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The Relationship Between Financial Development and Economic Growth in Nigeria

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ABSTRACT

This study aims to investigate the complex relationship between financial development and economic growth in Nigeria, examining the short-run and long-run dynamics through a comprehensive time series analysis spanning 1981 to 2023. The research seeks to evaluate the impact of financial development on economic growth while considering critical macroeconomic factors. **The study employs** a robust methodological approach, utilising the autoregressive distributed lag (ARDL) model complemented by bounds testing. The investigation incorporates control variables, including government expenditures, investment, trade openness, oil prices, and labour force, to provide a comprehensive economic assessment. **The empirical results** reveal a subtle relationship between financial development and economic growth in Nigeria. Despite confirming long-run cointegration among variables, the financial development index does not demonstrate statistically significant impacts on economic growth in either short- or long-run scenarios. However, the labour force emerges as the primary catalyst for economic expansion, with a 1% increase associated with a substantial 16.77% increase in real Gross Domestic Product (GDP) in the short term and a 1.48% increase in the long run. The study **conclusion** challenges conventional wisdom regarding the finance-growth nexus in developing economies. The findings highlight the critical role of human capital in Nigeria's economic trajectory while revealing potential inefficiencies in financial sector development and capital allocation. **This research contributes** to the ongoing discourse on financial development and economic growth by providing a comprehensive, contemporary analysis of Nigeria's economic landscape.

Keywords: financial development; economic growth; ARDL; cointegration; development economics; developing economies; Nigeria; Africa

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ОРИГИНАЛЬНАЯ СТАТЬЯ

Взаимосвязь финансового развития и экономического роста в Нигерии

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АННОТАЦИЯ

Целью данного исследования является изучение сложной взаимосвязи между финансовым развитием и экономическим ростом в Нигерии, основанное на анализе краткосрочной и долгосрочной динамики комплексных временных рядов за период 1981–2023 гг. Исследование направлено на оценку влияния финансового развития на экономический рост с учетом важнейших макроэкономических факторов. В исследовании используется надежный **методологический подход** с применением модели авторегрессионного распределенного лага (ARDL), дополненной тестированием границ. Для получения комплексной экономической оценки исследование включает ряд контрольных переменных, в том числе государственные расходы, инвестиции, открытость торговли, цены на нефть и численность рабочей силы. **Эмпирические результаты** показывают сложную взаимосвязь между финансовым развитием и экономическим ростом в Нигерии. Несмотря на подтверждение долгосрочной коинтеграции между переменными, индекс финан-

сового развития не демонстрирует статистически значимого влияния на экономический рост ни в краткосрочных, ни в долгосрочных сценариях. Тем не менее рабочая сила выступает в качестве основного катализатора экономического роста с ростом на 1%, связанным с существенным ростом реального валового внутреннего продукта (ВВП) на 16,77% в краткосрочной перспективе и ростом на 1,48% — в долгосрочной. **Выводы** исследования ставят под вопрос общепринятое представление о взаимосвязи финансов и экономического роста в развивающихся странах. **Полученные результаты** подчеркивают важную роль человеческого капитала в развитии экономики Нигерии, одновременно выявляя потенциальную неэффективность в развитии финансового сектора и распределении капитала. Данное исследование вносит **вклад** в научную дискуссию о финансовом развитии и экономическом росте, предоставляя всесторонний современный анализ экономического ландшафта Нигерии.
Ключевые слова: финансовое развитие; экономический рост; ARDL; коинтеграция; экономика развития; развивающиеся экономики; Нигерия; Африка

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1. Introduction

In recent decades, the role of financial intermediaries in financing economic growth has received a lot of attention in the literature. Economic growth is a core macroeconomic policy goal for many less developed countries where policymakers frequently seek actions that promote economic growth because of the favourable effects on employment and labour earnings. Financial liberalisation and financial repression policies have been debated in the finance industry, with differing effects on growth. However, there has been no agreement on the significance of the finance-growth relationship. According to Ogun [1], the challenge in addressing this disagreement is due to the diverse meanings of financial development.

Economic growth is usually measured by the growth in the Gross Domestic Product (GDP) because GDP measures the value of all final goods and services in the economy in consideration. While financial deepening reflects enhancement in the roles of financial intermediaries, it depicts improvements in the efficiency of borrowers in obtaining funding that meets investment purposes [1, 2]. Financial development is beneficial in and of itself since it improves resource allocation efficiency and allows savings to be successfully mobilised and channelled into productive projects. Furthermore, better-functioning markets boost the effectiveness of economic interventions [3]. As a result, the study of the connection between financial development and economic growth has raised much interest.

Financial development is a dynamic, complex and idiosyncratic process of economic change that cannot be understood based on simplistic monetary measures. The phenomenon of financial development at its core is multidimensional and evolves as the capacity of an economy to mobilise, allocate, and use financial resources increases. This is not a quantitative increase in the size of financial institutions, but rather a sophisticated combinative process of structural, institutional, and technological changes that fundamentally change how economic interaction occurs. From Schumpeter's perspective, which highlighted the innovative role of financial intermediation, to the current Schumpeterian ideas of innovative financial intermediation and a growing corpus of institutional economics, the idea of financial intermediation has been widely accepted as a significant driver of economic modernisation. Financial systems play an active role, not only in response to economic growth but also in creating mechanisms that determine risk management and capital allocation in the realm of traditional banking functions [4].

The transformative nature of financial development in emerging economies such as Nigeria is clear, where financial systems have to simultaneously cope with historical infrastructural challenges and respond to swift technological innovations. Modern financial development encompasses a broad spectrum of elements, covering everything from the rollout of formal banking services to remote rural areas to the advent of digital financial technologies that democratise access to financial resources. This goes beyond the volume of transactions; it also entails the quality of financial intermediation, the sophistication of financial instruments, and robust frame-

works for regulation that can support economic dynamism [5].

Financial development has dramatically changed with the advancements in technology. Blockchain technologies, mobile banking platforms and intricate algorithms in finance have transformed how financial services have been conceived and delivered. Understanding the innovation behind these financial services has the potential to clear away traditional barriers to financial exclusion, paving the way for new pathways to economic participation that were out of the question just a few decades ago. This means moving out of the existing traditional banking models to build more inclusive, efficient and responsive financial ecosystems [6].

In developing economies with structural heterogeneity and historical economic constraints, it is a complex undertaking fraught with many trade-offs and challenges. Its effectiveness rides on a combination of how developed the institutional capabilities are, what type of regulatory frameworks are in place, what technological infrastructure is in place, and, of course, the human capital development. Financial development is important despite the narrow immediate economic metrics. It is a fundamental mechanism through which their adaptive capacities and possible resilient pathways into economic uncertainties can be enhanced to create more inclusive pathways of economic participation. Financial development is not only about financial institutions but also about creating more sophisticated, efficient, and equitable respondent systems that can navigate the complexity of contemporary global economic landscapes [7].

Some scholars align with Joseph Schumpeter that increased functionality of the financial institutions enhances real sector innovations that boost economic growth; however, others view financial development as a result of economic development [3]. Levine [8] observed that certain economists, particularly in the field of development economics, had not always seen finance as crucial to the actual economy. Nonetheless, with the increasing application of technology to finance via blockchains, internet banking, automated teller machines (ATM), bank verification numbers (BVN), the possibility of a link cannot be completely disregarded. This study follows suit in examining the nature of this link in the context of the Nigerian economy.

There are numerous financial restructuring experiments in less developed nations that have been occasioned by the belief that financial development leads to economic development [9]. In a bid to enhance the efficiency and stability of the financial sector in Nigeria, the following prudential and economic regulatory policies have been adopted. The Nigerian banking sector, after its independence, had been controlled under strict regulations until the liberalisation of the Structural Adjustment Program (SAP). The sector of regulated commercial banks grew rapidly, rising from 40 in 1986 to 120 in 1993. Regulations were then reinstated in 1994, and recapitalisation and consolidation in 2004 reduced the number of banks to 25 [10]. According to Vittas and Mundial [11], while regulations are frequently employed to remedy market failures in the financial system, financial restructuring could also be used to impact the macroeconomy through loan growth and price stability.

Consequently, the purpose of this paper is to establish the empirical link between financial system development and economic growth in Nigeria. The author aims to evaluate both the short-run and the long-run co-integration between economic growth and financial development in Nigeria. The result of the study will be relevant to the formulation of development policy in Nigeria. After estimating the ARDL model of financial development and economic growth, the author seeks the existence of cointegration. The following is the breakdown of this paper. Section 2 is a literature review that explores the theoretical and empirical literature on the role of financial development in economic growth. Section 3 explains the empirical methods and data employed when conducting the empirical study. The author offers the estimation results and analyses conclusions in the fourth section. Section 5 contains the final observations, policy recommendations, and research ideas for the future.

2. Review of the literature

2.1. Theoretical review

Several theoretical predictions on the relationship between financial development and economic growth have been mentioned in the literature on financial development. As such, there are arguments supporting and opposing the line of thought that holds that financial de-

velopment increases the long-run growth rate. This section reviews theories suggesting that financial development fosters economic growth, specifically the demand-following and supply-leading theories.

The demand-following hypothesis postulates that changes in the real economy have to lead to corresponding changes in the financial economy. The growth-finance hypothesis, otherwise known as 'supply response, in the growth of the financial system', argued by Patrick [12], states that growth creates more demands; hence, the supply side responds to the growth of the financial system. Complex economic growth requires the formation of many new financial institutions, as well as their products, securities, and contractual relations with genuine financial investors and savers. As such, the financial market answers such requests. The demand-following hypothesis assumes that there is high entrepreneurship sensitivity to the availabilities of financial services with respect to the perceived new opportunities to earn profits out of financial services, whereby sufficient numbers of new forms within financial service institutions appear.

The supply-leading hypothesis, on the other hand, argues that the financial sector's development leads to real sectors' development. To elaborate, the supply-leading theory can be explained using the finance-led hypothesis. It presumes the existence of "financial institutions and the supply of their financial assets, liabilities, and related financial services ahead of demand." This would effectively channel resources from the surplus units to the deficient ones, thereby leading the other economic sectors in their development process [12].

The supply-leading concept has been referred to as innovation financing by [13]. He noted that efficiency gains accompany innovations to ensure that quality banks can identify the most probable winners and source funding for these potential technological innovators who can convert these ideas into reality in the form of new and innovative products and improved production techniques [8]. There are other theories, such as Keynesian and monetary growth theories, as well as Mackinnon and Shaw models, that also depict supply-leading concepts. However, there are differences in their belief about the role of the government and the mechanism of interest rates in the money market. As Brenner [14] pointed out, history and nature all testify that real interest rates tend to go up to the full employment level and can only be cut by government intervention to spur economic growth.

On the growth advantages of finance, the money and growth model as proposed by Tobin [15] also supports low or regulated interest as beneficial to growth. Since families have two commodities: money and productive capital, he realised that with a higher ratio of return receivable on capital as compared to money, there would, of course, be a higher proportion of capital to money as held in the hands of households. This results in a higher capital/labour ratio, higher labour productivity, and thus higher economic growth. Therefore, an action that shrinks the interest rate or the rate of return on capital leads to a higher rate of economic expansion.

2.2. Empirical review

Some other empirical papers relating to financial development and economic growth can also be found in the literature. Various estimating techniques have also been applied across several countries to test the existence of a co-integration relation between the variables. These investigations likewise produced diverse results: evidence for the demand-following theory, evidence for the supply-leading hypothesis, and both positive and negative relations.

Alenoghena et al. [16] stressed the non-linear relationship between financial sector development and economic growth in the Nigerian context. In the paper, the proxies for financial development included broad money and credit to the private sector, while the Nonlinear Autoregressive Distributed Lag (NARDL) method was employed to determine whether the interaction between financial development and GDP growth was asymmetric. The authors applied the threshold regression to ascertain the turning point for the variables in the research. The co-integration test indicates that there is a co-integration between the variables representing financial development factors and economic growth with an asymmetrical 'U' shaped relationship.

Ayinde and Yinusa [17] used the quantile regression method and data covering 1980 to 2013 to dissect and analyse the dynamics of financial development and inclusiveness of growth in Ni-

geria. They assert that the ninety percentile is the critical level of financial development that impacts inclusive growth and that the impact of financial development on inclusive growth varies depending on the measure of financial development utilised. However, in their Granger causality studies, causality runs from inclusive growth to financial development.

Choong and Chan [18] argue that financial deepening facilitates the process of economic growth, while on the same note, economic growth facilitates the process of financial development. Thus, financial intermediation plays a significant role in the process of saving. Similarly, the study by Akpansung and Babalola [19] aligns with the findings of Hussain and Chakraborty [20] and Nasir et al. [21], which concluded that financial sector development positively impacted growth by promoting saving, increasing the efficiency of the funds available for borrowing, and accumulating capital. In the context of what drives growth, Beck and Levine [22] analysed the relationship between financial development and economic growth and the determinants of growth in terms of private savings rates, capital accumulation, and total factor productivity. To ensure that the variables were truly exogenous, generalised method of moments (GMM) and instrumental variables (IV) were used, and the study discovered that financial development contributed towards a higher growth rate of economic growth and total productive factor.

Moreover, Adusei [23] also presented confirmatory arguments that spoke to the line of reasoning in support of the evidence of the relationship between financial development and growth and the two-way interaction between the two after analysing the correlation between financial development and growth in the 24 selected African countries within the period 1981–2010. Chukwu and Agu [24] analysed the relationship between financial development and economic growth by applying a multivariate Vector Error Correction Model (VECM) in Nigeria for the period 1971–2008 and revealed a long but mixed dependence on the type of financial advancement measure used. This proves that the demand-following theory is correct when the banking sector, private sector credit, and real broad money supply are taken as financial depth indicators, and, at the same time, the supply-leading hypothesis is true when the loan deposit ratio and the bank deposit liability indicators are used.

Nonetheless, one might identify that the existing and relatively newer models of financial development and its impact on growth, together with the corresponding methods, appear to be influenced by these various researchers' viewpoints on the theoretical part of money and finance in the economy, embracing the new emerging methods. Therefore, based on the foregoing, it is only clear that what is never tied to money or finance has a predominant role in real sector growth and is therefore easily identifiable in less developed economies. Such economies are characterised by a relatively less developed institutional structure of the financial sector with many more innovations and a large informal economy based on barter and trade centres.

2.3. Institutional economics and economic development: A comprehensive theoretical and empirical exploration

The relationship between institutional structures and economic growth has been a dominant area of study, mainly in countries like Nigeria that are in the stages of development. The work of institutional economists, with recent Nobel laureates and leading scholars, did not just enrich our understanding of how institutions work in shaping economic trajectories but also provided us valuable guidance on how we might sustain the institutions for prosperity while also offering protection from the forces that deplete them. Fundamentally challenging the traditional neoclassical economic approach, the theoretical foundation of institutional economics foundation stresses the crucial role of formal and informal institutions in the development process. Conceived on the basis of the seminal work of North [25], institutions are understood as complex and multidimensional "game rules" including both explicit constraints (constitutional environments, legal frameworks, property rights) and implicit constraints (social norms, cultural practices, and behavioural stereotypes).

A more dynamic interpretation of the development of institutions is given by Acemoglu and Robinson [26] in "The Narrow Corridor," in which they place economic progress in a small corridor between state power and societal power to be achieved. This perspective in the Nigerian context

suggests a complex institutional space with an overlay of patrimonial governance models superimposed on inherited colonial administrative structures and emerging democratic institutional mechanisms. The postured picture of Nigeria's institutional development also makes a compelling case study on the institutions' history of transformation, and despite the existence of post-colonial frameworks to support their economic development, there have been much-needed changes to post-colonial economic structures that have alluded to the centralisation of economic resources and participation and the extensive expanse of governance inefficiencies.

Okonjo-Iweala [27] noted that these institutional constraints have systematically obstructed sustainable economic development, generating a highly unyielding economic environment for financial intermediation and economic growth. Rodrik [28] further explains the understanding of institutional effectiveness, stating there is no rhizome in institutional development. Instead, the institutional frameworks that succeed must be contextually adaptive, and responsive to specific local economic, social and cultural conditions. This means that for Nigeria, institutional reforms, as for any country, should be carefully calibrated and based on unique historical and cultural complexities. There is consistent empirical evidence that efficient financial intermediation requires high-quality institutions. The emergence of digital technologies, blockchain and artificial intelligence has both challenges and opportunities for institutional transformation. Tapscott and Tapscott [29] explored how these technologies can help bring greater institutional transparency, lower transaction costs, and promote greater adaptive governance mechanisms. The Nigerian economy encompasses some of the most challenging problems of institutional development. Regulatory inconsistency, systemic corruption, limited technological infrastructure and complex ethnic and regional economic disparities continue to be persistent challenges. In contrast, recent research also points to some emerging opportunities. Getachew and Fon [30] indicate that adaptive institutional design and strategic policy intervention may overcome these historical constraints.

However, comprehensive institutional analysis such as strengthening property rights protection, establishing robust, flexible and transparent regulatory frameworks, implementing mechanisms of transparency and accountability, contributing to developing digital infrastructure, developing financial education and supporting entrepreneurial ecosystems, provides policy implications with some strategic interventions. The understanding of this implies that institutional development in developing economies such as Nigeria will require adaptive, context-specific approaches that take into account the reciprocal dynamics between formal structures and informal social dynamics.

3. Data and methodology

3.1. Data

This paper analyses data collected from 1981 to 2023, using data from the International Monetary Fund (IMF), the British Petroleum (BP) Statistical Review of World Energy, and World Bank Development Indicators. Real GDP is used for economic growth, while the IMF uses an average financial development index to communicate many aspects of financial development, such as financial depth, access to finance, and financial efficiency. The following control variables are included to capture other important factors influencing Nigerian economic growth: crude oil price, which is the average world oil price per cubic meter based on current US dollar; government consumption, which is fiscal policy as a percentage of GDP; trade, which is the trade openness as a percentage of the GDP; total population, which represents the labour force; Gross fixed capital formation, which represents the net investment as a percentage of GDP. This helps mitigate the incidence of endogeneity in the model to remove the omitted variable bias [31].

3.2. Financial Development Index: Conceptualisation and measurement

This study employs the Financial Development Index (FDI) as a comprehensive measure of the multi-dimensional dimensionality of financial sector development, overcoming the narrowness of single-dimensional metrics and building on a sophisticated theoretical framework that considers financial development as a multifaceted and complex phenomenon beyond simple monetary indicators. The index is constructed through a rigorous methodological approach that synthesises three primary dimensions of

Table 1
Variables used in the model

Abbreviation	Full Meaning
LOG_RGDP	Log Real GDP (Naira)
LOG_FDI	Log Financial Development Index
LOG_GEXP	Log General Government Final Consumption Expenditure (% of GDP)
LOG_INV	Log Gross Capital Formation (% of GDP)
LOG_TRADE	Log Trade (% of GDP)
LOG_OIL	Log Oil — Crude Prices (US$)
LOG_LAB	Log Total Population

Source: Compiled by the author.

financial development: financial depth, financial access and financial efficiency. Financial access reflects people's and businesses' capacity to rely on financial services. While the traditional banking metrics are documented, this dimension extends the discussion to include broader indicators of financial inclusion. Researchers measured the penetration of financial services through regressions using the number of bank branches, the amount of digital financial service adoption, and credit availability to small and medium enterprises.

The efficiency dimension offers insights into productivity and performance among financial intermediaries. The index captures the operational effectiveness of the financial system by examining indicators such as bank overhead costs, net interest margins, return on assets and technological adoption. It suggests that the quality of financial intermediation is as important as its quantity. Several financial economists, such as Levine [32] and Tabash and Anagreh [33], have consistently found empirical evidence indicating that multidimensional measures of financial development have superior explanatory power. This rich scholarly tradition is built on the index used in this study, which capitalises on the theoretical soundness and empirical robustness of how to understand financial sector development.

In the econometric models employed, each variable represents a critical component of economic analysis, capturing different dimensions of economic and financial performance. The definitions that are given below provide a broad understanding of the role of each variable in the theoretical model as well as their mathematical formulations. LOG_RGDP (Dependent Variable — Real Gross Domestic Product): It's an indicator of economic growth in Naira represented as the natural logarithm of real gross domestic product. The research normalises the data using the logarithmic transformation, reducing the effect of extreme values and linearising potential nonlinear relationships. The logarithmic is beneficial for the interpretation of coefficients, as percentage changes help stabilise variance across the time series. LOG_FDI (Financial Development Index): This variable represents the natural logarithm of the International Monetary Fund's financial development index, the multidimensional nature of financial sector development. The index integrates three key dimensions: (i) financial depth (size and liquidity of markets); (ii) financial access (accessibility of financial services to individuals and firms); and (iii) financial efficiency (the cost and intermediation efficiency of financial institutions). The logarithmic transformation assures comparability and reduces the risk of heteroscedasticity in the model. LOG_GEXP (Government Expenditure): This variable (as the natural logarithm of general government final consumption expenditure as a percentage of GDP) is used as a proxy for fiscal policy. It incorporates the government expenditure's contribution to economic activity in terms of potential multipliers, public investment and the government's economic intervention strategies.

LOG_INV (Investment): The investment accumulated in the economy, represented by the natural logarithm of the gross capital formation as a percentage of GDP. It responds to the accumulation of physical capital, infrastructure development and potential productivity increase.

The investment variable indicates the improvement of economic prosperity achieved through capital agglomeration. LOG_TRADE (Trade Openness): This variable is defined as total trade (exports and imports) expressed as a percentage of GDP. The link of trade openness to potential knowledge spillovers, competitive pressures, and access to international resources is plausible for growth. LOG_OIL (Oil Prices): The external economic shock potential from global oil markets is represented by the natural logarithm of crude oil prices in US dollars. Nigeria, being an oil-driven economy, has government revenue sources and economic stability that are significantly driven by fluctuations in the oil price. LOG_LAB (Labour Force): This variable serves as a proxy for the labour force. It is human capital availability, portraying the availability of the potential productive capacity, workforce dynamics, and demographic factors having the potential to affect economic growth.

3.3. Methodology

3.3.1. Unit root test

Following the study goal, the augmented Dickey-Fully (ADF) test on the variables is performed to determine their order of integration, and the following equations are estimated to test for the presence of a unit root in the variables at levels and with intercept. Followed by the test for the significance of $\rho_1 \;\; i = 1,2,\ldots,6$. Specifically, I find a unit root to decide whether to reject the null hypothesis, $H_0 : \rho_i = 0$.

$$\Delta LOG\_RGDP_t = \alpha_1 + \rho_1 LOG\_RGDP_{t-1} + \sum_{j=1}^{n1} \gamma_{1j} \Delta LOG\_RGDP_{t-j} + \xi_{1t},$$

$$\Delta LOG\_FDI_t = \alpha_2 + \rho_2 LOG\_FDI_{t-1} + \sum_{j=1}^{n2} \gamma_{2j} \Delta LOG\_FDI_{t-j} + \xi_{2t},$$

$$\Delta LOG\_GEXP_t = \alpha_3 + \rho_3 LOG\_GEXP_{t-1} + \sum_{j=1}^{n3} \gamma_{3j} \Delta LOG\_GEXP_{t-j} + \xi_{3t},$$

$$\Delta LOG\_INV_t = \alpha_4 + \rho_4 LOG_{INV_{t-1}} + \sum_{j=1}^{n4} \gamma_{4j} \Delta LOG_{INV_{t-j}} + \xi_{4t},$$

$$\Delta LOG_{TRADE_t} = \alpha_5 + \rho_5 LOG_{TRADE_{t-1}} + \sum_{j=1}^{n5} \gamma_{5j} \Delta LOG_{TRADEt-j} + \xi_{5t},$$

$$\Delta LOG_{OIL_t} = \alpha_6 + \rho_6 LOG_{OIL_{t-1}} + \sum_{j=1}^{n6} \gamma_{6j} \Delta LOG_{OILt-j} + \xi_{6t},$$

$$\Delta LOG_{LAB_t} = \alpha_7 + \rho_7 LOG_{LABt-1} + \sum_{j=1}^{n7} \gamma_{7j} \Delta LOG_{LAB_{t-j}} + \xi_{7t}.$$

After first differencing, the author performs similar tests with and without trend and intercept. In addition, the non-parametric Philips-Perron (PP) tests for robustness in the unit root testing.

3.3.2. Autoregressive distributed lag model (ARDL)

Considering the focus of this study, a regression between financial development and economic growth was performed to try and identify if a long-run relationship exists between these two and, if so, whether it is positively or negatively related to the Nigerian economy.

$$LOG_{RGDP} = f(LOG_{FDI}, LOG_{GEXP}, LOG_{INV}, LOG_{TRADE}, LOG_{OIL}, LOG_{LAB}).$$

As identified by Pesaran and Shin [34], this paper chooses the auto-regressive distributed lag (ARDL) approach towards the modelling of a relationship, with the bounds testing approach towards

the checking of a long-run co-integrating relationship. This paper chooses ARDL because the application of this dynamic model enables the testing for cointegration when both I(0) and I(1) variables are to be modelled.

The ARDL model is generally specified as:

$$\Delta LOG\_RGDP_t = \beta_0 + \sum_{j=1}^{n}\beta_{1j}\Delta LOG\_RGDP_{t-j} + \sum_{j=0}^{n}\beta_{2j}\Delta LOG\_FDI_{t-j} + \sum_{j=0}^{n}\beta_{3j}\Delta LOG\_GEXP_{t-j} + \sum_{j=0}^{n}\beta_{4j}\Delta LOG\_INV_{t-j} + \sum_{j=0}^{n}\beta_{5j}\Delta LOG\_TRADE_{t-j} + \sum_{j=0}^{n}\beta_{6j}\Delta LOG\_OIL_{t-j} + \sum_{j=0}^{n}\beta_{7j}\Delta LOG\_LAB_{t-j} + \theta_1 LOG\_RGDP_{t-1} + \theta_1 LOG\_RGDP_{t-1} + \theta_2 LOG\_FDI_{t-1} + \theta_3 LOG\_GEXP_{t-1} + \theta_4 LOG\_INV_{t-1} + \theta_5 LOG\_TRADE_{t-1} + \theta_6 LOG\_OIL_{t-1} + \theta_7 LOG\_LAB_{t-1} + \varepsilon_t.$$

If a long-run co-integrating relationship exists, I specify the error-correction model (ECM):

$$\Delta LOG\_RGDP_t = \beta_0 + \sum_{j=1}^{n}\beta_{1j}\Delta LOG\_RGDP_{t-j} + \sum_{j=0}^{n}\beta_{2j}\Delta LOG\_FDI_{t-j} + \sum_{j=0}^{n}\beta_{3j}\Delta LOG\_GEXP_{t-j} + \sum_{j=0}^{n}\beta_{4j}\Delta LOG\_INV_{t-j} + \sum_{j=0}^{n}\beta_{5j}\Delta LOG\_TRADE_{t-j} + \sum_{j=0}^{n}\beta_{6j}\Delta LOG\_OIL_{t-j} + \sum_{j=0}^{n}\beta_{7j}\Delta LOG\_LAB_{t-j} + \lambda\widehat{ECT}_{t-1} + \varepsilon_t.$$

Where ECT is the error-correction term, and λ is the speed of adjustment parameter.

4. Results

4.1. Descriptive statistics

Table 2 shows the descriptive statistics of the data (in natural logarithmic form) used in this investigation. The sample size is 43 years, spanning the years 1981 through 2023. Real Gross Domestic Product (RGDP) averaged 31.111 in natural logarithmic form for the period, with a low and maximum value of 30.417 and 31.909, respectively. Similarly, the Financial Development Index (FDI) averaged 1.704, with a low of 1.309 and a high of 2.108.

The same analogy applies to the other control variables in the model, such as General Government Final Consumption Expenditure (% of GDP) (GEXP), Gross Capital Formation (% of GDP) (INV), Trade (% of GDP), Oil — Crude Prices (US$) (OIL), Total Population (LAB). The variables are observed to be skewed positively and negatively. Real Gross Domestic Product is also observed to be positively skewed, while the Financial Development Index is negatively skewed.

Fig. 1 illustrates the relationship between economic growth, represented by Real Gross Domestic Product (RGDP), and financial development, measured by the Financial Development Index (FDI), from 1980 to 2023. Over this period, both indicators show an overall upward trend, but with distinct patterns and volatilities. RGDP demonstrates a consistent and steady increase throughout

Table 2
Descriptive statistics of the variables

Statistic	LOG_RGDP	LOG_FDI	LOG_GEXP	LOG_INV	LOG_ TRADE	LOG_OIL	LOG_LAB
Mean	31.111	−1.704	1.056	3.462	3.362	5.394	18.646
Median	30.896	−1.715	0.741	3.481	3.523	5.213	18.640
Maximum	31.909	−1.309	2.246	4.493	3.976	6.554	19.155
Minimum	30.417	−2.108	−0.093	2.702	2.212	4.382	18.135
Std. Dev.	0.524	0.185	0.780	0.507	0.496	0.659	0.307
Skewness	0.314	−0.219	0.211	0.099	−1.014	0.326	0.018
Kurtosis	1.547	2.565	1.556	2.139	3.003	1.841	1.791
Jarque–Bera	4.176	0.635	3.773	1.301	6.861	2.947	2.440
	[0.124]	[0.728]	[0.152]	[0.522]	[0.032]	[0.229]	[0.295]
Observations	43	43	43	43	43	43	43

Source: Developed by the author.

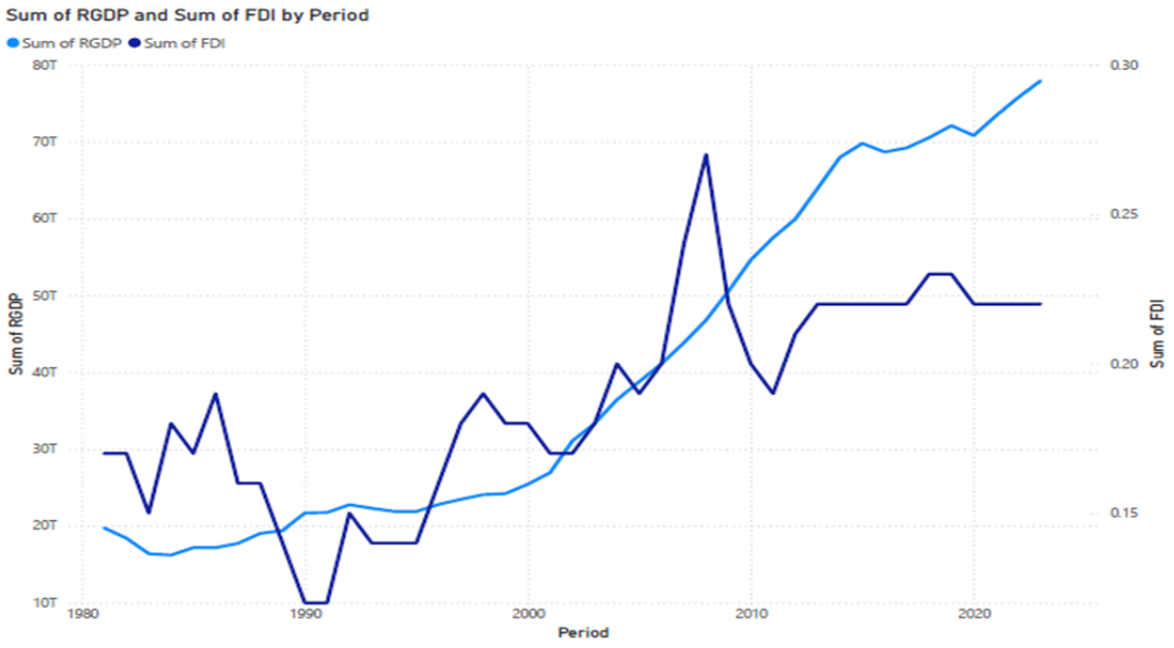

Fig. 1. **Trends in economic growth and financial development**

Source: Author's analysis using Power BI.

the timeframe, with the growth rate accelerating noticeably after 2000. This suggests a general improvement in economic output and living standards over time. The smooth, upward trajectory of RGDP indicates the relative stability of overall economic growth, even in the face of short-term fluctuations.

In contrast, the FDI exhibits significantly more volatility. It experienced several peaks and troughs, with a notable drop around 1990 and a sharp spike followed by a decline around 2008–2009, likely reflecting the global financial crisis. Despite these fluctuations, the FDI also shows a general upward trend, indicating long-term progress in finan-

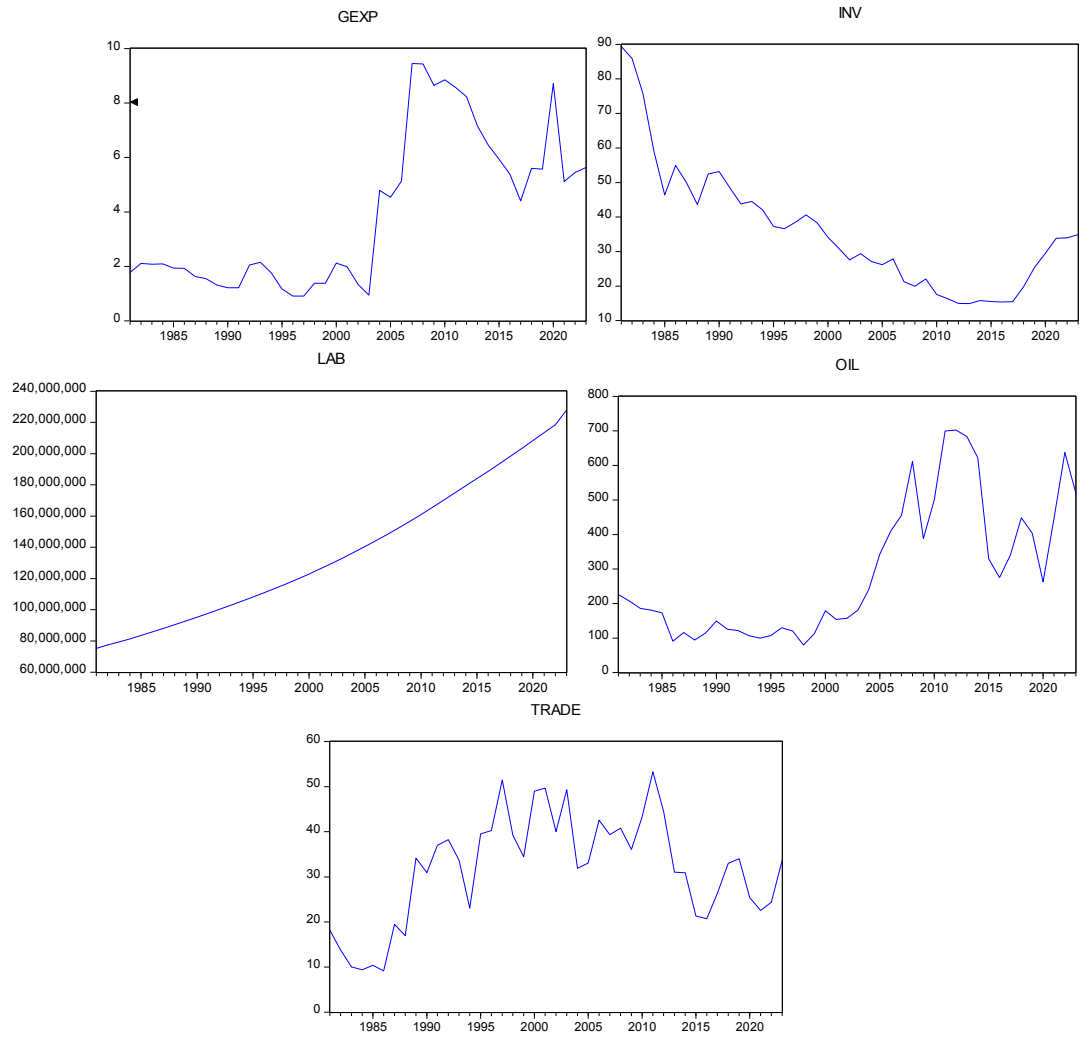

Fig. 2. **Trend analysis of all the variables**

Source: Developed by the author.

cial sector development. The divergence between RGDP and FDI trends, particularly during periods of financial stress, highlights the complex relationship between financial development and economic growth in Nigeria. While financial markets can experience rapid expansions and contractions, the broader economy tends to grow more steadily. This relationship underscores the importance of robust financial systems in supporting economic growth while also pointing to the potential risks of financial volatility on overall economic stability (*Fig. 2*).

4.2. Augmented Dickey-Fuller and Phillip-Perron test results

This section reports the probabilities of the null hypothesis, $H_0 : \rho_i = 0$ for all $i = 1,2,\ldots,6$ of the models specified in section 3.2.1, that is, at levels and when there is an intercept term. I also report the unit root results with and without trend and intercept at levels. I perform this at first difference also, and I carry out the non-parametric Philips-Perron (PP) test of unit root for robustness.

4.3. Autoregressive distributed lag model and bounds test

4.3.1. Cointegration analysis

Following the results from the unit root tests, I do not find any series integrated of order 2, that is I(2). All the variables are either stationary in their logged form or become stationary after differencing once. The ARDL model is, therefore, a suitable approach to modelling a scenario such as this where the series have mixed orders of integration.

Fig. 3 displays Akaike Information Criterion (AIC) values for the top 20 ARDL models, ranking them from best to worst fit. AIC values range from about –3.89 to –3.81, with lower values indicating

Table 3
Unit root test results

	LEVEL					
	Augmented Dickey-Fuller (ADF)			Phillip-Perron (PP)		
	Intercept	Trend & Intercept	None	Intercept	Trend & Intercept	None
LOG_RGDP	0.7301	0.7047	0.9993	0.9833	0.1301	0.9990
LOG_FDI	0.5764	0.1325	0.4276	0.6305	0.3830	0.2494
LOG_GEXP	0.7140	0.4853	0.6603	0.7140	0.4853	0.6973
LOG_INV	0.2042	0.9747	0.0626*	0.2224	0.9665	0.0846*
LOG_TRADE	0.3371	0.7865	0.5652	0.3586	0.8135	0.5776
LOG_OIL	0.6450	0.5285	0.6564	0.6249	0.4994	0.6619
LOG_LAB	0.9928	0.0060***	0.9943	0.9312	0.8069	0.9999
	FIRST DIFFERENCE					
LOG_RGDP	0.0066***	0.0473**	0.0243**	0.0066***	0.0473**	0.0104***
LOG_FDI	0.0004***	0.0031***	0.0000***	0.0000***	0.0000***	0.0000***
LOG_GEXP	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***
LOG_INV	0.0002***	0.0003***	0.0000***	0.0002***	0.0003***	0.0000***
LOG_TRADE	0.0000***	0.0238**	0.0000***	0.0000***	0.0000***	0.0000***
LOG_OIL	0.0005***	0.0036***	0.0000***	0.0000***	0.0004***	0.0000***
LOG_LAB	0.4071	0.7484	0.3017	0.0059***	0.0271**	0.2253

, ** and * represent 10%, 5% and 1% levels of significance, respectively.*

Source: Developed by the author.

better models. The best-fitting model is ARDL (1,0,0,0,1), suggesting a simple lag structure performs well. Top models generally favour simpler structures with many zero lags. The small differences in AIC values among leading models imply several may perform similarly well. This analysis aids in selecting the optimal ARDL model for time series forecasting.

Table 5 presents the results of an ARDL (Autoregressive Distributed Lag) bounds test for cointegration. ARDL (1, 0, 0, 0, 0, 1) indicates the lag structure of the ARDL model and 6.7867 is the calculated F-statistic for the bounds test. This suggests that the test found evidence of a long-run relationship between the variables. The table shows critical values for the bounds test at three significance levels. 1% lower bound (I0) which is 3.15 and upper bound (I1) is 4.43, 5% lower bound (I0) is 2.45, upper bound (I1) is 3.61 and 10% lower bound (I0) is 2.12, upper bound (I1) is 3.23 The F-statistic (6.7867) is higher than the upper bound at all significance levels, which supports the conclusion of cointegration. This means there is strong evidence for a long-run relationship between the variables in the model. Following this result, an error correction model is estimated and the results are presented in the next section.

4.3.2. Long-run and short-run results

Tables 6 and 7 above present the long-run and short-run results where the Error Correction Model (ECM) indicates that approximately 31.05% of any disequilibrium is corrected annually, suggesting a moderate speed of adjustment towards long-run equilibrium. In the short run, the labour force (LOG_LAB) emerges as the most significant driver of economic growth as a 1% increase in the labour force is associated with a substantial 16.77% increase

Table 4
Summary of the unit root test results

	Augmented Dickey-Fuller (ADF)			Phillip-Perron (PP)		
	Level	**First Difference**	**I(d)**	**Level**	**First Difference**	**I(d)**
LOG_RGDP	0.7047	0.0066***	I(1)	0.1301	0.0066***	I(1)
LOG_FDI	0.1325	0.0000***	I(1)	0.2494	0.0000***	I(1)
LOG_GEXP	0.4853	0.0000***	I(1)	0.4853	0.0000***	I(1)
LOG_INV	0.0626*	-	I(0)	0.0846*	-	I(0)
LOG_TRADE	0.3371	0.0000***	I(1)	0.3586	0.0000***	I(1)
LOG_OIL	0.5285	0.0000***	I(1)	0.4994	0.0000***	I(1)
LOG_LAB	0.0060***	-	I(0)	0.8069	0.0059***	I(1)

*, ** and *** represent 10%, 5% and 1% levels of significance, respectively.

Source: Developed by the author.

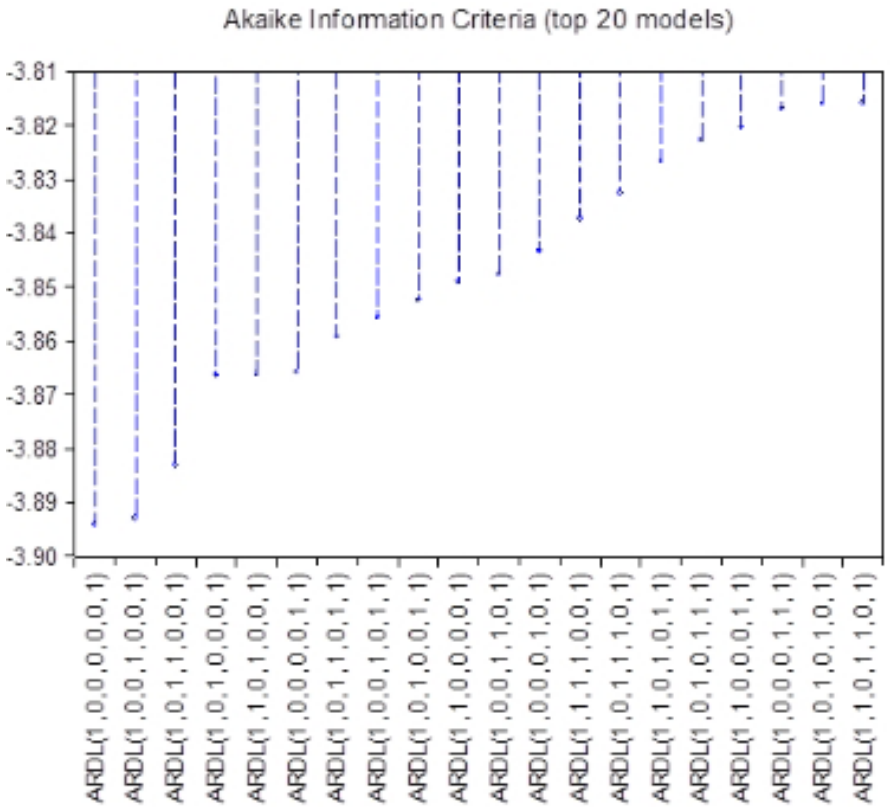

Fig. 3. **ARDL lag selection criteria (AIC)**

Source: Developed by the author.

in real GDP, highlighting the critical role of human capital in Nigeria's immediate economic expansion. Conversely, investment (LOG_INV) shows a slight negative impact, with a 1% increase in investment linked to a 0.0675% decrease in real GDP in the short term. The long-run analysis further emphasises the importance of labour as 1% increase in the labour force corresponds to a 1.48% increase in real GDP, indicating a strong positive relationship over time. However, investment continues to show a negative relationship, with a 1% increase in investment related to a 0.2175% decrease in real GDP in the long run.

Table 5
ARDL-bounds test result

Model		F-statistic	Result
ARDL(1, 0, 0, 0, 0, 0, 1)		6.7867	Cointegration
	1%	5%	10%
I0 Bound	3.15	2.45	2.12
I1 Bound	4.43	3.61	3.23

Source: Developed by the author.

Table 6
Error Correction Model [probability values of the coefficients]

	ΔLOG_RGDP (Dependent Variable)
ECT(−1)	−0.3105***
	[0.0004]
ΔLOG_FDI	−0.0653
	[0.2690]
ΔLOG_GEXP	−0.0008
	[0.9635]
ΔLOG_INV	−0.0675**
	[0.0386]
ΔLOG_TRADE	−0.0159
	[0.4054]
ΔLOG_OIL	0.0296
	[0.2119]
ΔLOG_LAB	16.7724**
	[0.0302]

*, ** and *** represent 10%, 5% and 1% levels of significance, respectively.

Source: Developed by the author.

Table 7
Long-run form [probability values of the coefficients]

	LOG_RGDP (Dependent Variable)
Constant	2.2536
	[0.6054]
LOG_FDI	−0.2101
	[0.2286]
LOG_GEXP	−0.0026
	[0.9636]
LOG_INV	−0.2175*
	[0.0787]
LOG_TRADE	−0.0511
	[0.3501]
LOG_OIL	0.0954
	[0.1605]
LOG_LAB	1.4803***
	[0.0000]

*, ** and *** represent 10%, 5% and 1% levels of significance, respectively.

Source: Developed by the author.

The financial development index (LOG_FDI) does not demonstrate statistically significant impacts in either the short or long run. In the short term, a 1% increase in the financial development index is associated with a 0.0653% decrease in real GDP, while in the long run; it corresponds to a 0.2101% decrease. However, these results are not statistically significant, challenging the expected positive relationship between financial development and economic growth in Nigeria. Other variables show minimal or statistically insignificant impacts. Government expenditure (LOG_GEXP) has a negligible effect, with a 1% increase associated with a 0.0008% decrease in real GDP in the short run and a 0.0026% decrease in the long run. Trade (LOG_TRADE) shows a slight negative relationship, with a 1% increase linked to a 0.0159% decrease in the short run and a 0.0511% decrease in the long run. Oil prices (LOG_OIL) demonstrate a small positive relationship, with a 1% increase corresponding to a 0.0296% increase in real GDP in the short run and a 0.0954% increase in the long run.

The absence of a statistically significant relationship between the financial development index and economic growth calls for some clarification. Although the IMF's financial development index is comprehensive, it may not precisely reflect the workable dynamics of the country's financial sector. The dual nature of Nigeria's financial system, with its formal financial institutions and a substantial array of informal financial mechanisms on the other hand, may not be adequately reflected in the index. In addition, the measurement may be more quantitative rather than qualitative factors such as institutional quality, financial innovation, or effectiveness of financial intermediation in specific sectors. Moreover, standard international financial development indicators might not be enough to capture Nigeria's specific economic structures, and regulatory environments that are highly complex with economic informality, which is very high. This puts the lack of statistical significance of the relationship into perspective such that its absence does not necessarily rule out the potential importance of financial sector development. Instead, it realigns thought towards more context-specific financial development measures that capture the distinct elements of Nigeria's economic characteristics.

4.4. Discussion

Comparative economic literature and empirical studies of similar developing economies provide considerable support for the significance of the labour force as one of the critical drivers of economic growth in Nigeria. According to Matashu and Skhephe [35], in their study on sub-Saharan African economies, human capital, predominantly represented by the labour force, accounted for a larger percentage of the economic growth variations observed in resource-dependent economies that have inherited comparable structures similar to Nigeria. Labour force expansion has proven to be a more reliable growth mechanism compared to financial sector interventions where predominant economies are characterised by large informal sectors and include an agricultural and service-oriented economic structure. Comparing the economies in West Africa with similar resource-rich developing nations, they find a consistent pattern. Countries such as Ghana, Côte d'Ivoire and Senegal have had similar economic trajectories, with economic expansion directly linked to labour force growth.

In support of this study, Yakubu and Akanegbu [36] study specifically on Nigeria observes that a 1% increase in the country's labour force participation increases the country's GDP. This pattern can be attributed to several structural factors prevalent in the economy with young demographic profiles, growing urbanisation, high educational attainment, and economic diversification attempts. Endogenous growth models, especially those provided by Lucas Jr. [37] and Romer [38] with human capital as a key stimulus to economic development, provide the theoretical underpinnings to the relationship identified in this study. When evaluating Nigeria, where traditional economic growth mechanisms including financial intermediation have not been showing enough efficacy, the labour force becomes much more energetic and responsive than previously envisioned. This result corroborates the structural transformation theories proposed by Arthur Lewis and subsequent development economists.

These research outcomes resonate with and challenge recent research on financial development in emerging economies. For instance, Appiah and Li [39] in their comprehensive study of financial development and economic growth in the Economic Community of West African States (ECOWAS) economies observe that the financial systems and economic growth relationship are not general but rather contingent on institutional quality and structural characteristics of the economy. These findings support the notion that financial development's effect is heterogeneous in the Nigerian context. Recent studies also align with the observation of the labour force as the primary cause of economic expansion in this study. According to Keji [40], human capital, more than anything else, is a more reliable driver of economic growth in developing economies, especially in resource-dependent nations, such as Nigeria. The strong positive relationship between the labour force and economic growth in either the short or long run highlights human capital development as a key part of future economic growth strategy.

The modest negative impact of investment supports recent critiques of conventional investment growth models. According to Mohamed Sghaier [41], since the institutional framework of an economy may be weak, more investment will not automati-

cally result in economic growth since resources are not used efficiently and inefficiencies and misallocations may occur. The counter-intuition investment growth relationship observed in this study analysis fits well with this perspective. The financial development index perspective does not mean that the supply-leading hypothesis offered by Patrick [12] and his successors in financial development theories has statistical significance. This study finding implies that the financial sector in Nigeria is likely not sophisticated or yet responsive enough to spur economic growth in the country. Similarly, Yusifzada and Mammadova [42] also revealed that the effectiveness of financial development depends upon the depth of financial intermediation, which may be inadequate in the Nigerian setting.

Additionally, the results confirm that government expenditure and trade openness have negligible effects as can be expected from complex macroeconomic settings in Nigeria. As corroborated by Awoa and Efogo [43], contexts of oil dependency economies often result in a non-linear and context-specific relationship of traditional growth determinants and these findings hence support the notion of the complex effects. The study's methodology of employing ARDL with bounds testing provides a robust approach to understanding these dynamic relationships. A broad examination that extends beyond the traditional static models, the study captures both short-run and long-run dynamics to provide insights into the temporal complexity of financial development and economic growth interactions.

Even though the variables fail to have any direct financial development impact, the result suggests an intriguing theoretical puzzle of why long-run cointegration exists between the variables. As Khan and Khan [44] discussed, the finance–growth relationship must be evaluated considering the transformation and institutional quality as mediating factors. The persistent disconnect between financial development and economic growth suggests potential structural inefficiency in the financial system such as insufficiency of credit to small and medium enterprises, excessive intermediation cost, or regulatory constraints that limit the instrumentality of capital allocation.

4.5. Limitations of the study

The study uses an aggregate Financial Development Index; while this is helpful for major studies, it conceals the influences of some components of the financial sector on economic growth. The composite nature of the index can obscure the sector-specific dynamics that would provide a more granular view of the finance growth relationship in Nigeria. This limitation does not diminish the contribution of the study but rather reveals the difficulty of studying financial development and economic growth in a developing economy. Moreover, they offer invaluable directions for future research that prompts further investigations into the finance-growth nexus in Nigeria and other emerging economies.

5. Conclusion

This research focused on the nexus between financial development and economic growth in Nigeria over the time frame of 1981 to 2023, employing time series data. The work aimed to analyse the relationship between financial development and economic growth. For this purpose, the augmented Dickey-Fully ADF and Philips-Perron (PP) were employed to test the stationarity characteristics of the variables, whereby ARDL was used to determine the long-run and short-run association between the dependent and the independent variables in the model. For the co-integration analysis of the variables, the Bounds test applied to the ARDL model was used. Furthermore, there is significant evidence of mean reversion in the model that includes the 31% ARDL-ECM adjustment rate because of the presence of the negative sign of the symbol and the absolute value of the coefficient of the error correction term.

The results reveal a convoluted interaction between financial development and economic growth in Nigeria. While long-run cointegration exists between these variables, indicating a stable long-term relationship, the nature of this relationship is not straightforward. The financial development index did not demonstrate statistically significant impacts on economic growth in either the short or long run. This challenges the conventional wisdom regarding the positive relationship between financial development and economic growth, at least in the Nigerian context. It raises important questions about the structure and functioning of Nigeria's financial sector and its ability to support real economic growth.

Government expenditures, trade, and oil prices showed statistically insignificant impacts on

economic growth, further emphasising the complexity of Nigeria's economic dynamics. These findings collectively suggest that while there is a long-run relationship between financial development and economic growth in Nigeria, the mechanisms through which this relationship operates may be more subtle than previously thought.

Policy recommendations

Following the findings presented in this study, the following policy recommendations are therefore provided.

Despite the lack of a significant positive impact from financial development in this study, continued efforts to reform and strengthen the financial sector remain important. This could include measures to enhance financial inclusion, diversify financial products and services, and strengthen regulatory frameworks to ensure stability and efficiency in the financial system.

Fiscal policy reforms should aim to enhance the impact of government expenditure on economic growth. This might include improving the efficiency of public spending, prioritising infrastructure and social services investments, and implementing tax reforms to increase revenue and reduce oil dependence.

Efforts should be made to improve the quality and efficiency of investments. This could involve implementing stricter project evaluation criteria, providing incentives for productive private sector investments, and enhancing transparency in investment processes. The goal should be to transform the currently negative relationship between investment and growth into a positive, productive one.

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