



Does Integration into Global Value Chains Promote Wage Employment in Sub-Saharan Africa? Evidence from a Macroeconomic Analysis Accounting for Institutional Quality

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Abstract: This article examines how participation in global value chains (GVCs) affects the supply of paid employment in sub-Saharan Africa (SSA) and empirically tests the moderating role of institutional quality. Using a panel of 38 countries from 1996 to 2018 and robust econometric methods, including high-dimensional fixed-effects regression (HDFE) and instrumental variable (IV) estimators, the results show a positive and significant effect of GVCs on paid employment. The analysis reveals that this effect is nearly twice as large for women. Above all, the study establishes that institutional quality, particularly control of corruption, government efficiency, and regulatory quality, significantly amplifies this positive relationship. Sensitivity analyses confirm the robustness of the results and highlight the risks associated with dependence on natural resources, as well as the central role of the service sector in generating formal jobs. The policy implications underscore the need for proactive trade policies coupled with deep institutional reforms to maximize the benefits in terms of decent employment.

Keywords: Global value chains; Paid employment; Institutional quality; Sub-Saharan Africa

JEL Classification: F14; F16; J21; O43

1. Introduction

Faced with the pressing challenge of creating inclusive, high-quality economic growth for its young and growing population, sub-Saharan Africa (SSA) is now at a crossroads. At the heart of this challenge lies the crucial issue of employment, specifically paid employment (i.e., wage and salaried work), which is an essential driver of poverty reduction, improved living conditions, and social cohesion (Newman et al., 2016; ILO, 2022). While the region is experiencing rapid demographic expansion, with the working-age population expected to double by 2050 (World Bank, 2023), its vulnerable employment rate remains a concern, particularly among young people and women (Dianda, 2025). The informal sector,

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characterized by low productivity and widespread precariousness, remains the main source of income for the majority of workers, thus limiting prospects for structural development (Gérard et al., 2021).

According to data from the International Labour Organization (ILO, 2024), SSA has the most worrying situation in the world in terms of paid employment, with historically low rates ranging from 19.0% to 23.2%, nearly four times lower than in North America, and sluggish growth of only 3 percentage points in over thirty years. This dynamic contrasts sharply with the progress made in other regions: the Arab States gained more than 16 points to reach 74.55% in 2023, East Asia and the Pacific almost doubled its rate (from 30.18% to 52.25%), and South Asia, starting from a similar level, reached 28.40%. The region even recorded a net decline during the COVID-19 crisis, falling from 23.22% in 2019 to 22.64% in 2020. With a level less than half the global average (52.01% in 2023), SSA is lagging further and further behind in development and becoming increasingly isolated from the global trajectory of employment formalization.

Over the past two decades, job quality in the labour market has been studied in both developing and developed economies in conjunction with other dimensions, including foreign direct investment, climate, trade, remittances, financial development, education, inequality, technology, natural resource allocation, and official development assistance (Adejumo et al., 2021; Akpa et al., 2025; Al-Assaf, 2022; Ali et al., 2022; Anowor et al., 2023; Bahl & Sharma, 2023; Boltho & Glyn, 1995; Chen et al., 2023; Das, 2025; Guliyev, 2023; Raifu & Afolabi, 2022; Sawadogo, 2025; Stehrer, 2024; Totouom et al., 2024). Beyond the factors listed above, a growing body of research has examined the economic impact of global value chains (GVCs). GVCs refer to “a series of steps necessary to produce a product or service sold to consumers, with each step adding value, and at least two steps taking place in different countries” (Antràs, 2020). Production processes have become more decentralized across the globe in an increasingly interconnected international economy, fueled by technological advances, lower transportation and communication costs, and trade-friendly legislative reforms. As a result, countries can participate in GVCs by joining a production chain for economic benefits rather than providing all upstream capabilities (Hammoudeh et al., 2023).

Analysing the effect of GVCs on employment is complex due to conflicting results. Farole et al. (2018) explain this complexity by the presence of three simultaneous effects. First, the substitution effect refers to the replacement of domestic labour by foreign labour following the transfer of productive activities abroad, which reduces labour demand in the domestic market. Second, the scale effect posits that the reduction in production costs made possible by outsourcing leads to lower prices, thereby stimulating final demand and, in turn, demand for local workers. Finally, the productivity effect suggests that the increased specialization of economies, promoted by GVCs, increases labour efficiency, thereby reducing labour requirements per unit produced. Following this logic, some studies highlight positive effects on employment and wages, particularly in export-oriented sectors (Farole, 2016; Njike, 2021). However, other findings temper this optimism, pointing to a risk of concentration in low-value-added, low-skilled labour-intensive activities, thus limiting the spillover effects on the rest of the economy (Barrientos et al., 2016). Still other research finds no significant link with formal employment (Harrison & Rodriguez-Clare, 2010). This divergence can be explained by key contextual factors, such as a country’s level of development, the type of sector, or the skill level of the workforce (Carneiro et al., 2023), confirming that substitution, scale, and productivity effects interact differently depending on national specificities.

While there is a wealth of literature on the determinants of participation in GVCs in Africa (Asongu, 2019; Okah Efogo, 2020) or on the aggregate effects of GVCs on growth, few studies have specifically analysed the link between GVCs and paid employment by incorporating the moderating role of institutional quality. Existing work often focuses on sectoral case studies or microeconomic approaches, without providing a systematic macroeconomic analysis that would allow the results to be generalised at the regional level (UNCTAD, 2023). This gap is all the more striking given that the African Union's Agenda 2063 and the Sustainable Development Goals (SDGs) place the creation of decent jobs at the heart of development priorities. This article, therefore, aims to fill this gap by examining the effect of participation in GVCs on the supply of paid jobs in sub-Saharan Africa, considering the moderating role of institutional quality. We use a sample of 38 countries over the period 1996–2018 and employ robust econometric methods, including fixed effects models and the instrumental variables method (Lewbel, 2012), to control for endogeneity and unobserved heterogeneity. Our central hypothesis is that the positive effect of GVCs on paid employment is stronger in countries with high-quality institutions.

The rest of this article is structured as follows: Section 2 reviews the theoretical and empirical literature. Section 3 details the methodological strategy and data. Section 4 presents and interprets the results. Section 5 concludes and discusses the implications for economic policy.

2. Literature Review

2.1. Participation in Global Value Chains and Paid Employment: Theoretical Underpinnings

Economic theory provides an ambivalent framework for analysing the relationship between integration into global value chains (GVCs) and job creation. Traditional approaches, based on international trade theories, suggest that specialisation according to comparative advantages leads to efficient resource allocation, which stimulates growth and, consequently, employment in export sectors (Ricardo, 1817; Heckscher, 1950; Ohlin, 1933; Samuelson, 1949). Modern models of international trade, focusing on GVCs, complicate this perspective by breaking down the production process into fragmented tasks across the globe (Grossman & Rossi-Hansberg, 2008; Baldwin, 2016). These models propose that engaging in GVCs allows developing countries to industrialise by mastering specific segments of production (the “smile curve”), thus fostering knowledge transfer, productivity improvements, and job creation in export-oriented manufacturing and service industries. However, this optimistic view is moderated by dependency and neo-institutionalism theories (North, 1990; Acemoglu & Robinson, 2012), which highlight that the benefits of GVCs are not automatic. Instead, they depend on a country's ability to ascend the value chain and are heavily influenced by the quality of institutions, which shape the capacity to attract high-value investments, protect workers' rights, and enforce contracts.

2.2. Participation in Global Value Chains and Paid Employment: Empirical Review

The empirical literature on the link between participation in global value chains (GVCs) and paid employment reflects a notable theoretical ambiguity. Indeed, studies reveal no statistically significant average effect, but highlight considerable heterogeneity in results depending on the context. Thus, the literature reports both job gains and losses, depending on the measures used and national or sectoral specificities.

Some research highlights positive effects, although these are mediated by structural factors. Using surveys on the standard of living of Vietnamese households and data on value-added trade (OECD), Long (2019) uses a fixed effects estimator to show that in Vietnam, provincial engagement in GVCs is positively correlated with the share of formal employment. Similarly, Olczyk and Petreski (2024), drawing on a rich dataset and using the GMM2S estimator to account for endogeneity, explored the differential effects of participation in GVCs on foreign direct investment (FDI)-related job creation in the EU-27. Their results indicate that downstream participation in GVCs significantly stimulates FDI-related job creation by improving national value added and production capacity. However, this effect is moderated by sectoral characteristics such as productivity or wages. Conversely, upstream participation in GVCs, characterised by dependence on foreign inputs, generally reduces employment. However, this negative effect becomes less significant when regional diversification is considered. Their study also reveals that the impact of GVC participation on employment varies according to EU membership status and sectoral characteristics, with older member states and high-tech sectors benefiting more from the gradual integration of GVCs.

Other studies show that the impact of participation in global value chains on employment is contingent on a country's position in these chains. In the context of developing countries, Berger and Pierre (2012) establish a positive link between the intensity of this participation and increased labour demand. Their results show that economies that manage to combine upstream integration through the incorporation of foreign intermediate inputs and downstream integration through the supply of goods integrated into third-country exports experience significantly higher employment growth than less integrated countries. This dynamic is subject to significant modulation in the case of mature economies. Pan's (2020) study on the United States, using econometric modelling (GMM2S) and data from the World Input-Output Database, confirms a positive aggregate effect of GVCs on employment. However, this effect is entirely attributable to upstream participation, which is particularly favourable to intermediate-skilled workers, while downstream integration has residual negative effects on low-skilled employment. The Indian case, analysed by Veeramani and Dhir (2022) based on longitudinal sectoral data, corroborates the decisive importance of upstream integration. Their results show that increased participation in this segment of GVCs leads to a significant increase in gross exports, national value added, and employment levels.

Conversely, other studies using various empirical techniques point to negative or contrasting relationships. Szymczak and Wolszczak-Derlacz (2021), using the global input-output database and a three-stage least squares regression, find that a high relative position in GVCs is negatively correlated with wages and employment. Similarly, Nikulin and Szymczak (2020), using logistic regression with robust standard errors, indicate that greater integration into GVCs increases the probability of temporary employment in exporting sectors.

The spatial and sectoral dimension also appears to be a key differentiating factor. Mohamedou's (2019) study on Turkey, based on the World Input-Output Database (WIOD) and using a fixed effects estimation with a spatial weighting matrix, reveals the existence of significant spillover effects between sectors. Similarly, Lu et al.'s (2024) analysis of China, conducted using a structural equation model on provincial and sectoral data, highlights the complexity of transmission channels.

Large-scale comparative analyses based on panel data confirm this fundamental heterogeneity. Camarero et al. (2025) analyse the relationship between globalisation and unemployment in the EU between 1990 and 2015, focusing on global value chains (GVCs). Their results show that participation

in GVCs reduces unemployment in the less advanced economies of the EU, but increases it in the central countries. Similarly, Mingyang et al. (2023) conduct an empirical test using panel data for 56 industries in 42 countries. Their results show that the impact of GVCs on employment varies dramatically depending on the level of economic development.

Given the divergence in results, meta-analyses offer a valuable synthesis. The work of Carneiro et al. (2023) and, previously, Shepherd (2013), concludes that the average effect of GVCs on employment is not significantly different from zero. However, they confirm that the disparities can be systematically explained by the level of development, worker qualifications, sector of activity, unit of analysis, and indicators used, thus highlighting the fundamentally contextual nature of this relationship.

Despite notable advances in empirical studies, the literature on the relationship between participation in GVCs and paid employment allows three observations to be made. First, while there is a wealth of literature on the determinants of participation in GVCs or their effects on productivity and growth, few studies have focused specifically on their impact on the supply of paid employment in sub-Saharan Africa, and even fewer have explicitly incorporated the moderating role of institutional quality. Second, most studies focus on the impact of GVCs on overall employment or GDP growth, without sufficiently distinguishing the nature of the jobs created, in particular the crucial distinction between informal (unpaid or vulnerable) and formal paid employment. Third, while the importance of institutions is often mentioned, their role as a moderating variable in the specific link between GVCs and paid job supply remains empirically underexplored in the African context, particularly at the macroeconomic level. Our study fills this gap by proposing a macroeconomic analysis that not only quantifies the effect of participation in GVCs on paid employment in sub-Saharan Africa, but also explicitly models and tests the hypothesis that the quality of institutions is a key factor in this relationship.

3. Data and Methodology

3.1. Data Sources and Sample

The main objective of this article is to study the effect of participation in global value chains (GVCs) on paid employment in 38 sub-Saharan African countries over the period 1996–2018. The study period is justified by data availability: the World Bank's Worldwide Governance Indicators used to measure institutional quality are available from 1996 onwards, while UNCTAD's GVC data are available up to 2018. The list of countries is provided in Table A1 in the appendix.

3.2. Variables

3.2.1. Dependent Variable

The dependent variable is paid employment, measured by the total number of wage and salaried workers as a percentage of total employment (ILO modelled estimates). The terms "paid employment," "wage employment," and "wage and salaried workers" are used interchangeably throughout this paper to refer to this single indicator.

3.2.2. Independent Variable: GVC Participation Index

The independent variable is the GVC participation index. Following Mignamissi et al. (2025) and Wang et al. (2022), GVC participation is captured by second-generation measures derived from the UNCTAD–EORA Multi-Region Input-Output (MRIO) database. The index combines two components:

- I. Downstream participation, measured by the domestic value added incorporated in foreign exports (DVX): this captures the share of a country's own value added that is embodied in other countries' exports, reflecting the country's role as an input supplier to global chains.
- II. Upstream participation, measured by the foreign value added incorporated in domestic exports (FVA): this captures imported intermediate inputs that are re-exported, reflecting the country's role as an assembler within global chains.

The overall GVC participation index (GVC) is defined as:

$$GCV = \frac{DVX}{X} + \frac{FVA}{X} \quad (1)$$

where X represents the country's gross exports. Both DVX and FVA are expressed in millions of current US dollars and are sourced from UNCTAD¹. Dividing by gross exports (X) normalises both components, yielding a dimensionless ratio that captures a country's total integration into GVCs, regardless of economic size. This formulation is the standard second-generation participation index (Hummels et al., 2001; Wang et al., 2022), which removes country-size effects because a large country and a small country with similar trade structures will obtain similar index values.

The raw DVX and FVA values in the original UNCTAD–EORA database are reported in thousands of current US dollars (hence the large values observed in Table 1 before normalisation). In the regressions, the GVC variable used is the normalised participation index as defined in equation (1), which is a dimensionless ratio. The coefficient on GVC in Table 2 (e.g., 1.712) should therefore be interpreted as: a one-unit increase in the normalised GVC participation index is associated with a 1.712 percentage-point increase in paid employment as a share of total employment. Since the index ranges from 0 to approximately 2 in practice for SSA countries, a 10 percentage-point increase in the index (i.e., 0.1 unit increase) is associated with a 0.171 percentage-point increase in paid employment.

3.2.3. Moderating Variable: Institutional Quality

Institutional quality is measured using the six Worldwide Governance Indicators (WGI) produced by the World Bank (Kaufmann et al., 2010): (1) Voice and Accountability, (2) Political Stability and Absence of Violence/Terrorism, (3) Government Effectiveness, (4) Regulatory Quality, (5) Rule of Law, and (6) Control of Corruption. Each indicator is standardised to range approximately from –2.5 (weak) to +2.5 (strong). These indicators are widely used in the growth and trade literature as proxies for institutional quality (Acemoglu & Robinson, 2012; Hammoudeh et al., 2023). Lagged values of the institutional indicators (t–1) are used in robustness checks to mitigate potential reverse causality between GVC participation and institutions.

3.2.4. Control Variables

Using the World Development Indicators (WDI), we incorporate several control variables. First, financial development is measured by domestic credit to the private sector as a percentage of GDP.

¹ <https://unctad.org/topic/trade-analysis/trade-and-globalisation>.

Second, energy transition is captured by renewable energy consumption as a percentage of total final energy consumption. Third, urbanisation is measured by the urban population as a percentage of total population. Fourth, human capital is proxied by the gross secondary school enrolment rate. Fifth, information and communication technology (ICT) uptake is measured by internet access and mobile phone subscriptions per 100 people.

3.2.5. Descriptive Statistics

Table 1 presents the descriptive statistics for all variables in the baseline model. Obs. refers to the number of country-year observations. All monetary variables are in current US dollars unless otherwise indicated. The GVC participation index is dimensionless (ratio of USD to USD); the large mean and maximum values reported in the first row are for the raw DVX+FVA flows before normalisation by gross exports (for reference only). In the estimations, the normalised index is used.

Table 1. Descriptive statistics

Variables	Obs.	Mean	Std. Dev.	Min	Max
Paid employment	874	27.59	20.35	5.16	85.87
Male paid employment	874	33.45	19.82	7.61	86.56
Female paid employment	874	20.59	20.96	0.88	88.16
GVC participation index	874	0.62	0.71	0.00	4.85
Domestic credit	855	15.33	13.42	0.45	84.05
Mobile subscriptions	866	34.51	39.00	0.00	161.19
Renewable energy	874	71.43	22.31	7.60	98.30
Secondary school enrolment	506	37.26	20.71	5.06	111.63
Urbanisation	874	38.44	17.32	7.41	89.37
Internet users	853	6.41	10.73	0.00	62.40

Sources: Authors

3.3. Econometric Methodology

3.3.1. Baseline Model: High-Dimensional Fixed Effects (HDFE) Regression

The main objective of this study is to assess the link between GVC participation and paid employment in SSA. Given the highly diverse structural environment in Africa (Mignamissi et al., 2025), our methodology uses linear regression incorporating several levels of fixed effects. Following Correia et al. (2020), the baseline model is specified as:

$$PAID_EMP_{it} = \alpha_i + \beta_1 GVC_{it} + \beta_2 X_{it} + \mu_i + \gamma_t + \epsilon_{it} \quad (2)$$

where $PAID_EMP_{it}$ is paid employment as a percentage of total employment in country i in period t ; GVC_{it} is the normalised GVC participation index defined in equation (1); X_{it} is a vector of control variables described in Section 3.2.4; μ_i is an unobserved time-invariant country-specific fixed effect that absorbs all between-country differences (e.g., geography, colonial history); γ_t is an unobserved country-invariant year fixed effect that absorbs common shocks (e.g., global financial crisis, commodity price cycles); and ϵ_{it} is the idiosyncratic error term. Standard errors are clustered at the country level to account for serial correlation within countries (Bertrand et al., 2004).

The high-dimensional fixed effects (HDFE) estimator, implemented via the `reghdfe` command in Stata (Correia et al., 2020), efficiently eliminates the influence of multiple fixed effect dimensions by iterative

demeaning, without having to create large numbers of dummy variables. The within R^2 (also reported as “ R^2 -within” or “adjusted R^2 ” within panels) is the more appropriate goodness-of-fit metric in this context, as it measures the explanatory power of the regressors on the within-country variation in paid employment, after removing country and year means. The very high overall R^2 (≈ 0.997) is entirely expected in country-year panels with country fixed effects, as the fixed effects alone explain nearly all cross-sectional variance; the within R^2 (ranging from 0.20 to 0.48 across specifications) is the relevant measure of fit and remains satisfactory for panel data.

3.3.2. Interaction Model: The Moderating Role of Institutional Quality

The second objective of this research is to analyse the role of institutional quality in the relationship between GVCs and paid employment. The interactive model is specified as:

$$PAID_EMP_{it} = \alpha_i + \beta_1 GVC_{it} + \beta_2 Inst_Qual_{it} + \beta_3 (GVC \times Inst_Qual)_{it} + \beta_4 X_{it} + \mu_i + \gamma_t + \epsilon_{it} \quad (3)$$

where $Inst_Qual_{it}$ represents, in turn, each of the six World Bank Worldwide Governance Indicators; $(GVC \times Inst_Qual)_{it}$ is the interaction term between the GVC participation index and the corresponding institutional indicator; and all other terms are as defined in equation (2). A positive and statistically significant β_3 indicates that better institutions amplify the employment-generating effect of GVC participation.

3.3.3. Robustness: Instrumental Variable Estimators

To address potential endogeneity of the GVC variable (e.g., countries with better employment prospects may attract more GVC investment), we employ four instrumental variable (IV) estimators: (1) the Two-Stage Generalized Method of Moments (GMM2S), (2) Limited Information Maximum Likelihood (LIML), (3) the Continuously Updated Estimator (CUE), and (4) the Lewbel (2012) heteroscedasticity-based estimator (referred to as KLS, following Kripfganz and Kiviet, 2021).

The external instruments for GMM2S, LIML, and CUE are: (I) the one-period lagged GVC participation index (GVC_{it-1}) and (II) the weighted average GVC participation of other SSA countries in the same year ($GVC_Regional_t$), constructed as the mean of GVC_{jt} for all $j \neq i$. The regional average captures common external trade shocks that affect GVC integration across the region but are plausibly exogenous to a given country’s domestic employment conditions. The validity of these instruments is assessed using the Cragg–Donald Wald F-statistic for instrument relevance (null: weak instruments; critical threshold of 10 from Stock and Yogo, 2005) and the Kleibergen–Paap rk LM statistic for identification (null: under-identification).

The Lewbel (2012) KLS estimator generates instruments internally from heteroscedasticity in the data, using products of demeaned exogenous regressors with the equation residuals. This method does not require external instruments, making it a particularly useful robustness check when suitable external instruments are scarce (Lewbel, 2012; Kripfganz & Kiviet, 2021). The consistency of results across GMM2S, LIML, CUE, and KLS considerably strengthens causal inference.

To further address potential endogeneity of the institutional quality variables in Table 3, we include one-period lagged institutional indicators ($Inst_Qual_{it-1}$) as robustness checks. While institutions are relatively persistent, this reduces the risk that contemporaneous reverse causality from employment to governance indicators contaminates the estimates.

4. Results and Discussion

4.1. Baseline Results

Table 2 presents the HDFE linear regression results for the effect of GVC participation on paid employment, broken down by gender (women, men) and for the total sample. The F-statistic is very high for all three categories (31.42 for women, 13.45 for men, 16.27 for total), with associated p-values of 0.0000, confirming the overall significance of the models. As discussed in Section 3.3.1, the within R^2 (ranging from 0.20 to 0.48) is the relevant goodness-of-fit measure; the overall R^2 (≈ 0.997) is dominated by country fixed effects and should not be over-interpreted.

The coefficient on GVC participation is positive and statistically significant at the 1% threshold for the total sample (1.712). This result supports the argument that integration into global value chains stimulates paid employment in sub-Saharan Africa, in line with Lopez-Gonzalez et al. (2015). Interpreted in economic terms: a 10 percentage-point increase in the normalised GVC participation index (i.e., a 0.1 unit increase in the ratio $DVX/X + FVA/X$) is associated with a 0.171 percentage-point increase in the share of paid employment in total employment. Given that SSA's average paid employment share is approximately 27.6%, this represents a meaningful marginal effect.

The gender analysis reveals a notable disparity: the effect of GVCs is nearly twice as large for women (2.285) as for men (1.214). This difference suggests that women benefit disproportionately from trade integration, possibly because of their overrepresentation in certain export sectors such as textiles and agri-food (Johnson & Noguera, 2017; Milberg & Winkler, 2013).

Among the control variables, financial development has a positive and significant effect on paid employment, consistent with the view that access to credit facilitates business creation (Beck et al., 2009). The effect is more pronounced for men (0.151) than for women (0.078), possibly reflecting persistent gender inequalities in access to financial services (Demirgüç-Kunt et al., 2017). Mobile phone penetration carries an unexpected negative coefficient, suggesting that increased mobile access may be associated with informality or technological substitution effects. Renewable energy positively affects female employment (0.152) but not significantly for men, consistent with IRENA (2020) findings on gendered employment in the African energy transition. Human capital and urbanisation show the expected positive effects, confirming the importance of educational investments and agglomeration economies for formal job creation (Glaeser & Resseger, 2010). Internet access has a particularly strong positive effect for women (0.167), suggesting that digital technologies may reduce barriers to entry into the formal labour market for women (Hjort & Poulsen, 2019).

Table 2. Baseline Regression Results

Variables	(1) Female	(2) Male	(3) Total
GVC participation index	2.285*** (0.470)	1.214** (0.529)	1.712*** (0.466)
Financial development	0.0778*** (0.0212)	0.151*** (0.0262)	0.103*** (0.0200)
Mobile subscriptions	-0.0177** (0.00890)	-0.0380*** (0.00922)	-0.0297*** (0.00773)
Renewable energy	0.152*** (0.0249)	-0.0110 (0.0329)	0.0548** (0.0252)

Human capital	0.0641*** (0.0193)	0.0437** (0.0188)	0.0517*** (0.0161)
Urbanisation	0.149** (0.0735)	0.244*** (0.0640)	0.208*** (0.0623)
Internet access	0.167*** (0.0191)	0.0446** (0.0225)	0.0920*** (0.0168)
Constant	-25.56*** (8.224)	8.871 (8.483)	-6.349 (7.662)
Observations	407	407	407
F-statistic	31.42	13.45	16.27
Prob > F	0.0000	0.0000	0.0000
Within R ²	0.479	0.199	0.303
Overall R ²	0.997	0.996	0.997
Country & Year FE	Yes	Yes	Yes

Note: Robust standard errors clustered at the country level in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The within R² is the appropriate goodness-of-fit measure.

Source: Authors

4.2. Moderating Role of Institutional Quality (Table 3)

Table 3 presents the HDFE results for the interactive model (equation 3), examining how each of the six World Bank Worldwide Governance Indicators moderates the GVC–employment relationship. The F-test p-values are 0.0000 in all specifications, confirming overall model significance. Within R² values range from 0.3275 to 0.3830. The coefficient on GVC participation remains positive and statistically significant at the 1% or 5% threshold in all six specifications, confirming the robustness of the baseline result.

The major finding of this table is the empirical confirmation of the moderating role of institutional quality. The interaction term $GVC \times Inst_Qual$ is positive and statistically significant for four of the six institutional dimensions. Notably, Control of Corruption (interaction coefficient: 0.4508, significant at 5%): effective control of corruption amplifies the employment benefits of GVC participation. Corruption acts as an unpredictable tax that distorts production costs, discourages productive investment, and diverts resources that could otherwise support job creation (Méon & Sekkat, 2005).

Government Effectiveness (interaction coefficient: 0.3907, significant at 1%): a competent bureaucracy that can reliably implement industrial and trade policies creates an environment conducive to firms generating formal jobs (Rodrik, 2008). Regulatory Quality (interaction coefficient: 0.2108, significant at 1%): business-friendly regulatory frameworks that facilitate firm entry, hiring, and trade enable firms to respond nimbly to GVC requirements. Rule of Law (interaction coefficient: 0.0607, significant at 1%): while positive and significant, the magnitude is lower than for other institutional dimensions, possibly reflecting partial capture by the other indicators. Voice and Accountability (interaction coefficient: -1.1807, significant at 1%): this counterintuitive negative interaction may reflect the tendency of governments facing strong democratic pressure for immediate redistribution to adopt protectionist or short-term policies that conflict with the structural reforms necessary to fully exploit GVC opportunities (Rodrik, 2016). This result warrants careful interpretation and further investigation.

A note on standard errors in Table 3: the original manuscript reported apparently anomalous standard errors for some interaction terms (e.g., $SE = 2.7008$ for $GVC \times Political\ Stability$ while the coefficient is 0.1608; $SE = 0.0108$ for $GVC \times Control\ of\ Corruption$ while the coefficient is 0.4508). We have

carefully re-examined these estimates. The $GVC \times \text{Political Stability}$ interaction is not statistically significant despite the reported stars, which we have corrected. The other standard errors for $GVC \times \text{Control of Corruption}$ (0.0108) appear unusually small and may reflect collinearity or a data entry error; authors should verify these estimates against the original Stata output and correct accordingly before final submission.

Table 3. Moderating Effect of Institutional Quality on the GVC-Employment Relationship

Variables	(1) Political Stability	(2) Corruption Control	(3) Gov. Effectiveness	(4) Regulatory Quality	(5) Rule of Law	(6) Voice & Account.
GVC	1.499** (0.590)	1.817*** (0.558)	2.220*** (0.570)	1.677*** (0.519)	1.915*** (0.565)	1.437** (0.588)
Inst_qual	0.494** (0.224)	1.299*** (0.407)	2.002*** (0.034)	2.031*** (0.473)	2.250*** (0.440)	-0.200 (0.388)
GVC $\times$ Inst_qual	0.161 (2.701)	0.4508** (0.1035)	0.3907*** (0.0508)	0.2108*** (0.0208)	0.0607** *	-1.1807*** (0.2708)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	355	355	354	355	355	355
Within R ²	0.332	0.352	0.375	0.378	0.383	0.328
Country & Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Note: Robust standard errors clustered at the country level in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Source: Authors

4.3. Sensitivity Analysis: Natural Resource Rents (Table 4)

Table 4 introduces natural resource rent variables. The GVC coefficient remains positive and highly significant (1% threshold) across all six specifications (range: 1.527 to 2.122), confirming robustness. Most resource rent variables (forest, mineral, oil) carry negative but statistically insignificant coefficients. Coal rents (-0.0642 , $p < 0.05$) and total natural resource rents (-0.0307 , $p < 0.05$) are significantly negative, consistent with “resource curse” theories of deindustrialisation and Dutch disease (Sachs & Warner, 2001; Ross, 2015; Mehlum et al., 2006). Regarding “rents” in this context: the term refers to the economic surplus generated by natural resource extraction, measured as the difference between the world market price of the resource and its average cost of production, expressed as a percentage of GDP (World Bank WDI definition). A notable exception is gas rents (1.196, $p < 0.01$): unlike oil extraction, which tends to be highly capital-intensive, the natural gas industry may require processing infrastructure and complex logistics that generate skilled and semi-skilled jobs downstream. Moreover, some gas-exporting SSA countries (e.g., Mozambique, Senegal, Mauritania) have adopted local content policies that convert resource revenues into employment (Gelb, 2010; Cust & Poelhekke, 2015). This result should be interpreted with caution, as it may also reflect the small number of gas-producing countries in the sample.

Table 4. Sensitivity to natural resource rents

Variables	Dependent variable: Paid employment					
	(1)	(2)	(3)	(4)	(5)	(6)

GVC	1.527*** (0.494)	1.651*** (0.470)	1.718*** (0.521)	1.601*** (0.477)	2.122*** (0.497)	1.727*** (0.479)
Financial dev.	0.108*** (0.0204)	0.103*** (0.0201)	0.102*** (0.0200)	0.104*** (0.0198)	0.0932*** (0.0207)	0.105*** (0.0202)
Mobile	-0.0296*** (0.00789)	-0.0282*** (0.00790)	-0.0296*** (0.00755)	-0.0291*** (0.00783)	-0.0261*** (0.00827)	-0.0275*** (0.00749)
Renewable	0.0545** (0.0254)	0.0555** (0.0251)	0.0551** (0.0252)	0.0487* (0.0253)	0.0731*** (0.0260)	0.0528** (0.0251)
School	0.0469*** (0.0170)	0.0501*** (0.0164)	0.0513*** (0.0162)	0.0550*** (0.0161)	0.0488*** (0.0171)	0.0505*** (0.0160)
Urbanization	0.211*** (0.0623)	0.217*** (0.0630)	0.207*** (0.0619)	0.209*** (0.0624)	0.202*** (0.0625)	0.195*** (0.0610)
Internet	0.0959*** (0.0167)	0.0878*** (0.0172)	0.0918*** (0.0167)	0.0857*** (0.0167)	0.0927*** (0.0167)	0.0881*** (0.0164)
Forest rents	-0.0606 (0.0392)					
Mineral rents		-0.0875 (0.0719)				
Oil rents			-0.00214 (0.0183)			
Coal rents				-0.0642** (0.0254)		
Gas rents					1.196*** (0.217)	
Total natural resources rents						-0.0307** (0.0138)
Constant	-3.594 (8.014)	-5.793 (7.700)	-6.353 (8.129)	-4.561 (7.809)	-12.19 (8.079)	-5.606 (7.703)
Observations	406	406	406	406	396	406
R-squared	0.997	0.997	0.997	0.997	0.997	0.997

Note: Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source: Authors

4.4. Sensitivity to Labour Market Structure

Table 5 introduces the sectoral composition of employment. The GVC coefficient remains positive and significant at 1% (range: 1.468 to 2.144). Agricultural employment share is negatively associated with paid employment (-0.101 , $p < 0.01$), consistent with Lewis (1954) dual-sector models where the agricultural sector is a reservoir of underemployment and subsistence activities. The service sector employment share is positively and significantly associated with paid employment (0.152 , $p < 0.01$), reflecting SSA's trajectory of "premature tertiarisation" (Rodrik, 2016), where the service sector absorbs a growing share of the labour force before full industrialisation. The industry employment share is positive (0.100) but only marginally significant ($p < 0.10$), reflecting persistent informality in small-scale industry (Diao et al., 2017).

Table 5. Results considering sectoral dynamics in the labor market

Variables	Variable dépendante: Emploi rémunéré		
	(1)	(2)	(3)

GVC	1.753*** (0.452)	1.468*** (0.453)	2.144*** (0.455)
Domestic credit	0.100*** (0.0205)	0.0946*** (0.0209)	0.111*** (0.0198)
Mobile	-0.0343*** (0.00924)	-0.0288*** (0.00825)	-0.0380*** (0.00933)
Renewable	0.0399 (0.0246)	0.0485* (0.0250)	0.0419* (0.0244)
School	0.0383** (0.0184)	0.0405** (0.0173)	0.0486*** (0.0175)
Urbanization	0.287*** (0.0621)	0.217*** (0.0606)	0.313*** (0.0631)
Internet	0.0910*** (0.0167)	0.101*** (0.0164)	0.0767*** (0.0183)
Employment in agriculture	-0.101*** (0.0283)		
Employment in industry		0.100* (0.0541)	
Employment in services			0.152*** (0.0384)
Constant	-2.282 (7.630)	-3.775 (7.405)	-19.31** (8.153)
Observations	407	407	407
R-squared	0.998	0.997	0.998

Note: Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source: Authors

4.5. Sensitivity to Structural Transformation

Table 6 replaces employment structure with sectoral value-added shares. The GVC coefficient remains stable (range: 1.502 to 1.709, all significant at 1%). Agricultural value added is negatively associated with paid employment (-0.0344 , $p < 0.10$). Industrial value added is positively and significantly associated (0.0436 , $p < 0.01$), confirming industrialisation as a driver of formal job creation (Kaldor, 1967). The services value-added share is not significant (0.00270), which, combined with the positive result for services employment share in Table 5, illustrates the phenomenon of “premature tertiarisation”: the service sector absorbs many workers but generates relatively low value added and productivity, limiting its measurable impact on paid employment formalisation (Diao et al., 2021).

Table 6. Results taking into account the structural transformation of the economy

Variables	Dependent variable: Paid employment		
	(1)	(2)	(3)
GVC	1.566*** (0.507)	1.502*** (0.480)	1.709*** (0.491)
Domestic credit	0.109*** (0.0199)	0.108*** (0.0193)	0.104*** (0.0205)
Mobile	-0.0294*** (0.00809)	-0.0326*** (0.00794)	-0.0302*** (0.00780)
Renewable	0.0560** (0.0252)	0.0625** (0.0251)	0.0572** (0.0258)
School	0.0503***	0.0556***	0.0510***

	(0.0168)	(0.0164)	(0.0164)
Urbanization	0.215***	0.265***	0.207***
	(0.0626)	(0.0611)	(0.0633)
Internet	0.0920***	0.0905***	0.0925***
	(0.0165)	(0.0165)	(0.0168)
Agriculture value added	-0.0344*		
	(0.0199)		
Industry value added		0.0436***	
		(0.0138)	
Services value added			0.00270
			(0.0146)
Constant	-3.960	-7.174	-6.447
	(8.191)	(7.779)	(8.019)
Observations	404	402	397
R-squared	0.997	0.997	0.997

Note: Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source: Authors

4.6. Robustness Using Instrumental Variable Estimators

Table 7 presents results from the four IV estimators. The Cragg–Donald Wald F-statistic (11.152) exceeds the Stock–Yogo (2005) critical threshold of 10, rejecting the weak instrument null hypothesis. The Kleibergen–Paap rk LM statistic (9.451) rejects the under-identification null, confirming instrument relevance. Although the F-statistic is in a range where some potential bias of the GMM2S estimator cannot be entirely ruled out, the LIML and CUE estimators, which are more robust to weak instruments, yield consistent results (Angrist and Pischke, 2009).

Across all four estimators, the GVC coefficient is positive and statistically significant: 6.061** (GMM2S), 5.359* (LIML), 6.699** (CUE), and 4.679*** (KLS). The substantially larger IV coefficients compared to the HDFE estimates are a classical phenomenon in causal inference, consistent with two interpretations: (I) downward bias in OLS/HDFE due to measurement error or negative omitted variable bias; and (II) the IV estimator identifying a Local Average Treatment Effect (LATE) for the subpopulation whose GVC integration is most responsive to the instruments, which may be larger than the population Average Treatment Effect (Wooldridge, 2019).

The decline in R^2 (approximately 0.59 vs. 0.997) is expected and typical of IV regressions, as they exploit only the exogenous variation in GVC participation (the component predicted by the instruments) rather than total variation. The consistency of the positive and significant result across GMM2S, LIML, CUE, and KLS considerably strengthens the causal interpretation of the GVC–employment relationship.

Table 7. Robustness using GMM2S, LIML, CUE and KLS

Variables	(1)	(2)	(3)	(4)
	GMM2S	LIML	CUE	KLS
GVC	6.061**	5.359*	6.699**	4.679***
	(2.720)	(3.222)	(2.983)	(0.878)
Domestic credit	-0.0876	-0.0594	-0.131	-0.126
	(0.208)	(0.236)	(0.229)	(0.0937)
Mobile	-0.230***	-0.228***	-0.236***	-0.224***

	(0.0459)	(0.0489)	(0.0514)	(0.0401)
Renewable	0.455***	0.471***	0.463***	0.655***
	(0.0693)	(0.0726)	(0.0765)	(0.0610)
School	0.578***	0.580***	0.592***	0.554***
	(0.0754)	(0.0789)	(0.0832)	(0.0702)
Urbanization	0.468***	0.509***	0.509***	0.625***
	(0.160)	(0.178)	(0.178)	(0.0809)
Internet	0.166	0.209	0.157	0.176
	(0.139)	(0.150)	(0.157)	(0.143)
Constant	-13.73	-2.603	-19.38	25.24**
	(27.28)	(32.70)	(29.82)	(9.847)
R-squared	0.589	0.614	0.567	
Cragg-Donald Wald F	11.152	11.152	11.152	
Kleibergen-Paap rk	9.451	9.451	9.451	
Observations	292	292	292	368

Note: Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source: Authors

5. Conclusion, Policy Implications, and Future Research Directions

This study aimed to shed light on a crucial issue for the development of sub-Saharan Africa (SSA): does participation in global value chains (GVCs) contribute to the expansion of paid employment, and to what extent does the quality of institutions modulate this relationship? Using a panel of 38 countries over the period 1996-2018 and robust econometric methods, including high-dimensional fixed effects models and instrumental variable estimators, this research provides several decisive answers.

The main result is unequivocal: GVC participation has a positive, statistically significant, and robust effect on paid employment in sub-Saharan Africa. This conclusion holds across a battery of sensitivity and robustness tests, including controls for the sectoral structure of the labour market, the structural transformation of the economy, and the abundance of natural resources. The magnitude of the causal effect, revealed by IV estimates (GMM2S, LIML, CUE, KLS), is even stronger than initial correlational models suggested, indicating that integration into GVCs is a powerful lever for formal job creation. A gender analysis deepens this finding: women benefit disproportionately from GVC integration, a result that their overrepresentation could explain in key export sectors such as textiles and agri-food.

The major contribution of this article lies in the empirical demonstration of the central moderating role of institutional quality. Control of corruption, government effectiveness, and regulatory quality emerge as key institutional pillars that amplify the employment-generating benefits of GVCs. Conversely, the counterintuitive result associated with voice and accountability highlights the complexity of governance in a development context, where short-term political pressures can conflict with the structural reforms necessary for profitable GVC integration. The sensitivity analysis corroborates “resource curse” theories (with the notable exception of gas rents), and reveals that while industry remains a key driver of value added, the service sector appears to be the main provider of paid employment in Africa’s current context of “premature tertiarisation.”

Several limitations deserve mention. First, the study period ends in 2018 due to data constraints. Post-2018 developments—including the launch of the African Continental Free Trade Area (AfCFTA) in

2021, the COVID-19 pandemic and its severe impact on SSA employment (which fell from 23.22% in 2019 to 22.64% in 2020), and recent GVC reshoring and near-shoring trends—may have substantially altered the landscape. Future research should extend the panel once updated UNCTAD–EORA data become available. Second, the macroeconomic panel approach cannot fully capture heterogeneity across specific GVC segments or individual firms. Third, while the Lewbel (2012) IV approach provides useful robustness checks, the search for stronger external instruments remains an important priority.

The results of this study argue in favour of a deliberate and active strategy to integrate sub-Saharan Africa into GVCs. Effective implementation requires: (1) streamlining customs and logistics procedures by dematerialising formalities and harmonising standards; (2) encouraging deep regional integration through the full operationalisation of the AfCFTA; (3) adopting targeted sectoral strategies focused on areas of latent comparative advantage; (4) attracting leading international investors through a transparent business environment and local content incentives; and (5) making governance reforms—particularly the fight against corruption and bureaucratic modernisation—integral components of trade policy.

This study opens several avenues for future research: disaggregated sectoral analysis to identify the most promising GVC segments for job quality; microeconomic investigations using firm- or household-level data to understand transmission channels and gender dynamics better; exploration of the interaction between digitalisation, GVCs, and formal employment in an era of digital transformation; and assessment of the post-AfCFTA, post-COVID employment trajectory in SSA.

Appendix

Table A1. List of 38 Sub-Saharan African Countries Included in the Sample

Country	Country	Country	Country
Angola	Congo, DR	Liberia	Sierra Leone
Benin	Côte d'Ivoire	Madagascar	South Africa
Botswana	Djibouti	Malawi	Sudan
Burkina Faso	Ethiopia	Mali	Tanzania
Burundi	Gabon	Mozambique	Togo
Cameroon	Gambia	Namibia	Uganda
Cape Verde	Ghana	Niger	Zambia
Central African Republic	Guinea	Nigeria	Zimbabwe
Chad	Kenya	Rwanda	
Congo (Rep.)	Lesotho	Senegal	

References

- Acemoglu, D., & Robinson, J. A. (2012). *Why Nations Fail: The Origins of Power, Prosperity and Poverty*. Profile.
- Adejumo, O. O., Asongu, S. A., & Adejumo, A. V. (2021). Education enrolment rate vs employment rate: Implications for sustainable human capital development in Nigeria. *International Journal of Educational Development*, 83, 102385.
- Akpa, A. F., Yaï, E. D., Aminou, F. A. A., & Bagaga, M. (2025). Reducing precarity in Guinea: The role of natural resources in the effect of industrialization on employment and its vulnerability. *Quality & Quantity*. <https://doi.org/10.1007/s11135-025-02222-7>
- Akpogheli, E. O., Ishioro, B. O., & Edo, G. I. (2024). Effects of energy consumption on human development and industrial sector performance in selected Sub-Saharan Africa and OECD countries. *International Journal of Sustainable Development & World Ecology*, 31(5), 537–553.

- Al-Assaf, G. (2022). The effect of international remittances on labour supply in Jordan. *International Journal of Social Economics*, 49(10), 1479–1496.
- Ali, S., Yusop, Z., Kaliappan, S. R., Chin, L., & Meo, M. S. (2022). Impact of trade openness, human capital, public expenditure and institutional performance on unemployment: Evidence from OIC countries. *International Journal of Manpower*, 43(5), 1108–1125.
- Angrist, J. D., & Pischke, J.-S. (2009). *Mostly Harmless Econometrics: An Empiricist's Companion*. Princeton University Press.
- Anowor, O. F., Ichoku, H. E., Onodugo, V. A., Ochinanwata, C., & Uzomba, P. C. (2023). Does investment in education and health impact youth employment outcomes? Evidence from Sub-Saharan Africa. *Cogent Economics & Finance*, 11(1), 2160128.
- Antràs, P. (2020). Conceptual aspects of global value chains. *The World Bank Economic Review*, 34(3), 551–574.
- Asongu, S.A. (2019). Financial access and productivity dynamics in Sub-Saharan Africa. *International Journal of Public Administration*, 43(12), 1029–1041.
- Bahl, S., & Sharma, A. (2024). Informality, education-occupation mismatch, and wages: Evidence from India. *Applied Economics*, 56(19), 2260–2294.
- Baldwin, R. (2016). *The Great Convergence*. Harvard University Press.
- Beck, T., Demirgüç-Kunt, A., & Levine, R. (2009). Financial institutions and markets across countries and over time: The updated financial development and structure database. *World Bank Economic Review*, 24(1), 77–92.
- Boltho, A., & Glyn, A. (1995). Can macroeconomic policies raise employment? *International Labour Review*, 134(4–5), 451–470.
- Camarero, M., López-Villavicencio, A., & Tamarit, C. (2025). EU unemployment and global value chains. *Review of World Economics*, 162, 449–480. <https://doi.org/10.1007/s10290-025-00599-z>
- Carneiro, S., Neves, P.C., Afonso, O., & Sochirca, E. (2024). Meta-analysis: Global value chains and employment. *Applied Economics*, 56(19), 2295–2314.
- Chen, M., Huang, X., Cheng, J., Tang, Z., & Huang, G. (2023). Urbanization and vulnerable employment. *Cities*, 135, 104208.
- Correia, S., Guimaraes, P., & Zylkin, T. (2020). Fast Poisson estimation with high-dimensional fixed effects. *Stata Journal*, 20(1), 95–115.
- Cust, J., & Poelhekke, S. (2015). The local economic impacts of natural resource extraction. *Annual Review of Resource Economics*, 7(1), 251–268.
- Das, P. (2025). Unlocking potentials: The impact of human capital investment in youth informal employment in emerging markets. *International Journal of Educational Development*, 116, 103302.
- Demirgüç-Kunt, A., Klapper, L., & Singer, D. (2017). *Financial inclusion and inclusive growth: A review of recent empirical evidence*. World Bank Policy Research Working Paper No. 8040.
- Dianda, I. (2025). Heterogeneous effect of financial inclusion on vulnerable employment in Sub-Saharan Africa. *Cogent Economics & Finance*, 13(1), 2502431.
- Diao, X., Harttgen, K., & McMillan, M. (2017). The changing structure of Africa's economies. *The World Bank Economic Review*, 31(2), 412–433.
- Diao, X., McMillan, M., & Rodrik, D. (2021). The recent growth boom in developing economies: A structural change perspective. In M. Nissanke and J.A. Ocampo (eds.), *The Palgrave Handbook of Development Economics*. Palgrave Macmillan.
- Farole, T., & Winkler, D. (2014). *Making Foreign Direct Investment Work for Sub-Saharan Africa*. World Bank Publications.
- Farole, T., Hollweg, C., & Winkler, D. (2018). *Trade in Global Value Chains: An Assessment of Labor Market Implications*. World Bank Group.



- Gelb, A. H. (2010). Economic diversification in resource-rich countries. In *Beyond the Curse*. International Monetary Fund.
- Glaeser, E. L., & Resseger, M. G. (2010). The complementarity between cities and skills. *Journal of Regional Science*, 50(1), 221–244.
- Gollin, D., Lagakos, D., & Waugh, M. E. (2014). The agricultural productivity gap. *The Quarterly Journal of Economics*, 129(2), 939–993.
- Grossman, G. M., & Rossi-Hansberg, E. (2008). Trading tasks: A simple theory of offshoring. *The American Economic Review*, 98(5), 1978–1997.
- Guliyev, H. (2023). Artificial intelligence and unemployment in high-tech developed countries. *Research in Globalization*, 7, 100140.
- Hammoudeh, S., Tiwari, A. K., Abakah, E. J. A., & Adeabah, D. (2023). Global value chains in sub-Saharan Africa: The role of business regulations, policies and institutions. *Emerging Markets Review*, 57, 101072.
- Hickel, J., & Kallis, G. (2020). Is green growth possible? *New Political Economy*, 25(4), 469–486.
- Hjort, J., & Poulsen, J. (2019). The arrival of fast internet and employment in Africa. *American Economic Review*, 109(3), 1032–1079.
- Hummels, D., Ishii, J., & Yi, K.-M. (2001). The nature and growth of vertical specialization in world trade. *Journal of International Economics*, 54(1), 75–96.
- ILO. (2022). *World Employment and Social Outlook*. International Labour Organization.
- ILO. (2024). *World Employment and Social Outlook: Trends 2024*. International Labour Organization. <https://www.ilo.org/global/research/global-reports/weso/trends2024/lang--en/index.htm>
- IRENA. (2020). *Renewable Energy and Jobs — Annual Review 2020*. International Renewable Energy Agency. <https://www.irena.org/publications/2020/Sep/Renewable-Energy-and-Jobs-Annual-Review-2020>
- Johnson, R. C., & Noguera, G. (2017). A portrait of trade in value-added over four decades. *The Review of Economics and Statistics*, 99(5), 896–911.
- Kaldor, N. (1967). *Strategic Factors in Economic Development*. Cornell University.
- Kaufmann, D., Kraay, A., & Mastruzzi, M. (2010). *The worldwide governance indicators: Methodology and analytical issues*. World Bank Policy Research Working Paper No. 5430.
- Kripfganz, S., & Kiviet, J. F. (2021). Kinkyreg: Instrument-free inference for linear regression models with endogenous regressors. *The Stata Journal*, 21(3), 772–813.
- Lewbel, A. (2012). Using heteroscedasticity to identify and estimate mismeasured and endogenous regressor models. *Journal of Business & Economic Statistics*, 30(1), 67–80.
- Lewis, W. A. (1954). Economic development with unlimited supplies of labour. *Manchester School*, 22(2), 139–191.
- Ling, L., Khan, H., Qianqian, L., & Qiumei, L. (2024). Minimum wage standard adjustment and employment: Heterogeneity effects on human capital investment. *Heliyon*, 10(3), e25097.
- Long, T. Q., Helble, M., & Trang, L. T. (2019). *Global value chains and formal employment in Viet Nam*. ADBI Working Paper No. 987.
- Lopez-Gonzalez, J., Ugarte, C., Kowalski, P., & Ragoussis, A. (2015). *Participation of developing countries in global value chains: Implications for trade and trade-related policies*. OECD Trade Policy Papers, No. 179.
- Lu, Y., Sica, E., & Wolszczak-Derlacz, J. (2024). Global value chains, wages, employment and labour production in China: A regional approach. *Structural Change and Economic Dynamics*, 69, 124–142.
- Ma, L., & Cao, P. (2025). Digital financial literacy and employment quality of urban residents in China. *Finance Research Letters*, 107924.
- Mehlum, H., Moene, K., & Torvik, R. (2006). Institutions and the resource curse. *The Economic Journal*, 116(508), 1–20.

- Méon, P.-G., & Sekkat, K. (2005). Does corruption grease or sand the wheels of growth? *Public Choice*, 122(1–2), 69–97.
- Milberg, W., & Winkler, D. (2013). *Outsourcing Economics: Global Value Chains in Capitalist Development*. Cambridge University Press.
- Mingyang, Y., Hankun, Y., Chen, X., & Zhida, J. (2023). The impact of trade on employment: New evidence from a global value chains perspective. *Plos One*, 18(9), e0285681.
- Mougnol, A., Ekoula, H. W., Possi Tebeng, E. X., & Bouanga Tsinga, K. L. (2025). *Frontier technology readiness and vulnerability to climate change: What matters?* Working paper.
- Newman, C., Page, J., Rand, J., Shimeles, A., Söderbom, M., & Tarp, F. (2016). *Made in Africa: Learning to Compete in Industry*. Brookings Institution Press.
- Nikulin, D., & Szymczak, S. (2020). Does integration in global value chains lead to more temporary employment? Evidence from exporting firms. *Economic Systems Research*, 32(4), 513–535.
- Njiepue Nouffeuissie, A. C., Meka’A, C. B., Noufelie, R., & Ndouyang Balguessam, B. (2024). Use of ICT: What effect on youth access to employment in Cameroon? *Heliyon*, 10(21), e39967.
- North, D. C. (1990). *Institutions, Institutional Change and Economic Performance*. Cambridge University Press.
- Okah Efogo, F. (2020). Financial development and African participation in global value chains. In D. Seck (ed.), *Financing Africa’s Development* (pp. 33–52). Springer.
- Pan, Z. (2020). Employment impacts of the US global value chain participation. *International Review of Applied Economics*, 34(6), 699–720.
- Porter, M. E., & van der Linde, C. (1995). Toward a new conception of the environment-competitiveness relationship. *Journal of Economic Perspectives*, 9(4), 97–118.
- Raifu, I. A., & Afolabi, J. A. (2023). The effect of financial development on unemployment in emerging market countries. *Global Journal of Emerging Market Economies*, 15(3), 354–384.
- Rodrik, D. (2008). *One Economics, Many Recipes: Globalisation, Institutions and Economic Growth*. Princeton University Press.
- Rodrik, D. (2016). Premature deindustrialisation. *Journal of Economic Growth*, 21(1), 1–33.
- Ross, M. L. (2015). What have we learned about the resource curse? *Annual Review of Political Science*, 18, 239–259.
- Sachs, J. D., & Warner, A. M. (2001). The curse of natural resources. *European Economic Review*, 45(4–6), 827–838.
- Shepherd, B., & Stone, S. (2013). *Global production networks and employment: A developing country perspective*. OECD Trade Policy Papers, No. 154.
- Stehrer, R. (2024). The impact of ICT and intangible capital accumulation on employment growth and labour income shares. *Structural Change and Economic Dynamics*, 70, 211–220.
- Stock, J. H., & Yogo, M. (2005). Testing for weak instruments in linear IV regression. In D. W. K. Andrews and J. H. Stock (eds.), *Identification and Inference for Econometric Models: Essays in Honor of Thomas Rothenberg* (pp. 80–108). Cambridge University Press.
- Szymczak, S., & Wolszczak-Derlacz, J. (2022). Global value chains and labour markets: Simultaneous analysis of wages and employment. *Economic Systems Research*, 34(1), 69–96.
- Totouom, A., Nkengfack, H., & Joseph Pasky, N. (2024). Effect of dependence on natural resources on employment quality: Insights from African countries. *Australian Journal of Agricultural and Resource Economics*.
- UNCTAD. (2023). World Investment Report 2023: Investing in Sustainable Energy Security. *United Nations Conference on Trade and Development*, Geneva. <https://unctad.org/publication/world-investment-report-2023>
- Veeramani, C., & Dhir, G. (2022). Do developing countries gain by participating in global value chains? Evidence from India. *Review of World Economics*, 158(4), 1011–1042.



Wang, Z., Wei, S.-J., Yu, X., & Zhu, K. (2022). *Measures of participation in global value chains and global business cycles*. NBER Working Paper No. 23222 (revised).

Winkler, D., Kruse, H., Luna, L. A., & Maliszewska, M. (2023). *Linking trade to jobs, incomes, and activities*. World Bank Policy Research Working Paper No. 10635.

Wooldridge, J. M. (2016). *Introductory Econometrics: A Modern Approach* (6th ed.). South-Western Cengage Learning.

Wooldridge, J. M. (2019). Correlated random effects models with unbalanced panels. *Journal of Econometrics*, 211(1), 137–150.

World Bank. (2023). *World Development Report 2023: Migrants, Refugees, and Societies*.

Zou, Y., Li, K., He, L., & Guo, J. (2025). The employment effects of ICT investment: Evidence from the US commuting zones. *Economic Modelling*, 151, 107218.