



South-South vs North-South value chain integration and value addition in Sub-Saharan Africa

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ABSTRACT

China is now Africa's largest trading partner, having surpassed the United States (US) in 2008. This is a vital development because trade facilitates capital injection as well as knowledge and technology spillovers in developing economies like Africa. However, the China-Africa trade has been extensively criticized, with China alleged of exploiting Africa's natural resources while dumping low-quality products on the continent. The dumping narrative is worth investigating given that the trade balance has favoured China since 2012, and the mix of China's exports to Africa remains contentious. This study argues that, if the narrative is exaggerated, Africa's backward value chain integration with China must contribute decisively to manufacturing output, industrial jobs, and/or total factor productivity (TFP), signifying a fair representation of intermediate inputs in China's exports to Africa, which the continent assembles for its export markets. The investigation is conducted in comparison to the US, as Africa's traditional trading partner, based on evidence from 23 Sub-Saharan African countries over the period 2005–2018. Our two-step system GMM estimates indicate that the dumping narrative cannot be ruled out, and thus African governments must take appropriate action to stop the practice. Backward value chain integration with the US, on the other hand, boosts manufacturing output, indicating that the US has fared relatively well in maintaining its shares of foreign value added (FVA) in Sub-Saharan Africa.

1. Introduction

There has been a considerable debate on the surge of China's South-South bilateral trade, particularly its impact on Africa's growth and development. Fig. 1 shows that China-Africa bilateral trade started surging in the early 2000s surpassing that of US-Africa trade in 2008. Trade is a vital growth and development component in developing countries as it facilitates capital, knowledge, and technology transfer, and, thus, the growth of China-Africa trade can be perceived as good for Africa's growth and development. Precisely, growth in Africa's exports to China can be thought of as a capital injection into Africa, while Chinese exports to Africa can be viewed as a transmission channel of technology and knowledge spillovers.

However, three red flags make China-Africa trade questionable as much as its impact on Africa's growth and development is concerned. First, Fig. 1 exhibits that since 2012 the China-Africa trade has been highly uneven, with the balance of trade favouring China, reflecting excess cash outflows to China. On the other hand, the US's exports to Africa have been constantly lower than Africa's exports to the US,

indicating a surplus trade balance on Africa's side. Second, the mix of Chinese exports to Africa remains unclear, with some studies claiming that they are mainly low-quality cheap finished products (Pigato & Tang, 2015). It is widely acknowledged that low-quality cheap imports pose a risk of replacing locally manufactured products, thus, killing domestic firms and exacerbating unemployment in the continent, with severe impacts on small to medium enterprises (SMEs) or infant industries. This appears to be true, especially in the African clothing and garment, electrics and appliances, utensils, hardware, jewellery and toys industries, which are heavily dominated by cheap Chinese products crowding out home-made products (Adekoya, 2018). Third, it is argued that Africa's exports to China are predominantly natural resources, which are sourced from China's mining investments in Africa, infrastructure-for-resources China-Africa barter deals, and resource-backed defaulted Chinese loans (Ngundu & Ngalawa, 2023). These red flags have perpetuated negativity in the media and among several scholars regarding the China-Africa trade. Meanwhile, China's engagement with Africa is predominantly viewed as natural resource exploitation and market-seeking China's foreign policy strategy, which takes

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advantage of the continent's deteriorating institutional framework. The global north, on the other hand, is perceived to value institutional quality, hence their traditional economic ties with Africa have been regressing along with the continent's institutional framework.

Recent trade literature indicates that imports should be high in intermediate inputs than finished goods for them to transmit into growth and development in developing countries (see, for example, [Owusu et al., 2022](#)). Assembling imported intermediate inputs for both domestic and foreign markets enhances productivity through technology and knowledge spillovers ([Roy, 2020](#)), resulting in increased manufacturing output and industrial employment. This has led to the rise of global value chains (GVC) integration analysis as a crucial perspective on international trade (see, for example, [Fronczek, 2017](#); [Mitchell & Caroline, 2009](#); [Wuttke, 2023](#)). A review of the existing GVC literature (see, for example, [Fagerberga et al., 2018](#); [Jithin et al., 2022](#); [Lotfi & Lotfi, 2021](#); [Obeng et al., 2021](#); [Urata & Baek \(2021; 2019\)](#)) strongly supports GVC integration through higher backward linkages in developing countries, that is, the import of intermediate inputs to assembly or further process for the export market. Thus, analysing the impact of Africa's backward value chain integration with China on the continent's growth and development can contribute towards addressing the uncertainty about the mix of Chinese exports to Africa. This analysis has been overlooked primarily due to the lack of consistent and reliable disaggregated data for China's exports to Africa.

Due to the large volume of international trade in intermediates, the contribution of a particular country to global production and trade is best measured in value-added (VA) terms, which is done by netting out the portion of exports that are made up of foreign intermediates and the portion of imports that are made up of re-imported domestic intermediates. Large databases that map the production relationships between all the nations are needed for this kind of analysis. The UNCTAD-Eora Global Value Chain database provides global data of VA originating in one country and exported by another, from 1990 to 2018. In the current study, this dataset is used to generate VA indices that originate in China and the US and are exported by Sub-Saharan African countries, indicating the region's backward value chain integration with the two countries. The indices are utilised to analyze the impact of China's and the US's contributions to Sub-Saharan African foreign value added (FVA)¹ on manufacturing output, industrial employment, and total factor productivity (TFP) in the region. In the process, the question of which imports add value to the region's growth and development is addressed.

The study is organised into five sections. The next section discusses the literature on the contribution of GVC to growth and development in developing countries. [Section 3](#) highlights the empirical strategy. [Section 4](#) presents and discusses the findings. The study is concluded in [section 5](#).

2. The impact of GVC integration in developing economies

GVC are a type of international production-sharing mechanism in which production is divided into activities and tasks performed in different countries (see, for example, [Abreha et al., 2021](#); [Miroudot & Nordström, 2020](#); [Mitchell & Caroline, 2009](#)). International trade and investment are increasingly organized within GVC, where the various stages of the manufacturing process are spread across multiple countries. According to the [Asian Development Bank \(ADB\) \(2021\)](#), breaking up the production process across multiple countries creates new opportunities for industrialized and less industrialized economies to integrate, with potential benefits for both but also with homework. It also helps developing countries accelerate the growth of their manufacturing industries without having to provide all other upstream capabilities, allowing them to capitalize on their comparative advantages ([Abreha et al., 2021](#)).

Countries participate in GVC through backward and/or forward linkages (see, for example, [Nasser-dine, 2019](#); [Casella et al., 2019](#)). Backward GVC integration occurs when a country imports intermediate inputs, assembly or further process them, and exports output, implying foreign value added (FVA) which is embodied in the country's export. Forward GVC integration captures the domestic value added (DVA) which is embodied in the third country's exports. Accordingly, GVC integration promotes intermediate and final commodity trade networking.

Existing GVC empirical evidence in developing countries indicates that backward GVC integration is more effective than forward GVC integration, primarily because it fosters productivity through technology and knowledge spillovers embedded in intermediate inputs, consequently increasing output and employment. For example, [Urata and Baek \(2021; 2019\)](#) show that backward GVC integration boosts TFP in developing countries through technology spillovers and the learning effect, with the benefits accruing only to firms that outsource intermediate inputs from advanced economies and export the output. An explanation given by [Roy \(2020\)](#) is that embedded technology and knowledge transmitted via imported intermediate inputs contributes to

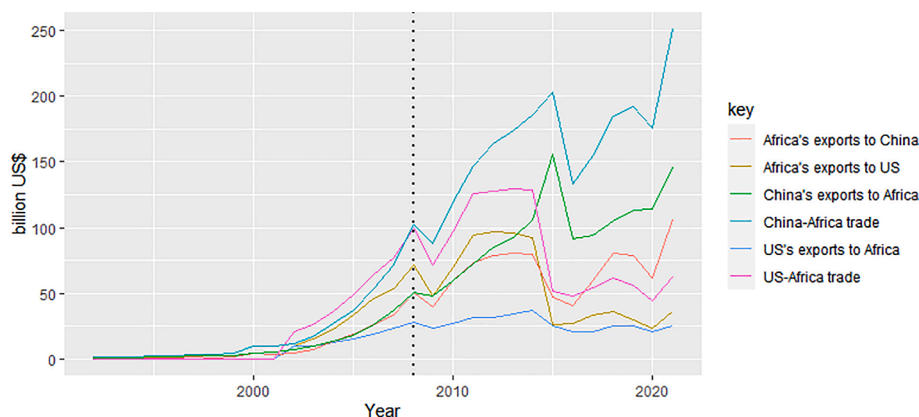


Fig. 1. China-Africa vs US-Africa trade from 1992 to 2021. **Source:** Author's computation using [CARI \(2022\)](#) dataset.

¹ The contributions of China and the US to Sub-Saharan African FVA are used in this study to indicate Sub-Saharan Africa's backward value chain integration with China and the US.

improvements in firm-level productivity and output, with exporting firms benefiting the most. Similarly, [Feng et al. \(2016\)](#) note that manufacturing firms that increase their intermediate input imports tend to increase their export volume and scope. The aforementioned studies highlight the fact that exporting firms, the majority of which are

multinational corporations as argued by Fagerberga et al. (2018), benefit the most from coordinating backward value chains in developing countries. In general, the importance of technology and knowledge spillovers in an economy’s production function is well known from the Romer (1986) and Lucas (1988) propositions, while the contribution of output to job creation can be traced back to Okun’s law in 1962 (Okun, 1962).

Worryingly, an analysis conducted using the UNCTAD-Eora Global Value Chain database from 1990 to 2018 shows that Sub-Saharan African countries participate more in GVC through forward linkages than backward linkages. According to Obeng et al. (2021) and Siba (2022), this is not surprising given that the region is a major source of raw materials for manufacturing industries in the global north and emerging countries, particularly China. Likewise, Krantz (2022) shows that Africa contributed 2.3% to global output and 2.5% of global VA in 2018, indicating the continent’s increased role as a supplier of raw materials rather than a consumer of intermediates. The assertions of Obeng et al. (2021), Krantz (2022) and Siba (2022) support Ngundu and Ngepah’s (2021) findings that the Chinese motive for engaging Sub-Saharan African countries in natural resources (raw materials) endowment is not different from that of the global north. However, the World Bank (2019) claims that GVC integration has benefited developing countries by making it easier for them to diversify away from primary products and toward manufacturing and services. African countries can, therefore, generate growth through GVC-driven development by shifting to higher-value-added tasks and incorporating more technology and know-how into all agricultural, manufacturing, and service production.

Thus, the current study is motivated by the importance of understanding the underlying mechanism by which Sub-Saharan Africa’s backward value chain integration with China and the US impacts the region’s manufacturing output, TFP, and industrial employment, a matter that has been overlooked since the existence of US’s North-South and the evolution of China’s South-South economic ties. Based on Fig. 1 and GVC integration literature, Sub-Saharan Africa’s backward value chain integration with both countries is expected to boost the region’s manufacturing output, industrial employment, and/or TFP. However, a higher impact is expected from China’s contribution, both individually and jointly with the US.

3. Data and econometric strategy

This section presents the data utilised in this study, followed by the econometric technique used to generate the results.

3.1. Data

This study uses a balanced panel dataset, with 14 time dimensions from 2005 to 2018 and a sample of 23 Sub-Saharan African countries. The sample comprises Angola, Botswana, Burundi, Cote d’Ivoire, Cameroon, Central African Republic, Eswatini, Gabon, Kenya, Lesotho, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, South Africa, Tanzania, Togo, and Zambia. The time and cross-sectional dimensions are restricted by the availability and consistency of data. The start and end dates are determined by the availability of the Africa Infrastructure Development Index (AIDI) and GVC datasets, which at the time when the study was conducted were available from 2005 to 2021 and 1990 to 2018, respectively. The countries in the sample have data for all of the proposed variables, with no or few missing values. The variables and their sources are described in Table 1.

3.2. Econometric analysis

This study employs a panel dynamic model with fixed effects and lagged explanatory variables to estimate the impact of Sub-Saharan Africa’s backward value chain integration with China and the US on

Table 1
Variables’ description and sources.

Variables	Description	Source
Manufacturing Output	Manufacturing, value added (% of GDP).	World Bank Database.
Industrial Employment	Employment in industry (% of total employment).	
FDI	Foreign direct investment, net inflows (% of GDP)	
Gross Fixed Capital Formation	Gross fixed capital formation (% of GDP).	
TFP	TFP Index.	Our World in Data Database (Feenstra, Inklaar & Timmer, 2015).
Infrastructure development	Africa Infrastructure Development Index (AIDI).	AIDI (2021).
Sub-Saharan Africa’s backward value chain integration with China	Value added (VA) originating in China and exported by Sub-Saharan Countries (% of FVA).	Author’s computation using UNCTAD-Eora GVC Database on main GVC indicators by country and country by country breakdown.
Sub-Saharan Africa’s backward value chain integration with the US	Value added (VA) originating in the US and exported by Sub-Saharan Countries (% of FVA).	

Source: Author’s compilation.

the region’s manufacturing output, industrial employment, and TFP, as shown in Equation (1).

$$y_{i,t} = \varphi y_{i,t-1} + X'_{i,t-1} \beta + \delta_i + \mu_t + \varepsilon_{i,t}, \text{ with (1)}$$

$$E(\varepsilon_{i,t}) = 0 \tag{2}$$

where, $y_{i,t}$ is a proxy for manufacturing output, industrial employment, and TFP in country i at time t , $X'_{i,t-1}$ is a set of relevant regressors, δ_i denotes country dummies that account for unobserved country-specific effects, μ_t denotes time dummies that account for period-specific effects, and $\varepsilon_{i,t}$ is the error term.

There have been substantial improvements in the estimation of fixed effects dynamic panel data models, particularly those with short time dimensions and large cross-sections, as in the current study, where the time dimension ($T = 14$) < the cross-sectional dimension ($N = 22$). Classical ordinary least squares (OLS)-based estimation techniques tend to produce biased estimates due to the Nickell (1981) bias, which hardly disappears asymptotically if $N \rightarrow \infty$ and T is fixed. Hansen (1982) proposed the generalized methods of moments (GMM) estimators as a robust solution to Nickell’s bias. The widely acknowledged GMM estimators are the difference GMM of Holtz-Eakin, et al. (1988) and Arellano and Bond (1991) and the system GMM of Arellano and Bover (1995) and Blundell and Bond (1998). The former estimator employs endogenous variable lags as instruments, whereas the latter augments the former by using additional moment conditions based on information contained in Equation (1) in levels (see, for example, Bun & Windmeijer, 2010; Benedikt, Julian & Mario, 2011; Sigmund & Ferstl, 2021).

The difference GMM estimator is based on the following moment conditions:

$$E(y_{i,t-s} \Delta \varepsilon_{i,t}) = 0 \text{ for } t = 3, \dots, T \text{ and } 2 \leq s \leq T - 1 \tag{3}$$

where, $y_{i,t-s}$ are suitable lags of the outcome variable $y_{i,t}$. The second and higher lags of $y_{i,t}$ are used as an instrument for the residual of Equation (1) in differences. However, the difference GMM estimator suffers from finite sample bias, especially when T is short and N is large, as well as imprecision on highly persistent series such as output, as the instruments tend to be weak predictors of the endogenous changes (Blundell & Bond, 2000; Bun & Windmeijer, 2010). These finite sample issues can be addressed using the system GMM, which combines in the system the moment conditions specified in Equation (3) with the moment conditions for the model in levels (Equation (4)).

$$E(\Delta y_{i,t-s}(\delta_i + \epsilon_{i,t})) = 0 \text{ for } s = 3, \dots, T \tag{4}$$

That is, the additional moment conditions (Equation (4)) of system GMM generate the moment conditions for $\epsilon_{i,t}$ of Equation (1) in levels by using lagged first differences of $y_{i,t}$. Additional moment conditions for both difference and system GMM arise from suitable lags of the lagged explanatory variables in levels that can be treated as endogenous, predetermined, or strictly exogenous.

The consistency of the system GMM estimator relies upon the validity of the instruments utilised. The number of instruments tends to increase exponentially as the number of periods increases. This instrument proliferation overfits endogenous variables, resulting in a finite sample bias. We address the issue of instrument proliferation in the same way that Roodman (2009) did by using a collapsed instrument matrix to reduce the number of moment conditions. We also use the Windmeijer (2005) small sample correction for standard errors and limit the lags to two (2).

The validity of the instruments is checked using a Sargan test of over-identifying restrictions and the Arellano and Bond tests for autocorrelation. The Sargan test examines the sample analogue of the moment conditions used in the estimation process to determine the overall validity of the instruments. As a result, the joint null hypothesis of valid instruments should be accepted. The Arellano and Bond tests, which are performed for first-differenced errors, determine whether the idiosyncratic error term is serially correlated. If the error term in levels is serially uncorrelated, we reject the null hypothesis of no first-order serial correlation in first differences (AR(1)), but not the null hypothesis of no second-order serial correlation in first differences (AR(2)).

4. Results

The findings are organized into three subsections: descriptive statistics, main findings, and diagnostics test, respectively.

4.1. Descriptive statistics

Table 2 summarizes the descriptive statistics for all variables used in this study. We are particularly interested in the average contributions of China and the US to Sub-Saharan African FVA from 2005 to 2018, herein referred to as Sub-Saharan Africa's backward value chain integration with China and the US.

Table 2 shows that, on average, China contributed more to FVA in Sub-Saharan Africa than the US, but only by a small margin of 0.8%. Similarly, according to Krantz (2022), China's contribution (2.7%) to Africa's FVA in 2018 was only 0.7% higher than that of North America. Fig. 2 indicates that China's contribution to Sub-Saharan African countries surpassed that of the US in 2010, and the gap widened in 2015 as VA originating in the US kept decreasing while that of China increased.

Furthermore, Fig. 2 mimics the graphs of China's and the US's exports to Africa in Fig. 1, implying a correlation between Sub-Saharan Africa's backward value chain integration with China and the US and

Table 2
Descriptive statistics.

Variable	Min	Mean	Max
Manufacturing output	1.533	11.488	35.215
Industrial employment	3.630	13.093	32.440
TFP	0.576	1.000	1.440
Gross fixed capital formation	6.350	22.670	42.790
FDI	-10.725	3.748	39.456
Infrastructure development	2.815	19.631	79.635
Sub-Saharan Africa's backward value chain integration with China	1.214	6.630	32.213
Sub-Saharan Africa's backward value chain integration with the US	0.621	5.787	25.647

Source: Author's computation.

the region's imports from the respective countries. In general, Sub-Saharan African imports from both China and the US account for a portion of the intermediate inputs that the region processes for its export market. However, while US exports to Africa have been lower than China's since the early 2000s and were nearly six times lower in 2021 (Fig. 1), the mix of China's exports to Africa appears to have a limited representation of intermediates; otherwise, China's average contribution to Sub-Saharan African FVA could have been significantly higher than that of the US in Table 2. As a result, it is reasonable to argue that Fig. 2 and the descriptive statistics in Table 2 depict a fair representation of US intermediate inputs assembled by African countries for export markets.

4.2. Sub-Saharan Africa's backward value chain integration with China and the US

The purpose of this study is to analyze the impact of China's and US' contributions to Sub-Saharan African FVA on manufacturing output, industrial employment, and TFP in the region. The analysis is based on Equation (1) and evidence from 23 Sub-Saharan African countries over the period 2005–2018. Tables 3 and 4 present the two-step system GMM estimated results for individual and joint specifications, respectively. For individual specifications (Table 3), China's results are reported in Columns (1) while Columns (2) show the US' results.

Table 3 shows that the contributions of China and the US to Sub-Saharan African FVA have no significant impact on the region's industrial employment and TFP. However, the US contribution has a positive and highly significant impact on manufacturing output, whereas China's contribution is statistically insignificant. All lagged dependent variables are positive and highly significant, indicating that the preceding manufacturing output, industrial employment, and TFP developments have a positive bearing on their present status quo. Gross fixed capital formation significantly enhances manufacturing output and industrial employment, but not TFP. This finding suggests a lack of domestic investment in technological advancement. Although TFP is a vital factor in industrialisation, the results in Table 3 show that its impact on manufacturing output and industrial employment is statistically insignificant. This finding confirms Obeng et al.'s (2021) claim that Sub-Saharan African countries lack the necessary technology to drive industrialisation and participation in GVC integration. FDI only increases industrial employment, which is not surprising given that foreign investors own the majority of African industries. The estimated coefficient of infrastructure development is statistically insignificant across all specifications, demonstrating that Sub-Saharan Africa lacks sufficient infrastructure to boost manufacturing output, industrial jobs, and TFP. Overall, these findings are consistent, with marginal differences in estimated coefficients, even when the analysis is conducted jointly, with China and US variables in a single specification (Table 4).

These findings suggest that Sub-Saharan Africa's backward value chain integration with China does not boost manufacturing output, create industrial jobs, or facilitate significant technology and knowledge transfer in the region. While the same is true for the US in terms of industrial job creation and technology as well as knowledge spillovers, backward value chain integration with the US enhances manufacturing output, signifying that the US has fared relatively well in maintaining its shares of FVA in Sub-Saharan Africa. These findings contradict our prior expectations, and thus, in line with Adekoya (2018) and Pigato and Tang (2015), it is reasonable to argue that China's exports to Africa are largely made up of finished goods for consumption, with a small proportion of intermediate inputs. On the contrary, US exports contain a fair share of intermediate inputs, which the region further processes for the export market, thereby increasing manufacturing output. Overall, these findings suggest that firms coordinating backward value chains in Sub-Saharan Africa are more integrated with the US than with China. Based on Fagerberga et al.'s (2018) argument, it is reasonable to argue that the majority of these firms are US-based firms that source inputs from

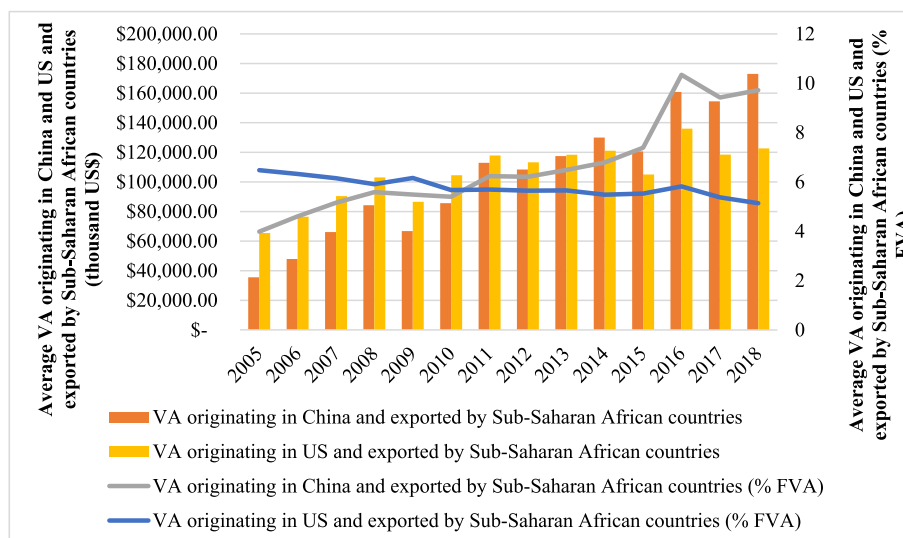


Fig. 2. Sub-Saharan Africa’s backward value chain integration with China and the US from 2005 to 2018. Source: Author’s computation using UNCTAD-Eora Global Value Chain Database (2023).

Table 3
Two-step system GMM estimates for individual specifications.

Dependent Variable:	Manufacturing output		Industrial employment		TFP	
	(1)	(2)	(1)	(2)	(1)	(2)
Lagged Dependent Variable	0.916*** (0.025)	0.914*** (0.025)	0.984*** (0.009)	0.983*** (0.008)	1.069*** (0.045)	1.053*** (0.045)
Sub-Saharan Africa’s backward value chain integration with China	0.012 (0.014)		-0.003 (0.205)		-0.0002 (0.002)	
Sub-Saharan Africa’s backward value chain integration with the US		0.082*** (0.025)		-0.005 (0.008)		-0.002 (0.005)
Gross fixed capital formation	0.026*** (0.009)	0.027*** (0.009)	0.010*** (0.004)	0.010*** (0.004)	-0.003 (0.002)	-0.002 (0.002)
Infrastructure development	0.006 (0.005)	0.007 (0.006)	-0.009 (0.028)	-0.009 (0.028)	-0.011 (0.011)	-0.007 (0.010)
FDI	0.017 (0.015)	0.016 (0.015)	0.006* (0.003)	0.006* (0.004)	0.003 (0.004)	0.002 (0.005)
TFP	1.940 (1.491)	2.179 (1.492)	0.440 (0.532)	0.525 (0.596)		
Sargan test	0.402	0.324	0.683	0.697	0.273	0.280
AR(1)	0.022	0.024	0.063	0.039	0.067	0.091
AR(2)	0.692	0.657	0.305	0.304	0.210	0.217
Wald test for coefficients	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Number of observations	322	322	322	322	322	322

Notes: ***, and * denote significance at the 1% and 10% levels, respectively. Robust standard errors are in parenthesis.

Source: Authors’ estimations using the *plm* package in R.

their motherland, process them in Sub-Saharan African countries where they are domiciled, and export output to other countries.

4.3. Diagnostic checks

As suggested by Roodman (2009), the *p*-values of the Sargan test are greater than 25% across all estimations, thus we fail to reject the joint null hypothesis of valid instruments. Furthermore, the *p*-values of the AR (1) and AR(2) tests indicate a first-order serial correlation in the first-differentiated equation, but no evidence of second-order serial correlation is detected. Overall, the diagnostics checks point to valid instruments and specifications for all estimations.

5. Conclusion

A review of the existing empirics strongly supports GVC integration through higher backward linkages in developing countries, asserting that it fosters technology and knowledge spillovers, creates jobs, and

boosts manufacturing output by assembling or further processing imported intermediate inputs for export markets. Hence, this study examines the impact of Sub-Saharan Africa’s backward value chain integration with China and the US on manufacturing output, industrial employment, and TFP using the two-step system GMM in a sample of 23 Sub-Saharan African countries from 2005 to 2018. This topic has received relatively little empirical attention thus far, despite China’s South-South growing trading relationship. China surpassed the US as Africa’s largest trading partner in 2008. However, there are several concerns about China-Africa trade, including the trade balance, which has remained in China’s favour since 2012, and the mix of China’s exports, which is alleged to consist of a high proportion of cheap low-quality finished goods and a low proportion of intermediate inputs. Cheap imports in terms of both quality and price are deleterious to domestic industries, and employment, and barely fosters technology and knowledge spillovers. Analyzing the impact of China’s contribution to the region’s FVA on growth and development, herein referred to as Sub-Saharan Africa’s backward value chain integration with China, is thus

Table 4

Two-step system GMM estimates for joint specifications.

Dependent Variable:	Manufacturing output	Industrial employment	TFP
Lagged Dependent Variable	0.917*** (0.026)	0.983*** (0.007)	1.052*** (0.043)
Sub-Saharan Africa's backward value chain integration with China	0.005 (0.012)	-0.003 (0.003)	0.001 (0.003)
Sub-Saharan Africa's backward value chain integration with the US	0.086*** (0.025)	-0.003 (0.008)	-0.004 (0.005)
Gross fixed capital formation	0.025*** (0.010)	0.010*** (0.004)	-0.002 (0.002)
Infrastructure development	0.006 (0.006)	-0.009 (0.027)	-0.009 (0.010)
FDI	0.017 (0.013)	0.007* (0.004)	0.003 (0.005)
TFP	3.047 (1.918)	0.453 (0.611)	
Sargan test	0.463	0.767	0.263
AR(1)	0.025	0.056	0.073
AR(2)	0.589	0.288	0.196
Wald test for coefficients	<0.001	<0.001	<0.001
Number of observations	322	322	322

Notes: ***, and * denote significance at the 1% and 10% levels, respectively. Robust standard errors are in parenthesis.

Source: Authors' estimations using the *plm* package in R.

necessary to address contentions about the mix of China's exports to Africa. The analysis is conducted comparatively with the US as Africa's traditional trading partner, which adds to the originality of the study. The study finds that, despite the surge of Chinese exports to Africa, Sub-Saharan Africa's backward value chain integration with China does not boost manufacturing output, create industrial jobs or facilitate the significant transfer of technology and knowledge in the region. While the same is true for the US in terms of industrial job creation and technology spillovers, backward value chain integration with the US enhances manufacturing output, signifying that the US has fared relatively well in maintaining its shares of FVA in Sub-Saharan Africa. Thus, it is reasonable to argue that China's exports to Africa primarily consist of finished goods for consumption, with a small share of intermediate inputs, whereas US exports include a fair share of intermediate inputs that the region further processes for the export market, thereby increasing manufacturing output. The findings emphasize the salience of policy-making in discouraging finished goods imports from both the global south and global north while facilitating imports of intermediate inputs to support domestic manufacturing output.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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