



Export Diversification and Government Intervention in Sub-Saharan Africa

Olawale Akinyele^a , James Temitope Dada^{a,*} 

a. Department of Economics, Obafemi Awolowo University, Ile-Ife, Nigeria

* Corresponding author, E-mail: jamesdada@oauife.edu.ng

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Abstract

The call for restructuring among economies characterized by mono-export practice becomes an alternative engine for driving a sustainable economy owing to potential indicators associated with diversification. This study assesses the intertemporal relationship between export diversification and government intervention among 14 Sub-Saharan African countries (SSA) between 1980 and 2019. Export diversification and government intervention are measures using the Theil indicator and stochastic frontier analysis, respectively, while system generalized methods of moments is used as the estimation technique. Findings from the study suggest the potency of government efficiency and effectiveness in addressing burgeon export diversification. Furthermore, the results validate the role of government expenditure, capital formation, and health expenditure in expatiating human development. The frontier result shows that larger SSA countries' government input factors for accentuating human development are accounted for by technical inefficiency. The result indicates that export concentration influenced the quality of government intervention among SSA countries. The study concludes with the need for reform that will powered diversification of African economy to have an effective trade agreement. Hence, the study recommends efficient government intervention through policies and reforms to achieve export diversification in SSA economies.

Keywords: Export Diversification, Efficiency, Human Development, Government Intervention.

JEL Classification: F13, H50, H51, O15.

1. Introduction

This study investigates the role of government intervention in the export diversification drive of sub-Saharan African countries. It is motivated by some issues in the research and policy circles. First, the call for restructuring among economies characterized by mono-export practice becomes an alternative engine for driving a sustainable economy owing to potential indicators associated with diversification. In addition, researchers

and policymakers have identified diversification as an engine for achieving a sustainable economy amidst developmental episodes. Diversification has been seen as a potential instrument for achieving a sustainable economy since it accelerates growth (Hesse, 2009; Naudé and Rossouw, 2011; Aditya and Acharyya, 2013; Dada and Abanikanda, 2022), discourages export concentration (Hesse, 2009; Munir and Javed, 2018), shields countries from adverse term of trade shocks, stabilizes revenue, discourages import dependence, and decreases the supply of risk-averse investors (Dawe, 1996).

Furthermore, export diversification became important, particularly among African countries characterized by low development indicators and high unemployment rates and ascribed as the world's poverty headquarters (Adebayo, 2018; Kazeem, 2018; Omodero, 2019; Dada and Fanowopo, 2020; United Nations Development Plan Report, 2021). The recent move toward a collective trade relation among African countries, as spelled out in the African Continental Free Trade Agreement (AfCFTA), is a step toward achieving better export diversification, trade sustainability, and economic integration among African countries and the rest of the world.

Furthermore, theories also emphasized the role of government in an economy. For instance, Keynesian proponents assert that the sustainability of an economy depends on the government's involvement since it provides an enabling environment and portends quality of service for the wellbeing of the populace. In addition, government's performance in any country determines the interaction of her economy with the rest of the world owing to the critical attribute of enabling environment such as infrastructural facilities and security created for the day-to-day activities of an economy. More so, government input factors should correspond to socioeconomic outcomes following insights from Wagner (1911), Peacock and Wiseman (1961), Musgrave (1969), and Keynesian proponents. An efficient government uses fewer resources to achieve potential outcomes. An enabling environment for diversification is a critical decision for the government that wants to achieve a sustainable economy, accelerates growth, discourages export concentration, shields countries from adverse terms of trade shocks, and stabilizes revenue. According to Keynesian proponents, an efficient governance process is needed to provide an adequate enabling and sustaining environment for an economy to operate.

However, empirical studies have remained inconclusive, with divergent views on the need for government involvement in economic activities. For instance, Sedrakyan and Candamio (2019), Gisore et al. (2014), Patricia and Izuhukwu (2013), Afonso and Jalles (2011), Hansson and Henrekson (1994), Barro and Sala-i-Martin (1992) and Barro (1990) established a direct relationship between government involvement and

the size of the economy, while studies by Landau (1983), Cashin, (1995), Kocherlakota and Yi (1997), Folster and Henrekson (2001), Abu-Bader and Abu-Qarn (2003), Schaltegger and Torgler (2006), Gregoriou and Ghosh (2009), Usman et al. (2011) and Olaoye et al. (2020) among others showed indirect nexus between government intervention and the size of the economy. Thus, regardless of the direction of the relationship, government institutions are held responsible for producing public goods (socioeconomic outcomes, infrastructure, and security), income distribution, and economic stability. Hence, any deviation from the actual objectives will be termed inefficient government involvement. This study, unlike previous work, investigates the performance of government involvement among countries in sub-Saharan Africa, characterized by enormous spending with low socioeconomic outcomes on export diversification.

Sub-Saharan African countries provide an interesting study area to examine the relationship. Over the years, government involvement in economic activities has increased, particularly among African countries. However, the increase in government expenditure among African countries has not translated to a rise in socioeconomic outcomes (Herrera and Pang, 2005; HDI Reports, 2019; Akinyele, 2019). This could be that export concentration has not been well anchored, or export diversification has not been situated within enabling and sustaining the environment. The need for government efficiency becomes inevitable as government involvement can be seen as the pillar that holds most of the African economy. Employing an unbalanced panel data on 14 countries in sub-Saharan Africa between 1980-2019, with the adoption of the Theil diversification index to measure export diversification, stochastic frontier to generate government efficiency and system generalized method of moments to address the issue of endogeneity found in the growth literature, this study addresses the gap in the literature by unearthing the role of government efficiency on export diversification drive. The Theil diversification index and stochastic frontier serve as a significant contribution of this study to the body of knowledge. Theil diversification index provides a comprehensive indicator (Cadot et al., 2011; Henn et al., 2013; International Monetary Fund, 2014), while stochastic frontier offers a robust measure of government spending efficiency by separating the technical term from the noisy effect in the study.

Apart from the introduction section, the remainder of the study is arranged thus. The literature review is presented in section 2, while section 3 describes the data and estimation methods. Empirical results are discussed in section 4, while section 5 concludes the study with policy recommendations.

2. Literature Review

2.1 Theoretical Foundations for Export Diversification

The paradigm of export diversification can be anchored on the quality of governance in Africa. Following the institutionalists' economic growth theory, it can be hypothesized that economic growth occurs due to the strong will of the political and economic environment to enhance and create room for productivity. Though export diversification is seen as an instrument, most African economies need it owing to the risk associated with export concentration, observed and unobserved heterogeneous factors, and the dynamism of diversification with the rest of the world. By extension, this depends on the nature of the institutional framework. In addition, studies (Evans and Rauch, 1999; Rodrik et al., 2004) have documented that growth in the non-resource sector becomes inevitable when the objectives of government participation are achieved.

According to David Ricardo's theory of comparative advantage, emphasis is placed on the manufacturing and distribution of products with a comparative advantage. Thus, achieving this is not without the government's mediation on oversight function, coordinating the implementation of guiding principles, and creating a friendly environment for transforming raw materials into finished products. In addition, the effectiveness of an economy depends on the quality of institutions (OECD, 2001; Stiglitz, 2001). However, studies in the literature have found that the primary impediments to Africa's economic progress are deficit infrastructure, institutional arrangement, low human capital development, mismanagement of funds and endowed resources, which translate to low diversification (Luiz, 2009; Fosu et al., 2006; Balamoune, 2005; Birdsall, 2007; Charnock, 2009; Akinyele and Adegboye, 2019). Meanwhile, an efficient government should make infrastructure available, invest in human capital, and access natural resources at a low transaction cost. The African economy is characterized by a weak institutional framework and huge government expenditure without corresponding socioeconomic outcomes; with such an environment, it is not prudent to put all eggs in one basket (Ferreira, 2009).

2.2 Extant Studies on Export Diversification

In recent times, the contributions of an open economy have been widely examined. Studies have documented that export diversifications are an instrument to enhance product knowledge, transforming the dependent economy into producing economy and strategies to facilitate trade-growth nexus (Wacziarg and Welch, 2008; Palley, 2012; Kim et al., 2018; Naito, 2017). Export diversification creates a knowledge base due to

interaction with the rest of the world, which could offer advice on productivity enhancement and increase the size of income. However, this depends on the conducive environment made available to facilitate trade.

A sustainable economy is a crucial focus for many societies (Mahdayi and Fatemi, 2007; Rasoulinezhad and Kang, 2016) though not without diversification. The interactions of exports, economic growth, and development have remained long age phenomena in the development studies with emphasis on trade flows, either bilateral or multilateral, as tools for a long-term sustainable economy (Mahdayi and Fatemi, 2007; Rasoulinezhad and Kang, 2016; Rasoulinezhad and Popoya, 2017). According to Imbs and Wacziarg (2003), the process of export diversification was examined, with findings showing a simultaneous relationship between export diversification and economic development. This result may have been influenced by the employment and value-added data adopted by the authors. Although, the study recognizes per capita income as an integral instrument for export diversification. However, in the last decades, the recurrent idea of drivers of export diversification has been highly documented by authors with an emphasis on per capita income, investment, human capital, population, terms of trade, institutional and governance factor, exchange rate, and geographical location with little or no attention to government involvement efficient (Imbs and Wacziarg, 2003; Matthee and Naude, 2007; Adeel and Temple, 2009; Breinlinch and Cunat, 2011; OECD and UN, 2011; Binti, 2011; Parteka and Tamben, 2011; Iwamoto and Nabeshima, 2012; Ofa et al., 2012; Agosin et al., 2012; Mevel and Karingi, 2012). Regardless of the results documented in the literature, the role of government performance becomes inevitable. Chang (2012) also pointed out that effective and efficient policies are needed for any sustainable economy.

Export diversification is integral for alleviating poverty and sustaining the economy when the government participates effectively in economic activities, mainly through export diversification. Following the success of the newly industrialized countries (NICs), neoclassical economists provided a theoretical convergence on export-led growth in the 1970s and 1980s. They hypothesized that increased exports spur economic growth by speeding up capital formation and boosting factor productivity growth (Mahdayi and Fatemi, 2007). Meanwhile, according to Keynesian proponents, government involvement in economic activities is driven by welfare objectives. In addition, it reduces exploitation between economic agents and bridges the gap between producers and investors during capita formation. Hence, this will facilitate low transaction costs and ensure a conducive environment for firms to compete (OECD, 2001; UN, 2011; Djankov et al., 2002). Regardless of the school of

thought, government involvement in economic activities has a long-lasting impact on economic growth. The government provides security, political stability, and effectiveness and is responsible for controlling corruption. The strength and realization of any diversification depend on the government's performance. A performing government is not only a signal to investors but also creates room for economic diversification. Plekhanov et al. (2009) posited that performing government inhibits conflicts and civil war, undermining the economy's potential. In addition, Starosta and Waldemer's (2010) study found that a functioning government promotes human capital development and counters corruption.

Following the Keynesian proponents, government intervention represents a strong fiscal measure to create an enabling environment that will facilitate trade, such as roads, housing, education, and health care, and stabilize the economy from any shock (Gisore et al., 2014). With this, it is suspected that a performing government has the potential for export diversification. In addition, drivers of export diversification may significantly affect export diversification if not crowded out by government regulations, particularly among African countries. Government involvement has a more significant influence on property rights and the rule of law, which promotes the creation of a fair and competitive market. Meanwhile, according to OECD (2001) and UN (2011), it was revealed that good governance is one of the essential drivers of diversification in African economies. They present it as a prerequisite for building an enabling environment for diversification.

In addition, studies have identified producing countries as the performing economy since it brings about a rise in income relative to the demand. The role export diversification plays in economic growth has been documented in the literature (Mahdayi and Fatemi, 2007; Rasoulinezhad and Kang, 2016; Rasoulinezhad and Popoya, 2017; Fosu and Abass, 2019; Huria and Brenton, 2015; Elhiraika and Mbate, 2014; Naudé and Rossouw, 2011). However, there is less attention to the core drivers of export diversification among resource-rich regions in SSA. The studies on export diversification will be inadequate, inaccurate, and unreliable without investigating peculiar drivers of export diversification among selected countries in SSA.

3. Research Methodology

3.1 Econometrics Model

The uniqueness of any economy depends on the nature of government involvement. A government interested in a sustainable economy will reduce the cost associated with diversification. Since diversification accelerates growth, discourages export concentration, and shields countries from adverse terms of trade shocks, thus

stabilizing revenue, discouraging import dependence, and decreasing the supply of risk-averse investors. Hence, an increase in the government's performance has a potential signal for reducing the cost associated with diversification.

Within the framework of the foregoing, the empirical model for the drivers of export diversification in African countries following Arellano and Bover (1995) is specified as:

$$DIV_{it} = \alpha + \beta DIV_{it-1} + \varphi X_{it} + \varepsilon_{it} \quad (1)$$

In Equation 1, *i* and *t* are the country and year in the study. The explanatory variables (government efficiency, government expenditure, corruption index, GDP per capita, and rent resources) are explained by the *X* component, which can drive the diversification process. Moreover, ε captured the stochastic component, and diversification (*DIV*) represents the regressand. Essentially, to capture the persistence of export diversification and the inherent endogeneity problem, instrumental variables are introduced as the lag value of diversification entered in the model to explain the dynamic relationship between export diversification and government intervention. The choice of explanatory variables is guided by economic theory.

The theoretical framework not only provides explanations of the link between institutional arrangement and the growth of an economy but also influences diversification opportunities (Rodrik et al., 2004). According to the new trade theory, the size of an economy affects the extent of diversification (Dixit and Norman, 1980; Helpman and Krugman, 1985). We adopt an averaging model with 14 Sub-Saharan African countries following the DFID-IMF calculation of export diversification, UNDP report (2019), and data availability.

3.2 Data and Description

The study extracted data from the World Bank, ICRG, and DFID-IMF databases. The paper adopts 14 selected sub-Saharan African countries (DR Congo, Ethiopia, Ghana, Kenya, Liberia, Mozambique, Nigeria, Sierra-Leone, South Africa, Sudan, Tanzania, Uganda, Zambia, and Zimbabwe) owing to the recent trade agreement following the IMF (2014) construct of Theil index for export diversification and data availability; the study has unbalanced panel data with five years moving average across countries between 1980 and 2019. The export diversification variable is sourced from the DFID-IMF. The institutional variable is sourced from the ICRG. Other variables in the study are sourced from the World Bank database. Further information on the variables is provided in Table 1.

Table 1. Data and Sources

Variables	Symbols	Measurement	Source
Export Diversification	DIV	The Theil export diversification index measures this	DFID-IMF
Government Efficiency	EFF	The Stochastic Frontier measures this	WDI, 2021
Government Expenditure	GOV	This is the ratio of government expenditure to GDP	WDI, 2021
Corruption Index	CC	This captures the extent to which public power is exercised for private gain	WGI, 2020
Size of an Economy	GDP	This is measured by per capita income in \$US	WDI, 2021
Resources Rent	RR	The total natural resources rents as a % of GDP	WDI, 2021
Human Development Indicator	HDI	Human development index	WDI, 2021
Gross Capital Formation	GCF	Gross fixed capital formation (% of GDP)	WDI, 2021
Health Expenditure	HE	Current health expenditure (% of GDP)	WDI, 2021

3.3 Techniques of Analysis

3.3.1 Theil Diversification Index

The study adopts the Theil diversification index to measure export diversification among African countries. According to Cadot et al. (2011a), a country diversification can be calculated for each year as:

$$DIV_i = \frac{1}{n} \sum_{k=1}^n \frac{X_{ik}}{\mu} \ln\left(\frac{X_{ik}}{\mu}\right) \quad (2)$$

where X_{ik} represent the product value of K exported by each country, n represent the overall number of export product and μ is the average exports defined as:

$$\mu = \frac{1}{n} \sum_{k=1}^n X_k \quad (3)$$

One key attribute of the Theil index is that it can be used to decompose the overall estimate into an intensive and extensive component (within and between components) as:

$$DIV_i = \sum_{j=0}^J \frac{n_j \mu_j}{n \mu} \ln\left(\frac{\mu_j}{\mu}\right) + \sum_{j=1}^J \frac{n_j \mu_j}{n \mu} \left[\frac{1}{n} \sum_{k \in G_j} \frac{X_{ik}}{n_j} \ln\left(\frac{X_{ik}}{\mu_l}\right) \right] \quad (4)$$

where $j = 1 \dots, J$ represents J partitions or groups of export products, n_j is the number of products, and μ_j is the average export value in group j . The term in the big parenthesis on the right-hand side of the equation above is the Theil index for group j . The between-group component captures diversification resulting from the extensive trade margin, i.e., the net addition of exported products. The within-group component captures diversification due to a more even distribution of export sales across the

existing set of exported products. By construction, the lower value of the indices corresponds to a higher degree of diversification. We followed the IMF (2014) to construct the index using the 6-digit harmonized system (HS) product-level data on each country's exports and defined groups at the 4-digit level.

3.3.2 Stochastic Frontier

The measure for efficiency level in this study draws strength from the stochastic frontier owing to the peculiar attribute of functional representation attached to the measurement and the separation of technical inefficiency from noisy effect (Aigner et al., 1977; Meeusen and van den Broeck, 1977; Pitt and Lee, 1981; Jondrow et al., 1982; Schmidt and Sickles, 1984; Battese and Coelli, 1988; 1992; 1995; Kumbhakar, 1990; Greene, 2005; 2008). The frontier is thus specified as:

$$Y_{it} = \beta X_{it} + \varepsilon_{it} \quad (5)$$

From Equation 5, the functional representation can be decomposed:

$$Y_{it} = \beta X_{it} + V_{it} - U_{it} \quad \text{for } i = 1, 2, \dots, n, t = 1, 2, \dots, T \quad (6)$$

In Equation 6, Y_{it} represent the output produced by various African government, X_{it} is a $k \times 1$ vector representing input factors combined by the government, V_{it} is noise, and U_{it} represents technical inefficiency. In this study, the production efficiency model was adopted following the submission of past studies (Battese and Coelli, 1988; 1992; 1995; Kumbhakar, 1990; Greene, 2005; 2008; Bolarinwa et al., 2021).

We can rewrite equation 6, following the Greene (2005) as well as Battese and Coelli (1995), to model the technical efficiency of production for the i^{th} country at time t , which can be specified as:

$$TE_{it} = \frac{e^{(\beta X_{it} + V_{it} - U_{it})}}{e^{(\beta X_{it} + V_{it})}} \quad (7)$$

where TE is the technical efficiency. From equations 6 and 7, the efficiency in the functional relationship can be defined following Jondrow et al. (1982). The production efficiency model as used in the study is therefore specified as:

$$HDI_{it} = \alpha GOV_{it} + \beta RR_{it} + \theta GCF_{it} + \delta HE_{it} \quad (8)$$

where the output is measured by the human development index (HDI), and the inputs used in the production include government expenditure (GOV), resources rent (RR), gross capital formation (GCF), and health expenditure (HE). All these variables for the input measure are expected to have a positive and significant relationship with the

output measure. However, following the resource cause hypothesis, it is anticipated that endowed resources negatively correlate with the human development index as a measure of output.

3.3.3 System Generalized Method of Moments

One of the fundamental advantages of export diversification is that it increases the size of an economy through expansions of export sales across the region. As such, there will be inherent dynamic relationships and endogeneity in the variables among the countries. In our model, the lagged dependent variable's introduction explains the adjustment dynamic. Hence, to capture the dynamism among these countries, the least-square estimator may result in the estimate being biased and inconsistent. However, the estimator explains the individual characteristic among the nations. In equation 1, since export diversification is defined by the lag of the dependent variable and stochastic term, this could bring an endogeneity problem to the model. To address the endogeneity and simultaneity problem, the study adopts the system generalized methods of the moment (SGMM) (Bolarinwa et al., 2021; Dada, 2021; Dada, Ajide, & Sharimakin, 2021). Furthermore, this approach is beneficial to this study as it can be used for both balanced and unbalanced panels. Additionally, the SGMM provides efficient and reliable results when the number of cross-sections exceeds the time dimension (i.e., $N > T$). To satisfy this condition, a five-year moving average of the data is utilized, e.g., 1980-1984, 1985-1989, 1990-1994, 1995-1999, 2000-2004, 2005-2009, 2010-2014, and 2015-2019. Thus, making a total number of eight-time series data point. Averaging the data over a period of five years reduces over-identification of instrument problems and smoothing the data since most macroeconomic variables tend to exhibit business cycles in their trend, which can bias the SGMM results (Dada, Ajide, & Adeiza, 2021).

4.1 Results and Discussion

The empirical results within the export diversification framework start with the descriptive statistics (Table 2) to have a clearer view of the series and the cross-sections used in the study. Among the selected countries in the SSA region, the most diversified export country has 6% export value, while on average; the region has 4% export diversification. Impliedly, there is a high level of export concentration among the countries used in the study. This suggests the need to facilitate export diversification among the sub-Saharan African countries in this era of free trade agreements where deep economic integrations are in view. Further, government involvement has not been augured well, as evident in the efficiency and spending of government. On average,

about 11% of government spending is on economic activities, with the highest value of government involvement for any country within the region standing at 24%. The reason could be that variation in human development is explained by the technical inefficiency and the high level of export concentration in the region. In addition, the endowed natural resources in the region have not been anchored for the performing economy; on average, about 12% of natural resources are accounted for in the SSA economy.

Meanwhile, the results in Table 3 revealed the degree of association between variables, and the coefficient at the diagonal showed the degree of association between a variable and itself. Following Bolarinwa et al. (2021), the degree of association between variables is within the acceptance region's range. The result is not unexpected since it conforms to the theoretical underpins the a priori expectation. Furthermore, to diagnose collinearity and multicollinearity in our model, variance inflation factor (VIF) was carried out in Table 4. Results show lower VIF and mean VIF values; there is an absence of collinearity and multicollinearity in the study. Likewise, the LLC and IPS test for a unit root in Table 5 revealed that the variables are stationary at $I(0)$ and $I(1)$.

Table 2. Descriptive Statistics

Variable	observation	Mean	Std. Dev.	Minimum	Maximum
DIV	109	4.032	1.076	1.878	6.038
EFF	112	0.838	0.075	0.667	0.995
GOV	112	11.605	4.995	1.15	24.09
RR	112	11.527	6.658	0.001	33.049
GDP	107	1267.353	1600.681	183.428	7486.173
CC	110	2.073	1.091	0	6

Source: Research finding (2022).

Note: DIV, EFF, GOV, RR, GDP, and CC represent export diversification, government efficiency, government spending, resource rent, size of an economy, and corruption index, respectively.

Table 3. Matrix of Correlations

Variables	DIV	EFF	GOV	RR	GDP	CC
DIV	1.000					
EFF	-0.091	1.000				
GOV	-0.560	-0.067	1.000			
RR	0.469	-0.001	-0.358	1.000		
GDP	-0.376	0.623	0.334	-0.296	1.000	
CC	-0.319	-0.040	0.436	-0.165	0.346	1.000

Source: Research finding (2022).

Note: DIV, EFF, GOV, RR, GDP, and CC represent export diversification, government efficiency, government spending, resource rent, size of an economy, and corruption index, respectively.

Table 4. Variance Inflation Factor

Variables	VIF	1/VIF
GDP	2.580	0.388
EFF	2.080	0.480
GOV	1.490	0.673
CC	1.400	0.713
RR	1.230	0.811
Mean VIF	1.760	

Source: Research finding (2022).

Note: EFF, GOV, RR, GDP, and CC represent government efficiency, government spending, resource rent, size of an economy, and corruption index, respectively.

Table 5. Panel Unit Root Test with Intercept

Variable	Levin Lin Chu (LLC)			Im Pesaran Shin		
	Level	First Difference	Remark	Level	First Difference	Remark
DIV	-4.396***		I(0)	-0.729	-5.488***	I(1)
EFF	2.464	-16.62***	I(1)	2.497	-3.947***	I(1)
GOV	-4.932***		I(0)	-0.204	-2.571***	I(1)
RR	-3.660***		I(0)	-0.377	-7.435***	I(1)
GDP	12.98***		I(0)	-1.444*		I(0)
CC	-6.281***		I(0)	-1.421*		I(0)

Source: Research finding (2022).

Note: ***, ** and * represent 1%, 5% and 10% levels of significance, respectively. I(0) and I(1) represent stationary at levels and first difference, respectively. DIV, EFF, GOV, RR, GDP, and CC represent export diversification, government efficiency, government spending, resource rent, size of an economy, and corruption index, respectively.

4.2 Frontier Analysis

In this subsection, the efficiency index is generated through a parametric approach of the stochastic frontier method. This is due to the underlying assumption of the functional relationship as explained in the methodology. In a conventional production approach, the production process involves different inputs that give output. As such, the performance of any decision-making unit can be quantified within this framework. In this study, to enhance our understanding of the need for government involvement in economic activities, we established the efficiency of government involvement in providing welfare through frontier analysis. Results show that government expenditure, capital formation, and health expenditure positively and significantly influence the human development of SSA countries.

Meanwhile, there is a negative relationship between resources rent and human development. Thus, these signs are not unexpected since they are in tandem with Keynesian proponents' a priori expectation and theoretical foundation (Pérez and Claveria, 2020; Sinha and Sengupta, 2019; Sedrakyan and Candamio, 2019; Gisore et al., 2014; Patricia and Izuhukwu, 2013). The frontier result shows wide variation in the use of input factors among countries in the SSA region to achieve human development. However, the estimated gamma in Table 6 shows that the total variation in human development is explained by technical inefficiency. Hence, this serves as a good proxy for government efficiency. Meanwhile, other diagnostic checks are in the correct magnitude.

Table 6. Frontier Model for Government Efficiency

Dep: HDI	Coefficient		
Frontier			
GOV	0.0056(0.0007)***		
RR	-0.0046(0.0006)***		
GCF	0.0025(0.0004)***		
HE	0.0025(0.0015)*		
Diagnostics			
Mu	0.1716(0.0061)***	Sigma_U ²	0.0101
Log likelihood	562.96	Sigma_V ²	1.32E-08
Prob. Value	0.0000	Gamma	0.9989

Source: Research finding (2022).

4.3 Effect of Government Intervention on Export Diversification

To examine the effect of government intervention on export diversification among countries in the SSA region, the study adopted a two-step SGMM of econometrics models. The empirical results are presented in Table 7. The role of government

intervention is presented in effectiveness and efficiency order. The results of government effectiveness without efficiency were presented in the second column, while in the third column, government efficiency was introduced into the model. The post estimation of the results reveals that the models do not encounter the problem of serial correlation. Though the models suffer from first-order correlation AR(1), none of the models suffer from second-order correlation. AR(1) is not necessarily an implied serial correlation (Akinlo and Dada, 2021). In addition, the Sargan test confirms that the instruments adopted in the estimation do not correlate with the error term. Therefore, the estimates are valid and robust for policy formulation. Lastly, the F statistic confirms the overall significance of the models.

From Table 7, the estimated result of the two-step SGMM established the dynamic nature of export diversification among SSA countries. This is evident in the models as the lag value of the export diversification variable across the models is statistically significant. The implication is that the past export diversification confers a positive and significant effect on the present level of export diversification. The fundamental advantage of a diversifying economy, particularly export diversification, is that it increases the size of an economy through expansions of export sales across the region. Meanwhile, the increased size of an economy potent a more significant influence on economic growth, discourages export concentration, shields countries from adverse terms of trade shocks, stabilize revenue, prevents import dependence, and decreases the supply of risk-averse investors. This is inconsonant with existing findings (Dawe, 1996; Hesse, 2009; Naudé and Rossouw, 2011; Aditya and Acharyya, 2013; Munir and Javed, 2018). This confirms the dynamic nature of export diversification in SSA.

The result revealed a negative relationship between government expenditure and export diversification. This implied that as government expenditure increases, export diversification falls. This could result from the export concentration of most SSA countries in financing their budget and the benefit associated with specialization through exposure to sector-specific. It suggests that when government intervention does not masquerade with economic diversification, the fiscal instrument will only increase in size with a corresponding tripartite increase in export concentration, import dependence, and terms of trade shocks. Furthermore, it implies that government spending among SSA countries has not effectively enhanced and facilitated export diversification in the models.

Likewise, corruption and export diversification has a negative and statistically insignificant relationship. As corruption rises, SSA countries pay less attention to export diversification. This could be that the export concentration practice of nations in the SSA region has been influenced by the high level of corruption owing to weak

enforcement of contracts, repeated rent-seeking, and excessive concentration of market power. The results suggest a reduction in corruption levels tends to portend greater regional export diversification. This result is in tandem with existing studies (Gani and Prasad, 2006; Brand, 2011; Cortinovis et al., 2016) that institutional variables are a more significant improvement in export diversification. Meanwhile, the introduction of government efficiency in the third column makes the direction of the relationship between corruption and export diversification to be negative and statistically significant. This indicates that efficient government intervention has become a veritable tool for economic restructuring for some SSA countries.

In addition, resource rent has a positive and insignificant relationship with export diversification. This implies that the abundance of resources positively influences export diversification in SSA. This suggests that resources endowed regions like SSA portend a more significant advantage for export diversification, trade sustainability, and economic integration in the region and the rest of the world. This result reveals that the abundance of natural resources facilitates the development of other tradeable sectors in the region though statistically insignificant, unlike previous studies that emphasized the resource curse hypothesis (Auty, 1993; Sachs and Warner, 1995; Sala-i-Martin and Subramanian, 2003; Kaldor et al., 2007). Resource rent is positive but insignificant influence on export diversification could result from a high level of export concentration and weak institutions that characterized the SSA economy.

Furthermore, economic growth and export diversification has a positive and insignificant relationship. The size of an economy has a long-lasting positive effect on export diversification. This suggests that as the size of the economy improves, more attention is given to export diversification. This result is inconsonant with IMF (2014) and IMF (2017), which focused on making a case for diversification and found that diversification in both exports and output is a crucial determinant of growth for low-income countries (LICs), especially the SSA region. The huge economic concentration and weak governance effectiveness could be the impeding factors for the insignificant relationship.

Finally, there is a negative and significant relationship between government efficiency and export diversification. This implies that government intervention has not been efficient towards export diversification. The reason could be that most SSA economies can finance their budget from the export concentration with less attention to human development. As government efficiency rises, there is a corresponding fall in export diversification. Meanwhile, the corruption index becomes significant with the inclusion of government efficiency into the model. The implication is that corruption

works together with government efficiency to affect export diversification significantly. This result reveals the quality of governance in SSA economies and the firm will of the political and economic environment to enhance and facilitate export diversification. Hence, government efficiency becomes a potent tool in validating export diversification as government improves human development, the more export diversification in SSA countries.

Table 7. Estimation Results

Dep Var.: DIV	Without Efficiency	With Efficiency
DIV _{it-1}	0.5417*(0.2817)	0.6908**(0.2595)
GOV	-0.0497**(0.0201)	-0.0473**(0.0197)
CC	-0.0696(0.0424)	-0.1154*(0.0619)
RR	0.0132(0.0164)	0.0184(0.0215)
LGDP	0.0543(0.0961)	0.2699(0.2216)
EFF		-2.8736*(1.5556)
Cons	1.9771(1.2548)	2.3740(1.5386)
Post estimation tests		
Sargan test (Prob.)	9.80(0.133)	11.60(0.071)
AR(1)(Prob.)	-2.05(0.041)	-2.23(0.025)
AR(2)(Prob.)	-0.64(0.523)	-0.50(0.617)
F test (Prob.)	24.68(0.000)	22.02(0.000)
No of Countries	14	14

Source: Research finding (2022).

Note: “()” are standard error, “* and **” signifies 10% and 5% level of significance, respectively.

5. Conclusion

The agreement among African countries to undertake structural reforms recently has depicted the peculiar role of government intervention in economic performance. Among many phenomena underpinning the SSA region, export diversification has remained at the center of debate due to gain from export specialization. Understanding government intervention's role in export diversification will accentuate the kind of policy and reforms necessary for the SSA region's economic performance. This study contributes to the body of knowledge on government intervention as a driver of export diversification from a sample of 14 SSA economies. There is a need for government intervention to achieve economic performance, particularly in export diversification. This need keeps evolving owing to issues on the size of an economy without corresponding evidence in the rise of human development. The spending pattern in SSA economies without corresponding development has called for policy perusal by the government and policymakers.

The outcome of this study implies that government interventions are not enough without the efficiency of government spending in decision-making. Likewise, government spending must be centered on promoting industrialization to improve human development. Policymakers must consider human capital investment as a channel for enhancing export diversification. After the recent trade agreement, government intervention has become seamless among its drivers for successful economic diversification in SSA countries.

These results offer important policy implications. First, government instruments should be implemented to influence export diversification. Moreover, government spending targeted for economic diversification will have a long-lasting impact on developmental episodes. Many policies and reforms can intensify export diversification. Understanding quality governance, particularly the effectiveness and efficiency of government intervention, has a long-lasting positive impact on export diversification. Export diversification will benefit a sustainable economy, stabilize revenue, and inhibit adverse trade shocks when government spending efficiency is attained. Moreover, SSA economies need to offset the export concentration, mainly to discourage import dependence and stabilize revenue. Most countries in the SSA region are spending though the spending has not been targeted to promote and facilitate diversification. Hence, the state of government efficiency has been frivolous to human development as such inhibiting diversification. This article contributes to the key policy toward sustaining an effective African continental free trade agreement on export diversification and government spending efficiency.

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