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EXAMINING THE RELATIONSHIP BETWEEN RESOURCE DEPENDENCE AND GROWTH IN SUB-SAHARAN AFRICAN

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Abstract

Economic progress is a key focus of any government due to it spill-over effect to any economy that required growth. Resources can be viewed has been positive or negative factors in stimulating economic growth. Currently, it has been proven that nations can diversify their economy rather than basing it on human capital and capital formation. Hence, this study examines resource dependence and growth nexus for Sub-Sahara Africa (SSA) countries. The study employed panel regression method and the data set span over 1996-2021 around the SSA. The study found that the human capital variable, secondary school enrolment rate has a positive impact on per capita income. Education is a key determinant of human capital development in any country. SSA countries need to as a matter of urgency look at investments in education in the sub-region. Beyond that, measures need to be put in place to monitor the disbursement of such investments in order to ensure that it serves the purpose of growth

Keywords: Growth; Resources; Panel method; SSA.

1. Introduction

Expansion in economic activities is the primary national goal of many nations owing to the merits it has on the aggregate system and the overall implication on the populace (Adekunle et al., 2022; Cheng et al., 2020; Fan et al., 2012). According to neoclassical economics, capital creation and skills emancipation are the fundamental elements of macroeconomic forces in a

nation, the stronger these factors, the larger the country's economic growth. (Gbadebo et al., 2021; Satrovic et al., 2023). Following that, Stiglitz's (1974) theoretical postulates establish that a region's endowment of national endowments affects a nation's economic expansion. These hypotheses imply that a nation with a greater national endowment will outpace countries lacking these endowments economically. In this sense, national endowment transforms to obvious benefits to nations, because, among other things, they enable economic self-sufficiency, commercial benefits, and capital generation (Torvik, 2005).

Natural resources, on the other hand, have a dominant impact because of their importance in economic interactions, their examination is critical and essential today. (Arin et al., 2018; Wu et al., 2018). Similarly, national endowment forms the foundation of contemporary manufacturing because human persistence is dependent on natural resources such as water, minerals, oil, timber, and others (Cheng et al., 2020; Satrovic et al., 2023). Nonetheless, the endowment of natural resources can be replicated in the Dutch disease theory, which holds that promoting economic growth through national endowment might affect different aspect of the economic enhancement (Corden, 1984). As a consequence, if the country's wealth of natural resources encourages economic growth, it may become a benefit to the economy. (Gylfason, 2001). On the other hand, if there is a negative association connecting natural resources and GDP growth, the benefit of national endowment becomes an impediment for national expansion (Gerelmaa et al., 2016).

Several research have been undertaken in this context to corroborate the resource impediment notion; nonetheless, there is no agreement on this notion. According to Gylfason (2001) and Mehrara (2009), nations with plentiful national endowments grow at an arithmetic rate than nations with restricted endowments. Other scholars, on the other hand, have tested the theory of the natural resource impediment, claiming that nation endowments are vital in shaping economic growth (Shao et al., 2014; Tan et al., 2023).

As previously said, it has been demonstrated that various elements, such as renewable energy, fossil energy, and technical innovation, among others, influence a country's potential to support economic growth. Energy is the primary component in the manufacturing of goods and services, demonstrating that renewable energy may boost economic growth and generate a sustainable process (Cheng et al., 2020; Matsen et al., 2005). Furthermore, empirical research emphasizes the relevance of fossil energy in the production process, which accounts for the majority of energy utilized and is positively associated to economic growth (Asiamah et aL, 2022; Shao et al., 2014). Similarly, human capital and technological innovation predominate over economic growth because they improve factor productivity, are positively associated with

the use of clean energies, and contribute to reversing negative environmental externalities (Havranek et al., 2016; Asiamah et al., 2022). However, because of the negative externalities of fossil energy on the environment, economic expansion is unmanageable (Libman, 2013).

The research objective is to examine the relationship between resource dependence and economic growth from 1996 to 2016. As a result, the focus of this current empirical work is critical as a result of limited natural resources which constrain national expansion and development. Additionally, dependence on resources hampers long haul development, which go to a hindrance to arriving at the Sustainable Development Goals and lead to ecological contamination.

The current empirical analysis tries to examine resources and growth relationship and, as a result, establish the appropriate policy measures to limit this phenomenon while keeping the horizon of sustainable development in mind. Thus, this study adds to the current literature on this topic in a variety of ways: (i) In the presence of technological progress, it is innovative to link the role of natural resources with economic growth. Furthermore, this research examines whether technological innovation may reduce the negative impact on economic progress and must be transformed into a boom (ii) Given the reliance of resources on economic growth, a theoretical and empirical examination of the connection among the creation of capital, labour force, resources from nature, alternative to fossil energy, and innovation in technology offers contemporary clarification for the use of sustainable development. Aside from the introduction, the remainder of the work is structured as follows: The literature review is covered in the section 2, the theoretical framework and model specification employed in the current study are shown in section 3, and the analysis and empirical results are discussed in the section 4 while section 5 shows the conclusions and recommendations.

2. Empirical Review

Past examinations take as a beginning stage the model proposed by Solow (1956) and Swan (1956) to look at the monetary development drivers; that is, they utilize the capital arrangement and workforce as the premise on which an economy is maintained. In this sense, Rahman and Velayutham (2020) look at the job of sustainable power and fossil energy on financial development in five Asian nations, in which they track down a drawn-out balance relationship. The discoveries uncover that capital development, workforce, sustainable power, and fossil energy are decidedly connected with monetary development. Likewise, in Asian nations, Mohsin et al. (2021) find that a drawn-out causal nexus and capital development and exchange transparency emphatically influence the monetary development of these nations. Azam et al.

(2021) look at the job of power from environmentally friendly power sources on monetary development in ten recently industrialized nations. The creators affirm a drawn-out balance relationship of the proposed model, showing that capital development and workforce are fundamental elements to drive monetary extension.

Further, involving dynamic board cointegration methods in twelve European nations, of which ten are the primary business sectors for gaseous petrol vehicles, Fadiran et al. (2019) track down a drawn-out harmony relationship, where the fossil energy and workforce have a negative relationship with the financial development, while capital arrangement drives the monetary development. Moreover, Pradhan et al. (2018), through long haul cointegration procedures in the G-20 nations, find that the capital development and workforce are determinants in the monetary development way. Correspondingly, they infer that data advances, like clients' availability to the web, speed up the improvement of monetary movement. Thusly, until the start of the 1990s, regular assets were considered as a probability of financial development; be that as it may, the proposes of the Dutch infection hypothesis and the scourge of assets scrutinized this alleged monetary benefit. In any case, there is no agreement on the satisfaction of these speculations since certain examinations avow that nations with bountiful regular assets don't produce monetary development (Kangning and Jian, 2006; Khan et al., 2020). In the interim, different creators attest that normal assets are the dominating elements that advance financial development (Mehrara, 2009; Philippot, 2010). In this unique circumstance, late examinations, for example, that of Haseeb et al. (2021) look at the job of regular assets in the monetary movement of Asian nations; their outcomes close the presence of a positive connection between financial development and normal assets in the most noteworthy quantiles of this relationship. Utilizing information cointegration methods and controlling for cross-sectional reliance, Rahim et al. (2021) find proof leaning toward the asset revile hypothesis in the Following Eleven nations. Their discoveries show that the expansion in regular assets pay hinders monetary development; in any case, human resources and mechanical advancement drive financial development.

Anyanwu et al. (2021) look at the job of regular assets on financial development in nations with and without a wealth of normal assets through a powerful information board. The outcomes show that pay imbalance in nations with plentiful normal assets creates a diminishing in financial development. Yasmeen et al. (2021a), utilizing a model of primary conditions, approves the speculation of the scourge of the regular assets. Their discoveries show a negative connection between regular assets and monetary development; moreover, environmentally friendly power and fossil energy add to financial development. Be that as it may, the impact of

monetary transparency is deficient to turn around the scourge of regular assets. Zaidi et al. (2019), utilizing board information cointegration techniques, presume that regular assets, globalization, and human resources decidedly influence monetary development in OECD nations. Cihan (2022) analyzes what the Coronavirus bar meant for the presentation of Turkey's modern zones. That's what the outcomes confirm, during the pandemic, the utilization of power and flammable gas diminished fundamentally in modern zones, which impacted financial action. Similarly, still up in the air by Ma et al. (2021) in their concentrate in which they analyze the effect languished by the interest over normal assets and monetary development during the Coronavirus episode. The creators express that during the pinnacle of Coronavirus diseases, normal assets unrefined components were emphatically impacted, which made burden financial development. Notwithstanding, the Coronavirus flare-up has caused a change sought after for normal assets and monetary development. In a similar setting, Rita et al. (2021) guarantee that a positive effect on the climate was confirmed during the pandemic on the grounds that the deadened financial exercises diminished the interest for petroleum products. Also, they propose that they recommend that the post-Coronavirus financial initiation ought to think about the utilization of clean energy. Then again, environmentally friendly power and fossil energy are habitually used to make sense of financial development conduct (Rahman and Velayutham, 2020).

Ponce et al. (2021) look at the drawn-out balance connection between monetary development and monetary turn of events, sustainable power, fossil energy, and human resources in Latin American nations. Their outcomes substantiate that the financial development of Latin America can be helped utilizing the two kinds of energy. Involving second-age econometric methods that control for cross-sectional reliance, Azam et al. (2021) reason that environmentally friendly power and fossil energy decidedly add to financial development, controlling the job of human resources and exchange transparency the recently industrialized nations. In 18 thermal power consuming nations, Christoforidis et al. (2021) affirm a drawn-out balance connection between thermal power, institutional quality and monetary development. Thermal power and institutional quality decidedly influence financial development; also, institutional quality makes collaborations to lessen thermal power utilization in the long haul. Additionally, Akadiri et al. (2019) track down fundamental discoveries on the determinants of financial development in 28 nations of the European Association. The review uncovers a drawn-out certain connection between monetary development and sustainable power, taking into account that capital arrangement drives the financial exhibition of the nations considered.

3. Theoretical framework and model specification

This study builds on the extended Endogenous Growth Model with natural resources (Stigliz(1974) and Barbier, (1999.). Based on this, a general growth function can therefore be specified as:

$$g = \alpha + \gamma R + g_A H + (\delta + \gamma + g_A)h + (\pi + \gamma + g_A)p + (\mu + \gamma + g_A)c + \varepsilon \quad (1)$$

The equation indicates that in the long run, the growth of the economy depends on natural resource utilization, human capital (both in level and changes), productivity in the economy, and consumption patterns. However, this study considers the case where the growth rate of income depends only directly on natural resource utilization and human capital accumulation so that

$$g = \alpha + \gamma R + g_A H + (\delta + \gamma + g_A)h + \varepsilon \quad (2)$$

Assume that the rate of technical innovation g_A is driven by institutional quality (Gylfason, 1999; Akpan and Chuku, 2014), the level of physical capital (Gylfason & Zoega, 2001, Gylfason, 2004) and the macroeconomic environment proxied by inflation (Harding &Venables, 2010; Ismail, 2010). That is;

$$g_A = f(\text{instQ} + \text{pc} + \text{inf}) \quad (3)$$

Substituting 3 into 2,

$$g = \alpha + \gamma R + g_A H + (\delta + \gamma + instQ + pc + inf)h + \varepsilon \quad (4)$$

Where g is the growth rate of the economy. γR is the rate of natural resource utilization, which is dependent on the resource rent or export value of the given resource. $g_A H$ represent the level of human capital while changes in human capital results from the rate of technical innovation, the rate of resource utilization and the discount rate.

The estimated model is

$$GDPPC = \alpha_i + +\delta(rrgdp)_{i,t} + \varphi HC_{i,t} + \sum_{j=1}^{k} \sigma_j X_{ji,t} + \varepsilon_{it} \quad j = 1, \dots n; t = 1, \dots T. \quad (5)$$

Where GDPPC = per capita income, RRGDP = resource rent in GDP, HC = Human capital.

In the equation above, X_{jit} are other regressors included in the model as control variables which are essential in the explanation of growth for the SSA region. These variables are physical capital, institutions, and inflation rate.

To achieve the objective of the study, the Fully modified Ordinary Least Squares (FMOLS) Estimator is adopted. The FMOLS was developed by Hansen and Philips (1990) to provide optimal estimates for cointegrating regressors, hence a basic requirement for the use of this technique is that the variables in the model must be cointegrated. The FMOLS is superior to

the standard pooled OLS estimator in that it corrects for serial correlation, heteroscedasticity and endogeneity in the regressors. Such issues are common to long-run cointegrating relationships (Pedroni, 2000). Simulation experiences and empirical research indicates that the FMOLS estimator performs well in relation to other methods of estimating cointegrating relationships (Hansen and Philips, (1990) and Pedroni (2000). Essentially, the study obtained all data used in this study from World Development Indicators (WDI) and SSA countries covered are Nigeria, Ghana, Niger, Cameroon, Benin, Mali, Angola etc. The study employed Levin, Lin and Chu Homogenous Unit Root Process.

4. Estimation and Interpretation of Empirical Results

4.1 Descriptive Statistics

The immediate statistics of the variables employed in the study are accessible and evaluated in this section. The outputs in Table 1 show that both the mean and median values for all the variables are in line with normal random time series trend (normally distributed). In addition, the standard deviation statistics show that most of the variables are well spread or normally distributed with both positive skewness values that are close to zero. The results further suggest that the distribution is quite peak as indicated by the kurtosis statistics of most of the variables, and the natural logarithm of primary export shows the highest peak in the cross-section. Importantly, the result indicates a normal distribution since their skewness values are relatively close to zero for most of the variables.

Table 1: Descriptive Statistics

VARIABLES	GDPPC	RR_GDP	SEC__ENR	PC	INFL	GOVTEFF	REGQTY
Mean	5.865301	16.78161	37.45049	21.37700	76.27982	-0.762916	-0.660960
Median	5.609963	11.27432	35.29744	21.41412	6.097804	-0.801334	-0.636884
Maximum	9.03199	61.94497	102.7539	25.17470	24411.03	1.020496	0.804242
Minimum	3.894060	0.551109	5.217160	15.75775	-35.83668	-1.884151	-2.297536

Std. Dev.	2.128202	14.49212	20.37158	1.445017	1144.132	0.570549	0.581635
Skewness	0.650184	1.331416	0.854696	0.047807	20.67903	0.687145	0.106544
Kurtosis	1.622186	3.861582	3.508060	3.623945	438.5567	3.134969	3.125037
Jarque-Bera	24.83353	153.0699	62.14529	7.786358	3740668.	37.26378	1.192839
Probability	0.000000	0.000000	0.000000	0.020380	0.000000	0.000000	0.550780

Source: Author's compilation, 2024

4.2 Analysis of Correlation Results

The correlation statistics is presented in Table 2. The result shows that the relationship among per capita income (GDPPC), resource dependence (RR_GDP), human capital (HC), physical capital (PC) and institutional quality (GOVTEFF, REGQTY) produce negative and positive relationship. This suggests that economic growth shows a mix correlation results (negative and positive) with improvements in the aforementioned indicators. Resource dependence correlated negatively with secondary school enrolment rate, physical capital and the measures of institutional quality. As it is well established in the literature, some of the deleterious impact of resource dependence is poor human and physical capital development and weak institutions. Therefore, it can be inferred that investments in these variables should result in reduced resource dependence.

Table 2: Correlation Statistics of Variables Employed

VARIABLES	GDPPC	RR_GDP	SEC_ENR	PC	INFL	GOVTEFF	REGQTY
GDP per capita	1.00	0.08	0.59	0.57	-0.05	0.33	0.34
Resource rent as a % of GDP	0.07	1.00	-0.17	-0.02	0.02	-0.50	-0.47
Secondary school enrolment rate	0.59	-0.17	1.00	0.36	-0.01	0.55	0.48

Physical capital (Gross fixed capital formation)	0.57	-0.02	0.36	1.00	-0.07	0.33	0.30
Inflation rate	-0.05	0.02	-0.01	-0.07	1.00	-0.05	-0.14
Government Effectiveness	0.33	-0.50	0.55	0.33	-0.05	1.00	0.88
Regulatory quality	0.34	-0.47	0.48	0.30	-0.14	0.88	1.00

Source: Author's compilation, 2024

4.3. Panel Stationarity Test Results

Tables 3 and 4 shows the unit root test for panel analysis of the employed variables in the study. In essence, the results confirm the appropriateness of using panel least square estimation procedure since the theoretical formulation is based on the assumption of normality.

Table 3: Levin, Lin and Chu Homogenous Unit Root Process

HOMOGENOUS(COMMON UNIT ROOT PROCESS)					
Variables	*LLC*				*Remarks*
	I(0)		*I(1)*		
	Statistics	*Probability*	*Statistics*	*Probability*	
GDP per capita	*1.91***	*0.03*	*-6.40****	*0.00*	*stationary*
Resource rent as a % of GDP (RRGDP)	*-1.31**	*0.09*	*-.13.76****	*0.00*	*stationary*
Human capital (Secondary school enrolment rate (SEC_ENR)	*-2.37****	*0.01*	*-16.42****	*0.00*	*stationary*
Physical capital (Gross fixed capital formation) (PC)	*-2.21****	*0.01*	*-7.26****	*0.00*	*stationary*
Inflation rate(INFL)	*0.98*	*0.84*	*-7.73****	*0.00*	*stationary*
Government Effectiveness(GOVTEFF)	*-6.33****	*0.00*	*-8.31****	*0.00*	*stationary*
Regulatory quality (REGQTY)	*-1.74***	*0.04*	*-4.86****	*0.00*	*stationary*

LLC: Levin, Lin and Chu t* ***1%;** 5%; *10% levels of significance.

Table 4: Im, Pesaran and Shaw, Augmented Dickey Fuller-Fisher, and Philips Peron-Fisher Heterogenous Unit Root Process

HETEROGENOUS (INDIVIDUAL UNIT ROOT PROCESS)													
Variable	*IPS*				*ADF-F*				*PP-F*				*Remark*
	I(0)		*I(1)*		*I(0)*		*I(1)*		*I(0)*		*I(1)*		
	Stat.	*Prob.*	*Stat.*	*Prob.*	*Stat.*	*Prob.*	*Stat.*	*Prob.*	*Stat.*	*Prob.*	*Stat.*	*Prob.*	
GDPPC	*2.56*	*0.99*	*-6.56****	*0.00*	*22.84*	*1.00*	*143.8****	*0.00*	*23.49*	*1.00*	*485.0****	*0.00*	*s*
RR_GDP	*-1.09*	*0.14*	*-10.90****	*0.00*	*66.99*	*0.20*	*231.2****	*0.00*	*75.18**	*0.06*	*442.1****	*0.00*	*s*
SEC_ENR	*-0.59*	*0.28*	*-8.77****	*0.00*	*101.8****	*0.00*	*393.9****	*0.00*	*65.24*	*0.19*	*258.1****	*0.00*	*s*
PC	*2.15*	*0.98*	*-8.41****	*0.00*	*35.34*	*0.98*	*173.6****	*0.00*	*33.38*	*0.99*	*354.5****	*0.00*	*s*
INFL	*-7.17****	*0.00*	*-17.61****	*0.00*	*177.9****	*0.00*	*391.9****	*0.00*	*503.7****	*0.00*	*2074.2****	*0.00*	*s*
GOVTEFF	*-3.92****	*0.00*	*-7.74****	*0.00*	*114.1****	*0.00*	*165.6****	*0.00*	*116.1****	*0.00*	*335.0****	*0.00*	*s*
REGQTY	*-0.90*	*0.18*	*-6.48****	*0.00*	*62.30*	*0.33*	*147.5****	*0.00*	*116.2****	*0.00*	*329.8****	*0.00*	*S*

IPS: Im, Pesaran and Shaw W-stat, ADF- F: Augmented Dickey Fuller-Fisher,Chi-Square;

PP-F: Philips Peron-Fisher, Chi Square. ***1%;** 5%; *10% levels of significance.

4.4 Panel Co-integration Test

The panel residual co-integration tests proposed by Kao (1999) as well as the Pedroni (1995,1999) are used to test for panel cointegration. The results from Tables 5 and 6 confirms the presence of co-integrating relationships in the models. Given the result, we can therefore conclude that long-run equilibrium relationship exists among the variables in the model. Furthermore, the results also confirm the reliability of using panel pooling procedures for our analysis, which can be clearly seen from Kao cointegration test (-5.65; 0.00).

Table 5: Homogenous Kao Residual based Cointegration Test

	Homogenous Kao Cointegration Test	
	Statistics	Probability
ADF	-5.65***	0.00

Source: Author's computation. ***1%;** 5%; *10% levels of significance

Table 6: **Unrestricted Cointegration Rank Test (Trace and Maximum Eigenvalue)**

Hypothesized	Fisher Stat.*		Fisher Stat.*	
No. of CE(s)	(from trace test)	Prob.	(from max-eigen test)	Prob.
None	407.4***	0.0000	204.6	0.0000
At most 1	303.6	0.0000	205.6	0.0000
At most 2	210.6	0.0000	154.8	0.0000
At most 3	135.3	0.0000	96.33	0.0000
At most 4	83.97	0.0000	69.65	0.0000
At most 5	42.69	0.0022	42.69	0.0022

Source: Author's computation. ***1%;** 5%; *10% levels of significance

From the result of the Johansen Fisher panel cointegration test presented above, both Trace and Maximum Eigen values indicates at most four cointegrating equations. Hence, we can reasonably infer from these test results that the variables utilized in the study are cointegrated. Cointegration is an important prerequisite in the application of the Fully Modified Ordinary Least Squares Technique adopted in this study.

4. Analysis and Discussion of the main empirical results

The broad objective of this study is to examine the relationship between resource dependence and growth in selected SSA countries. To estimate how resource dependence affects growth in the region, the study employed the Fully Modified Ordinary Least Squares. The study also

examined the causal link between resource dependence and economic growth in the 29 SSA countries utilized in the study. The VEC Granger causality test/block Wald exogeneity test and the panel causality test proposed by Granger (the stacked test) were used. What follows are these various results.

Table 7: Stacked Panel Causality Test Result

Null Hypothesis:	Obs	F-Statistic	Prob.
RR_GDP does not Granger Cause GDPPC	543	4.85841	0.0081***
GDPPC does not Granger Cause RR_GDP		2.52306	0.0812*
SEC__ENR does not Granger Cause GDPPC	551	1.61219	0.2004
GDPPC does not Granger Cause SEC__ENR		12.7648	4.E-06***
INFL does not Granger Cause GDPPC	515	2.07785	0.1263
GDPPC does not Granger Cause INFL		2.54143	0.0798*
INFL does not Granger Cause RR_GDP	507	3.21030	0.0412**
RR_GDP does not Granger Cause INFL		0.97559	0.3777
GOVTEFF does not Granger Cause RR_GDP	373	4.32524	0.0139***
RR_GDP does not Granger Cause GOVTEFF		1.31845	0.2688
PC does not Granger Cause SEC__ENR	515	13.5083	2.E-06***
SEC__ENR does not Granger Cause PC		0.56381	0.5694
GOVTEFF does not Granger Cause SEC__ENR	377	2.19592	0.1127
SEC__ENR does not Granger Cause GOVTEFF		3.39591	0.0346**
REGQTY does not Granger Cause SEC__ENR	377	4.49108	0.0118***
SEC__ENR does not Granger Cause REGQTY		0.08753	0.9162
GOVTEFF does not Granger Cause PC	360	0.35767	0.6996
PC does not Granger Cause GOVTEFF		3.56660	0.0293**
GOVTEFF does not Granger Cause INFL	362	1.33242	0.2651
INFL does not Granger Cause GOVTEFF		2.30008	0.1017*
REGQTY does not Granger Cause INFL	362	1.72189	0.1802
INFL does not Granger Cause REGQTY		2.66378	0.0711*
REGQTY does not Granger Cause GOVTEFF	377	3.80560	0.0231**
GOVTEFF does not Granger Cause REGQTY		3.55329	0.0296**

Source: Author's computation. ***1%;** 5%; *10% levels of significance

The result of the Granger causality test reported in Table 7 show the direction of causality between the variables employed in the model. The results show a bidirectional relationship between the RR_GDP and GDPPC hence the null hypothesis that RR_GDP does not granger

cause GDPPC can be rejected at 1 percent level and the alternative at 10% significance level. This study finds uni-directional causality between economic growth GDPPC and human capital development (SEC_ENR) and therefore, the null hypothesis that GDPPC does not granger cause SEC_ENR can be rejected at 1% level of significance. Next, we find unidirectional relationship between GDPPC and INFL so that the null hypothesis that GDPPC does not granger cause INFL can be rejected at 10% level. Also, the results show a unidirectional relationship between GOVTEFF and resource dependence so the null hypothesis that GOVTEFF does not granger cause RR_GDP can be rejected at 1%. We find a uni-directional relationship exist between PC and SEC_ENR at 1% significance level and that SEC_ENR granger causes GOVTEFF at 5% level of significance. In the same vein, our result show that REGQTY granger causes SEC_ENR at 1% significance level. We also find that INFL granger causes GOVTEFF and REGQTY at10% significance level. Lastly, we find that bidirectional relationship exists between GOVTEFF and REGQTY at5% significance level.

4.1 VEC Granger Causality Test Results

Here, we present the result of the VEC causality test. Given that the null hypotheses for no cointegrating equations were rejected, the VEC test of causality became the more appropriate as opposed to the VAR.

Table 8: VEC Granger Causality Test Results

DEPENDENT VARIABLE	INDEPENDENT VARIABLE	CHI-SQUARE	PROBABILITY
	D(PC)	12.05027	0.0024
	D(GOVTEFF)	9.973554	0.0068
	D(REGQTY)	12.36566	0.0021
D(GDPPC)	All	30.81422	0.0021
	D(PC)	6.518436	0.0384
	D(GOVTEFF)	7.585160	0.0225
D(RR_GDP)	All	19.58188	0.0754
	D(REGQTY)	7.910350	0.0192
D(SEC_ENR)	All	17.37173	0.1361
	D(GDPPC)	11.85101	0.0027
	D(INFL)	22.80525	0.0000
	D(REGQTY)	12.25079	0.0022
D(PC)	All	52.98727	0.0000
D(INFL)	All	7.406255	0.8296
D(GOVTEFF)	D(RR_GDP)	9.660168	0.0080

	D(PC)	6.632815	0.0363
	D(INFL)	6.800114	0.0334
	All	33.98912	0.0007
D(REGQTY)	D(INFL)	12.32341	0.0021
	All	25.36383	0.0132

Source: Author's computation. ***1%;** 5%; *10% levels of significance

The results of the VEC causality test is presented in Table 4b, from the table, it can be seen that when GDPPC is the dependent variable, causality is observed between it and PC, GOVTEFF and REGQTY so that all the variables in the model are judged to have causality with GDPPC at 1% significance level. Similarly, when RR_GDP is the dependent variable, causality is observed between it, PC and GOVTEFF hence all the variables in the model are taken to have causality with RR_GDP at 10% significance level. When **SEC_ENR** is the dependent variable, it granger causes REGQTY at 1% significance level. We find that when PC is the dependent variable, it granger causes GDPPC, INFL and REGQTY, therefore PC granger causes all the variables at 1% significance level. Finally, when GOVTEFF and REGQTY are the dependent variables, they granger cause all the variables in the model at 1% significance level.

The control of inflation is a well-established tool for maintaining stability in the macroeconomy. We find that GDPPC seem to be increasing inflation in our analysis. This confirms the theoretical postulations that resource dependence can severely distort the non-resource sectors of the economy spiraling into the Dutch disease. This further underscored the importance of a stable macroeconomic environment in the attainment of reduced resource dependence in SSA. Finally, the importance of the institutional environment is also emphasized in our findings. We find that regulatory quality boost government effectiveness and vice versa. And in turn, those two variables have strong causal relationships with all the variables in our model.

Table 9: Fully modified ordinary least squares result

DEPENDENT VARIABLE: LGDPPC		
VARIABLES	COEFFICIENT	T-STATISTIC
RR_GDP	0.003703	2.101460**
SEC__ENR	0.004069	2.210999**

PC	0.407873	17.00958***
INFL	4.56E-06	0.510181
GOVTEFF	-0.395207	-4.311059***
REGQTY	0.449442	5.206416***
R-SQUARED = 0.98	ADJUSTED R-SQUARED = 0.98	

Source: Author's computation. ***1%;** 5%; *10% levels of significance.

Generally, from the results in Table 9, it can be deduced that RRGDP, SEC_ENR, PC, GOVTEFF and REGQTY are significant determinants of per capita GDP in SSA. The Coefficient of Determination and Adjusted Coefficient of Determination is 98% implying that the model has an impressive goodness of fit. Hence, we can conclude that between 98% of the systematic variations in the dependent variable is explained by the regressors in the model. The estimated model has no constant term because the panel estimator accounts for heteroskedasticity. To check for multicollinearity, we examined the Variance Inflation Factor presented in Table (9). We conclude that multicollinearity is absent as all the uncentered VIFs are less than 10.

Table 10: Variance Inflation Factors

Variable	Coefficient Variance	Uncentered VIF
RR_GDP	3.11E-06	1.101300
SEC__ENR	3.39E-06	1.544157
PC	0.000575	1.643689
INFL	8.01E-11	1.023093
GOVTEFF	0.008404	1.458910
REGQTY	0.007452	1.377741

Source: Author's computation, 2024

The signs on the coefficients conform to apriori expectations except for government effectiveness and inflation. From the result, it can be seen that a one percent increase in RR_GDP will increase GDPPC by 0.003 percent in SSA. This is line with some of the previous

as was highlighted in this study, there is no unanimity on the relationship between resource dependence and growth. Certain findings have produced positive relationships. A case in point is the export led growth foundations of the staple thesis. (Chambers and Gordon, 1966; Poon, 1994). The effect of secondary school on per capita GDP is positive. The implication of this finding is that investments in education which is one of the bed-rock of human capital is essential to growth in resource dependent economies. Closely related to this is the role of physical capital in spurring economic growth. Our findings confirm the importance of this variable buttressed by the fact that a one percent increase in LPC will increase LGDPPC by 41%. The implication of this finding is that investments in physical capital will contribute significantly to economic progress in SSA. This is agreement with the findings of Glyfason and Zoega, (2001), Bravo ortega and Gregario (2003), Akpan and Chuku (2014).

Against apriori expectation, inflation positively affects GDP per capita although it is not significant in this study. The implication of this finding is the underdeveloped nature of the macroeconomic environment in SSA has made her economies highly susceptible to volatility and distortions from external markets. A stable macroeconomic environment is therefore an essential prerequisite for engendering economic growth in SSA countries. The coefficient of REGQTY is positive in conformity with theoretical postulations. Isham et al (2005), Mehlum et al (2006), Sala-i Martin and Subramanian (2012) of the positive effects good institutions have on development. However, surprisingly, government effectiveness is significant but negative in the study.

5. Conclusion and Recommendation

The objective of this study was to investigate the effect of resource dependence on economic growth. The study deployed a panel of 29 resource dependent Sub-Saharan African countries over the period of 1996 – 2016 using per capita GDP, natural resource rent (resource dependence), secondary school enrolment rate (proxy for human capital), gross fixed capital formation (proxy for physical capital), inflation rate, government effectiveness and regulatory quality (proxies for institutional quality). The study found strong evidence in support of the impact of these variables on per capita GDP. As expected, the human capital variable, secondary school enrolment rate has a positive impact on per capita income. Education is a key determinant of human capital development in any country. SSA countries need to as a matter of urgency look at investments in education in the sub-region. Beyond that, measures need to be put in place to monitor the disbursement of such investments in order to ensure that it serves its purpose.

Physical capital as predicted in the literature positively and significantly contributes to economic growth. In view of this, governments in SSA countries must create the enabling environment necessary for the growth of physical capital. Infrastructural development is an essential tool in this regard, not only does it significantly reduce the cost of doing business, it enhances the attractiveness of these countries to foreign direct investment. Another important consideration here is to open up various sectors of the economy rather than just natural resource-based sectors to foreign direct investment flows.

The key role that institutional quality plays in economic growth cannot be overemphasized. Regulatory quality was found to have a positive and significant effect on economic growth. Building strong institutions is an important element in the bid to extract maximum benefits from resource abundance otherwise corruption, rent-seeking and government failure will result in resource curse.

The study also broadened the literature on resource dependence by incorporating both the resource rent and various measures of the share of natural resources in merchandise export. This not only provided abroad based comparative analysis, it also provided robustness to the study.

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