The Effects of Global Value Chains on Global Firm Performance

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Abstract

Whether global value chain development and diffusion stimulate global firm performance is one of the most critical research questions in international economics and trade. However, measuring global value chains remains challenging. The literature has mainly attributed this challenge to the lack of a consistent approach that captures the convergence between microeconomic and macroeconomic indicators to measure global value chains. Due to the lack of a consistent approach that combines microeconomic and macroeconomic indicators to measure global value chains, the distribution of gains under global value chains across firms, countries, and continents has yet to be measured. Also, little is known about the effect of a measure of global value chains that combines macroeconomic and macroeconomic indicators on global firm performance. To contribute to knowledge and policy discussions, we construct a global value chains index based on macroeconomic and macroeconomic indicators and investigate its impact on global firm performance. We use microeconomic data from the World Bank Enterprise Surveys conducted between 20006 and 2023, covering 152 countries worldwide and macroeconomic data obtained from the World Bank open dataset for macroeconomic indicators. First, we find that the constructed global value chains index level is highly heterogeneous across firms' economic sectors, size levels, and continental localities. Second, evidence from the pooled Driscoll and Kraay and the generalised method of moments estimators reveals that improvements in the level of the constructed global value chains index are significantly associated with significant improvements in global firm performance. This study suggests that implementing policies to improve global value chain development and diffusion supported by technological progress (e-commerce) and stable exchange (exchange rate) rates would play a crucial role in improving and ensuring the sustainable performance of firms across countries.

JEL Classifications: D22; D24; F01; F13; F23; L25; Q12;

Keywords: Firm performance, Global value chains, Total factor productivity

1. Introduction

Many explanations can be offered for why it is essential to investigate the impact of global value chains (GVCs) on the performance of firms worldwide. Extant research has moved from the idea of firms as atomistic players towards examining firms in GVCs (Gereffi *et al.*, 2005; Kano *et al.*, 2020; Mcwilliam *et al.*, 2019). The literature has also shown that profitability outcomes are only conditionally a sign of positive business development in GVCs (Mouzas & Bauer, 2022). However, our understanding of business performance in GVCs remains limited and has not moved much beyond a variance-explaining approach with selected performance measures, such as firms' productivity, sales, profitability, employability, and fixed assets accumulation (Argote & Greve, 2007; Mitchell *et al.*, 2016; Wach *et al.*, 2016).

While performance is a key dependent variable in business research, assessing business performance in GVCs has serious shortcomings regarding design requirements (Mouzas & Bauer, 2022). Global shocks demonstrate a rising tension between firms' efficiency and resilience in GVCs, and a narrow understanding of performance in GVCs might harm organisations (Golgeci *et al.*, 2020; Mouzas & Bauer, 2022). Pursuing market effectiveness by continuously embracing business opportunities in GVCs may generate and sustain business growth (Gaertner & Ramnarayan, 1983; Mass, 2005; Vorhies *et al.*, 2009). The GVCs efficiently provide firms with cash liquidity and enhance their growth prospects (Mouzas & Bauer, 2022).

However, one of the most important puzzles in international trade is the absence of an unambiguous and significant impact of GVCs on firm performance due to the lack of a consistent approach that combines microeconomic and macroeconomic indicators to measure GVCs. The literature provides differing and mutually incompatible views on the impact of GVCs on firm performance. On the one hand, GVCs boost network trade, stimulating global productivity (Johnson, 2018). On the other hand, GVCs are among the factors of globalisation which significantly fragment global production processes (Sturgeon, 2019; Banga, 2013). Also, the literature remains silent on differentiating the impact of GVCs on the performance of firms in the manufacturing and service sectors. Thus, the existence of such a gap in measuring GVCs, inconsistent results, and the lack of clear information on firms in which sector of production is the most impacted by GVCs suggest that more research is needed on constructing GVCs index combining microeconomic and macroeconomic indicators and investigate whether the effect of constructed GVCs index on global firm performance attests to the effect of GVCs on firm performance currently documented in the literature.

First, this study constructs a GVCs index based on microeconomic and macroeconomic indicators by combining data obtained from the World Bank open data set for macroeconomic indicators and the World Bank Enterprise Surveys. The World Bank enterprise surveys provide data on four indicators of the firm's performance: real annual sales growth, employment growth, annual productivity growth, and percentage of firms buying fixed assets. These surveys also provide data on different measures of the GVCs, such as firms' export and import performance as micro-approaches to measure the GVCs. Also, the World Bank's open data set for macroeconomic indicators provides data on exports as a capacity to import indicator, which equals the current price value of exports of goods and services deflated by the import price index.

The sample includes all World Bank Enterprise Surveys conducted between 2006 and 2024. After data cleaning, we remained with 155,561 firms in the manufacturing and service sectors (84,873 firms in the manufacturing sector and 70,688 firms in the service sector) across 152 countries. Macroeconomic indicators used in this study were gathered across 152 countries in the sample and merged with the macroeconomic data, respectively, to the year of the survey and the country in the sample. Second, this study employs a pooled Driscoll and Kraay estimator to investigate the effects of the constructed GVCs index on the performance of firms worldwide. The advantage of employing the pooled Driscoll and Kraay estimator is that it caters for potential cross-sectional dependence in the models and provides more efficient estimates. Third and finally, this study instrument for the constructed GVCs index and employs the generalised method of moments (GMM) to check whether estimates obtained from the pooled Driscoll and Kraay estimator remain robust after managing the endogeneity hypothesis.

Notably, we find that the constructed GVCs index level is highly heterogeneous across firms' economic sectors, size levels, and continental localities. The level of the constructed GVCs index is considerably higher for firms operating in the manufacturing sector than those operating in the service sector. The level of the constructed GVCs index is considerably higher for large-sized firms than for small and medium-sized firms. The level of the constructed GVCs index is considerably lower for firms located on the African continent (whether operating in the manufacturing or service sector) than for firms located on other continents. Also, our empirical evidence from the pooled Driscoll and Kraay and the generalised method of moments estimators reveals that improvements in the constructed GVCs index are significantly (at a 1% significance level) associated with global firm performance.

The GMM estimates show that a one-point increase in the constructed GVCs index is associated with an increase of 2.04, 2.94, and 2.37 percentage points in the constructed global firm performance index for firms operating in the manufacturing sector, service sector, and when all firms are combined, respectively. These estimated effects are large enough and economically meaningful to conclude that improvements in the performance of firms worldwide are conditioned by their levels of global value chains—whereby economic policies

stimulating sustainable GVCs development have subsequent significant effects in stimulating the performance of firms across countries.

More importantly, this study contributes to the debate over developing a practical approach combining microeconomic and macroeconomic indicators to measure GVCs. This contribution is a good starting point in developing an approach that captures the convergence between microeconomic and macroeconomic indicators to measure GVCs, as it is urged in the extant literature (Johnson, 2018). It contributes to differentiating the influence of GVCs on the performance of firms in the manufacturing and service sectors. Finally, this study contributes to investigating the effect of GVCs on global firm performance by documenting that the effects of GVCs are highly sensitive to the endogeneity hypothesis. This contribution suggests that implementing policies to improve GVC development and diffusion, supported by policies to stimulate technological progress and stabilise exchange rates, would result in more effect of GVCs on improving and ensuring sustainable performance of firms across countries. This contribution is not well documented in the existing literature.

The rest of this paper is organised as follows. Section 2 provides the literature review. Section 3 describes the data and econometric model specification. Section 4 presents empirical results for the constructed GVCs index, pooled Driscoll and Kraay estimates, GMM estimates, and discussion. Section 6 summarises our concluding remarks and policy implications.

2. Literature Review

Global value chains (GVCs) have become the centre of the debate on the front page of international trade for two significant reasons. First, it is documented that GVCs have fragmented production processes across countries and continents (Sturgeon, 2019; Banga, 2013). Second, GVCs boost network trade, which in turn stimulates productivity growth across countries and continents (Johnson, 2018). However, one of the most important puzzles in the related literature is the absence of a consistent measure of GVCs and comprehensive studies evaluating their effects on firm performance. The extant literature has focused more on measuring GVCs and summarises existing approaches to measuring GVCs under two categories: micro and macro measurements of GVCs (Sturgeon, 2019; Johnson, 2018; Banga, 2013). For example, Johnson (2018), Brancati *et al.* (2017), and Banga (2013) review different macro techniques to measure GVCs based on input-output tables and micro techniques based on offshoring and input sourcing, joint exporting and importing, and multinational firms. However, Johnson (2018) documents that linking micro and macro techniques of measuring GVCs would improve the way of measuring GVCs. Due to the lack of a consistent measure of GVCs that captures the convergence between micro and macro approaches to measuring GVCs, the distribution of gains under GVCs across firms, countries, and continents has yet to be measured. This study is related to this literature in that it constructs a GVCs index based on an approach that combines microeconomic and macroeconomic indicators.

While most of the works in the extant literature have focused on measuring GVCs, little is known about their effects on firm performance. This study examines the effects of GVCs on individual firms' performance across countries and continents. This study is motivated by the study of Mouzas and Bauer (2022), who argue that comprehensive empirical studies are needed to understand the relationship between the operation of GVCs and individual firms' performance. Also, the motivation of this study relates to the works documenting that more studies on the association between coordinated behaviours in GVCs on governance patterns and performance are needed (Clarke & Boersma, 2017; Gereffi *et al.*, 2005; Kano et al., 2020; Verbeke, 2020). Mouzas and Bauer (2022) propose potential research areas to understand further GVCs, governance patterns, and performance, which include global geopolitical tensions, shifting in economic conditions in global value chains, rapid technological progress in digitisation, and global shocks that amplify firms' vulnerabilities in an increasingly interconnected GVC.

Moreover, this study relates to studies documenting that more studies are needed to investigate the effect of global shocks within GVCs and related subsequent effects on global firms' performance. For instance, in the work of Ali *et al.* (2022) and Mouzas and Bauer (2022), global shocks distort GVCs efficiency and subsequently inhibit business performance. Shaw (2020) documents that using science and information technology ─ which is, in most cases, transmitted across firms worldwide via GVCs ─ significantly reduces risks. Sivarajah *et al.* (2017) document the need for studies delivering a holistic view of how firms operating in global value chains accomplish performance outcomes of sustainable profitability, resilient growth, and efficient solvency. Richard *et al.* (2009) show that research is needed to improve our understanding of the dynamic interplay between multiple performance systems and performance outcomes. This study related to Sivarajah *et al.*'s (2017) and Richard *et al.*'s (2009) works in the way that it investigates the effect of GVCs on individual firms' performance outcomes across countries and continents.

Notably, the individual firms' performance correlates with the firms' financial resilience. However, our knowledge of what drives the firms' financial resilience during the global shock remains limited. Sheffi (2018) documents that the firms' resilience is conditional on redundant resources and flexibility in value chains. Unfortunately, Admati *et al.* (2018) have shown that firms' leverage in GVCs continues to rise, which impedes the pursuit of financial resilience. Leveraged firms appear to be biased towards selling assets instead of fortifying their equity through recapitalisation. Thus, this study relates to this trend in the literature by trying to investigate which firms in GVCs appear to be most robust towards the global shock and sustain their survival.

3. Data and Econometric Model Specification

The primary data used in the empirical analysis came from two datasets—the World Bank open dataset for macroeconomic indicators and the World Bank Enterprise Surveys. The World Bank's open dataset for macroeconomic indicators reports annual macroeconomic indicators from 1960 for all countries worldwide. World Bank Enterprise Surveys have been conducted by the World Bank across countries worldwide since 2006, targeting firms in manufacturing and service sectors in more than 159 countries worldwide. Note that the World Bank Enterprise Surveys are repeated cross-sectional datasets. The main advantages of using the World Bank Enterprise Surveys datasets for our study are that it has a pooled dataset with a large sample size, an essential characteristic for the representativeness and efficiency of the estimates and inferences.

We have access to the datasets of all rounds of the World Bank Enterprise Surveys conducted from 2006 to 2024 and macroeconomic indicators published annually by the World Bank from 1960 to 2023. The World Bank Enterprise Surveys datasets provide detailed information on each sampled firm from which we can obtain information on the firm's performance and engagement in the HVCs and generate other variables employed in this study as control covariates. From the macroeconomic indicator dataset, we can obtain an indicator on exports as a capacity to import indicator, which equals the current price value of exports of goods and services deflated by the import price index as a macroeconomic measure of GVCs. After data cleaning, we remained with 155,561 in the manufacturing and service sector firms (84,873 firms in the manufacturing sector and 70,688 firms in the service sector) across 152 countries.

3.1 Econometric Model Specification

To investigate the impact of GVCs on global firm performance, we employ a pooled Driscoll and Kraay estimator based on the linear regression model as in Equation 1. The employed

pooled regression model is mainly based on the data from Enterprise Surveys combined with macroeconomic indicators from the World Bank open dataset for macroeconomic indicators.

$$FPI_{ict} = \alpha + \beta^{GVCI \rightarrow FPI} GVCI_{ict} + \gamma_j \sum X_{ict,j} + u_{ict}, \quad (1)$$

where FPI_i denotes the outcome variable measured using the firm performance index (the firm performance index was constructed using the firm's sales growth, firm's employability growth, firm's annual growth, and growth of the firm's purchase of assets) for the firm i located in the country c for a cross-sectional enterprise survey conducted at the time t. $GVCI_i$ is the major regressor that measures global value chains for firm i located in country c for a cross-sectional enterprise survey conducted at the time t. $\beta^{GVCI \rightarrow FPI}$ measures the impact of global value chains on firm performance. X_{ij} is a vector of j, a set of control covariates included in the regression model to reduce the impact of omitted variable bias on the estimates. Employed control covariates—as described in Table 1—are documented to have the possibility of explaining the firm's performance (Munisi, 2023; Dezsö & Ross, 2012; Bose et al., 2020; Jiang & Nie, 2014; Eppinger & Ma, 2024; Kapri, 2019). u_i is an $IIDN(0, \sigma^2)$ error term.

3.1.1 Definitions of Variables and Summary Statistics

Our outcome variable FPI_i, *the global firm performance index,* consists of an index constructed by averaging four indicators of firm performance available in the World Bank enterprises survey dataset: the firm's real annual sales growth, annual employment growth, real annual labour productivity growth, and the percent of firms buying fixed assets. Averaging these four indicators to generate one indicator for measuring the firm performance was straightforward because they are all expressed in terms of percentage. Notably, the generated index measures the overall performance of a firm. Table A1 in the Appendix ranks countries in the sample according to the firms' overall performance. From Table A1, we note that the top five countries with firms with high overall performance are Liberia (29.64%), Slovenia (24.46%), Samoa (24.39%), Central Africa Republic (22.66%), and Solomon Islands (22.39%). The last five countries with firms with very low overall performance are Thailand (2.32%), Pakistan (0.86%), Egypt (-1.20%), Iraq (-5.59%), and South Sudan (-19.16%).

Our primary explanatory variable, $GVCI_i$, *the global value chains index* consists of an index score constructed by employing Principal Component Analysis (PCA) and following Eq.2 and Eq.3. The six variables are included in the PCA to construct the index score: the firm's export potential (the percentage of the firm's total sales that are exported directly and indirectly); the firm's cost of import compliance (typical costs to comply with all import requirements); the firm's import potential (the percentage of the firm's cost of imported inputs in total cost of all inputs and proportion of the firm's total inputs that are of foreign origin (%)); the firm's multinational exposure (proportion of private foreign ownership in a firm, %); the country's imports as the capacity to export; and the country's trade openness. The GVCI used in this study is based on Eq.3. Notably, employing PCA to generate one indicator for measuring global value chains is the most appropriate approach to generate index scores. Table A2 in the Appendix ranks countries in the sample according to the constructed global value chains index. From Table A1, we note that the top five countries with high overall global value chains index are Denmark (7.65), Tunisia (7.45), Cambodia (6.45), Malta (5.82), and Luxembourg (5.74). The last five countries with very low overall global value chains index are South Sudan (0.90), Sierra Leone (0.87), Venezuela (0.79), Angola (0.74), and Papua New Guinea (0.70).

$$IS_{GVC} = \sum_{j=1}^{p} \frac{L_j}{\sqrt{\lambda}} \times X_{j,GVC} \quad (2)$$

$$GVCI = e^{IS_{GVC} = \sum_{j=1}^{p} \frac{L_j}{\sqrt{\lambda}} \times X_{j,GVC}} \quad (3)$$

where IS_{GVC} denotes the raw score for the GVC, $X_{j,GVC}$ denotes standardised variables of the jth variable for the GVC, L_j denotes the loading factor for the jth variable included to compute the score, λ denotes the eigenvalue of the principal component and p denotes the total number of variables in the index.

Table 1 below defines all variables employed in this study, their roles ─ dependent or independent or control covariates ─ in model specification, and sources. Table 2 presents descriptive statistics of variables used in this paper and the correlation between the outcome variable and the set of explanatory variables used. Table 2, Column 5.5 shows that the correlation between the major outcome variable (overall firm performance index) and the major independent variable (overall global value chains index) is positive and statistically significant at a 1% level. Table 3 also shows the correction of the outcome variables and control covariates and the correlation between outcome variables and the proposed instruments to account for potential endogeneity.

Table 1. Variables Description

Variable	
Panel A. Dependent variables	
The firm's real annual sales growth	
The firm's annual employment growth	World Bank Open Datasets
The firm's real annual labour productivity growth	
The percent of firms buying fixed assets	
Overall Firm Performance Index	Authors' computation
Panel B. Major independent variables	
The firm's export potential	
The firm's cost of import compliance	
The firm's import potential	World Bank Open Datasets
The firm's multinational exposure	
The country's imports as the capacity to export	
The country's trade openness	
Overall Global Value Chain Index	Authors' computation
Panel C. Control Covariates (Macroeconomic and firm-level controls)	
Ease doing business (Inverse)	
Governance composite index	
Foreign Direct Investments (log)	
Foreign aid per capita (log)	
Top manager (Female = 1, Male = 0)	
Years of experience (Top manager)	
Firm size (SMEs = 1, Large firm = 0)	World Bank Open Datasets
Access to land as a major constraint (Major constraint = 1, Otherwise = 0)	
Access to electricity as a major constraint (Major constraint = 1, Otherwise = 0)	
Access to finance as a major constraint (Major constraint = 1, Otherwise = 0)	
Corruption as a major constraint (Major constraint = 1, Otherwise = 0)	
Labour regulation as a major constraint (Major constraint = 1, Otherwise = 0)	
Political instability as a major constraint (Major constraint = 1, Otherwise = 0)	
Tax rates (%)	
Exchange rate (ln)	
Africa (Africa = 1, Otherwise = 0)	
Panel D. Instrumental Variables	
gdp_P	World Bank Open Datasets
Counter_Firm_Performance1	
exchange_inverse1	
exchange_inverse2	

Table 2. Descriptive Statistics

	Mean (1)	Standard Deviation (2)	Minimum (3)	Maximum (4)	Pairwise Correlation (5)				
					The firm's sales (5.1)	Firm's employability (5.2)	The firm's annual growth (5.3)	The firm's purchase of fixed assets (5.4)	Overall Firm Performance Index (5.5)
The firm's real annual sales growth	1.639	24.710	-100.000	100.000	1.000				
Annual employment growth,	3.899	14.916	-96.560	98.447	0.268*	1.000			
Real annual labour productivity growth,	-1.988	25.158	-100.000	100.000	0.837*	-0.286*	1.000		
The percent of firms buying fixed assets	41.215	49.222	0.000	100.000	0.102*	0.104*	0.043*	1.000	
Overall Firm Performance Index	11.191	18.403	-71.120	98.964	0.744*	0.264*	0.593*	0.739*	1.000
The firm's export potential	11.414	26.314	0.000	100.000	0.035*	-0.007*	0.038*	0.113*	0.099*
The firm's cost of import compliance	0.247	2.787	0.000	100.000	0.024*		0.024*	0.020*	0.030*
The firm's import potential	17.327	28.881	0.000	100.000	0.026*	-0.010*	0.031*	0.141*	0.112*
The firm's multinational exposure	7.071	23.892	0.000	100.000	0.026*	0.006	0.022*	0.094*	0.080*
The country's imports as the capacity to export	35.869	4.119	28.049	56.506	0.050*		0.046*	0.125*	0.117*
The country's trade openness	0.025	0.168	0.000	3.421	0.006	0.006		0.012*	0.012*
Overall Global Value Chain Index	0.109	10.077	-4.263	34.033	0.035*	-0.007*	0.038*	0.113*	0.099*
Ease doing business (Inverse)	64.276	11.125	32.015	86.765	0.069*	-0.044*	0.087*	0.063*	0.086*
Governance composite index	-0.129	0.815	-1.638	2.528	0.074*	-0.026*	0.082*	0.147*	0.146*
Foreign Direct Investments (log)	21.441	4.053	4.605	26.706	-0.012*	-0.008*	-0.010*	-0.092*	-0.071*
Foreign aid per capita (log)	1.338	2.813	-2.813	6.620	-0.037*	0.038*	-0.054*	-0.068*	-0.069*
Top manager (Female = 1, Male = 0)	0.133	0.339	0.000	1.000	0.006	-0.019*	0.016*	-0.020*	-0.010*
Years of experience (Top manager)	19.104	11.285	0.000	60.000	-0.014*	-0.101*	0.040*	0.070*	0.036*
Firm size (SMEs = 1, Large firm = 0)	0.802	0.398	0.000	1.000	-0.028*	-0.026*	-0.012*	-0.141*	-0.113*
Access to land as a major constraint	0.148	0.355	0.000	1.000		0.022*	-0.012*	0.037*	0.024*
Access to electricity as a major constraint	0.303	0.459	0.000	1.000		0.020*	-0.013*	0.075*	0.048*
Access to finance as a major constraint	0.213	0.409	0.000	1.000	-0.025*	-0.011*	-0.017*		-0.014*
Corruption as a major constraint	0.287	0.452	0.000	1.000	-0.021*	-0.013*	-0.012*	0.012*	-0.005
Labour regulation as a major constraint	0.116	0.321	0.000	1.000		-0.020*	0.010*	0.047*	0.031*
Political instability as a major constraint	0.283	0.450	0.000	1.000	-0.035*	-0.033*	-0.014*	0.013*	-0.015*
Tax rates (%)	0.290	0.454	0.000	1.000	-0.005	-0.015*		0.040*	0.023*
Exchange rate (ln)	3.357	2.673	-1.536	10.059	-0.029*	0.019*	-0.038*	-0.087*	-0.077*
Africa (Africa = 1, Otherwise = 0)	0.219	0.414	0.000	1.000	-0.042*	0.048*	-0.064*	-0.068*	-0.072*
gdp P	0.853	2.161	0.000	23.563				-0.024*	-0.017*
Counter Firm Perfo~1	0.001	0.181	-0.087	50.594					
exchange inverse1	-0.528	3.238	-19.346	3.779	-0.032*	0.018*	-0.040*	-0.081*	-0.075*
exchange inverse2	-0.489	3.570	-57.287	23.818	-0.017*	0.013*	-0.023*	-0.061*	-0.052*

Note.

4. Results and Discussion

4.1 Illustration of Constructed GVCs Index

Figures 1 to 3 illustrate the level of constructed GVCs index by industry sector, size of the enterprise, and continental location of the firms. The constructed HVCs index is based on microeconomic and macroeconomic indicators. The microeconomic indicators employed to construct the index include the firm's export potential (the percentage of the firm's total sales that are exported directly and indirectly), the firm's cost of import compliance (typical costs to comply with all import requirements); the firm's import potential (the percentage of the firm's cost of imported inputs in the total cost of all inputs and proportion of the firm's total inputs that are of foreign origin (%)); and the firm's multinational exposure (proportion of private foreign ownership in a firm, %); while the employed macroeconomic indicators included in the constructed index include the country's imports as the capacity to export; and the country's trade openness. The construction of this index contributes to the extant literature, highlighting that linking micro and macro techniques of measuring GVCs would improve how GVCs are measured (Johnson, 2018).

Figure 1 shows that the GVCs index is substantially higher for firms operating in the manufacturing sector compared to the global value chains index level for firms operating in the service sector. Figure 2 demonstrates that the constructed global value chains index is substantially higher for large-sized firms operating in the manufacturing sector compared to the small and medium-sized firms operating in the manufacturing sector. Also, Figure 2 shows that the constructed global value chains index is substantially higher for large-sized firms operating in the service sector when compared to the small and medium-sized firms operating in the service sector. Figure 3 demonstrates that the constructed GVCs index is substantially higher for firms in other parts of the world (comparatively to the African continent) operating in the manufacturing sector compared to firms in Africa operating in the manufacturing sector. Also, Figure 3 shows that the constructed global value chains index is substantially higher for firms in other parts of the world (comparatively to the African continent) operating in the service sector compared to firms in Africa operating in the service sector. Moreover, the ranking of countries based on the constructed GVCs index is detailed in Table A2 in the Appendix.

Figure 1. The Level of Constructed GVCs Index by Economic Sector

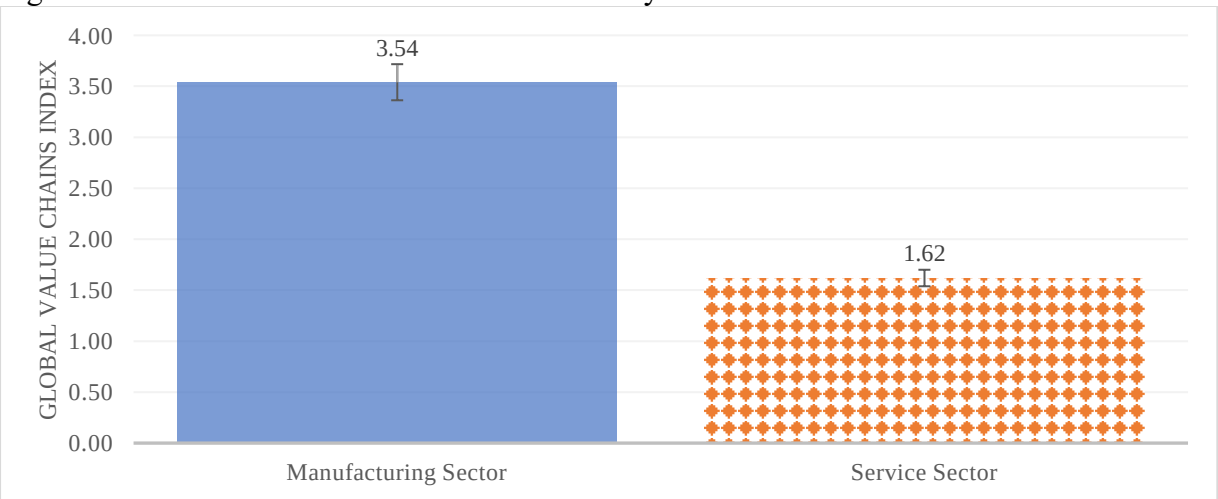


Figure 2. The Level of Constructed GVCs Index by Economic Sector and Size of Firms

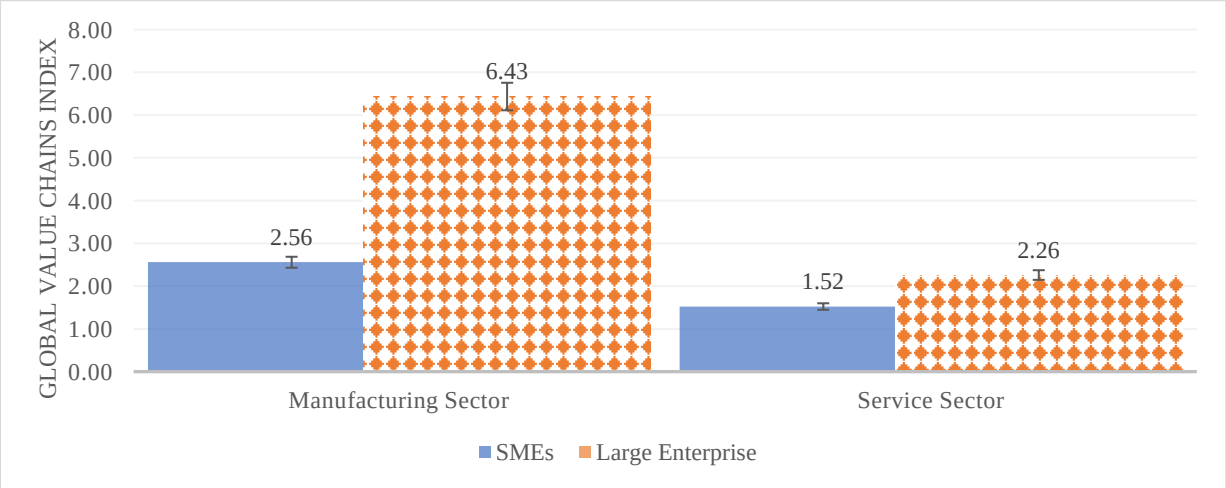
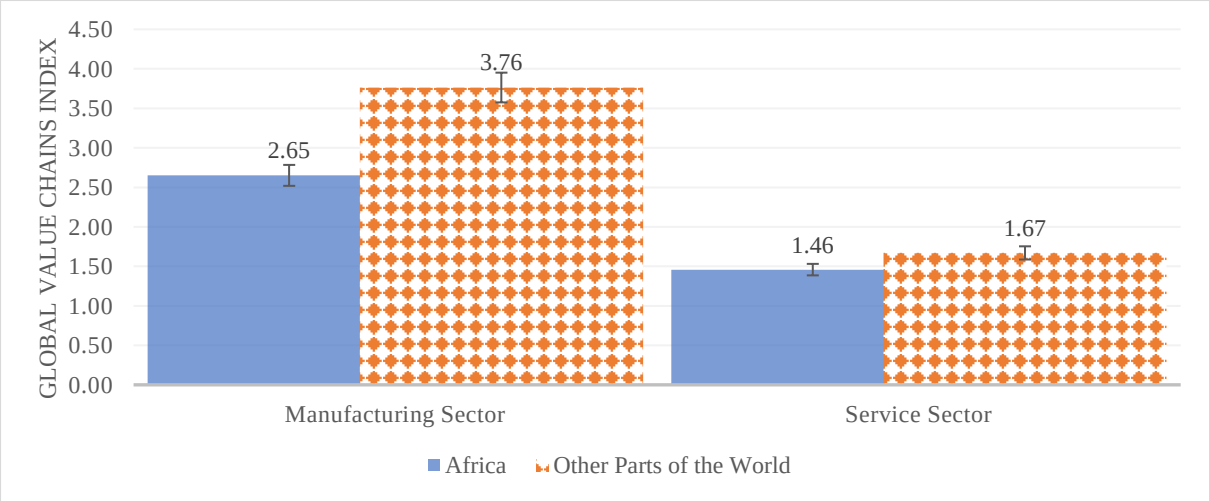


Figure 3. The Level of Constructed GVCs Index by Economic Sector and Continental Location of Firms



4.2. Pooled Driscoll-Kraay estimation

This section discusses the empirical findings based on the pooled Driscoll-Kraay estimator, which caters to potential cross-sectional dependence in the models. Table 3 reports the regression results on the direct effects of global value chains on the performance of manufacturing and service firms when combined. Tables 4–5 report the regression results on the direct effects of GVCs on the performance of manufacturing and service firms, respectively.

Overall, the preliminary results in Table 3 (when all firms in the manufacturing and service sectors are combined) show that the level of the firm's real annual sales growth, annual employment growth, real annual labour productivity growth, and the percent of firms buying fixed assets are positively and significantly predicted by the firm's export potential, cost of import compliance, import potential, multinational exposure, the country's imports as the capacity to export and the country's trade openness. Notably, results in Table 3, Column 6, show that the rise in the level of the constructed overall global value chains index significantly improves the level of overall firm performance. This finding is supported by the positive and statistically significant coefficients (at 1% level) of the overall global value chains index in the overall firm performance index model (Table 3, Column 6), ceteris paribus. Precisely, a one percentage rise in the overall global value chains index results in an increase of the overall firm performance index of 0.991 percentage points, ceteris paribus.

Table 4—where we consider only firms in the manufacturing sector—shows that the level of the manufacturing firm's real annual sales growth, annual employment growth, real annual labour productivity growth, and the percent of firms buying fixed assets are positively and significantly predicted by the firm's export potential, cost of import compliance, import potential, multinational exposure, the country's imports as the capacity to export and the country's trade openness. Notably, results in Table 4, Column 6, show that the rise in the level of the constructed overall global value chains index significantly improves the level of overall performance of firms in the manufacturing sector. This finding is supported by the positive and statistically significant coefficients (at 1% level) of the overall GVCs index in the overall firm performance index model (Table 4, Column 6), ceteris paribus. Precisely, a one percentage rise in the overall global value chains index results in an increase of the overall firm performance index of 1.06 percentage points, ceteris paribus.

Table 5—where we consider only firms in the service sector—shows that the level of the manufacturing firm's real annual sales growth, annual employment growth, real annual labour productivity growth, and the percent of firms buying fixed assets are positively and significantly predicted by the firm's export potential, cost of import compliance, import potential, multinational exposure, the country's imports as the capacity to export and the country's trade openness. Notably, results in Table 5, Column 6, show that the rise in the level of the constructed overall global value chains index significantly improves the level of overall performance of firms in the manufacturing sector. This finding is supported by the positive and statistically significant coefficients (at 1% level) of the overall global value chains index in the overall firm performance index model (Table 5, Column 6), ceteris paribus. Precisely, a one percentage rise in the overall global value chains index results in an increase of the overall firm performance index of 1.04 percentage points, ceteris paribus.

Turning to the results obtained for the control variables in Tables 2–4, Column 6, we largely find that an improvement in global governance has a positive and statistically significant effect on the level of the overall performance of firms worldwide. In contrast, an improvement in foreign direct investment across countries has a negative and statistically significant effect on the level of the overall performance of firms across the world. In support of theoretical expectations, we find that tax rate, lack of access to finance, and political instability have positive and statistically significant effects on the level of the overall performance of firms across the world. Macroeconomic theories suggest that an increase in tax rate corresponds with the expansionary fiscal policy that the government adopts to expand expenditures and that stricter tax enforcement improves firm performance (Johansson, 2010; Mironov, 2013). This expansionary fiscal policy, in turn, increases the aggregate demand with which firms can increase employment, level of sales, labour productivity and purchase new assets to satisfy the market in terms of aggregate supply. Also, the extant literature has documented that lack of access to finance and political instability are among the major factors impeding the performance of firms (Abdisa & Hawitibo, 2021; Kapri, 2019).

On the side of firm management, we find that firms whose top managers are females perform poorly when compared to firms whose top managers are males. We also find that the continental locality of firms plays a significant role in determining the performance of the firms, where our results show that firms located in Africa perform poorly when compared to firms located on other continents. The documented effects of female top managers and that of Africa as a firm locality are consistent with the existing results documenting that firms whose top managers are males outperform those whose managers are females and that firms located in Africa perform poorly when compared to firms located in other continents (Martínez-Zarzoso, 2023).

Contrary to theoretical expectation, we find that access to land as a major constraint, access to electricity as a major constraint, corruption as a major constraint labor regulation as a major constraint to the firm have positive and statistically significant effects on the level of the overall performance of firms across the world. The exchange rate is found to have negative

and statistically significant coefficients largely, and this connotes that the devaluation of currency across countries seems not to inhibit the overall performance of firms across countries, an assertion which is contrary to the literature documenting that the real depreciation of local currency improves the performance of firms through increased domestic and exports sales and productivity (Fung, & Liu, 2009). Also, the number of years of experience of the top manager is found to have negative and statistically significant coefficients, which is in contradiction with the documented effect in the literature (Zhang, 2017; Hamori & Koyuncu, 2015). The effect of ease of doing business is largely mixed. This effect is negative and statistically significant on the performance of firms operating in the manufacturing sector, while it is positive and statistically significant on the performance of firms operating in the service sector. However, the effect of easy-doing business is negative but not statistically significant on the performance of firms when firms in all the two sectors (manufacturing and services) are pooled together.

Table 3. The Effect of Global Value Chains on Firm Performance Based on pooled Driscoll-Kraay estimator (Firms in Manufacturing and Service Sectors Combined)

Full sample of all firms operating in the manufacturing and service sectors	Sales Growth (%)	Employment Growth (%)	Productivity Growth (%)	Buying Fixed Assets (%)	Firm Performance Index	Firm Performance Index
	(1)	(2)	(3)	(4)	(5)	(6)
The firm's export potential	0.014***	-0.004**	0.018***	0.061***	0.022***	
	(0.003)	(0.002)	(0.003)	(0.005)	(0.002)	
The firm's cost of import compliance	0.178***	0.007	0.173***	0.041	0.100***	
	(0.024)	(0.016)	(0.024)	(0.043)	(0.017)	
The firm's import potential	0.003	-0.001	0.004*	0.124***	0.033***	
	(0.002)	(0.001)	(0.002)	(0.005)	(0.002)	
The firm's multinational exposure	0.009***	-0.005***	0.014***	0.078***	0.024***	
	(0.003)	(0.002)	(0.003)	(0.005)	(0.002)	
Import as capacity to export (ln)	0.597***	0.099***	0.493***	1.705***	0.724***	
	(0.026)	(0.015)	(0.026)	(0.049)	(0.019)	
Trade openness	2.491***	0.642**	1.790***	5.406***	2.582***	
	(0.312)	(0.251)	(0.359)	(0.821)	(0.273)	
Global value chain index						0.991***
						(0.049)
Ease doing business (Inverse)	0.098***	-0.028***	0.119***	-0.187***	0.000	-0.002
	(0.009)	(0.005)	(0.009)	(0.016)	(0.006)	(0.006)
Governance composite index	1.587***	0.271***	1.216***	8.075***	2.787***	2.897***
	(0.105)	(0.067)	(0.106)	(0.215)	(0.079)	(0.077)
Foreign Direct Investments (ln)	0.046***	0.012	0.014	-0.529***	-0.114***	-0.294***
	(0.017)	(0.010)	(0.017)	(0.033)	(0.013)	(0.012)
Foreign aid per capita (ln)	-0.063*	0.038*	-0.111***	-0.874***	-0.252***	0.094***
	(0.033)	(0.020)	(0.033)	(0.062)	(0.024)	(0.022)
Top manager (Female = 1, Male = 0)	-0.194	-0.868***	0.649***	-2.327***	-0.685***	-0.519***
	(0.196)	(0.116)	(0.198)	(0.356)	(0.138)	(0.139)
Years of experience (Top manager)	-0.077***	-0.130***	0.043***	0.075***	-0.022***	-0.012***
	(0.006)	(0.003)	(0.006)	(0.011)	(0.004)	(0.004)
Firm size (SMEs = 1, Large firm = 0)	-1.448***	-1.532***	0.048	-15.164***	-4.524***	-4.724***
	(0.154)	(0.093)	(0.157)	(0.320)	(0.116)	(0.116)
Access to land as a major constraint	0.950***	1.098***	-0.011	4.896***	1.733***	1.592***
	(0.208)	(0.122)	(0.211)	(0.372)	(0.147)	(0.148)
Access to electricity as a major constraint	0.431***	0.767***	-0.238	6.921***	1.970***	2.223***
	(0.150)	(0.090)	(0.153)	(0.284)	(0.108)	(0.108)
Access to finance as a major constraint	-0.837***	-0.924***	0.026	-0.525	-0.565***	-0.582***
	(0.182)	(0.112)	(0.184)	(0.330)	(0.129)	(0.130)
Corruption as a major constraint	0.514***	-0.144	0.639***	1.916***	0.731***	0.576***
	(0.170)	(0.101)	(0.173)	(0.316)	(0.121)	(0.122)
Labor regulation	0.015	-0.551***	0.523**	1.529***	0.379**	0.300*
	(0.211)	(0.132)	(0.213)	(0.410)	(0.154)	(0.156)
Political Instability	-1.726***	-0.957***	-0.766***	-1.263***	-1.178***	-0.933***
	(0.168)	(0.101)	(0.171)	(0.312)	(0.120)	(0.121)
Tax rates	0.236	-0.138	0.405***	2.347***	0.713***	0.915***
	(0.155)	(0.094)	(0.157)	(0.297)	(0.113)	(0.113)
Exchange rate (ln)	0.688***	0.084***	0.595***	1.567***	0.733***	-0.128***

	(0.043)	(0.025)	(0.044)	(0.077)	(0.030)	(0.020)
Africa (Africa = 1, Otherwise = 0)	-1.488***	1.065***	-2.305***	-6.937***	-2.416***	-2.336***
	(0.197)	(0.110)	(0.202)	(0.335)	(0.134)	(0.134)
Constant	-26.268***	5.461***	-30.282***	5.641**	-11.362***	21.871***
	(1.317)	(0.758)	(1.341)	(2.490)	(0.951)	(0.504)
Observations	155,561	155,561	155,561	155,561	155,561	155,561
R-squared	0.015	0.017	0.015	0.083	0.064	0.049

Notes. This table reports the direct effects of global value chains on the performance of firms in manufacturing and service sectors, combined, controlling the effect of other selected covariates variables. Estimated results are based on the pooled Driscoll-Kraay estimator, which caters for potential cross-sectional dependence in the models. The dependent variables are the firm's real annual sales growth (Column [1]); the firm's annual employment growth (Column [2]); the firm's real annual labour productivity growth (Column [3]); the percent of firms buying fixed assets (Column [4]); and the constructed overall firm performance index (Columns [5] and [6]). Robust standard errors are in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table 4. The Effect of GVCs on the Performance of Manufacturing Firms based on pooled Driscoll-Kraay Estimator

Sub-sample of firms operating in the manufacturing sector	Sales Growth (%)	Employment Growth (%)	Productivity Growth (%)	Buying Fixed Assets (%)	Firm Performance Index	Firm Performance Index
	(1)	(2)	(3)	(4)	(5)	(6)
The firm's export potential	0.007**	-0.004*	0.011***	0.065***	0.020***	
	(0.003)	(0.002)	(0.003)	(0.006)	(0.002)	
The firm's cost of import compliance	0.229***	0.000	0.228***	0.087	0.136***	
	(0.034)	(0.022)	(0.034)	(0.065)	(0.026)	
The firm's import potential	0.001	0.006***	-0.003	0.160***	0.041***	
	(0.003)	(0.002)	(0.003)	(0.005)	(0.002)	
The firm's multinational exposure	0.014***	-0.009***	0.023***	0.079***	0.027***	
	(0.004)	(0.002)	(0.004)	(0.007)	(0.003)	
Import as capacity to export (ln)	0.690***	0.085***	0.588***	1.802***	0.791***	
	(0.036)	(0.022)	(0.037)	(0.073)	(0.027)	
Trade openness	3.863***	1.579***	2.244***	7.501***	3.797***	
	(0.668)	(0.539)	(0.745)	(1.698)	(0.589)	
Global value chain index						1.060***
						(0.058)
Ease doing business (Inverse)	0.020*	-0.039***	0.054***	-0.168***	-0.033***	-0.024***
	(0.011)	(0.007)	(0.011)	(0.022)	(0.008)	(0.008)
Governance composite index	1.920***	0.227**	1.624***	8.738***	3.127***	3.282***
	(0.142)	(0.090)	(0.142)	(0.299)	(0.108)	(0.107)
Foreign Direct Investments (ln)	0.078***	0.022	0.036	-0.410***	-0.068***	-0.316***
	(0.025)	(0.014)	(0.025)	(0.048)	(0.018)	(0.017)
Foreign aid per capita (ln)	-0.114**	0.026	-0.142***	-0.793***	-0.256***	0.144***
	(0.045)	(0.027)	(0.046)	(0.087)	(0.033)	(0.031)
Top manager (Female = 1, Male = 0)	0.223	-0.968***	1.162***	-0.882*	-0.116	0.074
	(0.271)	(0.166)	(0.277)	(0.521)	(0.196)	(0.196)
Years of experience (Top manager)	-0.074***	-0.115***	0.034***	0.019	-0.034***	-0.021***
	(0.007)	(0.004)	(0.007)	(0.015)	(0.005)	(0.005)
Firm size (SMEs = 1, Large firm = 0)	-1.190***	-1.432***	0.217	-12.452***	-3.714***	-3.950***
	(0.188)	(0.114)	(0.192)	(0.400)	(0.143)	(0.143)
Access to land as a major constraint	1.103***	1.294***	-0.043	5.341***	1.924***	1.840***
	(0.271)	(0.164)	(0.277)	(0.510)	(0.195)	(0.198)
Access to electricity as a major constraint	0.297	0.856***	-0.480**	6.708***	1.845***	2.222***
	(0.190)	(0.116)	(0.194)	(0.374)	(0.139)	(0.140)
Access to finance as a major constraint	-1.132***	-1.045***	-0.156	-0.745*	-0.769***	-0.686***
	(0.233)	(0.147)	(0.236)	(0.444)	(0.170)	(0.171)
Corruption as a major constraint	0.399*	-0.232*	0.582***	1.326***	0.519***	0.318**
	(0.217)	(0.131)	(0.221)	(0.424)	(0.159)	(0.161)
Labor regulation	0.025	-0.551***	0.546**	1.760***	0.445**	0.389*
	(0.265)	(0.168)	(0.268)	(0.536)	(0.197)	(0.200)
Political Instability	-1.624***	-1.072***	-0.521**	-2.288***	-1.376***	-1.085***
	(0.217)	(0.132)	(0.221)	(0.423)	(0.159)	(0.161)
Tax rates	0.136	-0.153	0.314	2.350***	0.662***	0.865***
	(0.201)	(0.124)	(0.205)	(0.403)	(0.149)	(0.150)
Exchange rate (ln)	0.671***	0.040	0.624***	1.706***	0.760***	-0.163***
	(0.057)	(0.035)	(0.059)	(0.108)	(0.041)	(0.027)
Africa (Africa = 1, Otherwise = 0)	-2.176***	0.854***	-2.821***	-7.770***	-2.978***	-2.848***

	(0.267)	(0.151)	(0.274)	(0.466)	(0.184)	(0.184)
Constant	-25.319***	5.797***	-29.420***	-4.076	-13.255***	23.472***
	(1.776)	(1.084)	(1.818)	(3.568)	(1.318)	(0.679)
Observations	84,873	84,873	84,873	84,873	84,873	84,873
R-squared	0.016	0.016	0.015	0.094	0.076	0.054

Notes. This table reports the direct effects of GVCs on the performance of firms only in the manufacturing sector, controlling the effect of other selected covariates. Estimated results are based on the pooled Driscoll-Kraay estimator, which caters for potential cross-sectional dependence in the models. The dependent variables are the firm's real annual sales growth (Column [1]); the firm's annual employment growth (Column [2]); the firm's real annual labour productivity growth (Column [3]); the percent of firms buying fixed assets (Column [4]); and the constructed overall firm performance index (Columns [5] and [6]). Robust standard errors are in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table 5. The Effect of GVCs on the Performance of Service Firms based on pooled Driscoll-Kraay Estimator

Sub-sample of firms operating in the service sector	Sales Growth (%)	Employment Growth (%)	Productivity Growth (%)	Buying Fixed Assets (%)	Firm Performance Index	Firm Performance Index
	(1)	(2)	(3)	(4)	(5)	(6)
The firm's export potential	0.039***	0.006**	0.035***	0.060***	0.035***	
	(0.006)	(0.003)	(0.006)	(0.010)	(0.004)	
The firm's cost of import compliance	0.116***	0.005	0.116***	0.111*	0.087***	
	(0.034)	(0.023)	(0.035)	(0.059)	(0.024)	
The firm's import potential	0.029***	-0.001	0.027***	-0.029**	0.006	
	(0.006)	(0.004)	(0.006)	(0.012)	(0.005)	
The firm's multinational exposure	0.004	-0.002	0.006	0.076***	0.021***	
	(0.004)	(0.003)	(0.005)	(0.008)	(0.003)	
Import as capacity to export (ln)	0.529***	0.072***	0.457***	1.560***	0.654***	
	(0.037)	(0.021)	(0.038)	(0.067)	(0.026)	
Trade openness	2.304***	0.091	2.126***	4.340***	2.215***	
	(0.376)	(0.292)	(0.430)	(0.959)	(0.321)	
Global value chain index						1.041***
						(0.101)
Ease doing business (Inverse)	0.183***	-0.024***	0.198***	-0.205***	0.038***	0.020**
	(0.014)	(0.008)	(0.014)	(0.024)	(0.009)	(0.009)
Governance composite index	1.141***	0.280***	0.726***	7.397***	2.386***	2.459***
	(0.158)	(0.099)	(0.161)	(0.311)	(0.116)	(0.113)
Foreign Direct Investments (ln)	0.015	0.021	-0.022	-0.572***	-0.140***	-0.264***
	(0.024)	(0.014)	(0.025)	(0.046)	(0.018)	(0.017)
Foreign aid per capita (ln)	-0.026	0.041	-0.085*	-0.947***	-0.254***	0.041
	(0.048)	(0.029)	(0.049)	(0.089)	(0.035)	(0.032)
Top manager (Female = 1, Male = 0)	-0.590**	-0.905***	0.280	-3.550***	-1.191***	-1.044***
	(0.281)	(0.162)	(0.283)	(0.489)	(0.196)	(0.196)
Years of experience (Top manager)	-0.081***	-0.145***	0.052***	0.166***	-0.002	0.003
	(0.009)	(0.005)	(0.009)	(0.017)	(0.006)	(0.006)
Firm size (SMEs = 1, Large firm = 0)	-2.439***	-2.125***	-0.407	-20.332***	-6.326***	-6.462***
	(0.276)	(0.163)	(0.279)	(0.541)	(0.204)	(0.204)
Access to land as a major constraint	0.821**	0.795***	0.131	4.040***	1.447***	1.281***
	(0.319)	(0.181)	(0.321)	(0.544)	(0.220)	(0.221)
Access to electricity as a major constraint	0.625**	0.804***	-0.032	7.334***	2.183***	2.276***
	(0.243)	(0.142)	(0.247)	(0.438)	(0.171)	(0.171)
Access to finance as a major constraint	-0.447	-0.735***	0.239	-0.422	-0.341*	-0.454**
	(0.288)	(0.173)	(0.290)	(0.494)	(0.199)	(0.199)
Corruption as a major constraint	0.608**	-0.040	0.663**	2.508***	0.935***	0.859***
	(0.270)	(0.157)	(0.274)	(0.472)	(0.187)	(0.188)
Labor regulation	0.022	-0.485**	0.456	1.241*	0.308	0.184
	(0.343)	(0.211)	(0.347)	(0.635)	(0.244)	(0.247)
Political Instability	-1.932***	-0.900***	-1.064***	-0.048	-0.986***	-0.801***
	(0.263)	(0.155)	(0.266)	(0.462)	(0.183)	(0.184)
Tax rates	0.348	-0.122	0.509**	2.315***	0.763***	0.990***
	(0.242)	(0.143)	(0.244)	(0.439)	(0.171)	(0.172)
Exchange rate (ln)	0.762***	0.106***	0.635***	1.340***	0.711***	-0.091***
	(0.065)	(0.037)	(0.065)	(0.112)	(0.045)	(0.031)
Africa (Africa = 1, Otherwise = 0)	-0.667**	1.126***	-1.521***	-5.901***	-1.741***	-1.744***
	(0.295)	(0.161)	(0.301)	(0.487)	(0.199)	(0.197)
Constant	-28.362***	7.119***	-33.935***	17.858***	-9.330***	21.026***

	(2.010)	(1.103)	(2.035)	(3.574)	(1.414)	(0.755)
Observations	70,688	70,688	70,688	70,688	70,688	70,688
R-squared	0.016	0.018	0.017	0.074	0.056	0.045

Notes. This table reports the direct effects of GVCs on the performance of firms only in the manufacturing sector, controlling the effect of other selected covariates. Estimated results are based on the pooled Driscoll-Kraay estimator, which caters for potential cross-sectional dependence in the models. The dependent variables are the firm's real annual sales growth (Column [1]); the firm's annual employment growth (Column [2]); the firm's real annual labour productivity growth (Column [3]); the percent of firms buying fixed assets (Column [4]); and the constructed overall firm performance index (Columns [5] and [6]). Robust standard errors are in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

4.3. Instrumental Variable Estimation

Theoretically, obtaining the direct effect of GVCs on firm performance is challenging for several reasons. First, other factors—besides those controlled for in the employed pooled cross-sectional regressions—can confound the impact of global value chains on the performance of firms. For example, technological progress and proliferation may robustly explain firm performance and GVCs simultaneously. The natural explanation of this is that technological progress and proliferation stimulate labour efficiency and productivity and the firm's global competitiveness. Second, firm performance may be endogenous to GVCs since it is documented that firms in countries with considerable GVC development perform better than firms in countries with low GVC development (Johnson, 2018).

We instrument the constructed GVCs index to address potential endogeneity concerns. We use a set of three candidate variables that predict the GVC well with a subsequent significant impact on firm performance. The three candidate instruments used in this study include *i) the inverse of technological progress computed as the inverse of Solow residuals; ii) the counter-firm performance measured as the inverse of the overall firm performance index; and iii) an instrument for counter-currency valuation measured as the inverse the value of local currency to US dollar*. Though similar instruments have not been widely used in the literature, the validity of used instruments rests on three hypotheses. First, the inverse of Solow residuals inversely correlates with economic performance, and technological progress improves the development of GVCs. Second, counter-firm performance degenerates global value chain development while firm performance is among the factors enhancing global value chain development. Third, counter-currency valuation may be among the factors impeding global value chains development (Fung & Liu, 2009).

We employ a two-stage general method of moments (GMM) estimator to estimate instrumental variable (IV) pooled regression. The first-stage results are reported in Table 6, and the second-stage results are presented in Table 7. First, Table 6 shows that the employed instruments significantly predict the constructed overall global value chains index as is required by the first condition for good instruments. In the model where we include only manufacturing firms in column 1, Table 6, the F test for excluded instruments is 609.45 (prob > F = 0.000), in the model where we include only service firms in column 2, Table 6, the F test for excluded instruments is 786.240 (prob > F = 0.000), and in the model where we include all firms in both manufacturing and service sectors in column 3, Table 6, the F test for excluded instruments is 96.80 (prob > F = 0.000). Second, the employed instruments are independent of the second-stage disturbance term, as required by the second condition for valid instruments. Both the LM test statistic for under-identification and the F statistic for weak identification show that employed instruments are identified, which indicates that they are independent of the disturbance term in the second-stage relation. Third, the estimated Hansen J statistics in columns 1 to 3 are 0.631, 0.795, and 2.917, which support the validity of employed instruments.

Table 5 provides the results for the first-stage regressions. Focusing on the role played by employed instruments in explaining GVCs, we observe that they have the expected negative sign and are statistically significant for predicting GVCs. Turning to other covariates employed to predict the level of GVCs (Table 5, Column 3), we observe that the coefficients for ease of

doing business, global governance, years of experience of the top manager, a dummy for the female top manager, a dummy for the lack of access to electricity, a dummy for political instability, and a dummy for firms located on the African continent are positive and statistically significant at 1% level of significance. Our results on the predicted effects of the ease of doing business, global governance, years of experience of the top manager, a dummy for the female top manager, and a dummy for firms located on the African continent on GVCs are consistent with previous literature. However, results on the predicted effects of the dummy for the lack of access to electricity and the dummy for political instability on GVCs contradict documented theory in the literature. We also observe that the coefficients for FDI, a dummy for SMEs, a dummy for lack of access to land, a dummy for lack of access to finance, a dummy for corruption as the major constraint the firm faces, and tax rate are negative and statistically significant at a 1% level of significance. The predicted effects of the dummy for SMEs, a dummy for lack of access to land, a dummy for lack of access to finance, and a dummy for corruption as the major constraint the firm faces on GVCs are consistent with previous literature. However, the predicted effects of FDI and tax rate contradict the documented theory in the literature.

Focusing on Table 6, which reports the GMM estimates of the effects of the GVCs and employed control covariates on the level of global firm performance, we observe that even after controlling for potential endogeneity, the impact of GVCs on the global firm performance is positive and significant at 1% level. A one-point increase in the constructed global value chain index is associated with an increase of 2.04, 2.94, and 2.37 percentage points in the constructed global firm performance index for firms operating in the manufacturing sector, service sector, and when all firms are combined, respectively. These estimated effects are large and economically meaningful to conclude that improvements in the performance of firms worldwide are conditioned by their levels of GVCs—whereby economic policies stimulating sustainable global value chain development have subsequent significant effects in stimulating the performance of firms across countries.

Notably, we consistently demonstrate that improvement in GVCs significantly increases the performance of firms operating in the manufacturing and service sectors. The robustness check also validates our earlier deductions from Tables 3–5, Column 6. Our earlier submissions based on the findings obtained for the control variables in Tables 3–5, Column 6, remain similar to those presented in Table 7. Thus, the consistency of our earlier findings with the robustness check is further attested. Overall, though there is a strong similarity between earlier findings and those emerging from the robustness check exercise in terms of the sign and significance of the coefficient of constructed GVCs, the magnitude of the coefficient of constructed global value chains is sensitive to the effect of endogeneity, which prompts us to reason along the line of thought that our earlier findings are biased by endogeneity effect that may be present in the employed pooled Driscoll-Kraay estimator.

Table 6. First Stage Regressions

Variables	Dependent Variable: Global Value Chain Index (1)		
	Manufacturing Sector (1.1)	Service Sector (1.2)	Manufacturing and Service Sectors (1.3)
Ease doing business (Inverse)	0.152***	0.003	0.081***
	(0.003)	(0.002)	(0.002)
Governance composite index	1.284***	0.455***	0.777***
	(0.067)	(0.048)	(0.043)
Foreign Direct Investments (ln)	-0.142***	-0.027***	-0.052***
	(0.011)	(0.007)	(0.007)
Foreign aid per capita (ln)	0.081***	-0.008	0.013
	(0.020)	(0.013)	(0.012)
Top manager (Female = 1, Male = 0)	1.077***	-0.108	0.264***
	(0.130)	(0.076)	(0.077)
Years of experience (Top manager)	0.027***	0.002	0.027***
	(0.003)	(0.003)	(0.002)
Firm size (SMEs = 1, Large firm = 0)	-6.793***	-1.698***	-5.614***
	(0.100)	(0.096)	(0.078)
Access to land as a major constraint	-0.101	-0.195**	-0.230***
	(0.108)	(0.079)	(0.071)
Access to electricity as a major constraint	0.484***	0.019	0.525***
	(0.085)	(0.068)	(0.059)
Access to finance as a major constraint	-0.322***	-0.178**	-0.192***
	(0.094)	(0.074)	(0.064)
Corruption as a major constraint	-0.479***	-0.005	-0.276***
	(0.093)	(0.073)	(0.063)
Labor regulation	0.168	-0.012	0.167*
	(0.123)	(0.098)	(0.086)
Political Instability	0.799***	0.328***	0.547***
	(0.097)	(0.073)	(0.065)
Tax rates	-0.644***	-0.290***	-0.477***
	(0.090)	(0.065)	(0.059)
Exchange rate (ln)	-0.066***	-0.064***	-0.021*
	(0.016)	(0.011)	(0.011)
Africa (Africa = 1, Otherwise = 0)	0.053	0.218***	0.218***
	(0.099)	(0.072)	(0.063)
gdp_P	-0.108***		-0.049***
	(0.030)		(0.017)
Counter_Firm_Performance1	-0.169***	-0.060***	-0.105***
	(0.005)	(0.002)	(0.007)
exchange_inverse1		-0.078***	
		(0.012)	
exchange_inverse2			-0.038***
			(0.007)
Observations	84,873	68,536	151,265
R-squared	0.136	0.085	0.075
Adj R-squared	0.136	0.0844	0.0750
F-Stat	552	2189	538.4
Prob > F	0.000	0.000	0.000
Root MSE	10.90	7.309	9.707
F-Test of excluded instruments (F-Stat)	609.45	786.240	96.80
	(0.000)	(0.000)	(0.000)
Underidentification test (Kleibergen-Paap rk LM statistic – Chi-Squared)	14.86	44.990	46.47
	(0.001)	(0.000)	(0.000)
Weak identification test (Cragg-Donald Wald F statistic)	12.960	37.690	14.77
	(0.000)	(0.000)	(0.000)

Notes. This table reports the results for the first-stage regressions when the dependent variable is the Global Value Chain. Heteroskedasticity-robust standard errors are in parenthesis. *, **, and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Table 7. GMM Estimates for the Effects of GVCs on Firm Performance

Variables	Dependent Variable: Firm Performance Index (1)		
	Manufacturing Sector (1.1)	Service Sector (1.2)	Manufacturing and Service Sectors (1.3)
Global value chain index	2.040***	2.943***	2.370***
	(0.509)	(0.415)	(0.112)
Ease doing business (Inverse)	-0.107	0.214***	0.016
	(0.079)	(0.009)	(0.011)
Governance composite index	-0.018	0.228	0.393***
	(0.683)	(0.277)	(0.150)
Foreign Direct Investments (ln)	0.278***	-0.031	0.059***
	(0.084)	(0.027)	(0.018)
Foreign aid per capita (ln)	0.228***	0.325***	0.257***
	(0.074)	(0.047)	(0.034)
Top manager (Female = 1, Male = 0)	-2.168***	-0.623**	-1.124***
	(0.666)	(0.287)	(0.223)
Years of experience (Top manager)	-0.047***	0.025**	-0.044***
	(0.017)	(0.010)	(0.007)
Firm size (SMEs = 1, Large firm = 0)	10.320***	0.073	9.343***
	(3.453)	(0.758)	(0.674)
Access to land as a major constraint	2.243***	2.194***	2.380***
	(0.320)	(0.318)	(0.217)
Access to electricity as a major constraint	1.727***	2.435***	1.380***
	(0.353)	(0.252)	(0.182)
Access to finance as a major constraint	0.145	0.383	0.115
	(0.317)	(0.292)	(0.193)
Corruption as a major constraint	1.531***	1.043***	1.408***
	(0.356)	(0.271)	(0.185)
Labor regulation	0.168	0.506	0.111
	(0.356)	(0.362)	(0.247)
Political Instability	-2.521***	-1.558***	-2.012***
	(0.488)	(0.299)	(0.190)
Tax rates	2.086***	1.911***	2.100***
	(0.409)	(0.268)	(0.184)
Exchange rate (ln)	0.135**	0.359***	0.194***
	(0.056)	(0.054)	(0.032)
Africa (Africa = 1, Otherwise = 0)	-1.658***	-0.706**	-1.259***
	(0.291)	(0.291)	(0.194)
Observations	84,873	68,536	151,265
R-squared	-0.643	-0.637	-0.744
Centred R-squared	-1.291	-1.194	-1.381
Adjusted R-squared	-0.644	-0.638	-0.745
F-Stat	753.1	710.2	1504
LM test statistic for under-identification	14.86	44.99	46.47
	(0.000)	(0.000)	(0.000)
F statistic for weak identification	609.5	786.2	96.80
Hansen J statistic	0.631	0.795	2.917
	(0.427)	(0.373)	(0.233)

Notes. This table reports the generalised method of moments (GMM) estimates of the effect of the GVCs and several other control covariates on Firm Performance. The gross domestic product by country, exchange rate by country, and constrained firm performance are used as instrumental variables for the constructed GVCs index. Heteroskedasticity-robust standard errors are in parenthesis. *, **, and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

4.4. Discussion

This study is motivated by a set of studies that documented that more research is needed on the alignment of individual firms' performance systems and the operation of GVCs. For instance, the extant literature highlights the need to investigate the evolving framework of coordinated behaviour in GVCs to explain governance patterns and performance outcomes (Clarke & Boersma, 2017; Gereffi *et al.*, 2005; Kano *et al.*, 2020; Mouzas & Araujo, 2000; Mouzas & Bauer, 2022; Verbeke, 2020). New research in this area comes at a time of global geopolitical tensions, shifting economic conditions in GVCs, rapid technological changes in digitisation, automation, and de-carbonisation, as well as rapid changes emanating from unpredictable events that amplify firms' vulnerabilities in an increasingly interconnected value chain (Mouzas & Bauer, 2022). Also, more research is needed to assess the impact of global adversities, such as pandemics, natural catastrophes, and risks within global value chains. Adversities like the COVID-19 pandemic can distort HVCs and consequently impact global business performance (Ali *et al.*, 2022; Donthu & Gustafsson, 2020).

Our study extends existing literature with fresh evidence in threefold. First, it constructs an overall global value chains index based on macroeconomic and microeconomic indicators. To our knowledge, the constructed GVCs index is not used in the literature. Second, it documents the effect of the constructed GVCs index on global firm performance from different aspects of firm categories (firms in the manufacturing sector, firms in the service sector, and by combining all firms in both sectors). Finally, it demonstrates how the three selected instruments moderate the global firm performance effect of the GVCs.

First, we construct a GVCs index based on microeconomic and macroeconomic indicators. This index contributes to the extant literature, which highlights that linking micro and macro techniques of measuring GVCs would improve how GVCs are measured (Johnson, 2018). Our results show that the level of GVCs is highly heterogeneous across firms' economic sectors, size levels, and continents of location. The estimated level of GVCs indicates that much effort is required to improve GVCs among firms operating in the service sector. Results highlight that the level of GVCs among small-sized firms operating in the manufacturing or service sector is considerably small compared to the level of GVCs among large-sized firms. Our results also highlight that the level of GVCs among firms located in Africa, whether operating in the manufacturing or service sector, is considerably lower than that among firms located on other continents. Our results are supported by the existing literature documenting that firms operating in the service sector, small sized-firms, and firms located in less developed countries face considerable constraints in terms of ensuring effective and sustainable strategic plans for material sourcing, production process, and market penetration (Korwatanasakul & Paweenawat, 2020).

Second, we find that an improvement in global firm performance and total factor productivity are positively influenced by an increase in the GVCs index—as constructed with the firm's export potential (the percentage of the firm's total sales that are exported directly and indirectly); the firm's cost of import compliance (typical costs to comply with all import requirements); the firm's import potential (the percentage of the firm's cost of imported inputs in the total cost of all inputs and proportion of the firm's total inputs that are of foreign origin (%)); the firm's multinational exposure (proportion of private foreign ownership in a firm, %); the country's imports as the capacity to export; and the country's trade openness. This suggests that implementing global policies to stimulate GVCs could be pivotal in achieving sustainable global firm performance and technological progress. Our findings are supported by the literature, which documents that GVCs are among the essential factors determining the performance of firms (Reddy & Sasidharan, 2024; Agostino, 2020). Results of the effect of GVCs on the firm's total factor productivity are presented in Table A3 in the Appendix. In the World Bank enterprise surveys, data on TFP are available only on manufacturing firms; hence, estimates reported in Table A3 are based on firms operating in manufacturing sectors.

Third, we generally observe that the magnitude of the effect of the constructed GVCs index is highly sensitive to the endogeneity hypothesis. This evidence indicates that different results in studies on the effect of GVCs that do not control the effect of endogeneity may be biased by the endogeneity hypothesis. The GMM results indicate that the instruments employed in this study are essential in enhancing the effect of GVCs on global firm performance. Finally, we argue that supply shocks and shocks in exchange rates are likely to make it challenging to improve global value chain development and diffusion and subsequently likely also to make it difficult to close the gap between the level of performance of firms operating in the manufacturing sector and those operating in the service sectors, the gap between the level of performance of firms located in developed countries and those located in developing countries, and the gap between the level of performance of small-sized firms and large-sized firms.

5. Conclusion and Policy Implications

In this study, we contribute to the literature by investigating the effects of global value chains on global firm performance. Whether global value chain development and diffusion stimulate global firm performance is one of the most important research questions in international economics and trade. However, measuring global value chains remains challenging. The literature has mainly attributed this challenge to the lack of a consistent approach that captures the convergence between microeconomic and macroeconomic indicators to measure global value chains. To contribute to knowledge and policy discussions, we construct a global value chains index based on macroeconomic and macroeconomic indicators and investigate its impact on global firm performance. We found that the constructed global value chains index level is highly heterogeneous across firms' economic sectors, size levels, and continental localities. We also demonstrate that improvements in the level of the constructed global value chains index cause significant improvements in global firm performance.

The central hypothesis of this research, which is that the global value chains significantly affect global firm performance, finds solid empirical support. Results provide two important insights into international trade policy. First, firms located in countries with considerable value chains would perform better than firms located in countries with low global value chain development. To stimulate the proliferation of global value chains across countries as a requirement to ensure sustainable growth and performance of firms worldwide, this study calls for facilitating the free movement of capital across countries to allow countries with a low endowment of global value chains to accumulate them due to international trade liberalization. Second and generally, this study suggests that implementing policies to improve global value chain development and diffusion supported by technological progress and stable exchange rates would play a crucial role in improving and ensuring the sustainable performance of firms across countries.

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Appendix

Table A1. Firm Performance Index

Rank	Country	Firm Performance
1	Liberia	29.64
2	Slovenia	24.46
3	Samoa	24.39
4	Central African R	22.66
5	Solomon Islands	22.39
6	New Zealand	22.03
7	Mauritius	21.20
8	Seychelles	21.05
9	Czech Republic	20.72
10	Sierra Leone	20.71
11	Guyana	20.55
12	Finland	20.30
13	Lithuania	20.17
14	Brazil	19.98
15	Bolivia	19.79
16	Sweden	19.48
17	Luxembourg	19.39
18	Latvia	19.38
19	Peru	19.31
20	Denmark	19.29
21	Togo	18.91
22	Chile	18.89
23	Vanuatu	18.85
24	Cyprus	18.67
25	Uruguay	18.65
26	Greece	18.64
27	Netherlands	18.53
28	Croatia	18.30
29	North Macedonia	18.27
30	Hungary	18.22
31	Malta	18.21
32	Estonia	18.18
33	Guinea-Bissau	17.96
34	Belgium	17.79
35	Georgia	17.53
36	Portugal	17.49
37	Namibia	17.43
38	Angola	17.36
39	Kosovo	17.26
40	Argentina	17.09
41	Bosnia and Herzeg	16.97
42	Venezuela, RB	16.78
43	Costa Rica	16.73
44	Botswana	16.62
45	Mali	16.61
46	Ecuador	16.60
47	Serbia	16.56
48	Rwanda	16.56
49	Colombia	16.26
50	Papua New Guinea	16.19
51	Cameroon	15.80
52	Ireland	15.78
53	Slovak Republic	15.74
54	Grenada	15.73
55	El Salvador	15.73
56	Vietnam	15.31
57	Congo, Dem. Rep.	15.27
58	Barbados	14.97
59	Gambia, The	14.94
60	St. Kitts and Nev	14.93
61	Eswatini	14.83
62	Montenegro	14.83
63	Paraguay	14.72
64	Albania	14.67
65	China	14.66
66	Bulgaria	14.59
67	Myanmar	14.45
68	Belize	14.37
69	Panama	14.34
70	Nicaragua	14.23
71	Guatemala	14.21
72	Guinea	14.16
73	Bhutan	14.16
74	Trinidad and Toba	14.13
75	Austria	14.13
76	Côte d'Ivoire	13.92
77	Honduras	13.77
78	Dominican Republic	13.74
79	Armenia	13.69
80	Sudan	13.64
81	France	13.55
82	Belarus	13.54
83	Burkina Faso	13.45
84	Germany	13.31
85	Bahamas, The	13.23
86	Ghana	13.22
87	Tajikistan	13.18
88	Benin	13.16
89	Mongolia	12.85
90	Poland	12.77
91	Romania	12.77
92	Philippines	12.75
93	Mozambique	12.66
94	Ethiopia	12.63
95	St. Vincent and t	12.47
96	Tanzania	12.19
97	Russian Federation	11.62
98	West Bank and Gaz	11.61
99	Moldova	11.44
100	Spain	11.40
101	Turkey	11.35
102	Lesotho	11.34
103	Djibouti	11.30
104	Israel	11.26
105	St. Lucia	11.15
106	Niger	10.97
107	Afghanistan	10.84
108	Singapore	10.61
109	Zambia	10.41
110	Antigua and Barbu	10.39
111	Mexico	10.04
112	Nepal	10.02
113	Uzbekistan	9.71
114	Cambodia	9.60
115	Kyrgyz Republic	9.53
116	Madagascar	9.42
117	Mauritania	9.33
118	Malaysia	9.32
119	Kenya	9.31
120	Morocco	9.18
121	Burundi	9.14
122	Tunisia	9.08
123	Chad	9.08
124	Kazakhstan	8.77
125	Senegal	8.43
126	Dominica	8.37
127	Malawi	8.08
128	Nigeria	8.04
129	Jordan	7.62
130	Sri Lanka	7.24
131	Jamaica	7.22
132	Azerbaijan	7.02
133	Uganda	6.85
134	Suriname	6.43
135	Bangladesh	6.17
136	Italy	6.12
137	Lebanon	6.01
138	Ukraine	5.52
139	Indonesia	4.86
140	Yemen, Rep.	4.42
141	India	4.26
142	Zimbabwe	3.47
143	Lao PDR	3.17
144	Timor-Leste	3.11
145	Saudi Arabia	3.03
146	Hong Kong SAR	2.85
147	South Africa	2.51
148	Thailand	2.32
149	Pakistan	0.86
150	Egypt, Arab Rep.	-1.20
151	Iraq	-5.59
152	South Sudan	-19.16

Table A2. Global Value Chain Index

Rank	Country	GVC Index	Rank	Country	GVC Index	Rank	Country	GVC Index
1	Denmark	7.65	52	Djibouti	3.13	103	Namibia	1.81
2	Tunisia	7.45	53	Romania	3.08	104	Egypt, Arab Rep.	1.77
3	Cambodia	6.45	54	El Salvador	3.07	105	Uzbekistan	1.77
4	Malta	5.82	55	Mauritania	3.05	106	Kosovo	1.75
5	Luxembourg	5.74	56	Peru	3.03	107	Tajikistan	1.70
6	Estonia	5.56	57	Moldova	3.01	108	Ghana	1.67
7	Bangladesh	5.54	58	Costa Rica	2.99	109	Jamaica	1.66
8	Sweden	5.37	59	Georgia	2.98	110	Cyprus	1.61
9	North Macedonia	5.13	60	Solomon Islands	2.92	111	Mozambique	1.59
10	Finland	5.03	61	Israel	2.80	112	Argentina	1.58
11	Vietnam	4.98	62	Dominica	2.79	113	Suriname	1.58
12	Slovenia	4.94	63	Spain	2.79	114	Singapore	1.58
13	Turkey	4.86	64	Pakistan	2.77	115	Mongolia	1.58
14	Bulgaria	4.79	65	Belarus	2.77	116	Grenada	1.57
15	Togo	4.79	66	Lebanon	2.74	117	Vanuatu	1.55
16	Czech Republic	4.73	67	Guatemala	2.71	118	Ecuador	1.55
17	Latvia	4.63	68	Dominican Republic	2.66	119	Cameroon	1.47
18	Lithuania	4.61	69	West Bank and Gaz	2.63	120	Saudi Arabia	1.46
19	Albania	4.55	70	Thailand	2.54	121	Botswana	1.45
20	Netherlands	4.55	71	Ireland	2.47	122	Afghanistan	1.41
21	Hong Kong SAR	4.50	72	Honduras	2.37	123	Burundi	1.37
22	Philippines	4.50	73	China	2.37	124	Colombia	1.37
23	Madagascar	4.43	74	Barbados	2.36	125	Malawi	1.37
24	Bhutan	4.22	75	Panama	2.33	126	Côte d'Ivoire	1.36
25	Sri Lanka	4.18	76	Montenegro	2.33	127	Mexico	1.34
26	Austria	4.15	77	Kyrgyz Republic	2.31	128	Burkina Faso	1.34
27	Belgium	4.10	78	Indonesia	2.30	129	Yemen, Rep.	1.33
28	Seychelles	4.10	79	Benin	2.27	130	Gambia, The	1.32
29	Malaysia	4.08	80	Germany	2.20	131	Senegal	1.32
30	Guyana	4.08	81	Serbia	2.20	132	Trinidad and Toba	1.25
31	Greece	4.05	82	Armenia	2.15	133	Chad	1.19
32	Lao PDR	4.04	83	Uganda	2.14	134	Mali	1.19
33	Portugal	3.97	84	Nigeria	2.13	135	Sudan	1.15
34	Croatia	3.85	85	Italy	2.13	136	South Africa	1.12
35	Lesotho	3.69	86	India	2.12	137	Brazil	1.11
36	Jordan	3.59	87	Niger	2.09	138	Guinea-Bissau	1.10
37	St. Lucia	3.54	88	France	2.04	139	Liberia	1.09
38	Hungary	3.50	89	Bolivia	2.03	140	Azerbaijan	1.09
39	Bosnia and Herzeg	3.47	90	Tanzania	2.00	141	Samoa	1.05
40	Morocco	3.40	91	Eswatini	1.98	142	Russian Federation	1.03
41	Mauritius	3.35	92	Ukraine	1.95	143	Kazakhstan	1.01
42	St. Vincent and t	3.35	93	Poland	1.95	144	Congo, Dem. Rep.	1.00
43	St. Kitts and Nev	3.32	94	Nicaragua	1.93	145	Zimbabwe	0.99
44	Kenya	3.30	95	New Zealand	1.89	146	Iraq	0.98
45	Belize	3.30	96	Paraguay	1.87	147	Guinea	0.96
46	Timor-Leste	3.30	97	Nepal	1.87	148	South Sudan	0.90
47	Antigua and Barbu	3.22	98	Rwanda	1.86	149	Sierra Leone	0.87
48	Myanmar	3.22	99	Ethiopia	1.86	150	Venezuela, RB	0.79
49	Slovak Republic	3.20	100	Central African R	1.83	151	Angola	0.74
50	Uruguay	3.18	101	Zambia	1.83	152	Papua New Guinea	0.70
51	Bahamas, The	3.16	102	Chile	1.82			

Table A3. The Effect of Global Value Chains on the Firm's Total Factor Productivity

VARIABLES	Dependent variable: Firm's Total Factor Productivity (Pooled Driscoll-Kraay estimator) (1)		Dependent variable: Firm's Total Factor Productivity (GMM Estimator) (2)	
			First Stage Estimates	Second Stage Estimates
	(1.1)	(1.2)	(2.1)	(2.2)
The firm's export potential	0.040			
	(0.088)			
The firm's cost of import compliance	0.059			
	(1.157)			
The firm's import potential	0.362***			
	(0.059)			
The firm's multinational exposure	0.462***			
	(0.108)			
Import as capacity to export (ln)	-2.458***			
	(0.715)			
The country's trade openness	73.359***			
	(25.202)			
Global value chains index		4.925**		
		(2.149)		
Global value chains index				8.239*
				(4.486)
Ease doing business (Inverse)	1.778***	1.732***	0.015***	1.281**
	(0.214)	(0.215)	(0.000)	(0.643)
Governance composite index	-16.204***	-11.454***	0.128***	-24.328***
	(3.618)	(3.551)	(0.007)	(7.212)
Foreign Direct Investments (ln)	-0.411	-0.619	-0.014***	1.396*
	(0.522)	(0.484)	(0.001)	(0.784)
Foreign aid per capita (ln)	-11.342***	-10.990***	0.008***	-10.332***
	(1.183)	(1.093)	(0.002)	(1.099)
Top manager (Female = 1, Male = 0)	-1.770	-1.163	0.108***	-10.981
	(7.290)	(7.300)	(0.013)	(9.086)
Years of experience (Top manager)	-0.213	-0.234	0.003***	-0.385*
	(0.165)	(0.163)	(0.000)	(0.228)
Firm size (SMEs = 1, Large firm = 0)	-18.777***	-25.257***	-0.679***	30.173
	(6.186)	(6.307)	(0.010)	(30.043)
Access to land as a major constraint	10.469	11.090*	-0.010	12.688*
	(6.365)	(6.381)	(0.011)	(6.489)
Access to electricity as a major constraint	-9.875***	-9.148**	0.048***	-11.762***
	(3.572)	(3.564)	(0.008)	(4.401)
Access to finance as a major constraint	-6.420	-6.871*	-0.032***	-3.746
	(4.089)	(4.118)	(0.009)	(4.316)
Corruption as a major constraint	-7.150	-6.548	-0.048***	-1.722
	(4.421)	(4.437)	(0.009)	(5.286)
Labor regulation	-4.245	-4.767	0.017	-5.920
	(5.088)	(5.104)	(0.012)	(5.253)
Political Instability	-6.171	-6.736*	0.080***	-13.973**
	(3.895)	(3.897)	(0.010)	(6.214)
Tax rates	-0.638	-0.535	-0.064***	2.375
	(3.872)	(3.851)	(0.009)	(4.315)
Exchange rate (ln)	-8.970***	-6.626***	-0.007***	-5.897***
	(0.973)	(0.612)	(0.002)	(0.627)
Africa (Africa = 1, Otherwise = 0)	-0.038	-0.588	0.005	5.617
	(4.363)	(4.441)	(0.010)	(4.813)
gdp_P			-0.011***	
			(0.003)	
Counter_Firm_Performance1			-0.017***	

			(0.000)	
Constant	141.171***	72.231***		
	(34.026)	(17.465)		
Observations	57,647	57,647	57,647	57,647
R-squared	0.014	0.013	0.136	0.030
F-Stat			552	235.9
			(0.000)	(0.000)
Centered R-squared				-0.0194
Adjusted R-squared			0.136	0.0301
Root MSE			1.090	
LM test statistic for under-identification				80.70
				(0.000)
F statistic for weak identification				33.33
Hansen J statistic				0.254
				(0.614)