Exploring the Impact of Income Inequality and Energy Consumption on Economic Growth in Africa

BADRELDIN MOHAMED AHMED ABDULRAHMAN[1,a,*],
MASTORA SAHAL GOMAA SAHAL[2], IGHARO AMECHI ENDURANCE[3],
YOUSIF SAEED AHMED AMIN[1], HISHAM MOHAMED MISBAH[4],
JAMAL NAJI ABED MAHASNEH[1]
[1]Department of Business Administration,
College of Business,
Jouf University,
Sakaka,
SAUDI ARABIA

[2]Academic Programs for Military Colleges,
Abu Dhabi University,
Abu Dhabi,
UNITED ARAB EMIRATES

[3]Department of Economics,
British Canadian University,
Obuju,
NIGERIA

[4]Department of Accounting,
College of Business,
Jouf University,
Sakaka,
SAUDI ARABIA

[a]ORCiD: https://orcid.org/0000-0003-2174-1150

**Corresponding Author*

Abstract: - This study examines the effect of income inequality and energy consumption on economic growth in Africa. The study relies on a descriptive analytical approach to analyze data from selected African countries during the year 2020. The dependent variable (Y) measures economic growth as a percentage change in real GDP per capita annually. Explanatory variables include the Gini coefficient, human capital, investment, trade openness, energy consumption and political stability. The results indicate a statistically significant inverse relationship between income inequality (measured by the Gini coefficient) and growth. This shows the negative side of economic development due to income inequality. Contrary to theoretical concepts, human capital has a negative effect on growth. The result is due to poor education and a mismatch between academic performance and labor market demands. Ultimately, this is quite the opposite of what economic theory predicts. The impact of investment on growth appears to be negative. Trade imbalances may explain the negative correlation between opening trade and statistical growth. External shocks and unfair competition provide support for the foundation. The data reveal an intricate relationship between income inequality, policy factors, and economic progress in Africa.

Key-Words: - Income inequality, Economic growth, Poverty, Energy Consumption, Human Capital, Polital Stability.

Received: August 3, 2025. Revised: November 11, 2025. Accepted: March 22, 2026. Published: June 11, 2026.

1 Introduction

The relationship between income inequality, energy consumption and economic development in Africa is a multifaceted issue. A diverse economy attracts economists and policymakers. Africa presents a unique opportunity to explore this relationship. Especially in the last twenty years. The continent has experienced significant economic growth. Income inequality remains a major problem. Improving growth rates and rising inequality go hand in hand. Together, they raise important questions about the content of progress. The economy plays an important role in shaping social welfare. Economic growth is a key objective of the Sustainable Development Goals (SDGs), which focus on reducing economic inequality within and between countries. Therefore, the relationship between economic growth and inequality is a key element in evaluating economic progress. Global economies have experienced significant economic expansion over the years, but the extent of this growth varies across nations, possibly due to a variety of factors. Most global economies have seen an accelerated growth rate throughout the years. The potential correlation between the heightened growth rate and inequality has been a significant issue, [1].

The lack of equality, particularly regarding status, rights, and opportunities, is defined as inequality according to the United Nations. As a result, disparities in the distribution of income, whether they exist across or within economies, are known as income inequality. In terms of income, nutrition, access to healthcare, and high-quality education, the wealth disparity between the wealthy and the rest of society continues to increase. Worldwide, data reveal that inequality is continuing to worsen, with the wealth gap widening and the disparity between the poor and the affluent deepening. According to [2], the wealthiest 10% own almost 75% of the world's wealth. Over the years, income disparity has grown substantially in the majority of developed and developing nations. As an example, mentioned in [3] and [4], the income disparity between the wealthiest 10% and the lowest 10% was 7:1 in the 1980s, but it is now nearly 9.5 times larger. A new aim within the SDGs is the decrease of inequality, which has been a growing concern since the 1980s due to the correlation between rising inequality and rising political and social instability in emerging nations. Developing nations had an average 11% growth in income disparity between 1990 and 2015 (after accounting for population size). Nigeria's Gini coefficient rose from 25.88 percent in 1982 to 32.4 percent in 2016, as reported by [5].

Economic theory presents several viewpoints about the correlation between income inequality and economic progress. The traditional Kuznets hypothesis posits that inequality rises during the first phases of economic development and thereafter declines as nations advance, [6]. This assumption does not apply consistently in the African environment. Important economic developments in countries such as South Africa and Nigeria Accompanied by marked income inequality, [7] and [8], indicate a potential distortion in the relationship between inequality and growth in Africa. Deviations from established patterns seen elsewhere need more intricate study. The structure of the African economic system has a strong influence on this relationship. Most African countries display a strong dependence on resources. This sometimes leads to unequal allocation of funds. Angola's oil sector drives economic development. Instead, they distribute income to a select and privileged group. This has led to huge wealth inequality, [9]. The informal sector plays a key role in Africa's economy. With a large population of people working irregularly and receiving low wages. The situation has become more serious. It leads to economic progress and poverty reduction, [10]. Moreover, political and institutional issues significantly affect the relationship between income inequality and economic development in Africa. Countries with fragile institutions often struggle with executions, [11].

This paper analyzes the intricate link between wealth disparity, energy consumption and economic development in Africa. This paper underscores the influence of various economic, political, and social factors. Continuation of this discourse, this research analyzes many case studies throughout the continent to enhance comprehension of the factors contributing to inequality in Africa and its relationship with economic progress. We have structured this paper into four sections: Section II examines the literature. Section III delineates the research technique, and parts four and five present the study results and concluding remarks, respectively.

2 Literature Review

Empirical research investigating the correlation between income inequality and economic growth provides inconsistent findings throughout time. Certain individuals see a significant negative association. Others see a markedly favorable association. The discrepancies stem from different methodologies. The variable mix of the estimated model, in conjunction with the study's data and

temporal scope, accounts for the discrepancies. Acquiring an autonomous comprehension is essential and advantageous before exploring the connection between economic progress and inequality. The author in [12] asserts that economic growth encompasses the availability of production elements that enhance individual productivity and improve the quality of life. Also [13] and [14] characterize this as a measurable and durable enhancement in a nation's production or per capita income via labor, energy, consumption, capital, trade volume, and improved welfare. Economic development is characterized by a substantial and enduring rise in real per capita income due to the enhancement of production capacity. This indicates that the rise in per capita income is attributable to inflation rather than an augmentation in productive capacity. Amid inflation rises in the pricing of products and services generated by a nation result in an elevation of per capita income, rather than an enhancement of production capacity. An increase in per capita income does not equate to economic expansion. Significant economic growth can only be attained when real per capita income persists in rising after accounting for GDP confounders. The concurrent growth of national output and population alone cannot support economic progress. The growth rate of California will decline as a consequence.

Therefore, the investigation of the correlation between economic growth and income disparity has served as a foundational reference for other academics in this domain. By analyzing the two major industrialized economies of the United Kingdom and Germany, where the empirical findings regarding the inverted U-curve were based on the hypothesis that income inequality initially increased during the industrialization process and subsequently decreased as development progressed. Unexpectedly, it was unable to provide sufficient empirical data to assess the idea of a prolonged temporal fluctuation in income disparity, nor could it precisely date the phases.

[15], examined the enduring relationship between inequality and economic growth in Bangladesh during 20 years (1977-2018) using the OLS estimation method, revealing that, in the first phase, inequality worsened as the economy progressed. Consequently, the disparity escalated over time as the economy underwent more vigorous and durable expansion. The study corroborated the Kuznets hypothesis within the context of the Bangladeshi economy. Moreover, [16] provide empirical study on the relationship between economic progress and income inequality in Tunisia, using yearly data for a time series analysis from 1984 to 2011. They established a justification that supports the adverse correlation between inequality and growth. They argue that exchange flexibility and economic growth have exacerbated imbalances stemming from trade liberalization, whereas financial development and investment in human capital have been essential in mitigating income disparity. They looked at data from Tunisia to see if there was a link between economic growth and wealth inequality

[17] analyze income and non-income inequality and its impact on development in South Africa, using data from 1995 and 2000. They observed substantial income inequality throughout the inquiry. The study's results revealed that South Africa is the most persistently unequal economy worldwide. The results have confirmed the negative impact of inequality on growth. [18], show that sub-Saharan Africa witnesses significant levels of gender inequality in income. There is a global consensus that such inequality can hinder macroeconomic development and stability. Data indicate that sub-Saharan Africa faces high levels of inequality. Despite 15 years of little development in the region, income inequality persists. The report underscores the substantial disparity between development and inequality in the area. Income disparity in Africa is more evident across all income tiers than in other regions globally. It designs efficient economic strategies to mitigate income disparity and accelerate the growth process.

Studies have found that there is a positive relationship between economic growth and inequality. Using data from 1984 to 2011 using the GMM analysis method. The correlation is inverse when inequality serves as the dependent variable. When economic growth served as the dependent variable, [19] confirmed this finding by using another GMM to examine 55 low-income countries and 56 high-income developing countries. He discovered that income disparity adversely impacts economic development in low-income emerging nations. [20], analyzed the correlation between inequality and GDP growth rates using a survey dataset from 29 sub-Saharan African nations spanning 1980 to 2019. The results demonstrate the absence of a robust association. Inside sub-Saharan Africa, inequality and economic progress are significant factors in their interaction. Neti-Raisi (2019) examined data from 28 developing nations from 1990 to 2018 in the short term.

On the other hand, [21], examined the relationship among poverty, inequality, and economic growth in Nigeria over the period of 1980 and 2018 using an OLS estimation technique and reported a positive and significant relationship between inequality and economic growth. [22],

analyzed the influence of debt on economic growth and international relations, using the World Bank Group's 2020 debt report. Findings indicate that while economic assistance is essential, its overutilization may result in adverse effects. Comprehending the ramifications and executing required actions is essential for enhancing debt management.

[23], employed survey data from a selection of Sub-Saharan African nations, revealing the diverse characteristics and configurations of income inequality across different countries and throughout various temporal contexts. According to the latest Alpha Beta Gamma approach (ABG), inequality is isotropic across income levels. Local circumstances define growth-inequality relationships. Different sector-led growth trajectories have had different effects on inequality at the median, higher, and lower income distributions. [24], employs a cointegration model to investigate the impact of income inequality on the real GDP of the United States and China between 1980 and 2012. The short-term relationship is negative and significant. The long-term relationship is both positive and significant. As a result, income inequality can increase long-term growth. But it affects short-term growth. [25], study long- and short-term inequality and economic development in China, Japan, South Korea, and the US using Engle-Granger's bivariate ECM technique. These interactions support the long-run S-shaped curve concept. This shows that economic development affects income disparity greatly. [26], examined how development drivers affect income inequality in 20 African nations from 1991 to 2015. Based on fixed effects. Growth and inequality appear to be positively and statistically related. In many countries in Africa, inequality does not affect growth. Research indicates that economic variability in African countries has not slowed economic progress. [27], used a vector adjustment model to study Nigeria's income inequality and national income per capita. They found a short-run positive relationship between inequality and economic growth from 1981 to 2017. This is a long-run negative relationship with economic development in 31 countries in sub-Saharan Africa between 1995 and 2015, as investigated by [28]. They examined these data through the two-step system generalized method of moments. The findings indicated that income inequality had a notable positive influence on economic growth through the saving transmission channel, whereas it exerted a statistically significant negative impact on economic growth in the region via the channels of fertility, credit market imperfections, and fiscal policy.

Authors in [29], examine the causes of wealth disparity and its effect on African countries' economic development using data collected from 35 African states over 40 years. Meanwhile, [30] indicates the existence of a long-term equilibrium relationship between the consumption of various energy products and economic growth in Saudi Arabia, with a positive and significant impact of liquefied petroleum gas consumption on GDP.
The research used OLS (Ordinary Least Squares) methods for estimating variables. The research demonstrated that rising income disparity hinders growth. The disruption element that propagated economic inequities included several factors, such as the amount of the government budget, the percentage of growth in the agricultural sector, and the endowment of land and people. Nevertheless, the falling levels of primary, secondary, and higher education, the frequent political unrest that undermines economic stability, and the high birth rate have all contributed to the widening of these disparities, [31] and [32]. Authors in [33] investigated the correlation between Saudi Arabia's GDP, carbon dioxide emissions (CO2), other refined product consumption (ORPC), natural gas consumption (NGC), and liquefied petroleum gas consumption (LPGC) between 1970 and 2021. They revealed a positive association between GDP growth and energy consumption using an autoregressive distributed lag (ARDL) bounds-testing approach. Accordingly, there is a long-term relationship between the factors that drive economic development and their regressors, and LPGC significantly boosts economic growth.

It is obvious from empirical research that has been referenced up to this point that the argument between economic growth and inequality is an ongoing subject, and the results have been highly different. Furthermore, most of the examined publications focused on the influence of inequality on economic development, neglecting to consider the possibility of the opposite outcome. According to the Kuznets theory, the current research evaluated the impact of economic growth on inequality using the most recent freely accessible data and a suitable analytical approach.

3 Research Methodology

This section scrutinizes the data and outlines the methodology for selecting indicators. We thoroughly examine the model parameters and their past expectations.

3.1 Data

Various sources, including World Bank Development Indicators, United Nations Development Program Human Development Reports, and other pertinent databases, provide the data for this study.

3.2 Method

The purpose of this research is to analyse the impact of income inequality and energy consumption on the expansion of the African economy. When it comes to analysing data on the selection of African countries in 2020, the research uses descriptive analysis techniques.

3.3 Model Specification

This research will develop an econometric model to study the relationship between income inequality and energy consumption on economic growth. Our econometric model is a multiple regression model with independent variables for income inequality, economic growth and other related factors Related.

Economic growth, expressed as a percentage change in real GDP per capita annually, is the dependent variable (Y). The following variables constitute the independent variables:

1. Income inequality (G): This variable is measured by the Gini coefficient, ranging from 0 (perfect equality) to 1 (perfect inequality). A higher value of the Gini coefficient indicates greater income inequality.
2. Human capital (H): Variable measured by the average number of school years of people aged 25 and over. Human capital should have a positive impact on economic growth.
3. Investment (V): This variable is measured as gross fixed capital formation as a percentage of GDP. Investments should have a positive impact on economic growth.
4. Trade Openness (T): Exports and imports, expressed as a proportion of GDP, quantify this variable. We expect the initiation of commerce to provide beneficial effects on economic growth.
5. Political stability: This variable is measured by an index ranging from 0 (very unstable) to 10 (very stable). Political stability should have a positive impact on economic growth.
6. Energy consumption (E): This variable is measured by energy consumption per capita in units, such as kilowatt-hours per capita, it expresses the amount of energy by an individual in a year.

The multiple regression model can be written as follows:

$$Y = \beta0 + \beta1G + \beta2H + \beta3V + \beta4T + \beta5P + \beta6E + \varepsilon \quad (1)$$

where:

Y = Annual percentage change in real GDP per capita represents economic growth.

G = Gini coefficient represents inequality.

H = Human Capital measured by average years of schooling for individuals aged 25 years and above.

V = Gross fixed capital formation as a percentage of GDP represents Investment.

T = Exports plus imports as a percentage of GDP (Trade Openness).

P = is the Political Stability Index, ranging from 0 (highly unstable) to 10 (highly stable).

E is energy consumption per capita.

β0, β1, β2, β3, β4, β5and β6 are coefficients that represent the effect of each independent variable on economic growth.

ε represents the error term or random disturbance that captures all other factors affecting economic growth but not included in the model.

Table 1. Data on dependent and independent variables

Countries	Dependent Variable	Independent Variables					
	(Y)	(G)	(V)	(H)	(T)	(P)	(E)
Algeria	-6.631659187	38.1	0.534556448	39.08982169	40.38975656	17.92453	14934
Tunisia	-9.436698359	41.4	0.516809944	15.84556602	84.33325914	25	9291
Mali	-4.290965 96	35.7	0.318269581	19.86350826	66.99057428	3.773585	1143
Ghana	-1.541636526	44	0.450056404	17.66074711	66.57549872	52.83019	3112
Chad	-4.661339 02	40.5	0.299782783	20.55507851	68.73036014	11.32076	237
Cameroon	-2.422434418	42.2	0.397401512	18.19229915	33.73883136	9.905661	1758
Zimbabwe	-9.670404777	50.3	0.466893107	10.04608116	47.31336542	13.20755	2680
Uganda	-0.423316497	42.7	0.384176582	23.5178704	37.00069239	18.86792	766
South Africa	-7.106588783	63.0	0.425453395	13.80823668	50.68684334	39.15094	23688
Namibia	-9.668821206	56.0	0.446437538	13.66538657	76.9252424	63.20755	8960

Source: created by authors based on World Bank data

4 Results and Discussion

Table 2. Summary ANOVA

Model Summary b										
					Change Statistics					
Model	R	R Square	Adjusted R-Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
1	.953 a	.908	.724	1.81114582	.908	4.943	6	3	.109	2.303
a. Predictors: (Constant), E, T, V, H, P, G										
b. Dependent Variable: Y										

Source: own calculation

The ANOVA summary provides important insights into the overall fit of the model and the significance of the regression. The F statistic of 4.9 indicates the model is statistically significant. It can be said that these tests can be relied upon in explaining the variables, meaning that the independent variables explain a significant portion of the variation in the dependent variable.

Table 3. Model Summary

	(Y)
R-square	0.91
Durbin-Watson test	2.30

Source: own calculation

From Table 3 the value of the coefficient of determination R^2 indicates the contribution of the independent variables in explaining the dependent variable. This indicates that a one-unit change in the independent variables contributes to explaining 91% of the expected change in the dependent variable (Y), while 15.8% is due to other factors not included in the study.

Table 4. The Regression Results

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	56.688	19.287		2.939	.061
	G	-.763	.279	-1.883	-2.735	.072
	V	-.335	.203	-.775	-1.648	.198
	H	-36.989	10.965	-.821	-3.373	.043
	T	-.229	.063	-1.174	-3.605	.037
	P	.218	.065	1.251	3.359	.044
	E	.000	.000	.669	1.467	.239
a. Dependent Variable: Y						

Source: own calculation

$$Y = 56.688 - 0.763G - 36.989 H - 0.335 V - 0.229 T + 0.218 P + 0.000E \quad (2)$$

Our ultimate objective is to study the impact of income inequality and energy consumption on economic growth in Africa. For this purpose, using the data presented in Table 1 and applying the Ordinary Least Squares (OLS) method, we estimated a linear model of equation (1) using the Statistical Analysis Program. The regression results are reported in Table 2, Table 3 and Table 4.

The results indicate that the overall model is statistically significant at 10%, as shown in Table 2. While the Durbin–Watson statistic indicates the absence of serial correlation in the model, this is a good sign for the model. The value of R^2 suggests that the variations in the explanatory variables (G, H, V, T, P, E), explain 91% of the variation in the dependent variable (Y).

After analyzing and presenting the results of the study model using the Ordinary Least Squares (OLS) method, the empirical results of the model showed that the economic growth in Africa(Y) as a dependent variable is inversely related to income inequality in Africa (G) (represented by the Gini coefficient). This means that when income inequality increases by one unit, the economic growth in Africa decreases by (-0.76), and the probability value indicates that the effect of income inequality is statistically significant.

This result confirms the study's hypothesis that income inequality negatively affects economic expansion in Africa, which is consistent with economic theory and is supported by economic literature. This indicates that high income inequality reduces economic growth, leads to lower savings and consumption, and creates an unstable political and social environment, which in turn affects investment and growth.

The empirical results also indicate that human capital (H) has a strong negative impact on economic growth in Africa. That is, if human capital increases, economic growth in Africa decreases and this effect is statistically significant. This result contradicts the study's hypothesis that human capital should have a positive effect on economic growth. It also contradicts economic theories, which suggest that education enhances productivity and increases economic growth.

Possible explanations for this contradiction include:

- The number of years of education may be insufficient to explain economic growth in the studied environment, possibly due to poor education

quality or a mismatch between the type of education/ training and the labor market needs.

- There might be an inflation of formal education in some countries, without an actual improvement in economically applicable skills.

The study found that investment (I) negatively impacts economic growth in Africa and is statistically insignificant. It does not contribute to explaining the dependent variable (Y). This contradicts the study's hypothesis that Investments should have a positive impact on economic growth. It is also inconsistent with economic theories, which consider that increasing investment supports economic growth. This might be due to several factors, including:

- Investment quality: Investment may be directed towards non-productive or unprofitable sectors, such as infrastructure projects that do not provide immediate returns or are not efficient.

- Investment volume: The investments in the countries studied may not be sufficient to generate a substantial impact on economic growth.

Timing: The positive impact of investment may take time to manifest, as the economic benefits of some investments may take years to realize.

The results of the study also showed that trade openness (T) negatively affects economic growth in Africa and is statistically significant. This means that an increase in trade openness by one unit leads to a decrease in economic growth. This result contradicts the study's hypothesis and the economic theories that support a positive relationship between trade openness and economic growth.

This result can be justified as follows:

- Trade imbalance: The countries included in the study may suffer from a significant trade deficit, leading to capital outflows and increased debt.

- Unfair competition: This suggests that trade openness in the studied countries may increase unfair competition and harm local sectors that are unprepared for international competition, which leads to a decline in economic growth.

- External shocks: These countries may experience negative effects due to their over-reliance on foreign trade, especially if they are exposed to price fluctuations or unfavourable trading conditions.

The empirical findings indicated that political stability and energy consumption have a positive and statistically significant effect on economic growth. This indicates that any improvement in political stability correlates with a rise in economic growth in Africa. This outcome aligns with the study's premise and economic theory. Political stability is essential for the economic development of any nation and is seen as a critical component in attracting foreign investment, which subsequently fosters economic growth.

5 Conclusion

This research shows that the income gap negatively impacts African economic development statistically. As income inequality rises, economic growth falls, supporting the idea that disparity reduces savings, consumption, and investment and creates political and social instability. Contrary to theory, human capital and trade openness may hurt development due to structural challenges, including insufficient education, labor market mismatches, and external vulnerabilities. Investment, generally a growth engine, has little effect on African economies. This might be due to poor investment allocation, low volumes, or delayed economic rewards. These data show that the variety and quality of investments matter more than the number. Political stability, however, considerably boosted economic development. Stable governance is essential for investment, development, and long-term economic growth. This research illustrates the intricate relationship between income disparity, policy, and economic growth. To boost growth, African policymakers should focus on economic disparity, education quality and alignment, and political stability. Addressing trade imbalances and investing in productive industries would also help maintain economic growth.

References:

[1] Roser, M. (2013). Global economic inequality. Our World in Data, [Online]. https://goo.su/nybLCT (Accessed Date: January 10, 2026).

[2] Balcilar, M., Akadiri, S. S., Gupta, R., & Miller, S. M. (2018). Partisan conflict and income inequality in the United States: A Nonparametric Causality-in-Quantiles approach. Social Indicators Research, 142(1), 65–82. https://doi.org/10.1007/s11205-018-1906-3.

[3] OECD 2014. Focus on Inequality and Growth. Directorate for Employment, Labor and Social Affairs. pp. 1-4, [Online]. https://web-archive-storage.oecd.org/aemint-web-archive-prod/web-archive/7b/7bfe84a0d93f42abf2d63ffae73a16dba825c7be67b1bff2d1189ccc329f45f8.pdf (Accessed Date: January 10, 2026).

[4] Timmer, M. P., Dietzenbacher, E., Los, B., Stehrer, R., & De Vries, G. J. (2015). An

Illustrated User Guide to the World Input–Output Database: the Case of Global Automotive Production. Review of International Economics, 23(3), 575–605. https://doi.org/10.1111/roie.12178.

[5] Spaull, N. (2012). Poverty & privilege: Primary school inequality in South Africa. International Journal of Educational Development, 33(5), 436–447. https://doi.org/10.1016/j.ijedudev.2012.09.009

[6] Kuznets, S. (1955). Economic Growth and Income Inequality. The American Economic Review, 45(1), 1–28.

[7] Leibbrandt, M., Finn, A., & Woolard, I. (2012). Describing and decomposing post-apartheid income inequality in South Africa. Development Southern Africa, 29(1), 19-34, [Online]. https://goo.su/cVWdW0 (Accessed Date: January 15, 2026).

[8] Akinbobola, T. O., & Saibu, M. O. O. (2013). Income inequality, unemployment, and poverty in Nigeria: A vector autoregressive approach. The Journal of Developing Areas, 47(2), 201-217. https://doi.org/10.1080/1384128042000261800

[9] System, J. (2018). Africa Review of Books, volume 14, n° 1, 2018. Africa Review of Books, 14(1). https://doi.org/10.57054/arb.v14i1.1287.

[10] Hilson, G., Hilson, A., Maconachie, R., McQuilken, J., & Goumandakoye, H. (2017). Artisanal and small-scale mining (ASM) in sub-Saharan Africa: Re-conceptualizing formalization and 'illegal' activity. Geoforum, 83, 80–90. https://doi.org/10.1016/j.geoforum.2017.05.004.

[11] Maunganidze, L. (2015). Zimbabwe: institutionalized corruption and state fragility. In United Nations University series on regionalism (pp. 39–60). https://doi.org/10.1007/978-3-319-20642-4_3.

[12] Schumpeter, J. A. (2006b). The Theory of Economic Development. In Kluwer Academic Publishers eBooks (pp. 61–116). https://doi.org/10.1007/0-306-48082-4_3.

[13] McConnell, V., & Wiley, K. (2012). Infill Development: Perspectives and Evidence from Economics and Planning. In Oxford University Press eBooks (pp. 473–502). https://doi.org/10.1093/oxfordhb/9780195380620.013.0022.

[14] Thirlwall, A. P. (1972). A Cross-Section Study of Population Growth and the Growth of Output and Per Capita Income in a Production Function Framework1. The Manchester School, 40(4), 339-356. https://doi.org/10.1111/j.1467-9957.1972.tb01123.x.

[15] Islam, S. M. A. (2009). Inequality and economic growth in Bangladesh–a diversified evidence on Kuznets pattern Uhypothesis. Journal of the Bangladesh Agricultural University, 7(1), [Online]. https://ageconsearch.umn.edu/record/208347/?v=pdf (Accessed Date: January 10, 2026).

[16] Wahiba, N. and Weriemmi, M. 2014. The Relationship between Economic Growth and Income Inequality. International Journal of Economics and Financial Issues 4(1): 135143, [Online]. https://goo.su/pSfjZ (Accessed Date: January 10, 2026).

[17] Bhorat, H., Van der Westhuizen, C., & Jacobs, T. (2009). Income and non-income inequality in post-apartheid South Africa: What are the drivers and possible policy interventions?. Development Policy Research Unit DPRU Working Paper, (09/138). https://dx.doi.org/10.2139/ssrn.2184183.

[18] Simon, J., Jonathan D. O., Arvind S., (2019). "The Prospects for sustained growth in Africa: Benchmarking the constraints," IMF Staff Papers, 57(1), 119-171. doi: 10.3386/w13120.

[19] Fawaz, F., Rahnama, M., & Valcarcel, V. J. (2014). A refinement of the relationship between economic growth and income inequality. Applied Economics, 46(27), 3351-3361. https://doi.org/10.1080/00036846.2014.929624

[20] Decker, R., Haltiwanger, J., Jarmin, R., & Miranda, J. (2014). The role of entrepreneurship in US job creation and economic dynamism. The Journal of Economic Perspectives, 28(3), 3–24. https://doi.org/10.1257/jep.28.3.3.

[21] Aregbeyen, O., & Kolawole, B. O. (2015). Oil revenue, public spending and economic growth relationships in Nigeria. Journal of Sustainable Development, 8(3). https://doi.org/10.5539/jsd.v8n3p113.

[22] Abdulrahman, B. M. A. (2023). Effects of fuel prices on economic activity: Evidence from Sudan. International Journal of Advanced and Applied Sciences, 10(6), 164–179. https://doi.org/10.21833/ijaas.2023.06.020.

[23] Abdulrahman, B. M. A., Yahia, A. E., Abdalrhman, H. A., & Helal, T. O. A. (2020). The Effect of Debts on Economic Development. Academy of Accounting and Financial Studies Journal, 24(3), [Online]. https://goo.su/oLbISg (Accessed Date: January 13, 2026).

[24] Massamba, S.L. 2016. Growth and inequality in Sub-Saharan Africa: insight from a linked abg method and cge modeling, [Online]. https://goo.su/loOEyaL (Accessed Date: January 20, 2026).

[25] Wang, Y. (2017). Will Inequality Affect Growth?: Evidence from USA and China since 1980. Research in World Economy, 8(2), 1. https://doi.org/10.5430/rwe.v8n2p1.

[26] Yang, Y., & Greaney, T. M. (2016). Economic growth and income inequality in the Asia-Pacific region: A comparative study of China, Japan, South Korea, and the United States. Journal of Asian Economics, 48, 6–22. https://doi.org/10.1016/j.asieco.2016.10.008.

[27] Akadiri, S., Akadiri, C. 2018. Growth and Inequality in Africa: Reconsideration. Academic Journal of Economic Studies 4(3): 76–86, [Online]. https://www.ceeol.com/search/article-detail?id=696067 (Accessed Date: January 20, 2026).

[28] Henry, J., & Panotani, P. (2019). Relationship between per capita national income and income inequality: Is the Kuznets hypothesis true for nigeria. International Journal of Innovative Science and Research Technology, 4(4), 198-206.

[29] Henry, J., Panotani, P. 2019. Relationship between per Capita National Income and Income Inequality: Is the Kuznets Hypothesis True for Nigeria? International Journal of Innovative Science and Research Technology 4 (4): 198-206, [Online]. https://2u.pw/ufHVZ (Accessed Date: January 20, 2026).

[30] Odusanya, I. A., & Akinlo, A. E. (2020). Growth effect of income inequality in sub-Saharan Africa: exploring the transmission channels. International Journal of Management and Economics, 56(2), 176–190. https://doi.org/10.2478/ijme-2020-0012.

[31] Odedokun, M., Round, J. 2020. Determinants of income inequality and its effects on economic growth: evidence from African countries. African Development Review, 16 (2): 269–84, [Online]. https://www.econstor.eu/handle/10419/52809 (Accessed Date: January 20, 2026).

[32] Kapidani, M., & Numani, E. (2023). Investing in green Energy: Profitability Analysis of solar energy for household consumption in Albania. WSEAS Transactions on Business and Economics, 21, 345–352. https://doi.org/10.37394/23207.2024.21.30.

[33] Daly, H., Abdulrahman, B. M. A., Ahmed, S. a. K., Abdallah, A. E. Y., Elkarim, S. H. E. H., Sahal, M. S. G., Nureldeen, W., Mobarak, W., & Elshaabany, M. M. (2024). The dynamic relationships between oil products consumption and economic growth in Saudi Arabia: Using ARDL cointegration and Toda-Yamamoto Granger causality analysis. Energy Strategy Reviews, 54, 101470. https://doi.org/10.1016/j.esr.2024.101470.

Contribution of Individual Authors to the Creation of a Scientific Article (Ghostwriting Policy)

The authors equally contributed to the present research, at all stages from the formulation of the problem to the final findings and solution.

Sources of Funding for Research Presented in a Scientific Article or Scientific Article Itself

No funding was received for conducting this study.

Conflict of Interest

The authors have no conflicts of interest to declare that are relevant to the content of this article.