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Effect of Financial Depth on Output and Economic Growth: Evidence from Sub-Saharan Africa

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Abstract

A lot of theoretical insights have been provided on the relationship between the financial and real sectors of the economy. The emerging theoretical postulations, which are devoid of consensus, have since been the subject of empirical investigations in respect of which, again, there is no consensus, not to talk of unanimity. Thus, this state of lack of consensus in the findings of the existing empirical studies calls for further studies that are aimed at resolving the contradictions. This informs the objective of the study, which is to examine the effect of financial depth on output and economic growth across African countries spanning from 1980 to 2019. The theoretical background rests on neo-classical theory and the supply-leading hypothesis. The study employed the dynamic fixed effect (DFE) estimation technique. The result reported that the three alternative proxies for the level of financial depth have positive effects on both overall economic growth and sectoral output growth. Also, each of the seven conditioning variables has the expected effects on economic growth. Based on the findings, the study therefore recommends that policymakers take measures aimed at deepening the level of the different forms of finance in order to promote economic growth.

Keywords: Financial Depth, Output Growth, Economic Growth, DFE, Sub-Saharan Africa.

Introduction

Financial depth is indispensable for sectoral output and economic growth, exerting a multifaceted influence across diverse dimensions of an economy. A well-established financial system enables efficient capital allocation, providing the necessary funding for investments in technology, research and development, and infrastructure, thereby propelling output growth in sectors such as industry and services (Beck & Levine, 2002). Additionally, financial depth in agriculture contributes to risk mitigation, empowering farmers to confidently invest in productivity-enhancing measure while, in the services sector, it fosters entrepreneurship, technological advancements, and global competitiveness (King & Levine, 1993). Overall, the depth and efficiency of financial markets and institutions serve as foundational elements that underpin innovation, risk management, and resource allocation, ultimately driving economic growth across various sectors (Levine, 1997).

This study endeavours to unravel the intricate relationship between financial depth, sectoral output, and economic growth in Sub-Saharan African countries. Despite the acknowledged importance of financial depth in driving economic progress, its impact on sectors like agriculture, industry, and services within the context of Sub-Saharan Africa (SSA) remains underexplored. The agricultural sector, fundamental to the livelihoods of many African communities, faces uncertainties regarding the extent to which increased financial depth can translate into enhanced productivity and efficiency. Similarly, questions linger about the efficacy of financial markets in funding large-scale projects and fostering technological advancements in the industrial sphere. Additionally, the services sector, crucial for innovation and entrepreneurship, warrants closer scrutiny to understand its unique challenges and opportunities in relation to financial depth. By delving into these sector-specific intricacies, this study seeks to elucidate how financial depth shapes sectoral output and ultimately influences economic growth trajectories across SSA nations.

Statement of Problem

In the context of Sub-Saharan Africa (SSA), the relationship between financial depth and sectoral growth poses specific challenges. Despite the global recognition of the positive association between financial development and economic growth (Levine, 1997), the nuanced dynamics within African economies remain inadequately understood. The agricultural sector, which is vital to many African economies, faces uncertainties regarding the extent to which increased financial depth can translate into enhanced productivity and efficiency. Similarly, the industrial sector grapples with questions surrounding the effectiveness of financial markets in funding large-scale projects and fostering technological advancements (Beck & Levine, 2002). Concurrently, the services sector, crucial for innovation and entrepreneurship (King & Levine, 1993), demands a more focused examination to comprehend the unique challenges and opportunities within each sector. The overarching problem lies in deciphering these sector-specific intricacies and understanding how these dynamics collectively shape the economic trajectory of the continent.

Admittedly, the academic research community has risen to the challenge, as reviewed extensively in the literature. Through the initial theoretical attempts of Robinson (1952), Patrick (1966), and others like Mackinnon (1973) and Shaw (1973), a lot of theoretical insights have been provided on the relationship between the financial and real sectors of the economy. The emerging theoretical postulations, which are devoid of consensus, have since been a subject of empirical investigations in respect of which, again, there is no consensus, not to talk of unanimity. While the conclusions of some of the studies are the existence of one-way causation in the effect of the financial sector on the real sector, others conclude that there is the existence of one-way causation from the real sector to the financial sector, while others reported the existence of a two-way causation between both, and still others reported an absence of causation either way. Thus, this state of lack of consensus in the findings of the existing empirical studies calls for further studies that are aimed at resolving the contradictions.

Objective of the Study

The primary objective of this study is to investigate the effect of financial depth on output (viz: agricultural, industrial, and services sectors) and economic growth across Sub-Saharan African countries.

Research Questions

1. How does financial depth affect economic growth in Sub-Saharan African countries?
2. How does financial depth influence output growth in the agricultural sector of Sub-Saharan African countries?
3. How does financial depth affect output growth in the industrial sector within Sub-Saharan African countries?
4. How does financial depth affect output growth in the services sector across Sub-Saharan African countries?

Through addressing these research questions, this study aims to provide insights into the intricate relationship between financial depth and sectoral performance, contributing to a better understanding of economic dynamics in Sub-Saharan Africa.

Research Hypotheses

From the research questions stated above, the four core hypotheses to be investigated empirically are as stated below:

1. **Ho_1:** There is no significant relationship between financial depth and economic growth in Sub-Saharan African countries.
2. **Ho_2:** There is no significant relationship between financial depth and output growth in the agricultural sector of Sub-Saharan African countries.
3. **Ho_3:** There is no significant relationship between financial depth and output growth in the industrial sector within Sub-Saharan African countries.
4. **Ho_4:** There is no significant relationship between financial depth and output growth in the services sector across Sub-Saharan African countries.

The rest of the paper is organised as follows: the review of the relevant literature is done in the second section while the third section deals with the methodology. The presentation and discussion of the results obtained from data analysis are considered in the fourth section while the conclusion and recommendations of the paper are discussed in the fifth section.

Literature Review

This section undertakes a review of the conceptual framework, relevant literature on the theories of economic growth, theories on the roles of finance on the economy, and relevant empirical literature on the effect of financial development on economic growth. This study reviews theories of economic growth to elucidate the factors that determine economic growth. Also, it reviews theories on the effect of finance on the economy to explain the relationship between finance and the real sector of the economy and, hence, economic growth.

Conceptual Review

The role of financial depth in influencing output and economic growth in Africa cannot be overstated. Financial development, characterized by improved risk management procedures, wider diversification of chances and options, higher information quality, and stronger incentives for responsible lending and monitoring, plays a critical role in attaining short-term economic performance (Abdulraheem et. al. 2019).

When it comes to the agricultural sector, financial depth has been found to have a significant impact on output. Studies have shown that a well-developed financial system, with increased access to credit and efficient financial intermediation, positively influences agricultural productivity in Africa (World Bank, 2012). This, in turn, contributes to overall economic growth and development.

Similarly, financial depth plays a crucial role in the industrial sector. Access to finance, risk management, and financial stability are key factors that contribute to increased investment and higher output in industries (World Bank, 2012). A deep and efficient financial system facilitates industrial development, leading to economic growth and job creation in African countries.

Furthermore, the services sector also benefits from financial depth. A well-developed financial system stimulates growth in banking, telecommunications, tourism, and other service sectors. Access to credit and efficient financial intermediation contribute to the expansion of service industries, which in turn positively impacts economic growth in Africa (Asongu & Odhiambo, 2018).

Theoretical Review

This section gives a broad review of growth theories as well as theories on the role of finance on the real sector of the economy. This discussion of these theories is organised into two sub-sections: the first sub-section explains the theories on the role of finance on the real sector of the economy, while the second sub-section reviews the growth theories so as to give an insight into the main theoretical analysis of economic growth.

Theories of Economic Growth

Growth theories explain the factors that determine economic growth. There exist many theories of economic growth in the literature. The relatively important ones, which are those reviewed below, include classical theory, Schumpeter theory, neo-classical theory and endogenous growth theory amongst others.

Classical growth theory (1723 - 1823) is based mainly on the work of two major classical scholars, Adam Smith and David Ricardo. Adam Smith's theory argues that the sources of output growth are capital accumulation, supply of land, growth of labour force, and change in institutions, which is determined exogenously and it is very important in determining economic growth. He also mentioned that production function comprising land, labour and capital is subjected to increasing returns to scale. David Ricardo's theory added technological know-how as one of the sources of growth, apart from the ones given by Adam smith. He also argues that production function is subjected to diminishing return to scale and he classified the factors of production into two, viz: variable factor and fixed factor. Land and capital are described as fixed factors while labour and technological knowhow are characterized as variable factors (Jhingan et. al. 2012). In all, the classical growth theory posited that sources of growth are land improvements, growth of labour force and growth of capital stock.

Schumpeter (1911) submits that a well-developed financial system catalyses technological innovation and economic growth by providing financial services and resources to entrepreneurs with the highest probability of successfully implementing innovative products and processes. He emphasised the important role that credit plays in the economy by contending that it is not the saving out of current income that supplies funds for investment but the credit creation by the banking system. He further claimed that entrepreneurs expand their business merely by borrowing from banks, not because some persons have made savings and deposited in the banks. Still, the banks create credit themselves to accommodate the business borrowers. Consequently, this might probably push up the prices; due to this, credit-creating facilities tend to free investors from the voluntary abstinence routine of the savers as a result; forced savings become an essential means of capital accumulation. However, in the Schumpeterian model, inflationary pressures are bound to operate as the development process gathers momentum by its very nature and approach. This is because the entrepreneurs' innovation activity being financed by the credit-creating banking system might lead to a rise in purchasing power of the community without a corresponding increase in production.

The failure of the classical growth theory in explaining the role of the technology led to the development of a new growth model known as the neoclassical growth model. Neo-classical growth theory was first introduced by Solow (1956) and Swan (1956). The theory posits growth in output to be a function of growth in inputs: capital, labour, and technological progress. Any increase in savings rate leads to only increase in both the steady state level of output per capita and capital per capita over time without affecting the growth rate of output. Growth rate of output remains unchanged due to law of diminishing marginal product of capital, because any further increase in capital will lead to a fall in output back to the steady state. Also, population growth reduces the steady-state level of capital per head and output per head as it increases over time and it increases the steady state growth rate of output. Long run growth of output also depends on improvement in technology and an absence of this will allow output per person to converge to a steady state value, which depends positively on savings rate and negatively on population growth rate (Dornbusch et. al. 2011).

Unlike the neoclassical growth model that attributes long-run growth to technological progress and population growth rate without clarifying the economic determinants of technological progress, the endogenous growth theory argues that the physical capital and knowledge capital are the main determinants of economic growth. The model assumes constant marginal product of capital, unlike the neoclassical or exogenous growth model which assumes diminishing marginal product of capital. The neoclassical theory assumes conditional convergence whereby countries with different saving rates but similar rate of technological progress and population growth rate will have different income level but similar growth rate of income. The endogenous growth theory predicts that the higher the saving rate, the higher will be the growth rate of income (Dornbusch, et al, 2011).

Theories on the Role of Finance on the Real Sector of the Economy

A review of some theories on role of finance on the real sector economy is presented in this sub-section. These theories explain the relationship between finance and the real sector of the economy and were popularised by Patrick (1966). They include the supply-leading hypothesis, demand following hypothesis, feedback hypothesis and independent hypothesis, which are all received below.

Supply-leading hypothesis postulates that it is financial development that precedes and lead to economic growth. Adherence to this hypothesis implies the need for creation of financial institutions and the supply of their financial assets, liabilities, and related financial services in advance of demand for them, especially the demand of entrepreneurs in the modern, growth-inducing sectors. It cannot be said that supply-leading finance is a necessary condition or precondition for inaugurating self-sustained economic development. Instead, it presents an opportunity to induce real growth by financial means. It thus is likely to play a more significant role at the beginning of the growth process than later (Patrick, 1966).

Contrary to the supply-leading hypothesis, the demand-following hypothesis postulates that economic growth leads to financial growth. Abiding by this postulation entails the need for creating modern financial institutions, their financial assets and liabilities, and related financial services in response to the demand for these services by investors and savers in the real economy. This is because the demand for financial services depends upon real output growth as well as the commercialisation and monetisation of agriculture and other traditional subsistence sectors. The more rapid the growth rate of real national income, the greater will be the demand by enterprises for external funds (the saving of others) and therefore financial intermediation (Patrick, 1966).

Also, the feedback hypothesis postulates that finance and economic growth are mutually causal. That is, the development of the financial sector stimulates real sector growth and vice-versa. This hypothesis asserts that a country with a well-developed financial system could promote high economic expansion through technological changes, product and services innovation (Schumpeter, 1911). This, in turn, will create increased demand for financial arrangements and services (Levine, 1997). As the financial sector effectively responds to this demand, these changes will stimulate a higher economic achievement, causing a change in the real sector. Both the financial sector and economic growth therefore are positively interdependent and their relationships could lead to bi-directional causality. In other words, the feedback hypothesis is a combination of the supply-leading and demand-following hypotheses.

Unlike the feedback hypothesis, the independent hypothesis postulates that financial sector development and economic growth are causally independent. According to Lucas (1988), finance is an "overstressed" determinant of economic growth. Therefore, any strategies aimed at promoting financial system development would be a waste of resources. It diverts attention from more relevant policies such as labour and productivity improvement programmes, implementation of pro-investment tax reforms, and encouragement of exports. He argued that, at best, the financial sector plays a minor role in economic growth. In other words, the development of the financial sector does not translate to real sector growth.

Empirical Review

A number of literatures is available on the effect of financial depth on economic growth. This review divides these empirical studies into those that reported positive effects and those that reported negative effects on economic growth. In their empirical studies, Bekele and Degu (2021) conducted a study to analyse the relationship between financial depth and economic growth and found that financial depth has a positive effect on economic growth. Other studies reported similar positive effects of financial depth on economic growth include the works of Sirag et. al. (2018), Le et.al. (2019) and Bui (2020). In contrast, Isiaka et. al. (2020), Kapaya (2020), Shapoval (2021) and Kerimov (2022) conducted studies examining the relationship between financial depth and economic growth and their findings indicated a negative effect of financial depth on economic growth.

Basically, such previous studies, as just reviewed, only analysed the effect of either financial development or deepening on only economic growth. To the best of the researcher's knowledge, none has studied the effects of financial deepening on both sectoral output and economic growth at the same time. This is quite important in order to optimise resource allocation, mitigate risks effectively, promote inclusive growth, enhance global competitiveness, and facilitate evidence-based decision-making for sustainable economic growth and development. This in addition to the need for studies that are based on more recent data to update the existing findings that have been based on now-stale data sets. The present study meets both these needs.

Methodology

Theoretical Framework

There are two strands of theory underlying this study: one on the role of finance on the economy and the other on the neoclassical growth theory. These are espoused sequentially.

Concerning the effect of financial development on economic growth, the theoretical foundation is premised on the Supply-leading hypothesis. The choice of the supply-leading hypothesis is as a result of its prediction that well-functioning financial institutions and markets have the capacity of driving economic efficiency, create and expand liquidity, mobilise savings, enhance capital accumulation, transfer resources from non-growth sectors to the more modem growth inducing-sectors, and also promote a competent entrepreneurial response in these modern sectors of the economy.

The hypothesis asserts that financial development affects growth positively through an improvement in the efficiency of capital accumulation and an increase in the rate of savings and the rate of investment. Specifically, Mckinnon (1973) and Shaw (1973) argued that a well-developed financial sector minimises transaction and monitoring costs and reduces asymmetric information, thereby leading to improvement in financial intermediation. The existence of a well-developed financial sector enhances the creation of financial services and accessibility to them in anticipation of their demand by participants in the real sector of the economy. One of the most significant implications of this supply-leading proposition is that, as entrepreneurs have new access to the supply-leading funds, their expectations increase and new horizons (or possible alternatives) are opened up, thereby making the entrepreneurs "think big". The supply-leading hypothesis presumes that the economy responds to growth in the real sector facilitated by financial development. Hence, financing development is expected to create opportunities for rapid and sustained growth of the overall economy.

With regards to the second strand of the theory, which is on economic growth, the theoretical foundation of the growth of GDP (i.e., economic growth) equation can be found in the growth accounting relationship. According to Dornbusch et al. (2011), the derivation of the growth accounting equation which, in turn, is rooted in the neo-classical production function, goes thus:

Assume an aggregate production function:

$$Y = Af(K,\ N)\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 1$$

where A= indicator of the level of technology, K= capital stock, N= labour, and Y= output.

This production function indicates that output is a function of labour, capital and technology.

Taking a total derivative of Y in the above Equation 1 gives Equation 2 below:

$$\Delta Y = MPN.\Delta N + MPK.\Delta K + F(K,N).\Delta A\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 2$$

where MPN and MPK stand for marginal productivities (or partial derivatives of Y with respect to each) of labour and capital respectively. If Equation 2 above is divided by Equation1, then the following will be arrived at:

$$\frac{\Delta Y}{Y} = \frac{MPN}{Y}.\Delta N + \frac{MPK}{Y}.\Delta K + \frac{\Delta A}{A}\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 3$$

Multiplying and dividing the first and second part of the Right Hand Side (RHS) by N and K respectively will give:

$$\frac{\Delta Y}{Y} = \left(\frac{MPN}{Y}N\right)\frac{\Delta N}{N} + \left(\frac{MPK}{Y}K\right)\frac{\Delta K}{K} + \frac{\Delta A}{A} \qquad \ldots 4$$

Assuming a perfect competitive market, so that factors are paid their respective marginal products, then, MPN = w and MPK = r, where w and r are the market wage rate and net capital rental rate. Also, $\frac{MPN}{Y}N$ and $\frac{MPK}{Y}K$ represent the shares of labour and capital in the total income respectively. Replacing the labour and capital shares with $1 - \alpha$ and α respectively will give us the growth accounting equation below:

$$\frac{\Delta Y}{Y} = (1 - \alpha)\frac{\Delta N}{N} + \alpha\frac{\Delta K}{K} + \frac{\Delta A}{A} \qquad \ldots 5$$

Equation 5 shows that the sum of weighted growth rates of inputs (with the weight being share of total output accruing to each factor of production) and the productivity growth rate on the right-hand side gives the growth of output on the left-hand side.

Model Specification

In order to determine the effect of financial development on economic growth, the neo-classical growth equation adopted in this study is extended through the level of technology (A), which can be construed broadly as embodying productivity and efficiency in all ramifications. This extension is through identification of possible determinants of productivity growth ($\frac{\Delta A}{A}$) and specification of total factor productivity growth ($\frac{\Delta A}{A}$) function. The determinants of factor productivity growth, $\frac{\Delta A}{A}$, include all factors with the exception of growth in the explicitly identified factors of production (which are only labour and capital in the above Equation 5) that influence economic growth. In the discussion here, such factors are limited to financial development variables which are the main postulated determinants that are of primary interest here.

Added to these are the control variables, which are trade openness, inflation rate, foreign direct investment inflow, life expectancy and government final consumption expenditure. The inclusion of trade openness is due to the fact that it is expected to boost economic growth through efficient resource allocation, knowledge and technology dissemination, and economies of scale, as supported by empirical studies like Keho (2020) and Raghutla (2020) that have all confirmed its positive effect on economic growth. Inflation is included in this study as price stability is crucial for economic agents to make accurate resource allocation decisions so that inflation rate should adversely affect productivity growth. Previous studies like Ehigiamusoe et. al. (2019) and Sulemana et. al. (2020) have confirmed its negative effect on economic growth and, by extension, on productivity growth also. This study too postulates this negative effect. Foreign direct investment (FDI) is expected to positively affect productivity growth and economic growth through knowledge spill overs, technological progress, and innovative efforts, as had been empirically confirmed by previous studies by Leandro et. al. (2017) and Maheswaranathan and Jeewanthi (2021). Also, longer life expectancy means higher returns on human capital, which encourages more investment in skills acquisitions and use of technology, which invariably increases productivity of labour, thereby stimulating economic growth. Studies such as Burns et. al. (2017) and Beşe and Kalaycı (2021) confirmed that life expectancy has positive effect on economic growth. Therefore, life expectancy is expected in this study to have a positive effect on productivity and, hence, economic growth. In the same manner, government final consumption expenditure (GEXP) can boost efficiency if focused on security, law and order, and positive externalities. However, it may be made unproductive due to bribery, corruption, or increased distortive taxes for financing it. Besides, since the bulk of GEXP is on consumption, this could reduce aggregate efficiency and, hence, productivity growth. Previous studies like Jong et. al. (2019) and Onifade et. al. (2020) have all reported that this GEXP has a negative effect on output growth. Therefore, on the whole, the study postulates that GEXP should have a negative effect on productivity growth.

Mathematical Format of the Productivity Growth ($\frac{\Delta A}{A}$) Relationship

Following the above, a linear panel data-based deterministic equation for the total factor productivity growth is as specified below:

$$\frac{\Delta A}{A} = \beta_3 \text{FINDI}_{\text{it}} + \beta_4 \text{GEXP}_{\text{it}} + \beta_5 \text{TRA}_{it} + \beta_6 \text{FDI}_{\text{it}} + \beta_7 \text{INF}_{\text{it}} + \beta_8 \text{LIF}_{\text{it}} \ldots\ldots\ldots\ldots\ldots 6$$

where:

FINDI = a representative financial depth variable which is alternatively proxied by each of the 3 financial variables (viz: broad money as percentage of GDP (BMG), banking sector asset (BSA), claims of private sectors by banks (CPB)); GEXP = General government final consumption expenditure in relation to the GDP; TRA = Trade Openness; FDI= Foreign Direct Inflow; INF = Inflation rate; LIF= Life expectancy and i, t subscripts = country and year subscripts respectively.

Also, it should be noted that β_3, β_4, β_5, β_6, β_7, *and* β_8 represent parameters to be estimated. Based on the justifications adduced earlier in this sub-section, the a priori expectations in respect of the signs of these slope parameters are as stated mathematically thus: β_4, $\beta_7 < 0$; $\beta_{3,\ 5}$, β_6, $\beta_8 > 0$.

In order to examine the effect of three alternative proxies of financial depth on economic growth, the neoclassical growth model in Equation 5 is re-specified. This is done by substituting the productivity growth ($\frac{\Delta A}{A}$) Equation 6 into the growth accounting Equation 5 and transforming the result into an econometric model of economic growth by adding the intercept β_0, time and country subscripts (t and i) and the stochastic error term (U), thus:

$$\left(\frac{\Delta Y}{Y}\right)_{it} = \beta_0 + \beta_1 \left(\frac{\Delta N}{N}\right)_{it} + \beta_2 \left(\frac{\Delta K}{K}\right)_{it} + \beta_3 \text{FINDI}_{\text{it}} + \beta_4 \text{GEXP}_{\text{it}} + \beta_5 \text{TRA}_{it} + \beta_7 \text{FDI}_{\text{it}} + \beta_8 \text{INF}_{\text{it}} + \beta_8 \text{LIF}_{\text{it}} + U_{it} \ldots\ldots\ldots\ldots\ldots 7$$

$\frac{\Delta Y}{Y}, \frac{\Delta N}{N}, \frac{\Delta K}{K}$ are as defined in connection with the growth accounting Equation 5 (where α and $1-\alpha$ are now replaced by β_1 and β_2 for notational convenience) while notations for other explanatory variables are as defined in connection with the productivity growth Equation (6).

Concerning the sectoral output growth equations specified for estimation, the study first starts with the sectoral output level, denoted by y, in respect of each of the three sectors of agriculture, industry and services, bearing in mind that the economy-wide output level or GDP, denoted by Y, is simply an aggregation of these three categories of a sectoral output y. By deriving a growth accounting relationship for each category of y (which is not shown for brevity) that corresponds to the economy-wide growth accounting Equation 5; and by specifying a productivity growth relationship for the sectoral output (also, not shown for brevity) in the same manner that is done to arrive at the economy-wide productivity growth equation 6; and, finally, by using this sectoral productivity growth to replace the productivity term in the sectoral growth accounting equation would yield the sectoral output growth Equation 8. It is to be noted that in this final sectoral output equation, it is the economy-wide capital stock growth ($\frac{\Delta K}{K}$) and labour force growth ($\frac{\Delta N}{N}$) that still appear, instead of sector-specific capital stock growth and labour force growth. This is due to absence of sector-specific statistics on capital stock and labour force and, hence, their growth rates. Concerning the representative financial depth explanatory variable (FINDI) as well as the other 5 control variables (viz: GEXP, TRA, FDI, INF and LIF), it is these same economy-wide explanatory variables that apply to the economy-wide output growth ($\frac{\Delta Y}{Y}$) that are retained here as postulated determinants of each sectoral output growth ($\frac{\Delta y}{y}$). Sector-specific equivalents of them are obviously inapplicable and the same directions of their effects on economy-wide output growth that posited earlier are still being retained here on sectoral output growth too. Sector-specific equivalents of these explanatory variables (i.e., other than $\frac{\Delta K}{K}$ and $\frac{\Delta N}{N}$) are obviously inapplicable.

$$\left(\frac{\Delta y}{y}\right)_{it} = \beta_0 + \beta_1\left(\frac{\Delta N}{N}\right)_{it} + \beta_2\left(\frac{\Delta K}{K}\right)_{it} + \beta_3\mathrm{FINDI_{it}} + \beta_4\mathrm{GEXP_{it}} + \beta_5\mathrm{TRA}_{it} + \beta_6\mathrm{FDI_{it}} + \beta_7\mathrm{INF_{it}} + \beta_8\mathrm{LIF_{it}} + u_{it} \quad \ldots\ldots 8$$

The above sectoral output growth Equation (8) is estimated for each of the three sectors identified in this study, which are agricultural, industrial and services sectors.

Estimation Techniques

It is pertinent to stress that both panel descriptive and inferential analyses were carried out in this study. The descriptive analysis involves the use of summary statistics to describe each of the variables. Also, the study first checks for the presence of a unit root in respect of each variable, using the Augmented Dickey Fuller-Fisher (Choi, 2001), Harris-Tzavalis, HT (1999) and Levin-Lin-Chu test (2002) panel unit root test procedure, to ascertain whether the variables are stationary at level, I.e., I(0) series, or at first difference, i.e., I(1), before estimating the models. Based on the outcome of the unit root test, the study also tests for the existence of cointegration or long run relationship among the variables, using Kao panel cointegration technique. Having conducted the diagnostic test, the study presents the estimates of the models. Premised on the outcomes of panel unit root and cointegration tests, only one variant of the panel ARDL estimation method, which is the DFE, is adopted, as this variant is the one supported by appropriate tests for choosing among alternative variants of Panel ARDL estimation method.

Data Nature, Coverage, Sources and Measurements

The data used in this study are panel data spanning from 1970 - 2019 years across 54 African countries. The definitions of the variables employed in the study, their sources and how they are measured are as described below:

(a). Financial Depth Indicator (FINDI): This comprises of 3 elements, and the source of all of them is the Global Financial Inclusion (Global Findex) Database of the World Bank, 2020. Their respective definitions and how they are measured are discussed in the next 3 paragraphs, viz: Paragraphs (i) to (iii). It is to be noted that, generally, the definitions of the variables are as provided in the data source itself.

(*i*). *Ratio of Broad Money to GDP (BMG):* Broad money is the sum of currency outside banks; demand deposits other than those of the central government; the time, savings, and foreign currency deposits of resident sectors other than the central government; bank and traveller's checks; and other securities such as certificates of deposit and commercial paper. This is measured as a percentage of GDP.

(*ii*). *Ratio of banking sector total asset to GDP*: This is total assets held by deposit money banks as a share of GDP. Assets include claims on the domestic real nonfinancial sector, including central, state and local governments, nonfinancial public enterprises, and the private sector. Deposit money banks comprise commercial banks and other financial institutions that accept transferable deposits, such as demand deposits. The data is measured in percentage.

(*iii*) *Ratio of Claims on Private Sectors by Banks to GDP (CPB)*: This is the domestic credit to private sector by banks and it refers to financial resources provided to the private sector by other depository corporations (deposit taking corporations except central banks), such as through loans, purchases of non-equity securities, and trade credits and other accounts receivable, that establish a claim for repayment. For some countries, these claims include credit to public enterprises. The data is measured in percentage.

(b) Economic Growth ($\frac{\Delta Y}{Y}$) and Sectoral Output Growth ($\frac{\Delta y}{y}$): Both the real GDP or economy-wide ouput level and the sectoral output level statistics (from which their annual growth equivalents are computed) are all sourced from the World Bank's WDI online database. The sectoral output growth pertains to growth of the value added in each of the agricultural, industrial and services sectors. Both the economy-wide and sectoral output growth are each measured as the annual growth that is computed as the first difference of the value added as a ratio (i.e percentage) of the preceding year value added.

(c) The general government final consumption expenditure ratio (GEXP) includes all government current expenditures for purchases of goods and services (including compensation of employees). Also, inflation (INF) is measured as the annual percentage in the consumer price index. Similarly, foreign direct investments (FDI) are the net inflows of investment to acquire a lasting management interest (10 percent or more of voting stock) in an enterprise operating in an economy other than that of the investor. The data is expressed as a percentage of GDP. Trade openness (TRA) is measured as the sum of a country's exports and imports of goods and services as a percentage of that country's GDP. Life expectancy (LIF) is an estimate of the average number of additional years that a person is expected to live if the prevailing patterns of mortality at the time of birth were to remain the same throughout his lifetime. It is measured in years. Labour force growth $(\frac{\Delta N}{N})$ is the annual percentage change in the size of labour force. Growth in capital stock $(\frac{\Delta K}{K})$ is the annual percentage in private capital stock (constructed base on private investment flows in constant 2015 international dollars). The statistics on all these (viz: GEXP, INF, FDI, TRA, LIF and L) are sourced from the World Bank's WDI, 2020 while the data on K comes from International Monetary Fund (IMF).

Results Analysis and Discussions

Descriptive Statistics

Table 1 presents the results of the summary statistics. The table consists of the columns for the variables and their description, the total number of observations, mean, standard deviation, the minimum and the maximum values.

Table 1: The Descriptive Statistics

Variable, Description and Measurement	Observations	Mean	Standard deviation	Min	Max
$\frac{\Delta Y}{Y}$ - GDP growth: annual %	2,700	3.990	7.540	-12.070	29.970
$\frac{\Delta y}{y}_{agr}$ - Agricultural sector growth: annual %	2,700	4.324	2.922	-1.202	4.431
$\frac{\Delta y}{y}_{ind}$ - Industrial sector growth: annual %	2,700	4.012	2.126	-1.730	4.341
$\frac{\Delta y}{y}_{srv}$ - Services sector growth: annual %	2,550	4.041	2.777	-2.153	4.261

Table 1: Contd

Variable, Description and Measurement	Observations	Mean	Standard deviation	Min	Max
$\frac{\Delta N}{N}$ – Labour force growth: annual %	2,700	3.624	7.862	-0.028	6.821
$\frac{\Delta K}{K}$ – Capital stock growth: annual %	2,300	2.504	1.957	-2.199	6.880
GEX - General expenditure: % of GDP	2,550	15.363	7.911	4.253	35.287
TRA - Trade Openness: % of GDP	2,600	51.205	12.396	22.307	60.670
FDI - Foreign Direct Investment Inflow: % of GDP	2,550	2.788	3.991	0.129	15.828
INF –Inflation: Annual % change of GDP deflator	2,700	11.952	21.644	-23.652	78.683
LIF - Life Expectancy: Years	2,700	54.437	8.822	39.833	74.954
BMG - Broad money: % of GDP	2,650	17.836	6.340	-1.225	20.174
BSA – Banking sector asset: % of GDP	2,650	12.336	4.844	2.256	16.053
CPB - Claims of private sector by banks: % of GDP	2,650	19.563	4.589	0.707	14.141

Source: Author's Computation, 2023.
Explanatory notes*: Obs = Observation, Std. Dev. = Standard Deviation, Min. = Minimum and Max. = Maximum.*

The results from Table 1 reveal that the mean, standard deviation, minimum value and maximum value of economic growth ($\frac{\Delta Y}{Y}$) are 3.99, 7.54, -12.07 and 29.97 percent respectively. In the case of agricultural output growth ($\frac{\Delta y}{y}_{agr}$), the mean, standard deviation, minimum value and maximum value are 4.34, 2.92, -1.20 and 4.43 percent respectively. Also, the mean, standard deviation, minimum value and maximum value of industrial output growth ($\frac{\Delta y}{y}_{ind}$) are 4.01, 2.13, -1.73 and 4.34 percent respectively. With regards to services sector output growth ($\frac{\Delta y}{y}_{srv}$), the mean, standard deviation, minimum value and maximum value are 4.04, 2.78, -2.15 and 4.26 percent. Also, the mean, standard deviation, minimum value and maximum value of labour force growth $\left(\frac{\Delta N}{N}\right)$ are 3.62, 7.86, -0.03 and

6.82 percent respectively. Pertaining to capital stock growth ($\frac{\Delta K}{K}$), the mean, standard deviation, minimum value and maximum value are 2.50, 1.96, -2.20 and 6.88 percent. Concerning the general government expenditure (GEXP), the mean, standard deviation, minimum value and maximum value are 15.36, 7.91, 4.25 and 35.29 percent respectively.

In the case of Trade Openness (TRA), the mean, standard deviation, minimum value and maximum value are 51.21, 12.40, 22.31 and 60.67 percent respectively. Also, the mean, standard deviation, minimum value and maximum value of foreign direct investment as a percentage of GDP (FDI) are 2.79, 3.99, 0.13 and 15.83 percent respectively. In the case of inflation (INF), the mean, standard deviation, minimum value and maximum value of foreign direct investment are 11.95, 21.64, -23.65 and 78.68 percent respectively. With regards to life expectancy (LIF), the mean, standard deviation, minimum value and maximum value are 54.44, 8.82, 39.83 and 74.95 years respectively. Relating to broad money as a percentage of GDP (M2), the mean, standard deviation, minimum value and maximum value are 17.84, 6.34, -1.23 and 20.17 percent respectively. Pertaining to bank sector assets as a percentage of GDP (BSA), the mean, standard deviation, minimum value and maximum value are 12.34, 4.84, 2.26 and 16.05 percent respectively. The mean, standard deviation, minimum value and maximum value of claims of private sector by banks as a percentage of GDP (CPB) are 19.56, 4.59, 0.71 and 14.14 percent respectively.

Correlation Analysis

Table 2 presents the estimated correlation coefficients that are to be the basis for the correlation analysis, which is carried out to ascertain both the magnitude and the direction (i.e., whether positive or negative) of association between every pair of variables employed in the study. It is also key as a screening test for the likely existence of multicollinearity when restricted to the correlation between explanatory variables only. A correlation between a pair of variables is interpreted to exist in this study if the p-value of the correlation coefficient does not exceed 1%, which is the cut-off significance level chosen in the study, while no correlation is adjudged to exist if the p-value exceeds the chosen 1% critical value.

Table 2: The Pairwise Correlation Matrix for the Control Variables, the Dependent Variables and Financial Development Indicator.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	$\frac{\Delta Y}{Y}$	$\frac{\Delta y}{y}_{agr}$	$\frac{\Delta y}{y}_{ind}$	$\frac{\Delta y}{y}_{srv}$	$\frac{\Delta N}{N}$	$\frac{\Delta K}{K}$	GEXP	TRA	FDI	INF	LIF
1. $\frac{\Delta Y}{Y}$	1.000 -										
2. $\frac{\Delta y}{y}_{agr}$	0.237 (0.000)	1.000 -									
3. $\frac{\Delta y}{y}_{ind}$	0.009 (0.012)	0.118 (0.001)	1.000 -								
4. $\frac{\Delta y}{y}_{srv}$	0.163 (0.000)	0.741 (0.000)	0.362 (0.000)	1.000 -							
5. $\frac{\Delta N}{N}$	0.347 (0.000)	0.263 (0.001)	0.182 (0.000)	0.254 (0.000)	1.000 -						
6. $\frac{\Delta K}{K}$	0.132 (0.000)	0.087 (0.006)	0.051 (0.069)	0.082 (0.039)	0.053 (0.063)	1.000 -					
7. GEXP	-0.083 (0.000)	0.185 (0.000)	0.035 (0.265)	0.150 (0.000)	0.218 (0.488)	0.139 (0.000)	1.000 -				
8. TRA	0.096 (0.006)	0.097 (0.002)	0.064 (0.042)	0.047 (0.070)	0.080 (0.037)	0.124 (0.001)	0.289 (0.000)	1.000 -			
9. FDI	0.112 (0.000)	0.132 (0.000)	0.153 (0.000)	0.151 (0.000)	0. 140 (0.000)	0.068 (0.036)	0.061 (0.054)	0.305 (0.000)	1.000 -		
10. INF	-0.084 (0.006)	-0.245 (0.000)	-0.074 (0.016)	-0.052 (0.098)	-0.057 (0.060)	-0.114 (0.000)	-0.181 (0.000)	-0.112 (0.000)	-0.058 (0.067)	1.000 -	
11. LIF	0.100 (0.004)	0.102 (0.000)	0.105 (0.000)	0.112 (0.000)	0.099 (0.011)	0.089 (0.015)	0.072 (0.021)	0.107 (0.001)	0.120 (0.000)	-0.095 (0.002)	1.000 -
12. BMG	0.165 (0.000)	0.132 (0.000)	0.018 (0.563)	0.186 (0.000)	0.007 (0.832)	0.080 (0.003)	0.439 (0.000)	0.332 (0.000)	0.088 (0.005)	-0.027 (0.388)	0.453 (0.000)
13. BSA	0.141 (0.000)	0.096 (0.002)	0.010 (0.738)	0.208 (0.000)	0.180 (0.000)	0.129 (0.000)	0.359 (0.000)	0.284 (0.000)	0.027 (0.390)	-0.149 (0.000)	0.518 (0.000)
14. CPB	0.099 (0.001)	0.152 (0.000)	0.045 (0.151)	0.148 (0.000)	0.058 (0.060)	0.105 (0.001)	0.319 (0.000)	0.294 (0.000)	0.065 (0.043)	-0.168 (0.000)	0.592 (0.000)

Sources: Author's Computation, 2023.

Explanatory Notes: $\frac{\Delta Y}{Y}$ *is GDP growth rate,* $\frac{\Delta y}{y}_{agr}$ *is agricultural sector growth,* $\frac{\Delta y}{y}_{ind}$ *is industrial sector growth,* $\frac{\Delta y}{y}_{srv}$ *is services sector growth,* $\frac{\Delta N}{N}$ *is labour growth rate,* $\frac{\Delta K}{K}$ *is growth in capital* *stock, GEXP is general government expenditure, TRA is trade openness, FDI is foreign direct investment inflow, INF is inflation, LIF is life expectancy, BMG is broad money as percentage of GDP, BSA is banking sector asset to GDP, CPB = claims of private sectors by banks. Numbers in the parenthesis ( ) are the p-values and the correlation coefficient is statistically significant if the p-value is less than 1 percent.*

Based on the above decision rule and the results in Table 2, it can be seen from the first column that $\frac{\Delta Y}{Y}$ is positively correlated with $\frac{\Delta Y}{Y}$, $\frac{\Delta y}{y}_{agr}$, $\frac{\Delta y}{y}_{srv}$, $\frac{\Delta N}{N}$, $\frac{\Delta K}{K}$, TRA, FDI, LIF, BMG, BSA and CPB; negatively correlated with GEXP and INF and uncorrelated with $\frac{\Delta y}{y}_{ind}$. The second column and second row of Table 2 show that $\frac{\Delta y}{y}_{agr}$ is positively correlated with $\frac{\Delta Y}{Y}$, $\frac{\Delta y}{y}_{ind}$, $\frac{\Delta y}{y}_{srv}$, $\frac{\Delta N}{N}$, $\frac{\Delta K}{K}$, TRA, FDI, LIF, BMG, BSA and CPB and negatively correlated with GEXP and INF and uncorrelated with nil. In the third column and third row of Table 2, it is shown that $\frac{\Delta y}{y}_{ind}$ is positively correlated with $\frac{\Delta y}{y}_{agr}$, $\frac{\Delta y}{y}_{srv}$, $\frac{\Delta N}{N}$, FDI and LIF and uncorrelated with eight other variables employed in the study. Also, in the fourth column and fourth row of Table 2, it is shown that $\frac{\Delta y}{y}_{srv}$ is positively correlated with $\frac{\Delta Y}{Y}$, $\frac{\Delta y}{y}$agr, $\frac{\Delta y}{y}$ind, $\frac{\Delta N}{N}$, FDI, LIF, BMG, BSA and CPB; negatively correlated with GEXP and uncorrelated with three other variables employed in the study. It can be seen from the fifth column and fifth row of Table 2 that $\frac{\Delta N}{N}$ is positively correlated with $\frac{\Delta Y}{Y}$, $\frac{\Delta y}{y}$agr, $\frac{\Delta y}{y}$ind, $\frac{\Delta y}{y}$srv, FDI and CPB and uncorrelated with seven other variables employed in the study. The sixth column and sixth row of Table 2 showed that $\frac{\Delta K}{K}$ is positively correlated with $\frac{\Delta Y}{Y}$, $\frac{\Delta y}{y}$agr, TRA, BMG, BSA and CPB; negatively correlated with GEXP and INF and uncorrelated with five other variables employed in the study. In the seventh column and seventh row of Table 2, it is shown that GEXP is positively correlated with $\frac{\Delta y}{y}$agr, $\frac{\Delta y}{y}$srv, $\frac{\Delta K}{K}$, TRA, BMG, BSA and CPB; negatively correlated with $\frac{\Delta Y}{Y}$ and INF and uncorrelated with four other variables employed in the study.
The eighth column and eighth row of Table 2 showed that TRA is positively correlated with $\frac{\Delta Y}{Y}$, $\frac{\Delta y}{y}$agr, $\frac{\Delta K}{K}$, GEXP, FDI, LIF, BMG, BSA and CPB; negatively correlated with INF and uncorrelated with three other variables employed in the study. The ninth column and ninth row of Table 2 showed that FDI is positively correlated with $\frac{\Delta Y}{Y}$, $\frac{\Delta y}{y}$agr, $\frac{\Delta y}{y}$ind, $\frac{\Delta y}{y}$srv, $\frac{\Delta N}{N}$, TRA, LIF and BMG and uncorrelated with five other variables employed in the study. It can be seen from the tenth column and tenth row of Table 2 that INF is negatively correlated with $\frac{\Delta Y}{Y}$, $\frac{\Delta y}{y}$agr, $\frac{\Delta K}{K}$, GEXP, TRA, LIF, BSA and CPB and uncorrelated with five other variables employed in the study. The eleventh column and eleventh row of Table 2 showed that LIF is positively correlated with $\frac{\Delta Y}{Y}$, $\frac{\Delta y}{y}$agr, $\frac{\Delta y}{y}$ind, $\frac{\Delta y}{y}$srv, TRA, FDI, BMG, BSA and CPB; negatively correlated with INF and uncorrelated with three other variables employed

in the study. In the twelfth row of Table 2, it is shown that GEXP is positively correlated with $\frac{\Delta Y}{Y}$, $\frac{\Delta y}{y}$agr, $\frac{\Delta y}{y}$srv, $\frac{\Delta K}{K}$, GEXP, TRA, FDI and LIF and uncorrelated with three other variables employed in the study. The thirteenth row of Table 2 showed that BSA is positively correlated with $\frac{\Delta Y}{Y}$, $\frac{\Delta y}{y}$agr, $\frac{\Delta y}{y}$srv, $\frac{\Delta N}{N}$, $\frac{\Delta K}{K}$, GEXP, TRA, and LIF; negatively correlated with INF and uncorrelated with two other variables employed in the study. Finally, in the fourteenth row of Table 2, it is shown that CPB is positively correlated with $\frac{\Delta Y}{Y}$, $\frac{\Delta y}{y}$agr, $\frac{\Delta y}{y}$srv, $\frac{\Delta K}{K}$, GEXP, TRA and LIF; negatively correlated with INF and uncorrelated with three other variables employed in the study.

In concluding this discussion, it is to be pointed out here that none of the pairs of the explanatory variables in the study has a high degree of correlation of up to or close to 0.80 in absolute term - which, according to Asteriou and Hall (2014), is usually taken as a rule of thumb-based benchmark, above which multicollinearity becomes an issue of serious concern.

Presentation and Discussion of Unit Root and Cointegration Test Results

Panel Data Unit Root Test

The panel data unit root test conducted in this study is carried out to examine the stationary nature of each of the variables used in the models to avoid the consequence of having spurious regressions. Table 3 shows the unit root test results of the panel series by employing the following panel unit root test methodologies viz: Harris-Tzavalis (HT), ADF-Fisher, and Levin-Lin-Chu (LLC). A 1 percent significance level is adopted in evaluating the results. The test methodologies and their decision rules are elaborated upon below. Starting with the ADF Fisher-type test, the null hypothesis is that all panels contain unit root, and the decision rule is that, if the p-value of the calculated test statistic is greater than 1 percent significance level, then, the null hypothesis is accepted so that it is to be concluded that all panels contain unit roots and, if otherwise, the null hypothesis is rejected. Also, the null hypothesis for HT panel unit root is that panel contains unit roots, and its decision rule is that, if the p-value of the computed test statistic is less than 1 percent significance level, the null hypothesis is rejected and it is to be concluded that the panels are stationary and, if otherwise, the null hypothesis is to be accepted. For the Levin-Lin-Chu test, its null hypothesis is that the panels contain unit root, and the decision rule is that, if the p-value of the calculated test statistic is greater than 1 percent significance level, then, the null hypothesis is to be accepted and it is to be concluded that all panels contain unit root and, if otherwise, the null hypothesis is to be rejected. The decision or conclusion indicated in the last column of Table 3 is arrived at on the basis of which of the null and alternative hypotheses is supported by a larger number (viz: two or all) of the three test methodologies, i.e., on the basis of the preponderance of support.

Table 3: Unit Root Test Results

Series	Stationary	HT	ADF-Fisher	LLC	Number of Test Methodologies Supporting Ho	Conclusions
$\frac{\Delta Y}{Y}$	Level	2.546 (0.035)	-7.037 (0.000)	-2.079 (0.027)	One	I(1)
	First difference	8.483 (0.000)	3.109 (0.055)	-9.070 (0.000)	Two	
$\frac{\Delta K}{K}$	Level	0.007 (0.000)	194.639 (0.000)	-3.195 (0.001)	All	I(0)
$\frac{\Delta N}{N}$	Level	0.210 (0.000)	2.285 (0.011)	-12.125 (0.000)	All	I(0)
$\frac{\Delta y}{y}_{agr}$	Level	0.145 (0.000)	-3.072 (0.019)	-3.042 (0.027)	One	I(1)
	First difference	4.100 (0.040)	7.005 (0.000)	-9.115 (0.000)	Two	
$\frac{\Delta y}{y}_{ind}$	Level	0.219 (0.031)	-2.207 (0.035)	-4.001 (0.016)	None	I(1)
	First difference	10.792 (0.000)	-7.585 (0.000)	-5.138 (0.000)	All	
$\frac{\Delta y}{y}_{srv}$	Level	0.215 (0.020)	-2.011 (0.043)	-3.177 (0.025)	None	I(1)
	First difference	0.957 (0.000)	-8.850 (0.000)	-10.848 (0.000)	All	
GEXP	Level	0.921 (0.010)	168.725 (0.000)	-2.358 (0.009)	All	I(0)
TRA	Level	114.039 (0.000)	316.281 (0.000)	-18.435 (0.000)	All	I(0)
FDI	Level	0.722 (0.000)	476.858 (0.000)	-7.171 (0.000)	All	I(0)
INF	Level	85.642 (0.000)	-22.585 (0.000)	-9.458 (0.000)	All	I(0)
LIF	Level	1.002 (1.000)	6.199 (1.000)	-62.636 (0.000)	One	I(1)

	First difference	0.873 (0.000)	171.754 (0.000)	-3.347 (0.999)	Two	
BMG	Level	0.8680 (0.8272)	-0.7064 (0.2400)	-9.948 0.9252)	None	I(1)
	First difference	-0.060 (0.000)	-37.239 (0.000)	-19.099 (0.000)	All	
BSA	Level	0.930 (1.000)	4.7535 (1.000)	-9.023 (0.926)	None	I(1)
	First difference	0.288 (0.000)	-23.166 (0.000)	-0.082 (0.000)	All	
CPB	Level	0.910 (1.000)	6.793 (1.000)	-0.482 (0.315)	None	I(1)
	First difference	0.186 (0.000)	-25.629 (0.000)	-16.812 (0.000)	All	

Sources: Author's Computation, 2022.

Notes: *Harris-Tzavalis (HT), ADF-Fisher and Levin-Lin-Chu (Ho: Panels contain unit roots). Explanatory Note:* $\frac{\Delta Y}{Y}$ *= GDP growth rate,* $\frac{\Delta N}{N}$ *= labour growth rate,* $\frac{\Delta K}{K}$ *= growth of capital stock,* $\frac{\Delta y}{y}_{agr}$*= agricultural sector growth,* $\frac{\Delta y}{y}_{ind}$ *= industrial sector growth,* $\frac{\Delta y}{y}_{srv}$ *= services sector growth, GEXP = general government expenditure, TRA = trade openness, FDI = foreign direct investment inflow, INF = inflation, LIF = life expectancy, BMG = broad money as percentage of GDP, BSA = banking sector asset to GDP, CPB = claims of private sectors by banks. Ho is determined to be supported if the p-value is less than 1% and contradicted if otherwise for the three tests (viz: HT, ADF-Fisher and LLC tests). Finally, the conclusion is reached on the basis of which of the null and alternative hypotheses is supported by, at least, two of these three tests.*

As seen from Table 3, the t-statistics for most of the variables is greater than the critical values at 1% significance level, i.e., their respective p-values are greater than 1 percent significance level, for all or majority of the three test methodologies. This implies the acceptance of the null hypothesis that all panels contain unit roots in respect of most of the variables, i.e., most of the variables are not stationary. Specifically, the Harris-Tzavalis panel unit root test reveals that almost all the variables are not stationary at level except $\frac{\Delta y}{y}$agr, $\frac{\Delta N}{N}$, $\frac{\Delta K}{K}$, GEXP, TRA, FDI and INF while they are all stationary at first difference. Also, ADF-Fisher shows that only $\frac{\Delta Y}{Y}$, $\frac{\Delta N}{N}$, $\frac{\Delta K}{K}$, GEXP, TRA, FDI and INF are stationary at level while others are stationary at first difference. Concerning Levin-Lin-Chu panel unit root test, it shows that the variables are not stationary at level but at first difference except $\frac{\Delta N}{N}$, $\frac{\Delta K}{K}$, GEXP, TRA, FDI, INF and LIF which are stationary at level. Based on the aforementioned guiding rule, that is, whichever of the null and alternative hypotheses that is supported by, at least, two of the three tests are to be upheld valid, it can therefore be concluded that most of the variables (including the dependent variables, which are $\frac{\Delta Y}{Y}$, $\frac{\Delta y}{y}$agr, $\frac{\Delta y}{y}$ind and $\frac{\Delta y}{y}$srv) in the table are not stationary at level because either all or majority of the tests do not support this. However, the result reveals that each of the variables that are not stationary at level becomes stationary at first difference (i.e., when they are differenced once).

Based on the above, it is found that none of the equations is free from, at least, one unit root variable and that all the dependent variables have unit root. This suggests that using OLS approach as estimation technique is prone to produce spurious regression results and also that a follow-up cointegration test is needed. However, since the study is not aware of the panel equivalent ARDL Bounds cointegration test that are meant for testing the cointegration of series that are a mix of I(0) and I(1), it is the Kao Residual version of the panel ARDL test for cointegration test that is employed and the outcome of the test is as reported in Table 4 in respect of each of the 12 models of the study. A 1 percent significance level of the test statistic is adopted in evaluating the results. The decision rule is that, if the p-value of the test statistic is greater than the chosen critical 1 percent significance level, then, the null hypothesis is accepted so that it is concluded that there is no cointegration and, if otherwise, the null hypothesis is rejected.

Panel Cointegration Test Results

In this sub-section, the study reports the cointegration test results with respect to the growth equations specified in the third section. This test has to be conducted since the result obtained from the unit root test shows that each equation has a combination of some variables that are stationary at levels and others that are stationary at the first difference. The study proceeds to employ an appropriate regression estimation methodology, conditional on the result obtained from the cointegration test, and the particular method that is adjudged to be a suitable one for handling this is the panel autoregressive distributed lag (PARDL).

However, since the study is not aware of any panel equivalent of the autoregressive distributed lag (ARDL) Bounds cointegration test that is meant for testing the cointegration of series of a mix of I(0) and I(1), it is the panel Kao cointegration test that is resorted to in testing for the presence or absence of a long-run relationship. This is an addition to making use of the same PARDL methodology in deriving the equation estimates that will also shed light on whether there is evidence of a statistically significant negative coefficient of one-period lag of the error-correction term, which, in turn, will shed light on whether there is added support for the evidence of a long-run relationship that is being examined here. The study is aware of other panel cointegration tests, such as the Pedroni and Westerlund tests (Pesaran & Smith, 1995), but refrains from adopting them due to their limitations in handling panel datasets with large cross-sectional (N) and small time series (T) observations, i.e., when N is greater than T (Pesaran & Smith, 1995; Asterious et al. 2020), which is the case in the present study.

The Kao cointegration test has the null hypothesis of no long-run relationship among the variables, and the decision rule is to reject the null hypothesis if the reported test statistic, which has a *t* distribution, is statistically significant at the chosen level of significance and accept the null hypothesis if otherwise. For this purpose, the study regards a test statistic as statistically significant if its p-value is equal to or less than 1%. On the whole, 12 models are covered by the tests, and these are the 3 benchmark economic growth models (each of which features one of the 3 financial depth variables as the regressor of primary interest); 9 models for sectoral output growth variables which feature the three financial depth variables.

Table 4: Results of the Kao Cointegration Test for the Overall Economic in Growth and the Sectoral Output Growth Models

	Model	No of observations	t-Stastic	p-value	Conclusion (H_o)
1	$\frac{\Delta Y}{Y}$ model with only BMG as variable of primary interest	2,430	-5.090	0.000	Reject
2	$\frac{\Delta Y}{Y}$ model with only BSA as variable of primary interest	2,430	-7.830	0.000	Reject
3	$\frac{\Delta Y}{Y}$ model with only CPB as variable of primary interest	2,350	-6.553	0.000	Reject
4	$\frac{\Delta y}{y}_{agr}$ model with BMG as the explanatory variable of primary interest	2,200	-5.133	0.000	Reject
5	$\frac{\Delta y}{y}_{ind}$ model with BMG as the explanatory variable of primary interest	2,200	-3.194	0.001	Reject
6	$\frac{\Delta y}{y}_{srv}$ model with BMG as the explanatory variable of primary interest	2,500	-8.555	0.000	Reject
7	$\frac{\Delta y}{y}_{agr}$ model with BSA as the explanatory variable of primary interest	2,400	-7.569	0.000	Reject
8	$\frac{\Delta y}{y}_{ind}$ model with BSA as the explanatory variable of primary interest	2,400	-6.583	0.000	Reject
9	$\frac{\Delta y}{y}_{srv}$ model with BSA as the explanatory variable of primary interest	2,400	-4.299	0.000	Reject

10	$\frac{\Delta y}{y}_{agr}$ model with CPB as the explanatory variable of primary interest	2,400	-7.569	0.000	Reject
11	$\frac{\Delta y}{y}_{ind}$ model with CPB as the explanatory variable of primary interest	2,400	-6.583	0.000	Reject
12	$\frac{\Delta y}{y}_{srv}$ model with CPB as the explanatory variable of primary interest	2,400	-4.299	0.000	Reject

Source: Author's Compilation, 2022.

Explanatory Notes: *BMG = broad money as percentage of GDP, BSA = banking sector asset as percentage of GDP, CPB = claims of private sectors by banks;* $\frac{\Delta y}{y}_{agr}$ *= agricultural sector output growth,* $\frac{\Delta y}{y}_{ind}$ *= industrial sector output growth and* $\frac{\Delta y}{y}_{srv}$ *= service sector output growth. The decision rule is that a test statistic is statistically significant if its p-value is not more than 1%, implying that Ho is rejected and, hence, the model is cointegrated.*

From Table 4, it can be observed that the t-statistic is statistically significant in each of the 12 models. This is evident from the p-values, which are all less than 1%. Following the decision rule earlier stated, the null-hypothesis is to be rejected, and hence, it is concluded that cointegration or a long-run relationship exists among the series featured in each model. This suggests that the panel ARDL estimation technique can be employed to derive not only the short-run but also the long-run estimates of the parameters of the models. As a robustness check, the suitability of the ARDL estimation approach is further examined later by noting whether there is evidence of statistically significant negative coefficients of the error-correction term, which, if it exists, would then provide additional support for this long-run relationship.

Results of the Mean Group (MG), Pooled Mean Group (PMG) and the Dynamic Fixed Effect (DFE) Tests

In estimating the models, tests are first carried out to determine the relative suitability of the three methods of estimating the panel ARDL regression, which are the mean group (MG), pooled mean group (PMG), and the dynamic fixed effect (DFE). In this regard, the Hausman test is applied to determine the relative suitability of the MG and PMG. Under the null hypothesis, if the difference in the estimated coefficients between MG and PMG is found not to be significantly different, it implies that PMG is more efficient. In other words, if the p-value of the Hausman test statistic is greater than 0.01, so that there is no significant difference between the coefficients derived from MG and PMG, it is concluded that the PMG estimator is more suitable than the MG estimator. Also, the same Hausman test is applied to determine the superiority between PMG and DFE methods. If the p-value is greater than 0.01, the null hypothesis is not rejected, and it is concluded that the PMG model is superior to the DFE model. Lastly, this same Hausman test is applied to determine the superiority between the MG and DFE estimators. If the p-value is greater than 0.01, the null hypothesis is not rejected, and it is concluded that the DFE model is superior to the MG model (Blankburne & Frank 2007). The overall conclusion as to which of the MG, PMG, and DFE estimators is adjudged to be the best is based on which of these estimators (i.e., MG, PMG, and DFE) is selected as superior either twice or three times in the table.

Accordingly, this sub-section presents and evaluates each of the models using the Panel ARDL (PARDL) regression equation estimates, with the Hausman test statistic as the criterion guiding the choice among the MG, PMG, and DFE methods of Panel ARDL estimation. The study settles for the PARDL rather than the Generalised Method of Moment Estimation (GMM) method, not only because of the nature of the study (by being micropanel in nature in the sense that the number of countries is greater than the years considered in the study), but also because of the former's ability to consider country-specific heterogeneity issues as well as its suitability when the variables are a combination of stationarity at level, i.e., I(0), and at first difference, i.e., I(1). Unlike the panel ARDL, the Generalised Method of Moment Estimation (GMM) ignores cross-sectional dependence of variables and estimates, and the panel members have homogenous slope coefficients, i.e., a homogenous panel (Durlauf et. al. 2004).

Table 5: Results of Hausman Test Guiding the Choice among MG, PMG and DFE Variants of PARDL Estimation

		Comparison between MG and PMG			Comparison between MG and DFE			Comparison between PMG and DFE			
	Model	Test stat	P-value	Decision on which is superior	Test stat	P-value	Decision on which is superior	Test stat	P-value	Decision on which is superior	Overall Conclusion on which of the MG, PMG and DFE is best
1	$\frac{\Delta Y}{Y}$ model with only BMG as variable of primary interest	5.18	0.629	PMG estimate	22.14	0.000	DFE estimate	33.04	0.000	DFE estimate	DFE is more efficient
2	$\frac{\Delta Y}{Y}$ model with only BSA as variable of primary interest	9.47	0.173	PMG estimate	30.03	0.000	DFE estimate	23.87	0.000	DFE estimate	DFE is more efficient
3	$\frac{\Delta Y}{Y}$ model with only BSD as variable of primary interest	3.43	0.836	PMG estimate	34.00	0.000	DFE estimate	30.11	0.000	DFE estimate	DFE is more efficient
4	BMG model in agricultural output growth equation	5.43	0.490	PMG estimate	21.65	0.000	DFE estimate	32.73	0.000	DFE estimate	DFE is more efficient
5	BMG model in industrial output growth equation	5.29	0.327	PMG estimate	24.00	0.000	DFE estimate	31.70	0.000	DFE estimate	DFE is more efficient
6	BMG model in services output growth equation	5.83	0.310	PMG estimate	38.77	0.000	DFE estimate	23.45	0.000	DFE estimate	DFE is more efficient
7	BSA model in agricultural output growth	5.66	0.322	PMG estimate	31.26	0.000	DFE estimate	33.12	0.000	DFE estimate	DFE is more efficient
8	BSA model in industrial output growth equation	5.05	0.437	PMG estimate	21.35	0.000	DFE estimate	34.19	0.000	DFE estimate	DFE is more efficient
9	BSA model in services output growth equation	5.12	0.422	PMG estimate	26.44	0.000	DFE estimate	35.12	0.000	DFE estimate	DFE is more efficient
10	CPB agricultural output growth equation	6.09	0.227	PMG estimate	21.40	0.000	DFE estimate	32.15	0.000	DFE estimate	DFE is more efficient
11	CPB model in industrial output growth equation	6.20	0.211	PMG estimate	25.14	0.000	DFE estimate	33.26	0.000	DFE estimate	DFE is more efficient
12	CPB model in services output growth equation	5.12	0.422	PMG estimate	26.44	0.000	DFE estimate	35.12	0.000	DFE estimate	DFE is more efficient

Source: Author's Compilation, 2022.

Explanatory Notes*:* $\frac{\Delta Y}{Y}$ *= GDP growth rate, BMG = broad money as percentage of GDP, BSA = banking sector asset as percentage of GDP, CPB = claims of private sectors by banks. The decision rule is that a test statistic is statistically significant if its p-value is not more than 5%, this means that Ho is rejected.*

In Models 1 to 12, the p-values of the Hausman test statistics are all greater than the 0.01 significance level, indicating that the PMG estimation method is superior to the MG estimation method. Similarly, when comparing the superiority of MG and DFE, the p-values of the Hausman tests are greater than 1%, implying that the DFE estimation method is superior. Furthermore, when comparing the superiority of the PMG and DFE estimation methods, the p-value of the Hausman test statistic in each model is 0.000, which is less than 0.01, thereby indicating that the DFE estimation method is superior to the PMG estimation method. Finally, when deciding which of the three estimation methods to use, the DFE estimation is the most efficient because it is selected as being superior twice out of three times in each of these twelve models. The last row of Table 6 highlights this fact by indicating that it is the DFE variant of the PARDL estimation method that is adopted in deriving each of the equation estimates, as just stated above.

Presentation and Evaluation of the PARDL Estimates of Models for Determining the Effects of Financial Depth Variables on the Overall Economic and Sectoral Output Growth

Following the above procedure and estimation of the model specified in this study, the resulting estimates, which cover data for the entire 1970 - 2019 period, are reported in Table 6. It should be noted that 12 equation estimates were derived from the model specified, and the optimal lag length adopted in deriving the estimates is determined by the Akaike Information Criterion (AIC). Also in this study, only the long-run estimates of all the 12 equations are reported in Table 6 while the short-run equivalents are not reported for brevity's sake and due to the fact that it is only the long run estimates that are of utmost importance for achieving the stated objectives of the study. Following the discussion in a previous sub-section on the criteria guiding the choice among the mean group (MG), pooled mean group (PMG) and the dynamic fixed effects (DFE) variants of Panel ARDL estimation, whichever of these three methods that is found to be favored by the criteria in respect of each equation is indicated in the last row of the table where estimates of that equations are reported (although, as it turns out, DFE happens to be the favoured one for each of the 12 models). Finally, in the tables, the numbers in "[ ]" type of parentheses immediately below the parameter estimates are the t-values while those in "( )" type of parentheses are the associated p-values. A variable's parameter estimate is considered to be statistically significant in this study and, hence, the variable is deemed to have an effect on the dependent variable if the p-value is less than or equal to 1%.

Table 6: PARDL Estimates of Regression Equations for Determining the Effects of Financial Depth Variables on Sectoral Output and Overall economic Growth

	Overall Economic Growth			Agricultural Output Growth			Industrial Output Growth			Services Output Growth		
	1	2	3	4	5	6	7	8	9	10	11	12
$\frac{\Delta N}{N}$	2.282 [1.88] (0.060)	2.340 [1.95] (0.052)	3.751 [3.19] (0.001)	3.179 [2.74] (0.006)	3.048 [2.64] (0.008)	3.016 [2.69] (0.007)	1.013 [0.79] (0.432)	3.450 [2.58] (0.010)	3.674 [2.76] (0.006)	4.256 [3.33] (0.001)	4.579 [4.07] (0.000)	4.491 [4.81] (0.000)
$\frac{\Delta K}{K}$	0.401 [0.86] (0.391)	0.662 [1.41] (0.158)	0.020 [0.04] (0.965)	1.075 [2.40] (0.017)	1.228 [2.73] (0.007)	0.742 [1.67] (0.096)	0.505 [1.02] (0.331)	0.732 [1.40] (0.161)	0.662 [1.25] (0.210)	0.124 [0.17] (0.865)	0.460 [1.34] (0.181)	0.679 [0.95] (0.343)
GEXP	-0.203 [-5.90] (0.000)	-0.218 [-6.49] (0.000)	-0.163 [-4.53] (0.000)	-0.089 [-2.70] (0.007)	-0.078 [-2.43] (0.015)	-0.093 [-2.71] (0.007)	-0.090 [-2.44] (0.015)	-0.014 [-0.37] (0.714)	-0.040 [-0.97] (0.330)	-0.239 [-4.21] (0.000)	-0.304 [-4.66] (0.000)	-0.676 [-4.97] (0.000)
TRA	0.119 [5.69] (0.000)	0.110 [5.39] (0.000)	0.080 [3.77] (0.000)	0.069 [3.42] (0.001)	0.062 [3.14] (0.002)	0.047 [2.30] (0.022)	0.115 [4.87] (0.000)	0.070 [3.08] (0.002)	0.092 [3.82] (0.000)	0.045 [1.32] (0.186)	0.018 [0.53] (0.593)	0.039 [1.20] (0.231)
FDI	0.150 [4.06] (0.000)	0.167 [4.57] (0.000)	0.175 [4.85] (0.000)	0.166 [4.70] (0.000)	0.177 [4.06] (0.000)	0.169 [4.92] (0.000)	0.208 [4.30] (0.000)	0.252 [4.61] (0.000)	0.241 [4.91] (0.000)	0.079 [1.40] (0.161)	0.127 [2.24] (0.026)	0.145 [2.62] (0.009)
INF	-0.011 [-1.14] (0.255)	-0.004 [-0.46] (0.647)	-0.009 [-0.92] (0.356)	-0.002 [-0.26] (0.794)	-0.001 [-0.17] (0.866)	-0.012 [-1.36] (0.175)	-0.087 [-4.88] (0.000)	-0.095 [-4.89] (0.000)	-0.088 [-4.21] (0.000)	-0.002 [-0.17] (0.866)	-0.007 [-0.47] (0.636)	-0.003 [-0.24] (0.812)
LIF	0.126 [2.63] (0.009)	0.175 [3.51] (0.000)	0.089 [1.89] (0.059)	0.355 [4.74] (0.000)	0.382 [4.00] (0.000)	0.344 [4.62] (0.000)	0.142 [2.78] (0.006)	0.138 [3.08] (0.002)	0.132 [2.46] (0.014)	0.028 [0.38] (0.701)	0.033 [0.43] (0.670)	0.136 [4.07] (0.000)
BMG	0.096 [4.08] (0.000)	-	-	0.062 [2.75] (0.006)	-	-	0.220 [4.78] (0.000)	-	-	0.206 [4.43] (0.000)	-	-
BSA	-	0.122 [4.43] (0.000)	-	-	0.070 [2.63] (0.009)	-	-	0.053 [1.74] (0.083)	-	-	0.046 [1.09] (0.276)	-
CPB	-	-	0.064 [3.43] (0.001)	-	-	0.092 [4.21] (0.000)	-	-	0.031 [1.50] (0.135)	-	-	0.181 [4.37] (0.000)
ECT	-0.793 [-5.79] (0.000)	-0.797 [-4.11] (0.000)	-0.720 [-4.60] (0.000)	-0.200 [-9.07] (0.000)	-0.210 [-10.37] (0.000)	- 0.241 [-9.22] (0.000)	-0.110 [-4.52] (0.000)	-0.106 [-4.25] (0.000)	-0.125 [-4.61] (0.000)	-0.161 [-8.84] (0.000)	-0.157 [-8.58] (0.000)	.-0.160 [-8.77] (0.000)
Observations	2430	2430	2350	2450	2400	2400	2450	2400	2400	2450	2400	2400
Panel estimation method	DFE	DFE	DFE	DFE	DFE	DFE	DFE	DFE	DFE	DFE	DFE	DFE

Source: Author's Compilation, 2022.

Explanatory Notes: $\frac{\Delta Y}{Y}$ = *GDP growth rate,* $\frac{\Delta \boldsymbol{N}}{\boldsymbol{N}}$ = *labour growth rate,* $\frac{\Delta \boldsymbol{K}}{\boldsymbol{K}}$ = *growth of capital stock, GEXP = general government expenditure, TRA = trade openness, FDI = foreign direct investment inflow, INF = inflation, LIF = life expectancy, BMG = broad money, BSA = bank sector asset, CPB = claims of private sectors by banks. Numbers in parentheses [ ] and ( ) are t-statistics and p-values respectively, with a coefficient being considered statistically significant if its p-value is less than or equal to 1% level of significance.*

Performances of the Explanatory Variables

From the results reported in Table 6, the coefficients of the three measures of financial depth are all positive but some are not statistically significant. Starting with BMG (broad money), its coefficient in each of the equations for agricultural, industrial and services output growth is positive and statistically significant, just as its coefficient in the equation for the overall economic growth too.

In the case of BSA (bank sector asset), while its coefficients in all the four equations are positive, they are statistically significant at the 1% level only in the equations for the overall economic growth and agricultural output growth and only marginally significant (at 10% level) in the industrial output growth equation while it is not significant at all in the services output growth equation. Thus, it is concluded that, while there is a very strong evidence of its positive effect on agricultural output growth and a somewhat weak evidence of its positive effect on industrial output growth, there is no evidence of its effect on services output growth. It is thus inferred that it must have been its positive effect on agricultural output growth, as augmented by its somewhat positive effect on industrial output growth that leads to and explains the observed strong positive effect on the overall economic growth.

Also, concerning the coefficients of CPB (claims of private sectors by banks), it can be seen that, while all its four coefficients are positive, the one in the equation for industrial output growth is not statistically significant. It is thus deduced that it is its positive effects on both agricultural and services output growth that reinforce one another to produce that observed very strong positive of it effect on the overall economic growth.

Concerning labour force growth rate ($\frac{\Delta N}{N}$), out of its 12 positive coefficients, 9 are statistically significant while the remaining 3 are statistically insignificant at 1% level. The observed generally positive effects conform with the a priori expectation, as predicted by the adopted growth accounting framework, and also consistent with the findings of a number of previous studies, like Zulu and Banda (2015) and Jose (2019). In the case of capital stock growth ($\frac{\Delta K}{K}$), the 12 coefficients of $\frac{\Delta \boldsymbol{K}}{\boldsymbol{K}}$ are all positive, but with only 1 being statistically significant while the remaining 11 are statistically insignificant. This observed positive growth effect (though with less than convincing evidence in view of lack of statistical significance of almost all the coefficients) conforms with the a priori expectation, as predicted by the adopted growth accounting framework, and also consistent with the findings of a number of previous studies, like Myagmarsuren and Choong (2015) and

Fournier (2016). Also, the coefficients of general government expenditure (GEXP) are negative in all the 12 equations, with 8 of these being statistically significant while the remaining 4 are statistically insignificant. This result corresponds with the a priori expectation and also in line with previous empirical findings, reported by Jong et. al. (2019) and Onifade et. al. (2020). In the case of trade openness (TRA), its 12 coefficients are all positive, with 8 of these being statistically significant while the remaining 4 are statistically insignificant. This implies that it has a positive effect on both sectoral output growth and overall economic growth. These observed positive effects align with the a priori expectation and findings from previous studies, like Keho (2020) and Raghutla (2020).

In the case of foreign direct investment (FDI)**,** the coefficients of FDI are positive in all the 12 equation estimates, with 10 of these being statistically significant while the remaining 2 are statistically insignificant. The observed positive effect is in line with the postulation in this study and previous empirical studies, like Leandro, Yin and Li (2017) and Maheswaranathan and Jeewanthi (2021), which also reported its positive effects. Also, the coefficients of inflation (INF) are all negative in the 12 equations, out of which only 3 are statistically significant and 9 are statistically insignificant at the 1% level. This negative effect aligns with the a priori expectation and previous studies, such as Ehigiamusoe et. al. (2019) and Sulemana et. al. (2020), among others. Concerning the coefficients of life expectancy (LIF), the coefficients of LIF are positive in all the 12 model estimates, with 8 being statistically significant and 4 being statistically insignificant. This indicates that LIF has a positive effect on both economic and sectoral output growth, which aligns with the a priori expectation and previous studies like Burns et al. (2017) and Beşe et al. (2021). Lastly, the coefficients 1-peeriod lag of error correction term (ECT_{it}-1) in all the 12 model estimates are negative, statistically significant, and less than unity in absolute value, with the p-values being less than 1% in each model, thus indicating long-term relationships between economic growth and sectoral output growth and their respective regressors. This finding is in accord with what was earlier confirmed by the result of the Kao panel cointegration test presented in Table 4.

Conclusion and Recommendations

This study investigates the effect of financial depth on the overall economic growth and output growth in Africa, using annual balanced panel data that covered 1980 - 2019 for 43 Sub-Sahara African countries. The study was informed by the arguments concerning the way the financial and real sectors of the economy affect each other and the controversies between the two opposing views in the literature regarding their relationship. The theoretical background rests on neo-classical and the supply-leading hypothesis. Next to the outcomes of the panel unit root and cointegration tests carried out, the study adopted panel ARDL method in estimating the regression equations specified for both sectoral output and economy-wide growth.

Following the application of the aforementioned methodology, it was found that the three alternative proxies for the level of financial depth (viz: broad money (BMG), bank sector assets (BSA), claims of private sectors by banks (CPB)) have positive effects on both overall economic growth and sectoral output growth. Also, each of the 7 conditioning variables (viz: GDP growth rate ($\frac{\Delta Y}{Y}$), labour growth rate ($\frac{\Delta N}{N}$), growth of capital stock ($\frac{\Delta K}{K}$), general government expenditure (GEXP), trade openness (TRA), foreign direct investment inflow (FDI), inflation (INF), life expectancy (LIF)) has the expected effects on the economic growth.

Based on the findings, this study therefore recommends that:

- The policymakers take measures aimed at deepening the level of the different forms of finance in order to promote economic growth and sectoral output growth.
- Also, as evidence in the study indicates that labour growth rate, growth in capital stock, trade openness, foreign direct investment, and life expectancy have positive effects on overall economic growth and sectoral growth, it is recommended that, to boost economic growth, each of these variables be strengthened.
- Similarly, given the observation that total government expenditure and inflation have negative effects on economic growth, it is recommended that Sub-Saharan African countries implement necessary policies to reduce inflation and curtail government spending in order to promote economic growth and sectoral output growth.

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