both upstream suppliers of intermediates and downstream users. A total of 25% of MSIL joint venture firms' participating in GVCs attract more investment, improve productivity, provide the advantage of cheaper and better-quality inputs through subcontracting, improve efficiency, and induce technology transfer and knowledge spillovers from lead firms.

The use of information and communication technology and an improved transport network have improved 30% of joint venture firms' access to global markets, new business partners, and customers, including the development of entrepreneurial possibilities through international strategic alliances, and mergers and acquisitions with MNEs via actual and virtual global networks. A total of 35% of firms have become specialized suppliers in GVCs and have benefited from subcontracting at reduced cost. Learning processes in GVCs improve human and technological capital upgrading of only 20% of firms due to the low level of human capital and technological capability on the part of participating SMEs and power asymmetries between the lead firm and suppliers. A total of 45% of subcontracting firms in GVCs face the challenges of conforming to global standards in terms of technology, quality, delivery, and after-sales service and to adapting routines and managerial practices of MNEs at local and or/cluster level. Some SMEs (35% of firms) have also faced challenges in terms of managerial and financial resources, and the ability to upgrade, innovate, and protect their own technology due to not having sufficient R&D and skills to comply with product quality standards.

In brief, the participating firms have shown modest performance in terms of benefits from participation in GVCs, due to inadequate access to information, technological and managerial skill acquisition, and market opportunities for higher value added. Most participating SMEs faced barriers in attracting investment as well as cheaper and better-quality inputs from subcontracting, and technology transfer and knowledge spillovers from lead firms. SMEs also faced the obstacle of an inadequate transport network in accessing international markets and new business partners through overseas strategic alliances. Moreover, SMEs experienced obstacles such as inadequate learning to improve human and technological capital upgrading and insufficient financial resources to upgrade, innovate, and protect their own technology due to a lack of in-house R&D and skills to maintain global quality standards.

The overall assessment of the impacts of GVC participation based on the results of interviews supports the argument that SMEs' participation in GVCs benefits them modestly, despite a negative impact on wages, which may be attributed to a higher labor supply on account of the youth bulge and mushrooming growth of technical institutions supplying graduates. However, restructuring of production through subcontracting and GVCs facilitates economic, industrial, functional, human, and technical upgrading of SMEs. New niches for ACSs continuously emerge from production disruption, where SMEs can rapidly occupy those places by taking advantage of their flexibility and ability to progress fast.

13.8 Policy Implications

Policy plays a significant part in leveraging SMEs' integration into GVCs, which calls for a broad range of policies by involving private players and strong political leadership for effective collaborative implementation focusing on services trade and efficient domestic markets including easing restrictions on foreign ownership as well as removing barriers to competition. Some SMEs lack the ability to upgrade and deliver products and production systems as per the expectations of the lead firm to meet quality, supply standards, and delivery times due to increasingly stringent quality requirements and therefore need support to meet global quality standards. Continuous technological upgrading is essential to meet standards. The government should support SMEs by providing financial incentives to invest in appropriate technology and strengthen the national innovation systems to develop their R&D capacity.

Some SMEs lack awareness of the complexity of the tasks and timely delivery. Therefore, the government could facilitate their participation in GVCs by raising awareness of the benefits and potential of subcontracting to improve competitiveness by rationalization of resources using market intelligence and managerial capacities. Technological upgrading is essential for participation of SMEs in GVCs, for which skills development programs should be initiated to promote partnerships between SMEs and global players focusing on technology transfer, products, processes, and management practices.

Only 20% of participating SMEs feel that participation in GVCs contributed to upgrading human capital and technological capability; therefore, there is a need to raise technical and managerial skills in SMEs to facilitate greater integration into GVCs. There is also a need to promote technology and knowledge transfer by MNEs to local suppliers and subcontractors, which can influence them to develop business linkages with SMEs. Local suppliers should actively develop their network on a global scale to improve their innovation capability by knowledge sharing and collaboration to improve performance.

The government should provide the necessary support for interfirm collaboration, allocate funds for the development of ACFs, promote partnership ventures to enable firms to work together, encourage OEMs to develop longer-term plans, and help local suppliers to work in partnership to build capabilities in design, engineering, and production engineering. The relative competitiveness of the automotive sector needs to improve to make India a production destination through labor reforms, supplying necessary skills, safety, and security, and infrastructure development.

SMEs face regulatory barriers, including different and concurrent quality standards, high technical standards, cost-efficiency, product

liability, and industrial safety and environmental regulations, which require their capabilities and skills to be enhanced to meet new standards due to their strategic significance in the automotive sector and their integration into GVCs to be made as smooth as possible. Investment in product and process innovation must be met for GVC participation by addressing credit market imperfections and broadening the range of financing instruments available to SMEs. Institutional arrangements to implement logistics-related reforms must be evolved to facilitate greater SME participation in GVCs.

Robust institutions should be developed to increase the level of awareness of the opportunities for participation of SMEs in GVCs. Accurate information should be disseminated on the benefits of subcontracting and the needs of upstream and downstream partners in GVCs through complete databases and electronic platforms. SME clusters, incubation centers, and networks should be developed and strengthened at regional and subregional levels for continuous innovation and R&D. Institutional support should improve negotiating capacities and skills through supplier development programs in design and production engineering.

Skills development programs should focus on imparting specific technical and business skills with a view to collaborating with domestic and overseas partners. Information sharing should be targeted for technological upgrading of product quality and process standards, intellectual assets, and intellectual property. Development of in-house technological capabilities and innovation is essential for improving SMEs' competitiveness to create low-cost products, which requires transparency and robust information flow to lower-tier firms. There should be investment in technology, process upgrading, and R&D in order to protect SMEs' intellectual assets.

SMEs should be helped in acquiring quality certificates and achieving a zero-defect culture. There is a need to expand aftermarket activities and exports, as well as enforcing emission and safety standards to open global export markets. Digital and analytics-driven transformation of the auto component sector is essential for transforming automotive organizations across the value chain. Manufacturers can coinvest in R&D and product development through partnerships. Government should facilitate exports through encouraging cooperative supply chains in high-potential export markets. Assemblers should invest in and collaborate with tier 1 and tier 2 component manufacturers to help them build relevant human capital and technological and digital capabilities. Total quality management, robust supply chain management, quality certification, and total production maintenance should be promoted and strengthened.

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Appendix A13: Characteristics of Interviewed SMEs

SMEs	Capital/Ownership Structure	Main Production	Market Share in Parts and Component Industry in India	Linkage with MSIL
Jay Bharat Maruti Limited (JBML) Incorporated: March 1987 Factory location: Manesar (Haryana) Total employees: 500+	AC: ₹270.00 million PC: ₹216.50 million A subsidiary of JBM Group, and entered into a technical assistance agreement with Hamamatsu Pipe Company Japan Accreditation: ISO/TS16949, OHSAS 18001, ISO 14001, ISO 9001	Sheet metal components, assemblies and sub-assemblies including welded assemblies, exhaust systems, fuel filters, chassis, rear axles, suspension parts, and components for automobiles	OEM: 01 Plants: 10	A JV of MSIL and supplier of 100% of its components to MSIL
Sharda Motors Industries Limited Founded: January 1986 Factory location: New Delhi Total employees: 3,500+	AC: ₹50.46 million PC: ₹50.00 million A public/nongovernment company limited by shares Accreditation: ISO/TS16949, ISO 9001	Processing technologies/ components	OEMs: 08 Plants: 10	Supplier of seat cushion frames. A JV between Suzuki, MSIL, and Sharda Motors
Magneti Marelli Powertrain India Private Limited Founded: November 2009 Factory location: Manesar (Haryana) Total employees: 115+	AC: ₹150.00 million PC: ₹150.00 million A nongovernment company limited by shares Accreditation: ISO/TS16949, EN 16001, ISO 50001, ISO 9001	Robotized gearboxes for automobiles/ automated manual transmissions including electronic systems, suspension systems, exhaust systems, and automotive lightings	A subsidiary of a foreign company OEM: 01 Plant: 01	Supplier of fog light lamps, rear lamp bulbs, tail lamps, and automated manual transmissions. A JV between Magneti Marelli, Suzuki, and MSIL

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Table A13 *continued*

SMEs	Capital/Ownership Structure	Main Production	Market Share in Parts and Component Industry in India	Linkage with MSIL
Lumax D K Auto Industries Limited Incorporated: May 1997 Factory location: Gurugram Total employees: 650+	AC: ₹211.00 million PC: ₹42.40 million A private/nongovernment company Accreditation: ISO/TS16949, ISO 9001	Gear shifters, parking brakes, plastic trim parts, precision components, bumper corner components, and exhaust finishers	A subsidiary of Lumax Auto Technologies Limited, Pune OEMs: 05 Plant: 01	Supplier of lighting lamps
Lumax Cornaglia Auto-Technologies Private Limited Incorporated: June 2007 Factory location: New Delhi Total employees: 100+	AC: ₹75.00 million PC: ₹64.27 million A private/nongovernment company Accreditation: ISO/TS16949, ISO 14001, OHSAS 18001	Air intake systems and plastic granules for automobiles	A 50-50 JV with Cornaglia Group, Italy and a subsidiary of Lumax Auto Technologies Limited, Pune and a JV between Lumax Technologies and Cornaglia Metallurgical Products India Private Limited OEMs: 4 Plant: 01	Supplier of plastic granules for automobiles
Lumax-Gill Austem Auto-Technologies Private Limited Incorporated: November 2013 Factory location: Gurugram (Haryana) Total employees: 20+	AC: ₹90.00 million PC: ₹49.40 million A private/nongovernment company Accreditation: ISO/TS16949, ISO 14001, ISO 50001	Lighting and illumination solutions	A 50-50 JV with Gill-Austem, US and a subsidiary of Lumax Auto Technologies Limited, Pune OEMs: 03 Plant: 01	Supplier of front lightings/head lamps
Denso India Limited Established: November 1984 Factory location: Manesar (Haryana) Total employees: 1,200+	AC: ₹320.00 million PC: ₹320.48 million A private/nongovernment company Accreditation: ISO/TS16949, ISO 9002, ISO 9001, ISO 9000, OHSAS 18001	Transmission and spare parts	A subsidiary of Denso Global, Japan, and Denso International India Private Limited, New Delhi OEMs: 03 Plant: 01	Supplier of condensers, with radiators, fuel injectors, wiper systems and power windows

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Table A13 *continued*

SMEs	Capital/Ownership Structure	Main Production	Market Share in Parts and Component Industry in India	Linkage with MSIL
Futaba Maruti India Incorporated: November 2007 Factory location: Manesar (Haryana) Total employees: 500+	AC: ₹900.00 million PC: ₹900.00 million A private/nongovernment company Accreditation: ISO/TS16949	Car exhaust systems, car exhaust pipes, steel car exhausts, magna flow exhaust systems, and silence exhaust systems for car silencers	A subsidiary of Futaba Industrial Gujarat Private Limited, Ahmednagar (Gujarat) OEM: 01 Plant: 01	A JV of MSIL and supplier of exhaust cold ends
Krishna Maruti Limited Incorporated: June 1991 Factory location: Manesar (Haryana) Total employees: 1,773	AC: ₹55.00 million PC: ₹42.41 million A private/nongovernment company Accreditation: ISO/TS16949, ISO 9001, QS 9000, OHSAS 18001	Metal fuel tanks, gear shifter assemblies, cabin systems, seat structures, seat assemblies, door trim panels, automotive seating systems, alternate fuel systems, automotive fabrics, vehicle interior systems (door trims and roof headlines), vision systems, chassis systems, cabin systems, and body structure systems	A subsidiary of Krishna Group and an associate company of MSIL OEMs: 09 Plants: 02	Supplier of seat structures, seat assemblies, and door trim panels
Hella India Automotive Private Limited Incorporated: November 1980 Factory location: Gurugram (Haryana) Total employees: 1,146+	AC: ₹224.10 million PC: ₹89.97 million A private/nongovernment company Accreditation: ISO/TS16949, E-mark, ISO 14001, ISO 9001	Modules, LED tail and plough lamps, LED products, decorative lamps, air temperature sensors, accelerator pedals, and fog products	A 100% subsidiary of HELLA GmbH & Co. Germany OEMs: 17 Plant: 01	Supplier of air temperature sensors, accelerator pedals, and fog products

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Table A13 *continued*

SMEs	Capital/Ownership Structure	Main Production	Market Share in Parts and Component Industry in India	Linkage with MSIL
Minda Industries Limited Incorporated: September 1992 Factory location: Greater Noida (Uttar Pradesh) Total employees: 1,500+	AC: ₹630.50 million PC: ₹520.40 million A private/nongovernment company Accreditation: ISO/TS16949, ISO 9001, ISO 14001, OHSAS 18001	Switching systems, acoustic systems, alloy wheels, and floor consoles	A subsidiary of N K Minda Group OEMs: 33 Plants: 05	Supplier of floor consoles
Omron Automotive Private Limited Incorporated: January 2006 Factory location: Gurugram (Haryana) Total employees: 500+	AC: ₹300.00 million PC: ₹155.58 million A private/nongovernment company Accreditation: ISO/TS16949, ISO 9001, ISO 14001	Electronic valves and tubes, central body control module, and other electronic components	A JV of Omron, Japan OEMs: 05 Plant: 01	Supplier of central body control modules and other electronic components
Shiroki Technico India Private Limited Incorporated: May 2014 Factory location: Gurugram (Haryana) Total employees: 200+	AC: ₹0.50 million PC: ₹0.13 million A private/nongovernment company Accreditation: ISO 9001	Alloy wheels and window regulators, seat devices and windows, regulators, and sheet metal-related operations	A JV between Shiroki Corporation Japan and Technico Industries India OEMs: 05 Plant: 01	Supplier of seat recliners
Mitsubishi Electric Automotive India Private Limited Established: July 2001 Factory location: Manesar (Haryana) Total employees: 192+	AC: ₹190.00 million PC: ₹190.00 million A private/nongovernment company Accreditation: ISO/TS16949, ISO 9001, ISO 14001, OHSAS 18001	Air conditioners for cars	A subsidiary of Mitsubishi Electric Corporation Japan OEMs: 03 Plant: 01	Supplier of various electric auto components

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Table A13 continued

SMEs	Capital/Ownership Structure	Main Production	Market Share in Parts and Component Industry in India	Linkage with MSIL
Jay Ushin Limited Incorporated: August 1986 Factory location: Manesar (Haryana) Total employees: 200+	AC: ₹150.00 million PC: ₹150.00 million A private/nongovernment company Accreditation: TS16949, ISO 9001	Automotive batteries, locks and key sets, combination switches, control panels for heaters, and door latches	A JV of Ushin Limited, Japan OEMs: 05 Plants: 07	Supplier of manual heater controls
UFI Filters India Private Limited Incorporated: June 2006 Factory location: New Delhi Total employees: 200+	AC: ₹210.00 million PC: ₹210.00 million A private/nongovernment company Accreditation: ISO/TS16949, IATF 16949, ISO 9001, ISO 14001, OHSAS 18001	Automotive filters, diesel filters, and fuel filters	A subsidiary of UFI Filters Italy OEMs: 06 Plant: 01	Supplier of diesel filters
A Raymond Fasteners India Private Limited Founded: November 2007 Factory location: Gurugram (Haryana) Total employees: 172+	AC: ₹700.00 million PC: ₹445.23 million A private/nongovernment company limited by shares Accreditation: ISO/TS16949, ISO 9001	Automotive electrical distribution systems, automotive fasteners, fluid connectors, and brake boosters	A JV of ARaymond, France OEMs: 13 Plant: 01	Supplier of fluid connectors, and brake boosters
Bharat Seats Limited Incorporated: 1986 Factory location: Manesar (Haryana) Total employees: 200+	AC: ₹70.00 million PC: ₹63.00 million A private/nongovernment company limited by shares Accreditation: ISO/TS16949, ISO/IEC 17025, ISO 27001	Automobile seats, car seat assemblies, seat frames, and seating systems	OEMs: 0 Plant: 01	A JV of MSIL and supplier of automobile seats, car seat assemblies, seat frames, and seating systems

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Table A13 continued

SMEs	Capital/Ownership Structure	Main Production	Market Share in Parts and Component Industry in India	Linkage with MSIL
Amtech Auto Limited Founded: August 1988 Factory location: Manesar (Haryana) Total employees: 1,300+	AC: ₹800.00 million PC: ₹496.51 million A public/nongovernment company limited by shares Accreditation: ISO/TS16949	Basic precious and nonferrous metals, brake assembly, brake drum equipment, etc.	An Indian MNC OEMs: 09 Plant: 01	Supplier of metals, brake assemblies, and brake drum equipment
Motherson Automotive Technologies and Engineering Limited Established: April 1995 Factory Location: Manesar (Haryana) Total employees: 1,000+	AC: ₹2,500.00 million PC: ₹20.00 Accreditation: ISO/TS16949, ISO 9001, VDA 6.1	Brakes, gearboxes, axles, road wheels, suspension shock absorbers, radiators, silencers, exhaust pipes, steering wheels, steering columns, and steering boxes	OEMs: 09 Plant: 01	Supplier of small automotive parts and accessories

AC = authorized capital, EN = Energy Management System, IATF = International Standard for Automotive Quality Management Systems, ISO = International Organization for Standardization, JV = joint venture, MNC = multinational corporation, OEM = original equipment manufacturer, OHSAS = Occupational Health and Safety Assessment Series, PC = paid-up capital, VDA = quality management system, TS = technical standard.

Source: Compiled by author.

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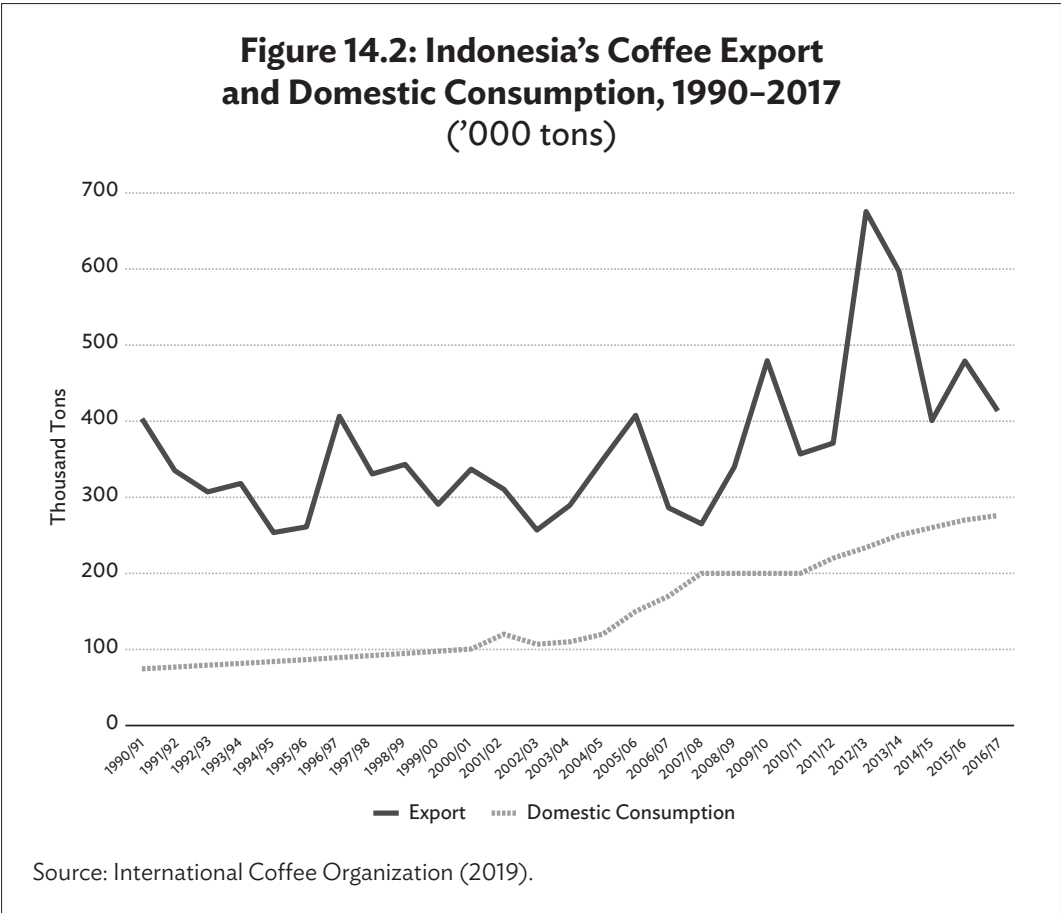
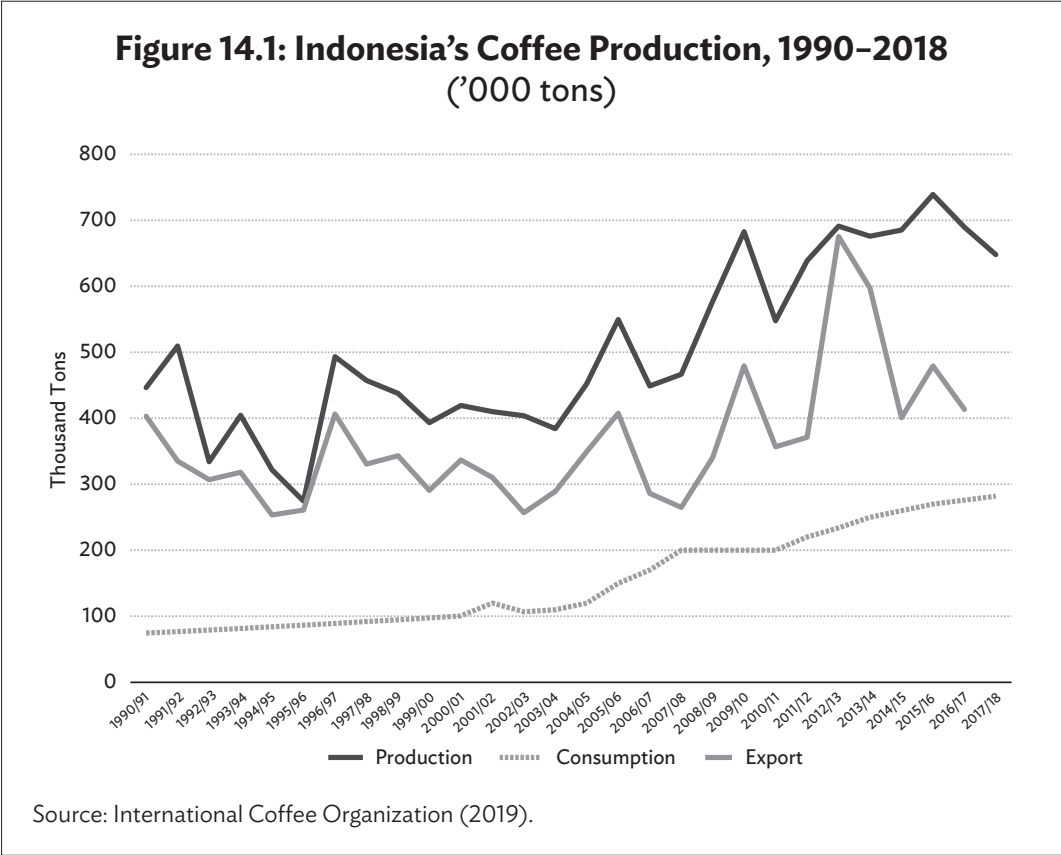
Impacts of Involvement in the Global Value Chain on Coffee Farmers in Indonesia: Case Study of Margamulya Coffee Producer Cooperative and Mitra Malabar Cooperative, Bandung, Indonesia

Amzul Rifin and Dahlia Naully

14.1 Introduction

Indonesia is the fourth-largest producer of coffee in the world, contributing 7% of the world's production in 2017/18 (ICO 2019). There was an increase in annual production of 3.6% between 1990 and 2018 despite its average fluctuation (Figure 14.1) (ICO 2019). This increase was caused by an average increase in land area of 2.35% between 1980 and 2017, with the land being used for farming (Statistics Indonesia 2018). In recent years, several local governments have intensified efforts in distributing coffee seedlings to farmers, especially in mountainous areas, with a view to replacing horticultural products with coffee and supporting land conservation.

The coffee produced in Indonesia is either consumed domestically or exported. In 2016/17, 60% of Indonesia's coffee production was exported and 40% was consumed domestically. The percentage of exports is still larger, but the share has decreased significantly. In 1990/91, the share of exports had reached 84%, reflecting a significant increase in domestic consumption over the years (Figure 14.2). Between 1990 and 2017, the



average increase in domestic consumption was 5.4% while exports grew by 3.1% in the same period (Figure 14.2).

Coffee producers in Indonesia can be divided into three categories: smallholder, government, and private. In 2018, 95% of coffee was produced by smallholders, followed by private and government enterprises with 3% and 2%, respectively (Ministry of Agriculture 2018). The increase in production in recent years has also been dominated by the smallholder. During the period from 1980 to 2017, smallholder production increased by an average of 2.17% and land area by 1.62% (Ministry of Agriculture 2018). The data imply an increase in productivity by smallholders. In addition, there has been land expansion in recent years, especially in the mountainous areas, to enable the planting of coffee in place of previously grown crops. On high-altitude land, most farmers planted arabica, which made up 28% of the country’s coffee production. Meanwhile, the lowland area was used to plant robusta, which accounted for 72% of Indonesia’s coffee production in 2018.

The coffee supply chain involves several institutions before the product reaches the consumers (Figure 14.3). Farmers sell their coffee



to traders, farmers' groups, or in some cases a cooperative. They can sell in the form of red cherry or peeled red cherry. The traders either sell the coffee to an intermediary, usually located in the urban areas or the capital of the regency, or they sell the product directly to a broker and/or an exporter. The traders usually sell in the form of green beans. These brokers and exporters are usually located in the capital city of the province. They are normally members of the Association of Indonesian Coffee Exporters and Industries (AICE or AEKI), which is also a member of the International Coffee Organization (ICO). The exporters also usually sell in the form of green beans, which are more processed than the green beans received from the traders. The exporters do not always sell the coffee to the international market, especially if the quality does not meet the minimum standard of export requirements. Instead, the coffee is sold to local processing companies to produce a typical fine-ground coffee with a strong flavor (*kopi kampung*) under locally well-known brands (Arifin 2010).

Besides multinational companies (e.g., Nestlé), there are several small and medium-sized enterprises (SMEs) involved in this supply chain (e.g., roasters). These roasters have supplied the international market, although the amount given to large trade exporters is much smaller. These roasters have an advantage compared to the traders because they have direct contact with the farmers through the farmers' groups. In addition, there are also cooperatives that have direct contact with the domestic and international markets. These cooperatives usually sell their coffee in the form of roasted coffee, although the quantity is smaller than that of other traders or exporters, especially for the international market.

Coffee farmers have a close relationship with so-called collector traders, who provide cash during the production process without the complicated procedures of moneylending. In return, the farmers must sell their products to the traders, leaving the smallholders with limited choices in terms of marketing channels. This creates an interlocking trading system at the village level. These traders encourage the farmers to harvest low-quality coffee beans, leaving the value added to be accumulated among the traders. Given their high dependency on traders due to moneylending, the coffee farmers are in a weak bargaining position. Due to the monopsony behavior of the traders and their distortion of price transparency, the market structure of the coffee marketing system at the village level has become relatively unfair.

At the global trade level, coffee exporters attempt to obtain a fairer price from their partners overseas. Exporters, affiliated directly with global roasting companies, usually do not have complicated procedures in business negotiations. In the growing global value chain (GVC)

initiatives, buyers tend to establish subsidiary trading and roasting companies in coffee-producing regions in developing countries. These companies generally apply certification costs to capture the interest of smallholder farmers who could not afford the extra costs. The small farmers interlock with such supply chain systems as a result of the influence of global buyers even at the farm level in rural areas.

Among the institutions involved in the coffee supply chain are cooperatives, although there are relatively few of these. According to Statistics Indonesia (2014), only 0.78% of Indonesia's coffee farmers sell their majority product to cooperatives and the majority of coffee farmers sell their coffee to traders (88%). In terms of quantity, 2.6% of cherry beans or peeled cherries are sold to cooperatives and 84% are sold to traders (Statistics Indonesia 2014). Despite this small role of cooperatives in the coffee supply chain, there are several advantages to their involvement (Hendar 2010):

- (1) A cooperative is a member-based organization; in other words, cooperatives gather people with a common economic activity, and together they form an enterprise owned collectively by members.
- (2) An unforeseen consequence of a cooperative is that every member has the same rights regardless of size. In addition, a cooperative is controlled democratically by its members, and members have equal voting rights (one member, one vote).
- (3) A cooperative brings together people who have a common economic business activity. Therefore, the business must support the economic activity of its members. The cooperative must provide the products or services that are most needed by its members, including the owners and consumers of the cooperative.

The objectives of forming an agricultural cooperative are (Saragih 2000, 2010a, 2010b):

- (1) to increase the bargaining position of its members;
- (2) to increase competitiveness in pricing through optimal economies of scale;
- (3) to provide products or services to its members;
- (4) to increase market opportunity;
- (5) to improve product and service quality; and
- (6) to increase its members' income.

This chapter analyzes the impact of GVC involvement of cooperatives for coffee farmers. Although the involvement of cooperatives in the coffee supply chain is relatively small, since the main

characteristic of a cooperative is that it provides benefits to its members, its involvement in the supply chain hopefully benefits members more than other organizations. The profit received by a cooperative will be distributed annually to the members (i.e., farmers); therefore, the inclusion of the cooperative in the GVC will benefit farmers more than firms. In addition, as members, the farmers have the right to control the cooperative, especially in terms of purchasing price and the service received by members. An agricultural cooperative is a firm jointly owned by individuals that support the farmers' activities, and the farmers benefit from the economies of scale when facing competition from more established firms in the coffee GVC (Bijman 2010).

We compare two cooperatives in different situations are compared. The first, Margamulya Coffee Producer Cooperative, currently exports its product, while the second, Mitra Malabar Cooperative, previously exported its coffee crop, but currently sells the coffee domestically. A study of the experience of the two cooperatives can suggest policy aimed at increasing the involvement of cooperatives in the coffee supply chain in Indonesia.

14.2 Literature Review

Several studies have discussed the impact of involvement in the coffee global supply chain on stakeholders. A cooperative's involvement in the global supply chain has underlying consequences. In the case of coffee, such involvement pushes the producers to meet several standards set by international buyers. These standards mainly surround the aspect of sustainability through certification, traceability, and other quality-related factors. The impact is evident on the farmers, farmers' groups, and even society as a whole.

Astuti et al. (2015) analyzed the impact of coffee certifications on the economic performance of Indonesian players (farmers, traders, exporters, and Indonesian roasters) and how economic rent is distributed among them. The article indicates that the economic rent from the certification is distributed unequally along the coffee value chain, with roasters receiving 95.46% (robusta) and 83.66% (arabica) of the total economic rent (retailers excluded). Economic rent is calculated as the difference between the price of certified coffee and conventional coffee divided by the price of conventional coffee. The highest price difference occurred on the roaster level (Rp28,000 or \$2.39 per kilogram for robusta and Rp32,500 or \$2.77 per kilogram for arabica), with roasters receiving the highest proportion of economic rent.

Overall, farmers enjoy a small portion of the direct benefit from certification in the form of a higher price per kilogram for their coffee

and of possible benefits regarding increased productivity and quality, resulting from training in, and advice on, crop management. The price difference on the farmer level between certified and conventional coffee was Rp400 or \$0.03 for robusta and Rp2,200 or \$0.19 for arabica. In addition, the choice of certification is based on the economic benefit that the farmers receive (Ibnu et al. 2015).

On the farmers' group level, involvement in the global supply chain has increased the capacity of the farmers' groups and cooperatives to meet quality standards (Arifin 2010). Meanwhile, on the society level, Neilson, Wright, and Aklimawati (2018) found that the geographical indication (GI)¹ of coffee has had limited tangible economic benefit for coffee farmers, who have only gained intangibly in terms of promoting a sense of regional pride and cultural identity. In addition, this benefit is only received by key individual farmers who are able to consolidate wealth and their social position (Vicol et al. 2018).

In regard to the involvement of cooperatives, several are actively involved in the coffee supply chain, especially ones related to the international market. Several cooperatives are ultimately involved in two ways (Stiyawan, Fadli, and Effendy 2016). First, the cooperatives are actively involved in connecting the farmers with the global buying channels through exporters. The function of these cooperatives is mainly to increase the bargaining power of farmers in dealing with traders and exporters (Yanuar and Feryanto 2013). Other functions include collective marketing, collective input purchasing, risk sharing, market information sharing, decreasing asymmetric information, and processing (Yanuar and Feryanto 2013). Nevertheless, the cooperatives are insufficient to help coffee farmers to increase coffee prices, and coffee farmers act as the price taker rather than the price maker (Putri, Fariyanti, and Kusnadi 2013).

Second, cooperatives help farmers to obtain certification. In addition, these cooperatives play a role in coordinating the coffee value chain (Ita 2015). Several cooperatives in Gayo, in Aceh Province, function as a hub between farmers and a certification institution, such as Fairtrade. The cooperative facilitates the certification through inspecting and monitoring the farm management process, which is required by the certification institution. With the certification, farmers receive a premium price for their coffee beans that are sold on the international market. The objective of Fairtrade certification is making trade fair,

¹ A geographical indication is a sign of the place of origin of goods and/or products, which, due to geographical environment factors, including nature, humans, or a combination thereof, indicates a specific reputation, quality, and certain characteristics of the produced goods and/or products.

empowering small producers, and fostering sustainable livelihoods (Fairtrade 2020). Besides certification, these cooperatives also perform a function in agricultural extension, distribution of agricultural inputs such as seedlings and fertilizer, processing, and marketing (Hasan 2014; Stiyawan, Fadli, and Effendy 2016).

There are several benefits of the Fairtrade certification, such as more stable prices and better farm management (Fogelberg 2012). However, several research articles have found that noncertified farmers had a higher income than certified farmers (Almqvist 2011; Fogelberg 2012; Lochner 2018) and that the benefits of certification were only received by exporters and collectors (Gunarsson 2009; Andriadi et al. 2019). Meanwhile, in terms of business, the cooperatives in Aceh have been able to make a profit and distribute their profits to their members (Agustia, Kusnadi, and Harianto 2016).

14.3 Cooperative Policies in Indonesia

Agricultural cooperatives were first established in 1973 and were called village unit cooperatives, or Koperasi Unit Desa (KUD). They were given responsibilities for farm credit regulations, agricultural input and incentive distribution, marketing of farm commodities, and other economic drivers associated with a cooperative. The government specifically guaranteed both high-quality marketing and top market price to encourage the growth of farm cooperatives.

The rapid development of KUDs led the government to expand the scope of agricultural cooperatives by issuing Presidential Decree No. 2/1978. Thus, the KUDs not only became institutions that support agricultural production but also rural economic institutions. Under the government program, cooperatives provided food, particularly rice, and through the KUD played a significant role. The KUD distributed farm credit in the form of fertilizer, seed, and other inputs to farmers, which are outlined by farm lending programs. However, for the development of other agricultural commodities, the KUD role was still minimal.

In order to strengthen the presence of cooperatives, the government issued Presidential Decree No. 4/1984 regarding their development of the KUD. This decree established the KUD as a center of economic activity in rural areas, an integral part of national development, which would be supervised and developed in an integrated manner through an intersectoral program. At the same time, the Presidential Decree confirmed that the KUD was the only cooperative in rural areas. With the exception of those with permits obtained from the Ministry of Cooperatives, all existing cooperatives in rural areas had to be merged into the newly established KUDs or be required to disband. Some

farmers set up other forms of organization, such as a farmers' association, since setting up a cooperative was not permitted (Baga 2016). The associations include the Cocoa Farmer Association, the Coffee Farmer Association, etc. One of the permitted agricultural cooperatives was a dairy cooperative (Baga 2016). During the New Order period, the KUD acted as an intermediary for the Board of Logistics to buy rice from farmers in support of the government policy for rice price stabilization, which guaranteed both marketing and market price (Suradisastira 2006; Purwaatmoko 2018). The function was abolished in 1999 when Indonesia signed an agreement with the International Monetary Fund.

The development of the KUD destroyed several well-established cooperatives, such as the rubber and copra cooperative (Aziz 1987). In addition, the KUD's involvement in monopolistic practices obliterated the clove agribusiness in Indonesia, causing farmers to no longer have the desire to plant cloves. As a result, many farmers cut down their clove trees (Soedjono 1997).

The issuance of Presidential Decree No. 18/1999 removed the monopoly of the KUD as the only cooperative in rural areas. This regulation also forced the KUD to become independent and no longer dependent on government programs, in addition to preparing for competition with other rural economic institutions or actors. Many KUDs were experiencing difficulties in their new position, and they could not properly exploit the wide-open opportunities of the domestic and foreign markets during the economic crisis (Widjajani and Hidayati 2014). In fact, between 1997 and 2000, there was a 15% decline in the number of KUD members, and in 2007 the number fell by 58% compared to 2000 (Baga 2016). The unsatisfactory number of KUD developments led to negative perceptions among the public toward the members of KUDs (Baga 2016). These negative appraisals were due to the misperceptions about cooperatives among Indonesian people.

Nasution (2007) mentioned three misperceptions about cooperatives in Indonesia. First, cooperatives are undeveloped because the main characteristic of a cooperative is that it is a nonprofit-making organization, with the decision-making mechanism being one member, one vote. This perception is evidently flawed. Many cooperatives in other countries perform better than non-cooperative businesses. Second, cooperatives are only efficient if continuously supported by the government. However, government interference in cooperatives can result in inefficiency and a lower quality of service. Cooperatives need government aid, though not much, since the problems they face are structural. Government assistance should be in the form of programs that support and create favorable conditions, so that the cooperative movement is responsible for its own development (Soedjono 1997).

Third, cooperatives in Indonesia are considered to have a traditional nature and character, which makes them difficult to grow and sustain. The failure of cooperatives in Indonesia was because they abandoned the true cooperative nature. Cooperatives were established without applying the cooperative principles, resulting in pseudo-cooperatives. They failed to apply their principles and rules and used the term “cooperative” in name only.

After the abolishment of the KUD monopoly, several agricultural cooperatives focusing on a single commodity, including coffee, were established. The establishment of the Coffee Institution was mostly an initiative of private or nongovernment organizations, especially in regions that have been involved in the GVC and with specialty coffee such as Gayo (Aceh) and Toraja (South Sulawesi). This cooperative was established as a requirement in the coffee certification process, and the involvement of the government during the New Order regime was minimal. Therefore, the establishment of a cooperative in the coffee sector in these areas was mostly welcomed (Neilson 2008).

14.4 Methodology

This chapter has utilized a case study approach with descriptive analysis. Two cooperatives are compared: Margamulya Coffee Producer Cooperative (MCPC) and Mitra Malabar Cooperative (MMC). The two cooperatives were selected based on their current export activities. MCPC is currently conducting export activities, while MMC is currently selling coffee beans to the domestic market but previously conducted exports.

The primary data collection was conducted via in-depth interviews with the leaders of both cooperatives. For MCPC, an in-depth interview with Mr. Mohamad Aleh, the head of the cooperative was conducted on 14 December 2019. Meanwhile, for MMC, an in-depth interview with Mr. Faqih, the manager of the cooperative, was conducted on 28 February 2020. In addition to the primary data, secondary data were also collected from journal articles and from Statistics Indonesia.

Comparing the data from the two cooperatives revealed the impact of involvement on farmers in the GVC. Additionally, policy implications were also addressed in order to increase the farmers’ welfare through their involvement in the GVC.

14.1.1 Analysis and Discussion

Table 14.1 provides a summary of the comparison of the two cooperatives.

Table 14.1: Comparison between Margamulya Coffee Producer Cooperative (MCPC) and Mitra Malabar Cooperative (MMC)

Aspect	Mitra Malabar Cooperative (MMC)	Margamulya Coffee Producer Cooperative (MCPC)
Founded	2012	2014
Founder	Farmer and businessman	Farmer
Members	29 nonfarmers in the city of Bandung	200 farmers who own and operate land in a rural area
Sales	2 tons of green beans and 4.8 tons of roasted beans with a value of Rp586 million or \$41,020 in 2019 (only coffee)	120 tons of green beans and 40 tons of roasted beans with a value of Rp11.6 billion or \$812,000 in 2019
Scope	Province level	Regency level
Business	Coffee, coconut, essential oils, premium rice	Coffee
Export	No	Yes
Processing	From unhusked green beans to green and roasted beans	From cherry beans to green and roasted beans
Supply chain	Buy unhusked green beans from farmers' group	Buy cherry beans from farmers
Service to member	Members serve as facilitators	Agriculture-related services
Future plan	Focus on increasing farmers' productivity	Focus on export

Source: Compiled by authors.

14.4.2 Cooperative History

MMC was established in 2012 by a businessman named Mr. Jayagama and another businessman from the Rahayu Farmers Group named Mr. Supriatna Dinuri. Before forming the cooperative, both founders established a firm called PT Nuga Ramitra, which introduced the coffee brand Coffee Malabar in 2010. The firm also developed a coffee garden by revitalizing displaced land, planting a new coffee garden, and developing Malabar Indonesia’s coffee breeding fields. They attempted to develop Malabar civet coffee by cultivating civet husbandry and developing civets.

In 2011, with the help of the Netherlands nongovernment organization PUM, MMC welcomed a coffee expert in order to increase the value added through developing processing facilities from upstream activities to downstream activities. In the same year, the cooperative

received two Malabar coffee awards, namely from Puslitkoka (a coffee and cocoa research center) in Jember, East Java, as the third-best coffee flavor and as the best cultivation of the cilantro cage management in Indonesia (Febrianny, Purwanegara, and Aprianingsih 2019).

In 2015, MMC was split between the cooperative and the farmers' group. The cooperative base moved to Bandung, the capital city of West Java, while the farmers' group was focused on the production side of the business. This farmers' group supplied the coffee beans to the cooperative. The cooperative was made up of 29 members, consisting mostly of volunteers who were concerned with the development of coffee in West Java.

In addition to coffee, MMC currently focuses on coconut, essential oils, and premium rice. Also, MMC accompanies rural villagers in agroforestry activities, which assist villagers in planting several commodities in the mountain areas that are mostly owned by the government firm Perhutani.

The development of MCPC started when Indonesia experienced a financial crisis in 1997–1998. Mr. Mochamad Aleh, the initiator of the cooperative, was removed from his current job as a construction worker in the city. In 2001, he returned to his hometown in Margamulya Village, Pangalengan, Bandung and searched for land to plant coffee. He saw coffee as a prospective commodity, while most farmers were planting other horticultural products at that time.

In addition to planting coffee on their own land, farmers planted coffee in the mountain foothills, which belonged to the government-owned enterprise Perhutani. In 2006, Mr. Mochamad Aleh received land legally from Perhutani at the village level and signed an agreement with Perhutani by forming the group Forest Village Community Institution (Lembaga Masyarakat Desa Hutan/LMDH). With this agreement, other farmers began to plant arabica coffee, and the mountain foothills were filled with coffee plants in 2008. In addition, many horticultural farmers shifted to planting coffee.

In 2010, Mr. Mochamad Aleh formed a farmers' group called the Margamulya Farmers' Group, and in 2011 he received machinery for coffee processing as a reward for conserving the land on the mountains. Due to the increase in coffee farms and members, the group needed a legal formal buyer, especially when dealing with commercial and international buyers. As a result, in 2014, the Margamulya Coffee Producer Cooperative was formed. The cooperative was officially established through Notarial Deed No. 9 dated 18 March 2014, and was located in Jl. Raya Bandung-Pangalengan Km 36.5 Margamulya Village. From an initially 20 members, there are currently around 200 members farming land covering 250 hectare (ha), consisting of 200 ha

of Perhutani's land and 50 ha of the farmers' own land. The cooperative served two villages (Margamulya Village and Tribaktimulya Village), which consisted of several farmers' groups.

Currently, MCPC focuses on coffee. Besides being involved with the coffee supply chain, the cooperative also gives training to baristas in order to teach about the characteristics of the coffee and how coffee is processed. Mr. Mohamad Aleh also shares his experience of developing coffee with others in order to increase the knowledge of the stakeholders regarding coffee.

14.4.3 Exporting

Demand for MCPC exports grew when the cooperative was invited to be involved in trade expos in the foreign market. At the time, buyers from Japan offered to buy coffee at 18 tons per shipment, but the cooperative could not fulfill the demand due to limited capital for buying cherry beans from the farmers. The Japanese buyers then offered to cooperate with an exporter called PT Taman Delta in Semarang, Central Java, Java in order to conduct indirect exporting. In 2019, MCPC exports through PT Taman Delta amounted to 60 tons, with every shipment of two tons transported to Semarang, Central Java. In addition, MCPC exported 60 tons of coffee through PT Samosir Sumatra in Medan, North Sumatra, and sent 15 tons with every shipment in 2019. The payment from the exporter was conducted through bank transfer at least three months after the exporter received the coffee beans, utilizing 90-day payment terms, which are business standard in most cases.

The cooperative also sold directly to foreign consumers. In 2019, around 20 tons of green beans were sold directly to foreign consumers using delivery companies in several countries, including the Netherlands, Norway, and Singapore. Usually, every shipment was less than 100 kilograms. The cooperative met the foreign buyers during an international expo, which was organized by the Indonesian government and at which the cooperative was representing West Java Province, so all costs for participating in the expo were borne by the West Java government. The price of selling to a foreign buyer was usually higher than selling domestically or to an exporter. The price of direct export was around Rp140,000 per kilogram or \$10 per kilogram, excluding shipping costs. The price is higher since they were grade 1 coffee beans, which has a higher value added. The coffee beans were shipped once the cooperative received the money in advance, including the shipping cost.

Direct exporting is more profitable for the cooperative because of advance payments, but the amount of available product is limited. Meanwhile, the amount sold to an exporter is supplied more frequently,

although the payment is received only after three months. A cooperative conducting direct exporting using containers will face several problems:

(1) **Continuity**

For direct exporting, a minimum of 18 tons of green beans are needed to fill a container each month. In order to fill a container, the cooperative must store more cherry beans from farmers during the annual harvest period from March to August. The cooperative will face two problems buying cherry beans from farmers: storage capacity and capital. The challenge is that farmers prefer to receive cash directly after selling to the cooperative.

(2) **Quality**

Exporting directly requires a better quality of coffee bean. The quality of coffee produced by the cooperative members must be guaranteed and fulfill the requirements. On the contrary, due to the insufficient supply, the cooperative must purchase from nonmembers, which could result in lower quality and rejection of the shipment by foreign buyers. In addition, the cooperative must fulfill the food quality and safety regulations.

The export market contributed 80% of the total sales of MCPC, making it the cooperative's main market. MCPC has a contract with two exporters and has conducted direct exporting, thus securing a guaranteed market for the cooperative's product. The guaranteed export market meant the cooperative could give its members a guaranteed price of Rp10,000 per kilogram of red cherry beans. In addition, the farmers would receive a profit or benefit from the cooperative depending on how much of their coffee they sold to the cooperative at the end of the fiscal year.

MMC currently does not go through an exporter. In 2003, however, the cooperative conducted direct exporting to Morocco in the amount of 18 tons of green beans, consisting of 9 tons of arabica and 9 tons of robusta. This export was the result of MMC's involvement in a trade expo conducted by the Indonesian Embassy in Morocco. After the expo, the buyer visited Bandung, West Java in Indonesia to check the requirements for the coffee that would be purchased. The coffee was exported conducted using a partnership system, which means both sides shared the cost. MMC bore the cost from the farmer to the shipping seaport in Jakarta (Tanjung Priok), while the Moroccan side bore the cost from Jakarta's port to the port and buyer in Morocco. The first export was conducted in November 2013 and reached Morocco in January 2014.

The export activity was conducted transparently, meaning both sides acknowledged the purchase terms, selling price, and payment terms, and the payment was made after the coffee beans had been sold to the consumers. MMC bore 67% of the cost, while the Moroccan side bore the remaining 33%. The largest cost factor was the purchasing price of the coffee beans from the farmers. MMC cooperated with investors to gather the capital and to buy 18 tons of green coffee beans from the farmers at a price of Rp27,000–Rp30,000 (\$1.9–\$2.1) per kilogram. Using this export cooperation, MMC returned profits to the farmers in the form of cash or coffee seed, amounting to 25% of the profit obtained from the export.

In 2014, MMC visited Morocco and received an order of six containers (or around 108 tons) of green coffee beans. During the negotiation, MMC asked for the following export terms:

- (1) Change in purchasing price from the farmers. From the previous price of Rp27,000–Rp30,000 (\$1.9–\$2.1) per kilogram, the cooperative asked for a price of Rp45,000 (\$3.2) per kilogram of green coffee beans, since the sales price in Morocco was the equivalent of Rp80,000 (\$5.7) per kilogram.
- (2) The price was to be based on the international prices for coffee and the world market.
- (3) The payment would be made 1 month after the Moroccan side received the green beans, whereas previously the payment terms were 4 months.

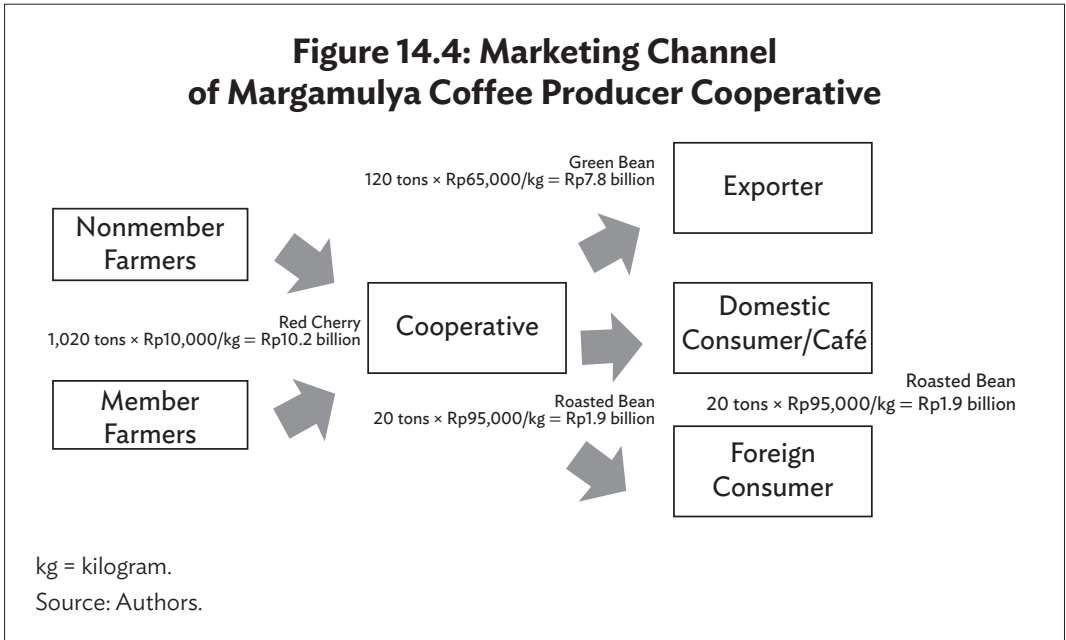
However, the Moroccan side could not agree to the first and second terms. The cooperative explained the failed negotiation to the farmers, and when the Moroccan side visited the farmers to purchase the green coffee beans directly, none of the farmers agreed to sell to them. Since then, MMC has stopped exporting because the cooperative felt that the farmers should have been receiving a higher price. Additionally, prices in the domestic market were higher than for the exports.

MMC conducted direct coffee exporting to Morocco in 2013. The benefits of exporting were being able to obtain higher prices and give a cashback to the coffee farmers. This showed that the export market can be of more benefit than the domestic market when the marketing channel is shorter or when conducting direct export rather than through exporters. Conducting direct exporting requires more capital, however, since the export amount is huge (around 18 tons of green beans or about Rp540 million or \$37,700 for each shipment) and cannot be handled alone by the cooperative.

14.4.3 Marketing Channel

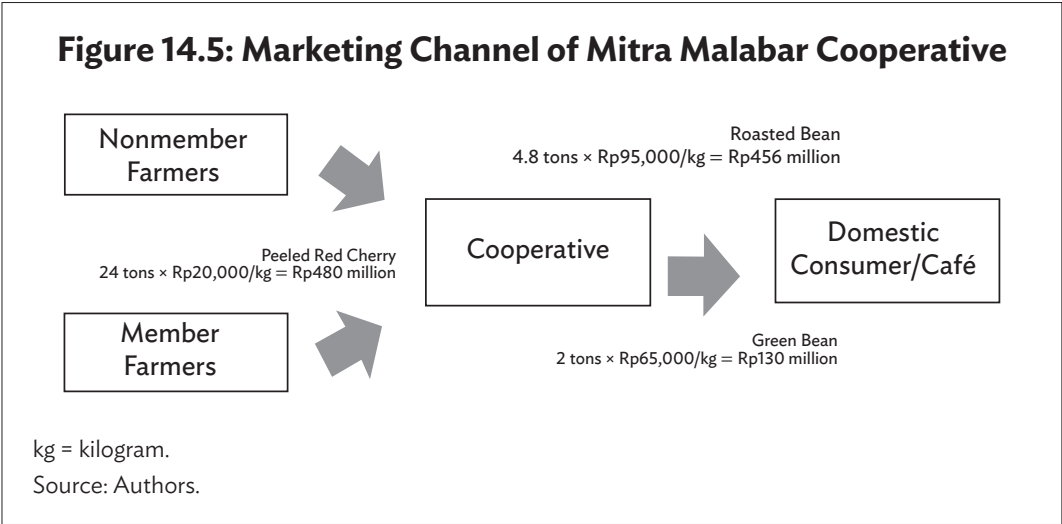
The flow of marketing channels in cooperatives can be seen in Figures 14.4 and 14.5. Coffee harvesting occurs from March to August. Farmers only harvest the red cherries to ensure the quality of the green beans, and they sell the red cherries to cooperatives at a price of Rp10,000 or around \$0.71 per kilogram. In 2019, about 1,020 tons of red cherries were purchased by MCPC from members and nonmembers.

The red cherries are processed through the cooperative at that time, becoming peeled red cherries (*gabah*). The next process is to peel the inner layer of the beans to become green beans. One kilogram of green beans is derived from 16 kilograms of red cherries. These green beans can be processed further into roasted beans or ground coffee powder. One kilogram of green beans can be processed into 0.8 kilograms of roasted beans. For exporters, the cooperative sells the green bean form at a price of Rp65,000 or \$4.64 per kilogram (Figure 14.4). The cooperative also sells in the form of roasted beans at a price of Rp95,000 or \$6.79 per kilogram.



MMC received around 24 tons of *gabah* from member and nonmember farmers in 2019. The cooperative processes the peeled red cherries to become roasted beans or green beans (Figure 14.5). The cooperative has the processor to make roasted and/or green beans. The

roasted and green beans are then sold to domestic consumers such as cafés, local shops, and retailers. The cooperative also owns a café called Café Kopi Nusantara in Cibubur, Jakarta. In 2019, the cooperative sold 400 kilograms of roasted beans per month or 4.8 tons per year and 2 tons of green beans in 2019.



14.4.4 Service to the Members

MCPC has played its role in connecting farmers with the GVC in functioning in several aspects (Djuwendah et al. 2017, 2019):

- (1) Procurement of farming inputs, which includes activities such as performing quality coffee seedling measurements, distributing free coffee seedlings to coffee farmers, aiding distribution of pest repellents to farmers, and providing loans for coffee farming capital.
- (2) Production process, which includes activities such as fostering farmers in coffee farming according to UTZ² certified Standard Operating Procedure, facilitation and assistance of the transfer of coffee farming technology, integrated pest management, harvest, and post-harvest.

² One of the largest programs and a label for sustainable farming usually for coffee and cocoa.

- (3) Coffee processing (agroindustry), which includes activities such as processing coffee cherries into green beans and roasting beans, and grinding instant coffee (ready to brew), conducting custom work on coffee (makloon) ordered by nonmembers, and increasing the quality of the products.
- (4) Product marketing, which includes activities such as buying coffee cherries from farmers, providing price guarantee, conducting market research, and increasing the product distribution network.
- (5) Financial services, which includes activities such as providing recommendations and guarantee of lending money to banks, and providing loans in limited quantities. Farmers receive loans of between Rp500,000 and Rp5,000,000 (\$35–\$357), paid during the harvest when the farmers sell the cherries to cooperatives (Karyani et al. 2019).
- (6) Minimization of farming risk, which includes activities such as providing storage facilities (warehouse), providing an information center regarding quality, price, and the coffee market, in cooperation with the Local Government Office of Cooperatives, SMEs, the Government Office of Industry and Trade, the Indonesian Creative Youth Academy, and coffee exporters.
- (7) Facilitation of human resource development, which includes activities such as using the cooperative as a place of training and supervising the transfer of technology and farming skills.
- (8) Research and development of coffee farming business, which includes activities such as building partnerships and business networks with various parties (government, local government offices, associations, entrepreneurs) and performing market research.

The cooperative members receive benefits, especially if the cooperatives are involved in the GVC in several ways. Those ways are:

- (1) the member receives high-quality coffee seedlings in order to produce high-quality cherry beans;
- (2) the buying market is guaranteed, which means the cooperative will buy all the cherry beans produced by the members at a specified quality;
- (3) the cooperative members receive training for improving the coffee productivity and quality; and
- (4) the cooperative members receive a dividend at the end of every year.

The MMC members are mostly volunteers, which gives them a unique ability to foster community development, as opposed to coffee farmers who may lack that ability. Therefore, the cooperatives give their members a network to conduct community development activities specifically for coffee farmers to improve morale and the conditions of coffee farming as a whole.

14.4.5 Future Plans

Currently, MCPC is focusing on the export market, either direct or indirect exporting. The export market has potential, with demand being huge in the international market. In addition, the cooperative is also trying to increase sales in the domestic market and is providing training for baristas who have started a coffee business.

Meanwhile, MMC is focused on increasing the coffee farmers' productivity, which will eventually increase their income. As regards the main market, MMC will focus on the domestic market since currently the domestic price is higher than the export price.

14.5 Conclusion

The objective of this chapter was to analyze the benefits to farmers of participating in GVCs through cooperatives by comparing two cooperatives (MCPC and MMC), one currently conducting export and the other not.

The results indicate that the export market is significant for MCPC. From the data, we also see that direct exporting is more beneficial than indirect exporting through exporters since a higher price is charged. The main products for indirect exporting are green beans, while roasted beans are the main products for direct exporting. However, the export market does not always have a higher price, as currently domestic market prices are higher. Due to this price situation, MMC has concentrated on selling to domestic partners rather than entering the international market.

In the future, direct exporting must be targeted by the cooperatives since it involves exporting product at a higher price than indirect exporting. In addition, direct exporting gives cooperatives more bargaining power, for them to be able to increase the price paid to farmers. There are two advantages when a cooperative conducts direct exporting. First, the cooperative's profit is higher since it got rid of the intermediary or exporter in the process. Bank Indonesia (2018) reported that the margin to the exporter was around Rp7,000 per kilogram in the

case of green beans, which can be transferred to the farmers' selling price. Second, the cooperative can sell in the form of roasted beans rather than green beans, which have a higher price and value added.

In order to conduct direct exporting, the government should support cooperatives to obtain capital for the purchase of red cherries or peeled cherries from the farmers. Assuming 18 tons of green beans per export shipment, the cooperative needs Rp1.08 billion in capital to buy red cherries, assuming a price of Rp10,000 per kilogram. In addition, the government should also arrange to collect the 18 tons of green beans per shipment since every cooperative has limited storage and is limited to buying red cherries or peeled cherries from the farmers.

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