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The Relationship Between Financial Development and Economic Growth: A Case of South Africa

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Abstract

This study's focus is on the analysis of South Africa's finance-growth nexus. To contribute to the essential discussion that may prompt consideration of the financial sector reform agenda that fosters growth, this topic is being researched during this challenging economic period of slow real economic growth in South Africa, with 1.8% and 29.81% of GDP growth and unemployment rate, respectively in 2022. This study analyses the South African time series utilizing annual data from 1980 to 2018 to determine whether South Africa has a unique or distinctive finance-growth nexus. To capture the multidimensional phenomenon of financial systems, we employed the recently developed broad measure of financial development offered by the International Monetary Fund. We examined the long-run and short-run relationships between financial development and economic growth using the Autoregressive Distributed Lag (ARDL) technique which has many advantages over cointegration tests. Furthermore, this study reveals evidence of a mixed finance-growth casual association supporting the feedback hypothesis, sensitive to explanatory variables used as indicators of financial development, however, it does not find a relationship between financial development and economic growth in South Africa. Overall, we find that financial development and economic growth progress independently is particularly important for South African policymakers considering that the assertion by the companies that grow at levels that cannot be funded by internal funding is associated favourably with the development of the financial system and the securities markets. Therefore, we recommend that policymakers deploy strategies that shape the development of financial institutions and financial markets in a direction that affects firms' access to external finance to directly contribute to economic growth. We recommend the formulation of policies that support both financial institutions-based development and financial markets-based financial development, such as policies that allow for increased retail participation in the financial market.

Keywords: Financial Development, Economic Growth, South Africa(Adams, 2015)

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1. Introduction

The finance growth nexus has been subject to considerable debate in the development and growth literature. This study contributes to this debate by focusing on South Africa's finance-growth nexus. This debate is particularly essential for South Africa, considering the challenges of persistent inequality, a growing unemployment rate, and a country that is unable to promote self-employment

and growth of micro and small enterprises. Progressively, various studies on finance growth have revealed differing viewpoints. For instance, Goldsmith (1959) appreciated the role of financial development in stimulating growth where a country's course of economic development and the pace of the growth is influenced by differences in the financial organization and customs of that country. This argument is supported by some recent finance researchers Demirguc-Kunt and Maksimovic (2002); Godspower-Akpomiemie and Ojah (2017) and Rapapali and Simbanegavi (2020), including World Bank report [1], which stipulates that financial development contributes meaningfully to economic activities, is crucial to alleviating poverty, and is connected to immersive increases in income distribution. This argument is also supported by Anayiotos and Toroyan (2009); Arcand, Berkes, and Panizza (2015); King and Levine (1993); Ohiomu and Oligbi (2020) and Goldsmith (1969); who provided evidence of a positive correlation between the size of the financial system and long-run economic growth.

Some literature overlooked the role of financial development in stimulating the economic growth rate; for instance, some works claimed that financial markets are less significant and over-stressed (Levine, 1997; Lucas Jr, 1988; Meier & Seers, 1984). Cross-country studies presented a rather opposing view that the direction of the relationship could be bi-directional and differs from country to country. The differences can be attributed to institutional characteristics, policies, and differences in the implementation (Aghion & Howitt, 2009; Demetriades & Hussein, 1996; Ndlovu, 2013). Arcand et al. (2015) and Cecchetti and Kharroubi (2015); argue that there is a threshold beyond which financial development has a weakening effect on growth and found that credit booms increase the promulgation and amplification of shocks that harm innovation-driven sectors (Bist, 2018; Peia & Roszbach, 2015; Swamy & Dharani, 2019). Cecchetti and Kharroubi (2012) added that the financial sector competes with the rest of the economy for scarce capital stock, therefore, financial booms are not, in general, growth-enhancing. This threshold effect is dismissed by the International Monetary Fund as not being relevant for sub-Saharan Africa (Mlachila, Jidoud, Newiak, Radzewicz-Bak, & Takebe, 2016). Opoku, Ibrahim, and Sare (2019) suggest that financial development and economic growth evolve independently and caution against making general suppositions about the causal relationship between financial development and economic growth. While others established that causality between financial development and economic growth depends on the choice of measure of financial development (Odhiambo, 2008; Ohiomu & Oligbi, 2020).

Conventional understanding suggests that better-developed financial systems are good not just for rapid economic growth but likely to address issues of poverty and inequality (Ojah & Kodongo, 2015; Silva, Tabak, & Laiz, 2021; Wu, Huang, Chang, Chiou, & Hsueh, 2020). This understanding is shared by Demirguc-Kunt and Maksimovic (2002) and Nguyen, Thai-Thuong Le, Ho, Nguyen, and Vo (2022) whose assertion suggests that enterprise activities for developing countries are supported by well-functioning financial institutions and securities markets becoming more effective in later stages of development. It is, for this reason, this research aims to investigate the postulated link between financial development and economic growth in South Africa. Although there are many studies on the subject, there is little coverage of sub-Saharan African countries. Even so, the previous studies have relied mainly on cross-sectional data, thus failing to address country-specific issues. This study uses country-specific data to investigate the relationship between financial development and economic growth in South Africa. Looking at this topic during this tough economic period (of slow real economic growth of 1.8% in 2022 and 29.81% of unemployment in the same year), this study seeks to add to the critical debate that may inform policymakers and interested stakeholders on the consideration that needs to be made on the quality of financial development and critically assess if this development enables meaningful economic activities. Furthermore, for a country that seeks inclusive growth, this study anticipates that its findings will be beneficial for the growth agenda. Lastly, we use the recently developed broad measure of financial development which captures several

1. https://www.worldbank.org/en/publication/gfdr/gfdr-2016/background/financial-development

multidimensional aspects of the financial system.

The remainder of the paper is ordered as follows: Section two reviews the literature, while section three details the methodology deployed in this study. The presentation of the data analysis along with findings is the focus of section four of this report. Section five concludes the study and provides recommendations and suggestions for future studies.

2. Literature review

Theoretical relations on finance growth can be traced as far back as 1911 when Schumpeterian contribution established that innovation promotes economic growth. This is the case as Ojah and Kodongo (2015) emphasize the financial system's economic importance as an industry that can facilitate the much-needed outside investment for this innovation, which will ultimately result in increased output and jobs. Wu et al. (2020) argue that an efficient and robust financial system that directs resources to be used most creatively and encourages them to be distributed more effectively is the major driver of growth. This point of view is supported by Fagiolo, Giachini, and Roventini (2019) and (Meierrieks, 2014) who found that banks' loan provision fosters technological innovation and diffusion, which improves long-run economic growth. Other studies further highlighted the role of financial institutions in stimulating innovation, determining and supporting productive investments that encourage future growth (Mollaahmetoğlu & Yasar Akcali, 2019). See also McKinnon (1973), and Shaw (1973) on their popular "McKinnon-Shaw" hypothesis as cited by Adeniyi and Egwaikhide (2013). Also emphasized that an efficient financial system with increased financial instruments and product diversity is attributed to new technologies and entrepreneurs. The widespread use of financial instruments, channels, and efficient allocation of resources triggers investments and the realization of economic growth and an increase in productivity in the real sector. Guru and Yadav (2019) put forward that, increasing financial access implants dynamic effectiveness in the system by bringing about structural change through innovation and welfare gain to the entire economy.

While a growing body of work is reflective of the positive impact of financial development on economic growth, alternate views exist that controvert this assertion. Robison (1952) as cited in Choong and Chan (2011); Levine (1997) asserts that finance develops as a result of growing economies. Cecchetti and Kharroubi (2012) argue, "Too Much" finance has a diminishing effect on economic growth. Nyasha and Odhiambo (2018) added that extreme caution should be applied while arguing for/against the relationship between financial development and economic growth.

Early literature on financial development and economic growth shows diverse channels of transmission and association between financial development and growth, but all in harmony that there is a significant and positive relationship between these two variables. Goldsmith (1959), focused on the relationship between financial development and the efficiency of investment. While McKinnon (1973) and Shaw (1973) demonstrate the importance of financial liberalization in promoting domestic savings and hence investment. Through this work, we have been able to point to evidence supporting the view that financial development is good for growth.

a. Theories on financial development and economic growth

The financial development and economic growth nexus is acknowledged to be highly complex; and depends on multiple factors, namely: country-specific conditions, the empirical model used, the proxy used to capture the level of financial development; and the data-analysis method used (Nguyen et al., 2022; Nyasha & Odhiambo, 2018; Paun, Musetescu, Topan, & Danuletiu, 2019). The issue of whether more finance implies more growth, however, has not been settled yet.

In the literature, there are three hypotheses of causality associations explored connecting financial development and economic growth that are worth exploring. These hypotheses have been adopted by some economic researchers Guru and Yadav (2019); Levine (1997); Kolapo, Oke, and Olaniyan (2018); Ndlovu (2013); Odhiambo (2010); Ojah and Kodongo (2015) and (Puryan, 2017), amongst

others. Firstly, the Supply-leading hypothesis. Secondly, the Demand-leading. Thirdly, the feedback hypothesis suggests a mutual influence between financial development and real sectors of the economy (Nyasha & Odhiambo, 2018).

A section of the literature that supports the supply-leading hypothesis, argues that financial development is a requirement for economic growth. Implying that the real economy won't be able to significantly expand without access to certain financial services and tasks carried out by a more open financial sector inside an appropriate institutional system. The financial system influence is expected to come from different channels as highlighted by Schumpeter in Meierrieks (2014); Khan and Senhadji (2000) and Levine (1997), who then differentiated them into five conduits whose general use can inspire economic growth (Mollaahmetoğlu & Yasar Akcali, 2019). These channels help in(i) risk pooling and diversification; (ii) information production and the allocation of capital; (iii) agency problems alleviation; (iv) the mobilization of savings; and (v) easing trade. Puryan (2017), states that this hypothesis' proponents recommend that government policies be focused on strengthening the financial system since efficient financial systems have a significant impact on economic growth and that the relationship between financial development and economic growth is therefore causative. King and Levine (1993) established an endogenous growth model with links to entrepreneurship, finance, and economic, and economic growth. They discovered evidence in support of the central proposition of their model: improved financial institutions encourage quicker productivity growth and growth in per capita output by directing society's resources to attractive productivity-enhancing projects. Guru and Yadav (2019) looked at the emerging economies (BRICS) for the period 1993 to 2019 and discovered a significant and favourable correlation between financial development and the expansion of some economies. Additionally, the parallel growth of bank and stock market operations is essential to the process of an economy's expansion, and their investigation concluded that financial development is the primary driver of economic growth. Other studies also found that a robust and efficient financial system that directs resources to be used most creatively and encourages them to be distributed more effectively is the major driver of growth (Wu et al., 2020).

The other strand of literature (demand-leading hypothesis) contends that the financial sector couldn't exist if there wasn't an actual economic sector that needed specific forms of financial goods and services. Odhiambo (2010), looking at South Africa found that overall, economic expansion has a significant impact on the development of the financial sector. This implies that policymakers must focus on the pro-economic growth policies as they would be positive to financial development. Peia and Roszbach (2015) looking at 22 advanced economies, found that stock market development tends to cause economic development, while a reverse causality is mostly present between the banking sector development and output growth. Bist (2018) used data from 16 African and non-African low-income countries and found unidirectional causality from economic growth to financial development in the short run, supporting demand following analysis.

Lastly, the Feedback hypothesis argues that neither process has a strong or consistent causal relationship with the other. Nguyen et al. (2022) looking at emerging markets found that financial development and economic growth could not be separated, implying that policies pro-financial development are supportive of economic growth.

In seeking to understand the finance growth relationship, we also explore economic growth theories that highlight the beneficial effect of finance on economic progress. This study considered; the neoclassical growth model which emphasizes the role of capital accumulation (Aghion & Howitt, 2009; Van, 2020). It assumes growth is acquired by: (i) a production function that expresses the current flow of output as a function of the current stock of capital and labour, (ii) a law of motion that shows how capital accumulation depends on investment and capital depreciation. Paun et al. (2019) opined that capital is an important production factor. Secondly, we considered the endogenous growth model which emphasizes that economic growth is an endogenous outcome of an economic system, not the result of exogenous elements. The endogenous growth theory proposes channels

(capital growth and productivity growth channels) through which the rate of technological progress, and hence the long-run rate of economic growth, can be influenced by economic factors. The endogenous growth models assume that the level of investment and productivity growth are the channels of transmission from financial intermediation to economic growth (Mohieldin, Hussein, & Rostom, 2019; Romer, 1990).

b. South African Economic background

According to the South African Banks Registrar [2], South Africa has 62 banks registered, 12 being foreign branches, 29 foreign representatives, 4 foreign-controlled banks, 14 locally controlled banks, and 3 mutual banks. The Banking Association of South Africa [3] reports that the banking industry assets are dominated by the five largest banks accounting for 90% of the share, a sector much-admired for being advanced and robust, furthermore, a sector that contributes 20% to the gross domestic product of the country. The South African capital market is vigorous, liquid, and relatively well-developed compared to its African counterparts (Odhiambo, 2010). South Africa has three exchanges; the Johannesburg Stock Exchange (JSE) is the largest and oldest with a history dating back to 1887, the second exchange (A2X) was established in 2014, primarily positioning itself as an alternative secondary market, has 94 listed instruments making up R 6.6 trillion market capitalization [4] lastly, the third exchange (ZARX) was granted full stock exchange license in 2016.

Since transitioning to democracy, the South African democratic government has made considerable strides toward improving the well-being of its citizens, however, progress is slowing down with real GDP showing a sluggish performance and growing inequality between 2009 and 2018. The real GDP in 2010 recovered strongly to 3.0% from -1.5% in 2009. Although in 2011 there was a slight increase to 3.3% of real GDP, the country could not maintain this growth as noted in the decline to 2.2% in 2012. Real GDP recovered to 2.5% in 2013 but later declined in 2014 to 1.8% and further declined in 2015 and 2016 to 1.2% and 0.4% respectively. It, however, recovered in 2017 to 1.4% but that recovery was followed by declines in 2018 and 2019 to 0.8% and 0.2% respectively. 2020 showed a rebound to 1.1% which was followed by 1.4% and 1.8% growth in 2021 and 2022 respectively [5].

Despite being an economic hub for Southern African countries, home to a developed financial system, South Africa continues to experience sluggish and volatile economic growth, sometimes at the brink of recession. An interesting paradox as the financial sector has increased in modernization and sophistication, the economic performance continues to stutter adding to the ambiguity on the nature of the relationship between financial development and economic growth.

3. Methodology and Data

a. Research Design

The objective of this study is to examine the link between financial development and economic growth using country-specific time series data. Previous studies relating to this topic deployed quantitative research design (Amusa, 2014; Mohieldin et al., 2019; Nyasha, Gwenhure, & Odhiambo, 2016; Nyasha & Odhiambo, 2019). Following similar studies on this topic (Muyambiri & Odhiambo, 2018; Ndlovu, 2013; Nyasha & Odhiambo, 2015, 2019; Ohiomu & Oligbi, 2020) amongst others, this study adopts time series modeling techniques for a single country to avoid losing or interacting with individual country-specific characteristics. Therefore, the focus is only on South Africa, using annual time series data covering the period from 1980 to 2018. Between 2019 and 2021 experienced the advent of Covid-19, was a catastrophic period not only for South Africa but for the rest of the

2. www.resbank.co.za/en/home/what-we-do/Prudentialregulation/sa-registered-banks-and-representative-offices
3. www.banking.org.za/wp-content/uploads/2023/01/Lessons-from-the-Covid-19-Pandemic-in-South-Africa.pdf
4. https://www.a2x.co.za/market-data/
5. stats.oecd.org/Index.aspx?datasetcode=SNA$_{TABLE1_{ARCHIVE}}$

world. This period was extraordinary, curfew along with level 5 lockdown was introduced and led to the real economy coming to a standstill. These actions had undesired consequences for the economy and economic well-being of the citizens and companies. Financial sector customers (both corporate and individuals) were mostly unable to service their financial commitments. This study excludes the 2019 -2020 periods as this was not 'normal' thus opening an opportunity for misinterpretation of the results of this study. All data used in this study is secondary and obtained from reputable sources.

i. Variable Description

Table 1. Summary of Variables, Symbols, and Sources

Variable	Symbol	Comment
Dependent Variable		
Economic Growth	RGDP	Economic growth is a macroeconomic variable measured by gross domestic product (GDP). The growth rate of real GDP (RGDP) is often used as an indicator of the economy's general health (Nyasha et al., 2016). Thus, an increase in real GDP is generally interpreted as an indication that the economy is doing well. The annual growth rates of real gross domestic product (RGDP) were obtained from the OECD stat dataset (https://stats.oecd.org)
Independent Variables		
Financial institutions variables		Čihák, Demirgüč-Kunt, Feyen, and Levine (2013) express discomfort that there are
Financial Institutions Access Index	FIA	shortcomings concerning measures of financial development. To address these
Financial Institutions Depth Index	FID	shortcomings this study used the new dataset on financial development indexes
Financial Institutions Efficiency Index	FIE	introduced by Svirydzenka (2016) obtained from the IMF dataset (https://data.imf.org).
Financial markets variables		
Financial Markets Access Index	FMA	
Financial Markets Depth Index	FMD	
Financial Markets Efficiency Index	FME	Svirydzenka argues that the use of these sub-indices and the final index allows for a comprehensive assessment of a particular feature of financial systems and the overall level of financial development.
Government Spending	GS	Economic growth is influenced by multiple factors. Government spending is added as a control variable and data is obtained from Refiniv.

Based on the variable description above, the model takes the following general form:

$$RGDP = \int(FIE, FID, FIAFME, FMD, FMA, GS) \tag{1}$$

The dependent and independent variables are defined in Table 1. This gives us the empirical model for estimation:

$$RGDP = \beta_0 + \beta_1 FIE_t + \beta_2 FID_t + \beta_3 FIA_t + \beta_4 FME_t + \beta_5 FMD_t + \beta_6 FMA_t + \beta_7 GS + \varepsilon_t \tag{2}$$

Dependent and independent variables are as defined in equation 1 and Table 1 , while β_0 is the constant and ($\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6$ and β_7) are respective coefficients.

$$\begin{aligned} \Delta RGDP_t = \beta_0 &+ \sum_{t=1}^{n} \beta_1 \Delta RGDP_{t-i} + \sum_{i=0}^{n} \beta_2 \Delta FIE_{t-i} + \sum_{i=0}^{n} \beta_3 \Delta FID_{t-i} + \sum_{i=0}^{n} \beta_4 \Delta FIA_{t-i} \\ &+ \sum_{i=0}^{n} \beta_5 \Delta FME_{t-i} + \sum_{i=0}^{n} \beta_6 \Delta FMD_{t-i} + \sum_{i=0}^{n} \beta_7 \Delta FMA_{t-i} + \sum_{i=0}^{n} \beta_8 \Delta GS_{t-i} + \\ &+ \delta_1 RGDP_{t-i} + \delta_2 FIE_{t-i} + \delta_3 FID_{t-i} + \delta_4 FIA_{t-i} \delta_5 FME_{t-i} + \delta_6 FMD_{t-i} \\ &+ \delta_7 FMA_{t-i} + \delta_8 GS_{t-i} + \varepsilon_t \end{aligned} \tag{3}$$

Equation 4 is for Error-correction Model.

$$\begin{aligned}\Delta RGDP_t = \beta_0 &+ \sum_{t=1}^{n} \beta_1 \Delta RGDP_{t-i} + \sum_{i=0}^{n} \beta_2 \Delta FIA_{t-i} + \sum_{i=0}^{n} \beta_3 \Delta FIA_{t-i} + \sum_{i=0}^{n} \beta_4 \Delta FID_{t-i} \\ &+ \sum_{i=0}^{n} \beta_5 \Delta FME_{t-i} + \sum_{i=0}^{n} \beta_6 \Delta FMA_{t-i} + \sum_{i=0}^{n} \beta_7 \Delta FMD_{t-i} + \sum_{i=0}^{n} \beta_8 \Delta GS_{t-i} + \\ &+ \varphi_1 ECM_{t-1} + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots (4)\end{aligned} \tag{4}$$

b. Data Analysis

Shrestha and Bhatta (2018) assert that applying the fitting methodology for the time series data is the most crucial part of the time series analysis, as the wrong specification of the model or using the wrong method provides biased and unreliable estimates. They also posit that, primarily, the method of selection for the time series examination is based on the unit root test results which determine the stationarity of the variables. This is because methods commonly used to examine time series data cannot be used to analyze nonstationary series.

As the starting point, descriptive statistics, including a unit root test was carried out, for arguments of the essence of preliminary analysis, especially the unit root and its methods, see Brooks (2014); Kargbo (2012); Mohieldin et al. (2019). Though unit root testing was not a requirement for the adopted approach, it was performed to ensure that none of the variables used in this study were found to be integrated more than I(1).

After finding that none of the variables were integrated more than I(1), this study proceeded with the ARDL approach through a step-by-step process. (i) the optimal lag was determined by taking the smallest information criterion as it performs better (Brooks, 2014; Nkoro & Uko, 2016). (ii) Conducted Bounds test for cointegration (see equation 3.2), to determine the existence of the long-run relationship of the variables used. The cointegration hypothesis was tested using f-statistics against the Narayan (2005) critical values. (iii) ARDL reparameterization for error correction model to get the long and short-run information. One important result of interest of this reparameterized model was the coefficient value along with t-statistics being statistically significant. The ARDL model for equation (3.3) and its reparameterized equation for equation (3.4) was put through diagnostic and stability testing, which all confirmed models to be stable and whose results can be interpreted. The results from running equation (3.3) and equation (3.4) were interpreted to infer the long-run and short-run causality of the variables. Also, run the pairwise Granger test to confirm the inferred results.

4. Analysis and results

a. Descriptive analysis

Table 2. Summary Statistics

	RGDP	FIE	FID	FIA	FME	FMD	FMA	GS
Mean	2.280	0.614	0.722	0.218	0.221	0.466	0.178	3.807
Median	2.485	0.606	0.686	0.171	0.234	0.465	0.177	2.290
Maximum	6.621	0.779	0.877	0.423	0.518	0.789	0.432	44.49
Minimum	-2.137	0.499	0.596	0.112	0.041	0.177	0.027	-6.010
Std. Dev.	2.262	0.056	0.095	0.106	0.152	0.189	0.115	7.235

Source: Author's Analysis based on data described in section 3 of this report Note: Descriptive statistics are calculated on all available annual data for the 1980–2018 period

Table 2 reveals that the variables are not highly deviated from the mean, with a standard deviation of less than 1, apart from the real GDP (RGDP) which recorded a standard deviation of 2.3, and 7.235 for GS. The highest and lowest level of the data is also relatively not dispersed, which indicates no presence of outliers, except for the RGDP with the highest and lowest level of 6.62 and -2.14, GS 44.49 and -6.010 respectively.

b. Correlation Analysis of Data

Table 3. Correlations

Probability	RGDP	FIA	FID	FIE	FMA	FMD	FME	GS
RGDP	1.0000							
	—-							
FIA	-0.1169	1.0000						
	0.4785	—-						
FID	0.0222	0.9282	1.0000					
	0.8933	0.0000	—-					
FIE	0.1963	0.6357	0.8049	1.0000				
	0.2311	0.0000	0.0000	—-				
FMA	0.1105	0.4922	0.6162	0.5384	1.0000			
	0.5032	0.0015	0.0000	0.0004	—-			
FMD	0.0538	0.8702	0.9508	0.7637	0.7223	1.0000		
	0.7448	0.0000	0.0000	0.0000	0.0000	—-		
FME	0.1416	0.7147	0.7963	0.6827	0.7315	0.9150	1.0000	
	0.3900	0.0000	0.0000	0.0000	0.0000	0.0000	—–	
GS	0.0503	-0.1755	-0.1715	-0.1060	-0.2009	-0.1974	-0.1906	1.0000
	0.7611	0.2852	0.2966	0.5206	0.2200	0.2285	0.2451	—-

Note: Correlations are computed on all available annual data for the 1980–2018 period. Note: p-values are reported below the values of the correlation

From Table 3, all indexes of financial markets development and financial institutions development are positively correlated with economic growth, except for financial institutions access (FIA). Similarly, indexes of financial institutions' development and financial market development are positively correlated with each other. Suggesting that financial development involves both larger banks and larger markets (Demirgüç-Kunt, Feyen, & Levine, 2012). GS is showing a low negative correlation with all variables of financial development and is positively correlated with RGDP. The high correlation raises concerns of multicollinearity, a concern that Adebayo, Udemba, Ahmed, and Kirikkaleli (2021) and Njumwa, Saina, and Serem (2022) argue is resolved by choosing the appropriate optimal lag period for the ARDL models.

c. Unit Root Tests

While ARDL modelling does not require pre-testing of variables and is deemed ideal to work with variables whose stationary is questioned, it is, however, significant to conduct the unit root test, to ascertain that none of the regressors is integrated of order more than I(1). Therefore, we used the Augmented Dickey-Fuller (ADF), Phillips-Perron test (PP), Kwiatkowsky, Phillips, Schmidt, and Shin test (KPSS) to confirm that variables under discussion were at most integrated of order 1 (Brooks, 2014, p. 381). The results in Tables 4 to 6 confirm the order of integration of less than or equal to 1, confirming that the ARDL bounds test is an appropriate estimation technique.

d. The ARDL Estimations

Table 4. ADF Unit root test results

	Augmented Dickey-Fuller				
	Level		1st Differen		
Variables	Constant	Trend and Intercept	Constant	Trend and Intercept	Decision
	-4.441374	-4.456644	-7.298767	-7.205859	
RGDP	(0.0011)***	(0.0055)***	(0.0000)***	(0.0000)***	I(0)
	-0.018963	-1.802868	-3.791499	-3.915594	
FIA	(0.9507)	(0.6830)	(0.0064)***	(0.0212)***	I(1)
	0.758946	-2.314647	-6.857923	-7.061645	
FID	(0.9918)	(0.4163)	(0.0000)***	(0.0000)***	I(1)
	-2.772223	-4.200827	-8.766670	-8.656681	
FIE	(0.0718)*	(0.0105)	(0.0000)***	(0.0000)***	I(1)
	-1.682054	-2.915909	-7.944075	-7.874315	
FMA	(0.4320)	(0.1691)	(0.0000)***	(0.0000)***	I(1)
	-0.925789	-2.735877	-6.004769	-5.920403	
FMD	(0.7690)	(0.2289)	(0.0000)***	(0.0001)***	I(1)
	-1.260767	-3.204918	-7.636619	-7.527158	
FME	(0.6376)	(0.0987)	(0.0000)***	(0.0000)**	I(1)
	-6.389712	-6.410874	-7.768556	-7.650882	
GS	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000***	I(0)

Note: ***,**, and * denote significance at 1%, 5%, and 10%, respectively. P-values in parentheses. Maximum lags are automatically selected by the Schwarz information criterion. Source: Author's computation based on data described in this text.

Table 5. PP unit root test

	Phillips-Perron Test				
	Level		1st Differen		
Variables	Constant	Trend and Intercept	Constant	Trend and Intercept	Decision
RGDP	-4.451588	-4.456644	-9.390162	-9.017125	
	(0.0010)***	(0.0055)**	(0.0000)****	(0.0000)***	I(0)
	0.414872	-1.284538	-3.819783	-3.866668	
FIA	(0.9811)	(0.8767)	(0.0060)***	(0.0238)**	I(1)
	-0.119723	-2.196542	-8.948593	-9.213531	
FID	(0.9399)	(0.4778)	(0.0000)****	(0.0000)***	I(1)
	-2.652601	-4.208006	-16.11719	-16.62853	
FIE	(0.0917)*	(0.0103)***	(0.0000)***	(0.0000)***	I(0)
	-1.487456	-2.888165	-7.944075	-7.874315	
FMA	(0.5291)	(0.1774)	(0.0000)****	(0.0000)***	I(1)
	-0.850518	-2.827783	-6.452962	-6.053601	
FMD	(0.7928)	(0.1967)	(0.0000)***	(0.0001)***	I(1)
	-1.090915	-3.186872	-7.559381	-7.455162	
FME	(0.7095)	(0.1023)	(0.0000)****q	(0.0000)***	I(1)
	-6.586046	-6.886752	-35.18967	-35.39028	
GS	(0.0000)	(0.0000)	(0.0001)***	(0.0000)**	I(0)

Note: ***,**, and *denotes significance at 1%, 5%, and 10%, respectively. P-values in parentheses. Source: Author's computation based on data described in this text.

Table 6. KPPS unit root test

Kwiatkowski-Phillips-Schmidt-Shin					
	Level		1st Difference		
Variables	Constant	Constant and Intercept	Constant	Constant and Intercept	Decision
RGDP	0.139660**	0.121667**			I(0)
FIA	0.637524	0.174023	0.261259**	0.112789 * *	I(1)
FID	0.713015	0.162985	0.131139**	0.094373 * *	I(1)
FIE	0.654918**	0.085050	0.411144**	0.363397**	I(0)
FMA	0.664275	0.1080663 * *	0.082025**	0.065497 * *	I(0)
FMD	0.737932	0.094534**	0.158573**	0.145306	I(0)
FME	0.65972	0.084371 * *	0.076913**	0.066438 * *	I(0)
GS	0.196522	0.085858**	0.500000**	0.500000**	I(0)

Note: ***,**, and * denote significance at 1%, 5%, and 10%, respectively. Source: Author's computation based on data described in this text.

i. Determining Model Optimal Lags

The optimal lag length for all variables is established using the VAR lag length selection criteria with the maximum lag set at 3, as derived based on the listed information criterion in Table 7 and Table 8. These Tables (7 to 8) show the VAR optimal lag length selection by the different information criteria.

Table 7. : Akaike information criterion (AIC) Lag Lengths

Lag	RGDP	FIA	FMA	FID	FMD	FIE	FME	GS
0								6.885419*
1	4.2386408*		-2.340115*		-3.349259*		-2.365328*	
2		-5.310616*		-4.896652*		-3.668918*		
3								

Notes: * indicates lag order selected by the criterion, each test at a 5% level. AIC: Akaike information criterion. Lag is the selected lag. Source: Author's computation based on data described in this text

Table 8. Schwarz information criterion (SIC) Lag Lengths

Lag	RGDP	FIA	FMA	FID	FMD	FIE	FME	GS
0								6.929405*
1	4.372734*		-2.252142		-3.261285*	-3.560329	-2.277355*	
2		-2.277355*		-4.734520				
3								

Notes: * indicates lag order selected by the criterion, each test at a 5% level. SIC: Schwarz information criterion. Lag is the selected lag. Source: Author's computation based on data described in this text.

Using AIC information in Table 7, we determined the optimal lag length for GS to be 0 lag, RGDP, FMD, FMA, and FME to be lag 1, and lag 2 for FIA, FID, and FIE. However, when using SIC information criteria (Table 8), we observe similar lag lengths as in Table 7. Brooks (2014) argues that overall, no criterion is unquestionably superior to the other. Because SIC is strongly consistent (but inefficient) while AIC is not consistent but is generally more efficient. Nkoro and Uko (2016), argued that an optimal lag length to be considered ideal is one that has the "smallest" AIC or SIC. However, early research by Pesaran, Shin, and Smith (1999), confirms that SIC is a more consistent criterion than AIC, but both information criteria were considered based on their strength, however, the information criterion considered the most is the one with the smallest outcome.

The selected lag lengths are subjected to the Breusch-Godfrey Serial Correlation LM Test to confirm the non-existence of serial correlation. For SIC criteria (Table 10) and AIC criteria (Table 9), there is no evidence of serial correlation. To remove serial correlation, the lag length of these variables was increased. This study uses annual data from 1980 – 2018 (38 years) and an increase

Table 9. AIC information criteria lag length Serial Test

Breusch-Godfrey Serial Correlation LM Test: Null hypothesis: No serial correlation at up to 2 lag								
Lag	RGDP	FIA	FMA	FID	FMD	FIE	FME	GS
0								0.1971
1	0.3030		0.4826		0.9863		0.7395	
2		0.3532		0.8481		0.4318		
3								

Each variable was tested against a 5% significance level. Source: Author's computation based on data described in this text.

Table 10. SIC information criteria lag length Serial Test

Breusch-Godfrey Serial Correlation LM Test: Null hypothesis: No serial correlation at up to 2 lag								
Lag	RGDP	FIA	FMA	FID	FMD	FIE	FME	GS
0								
1	0.3030		0.3403		0.9863		0.7395 0.3954	
2		0.3532		0.5320		0.2429		
3								

Each variable was tested against a 5% significance level. Source: Author's computation based on data described in this text.

in lag length brings the loss of a degree of freedom which potentially would bring doubt to our estimates. For these stated reasons, the SIC criterion was the selection criteria of choice.

ii. Bounds Testing

The examination of the long-run relationship of variables is carried out using the ARDL bounds test on each of the variables using equation (3.3) based on the SIC lag lengths. The optimal lag length selected for Table 4.10 is based on SIC ARDL (1, 0, 0, 0, 0, 0, 0) and (1, 0, 0, 0, 0, 0, 0) for AIC ARDL.

Table 11. Bounds F-test for cointegration

Dependent Variables	Function	F-Statistics	Cointegration	Next Step		
RGDP	F(RGDP|FIE,FID,FIA,FME,FMD,FMA,GS)	3.569468***	No	ARDL		
Asymptotic critical values	1%	5%		10%		
Narayan (2005, p. 1988, Table Case III: Unrestricted intercept and no trend)	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
	3.8	5.643	2.797	4.211	2.353	3.599

*Note: ***, **, and *denotes significance at 1, 5, and 10, respectively. Source: Author's computation based on data described in this text*

The F-statistics critical values have a lower bound and an upper bound. The upper bound assumes that all variables are I(1), and the lower bound assumes that they are all I(0). In this study, the F-statistic was carried out on the joint hypothesis, with a Null hypothesis (Ho): the long-run relationship does not exist. if the calculated F-statistic for this joint hypothesis in Tables 11 and Table 12 is above the upper bound level I(1), the null hypothesis of no cointegration is rejected at the 1%, 5%, and 10% significance level; confirming the variables are cointegrated. Where the calculated F-statistic falls within the upper and the lower-bound levels, the results are inconclusive. Table 11 shows no cointegration and 12 confirms the existence of cointegration, except for FMA, we proceed to test the speed of adjustment to long-run equilibrium (Equation 3.4). The results in Table 11 were

Table 12. Bounds F-test for cointegration for all variables

Dependent Variables	Function	F-Statistics	Cointegration	Next Step		
FIE	F(FIE|RGDP, FID,FIA,FME,FMD,FMA,GS)	6.448598* Yes ECM				
FID	F(FID|RGDP, FIE,FIA,FME,FMD,FMA,GS)	4.919094**	Yes	ECM		
FIA	F(FIA|RGDP, FIE,FID,FME,FMD,FMA,GS)	6.391382***	Yes	ECM		
FME	F(FME|RGDP, FIE,FID,FIA,FMD,FMA,GS)	8.415657***	Yes	ECM		
FMD	F(FMD|RGDP, FIE,FID,FIA,FME,FMA,GS)	6.544067***	Yes	ECM		
FMA	F(FMA|RGDP,FIE,FID,FIA,FME,FMD,GS)	1.726394	No	ARDL		
GS	F(GS|RGDP,FIE,FID,FIA,FME,FMD,FMA)	4.572457**		Yes	ECM	
Asymptotic critical values Narayan (2005, p. 1988, Table Case III: Unrestricted intercept and no trend)	1%	5%		10%		
	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
	3.8	5.643	2.797	4.211	2.353	3.599

*Note: ***, **, and *denotes significance at 1%, 5%, and 10%, respectively. Source: Author's computation based on data described in this text.*

indeterminate when RGDP was a dependent variable as F-statistic was between the lower and upper bound of the asymptotic critical values, and as a result, would treat this as no cointegration.

iii. Estimated ARDL Models: The long-run and Short-run ECM Models

In this section, coefficients of the explanatory variables were derived for both long-run and short-run estimates using different dependent variables.

With Real GDP (RGDP)

Table 13. Estimated short-run coefficients based on the dependent variable:

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.270713	0.507385	0.533546	0.5976
D(FIA)	-30.65608	25.15508	-1.218684	0.2325
D(FID)	-14.27250	26.12204	-0.546378	0.5888
D(FIE)	17.17565	12.32508	1.393553	0.1737
D(FMA)	1.691979	6.789762	0.249196	0.8049
D(FMD)	-14.83307	12.74392	-1.163933	0.2536
D(FME)	3.711901	8.194446	0.452978	0.6538
D(GS)	0.021332	0.040030	0.532909	0.5980
R-squared	0.185036	Mean dependent var		-0.153515
Adjusted R-squared	-0.005122	S.D. dependent var		2.529412
S.E. of regression	2.535882	Akaike info criterion		4.883624
Sum squared resid	192.9209	Schwarz criterion		5.228379
Log likelihood	-84.78885	Hannan-Quinn criter.		5.006285
F-statistic	0.973063	Durbin-Watson stat		2.277897
Prob(F-statistic)	0.468467			

Source: Author's computation based on variables described in this study.

With Financial Markets Access Index (FMA)

Table 14. Estimated short-run coefficients based on the dependent variable: FMA

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
D(FMA(-1))	-0.381579	0.183764	-2.076460	0.0479
D(RGDP)	0.001502	0.001741	0.862817	0.3961
(FIA)	-0.004600	0.248285	-0.018526	0.9854
(FID)	-0.243299	0.260986	-0.932232	0.3598
D(FIE)	-0.020292	0.129270	-0.156972	0.8765
D(FMD)	0.127060	0.129842	0.978574	0.3368
D(FME)	-0.187965	0.089648	-2.096693	0.0459
D(GS)	–7.62E – 05	0.000388	-0.196580	0.8457
D(DUMFMA)	0.830362	0.057971	14.32382	0.0000
D(DUMFMA(-1))	0.365849	0.174269	2.099341	0.0456
C	0.003299	0.004928	0.669451	0.5091
R-squared	0.924379	Mean dependent var		0.010752
Adjusted R-squared	0.895294	S.D. dependent var		0.074332
S.E. of regression	0.024053	Akaike info criterion		-4.375368
Sum squared resid	0.015042	Schwarz criterion		-3.896446
Log likelihood	91.94430	Hannan-Quinn criter.		-4.206525
F-statistic	31.78202	Durbin-Watson stat		2.085437
Prob(F-statistic)	0.000000			

Source: Author's computation based on variables described in this study.

With Financial Markets Access Index (FMA)

Table 13 and Table 14 are the short-run estimations where we did not find cointegration. The RGDP model in Table 13 is indeterminate with variables found to be positively insignificant, except FID, FIA, and FMD negatively insignificant. Two variables of financial institutions are negative, it might be faced with a situation defined by Demirguc-Kunt, Beck, and Honohan (2008) be an economy that has a group that consists of "individuals and firms that are unbankable from the perspective of commercial financial institutions and markets". Making use of the financial services provided by banks remains a challenge for this segment of the economy because financial institutions lack adequate information about the creditworthiness of prospective users of credit. Also, consistent with Nyasha and Odhiambo (2015) who argued that bank-based financial development "is vulnerable to problems, such as inefficient capital allocation". This adds to the narration that financial institutions are not always optimal in the gathering and processing of information, and as a result, do not finance investment projects in the real sector. Overall, the market-based and bank-based variables are not complementary and do not show evidence that their development leads to economic growth in the short run. Table 14 is the estimates for the FMA model that exhibited a no cointegration relationship. FME is negatively significant, while all other variables are mixed and insignificant.

With Financial Institutions Access Index (FIA)

Table 15-Panel A shows that variables are mixed and mostly insignificant in the presence of FIA, FMA is negative and significant. Disequilibrium in the system is corrected in the long run by the error correction term. From Table 15 Pane B, only FMD is not significant in the short run. ECM

coefficient indicates that distortions in the short term would be brought back to equilibrium at a rather moderate rate of 42.34% within 2 years and 3 months (1/0.4234=2.36). The adjusted R^2 confirms that variation in FIA is explained by the regressors, and Durbin-Watson statistics confirm the absence of autocorrelation.

Table 15. Estimated long-run coefficients based on the dependent variable: FIA

Panel A: Long run Estimates				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
RGDP	-0.000432	0.002608	-0.165659	0.8699
FID	-0.060741	0.371063	-0.163695	0.8715
FIE	-0.158314	0.187368	-0.844935	0.4072
FMA	-0.493182	0.139257	-3.541512	0.0018
FMD	0.536286	0.230757	2.324032	0.0298
FME	0.069263	0.124358	0.556963	0.5832
GS	-0.000221	0.000591	-0.374704	0.7115
DUMFIA	0.254260	0.143306	1.774239	0.0899
Panel B: Short-run Estimates				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.069854	0.008081	8.644301	0.0000
D(FIA(-1))	0.250130	0.094260	2.653614	0.0145
D(FMA)	-0.081966	0.021979	-3.729343	0.0012
D(FMA(-1))	0.112238	0.026419	4.248399	0.0003
D(FMD)	-0.044645	0.034939	-1.277802	0.2146
D(FMD(-1))	-0.147047	0.043172	-3.406100	0.0025
CointEq(-1)*	-0.423435	0.051069	-8.291448	0.0000
R-squared	0.769277	Mean dependent var		0.007775
Adjusted R-squared	0.723132	S.D. dependent var		0.017145
S.E. of regression	0.009021	Akaike info criterion		-6.409817
Sum squared resid	0.002441	Schwarz criterion		-6.105049
Log Likelihood	125.5816	Hannan-Quinn criter		-6.302372
F-statistic	16.67096	Durbin-Watson stat		1.951775
Prob(F-statistic)	0.000000			

*Source: Author's computation based on data described in this text. Note: DUMFIA is the interactive dummy variable given by dummy*FIA.*

With Financial Markets Efficiency Index (FME)

Table 16-Panel A shows FMD and FID are mixed and statistically significant, and FIA, FIE, FMA, GS, and RGDP are also mixed and insignificant. This shows that a percentage increase in FID would reduce FME by 1.89%, while an increase in FMD will increase FME by 1.32%. The long-run results in Table 16-Panel A as well as in Tables 17-Panel A to 20-Panel A indicate that any disequilibrium in the system can be corrected in the long run by the error correction term. Table 16-Panel B shows only two variables were found to have a relationship with FME. One explanatory variable is statistically significant. FIE is negative and significant implying an increase in FIA, would lead to a 1.15%. increase in FME. The ECM coefficient indicates that distortions in the short term would be brought back to equilibrium at a rate of 83.2% within 1 year and 2 months (1/0.832=1.20). The adjusted R^2 confirms variation in FME is explained by the regressors and Durbin-Watson statistics confirm the absence of autocorrelation..

Table 16. Estimated long-run coefficients based on the dependent variable: FME

Panel A: Long run Estimates				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
RGDP	-0.001141	0.004474	-0.254967	0.8007
FIA	0.255445	0.258202	0.989321	0.3313
FID	-1.888470	0.544466	-3.468480	0.0018
FIE	0.520439	0.359119	1.449212	0.1588
FMA	0.187320	0.156079	1.200155	0.2405
FMD	1.326133	0.220158	6.023560	0.0000
GS	-0.000411	0.001166	-0.352479	0.7272
PanelB: Short-run Estimates				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.462430	0.049436	9.354075	0.0000
D(FIA)	1.149755	0.382314	3.007357	0.0056
D(FMA)	-0.069762	0.090744	-0.768779	0.4487
CointEq(-1)*	-0.832976	0.090466	-9.207603	0.0000
R-squared	0.757772	Mean dependent var		0.008056
Adjusted R-squared	0.736399	S.D. dependent var		0.072570
S.E. of regression	0.037259	Akaike info criterion		-3.642537
Sum squared resid	0.047200	Schwarz criterion		-3.470159
Log likelihood	73.20820	Hannan-Quinn criter.		-3.581206
F-statistic	35.45461	Durbin-Watson stat		1.815458
Prob(F-statist:	0.000000			

Source: Author's computation based on data described in this text

With Financial Markets Depth Index (FMD)

Table 17-Panel A results show that FID and FME are positively significant, while the rest of the variables are not, while FIE negatively affects FME. Panel B shows that FIE is negative and significant. The ECM coefficient indicates that distortions in the short term would be brought back to equilibrium at a rate of 82.57% within 1 year and 2 months (1/0.8257=1.21). FMD variation is explained by the regressors, and there is an absence of autocorrelation as confirmed by Durbin-Watson statistics.

With Financial Institutions Efficiency Index (FIE)

From Table 18-Panel A, it is found that FIA, FME, and FMD are mixed with weak significance levels, while FID is positively significant. The results reveal that real GDP and GS are not related to any changes in financial institutions' efficiency. The results of Table 4.17-Panel B show that distortions in the short term would be brought back to equilibrium at a rate of 83.92% within 1 year and 2 months (1/0.8392=1.20). The adjusted R2 confirms variation in FIE is explained by the regressors and Durbin-Watson statistics reveal the absence of autocorrelation.

With Financial Institutions Depth Index (FID)

In Table 19-Panel A, FME is negatively significant, while FIA and FIE are positively significant, and the rest of the variables are not statistically significant. Table 19-Panel B show that the ECM coefficient indicates that distortions in the short term would be brought back to equilibrium at a rate of 84.17% within 1 year and 2 months (1/0.8417=1.19). The adjusted R2 explains that 62% of the variation in FID is explained by the regressors. Durbin-Watson statistics of approximately 1.92 reveals the absence of autocorrelation.

Table 17. Estimated long-run coefficients based on the dependent variable: FMD

Panel A: Long run Estimates				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
RGDP	0.000945	0.003099	0.304798	0.7628
FIA	-0.196205	0.205991	-0.952493	0.3490
FID	1.556461	0.292602	5.319370	0.0000
FIE	-0.450788	0.224082	-2.011713	0.0540
FMA	0.002016	0.089809	0.022449	0.9822
FME	0.588615	0.084069	7.001583	0.0000
GS	-3.75 E-06	0.000815	-0.004608	0.9964
Panel B: Short-run Estimates				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.380901	0.049300	-7.726202	0.0000
D(FIA)	-0.703180	0.254412	-2.763936	0.0100
CointEq(-1)*	-0.825721	0.102073	-8.089541	0.0000
R-squared	0.657972	Mean dependent var		0.013438
Adjusted R-squared	0.638428	S.D. dependent var		0.042889
S.E. of regression	0.025789	Akaike info criterion		-4.402046
Sum squared resid	0.023278	Schwarz criterion		-4.272763
Log likelihood	86.63888	Hannan-Quinn criter.		-4.356048
F-statistic	33.66543	Durbin-Watson stat		1.812545
Prob(F-statistic)	0.000000			

Source: Author's computation based on data described in this text

Table 18. Estimated long-run coefficients based on dependent variable: FIE

Panel A: Long run Estimates				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
RGDP	0.003575	0.002878	1.242259	0.2244
FIA	-0.278994	0.162376	-1.718193	0.0968
FID	1.036389	0.344398	3.009277	0.0055
FMA	-0.039412	0.074303	-0.530421	0.6000
FMD	-0.365771	0.192617	-1.898961	0.0679
FME	0.204339	0.119822	1.705350	0.0992
GS	9.81 E-05	0.000752	0.130480	0.8971
DUMFIE	0.048927	0.042726	1.145136	0.2618
PanelB: Short-run Estimates				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.031694	0.005074	6.246398	0.0000
CointEq(-1)*	-0.839180	0.101149	-8.296480	0.0000

*Source: Author's computation based on data described in this text. Note: DUMFIE is the interactive dummy variable given by dummy*FIE.*

Table 19. Estimated long-run coefficients based on the dependent variable: FID

Panel A: Long run Estimates				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
RGDP	-0.000964	0.001593	-0.605137	0.0 .5500
FIA	0.241497	0.079704	3.029913	0.0052
FIE	0.299594	0.095466	3.138214	0.0040
FMA	-0.006699	0.040523	-0.165315	0.8699
FMD	0.377121	0.084378	4.469410	0.0001
FME	-0.213658	0.065960	-3.239217	0.0031
GS	-0.000170	0.000416	-0.407849	0.6865
DUMFID	0.042737	0.019182	2.227987	0.0341
Panel B: Short-run Estimates				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.290496	0.036432	7.973561	0.0000
CointEq(-1)*	-0.841693	0.108102	-7.786088	0.0000

*Source: Author's computation based on data described in this text. Note: DUMFID is the interactive dummy variable given by dummy*FID*

With Government Spending

Table 20. Estimated long-run coefficients based on the dependent variable: GS

Panel A: Long run Estimates				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
RGDP	0.072142	0.104136	0.692766	0.4946
FIE	-10.79511	7.487372	-1.441776	0.1613
FIA	-1.666718	5.446088	-0.306039	0.7620
FID	28.98818	12.46717	2.325160	0.0281
FME	5.799605	4.177995	1.388131	0.1769
FMD	-20.56875	6.702954	-3.068610	0.0050
FMA	-3.662109	2.390778	-1.531765	0.1377
DUMGS	0.843256	0.044831	18.80987	0.0000
Panel B: Short-run Estimates				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-3.953071	0.180517	-21.89860	0.0000
D(GS(-1))	0.047351	0.017854	2.652107	0.0134
CointEq(-1)*	-1.110592	0.019608	-56.64044	0.0000
R-squared	0.991443	Mean dependent var		-0.021622
Adjusted R-squared	0.990940	S.D. dependent var		10.69589
S.E. of regression	1.018103	Akaike info criterion		2.951363
Sum squared resid	35.24212	Schwarz criterion		3.081978
Log likelihood	-51.60022	Hannan-Quinn criter.		2.997411
F-statistic	1969.658	Durbin-Watson stat		1.989794
Prob(F-statistic)	0.000000			

*Source: Author's computation based on data described in this text. Note: DUMGS is the interactive dummy variable given by dummy*GS.*

Table 20-Panel A shows that impact of the variables is mixed and mostly insignificant in the presence of GS, FMD is negative and significant, while FID is positive and significant. Disequilibrium in the system is corrected in the long run by the error correction term. From Table 20 Pane B, only lagged GS is significant in the short run. ECM coefficient indicates that distortions in the short term would be brought back to equilibrium at a rather accelerated rate of 111% within 3 months (1/1.1106=0.90). The adjusted R2 confirms that variation in GS is explained by the regressors, and Durbin-Watson statistics confirm the absence of autocorrelation.

The estimated model passed all diagnostic tests performed for serial correlation and heteroscedasticity (see Table 21).

Table 21. Diagnostic Test

	RGDP	FIE	FID	FIA	FME	FMD	FMA	GS
Test Statistics	F-statistic and Probability							
Serial Correlation	0.591263	2.426892	0.012149	1.973322	0.110588	0.000296	1.003915	1.037488
	(0.4419)	(0.2972)	(0.9938)	(0.3728)	(0.7395)	(0.9863)	(0.3164)	(0.3084)
Heteroscedasticity	2.275360	10.29045	5.101740	16.72870	4.052131	6.346401	13.91852	9.733230
	(0.9714)	(0.3275)	(0.8254)	(0.2709)	(0.9450)	(0.7048)	(0.1767)	(0.4642)

Note: Test on a significance level of 5%. The p-value is in parentheses. Source: Author's computation based on variables described in this study

iv. Analysis of Causality Test

To support the inferred causal relationship from the output result in Tables 13 to Table 20, this study computed the pairwise Granger causality.

Table 22. Pairwise Granger Causality Tests

Null Hypothesis:	Obs	F-Statistic	Prob.
FIE does not Granger Cause RGDP	37	0.79356	0.4609
RGDP does not Granger Cause FIE	37	0.25068	0.7798
FID does not Granger Cause RGDP	37	2.52901	0.0956
RGDP does not Granger Cause FID	37	2.48173	0.0995
FIA does not Granger Cause RGDP	37	0.20573	0.8151
RGDP does not Granger Cause FIA	37	0.97167	0.3893
FME does not Granger Cause RGDP	37	0.90133	0.4161
RGDP does not Granger Cause FME	37	0.95501	0.3955
FMD does not Granger Cause RGDP	37	1.02307	0.3709
RGDP does not Granger Cause FMD	37	2.85901	0.0720
FMA does not Granger Cause RGDP	37	3.42092	0.0450
RGDP does not Granger Cause FMA	37	0.11455	0.8921
GS does not Granger Cause RGDP	37	0.06229	0.9397
RGDP does not Granger Cause GS	37	0.99147	0.3821

: ***, **, and * denote significance at 1%, 5%, and 10%, respectively. Source: Author's analysis based on data described in this text. Source: Author's computation based on variables described in this study.

Observable from Table 22, FID|RGDP exhibits a bidirectional causality, though weak at a 10% significance level in the short run and is consistent with the result of Kolapo et al. (2018); Nyasha and

Odhiambo (2015) on bank-based development and in contrast with Nyasha and Odhiambo (2015). FMA|RGDP shows a strong unidirectional causality at a 5% significance level. In the FMD|RGDP, and RGDP|FMD hypotheses, it is notable though that FMD does not granger cause RGDP, there is an unidirectional causality where RGDP in the short-run weakly granger causes FMD at a 10% significance level, consistent with (Odhiambo, 2010). The rest of the financial development and economic growth in South Africa develop independently.

5. Conclusion and Recommendations

Conclusion

The study on financial development and economic growth has been inconclusive, just like a few previous authors on this topic, we found that financial institutions-based financial development or financial market-based development shows no evidence to impact economic growth and both variables develop independently. Though not significant, FID and FIA are negative in the short run. This result is consistent with Nyasha and Odhiambo (2015) who argued that bank-based financial development is vulnerable to imperfections of inefficient allocation of capital to deserving projects. The inefficient allocation of scarce resources can be attributed to weak competition in the banking sector (Rapapali & Simbanegavi, 2020). These results corroborate assertions by Hawkins (2002) that inefficiencies in the banking industry will stifle novelty and ultimately hold back economic growth. These results are consistent with Opoku et al. (2019) that financial development and economic growth occur separately and are a warning against making broad assumptions about their causal link. Lastly, in contrast to Wu et al. (2020) who argued that in developing countries who are in the early stages of economic development, the relationship between financial development and economic growth is expected to be stronger.

Secondly, the impact of financial markets-based financial development on economic growth also showed mixed effects. Apart from financial market depth (FMD) which is negative in the long run and with no association with economic growth, financial markets access (FMA) and financial markets efficiency (FME) are positive but have no association in the long run nor short run with economic growth. Therefore, we infer that neither financial institutions-based financial development nor financial markets-based financial development is integral in propelling economic growth in South Africa. These results are consistent with Puryan (2017) who found a one-way causal relationship between banking sector development towards economic growth, as well as the results by Ndlovu (2013) and Nyasha and Odhiambo (2015) who found that stock market development, as measured by various financial development indicators, has no significant impact on economic growth. Government spending as a control variable is found not to have any impact on economic growth.

However, the result is contrary to that of Mohieldin et al. (2019), who found the financial market to have a strong association with economic growth in Egypt. The results of the causal relationship between financial markets based financial development and economic growth show evidence in support of supply leading hypothesis in the long run and short run (see, among others, Nyasha et al. (2016); Odhiambo (2010) and Puryan (2017)). While financial institution depth supports the feedback hypothesis consistent with Nguyen et al. (2022). The empirical results of this study show evidence that the causal relationship between financial development (financial institutions and financial markets) and economic growth is sensitive to the variables used as well as the country of study. Most importantly, this study confirms the existence of a causal relationship between financial institutions/ financial markets development and economic growth, which is supported by Nyasha and Odhiambo (2019) and Nguyen et al. (2022). , though financial institution development predominates.

We overall find that financial develop and economic growth develop independently is particularly important for South African policymakers considering the assertion by Demirguc-Kunt and Maksimovic (2002) that companies that grow at levels that cannot be funded by internal funding are associated favourably with the development of the financial system and the securities markets.

Recommendations

In this study, we found no evidence that financial institutions' and financial markets' development affects economic growth. Therefore, we recommend that policymakers should deploy strategies that shape the development of financial institutions and financial markets in a direction that affects firms' access to external finance to directly contribute to economic growth, for instance, policies that encourage the creation of new companies, innovative products, and services, especially in this new era of financial technology engagements. Secondly, because financial institutions and financial markets relate differently to the real economy, we recommend the formulation of policies that support financial markets-based financial development, such as policies that allow for increased retail participation in the financial market. For further research, we recommend that the role and effect of external financing partners be included in the study of financial development and economic growth that can support enterprise creation, this is because external financing could facilitate enterprise creation, in turn, lead to rapid economic growth.

Biography note

Euphemia Godspower-Akpomiemie (Ph.D.) is a lecturer at Wits Business School, University of the Witwatersrand, where she engages students on Digital Financial Services (Fintech), Digital Business, Banking Operations, and Risk Management. She holds a Ph.D., in (Finance), specializing in Banking and Finance from the University of the Witwatersrand. Her research interest is on banking regulation; banking fragility; efficiency and performance matters; financial technology (Fintech) and digitization in the financial industry; money laundering and transparency in the banking industries; and other financial and regulatory matters in the financial system.

Simphiwe Zimu holds a degree in Master of Finance and Investment (MMFI) from Wits Business School, University of the Witwatersrand. He is a business analysis and currently works as a Senior Money Market Dealer for one of the South African big 5 banks that has a greater reach to the rest of the African region. Simphiwe's research interest is on digital finance, financial markets performance, and other financial matters, especially with focus in African markets.

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