

Population Growth, Financial Development, and Economic Growth in Sub-Saharan African Countries

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Abstract

This study examines the effect of population growth, financial development and economic growth in sub-Saharan Africa countries from the period of 2011 to 2022. The paper employed a panel data of seven (7) sub-Saharan Africa countries. The study employed a two-system Generalized Method of moment (GMM) approach were also employed to test the hypotheses and the presence of a long-run co-integration connection was indicated. The finding reveals that the finding reveals that mortality rate and fertility rate have a joint positive and significant effect on Real Gross Domestic Product of sub-Saharan Africa. While Money Supply and Domestic Credit to Private Sector have a negative and significant effect on Real Gross Domestic Product of sub-Saharan Africa. Based on the finding, the study concludes that population growth and financial development play a significant role in enhancing economic growth of sub-Saharan Africa. The study recommends the need for sustainable population growth and financial strategies in Sub-Saharan Africa. It emphasizes the importance for financial institution to promote economic growth while minimizing financial costs. The thesis provides valuable insights into the complex interplay between population growth, financial development, and economic growth in the region, offering a basis for evidence-based decision-making and sustainable development strategies.

Keywords: Sub-Saharan, Africa, Population Growth, Financial Development, Economic Growth

Introduction

Sub-Saharan Africa is a region characterized by rapid population growth and evolving financial systems, both of which have significant implications for economic development. The relationship between population growth and financial development on economic growth in this region is a topic of increasing importance and interest. As the population in Sub-Saharan Africa continues to expand, the demand for financial services and investment opportunities also grows, making it imperative to examine how these factors intersect and impact the overall economic trajectory of the region Huang (2010). In this article, we will explore the complex relationship between population growth, financial development, and economic growth in Sub-Saharan Africa. We will investigate the role of demographic changes in shaping the effectiveness of financial systems, the influence of population dynamics on investment patterns and capital accumulation, and the potential implications for sustainable economic development. By delving into this topic, we aim to contribute to a better understanding of the unique challenges and opportunities facing Sub-Saharan Africa in the context of its population growth and financial landscape.

Population growth, financial development, and economic growth in sub-Saharan Africa have all been important factors in shaping the region's overall development in recent years. Sub-Saharan Africa is home to a rapidly growing population, which has significant implications for the region's economic and financial development. Population growth in sub-Saharan Africa has been one of the most rapid in the world. According to the United Nations, the region's population is expected to double by 2050, reaching nearly 2 billion people. This rapid population growth presents both opportunities and challenges for the region. On one hand, a large and young population can be a source of innovative ideas, vibrant labor force, and consumer demand,

which can drive economic growth. However, it also puts pressure on resources, infrastructure, and social services, such as education and healthcare Karim and Amin (2018). Financial development in sub-Saharan Africa has been a crucial factor in promoting economic growth. Over the past few decades, the region has seen progress in financial inclusion, access to credit, and the development of financial markets. This has allowed businesses to access capital, encouraged savings and investment, and facilitated the efficient allocation of resources in the economy (Levine, 1997). Despite these advancements, financial development in sub-Saharan Africa still faces significant challenges. Access to financial services remains limited, particularly in rural areas, and there is a lack of deep and well-functioning financial markets. In addition, weak regulatory frameworks, political instability, and governance issues continue to hamper financial development in the region (Ellis, 2007).

Economic growth in sub-Saharan Africa has shown resilience in recent years, despite facing various challenges. The region's economic growth is driven by factors such as natural resource exploitation, agriculture, and a growing consumer market. However, the quality of this growth remains a concern, as it has not always translated into sustainable development, poverty reduction, or shared prosperity Levine (1999). Furthermore, sub-Saharan Africa's economic growth is vulnerable to external shocks, such as fluctuations in commodity prices, climate change, and global economic trends. In addition, the region's economic growth is also hindered by factors such as weak infrastructure, limited access to technology and innovation, and institutional constraints Hassan, et al, (2011). Empirically, population growth, financial development, and economic growth are closely interlinked in sub-Saharan Africa. As the region continues to grapple with the challenges and opportunities presented by a growing population, enhancing financial development and promoting sustainable economic growth will be essential for addressing poverty, inequality, and promoting long-term development in sub-Saharan Africa. This will require targeted policies and investments in areas such as education, healthcare, infrastructure, and governance to harness the potential of the region's population and foster inclusive and sustainable economic growth.

Literature Review

This section reviews the theoretical literature, conceptual literature, empirical literature and summary of reviewed literature.

Theoretical Review

literature on population growth and financial development on economic growth provides some theoretical explanation on the relationship between population growth and financial development on economic growth in sub-Saharan African countries. The theoretical framework will be grounded on three theories namely: Demand-following theory of financial development, Malthusian Theory of Population and Neo-Classical Growth Theory of Economic Growth.

Demand-following Theory

The demand-following theory was developed by Robinson (1952), and in summary, it states that financial development follows economic growth and where enterprises lead, finance follows. This theory places emphasis on the demand and supply side of financial development. For demand-following theory, it can also be called “growth-led finance” hypothesis. It states that the growth of the economy generates additional and new demand for financial services, “which bring about a supply response in the growth of the financial system” that the ‘supply-leading’ hypothesis posits a unidirectional causation that runs from financial deepening (financial sector development) to economic development implying that new functional financial markets and institutions will increase the supply of financial services. This will definitely lead to high but sustainable real economic growth. This hypothesis performs two roles namely to transfer resources from low growth sectors to high growth sectors and to promote

entrepreneurial response in the later sector. The level of demand for financial services depends upon growth of real output, and commercialization and monetization of agriculture and other traditional substance sectors. An accelerated growth rate of real national income stimulates greater demand for external funds by enterprises and this will bring about increase in the level of financial intermediation, as firms find it increasingly difficult to pursue expansion policy from internally generated funds. Moreover, the greater the variance in the growth rates among different sector of the economy, the greater will the responsibility of the financial system to perform the role of financial intermediation by allocating savings to fast growing industries away from slow growing industries and firms. In this way, the system can thus support and sustain the leading sectors in the process of growth. The demand following financial hypothesis assumes that there is high elasticity in the supply of entrepreneurship in the financial services “relative to growing opportunities for profits from provision of financial services”, in such a way that there is sufficient expansion in the number and diversity of types of financial institutions. It is also assumed that there is in existence favourable legal, institutional and economic environment.

Malthusian Theory

The Malthusian theory of population was used as the theoretical underpinning of the study. Thomas Robert Malthus propounded the theory in 1798. Adam Smith, David Ricardo, and many other mercantilist economists contributed to its further development. Malthus revolted against the prevailing optimism shared by his father, Godwin, that a perfect state could be attained if human restraints could be removed. Malthus objection was that the pressure of increasing population on the food supply would destroy perfection and cause misery in the world. Malthus was severely criticised for his pessimistic views, which led him to travel on the continent of Europe to gather data in support of his thesis. He incorporated his research into the second edition of his essay, published in 1803. The Malthusian theory explains the relationship between the growth in food supply and population. It states that population increases faster than food supply, which, if unchecked, leads to vice or misery (Amin, 2008). The theory stressed further that if people fail to check the growth of population through the adoption of preventive checks, positive checks operate in the form of vice, misery, famine, war, disease, pestilence, floods, and other natural calamities that tend to reduce population and thereby bring balance to the food supply. According to Malthus, preventive checks are always in operation in a civilised society, while positive checks are crude. Malthus appealed to his countrymen to adopt preventive checks in order to avoid vice or misery resulting from the positive checks. The theory is applicable to the study in three directions. Rapid population growth is a menace that for long has continued to expose the country to the hydra-headed monster known as poverty. For a long time, the country has been rated as one of the poorest nations in the world. The United Nations Development Index in 2018 rated the country as 157 out of 171 nations battling with poverty. Amnesty International in 2017 and 2018 also stressed that the country is also among the worst nations battling with poverty. The population outburst that is ravaging the country is a setback to agricultural practices. It has led to the challenges of land fragmentation and degradation. Agriculture, which is the mainstay of society, is practiced on a subsistence level. Tools are still primitive, and there is repeated pressure on the land. This has spurred the rise of poverty in the country. Another aspect in which the theory is applicable to the study is the issue of conflict, which is so common in the country. Population outbursts have led to pressure on land, which has encouraged unnecessary competition. The country is bedeviled with challenges and conflicts. There is the presence of inter- and intra-community conflict, ethnic and religious conflict, communal conflicts, conflicts between herders and farmers, violence and attacks by militia groups and religious sects, and many others. These are anomalies that are associated with the challenges of population explosions in the country. The theory is also related to the study in the area of degradation. The land that is a veritable tool is overused and abused in a lot of ways.

It has been subjected to abuses in the form of oil spillages, erosion from mining activities, deforestation, and a lot of others.

Neo-Classical Growth Theory of Economic Growth

Robert Solow first proposed this over 40 years ago. The model believes that a sustained increase in capital investments increased the growth rate only temporarily because the ratio of capital to labour went up. The marginal product of additional units is assumed to decline, and thus an economy eventually moves back to a long-term growth path with the real GDP growing at the same rate as the growth of the workforce plus factor to reflect improving productivity. Neo-classical economists who subscribe to the Solow model believe that to raise an economy's long-term trend rate of growth, it requires an increase in labour supply and also a higher level of productivity of labour and capital. Differences in the rate of technological change between countries are said to explain much of the variation in growth rates. The neo-classical models treat productivity improvements as an exogenous variable, which means that productivity improvements are assumed to be independent of the amount of capital investment (Aspromourgos 1986). The neoclassical growth theory of economic growth is a model of the level and allocation of the national commodity founded on the social endowments of out features, like labour and 'capital', technical circumstances of out, and customer favourites. Pre-Solowian scholars concentrated on the fortitude of long-term equilibrium with assumed endowments in all aspects, but this model was also assumed to be concerned with economic growth. Economic growth has been observed as 'endogenous' in the distinctive neoclassical logic that it hangs on the resolution of the population (a gathering of persons) between saving perceived as the source of capital and present utilization. There was a firm correlation between the share of capital in the sharing model and the progress model. The presence of an affirmative rate of incomes hinged on the lack of capital exactly because it embodied the compensation for a saving choice that, either by authorizing an advanced per capita endowment or by equipping fresh labourers with the normal capital bequest, was fundamental for per capita and total economic progress. This is what we refer to as the 'orthodox concept' of economic growth as thought by the neoclassical theory of economists (Dequech, 2007).

Conceptual Review

Financial Development

Financial development refers to the evolving and expanding system of financial institutions, markets, instruments, and infrastructure within an economy. It encompasses the growth and sophistication of banking, insurance, capital markets, and other financial services, as well as the development of regulatory mechanisms, governance structures, and technological innovations that support the functioning and efficiency of the financial system. The concept of financial development is closely linked to the broader process of economic development, as it plays a crucial role in facilitating productive investment, resource allocation, risk management, and the mobilization of savings and capital. A well-developed financial system is essential for promoting economic growth, reducing poverty, and fostering overall prosperity within a society (Noureen (2013)). The concept of financial development is about creating an inclusive, efficient, and resilient financial system that supports sustainable economic growth, fosters investment and entrepreneurship, and enhances the overall well-being of individuals and communities within a society. It is a dynamic and ongoing process that is influenced by globalization, technological advancements, demographic changes, and policy decisions (Garba 2014).

Population Growth

Population growth refers to the increase in the number of individuals in a population over time. This growth can occur through natural processes such as birth and immigration, as well as through societal factors like technological advancements and economic development. The concept of population growth is closely linked to the study of demography, which is the

scientific study of human populations. Demographers analyze changes in population size, structure, and distribution, as well as the factors that influence these changes. There are several factors that contribute to population growth. One of the main drivers of population growth is fertility, which refers to the number of births in a population. High fertility rates can lead to rapid population growth, while low fertility rates can result in slower growth or even population decline. Another important factor in population growth is mortality, or the number of deaths in a population. High mortality rates can limit population growth, while low mortality rates can contribute to rapid growth. Advances in healthcare, sanitation, and access to clean water have led to significant decreases in mortality rates in many parts of the world, contributing to population growth. Migration is also a key factor in population growth. When individuals move from one area to another, they can significantly impact the population size and composition of both the area they leave and the area they move to Charles and Philipp (2014). Population growth has significant implications for society, the economy, and the environment. A rapidly growing population can put pressure on infrastructure, natural resources, and social services. It can also lead to increased competition for jobs and housing, and can strain social and political systems. On the other hand, a declining population can lead to labor shortages, reduced economic growth, and challenges in providing care for an aging population. At a global level, concerns about overpopulation and its impact on the environment have led to discussions about sustainable development and the need to balance economic growth with environmental conservation (Bloom et al., 2003). Population growth is a complex and multi-faceted phenomenon that has far-reaching implications for societies and the world as a whole. Understanding the factors that drive population growth and its impacts is crucial for making informed decisions about policies and programs aimed at managing and shaping future population trends.

Economic Growth

Economic growth refers to an increase in a country's production of goods and services over time. It is typically measured by an increase in a country's Gross Domestic Product (GDP), which is the total value of all goods and services produced within a country's borders. Economic growth is a crucial aspect of a country's development and is often seen as a key indicator of a nation's overall economic health. It is important because it leads to higher standards of living for the citizens of a country, as it creates more job opportunities, higher wages, and a greater availability of goods and services. Cashell (2006). There are several factors that contribute to economic growth. One major factor is technological advancement, which allows for more efficient production processes, leading to increased output. Another factor is investment in human capital, such as education and training, which can lead to a more skilled and productive workforce. Additionally, investment in physical capital, such as infrastructure and machinery, can also contribute to economic growth by increasing productive capacity. Todaro (1977) defines economic growth as the increase over time in an economy's capacity to produce the goods and services needed to improve the wellbeing of its citizens in increasing numbers and diversity. It is the steady process by which the productive capacity of the economy is increased over time to bring about rising levels of national income. Economic growth is often driven by policies and decisions made by the government, such as monetary and fiscal policies, trade policies, and regulations. These policies can have a significant impact on a country's economic growth, either by promoting investment and innovation or by hindering economic activity. However, it is important to note that economic growth is not without its drawbacks. For example, rapid economic growth can lead to environmental degradation and resource depletion. Additionally, unequal distribution of wealth and income can lead to social and political unrest. It is therefore important for countries to pursue sustainable and inclusive economic growth that takes into account environmental and social factors (Cashell, 2006).

Empirical Literature Review

Monica et al. (2022) examined the relationship between population growth and economic growth in Tanzania over the period 1980–2019. The paper used an autoregressive distributed lag model. The study shows that population growth, gross investment, government spending, total fertility rate, life expectancy, dependency ratio, and net inflows of foreign direct investment have a negative impact on economic growth, while trade opening has a positive impact on economic growth. In addition, the analysis shows that there is a negative correlation between population growth and economic growth in Tanzania.

Saberi et al. (2021) applied an overlapping generation model from 1989 to 2017 to examine the effect of population ageing and human capital on economic growth in Iran. The paper found that the effect of ageing on economic growth is a consequence of these two factors. In the simulated model, a minimum growth of human capital is necessary to overcome the negative impacts of labour force growth reduction due to ageing on economic growth in Iran. Furthermore, the outcomes of the analysis show that population ageing, if combined with policies to increase human capital, can compensate for the negative impact of ageing on growth.

Eze-Michael (2020) studied the link between economic growth and population growth in Nigeria from 1989 to 2018. The paper applied co-integration and Granger causality tests to discover how population growth would be beneficial to economic growth in Nigeria during the period of study.

Adewale et al. (2019) examine the link between population change and economic growth and carbon emissions spanning from 1981 to 2017 in Nigeria. The study employed an autoregressive distributed lag approach to co-integration (ARDL) to uncover how population total, gross domestic product per capita, urbanisation rate, and energy use have a positive influence on carbon emissions. Furthermore, energy use and urbanisation both contributed significantly to increasing carbon emissions in the long and short run, respectively.

In view to seek further empirical study in order to uncover out the current state on the influence of financial development on economic growth. Makrychoriti et al. (2022) used a sample of EU countries over the period 2002–2020 and suggested that trust can influence the behaviour of economic agents and improve access to financing for both households and corporations. Therefore, trust could mitigate the negative impact of financial stress on economic growth.

Purewal and Haini (2022) found that financial markets and institutions pro-mote growth, with institutions dominating with regards to this positive effect, while they also confirmed the existence of an inverse U-shaped finance-growth relationship.

Mohieldin et al. (2019) examined the impact of financial development on economic growth in Egypt using time series data between 1980 and 2016. They utilized ARDL technique to analyze the new data set of financial development indexes released by IMF. Their analysis reveals a strong relationship between real growth per capita and financial development. Surprising, their study indicates no causal relationship between access and uses of financial service and real per capita income. However, stock market indices have strong association with real per capita gross domestic product. The author suggests further reforms in banking and stock markets for their critical role in enhancing economic growth and welfare of Egypt. Alexiou et al. (2018) found that over the period of 1998–2014, increased credit flows negatively affected 34 European and Commonwealth of Independent States economies while the significant positive effect of money supply on growth before the GFC is not confirmed for advanced economies in contrast to developing countries.

Methodology

This chapter presents the research methodology underlying this study, model specification, sources and methods of data collection, variable descriptions and measurement, and finally the method of data analysis used to accomplish the purpose of this study. The paper sourced dataset from World Development Indicators and Central Bank of Nigeria Statistical Bulletin, 2022. The seven (7) sub-Saharan Africa countries are: Nigeria, Ghana, South Africa, Botswana, Kenya, Uganda and Ethiopia. We used a two-system GMM model technique used by Barro and Sala-i-Martin (2017) because is favored in the thesis due to its proficient of avoiding biased results due to relationship between the error term and the lagged endogenous variable. The equation of the GMM is given as;

$$\sum (z(yI - xI\beta)) = 0 \quad (1)$$

Thus, the estimated model is:

$$\ln RGDP_t = \alpha_0 + \alpha_1 LFER_{it} + \alpha_2 \ln MOR_{it} + \alpha_3 \ln DCPS_{it} + \alpha_4 \ln MS_{it} + U_t \quad (2)$$

Where;

α_0 and b_0 are the constant terms,

$\alpha_1 - \alpha_2$ and $b_1 - b_2$ are intercept parameters,

$\ln$ is Logarithm to base ten, RGDP is Real Gross Domestic Product,

FER is fertility Rate,

MOR mortality rate,

DCPS is Domestic Credit to Private Sector: refers to financial resources provided to the private sector by other depository corporations (deposit taking corporations except central banks),

MS is Money Supply: measures the total volume of money supply in the economy and is defined as narrow money plus savings and time deposits with banks including foreign denominated deposits.

e , that establish a claim for repayment.

RGDP = real gross domestic product of the countries,

FER = fertility rate,

MOR = mortality rate,

DCPS = domestic credit to private sector,

MS = money supply,

ε_1 = stochastic or disturbance/error term,

n_t = time dimension of the variables

α_0 = constant or intercept.

Data Analysis and Results

Table 1: Descriptive Data Analysis

	RGDP	MS	MOR	FER	DCPS
Mean	5.143193	4.445454	25.99160	-0.501731	31513.68
Median	4.950000	4.451000	26.40000	-0.263000	8.670000
Maximum	19.68000	6.194000	38.10000	4.018000	910441.0
Minimum	0.110000	2.261000	11.00000	-9.399000	-5.690000
Std. Dev.	3.405715	1.005040	6.956092	2.863729	115128.7
Skewness	1.305694	-0.402620	-0.452236	-1.814291	5.229762
Kurtosis	5.839983	2.620325	3.069030	6.366301	35.16739
Jarque-Bera	73.80406	3.929806	4.079884	121.4722	5673.040
Probability	0.012357	0.014016	0.013036	0.01016	0.01287
Sum	612.0400	529.0090	3093.000	-59.70600	3750128.
Sum Sq. Dev.	1368.670	119.1923	5709.692	967.7115	1.56E+12
Observations	84	84	84	84	84

Source: E-views Output, 2024.

Table 1 illustrates the characteristics of the variables studied. It is known that the number of samples is 84, which is from seven (7) sub-Saharan African nations. The description of the object of research can be seen in descriptive statistics. Which is processed using the programme E-Views 12. This analysis aimed to explain the average value (mean) and standard deviation of the comparison between the independent variables and moderate variables on the dependent variable. Table 1. above presents the descriptive statistics of research variables (real gross domestic product, fertility rate, mortality rate, net migration rate, energy consumption, electricity consumption, and fossil fuel consumption) over a period of eleven years from 2011 to 2022. As shown in Table 1, real gross domestic product (RGDP) recorded over the period a mean value of 5.14 with a maximum of 19.68 and a minimum of 0.11 per annum. The standard deviation of real gross domestic product (RGDP) is 3.4, and this indicates that real gross domestic product (RGDP) has a low deviation or dispersion from the mean over the study period. The skewness value of 1.305694 indicates that the panel data has long-left tails, while the kurtosis value of 5.839983 indicates the presence of a mesokurtic series (normal distribution). This was validated by the Jarque-Bera statistic value of 73.80406 and its associated probability value of 0.01235, which is greater than 0.05.

Also, the net money supply (MS) recorded over the period had a mean value of 4.45, with a maximum of 6.19 and a minimum of 2.26 per annum. The standard deviation of the net migration rate (MS) is 1.01, which indicates the money supply (MS) has a low deviation or dispersion from the mean over the study period. The skewness value of -0.402620 indicates that the panel data has long-left tails, while the kurtosis value of 2.620325 indicates the presence of a mesokurtic series (normal distribution). This was validated by the Jarque-Bera statistic value of 3.929806 and its associated probability value of 0.014016, which is greater than 0.05. In addition, the mortality rate (MOR) recorded over the period had a mean value of 25.99, with a maximum of 38.1 and a minimum of 11.0 per annum. The standard deviation of mortality rate (MOR) is 6.95, and this indicates that mortality rate (MOR) has a high deviation or dispersion from the mean over the study period. The skewness value of -0.452236 indicates that the panel data has long-left tails, while the kurtosis value of 3.069030 indicates the presence of a mesokurtic series (normal distribution). This was validated by the Jarque-Bera statistic value of 4.079884 and its associated probability value of 0.013036, which is greater than 0.05. In furtherance, fertility rate (FER) recorded over the period a mean value of -0.50 with a maximum of 4.02 and a minimum of -9.40 per annum. The standard deviation of fertility rate (FER) is 2.86, and this indicates that fertility rate (FER) has a high deviation or dispersion from the mean

over the study period. The skewness value of -1.814291 indicates that the panel data has long-left tails, while the kurtosis value of 6.366301 indicates the presence of a mesokurtic series (normal distribution). This was validated by the Jarque-Bera statistic value of 121.4722 and its associated probability value of 0.01016, which is greater than 0.05.

Moreover, Domestic Credit to Private Sector (DCPS) recorded over the period a mean value of 31513.68 with a maximum of 910441.0 and a minimum of -5.69 per annum. The standard deviation of Domestic Credit to Private Sector (DCPS) is 115128.7, and this indicates that Domestic Credit to Private Sector (DCPS) has a high deviation or dispersion from the mean over the study period. The skewness value of 5.229762 indicates that the panel data has long-left tails, while the kurtosis value of 35.16739 indicates the presence of a mesokurtic series (normal distribution). This was validated by the Jarque-Bera statistic value of 5673.040 and its associated probability value of 0.01287, which is greater than 0.05. Using the probability of the explanatory variables computed in Table 1 at the 5% level of significance, we conclude that all the variables used in this study are statistically significant.

Table 2: Pesaran and Shin Test and Levin, Lin & Chu Test Panel Unit Roots Test Results

Variables	IM, PESARAN AND SHIN W-STAT			LEVIN, LIN & CHU (LLC)TEST		
	Statistic	Prob.**	Order of Integration	Statistic	Prob.**	Order of Integration
RGDP	-3.88262	0.0001	I(0)	-2.78945	0.0026	I(0)
MS	-3.91774	0.0000	I(0)	2.86675	0.0003	I(0)
MOR	-3.83498	0.0001	I(0)	-4.09486	0.0000	I(0)
FER	-2.65473	0.0040	I(0)	-4.84760	0.0000	I(0)
DCPS	-4.86331	0.0000	I(0)	-5.07476	0.0000	I(0)

Source: Researchers' Computation E-views Output, 2024.

The results of panel unit root in Table 2. above show that all variables were stationary at level forms since the probability values of LLC are less than 0.05; thereby indicating that all variables were integrated of order zero, that is [I(0)]. In other words, after comparing the probability value of Levin, Lin and Chu t-statistics against the alpha value at 0.05 level of significance, it was ascertained that RGDP is Real Gross Domestic Product, FER is fertility Rate, MOR mortality rate, DCPS is Domestic Credit to Private Sector proxy for financial development provided to the private sector by other depository corporations. MS is Money Supply: measures the total volume of money supply in the economy and is defined as narrow money plus savings and time deposits with banks including foreign denominated deposits were integrated at order I(0) and were as a result stationary at levels. However, since the variables were integrated of the same order I(0), we cannot test for co-integration but estimate the panel regression based on the order of integration of the model variables.

Table 3: Correlation Matrix

VARIABLES	RGDP	MS	MOR	FER	DCPS
RGDP	1.0000				
MS	0.4537	1.0000			
MOR	0.6371	0.6554	1.0000		
NIM	0.4648	0.4963	0.6065	1.0000	
FER	0.4345	0.5543	0.6814	0.6917	1.0000

Source: E-views Output, 2023.

Table 3. directly above displays the correlation statistics on both constructs simultaneously. It is the avenue of knowing if the data analyzed labelled any form of multicollinearity and to ascertain any possible association amongst the variables. Though, the summary of this Table 3. demonstrates that the correlation between construct does not exceed the 80% threshold; therefore, the absence of multicollinearity.

Table 4. Random-Effect GLS Regression Results

Dependent Variable: RGDP

Variable	Coef.	Std. Err	z	P> z	[95% Conf. Interval]
MS	-.0167054	.0041121	-4.06	0.000	-.024765 - .0086457
MOR	.2665824	.0660818	4.03	0.000	.1370644 .3961004
DCPS	-.0167699	.0027752	-6.04	0.000	-.0222093 -.0113306
FER	-.0053027	.0017194	-3.08	0.002	-.0086728 -.0019327
_cons	9.408706	.7563363	12.44	0.000	7.926314 10.8911

R-squared = 0.7286; Adjusted R-squared = 0.0592; F-statistic = 279.51;

Prob(F-statistic) = 0.0000;

Source: E-views Output, 2023

The result of the random effect model analysis in Table 4. shows that money supply (MS) has a negative (-.0167054) and non-significant (0.000) effect on real gross domestic product (RGDP). This means that real gross domestic product (RGDP) will decrease by 16.7% given a percentage increase in money supply (MS), while real gross domestic product (RGDP) will increase by 16.7% given a percentage decrease in money supply (MS).

Also, mortality rate (MOR) has a positive (.2665824) and non-significant (0.000) effect on real gross domestic product (RGDP). This means that real gross domestic product (RGDP) will increase by 26.6% given a unit percentage in mortality rate (MOR), while real gross domestic product (RGDP) will decrease by 26.6% given a percentage decrease in mortality rate (MOR). In addition, Domestic Credit to Private Sector (DCPS) has a negative (-.0167699) and non-significant (0.000) effect on the real gross domestic product (RGDP). This means that real gross domestic product (RGDP) will decrease by 16.7% given a percentage increase in the Domestic Credit to Private Sector (DCPS), while real gross domestic product (RGDP) will increase by 16.7% given a percentage decrease in the Domestic Credit to Private Sector (DCPS). Furthermore, fertility rate (FER) has a positive (-.0053027) and non-significant (0.002) effect on real gross domestic product (RGDP). This means that real gross domestic product (RGDP) will increase by 5.3% given a percentage increase in fertility rate (FER), while real gross domestic product (RGDP) will decrease by 5.3% given a percentage decrease in fertility rate (FER).

From the empirical result of the random effect model analysis presented in Table 4, the adjusted R-squared obtained is 0.7286. This shows that if the coefficient of determination is adjusted, approximately seventy-two percent (72%) of the changes in real gross domestic product are attributable to changes in money supply, mortality rate, domestic credit to private sector, and fertility rate, while the remaining eighteen percent (18%) of the variation in the model is equally captured by the error term (unknown factors outside the random effect model). Lastly, the prob (F-statistic) value of 0.0000, which is less than 0.05, shows that the random effect model estimated is statistically significant. This also means that money supply, mortality rate, domestic credit to private sector, and fertility rate have a joint significant effect on real gross domestic product.

Table 5: Fixed Effect (Within) Regression Results

Dependent Variable: RGDP						
Variables	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
MS	-.0164418	.0041239	-3.99	0.000	-.0246197	-.008264
MOR	.2500245	.0667756	3.74	0.000	.1176059	.3824431
FER	-.0170685	.0027831	-6.13	0.000	-.0225875	-.0115494
DCPS	-.0055339	.0017274	-3.20	0.002	-.0089594	-.0021084
_CONS	9.61305	.7258755	13.24	0.000	8.173611	11.05249

R-squared = 0.7288; Adjusted R-squared = 0.0929; F-statistic = 46.59;
 Prob(F-statistic) = 0.0000;

Source: Researchers' Computation, E-views Output, 2024

The result of the fixed effect model analysis in Table 5 shows that mortality rate (MOR) has a positive (.2500245) and significant (0.000) effect on real gross domestic product (RGDP). This means that real gross domestic product (RGDP) will increase by 123.3% given a unit percentage in mortality rate (MOR), while real gross domestic product (RGDP) will decrease by 123.3% given a percentage decrease in mortality rate (MOR). Also, money supply (MS) has a negative (-.0164418) and significant (0.000) effect on real gross domestic product (RGDP). This means that real gross domestic product (RGDP) will decrease by 131.9% given a percentage increase in money supply (MS), while real gross domestic product (RGDP) will increase by 0.0122 given a percentage decrease in money supply (MS). In addition, the fertility rate (FER) has a negative (-.0170685) and significant (0.000) effect on the real gross domestic product (RGDP). This means that real gross domestic product (RGDP) will decrease by 17% given a percentage increase in the fertility rate (FER), while real gross domestic product (RGDP) will increase by 17% given a percentage decrease in the net fertility rate (FER). Moreover, Domestic Credit to Private Sector (DCPS) has a positive (-.0060544) and significant (0.196) effect on real gross domestic product (RGDP). This means that real gross domestic product (RGDP) will increase by 6% given a percentage increase in Domestic Credit to Private Sector (DCPS), while real gross domestic product (RGDP) will decrease by 6% given a percentage decrease in Domestic Credit to Private Sector (DCPS).

From the empirical result of the fixed effect model analysis presented in Table 4., the adjusted R-squared obtained is 0.7288. This shows that if the coefficient of determination is adjusted, approximately seventy-two percent (72%) of the changes in real gross domestic product are attributable to changes in money supply (MS), fertility rate (FER), Domestic Credit to Private Sector (DCPS) and mortality rate (MOR), while the remaining twenty-eight percent (28%) of the variation in the model is equally captured by the error term (unknown factors outside the fixed effect model). Lastly, the prob (F-statistic) value of 0.0000, which is less than 0.05, shows that the fixed effect model estimated is statistically significant. This also means that money supply (MS), fertility rate (FER), Domestic Credit to Private Sector (DCPS) and mortality rate (MOR) have a joint significant effect on real gross domestic product.

Table 6: Result of Hausman's Test

Test Summary	Chi-Sq. Statistic			Prob.
	Chi-Sq.	d.f.		
Period random	3.76	6		0.7089

Source: Researchers Computation, E-views Output, 2024.

The result of the Hausman test is shown in Table 5. From the Table, the chi-square statistic value (3.76) with a probability value of 0.7089 suggests that the fixed effect model is appropriate and should be preferred over random effect model. Specifically, since the p-value of 0.7089 is less than 0.05, we therefore retain the null hypothesis and conclude that random effect model is appropriate for this study. Specifically, it is well known that both the “random effects” and the “fixed effects” panel estimators are consistent under the assumption that the model is correctly specified and that (among other things) the repressors are independent of the “individual-specific effects” (the “random effects” assumption).

Table 7: Two-Step System Generalized Method of Moment (GMM) Results

Variables	Corrected Coef.	Std. Err.	z	P> z	[95% Conf. Interva	
LNRGDP						
L1.	1.005355	.0218198	46.08	0.000	.9625886	1.048121
MS	-.0391875	.0030491	-12.85	0.000	-.0451637	-.0332114
MOR	.4156479	.001985	-209.39	0.000	-.4195385	-.4117573
DCPS	-.009889	.0013137	-7.53	0.000	-.0124637	-.0073143
FER	.0018047	.0026217	0.69	0.491	-.0033338	.0069431
_cons	-.0466035	.0007211	-64.63	0.000	-.0480168	-.0451901
R-squared = 0.846527; Prob (F-statistic) = 0.000;						

Source: Source: E-views Output, 2024.

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$ show statistical significance at 1%, 5%, and 10% level, respectively. Robust Standard errors are in parentheses. P-value reported for A-Bond AR (2), Sargan, and Hansen test statistics. Yitayaw et al., Cogent Economics & Finance (2023). Arellano-Bond test for AR(1) in first differences: $z = 0.13$ $Pr > z = 0.000$ and Arellano-Bond test for AR(2) in first differences: $z = -0.47$ $Pr > z = 0.637$

Sargan test of over rid. restrictions: $\chi^2(5) = 64.42$ $Prob > \chi^2 = 0.135$, (Not robust, but not weakened by many instruments.). Hansen test of over rid. restrictions: $\chi^2(5) = 1.11$ $Prob > \chi^2 = 0.253$, (Robust, but weakened by many instruments. The result of the Dynamic Panel Data Two-Step System Generalised Method of Moment Analysis in Table 6. shows that Money Supply (MS) has a negative (-.0391875) and significant (0.000) effect on real gross domestic product (RGDP). This means that real gross domestic product (RGDP) will decrease by 39.1% given a percentage increase in Money Supply (MS), while real gross domestic product (RGDP) will increase by 39.1% given a percentage decrease in Money Supply (MS). Also, Motility rate (MOR) has a positive (.4156479) and significant (0.000) effect on real gross domestic product (RGDP). This means that real gross domestic product (RGDP) will increase by 41.5% given a unit percentage in Motility rate (MOR), while real gross domestic product (RGDP) will decrease by 41.5% given a percentage decrease in Motility rate (MOR). In addition, the net Domestic Credit to Private Sector (DCPS) has a negative (-.009889) and significant (0.000) effect on the real gross domestic product (RGDP). This means that real gross domestic product (RGDP) will decrease by 9.8% given a percentage increase in the Domestic Credit to Private Sector (DCPS), while real gross domestic product (RGDP) will increase by 9.8% given a percentage decrease in the Domestic Credit to Private Sector (DCPS). Moreover, fertility rate (FER) has a positive (.0018047) and significant (0.491) effect on the real gross domestic product (RGDP). This means that real gross domestic product (RGDP) will increase by 18% given a unit increase in fertility rate (FER), while real gross domestic product (RGDP) will decrease by 18% given a unit decrease in fertility rate (FER).

Discussion of Findings

This study examines the effect of population growth, financial development and economic growth in sub-Saharan Africa countries from the period. The findings shows that if the coefficient of determination is adjusted, approximately eighty-four percent (84%) of the changes in real gross domestic product are attributable to changes in Money Supply, fertility rate, mortality rate, and Domestic Credit to Private Sector, while the remaining sixteen percent (16%) of the variation in the model is equally captured by the error term (unknown factors outside the model). The finding is related to the finding of Ismail et al (2016) who established that mortality rate and fertility rate have a joint positive and significant effect on Real Gross Domestic Product had a long term co-integrating relationship with economic growth. Also, the finding is in agreement with the finding of Bekun and Agboola (2019) who found that there is a substantial and positive association between economic growth.

Population growth play a crucial role in shaping financial development and economic growth. The rapid population growth in sub-Saharan Africa has put considerable pressure on financial development and infrastructure. As population increases, so does the demand for financial development, resulting in increased financial development. However, it is important to note that population growth can also contribute positively to economic growth through increased labor force and entrepreneurship.

Financial Development and population growth can contribute to Nigeria's economy by increasing access to credit, financial development enables more Nigerians to access loan, promoting entrepreneurship, agriculture, and industry. Improves financial inclusion: mobile banking, agent banking, and digital payment system expand financial services to rural areas. Economic growth has a reciprocal relationship with both population growth and financial development. A strong and sustainable economy can provide resources and opportunities for population control measures and investments in financial development technologies. Similarly, a well-managed population and a shift towards economic growth by reducing resource constraints and fostering innovation.

Conclusion and Recommendations

This study examines the effect of population growth, financial development and economic growth in sub-Saharan Africa countries. The finding reveals that the finding reveals that mortality rate and fertility rate have a joint positive and significant effect on Real Gross Domestic Product of sub-Saharan Africa. While Money Supply and Domestic Credit to Private Sector have a negative and significant effect on Real Gross Domestic Product of sub-Saharan Africa. The study concludes that the population and financial development have great influence on the economic growth of sub-Sahara African countries. Based on the findings, the study recommends that:

References

- Adewale, F. L., Matthew, O. O., Joshua, O. O. & Clement, A. O. (2019). The impacts of population change and economic growth on carbon emissions in Nigeria. *Iranian Economic Review (IER)*, 23(3), 715-731.
- Alexiou, C., Vogiazas, S., & Nellis, J. G. (2018). Reassessing the relationship between the financial sector and economic growth: Dynamic panel evidence. *International Journal of Finance & Economics*, 23(2), 155–173.
- Aspromourgos, T. (1986); On the origins of the term Neoclassical. *Cambridge Journal of Economics*, 10, 265-270

- Cashell, B. (2006). *Economic growth, inflation, and unemployment: Limits to economic policy*. CRS Report for Congress Published
- Charles, G. & Philipp, E. (2014). Demography and economics: Look past the past, financial markets group. *International Journal of Economics, Business and Management Research*, 1(03), 39-47. <http://ijebmr.com> www.ijebmr.com.
- Dequech, D. (2007); Neoclassical, mainstream, orthodox and heterodox, economics. *Journal of Post Keynesian Economics*, 30 (2), 279- 302.
- Ellis, K. (2007). Is financial liberalisation enough to promote financial inclusion “opinion” a *Journal of Overseas Development Institute, Westminster, London*.
- Eze-Michael, E. N. (2020), Youth restiveness and economic development in Nigeria: A Study of Niger-Delta. *Journal of Political Science and International Relations*, 3(3), 54-70.
- Garba, S. B. (2014), financial sector development & economic growth in Nigeria: An empirical investigation. *International Journal of Finance & Accounting*, 3(4), 253-265.
- Hassan, M.K., Benito, S., Jung-Suk, Y. (2011). Financial development and economic growth: New evidence from panel data. *The Quarterly Review of economics and Finance*, 51, 88-104.
- Karim, A. & Amin, S. B. (2018). The impact of population growth on the economic growth of selected South Asian Countries: A panel co-integration analysis. *Journal of Accounting, Finance and Economics*, 8(3), 17-34.
- Levine, (1997). *Law, Finance, and growth*. University of Virginia mimeo.
- Mohieldin, M., Hussein, K., Rostom, A. (2019), *On financial development and economic growth in the Arab Republic of Egypt*. United States: World Bank.
- Monica, I., Elevatus, N. M, & Rocky, J. A. (2022). Does population growth have any impact on economic growth? Evidence from Tanzania. *International Journal of Engineering, Business and Management (IJEEM)*, 6(1), 86-78.
- Nouren A. (2009), The causality between financial development and economic growth in Kenya. *MPRA paper* 49, 262.
- Purewal, K., & Haini, H. (2022). Re-examining the effect of financial markets and institutions on economic growth: Evidence from the OECD countries. *Economic Change and Restructuring*, 55(1), 311–333
- Saberi, M., Afshari, Z., Sarlak, A., Hosseini, F. Fakhroddin, S. & Safarzadeh, E. (2021). The impact of population ageing and human capital on the economic growth in Iran: An analysis with an overlapping generation’s model. *Quarterly Journal of Applied Theories of Economics, Faculty of Economics, Management and Business, University of Tabriz*, 8(3), 29-54.
- Tadaro, M. P., (1977). *Definition of foreign direct investment, economic development* (7th ed.). Addison Weble.