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Institutional Drivers of Global Value Chains Participation in African Countries

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Institutional drivers of Global Value Chains Participation in African countries.

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Abstract

Despite the expansion of global value chains (GVCs) over the last three decades, African countries trail the other developing regions in terms of GVC integration. Yet, the drivers of African countries' GVC participation are not well understood compared to developed countries. The current paper fills this knowledge gap by providing empirical evidence of the institutional drivers of GVC participation in Africa. It uses the instrumental variable approach based on a panel dataset of 37 African countries spanning the period 2002-2018 to examine the impacts institutions have on total, backward, forward GVCs as well as GVC position. Though no significant effect is recorded with respect to total GVC participation, the instrumental-variable estimates suggest that upgraded institutions encourage backward GVCs and reduce both forward GVCs and upstreamness. For a successful transition from upstream stages of GVCs, African countries must consider strengthening their political and economic institutions.

Keywords: Institutions, global value chains, African countries and instrumental variable approach.

JEL classification : F13, F23, P48, E02

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1. Introduction

The sustained expansion of international trade flows witnessed over the last three decades was principally propelled by the observed growth in global value chains (GVCs) (World Bank, 2020). Many factors as the revolution in information and communication technology (ICT), the substantial drop in transport costs, subsequent to ICT upheavals, and the trade liberalization marked by the integration of China, India, and the Soviet Union into the world economy are often cited as the root causes of the proliferation and intensification of GVCs, the latter being conceived as production fragmentation at the global level (World Bank, 2020; Amador & Cabral, 2016; Del Prete et al., 2018). Featuring various stages in the production of goods and services, from product design to supply, culminating in the delivery to end-users, GVCs can take either a spiderlike or snakelike structure (World Bank, 2020). In the spiderlike structure, parts and components of goods are produced elsewhere and assembled in a single plant while the snakelike structure features sequential value additions (Baldwin & Lopez-Gonzalez, 2015).

GVCs have additional distinctive attributes that make them attractive to researchers and policymakers. GVCs involve intermediate goods that cross borders multiple times. Challenges posed by such particularity of GVCs, in regard to accurate measurement, has caught researchers' attention. Another peculiar feature, which makes GVCs attractive to policymakers, lies in their capacity and potential to foster economic growth and alleviate poverty (World Bank, 2020). Countries integrated into the globalized production fragmentation become integral parts of the world economy and are given the possibility to enhancing their specialisation processes. By tapping into their comparative advantages, owing to specialization, participant countries derive productivity gains (Jangam & Rath, 2022; Banga, 2022; Park & Park, 2021), employment growth (Veeramani & Dhir, 2022), and other benefits attached to access to cost-effective inputs, all which create economic growth opportunities (Gereffi, 2019).

Despite the growth potential of GVCs, African countries marginally participate in GVCs, specializing in commodity export. Recent estimates highlight that African countries accounts only for 0.7 percent and 1.6 percent of global GVC output in manufacturing and services sectors respectively (Mancini et al., 2023). In that regard,

understanding (institutional) drivers and inhibitors of African countries' integration into GVCs has become an important policy question.

The current paper aims to investigate the institutional drivers of African countries' GVC participation. As highlighted by previous studies, countries' institutional frameworks are relevant for a thriving and sustainable GVC integration to the extent that institutions are sources of comparative advantages (Levchenko, 2007; Ma et al., 2012; Nunn, 2007; Nunn & Trefler, 2014). Good institutional frameworks enhance contractual institutions that are required in the production of complex goods; conversely, inadequate contractual institutions impede the timely supply of intermediate goods, hinder the assembly process, and delay overall production (World Bank, 2020). Furthermore, inclusive institutions that ensure the protection of property rights favour capital accumulation and economic growth (Acemoglu et al., 2005; Acemoglu & Johnson, 2005), which, in turn, encourage GVC-related trade (Kowalski et al., 2015).

The current paper centres around African countries as the study area. It does so for two fundamental reasons. First, it draws from a highlight from the literature according to which institutions are highly correlated GVC participation in Africa: specifically, the quality of institutions and the level of GVC participation is low in African countries in contrast to developed countries (Van Biesebroeck & Mensah, 2019). A second reason draws on the advocacy for an institution-led development approach by the post-Washington consensus coupled with the rising demand from civil society movements for more democratic, stable, and pro-growth institutions across African countries. All these make a compelling argument for investigating the implications that improved institutions would have on economic outcomes including GVC integration. Such investigation is critical to provide a novel policy lever for African policymakers.

The paper makes a dual contribution to the literature. An observation is that only a few past studies covered the institutional drivers of GVC participation (Alhassan et al., 2021; Ge et al., 2020; Ha et al., 2023; Hammoudeh et al., 2023). Empirical evidence for African countries is scanty and fragmented. To the best of our knowledge, Alhassan et al. (2021) and Hammoudeh et al. (2023) are the sole existing studies to have explored the causal effects of institutional frameworks on African countries' participation in GVCs. The current paper fills in the void and enlarges perspective on the institutional drivers of GVC participation among African countries. This is the first contribution.

Although the current paper aligns with the macro-based works of Alhassan et al. (2021) and Hammoudeh et al. (2023), it differs methodologically. While Alhassan et al. (2021) used the system generalised method of moments (S-GMM) and Hammoudeh et al. (2023) relied on a fixed-effects model, the current paper employs the instrumental variable approach, where institutions are instrumented with waves of democracy and good governance. This is the second contribution.

Based on a panel dataset of 37 African countries observed during the period spanning 2002-2018, key findings suggest that institutions favour backward GVCs and discourage both forward GVCs and upstreamness. Furthermore, no significant impact on total GVC participation is recorded. Consistent with Alhassan et al. (2021), and Montfaucon et al. (2023), these findings advocate for institutional reforms in order to stimulate African countries' engagement in the globalised GVC-related trade.

Following the introduction section (section 1), the rest of the paper is organised into four additional sections. Section 2 provides a brief overview of related literature. Section 3 outlines the data and methodology used. Section 4 presents the main results and section 5 concludes the paper and outlines some policy recommendations.

2.Literature underpinnings

A growing attention has been directed toward the main drivers of GVCs. Prior research has identified both policy-based such as regional trade agreements, tariffs, openness to inward FDI, infrastructure, business environment, and institutions and non-policy-based factors including market size, level of industrialisation, and proximity to major GVC hubs as determinants of GVC participation (Baldwin & Lopez-Gonzalez, 2015; Fernandes et al., 2020; Kowalski et al., 2015). The world development report 2020 has stressed on factor endowments, market size, geography, level of development, and institutions as the main determinants of GVC participation (World Bank, 2020).

The current paper is mainly interested in the institutional drivers of GVC participation. Institutions are conceived either as humanly devised constraints shaping life in society (North, 1990), instruments of governance (Coase, 1960) or a set of rules that balance the game among the players (North, 1990). An adequate institutional framework contributes to establishing confidence, trust, and certainty while reducing uncertainty and transaction costs (North, 1990). Inclusive economic institutions enforce property

rights and incentivize economic agents to engage in activities such as production and trade (Acemoglu et al., 2001; North, 1990). Therefore, institutions are valued as a fundamental ingredient for sustained economic growth and nations' prosperity (Acemoglu et al., 2001; Acemoglu & Robinson, 2010; North, 1990; Robinson et al., 2005).

The trade-institutions literature emphasizes the significance of institutions to countries' participation in GVC-related trade (Levchenko, 2007; Ma et al., 2012; Nunn, 2007; Nunn & Trefler, 2014). Good institutions represent a source of comparative advantage, especially in the production of complex goods, where contractual inputs and innovative efforts are critical (Nunn & Trefler, 2014). In a situation where enhanced contractual institutions are deficient, the delay in the supply of intermediate goods hampers the assembly process and retards production, leading to a higher likelihood of specialising in the production of simple goods. Countries with good institutions, by contrast, incur relatively low costs in producing complex goods (Ma et al., 2012; Nunn & Trefler, 2014).

The World Development Report 2020 underscores that the rule of law and political stability are institutional ingredients which are relevant in triggering and fostering GVC participation (World Bank, 2020). Countries with high level of political stability are more likely to engage in backward GVCs, while less politically stable countries tend to engage in forward GVC participation.

Despite the relevance of institutions to GVC participation, empirical research on the linkage between institutions and GVCs is still in its infancy. Only a few past investigations explored the effects institutions have on GVC participation (Alhassan et al., 2021; Ge et al., 2020; Ha et al., 2023; Hammoudeh et al., 2023). Using a panel dataset of 47 African countries and the system Generalised Method of Moments (S-GMM), Alhassan et al. (2021) concluded to diverse effects of institutions on GVC participation. Hammoudeh et al. (2023) investigated the effects of business regulations, policies, and institutions on GVC participation in Sub-Saharan African countries and concluded that improved business regulations operate as a significant driver of GVC participation. Ge et al. (2020) reported similar results for China. Conversely, while exploring how bribery influences GVC participation, Ha et al. (2023) found that greasing bribery stimulates GVC participation.

It is noted from the review of the literature that only a few studies have focused on the institutions-GVC nexus. To the best of our knowledge, Alhassan et al. (2021) and Hammoudeh et al. (2023) are the sole existing studies based on African countries. Other studies either examined simple correlations between institutions and GVC participation (Montfaucon et al., 2023; Fernandes et al., 2020). This paper aims to fill this gap by examining the causal effects of institutions on GVC participation in the African context, exploring various GVC-related indicators, including upstreamness, total, backward, and forward participation.

3. Methodology and data

3.1. Empirical model

Equation 1 is specified to assess the impact of institutions on GVC-related indicators.

$$GVC_{ct} = \beta_0 + \beta_1 INST_{ct} + \beta_2 X_{ct} + v_c + \varepsilon_{ct} \quad (1)$$

where v_c is country fixed-effects included to account for country time-invariant heterogeneities such as geography, culture, climate, land, country's legal origin etc. The term ε_{ct} stands for the idiosyncratic error term. The subscripts c and t denote country and time, respectively. β_i ($i = 0, 1 \text{ and } 2$) are the parameters to be estimated. The dependent variable GVC corresponds to the common GVC-related measures that are total, forward (DVX), backward GVC participation (FVA) and GVC position (POSIT). The GVC-related variables are expressed in logarithmic terms. The backward GVC participation measures foreign value added embodied in a country's exports (i.e. inputs imported to produce goods that are shipped abroad) and the forward GVC participation is the value added of a country embodied in the exports of other countries (inputs produced and shipped that are later re-export by trade partners). The GVC position index defines the relative upstreamness of a country in a particular industry. A country with a larger position index participates in the upstream stages of GVCs; that is, it contributes more value added to other countries' exports than other countries contribute to theirs (Aslam et al., 2017; Casella et al., 2019). Following Koopman et al. (2014) and Aslam et al. (2017), total GVC participation and the GVC position index are computed as follows:

$$Total\ GVC\ participation = \frac{FVA + DVX}{Gross\ Exports} \quad (2)$$

Position index

$$\begin{aligned} &= \text{Log} \left(1 + \frac{DVX}{\text{Gross Exports}} \right) \\ &- \text{Log} \left(1 + \frac{FVA}{\text{Gross Exports}} \right) \end{aligned} \quad (3)$$

The variable INST measures the quality of institutions. The latter is mainly proxied with the index of institutions computed based on the World Bank's Worldwide Governance Indicators (WGIs). These include control of corruption (CCE), regulatory quality (RQE), government effectiveness (GEE), political stability (PSE), rule of law (RLE), and voice and accountability (VAE) (Kaufmann & Kraay, 2023). Each indicator ranges from -2.5 to 2.5, with greater values indicating strong governance performance. Based on these institutional measures, the computed index of institutions is approximated to first principal component (the outputs of this analysis are not reported to save space). For robustness checks, the United Nation Conference on Trade and Development's (UNCTAD) index of institutions is used. The UNCTAD's institutional indicator measures political stability and efficiency through the regulatory quality, effectiveness, success in fighting criminality, corruption, and terrorism, and safeguarding of citizens' freedom of expression and association. Expressed in percentage, the greater the UNCTAD's index of institutions, the better the quality of institutions.

In addition to the quality of institutions, other factors such as market size (level of development), factor endowment and geography are critical to GVC participation (World Bank, 2020). These factors are controlled for through a set of controls including, GDP per capita (GDP), foreign direct investment as a percentage of GDP (FDI), total population (POPU) and resource rent (RESOUR), integrated in the vector X .

GDP per capita and total population are used as proxy to market size which is a critical variable in international trade. Larger economies (markets) are likely to use domestically sourced inputs and reduce the use of imported inputs in their exports, thus participating in forward GVCs rather than backward GVC. Logically, small economies are tributary to foreign markets, importing inputs from abroad, and thus likely to engage in backward GVCs (Kowalski et al., 2015).

According to the Heckscher-Ohlin model, factor endowments are key determinants of countries' participation in international trade and GVCs. From the World Bank's perspective, developing countries with abundant natural resources (copper, iron, gas, oils, and other minerals) are likely to engage in forward GVCs, while low-skill-abundant countries (i.e., African countries) participate in backward GVCs. In some instances, a pool of large low-skilled labour may facilitate participation in manufacturing GVCs, while higher skills may trigger upgrading. The scarcity of physical capital prompts developing countries to specialise less in capital-intensive goods, thus engaging in forward GVCs. Given that multinational firms (MNCs) have the potential to transfer technology and know-how and to bring new physical capital, FDI acts as a catalyst for GVC integration (World Bank, 2020). We capture factor endowment by the ratio of resource rent to GDP, the ratio of FDI to GDP and total population.

The pertinence of geography for international trade is well-known from the gravity model. Trade costs and distance are key factors that affect a country's decision to import from another country. In a globalised world where intermediate inputs cross borders multiple times (Montfaucon et al., 2023), the larger the distance of a country from the GVC hubs (China, Germany, and the USA), the lower the likelihood of participating in GVCs (Baldwin & Lopez-Gonzalez, 2015). We account for geography as a time-invariant country-level heterogeneities absorbed in the country-fixed effect term v_c .

3.2. Identification Strategy

A major concern related to Equation 1 is the problem of endogeneity. Generally, endogeneity arises when regressors are correlated with the disturbance term. Measurement errors, omitted variable bias and simultaneity bias are the leading causes of endogeneity (Wooldridge, 2010). Our identification strategy is interested in the endogeneity of institutions. Institutions are not exogenous and their endogeneity may proceed from historical institutional legacies through colonisation (Acemoglu et al., 2001, Acemoglu & Johnson, 2005 and La Porta et al., 1997). The nature of institutions established by earlier colonisers, whether extractive or inclusive, and the features of the legal system inherited from colonisation affect today's quality of institutions. Furthermore, there may be a reverse causality between institutions and GVC-related variables. While institutions have the potentials to determine countries' GVC

participation, the latter is also likely to affect the quality of institutions. Drawing on the aforementioned, estimating Equation 1 with ordinary least square (OLS) would lead to biased estimates. Therefore, we resort to instrumental variable (IV) approach to address both the endogenous nature of institutions and the reverse causality between institutions and GVC participation.

The paper relies on the existing empirical works to find a relevant instrument for institutions. We specifically exploit the exogenous variations in regional quality of institutions – waves of democracy and good governance in the sense of Acemoglu et al. (2019) – as an excluded instrument for institutions. To measure the sub-regional waves of democracy and governance, we first divide the study countries into five regional economic communities (RECs), drawing from Mignamissi et al. (2023). These RECs are East African Community (EAC), Economic Community of West African States (ECOWAS), Economic Community of Central African Countries (ECCAC), Arab Maghreb Union (AMU) and Southern African Development Community (SADC). Drawing from Mignamissi et al. (2023) according to which the five RECs share similar institutional framework, we generate a leave-out mean of the index of institutions. Specifically, for each country i within a REC consisting of n member states, we calculate the indicated instruments by taking the sub-regional averages of the index of institutions of the other $n - 1$ countries.

For the excluded instrument to be valid, it must satisfy two critical conditions. First, the excluded instrument must be relevant. An instrument is relevant when it is highly correlated with the instrumented variable which is the index of institutions in the current figure. Our study's hypothesis is that the waves of democracy and good governance, our preferred excluded instrument of interest, are correlated with the quality of institutions. From the theory of “waves of democracy”, institutions in a given country can also be affected by the (historical) quality of institutions in neighbouring countries (Acemoglu et al., 2019). According to this line of thought, democratisation tends to happen in regional waves. A country is more likely to shift to democracy or away from it if similar transitions have recently occurred in neighbouring countries. The greater the regional democratic capital, considered as a stock of civic and social assets, the lower the probability for a country to transition to autocracy (Acemoglu et al., 2019; Persson & Tabellini, 2009). the theory of waves of democracy supports therefore the underlying hypothesis of the relevance of instrument.

The second most critical hypothesis is that the instrument must be exogenous. This entails that the instrument must not be correlated with the error terms in the second stage of IV approach. In the current figure, the exclusion restriction hypothesis would be satisfied if the excluded instrument affects GVC-related outcomes only through the quality of institutions. While the relevance of the instrument is verifiable through a simple correlation analysis, the exclusion restriction cannot be formally and statistically tested. The validity of the exclusion restriction can be examined to the extent that the instrument violates the restriction, affecting outcome variables through other means than the quality of institutions. One of threats to the excludability in the current figure is that the selected instrument – the waves of institutions and governance – is likely to have an indirect effect on GVC-related indicators through traditional trade flow. However, we argue that this channel is unlikely in the context of a low level of intra-African trade. Another threat to our identification, the excludability of the instrument, is that time-trended unobserved characteristics may jointly affect both institutional variables (including the wave of institutions and governance) and GVC-related indicators. We address these issues by controlling for quadrennial time fixed effects in the robustness checks sub-section.

3.3. Data and Sources

The paper uses a panel dataset covering 37 African countries from 2002 to 2018. The data were gathered from various sources including the World Bank and United Nations Conference on Trade and Development's (UNCTAD). Variables such as FDI inflows, natural resource rent, GDP per capita, and worldwide governance indicators (WGIs) were obtained from the World Bank database. The WGIs serve in the computation of the index of institutions which is used as a proxy to the quality of institutions. An alternative measure of institutions was drawn from the UNCTAD database. GVC indicators were obtained from the UNCTAD-Eora Multi-Region Input Output (Eora MRIO) database, covering 189 countries from 1990 to 2018. Eora-MRIO database, is preferred to World Input-Output Database (WIOD) and Trade in Value Added (TiVA) due to its broad country coverage and the advanced methodology employed in the computation of GVC indicators (Alhassan et al., 2021).

Seventeen countries were excluded from the total list of 54 African countries due to data limitation, reducing the sample to 37 units; those countries excluded are Benin,

Burkina Faso, Comoros, Congo, Eritrea, Ethiopia, Equatorial Guinea, Eswatini, Guinea, Guinea-Bissau, Libya, Lesotho, Seychelles, Somalia, Sudan, South Sudan and Zimbabwe. The absence of annual WGIs' data before 2002 and GVC data after 2018 limits the study period to 2002-2018.

Tables 1 and 2 present the descriptive statistics and the correlation matrix for the study variables, respectively. Table 2 indicates that the WGI's index of institutions is positively and significant correlated with backward GVC participation, while it is negatively and significantly correlated with GVC position and forward participation. The correlation coefficient between the WGI's index of institutions and total GVC participation remains negative albeit insignificant; however, it turns positive and significant when institutions are measured by the UNCTAD's index of institution. A further observation is that institutions are weakly correlated with total GVC participation compared to the other GVC-related variables. The links between the WGI's index of institutions and GVC-related indicators are further corroborated graphically in the scatterplots depicted in Figure 1. While a closer examination suggests that covariates are weakly correlated with one another, GDP per capita, population, and resource rent show a strong correlation with institutional indicators, as shown in Table 2. This collinearity may stem from the endogeneity of institutions, which is addressed in the methodology section.

Table 1: Descriptive statistics

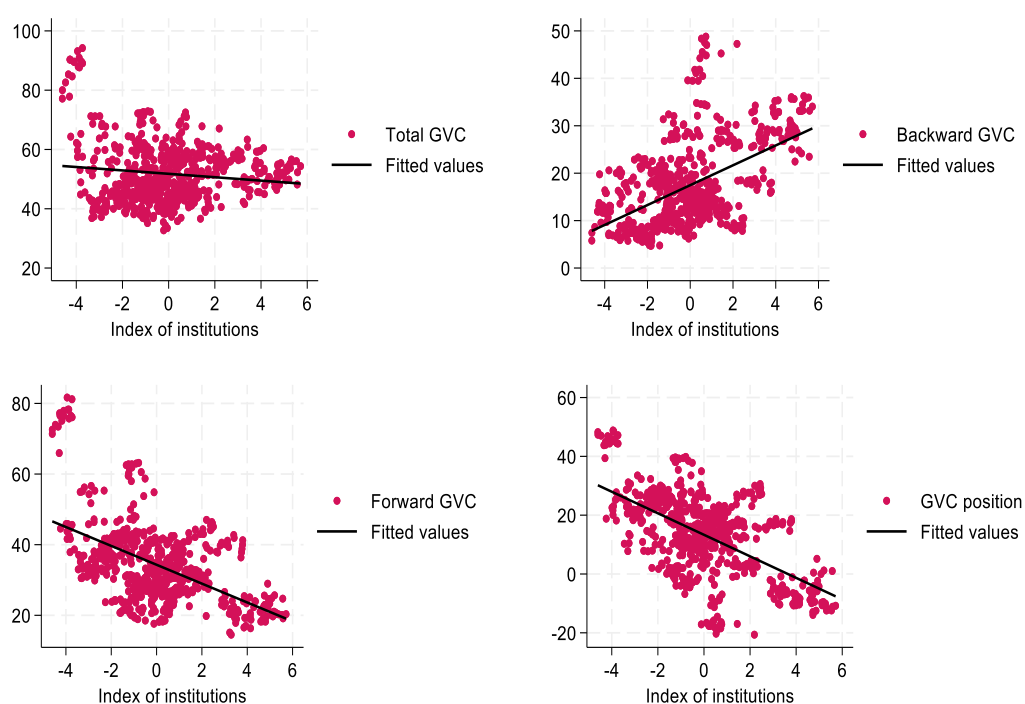
Variables	Obs.	Mean	Std. Dev.	Min	Max
<u>Dependent variables</u>					
Log. GVC participation (LGVC)	629	3.93	0.18	3.48	4.54
Log. Backward participation (LFVA)	629	2.73	0.49	1.54	3.88
Log. Forward participation (LDVX)	629	3.48	0.30	2.67	4.40
Log. GVC position (LPOSIT)	629	2.61	0.96	-3.94	3.88
<u>Independent variables</u>					
WGI's index of institutions (INST_1)	629	0,00	2,19	-4,60	5,71
UNCTAD's index of institutions (INST_2)	595	43,8	12,4	17,1	75,4
GDP per capita (GDP)	618	7,17	0,93	5,61	9,27
Foreign Direct investment (FDI)	629	4,83	8,66	-10,7	103
Log. Population (LPOPU)	629	16,1	1,48	11,9	19,1
Resource rent (RESOUR)	629	11,1	9,75	0,00	52,5

Table 2: correlation matrix

	LGVC	LFVA	LDVX	LPOSIT	INST_1	INST_2	GDP	FDI	LPOPU	RESOUR
LGVC	1.00									
LFVA	0.31*	1.00								
LDVX	0.53	-0.58*	1.00							
LPOSIT	0.24*	-0.64*	0.68*	1.00						
INST_1	-0.06	0.52*	-0.53*	-0.32*	1.00					
INST_2	0.09*	0.52*	-0.48*	-0.26*	0.99	1.00				
GDP	0.02	0.07	-0.15*	0.05	0.57*	0.54*	1.00			
FDI	0.11*	0.10*	0.01	0.03	-0.01	-0.01	-0.12	1.00		
LPOPU	-0.14*	-0.61*	0.46*	0.35*	-0.33*	-0.32*	-0.14*	-0.20*	1.00	
RESOUR	0.15*	-0.40*	0.44*	0.34*	-0.42*	-0.37*	-0.06	0.09*	0.07	1.00

Note. * denotes 5% significance level.

Figure 1: Correlation coefficients between index of institutions and GVC indicators, 2002–2018.



Note. The index of institutions is computed as first principal component analysis (PCA) based on the World Bank's worldwide governance indicators (WGIs).

Source: Authors based on UNCTAD and World Bank database, 2024.

4. Main results

4.1. Baselines results – pooled and fixed effects models

The analysis of the main results commences with the baseline estimates. Initially, the empirical model is estimated using ordinary least square (OLS). Table 3 presents the estimates from the pooled model without controlling for country fixed effects and Table 4 shows the estimates obtained with fixed effects. Columns 1 to 4 of each table show the estimated effects of institutions on total, backward, forward GVC participations, and GVC position, respectively. The coefficient of institutions is positive and significant in Column 2, while it is negative and significant in Columns 1, 3 and 4 of Table 3. The quality of institutions is thus positively correlated with backward GVC participation (Column 2) and negatively related to total GVC participation (Column 1), forward GVC participation (Column 3) and GVC position (Column 4).

The results from the pooled model have slightly changed after controlling for country fixed effects in the empirical model. The estimated coefficient of institutions turns insignificant in Column 1 of Table 4, while its sign and significance remain consistent with results reported in Table 3. Furthermore, the estimated coefficient of institutions has slightly decreased in absolute terms, except for Column 4. Overall, when fixed effects are controlled for, institutions remain positively correlated with backward GVCs and negatively associated with forward GVCs and upstreamness. Caution should be exercised in interpreting these results, as the issue related the endogeneity of institutions has not yet been addressed. Further analyses are thus required to give these results causal interpretations.

Table 3: Estimates from pooled OLS

	GVC participation (Log.)	Backward GVC participation (Log.)	Forward GVC participation (Log.)	GVC position (Log.)
	(1)	(2)	(3)	(4)
Institutions	-0.010** (0.004)	0.095*** (0.008)	-0.055*** (0.006)	-0.116*** (0.025)
GDP per capita (Log.)	0.017* (0.009)	-0.136*** (0.018)	0.050*** (0.012)	0.083* (0.048)
FDI (percentage of GDP)	0.001* (0.000)	0.000 (0.001)	0.002** (0.001)	0.007* (0.004)
Population (Log.)	-0.019*** (0.005)	-0.160*** (0.009)	0.071*** (0.006)	0.336*** (0.033)
Resource rent	0.002** (0.000)	-0.010*** (0.001)	0.007*** (0.001)	0.027*** (0.004)
Constant	4.091*** (0.108)	6.418*** (0.199)	1.865*** (0.139)	-3.973*** (0.600)
Observations	618	618	618	518
R-squared	0.060	0.573	0.459	0.307
Country fixed-effects	No	No	No	No

Note. The table showcases the ordinary least square (OLS) estimates of the effects of institutions on African countries' participation into global value chains over the period 2002-2018. The index of institutions, which measures the quality of institutions, is computed as the first principal component analysis (PCA) based on the World Bank's worldwide governance indicators (WGIs). The WGIs include control of corruption, regulatory quality, government effectiveness, political stability, rule of law, and voice and accountability.

Standard errors are in parentheses.

* $p < .10$, ** $p < .05$, *** $p < .01$.

Table 4: Estimates from fixed effects models

	GVC participation (Log.)	Backward GVC participation (Log.)	Forward GVC participation (Log.)	GVC position (Log.)
	(1)	(2)	(3)	(4)
Institutions	-0.004 (0.005)	0.039*** (0.011)	-0.025*** (0.006)	-0.162*** (0.241)
GDP per capita (Log.)	0.083** (0.032)	0.050 (0.075)	-0.002 (0.042)	-0.206 (0.241)
FDI (percentage of GDP)	0.001*** (0.000)	0.003*** (0.000)	0.000 (0.000)	-0.002 (0.002)
Population (Log.)	-0.072** (0.031)	-0.019 (0.073)	-0.118*** (0.041)	-0.164 (0.215)
Resource rent	0.002*** (0.000)	0.003*** (0.001)	0.002*** (0.000)	-0.005 (0.004)
Constant	4.473*** (0.370)	2.622*** (0.878)	5.398*** (0.495)	6.787*** (2.599)
Observations	618	618	618	518
R-squared	0.030	0.182	0.052	0.000
Country fixed-effects	Yes	Yes	Yes	Yes

Note. The table showcases the ordinary least square (OLS) estimates of the effects of institutions on African countries' participation into global value chains over the period 2002-2018. The index of institutions, which measures the quality of institutions, is computed as the first principal component analysis (PCA) based on the World Bank's worldwide governance indicators (WGIs). The WGIs include control of corruption, regulatory quality, government effectiveness, political stability, rule of law, and voice and accountability.

Standard errors are in parentheses.

* $p < .10$, ** $p < .05$, *** $p < .01$.

4.2. Main results – IV-2SLS estimates

The IV-2SLS results are now presented. Table 5 showcases the first stage's results. Columns 1 to 4 show that the excluded instrument, which is the wave of democracy and good governance, has a strong positive relationship with the quality of institutions. Countries in the same regional economic communities (REC) are thus likely to experience similar institutional dynamics. Country members of a given REC which underwent waves of good institutions are likely to improve their institutional frameworks. Given that the first stage estimate is non zero, the resulting IV estimates

(presented later) are likely to be informative. Furthermore, the F statistics of the first stage estimates are over the conventional thresholds for determining whether an excluded instrument is highly predictive in the first stage. The direct implication is that the excluded instrument is relevant.

Table 5: First stage results

	Dependent variable: index of institutions			
	(1)	(2)	(3)	(4)
Waves of governance	0.365*** (0.103)	0.331*** (0.097)	0.497*** (0.063)	0.367*** (0.089)
GDP per capita (Log.)			1.206*** (0.061)	2.588*** (0.243)
FDI (percentage of GDP)			0.009 (0.006)	0.005* (0.003)
Population (Log.)			-0.621*** (0.046)	-1.955*** (0.245)
Resource rent			-0.099*** (0.005)	-0.023*** (0.004)
Constant	-0.012 (0.093)	0.578 (0.244)	2.588*** (0.979)	9.063*** (2.496)
Observations	578	578	578	578
R-squared	0.021	0.935	0.655	0.947
F test of excluded instruments			70.62	16.37
Country fixed effects	No	Yes	No	Yes

Note. The table reports the instrumental variable (IV)'s first stage estimates where the quality of institutions is instrumented with the waves of democracy and governance. The index of institutions, which measures the quality of institutions and governance, is computed as the first principal component analysis (PCA) based on the World Bank's worldwide governance indicators (WGIs). The WGIs include control of corruption, regulatory quality, government effectiveness, political stability, rule of law, and voice and accountability. Standard errors are in parentheses.

* $p < .10$, ** $p < .05$, *** $p < .01$.

The IV estimated effects of institutions on GVC-related indicators are reported in tables 6 and 7 (second-stage estimates). Table 6 and 7 present IV estimates without and with county fixed effects, respectively. Compared to the OLS estimate, which is negative and significant as indicated by Table 3, the estimated coefficient of institutions turns positive and significant in Column 1 of Table 6. After controlling for country fixed effects, the estimated coefficient of institutions in Column 1 of Table 7 remains

consistent with the one reported in Column 1 of Table 6. Furthermore, while the coefficient of institutions is positive and significant in Column 2, it is negative and significant in Columns 3 and 4. Overall, the IV estimates reveal that improved institutions favor both total and backward GVC participation while they have a reducing effect on forward GVC participation and upstreamness.

Most of the estimated coefficients of the control variables are not consistent across tables 6 and 7. The estimated coefficients for GDP per capita in Table 6 (columns 3 and 4) turn insignificant in table 7 and the signs of the estimated coefficients for population are not consistent across tables 6 and 7. Furthermore, the estimated coefficients for resource rent turn significant (insignificant) in Table 7 (columns 2, 3 and 4) while they are insignificant (significant) in the same column of Table 6. These inconsistencies signify that the correlates between these controls and the GVC-related variables of interest are not robust to country fixed effects introduced in the estimated empirical equations in table 7. Some consistencies are observed across tables 6 and 7 though. The estimated coefficient for GDP per capital is negative and significant in Column 2 of tables 6 and 7, while the ones obtained for resource rent remain consistently positive and significant in Column 1. As a result, much developed and resource-poor African countries are less likely to engage in backward and total GVCs, respectively. Since the coefficients of FDI turns insignificant in Table 7, it follows that, surprisingly, FDI inflows have no significant effect on GVC-related variables among African countries.

The most relevant tests for the validation of the empirical IV model are equally reported for each of the estimated equations to ascertain their quality. It is important to highlight that the overidentification test is not feasible given that the empirical equation is just identified. However, other critical tests have been performed to ascertain the validity of the excluded instrument. The first is the under-identification test of Kleibergen and Paap (2006), which examines whether the excluded instrument is correlated with the endogenous regressor. The empirical statistics of this test is Kleibergen-Papp's rk LM statistic which is distributed as χ^2 under the null hypothesis that the equation is under-identified. As shown in by tables 6 and 7, the null hypothesis is rejected in all estimated equations, supporting that the excluded instrument is relevant as underlined in the first-stage regressions.

The second test is the identification test which is the test of weak excluded instrument developed by Cragg and Donald (1993) and popularized by Stock and Yogo (2005). It specifically tests whether the correlation between the excluded instrument and the endogenous regressor is sufficiently strong. Under the null hypothesis that the instrument is weak, the Kleibergen-Paap's rk Wald statistic, distributed as the F statistic, is compared to Stock-Yogo's critical value for various ratios of IV-to-OLS bias. Results support the rejection of the null hypothesis that the bias of the IV estimate due to a weak instrument is greater than 15 percent of the corresponding bias in the OLS estimate.

Table 6: IV results, second stages without country fixed effects

	Dependent variable: GVC-related variables			
	GVC participation (Log.)	Backward GVC participation (Log.)	Forward GVC participation (Log.)	GVC position (Log.)
	(1)	(2)	(3)	(4)
Institutions	0.051** (0.022)	0.205*** (0.031)	-0.046** (0.021)	-0.296*** (0.078)
GDP per capita (Log.)	-0.053* (0.029)	-0.280*** (0.044)	0.045 (0.027)	0.309*** (0.073)
FDI (percentage of GDP)	0.000 (0.000)	-0.002 (0.001)	0.002*** (0.000)	0.011*** (0.002)
Population (Log.)	0.024 (0.016)	-0.095*** (0.019)	0.077*** (0.015)	0.246*** (0.031)
Resource rent	0.008*** (0.002)	0.001 (0.003)	0.008*** (0.002)	0.005 (0.007)
Constant	3.800*** (0.154)	6.243*** (0.216)	1.817*** (0.183)	-3.877*** (0.719)
Observations	578	578	578	578
Centered R-squared	-0.160	0.445	0.431	0.256
Kleibergen-Paap rk LM statistic	46.92***	46.92***	46.92***	36.13***
Cragg-Donald Wald F statistics	61.91	61.91	61.91	47.04
Kleibergen-Paap rk Wald F statistic	70.62	70.62	70.62	49.62
Stock-Yogo (10%)	16.38	16.38	16.38	16.38
Stock-Yogo (15%)	8.960	8.960	8.960	8.92
Country fixed effects	No	No	No	No

Note. The table reports the instrumental variable (IV) estimates of the effects of institutions on African countries' participation into global value chains over the period 2002-2018, where the quality of institutions is instrumented with the waves of democracy and governance. The index of institutions, which measures the quality of institutions and governance, is computed as the first principal component analysis (PCA) based on the World Bank's worldwide

governance indicators (WGs). The latter includes control of corruption, regulatory quality, government effectiveness, political stability, rule of law, and voice and accountability.

Robust standard errors are in parentheses.

* $p < .10$, ** $p < .05$, *** $p < .01$.

Table 7: IV results, second stages with country fixed effects

	Dependent variable: GVC-related variables			
	GVC participation (Log.)	Backward GVC participation (Log.)	Forward GVC participation (Log.)	GVC position (Log.)
	(1)	(2)	(3)	(4)
Institutions	0.081* (0.047)	0.389*** (0.146)	-0.131** (0.054)	-0.544*** (0.203)
GDP per capita (Log.)	-0.133 (0.118)	-0.813** (0.363)	0.251* (0.138)	0.861 (0.588)
FDI (percentage of GDP)	0.000 (0.000)	0.001 (0.002)	0.000 (0.000)	-0.000 (0.003)
Population (Log.)	0.087 (0.096)	0.614** (0.290)	-0.312*** (0.108)	-0.905* (0.471)
Resource rent	0.004*** (0.001)	0.011*** (0.004)	-0.000 (0.001)	-0.016** (0.007)
Constant	3.335*** (0.880)	-2.103 (2.666)	7.056*** (1.000)	12.26*** (4.234)
Observations	578	578	578	498
Centered R-squared	0.816	0.747	0.886	0.735
Kleibergen-Paap rk LM statistic	17.04***	17.04***	17.04***	15.21***
Cragg-Donald Wald F statistics	16.68	16.68	16.68	14.97
Kleibergen-Paap rk Wald F statistic	16.37	16.37	16.37	14.70
Stock-Yogo (10%)	16.38	16.38	16.38	16.38
Stock-Yogo (15%)	8.960	8.960	8.960	8.960
Country fixed effects	Yes	Yes	Yes	Yes

Note. The table reports the instrumental variable (IV) estimates of the effects of institutions on African countries' participation into global value chains over the period 2002-2018, where the quality of institutions is instrumented with the waves of democracy and governance. The index of institutions, which measures the quality of institutions and governance, is computed as the first principal component analysis (PCA) based on the World Bank's worldwide governance indicators (WGs). The latter includes control of corruption, regulatory quality, government effectiveness, political stability, rule of law, and voice and accountability.

Robust standard errors are in parentheses.

* $p < .10$, ** $p < .05$, *** $p < .01$.

4.3. Robustness checks

We perform three robustness checks. In a first robustness check, we control for the interaction of institutions with natural resource rent. The inclusion of the interaction term is critical for the understanding of the role of natural resource in the nexus between GVC participation and institutional quality. Natural resources have long been considered a curse due to their potential to deter manufacturing activities (Sachs & Warner, 1999), lower investment in education and innovation (Gylfason et al., 2000), and instigate conflicts in developing countries (Adhvaryu et al., 2021). Recent literature underlines that whether abundant natural resources are a curse or not depends on the quality of institutions (Hodler et al., 2023). Both variables interact with each other to produce a given economic outcome. In weak institutional frameworks for instance, abundant natural resources lead to rent-seeking, corruption, and political violence, resulting in worse development outcomes, whereas good institutions tend to mitigate the curse of natural resources (Cabrales & Hauk, 2011; Mehlum et al., 2006).

The integration of the interaction term in the empirical equation does not change findings reported so far. Table 8 confirms that good institutions exert a positive effect on both total and backward GVC participation while they have a reducing effect on forward GVC participation and upstreamness. Furthermore, the coefficient of the interaction term is negative and significant for backward GVC participation while it is positive for forward participation and upstreamness. With the same level of institutional quality, resource-rich countries are likely to exhibit low backward GVCs and greater forward GVCs and GVC upstreamness.

In a second robustness check, we use alternative metrics of institutions. In addition to the WGIs used so far, we also employ UNCTAD's index of institutions. The main results reported in Table 9 are consistent with previous findings except that the coefficient of institutions turns insignificant for total GVC participation. Therefore, the positive effect of institutions on total GVC participation, reported so far, is not robust to alternative measure of institutions. We retain that institutions have: (i) no significant effect on total GVC participation, (ii) a positive effect on backward participation and (iii) a negative effect on forward GVC participation and position (upstreamness).

In a third robustness check, in addition to country fixed effects, we control for time fixed effect to account for time-trended unobserved characteristics. The results reported

in Table 10 are consistent with Table 9. While good institutions promote backward participation and discourage both forward participation and upstreamness, they have no significant effect on total GVC participation.

Table 8: Robustness checks – interaction of institutions and natural resources

Dependent variable: GVC-related variables				
	GVC participation (Log.)	Backward GVC participation (Log.)	Forward GVC participation (Log.)	GVC position (Log.)
	(1)	(2)	(3)	(4)
Institutions	0.097* (0.058)	0.463** (0.183)	-0.164** (0.067)	-0.829** (0.366)
Institutions×Resource rent	-0.001 (0.001)	-0.007** (0.003)	0.003** (0.001)	0.022** (0.011)
Observations	578	578	578	498
R-squared	0.806	0.724	0.883	0.691
Kleibergen-Paap rk LM statistic	16.03***	16.03***	16.03***	9.016***
Cragg-Donald Wald F statistics	14.46	14.46	14.46	8.305
Kleibergen-Paap rk Wald F statistic	15.16	15.16	15.16	8788
Stock-Yogo (10%)	16.38	16.38	16.38	16.38
Stock-Yogo (15%)	8.960	8.960	8.960	8.960
Control variables	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes

Note. The table reports the instrumental variable (IV) estimates of the effects of institutions on African countries' GVC participation over the period 2002-2018, where the quality of institutions is instrumented with the waves of democracy and governance. The index of institutions, which measures the quality of institutions and governance, is computed as the first principal component analysis (PCA) based on the World Bank's worldwide governance indicators (WGIs). The WGI include control of corruption, regulatory quality, government effectiveness, political stability, rule of law, and voice and accountability. The control variables included in the regressions are resource rent, FDI in percentage of gross domestic product, logarithm of GDP per capita and logarithm of population size. These are not reported to save space.

Robust standard errors are in parentheses.

* $p < .10$, ** $p < .05$, *** $p < .01$.

Table 9: Robustness checks – alternative measurement of institutions

Dependent variable: GVC-related variables				
	GVC participation (Log.)	Backward GVC participation (Log.)	Forward GVC participation (Log.)	GVC position (Log.)
	(1)	(2)	(3)	(4)
Institutions	-0.000 (0.005)	0.025** (0.011)	-0.011* (0.006)	-0.060* (0.028)
Observations	544	544	544	472
R-squared	0.860	0.912	0.898	0.771
Kleibergen-Paap rk LM statistic	15.17***	15.17***	15.17***	11.01***
Cragg-Donald Wald F statistics	15.75	15.75	15.75	10.89
Kleibergen-Paap rk Wald F statistic	14.88	14.88	14.88	10.62
Stock-Yogo (10%)	16.38	16.38	16.38	16.38
Stock-Yogo (15%)	8.960	8.960	8.960	8.960
Control variables	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes

Note. The table reports the instrumental variable (IV) estimates of the effects of institutions on African countries' participation into global value chains over the period 2002-2018, where the quality of institutions is instrumented with the waves of democracy and governance. The quality of institutions is measured by UNCTAD's index of institutions. For details about included controls, consult the note in Table 8.

Robust standard errors are in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$.

Table 10: Robustness checks – control for both country and time fixed effects

Dependent variable: GVC-related variables				
	GVC participation (Log.)	Backward GVC participation (Log.)	Forward GVC participation (Log.)	GVC position (Log.)
	(1)	(2)	(3)	(4)
Institutions	0.022 (0.053)	0.462** (0.206)	-0.283*** (0.100)	-0.839*** (0.296)
Observations	544	544	544	470
R-squared	0.893	0.695	0.756	0.644
Kleibergen-Paap rk LM statistic	10.87***	10.87***	10.87***	11.72***
Cragg-Donald Wald F statistics	10.03	10.03	10.03	10.82
Kleibergen-Paap rk Wald F statistic	10.00	10.00	10.00	10.82
Stock-Yogo (10%)	16.38	16.38	16.38	16.38
Stock-Yogo (15%)	8.960	8.960	8.960	8.960
Control variables	Yes	Yes	Yes	Yes

Country fixed effects	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes

Note. The table reports the instrumental variable (IV) estimates of the effects of institutions on African countries' participation into global value chains over the period 2002-2018. Both quadrennial time fixed effects and country fixed effects are integrated into the estimates empirical equations. The quality of institutions is measured by UNCTAD's index of institutions and instrumented with the waves of democracy and governance. For details about included controls, consult the note in Table 8.

Robust standard errors are in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$.

5. Conclusion and Policy Implications

The current study aims at examining the effects institutions have on GVC-related indicators using a sample of 37 African countries observed from 2002 to 2018. The study specifically analyses the effects of institutions on total, backward, forward GVC participation, and GVC upstreamness. To achieve its intended goal, the study uses the instrumental variable approach (IV). Drawing on Acemoglu et al. (2019), institutions are instrumented by waves of democracy and good governance.

Findings emphasize the relevance of institutions for African countries' participation in global supply chains (Alhassan et al., 2021; Ge et al., 2020; Ha et al., 2023; Hammoudeh et al., 2023). Though no significant effect of institutions on total GVC participation is detected, the quality of institutions has a significant implication for the participation pattern. Findings suggest that African countries are more likely to engage in backward GVCs and less likely to participate in forward GVCs as institutions improved. Specifically, African countries with good institutions tend to embody foreign added value in their exports and reduce the amount of domestic added value in foreign countries' exports. This finding is in line with Alhassan et al. (2021) and Montfaucon et al. (2023). For instance, Alhassan et al. (2021) found that political stability encourages backward GVC participation while it tends to reduce forward GVC participation in the context of African countries. Consistent with Alhassan et al. (2021), our findings further suggest that institutions have a negative impact on the GVC position index. Good institutions seem to reduce the participation of African countries in the upstream production stages of GVCs. The transition to a lesser upstreamness would be beneficial to African countries as it entails less export of commodities and raw materials. Furthermore, backward integration is found to enhance industrial and export upgrading (Tian et al., 2022). Ndubuisi and Owusu (2022) have further shown

that upstream specialization exerts a downward effect on wage in developing countries, making lower wage earners worse off.

Like other factors such as physical infrastructure deficiency, underdeveloped manufacturing sector, poor financial markets, and higher tariffs, which are all found to keep African countries' GVC integration at a low level (Allard et al., 2016), our study reveals that the poor quality of institutions significantly affects those countries' GVC development as well. Substantial institutional reforms and policies are thus needed to ensure private sector growth. We propose two concrete approaches to achieve this. First, institutional policies must aim to a favorable investment environment. Enforcing the protection of property rights and eliminating bureaucratic red tape would incentivize and attract local and foreign investors to the manufacturing sector, facilitating backward GVC participation. Second, African countries must engage in comprehensive trade agreements to benefit from the institutional spill-over effects across borders, as suggested by Alhassan et al. (2021). To optimize these spill-over effects, African countries must prioritize the coordination of their political and economic institutions.

Despite its contribution to the literature, this study has several limitations. First, due to data limitations we only cover 37 African countries. Future studies may want to enlarge the sample size to all African countries. Furthermore, given that studies which have explored the institutional drivers of GVC development are fragmented and scanty, expanding the scope beyond African countries for a comparative purpose would offer valuable insights across countries' development spectrum. Note that the current investigation is a macro-based analysis that overlook sectoral changes driven by GVC participation. Future research may address this gap by providing a more nuanced understanding of the specific sectors where institutions play a pivotal role, as highlighted by Baldwin and Lopez-Gonzalez (2015). A further step can be geared toward firm-level panel data to generate comprehensive and detailed analyses.

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