

The Role of Financial Development on Economic Growth in South Africa

Güney Afrika'da Finansal Gelişmenin Ekonomik Büyüme Üzerindeki Rolü

Sevgi SÜMERLİ SARIGÜL
Assoc. Prof. Dr., Kayseri University
ssumerli@kayseri.edu.tr
<https://orcid.org/0000-0002-3820-6288>

Received : 01.09.2025
Revised : 26.09.2025
Accepted : 29.09.2025
Type of Article : Research

Murat ÇETİN
Prof. Dr., Tekirdağ Namık Kemal University
mcetin@nku.edu.tr
<https://orcid.org/0000-0002-7886-4162>

ABSTRACT

Keywords:
Financial Development,
Economic Growth,
ARDL,
FMOLS,
South Africa
Jel Codes:
C33, O16, O55

South Africa has long been a prominent example of economic growth, unlike other African countries. Therefore, this study investigates the financial development-economic growth link employing time-series techniques over the period 1990-2022. It also incorporates energy efficiency, trade openness, and government spendings into the economic growth model. The study uses the ARDL bounds test to analyze the cointegration relationship and the FMOLS estimator for long-term coefficient estimates. The estimates suggest that financial development accelerates economic growth. Therefore, the "financial development-driven economic growth" hypothesis is proven for the South African economy. The estimates also suggest that energy efficiency, trade openness, and government spendings support economic growth. These results may offer important recommendations for growth policies in the South African economy.

ÖZET

Anahtar Kelimeler:
Finansal Gelişme,
Ekonomik Büyüme,
ARDL,
FMOLS,
Güney Afrika
Jel Kodları:
C33, O16, O55

Güney Afrika, uzun süredir diğer Afrika ülkelerinden farklı olarak görece güçlü ekonomik büyüme performansı ile dikkat çekmektedir. Bu çalışmanın amacı, 1990-2022 dönemine ilişkin veriler kullanılarak finansal gelişmenin ekonomik büyüme üzerindeki etkisini zaman serisi yöntemleri aracılığıyla incelemektir. Analize finansal gelişmenin yanı sıra enerji verimliliği, ticari dışa açıklık ve kamu harcamaları da dahil edilmiştir. Eşbütünleşme ilişkisini test etmek amacıyla ARDL sınır testi uygulanmış, uzun dönem katsayılarının tahmininde ise FMOLS yöntemi kullanılmıştır. Ampirik bulgular, finansal gelişmenin ekonomik büyümeyi anlamlı ve pozitif yönde etkilediğini ortaya koymakta; dolayısıyla "finansal gelişme odaklı büyüme" hipotezini Güney Afrika ekonomisi bağlamında doğrulamaktadır. Ayrıca enerji verimliliği, ticari dışa açıklık ve kamu harcamalarının da ekonomik büyümeyi desteklediği sonucuna ulaşılmıştır. Elde edilen bulgular, Güney Afrika ekonomisinin büyüme politikalarına yönelik önemli politika önerileri sunmaktadır.

1. INTRODUCTION

In every economy, financial development is essential for achieving the desired level of economic progress. From past to present, many scholars have argued that financial development facilitates easier and more affordable access to credit for the real sector, thereby promoting productivity and growth (Kwakwa et al., 2023). Financial development also influences economic growth by facilitating and supporting capital inflows (Nguyen & Lee, 2021). Moreover, financial development can help reduce poverty by facilitating access to financial possibilities for poor people. Developments in the financial sector may also encourage renewable energy investments and projects, thereby escalating the production and use of renewable energy (Horky & Fidrmuc, 2024). Jianguo et al. (2022) suggest that financial sector may influence environmental quality by either increasing or decreasing CO₂ emissions and thus influencing environmental pollution.

Undoubtedly, one of the most widely dealt with topics in the literature encompasses the finance-economic development link (Kar et al., 2008; Hasan et al., 2021; Elfaki et al., 2021). The traditional theory of financial development seeks to explain the effects of transaction and information costs in markets, institutions, and financial instruments. The primary aim of the financial system is to ensure the optimal use of resources by enabling their adequate allocation over time and space. When the conditions of financial services are developed and expanded to more efficiently and effectively meet the needs of economic development, economic growth is promoted and supported (Levine, 1997). These theoretical explanations have led to the emergence of the "finance-led growth hypothesis" which has been empirically investigated by numerous researchers over time.

This study tests the aforementioned hypothesis in the example of South Africa. There are several important reasons why this country was selected as the case country for this research. First, the growth figures of South Africa clearly indicate a significant level of development. For example, the country's per capita income increased from \$6,381 in 1990 to \$8,095 in 2000, \$12,637 in 2010, and \$15,457 in 2024, demonstrating an upward trend of nearly threefold over the 1990–2024 period. The average annual growth rate of 2.7% between 1960 and 2024 is another key indicator of the country's economic performance (World Bank, 2025). In the first quarter of 2025, while the overall South African economy grew by 0.8%, the agricultural sector expanded by 15.2%, the transportation sector by 2.4%, the trade sector by 0.5%, and the financial sector by 0.2%. During the same period, gross fixed capital increased by 1.7%, and government expenditures rose by 0.1%.

Second, while the financial sectors of many African countries remain fragile, South Africa stands out as a country with a robust financial system in the region. South Africa's financial system appears resilient. The government continues to closely monitor financial risks and develop macroprudential regulations to minimize systemic risks. The capital-to-risk-weighted assets ratio of banks remains above the minimum requirements and is comparable to those in many OECD and G20 economies. Corporate debt has generally remained stable, and at 31%, is lower than the average for developing countries in the OECD and G20 (OECD Report, 2025).

Furthermore, the financial system in South Africa is large and well-regulated, reflecting a strong commitment to independent auditing and adherence to international standards and best practices (IMF Report, 2022). Scholars such as Abiodun & Temidayo (2022) acknowledge that South Africa's economic development is encouraged by this robust financial structure.

In light of these developments, the study detects the "finance-led growth" hypothesis in the South African economy using time series techniques. This study provides important gains for the literature. Firstly, few studies specifically investigate this link in the South African context; thus, the study is expected to provide a substantial contribution. Secondly, although the study primarily focuses on the financial development-economic growth relation, it also incorporates series such as energy efficiency, trade openness, and government expenditures into the growth model, drawing from the literature. In doing so, it becomes a unique study that examines the relationships among these variables in the South African economy. A notable distinction of this study is its inclusion of energy efficiency and government expenditure variables in the model, which has rarely been done in the literature. Thirdly, by applying the Ng-Perron test, the study conducts stationarity analysis using four different test statistics. The ARDL bounds test is applied as a cointegration approach. FMOLS estimator is employed for coefficient estimations. Finally, the empirical findings offer valuable insights for policy recommendations.

The structure of the study is as follows: Section 2 reports the literature. Section 3 provides the model, data set, and econometric techniques. Section 4 discusses the empirical outcomes. The study ends with a conclusion.

2. LITERATURE REVIEW

The relationship between financial development (FD) and economic growth (EG) has long been one of the most debated topics in the economics literature. Levine (1997) emphasizes that the financial system supports growth by mobilizing savings, allocating capital efficiently, and financing innovative activities, while Arestis & Demetriades (1997) argue that the growth effects of financial deepening are context-specific and dependent on institutional structures. Early empirical studies show a generally positive relationship between FD and EG, though measurement choice plays a crucial role (De Gregorio & Guidotti, 1995). Calderón & Liu (2003), using a large sample of 109 countries, demonstrate that the direction of causality between FD and EG varies across regions and levels of development. A comprehensive meta-analysis by Valickova et al. (2015) further confirms the overall positive and significant impact, but highlights that the magnitude of the relationship is sensitive to sample, indicator choice, and methodological specifications.

Empirical evidence at the country and panel level highlights the heterogeneity of the FD-EG nexus. Hassan et al. (2011) find robust positive effects of FD on growth across panels, though the magnitude is smaller in low-income countries. Bist (2018), focusing on 16 low-income countries, reveals that institutional capacity conditions the strength of the FD-EG relationship. In Sub-Saharan Africa, Ibrahim & Alagidede (2018) argue that financial development contributes to growth particularly when accompanied by financial inclusion. In Ghana, Adu et al. (2013) show that the choice of FD indicator (credit, monetary, or market-based measures) critically shapes empirical outcomes. Caporale et al. (2015) demonstrate that in new EU member states, financial development supports growth but the magnitude is affected by integration pace, regulatory quality, and macroeconomic vulnerabilities.

The Asian experience also offers valuable insights. In China, financial reforms and banking sector deepening have been found to support long-run growth (Liang & Jian-Zhou, 2006; Zhang et al., 2012). In Taiwan and Vietnam, FD positively contributes to growth, though the effects vary across periods and policy structures (Chang & Caudill, 2005; Anwar & Nguyen, 2011). Fung (2009) suggests that the FD-EG relationship may display convergence or divergence dynamics depending on regional integration. In the BRICS context, Guru & Yadav (2019) find a robust positive nexus, while Ohlan (2017) highlights the complementary role of tourism and financial development in supporting growth in India.

Recent contributions have extended the debate by incorporating nonlinearity, asymmetry, and vulnerability to external shocks. Asteriou & Spanos (2019) show that the FD-EG relationship in the EU weakens, or even reverses, during crisis periods. Badeeb and Lean (2017) find that in oil-dependent economies, the FD-EG nexus is highly sensitive to oil price fluctuations. Similarly, Shahbaz et al. (2017) demonstrate that in India, the link between FD, energy consumption, and growth is nonlinear and asymmetric, indicating regime-dependent dynamics. Cheng et al. (2021) emphasize the role of ICT diffusion in enhancing the efficiency of financial intermediation, thereby strengthening the FD-EG channel in the digital era.

Recent studies on emerging markets further underline these complexities. Durusu-Ciftci et al. (2017) highlight that FD generally supports growth but may be unstable in the long run due to crises, institutional weaknesses, or external shocks. Abu-Bader & Abu-Qarn (2008) show that while FD supports growth in Egypt, fiscal imbalances and macroeconomic distortions weaken this effect. Choong & Chan (2011) argue that the FD-EG relationship is not universal but context-dependent across different regions. Nguyen et al. (2022), examining emerging markets, confirm that FD matters for growth, though the size and persistence of the effect vary across countries.

Taken together, the literature broadly supports a positive FD-EG relationship, but the evidence consistently reveals heterogeneity depending on measurement choices (Adu et al., 2013; Valickova et al., 2015), institutional and structural conditions (Bist, 2018; Caporale et al., 2015), and vulnerability to crises and external shocks (Asteriou & Spanos, 2019; Badeeb & Lean, 2017). Sectoral linkages (Ohlan, 2017), energy dependence (Shahbaz et al., 2017), and the diffusion of digital and ICT technologies (Cheng et al., 2021) further shape the magnitude and direction of the nexus. Overall, the findings underscore that the FD-EG relationship is not uniform, but rather context-specific, highlighting the need for differentiated policy approaches tailored to levels of development, institutional quality, and structural vulnerabilities.

3. MODEL and DATASET

The study investigates the relationship between financial development and economic growth in South Africa. In this analysis, economic growth is treated as the dependent variable, whereas all other factors serve as explanatory variables. The models used by Islam et al. (2013), Elfaki et al. (2021), Tekbaş (2022), Doğan et al. (2022), Ullah

et al. (2023), Jóźwik et al. (2023), Saadaoui et al. (2024) and Jozwik et al. (2025) effective in determining our model. The model of the study can be expressed through the following closed-form equation:

$$GDP = f(FIN, EN, TR, EXP) \quad (1)$$

In this equation, GDP represents real per capita income, FIN denotes financial development, EN indicates energy efficiency, TR refers to trade openness, and EXP represents government expenditures. The energy efficiency data were obtained from the OECD database, while the data for all other series were taken from the World Bank database. Since the elasticities of the series are to be interpreted, all series were transformed into their natural logarithms before being included in the analyses. Accordingly, the explicit form of our model, which was represented in a closed form in Equation 1, is provided below:

$$LNGDP_t = \alpha + \theta_1 LNFIN_t + \theta_2 LNEN_t + \theta_3 LNTR_t + \theta_4 LNEXP_t + \varepsilon_t \quad (2)$$

In this equation, α , t and ε_t represent the intercept term, the time dimension, and the error term, respectively. Each coefficient measures and estimates the elasticity of economic growth with respect to financial development, energy efficiency, trade openness, and government expenditures, respectively. Table 1 provides detailed descriptions of each variable, while Figure 1 summarizes the temporal evolution of the series over the period 1990-2022.

Table 1. Data Set and Descriptive Statistics

Variables	Symbol	Measurement	Source	Expected value
Economic Growth	GDP	Real GDP per capita (constant 2015 USD)	WB	(-)
Financial Development	FIN	Domestic credit provided by banking sector (% of GDP)	WB	(+)
Energy Efficiency	EN	GDP per TPES unit	OECD	(+)
Trade Openness	TR	Total foreign trade (% of GDP)	WB	(-) (+)
Government Expenditures	EXP	Government final consumption expenditure (% of GDP)	WB	(-) (+)

The study follows a three-step econometric strategy. In the first step, the stationarity analysis is examined using the Ng-Perron (2001) test. Monte-Carlo simulations demonstrate that this approach can produce more robust results than other unit root tests. This is primarily due to the ability to apply four different tests simultaneously, as outlined below:

$$MZ_a = ((T^{-1}y_t)^2 - f_0)/2k \quad (3)$$

$$MZ_t = MZ_a * MSB \quad (4)$$

$$MSB = (k/f_0)^{1/2} \quad (5)$$

$$MPT = (c^2k - cT^{-1}y_t^2/f_0) \quad (6)$$

The second step encompasses the cointegration among the series. This is detected using the ARDL bounds test of Pesaran et al. (2001). The most important distinguishing feature of this test is that it allows variables to be stationary at the level or first difference. Its second distinguishing feature is its ability to predict both short- and long-term dynamics. Its third feature is its ability to yield more reliable results in shorter samples. The presence of cointegration in this test is demonstrated by comparing the calculated F-statistic with the upper and lower critical values.

The final step estimates the parameters using the FMOLS estimator. The FMOLS estimator, proposed by Phillips & Hansen (1990), is one of the most important techniques that can be used when there is a cointegration relationship between the series. Providing reliable and robust results in small samples, the FMOLS estimator also has significant advantages in eliminating problems of endogeneity and serial correlation among the variables.

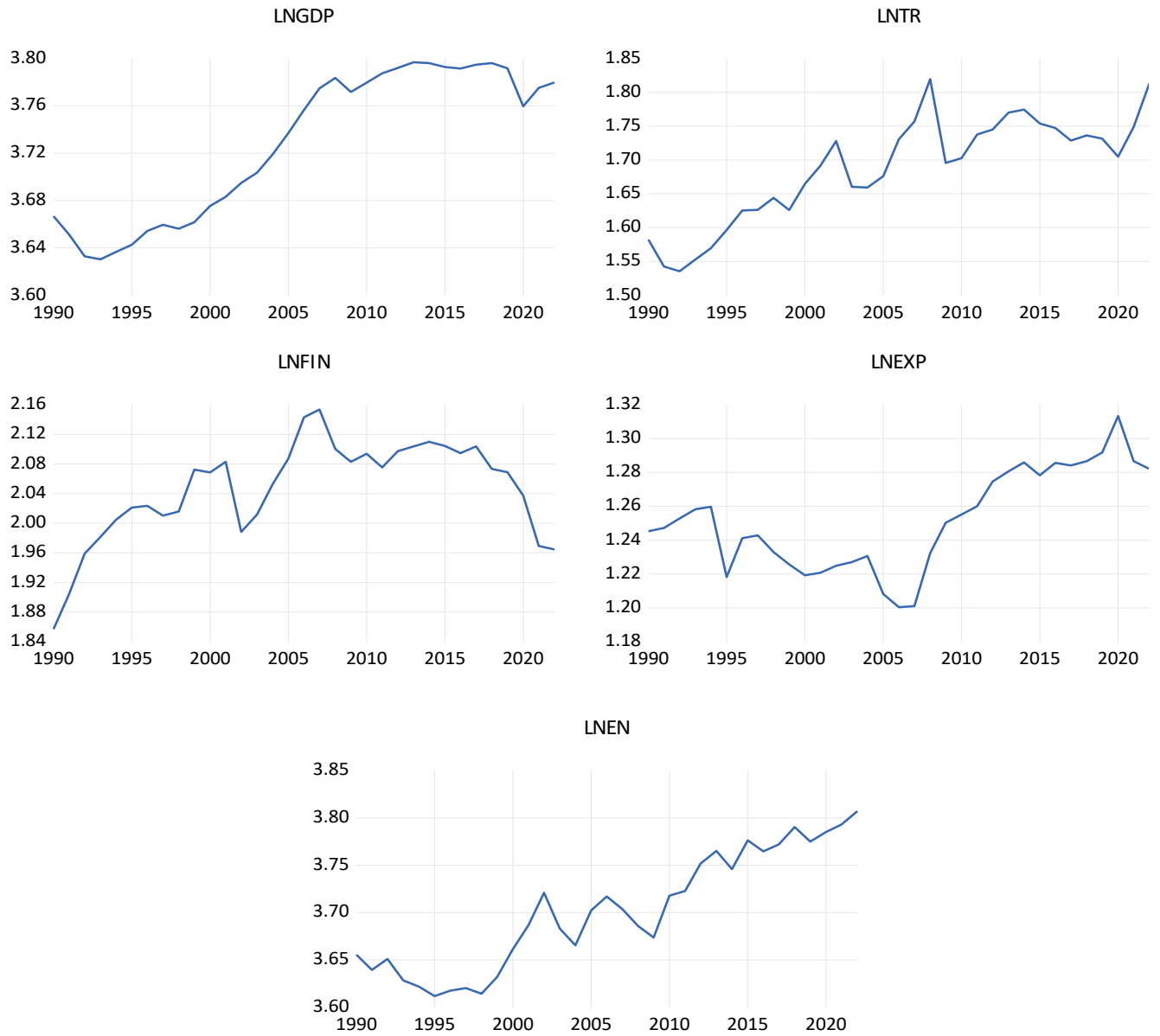


Figure 1. Temporal Trends of the Series Over the Period 1990-2022

4. FINDINGS and DISCUSSION

The empirical analysis begins with a review of the summary statistics (Table 2). Among the series, LNGDP records the highest values for the mean, median, minimum, and maximum, whereas LNEXP exhibits the lowest values across these measures. In terms of variability, LNEXP shows the lowest standard error (0.029), while LNTR displays the highest (0.077). The distributional properties further indicate that LNGDP and LNFIN are negatively skewed, whereas LNEN, LNTR, and LNEXP are positively skewed.

Table 2. Summary Statistics

	LNGDP	LNFIN	LNEN	LNTR	LNEXP
Mean	3.728	1.766	3.701	1.687	1.251
Median	3.756	1.777	3.702	1.702	1.250
Max.	3.796	1.847	3.807	1.819	1.313
Min.	3.630	1.668	3.611	1.535	1.200
Std. Error	0.062	0.045	0.062	0.077	0.029
Skewness	-0.289	-0.389	0.090	0.406	0.074
Kurtosis	1.389	2.435	1.682	2.251	2.025
Observations	33	33	33	33	33

Table 3 presents the correlation matrix, which highlights the relationships among the variables. The results demonstrate a positive correlation between financial development and economic growth, with similar positive associations observed between economic growth and the other explanatory variables. Notably, LNTR exhibits the highest positive correlation with economic growth, with a coefficient of 0.894.

Table 3. Correlation Matrix

	LNGDP	LNFIN	LNEN	LNTR	LNEXP
LNGDP	1.000				
LNFIN	0.694	1.000			
LNEN	0.869	0.437	1.000		
LNTR	0.894	0.744	0.794	1.000	
LNEXP	0.482	0.013	0.647	0.297	1.000

The study examines the unit root features of the series, specifically their order of stationarity, using the Ng-Perron unit root approach. This method, which involves four test statistics—MZa, MZt, MSB, and MPT—has its application outcomes expressed in Table 4. The relevant table reveals that each series has a unit root at levels but becomes stationary at first differences.

Table 4. Unit Root Analysis

Level	MZa	MZt	MSB	MPT
LNGDP	-0.693	-0.435	0.628	22.426
LNFIN	-3.882	-1.361	0.350	6.332
LNEN	-0.104	-0.053	0.509	19.153
LNTR	-1.811	-0.661	0.365	10.041
LNEXP	-2.890	-1.102	0.381	8.208
First difference	MZa	MZt	MSB	MPT
LNGDP	-11.127***	-2.342***	0.210***	2.262***
LNFIN	-15.130***	-2.749***	0.181**	1.622***
LNEN	-15.224***	-2.735***	0.179**	1.696***
LNTR	-15.030***	-2.600***	0.173***	2.146**
LNEXP	-15.451***	-2.772***	0.179**	1.612***

Note: *** and ** indicate significance at the 1% and 5% levels, respectively.

The stationarity of the series at their first differences indicates that a cointegration relationship among these series can be investigated. In this context, the ARDL bounds test is utilized to assess the cointegration among the series. A main feature of this cointegration method is its ability to appropriately determine the optimal lag length. The lag length results obtained from the most suitable VAR model established for this purpose are presented in Table 5. As can be seen, the suitable lag length is 1. Therefore, this lag length was preferred for the cointegration analysis.

Table 5. VAR Lag Length

	LR	FPE	AIC	SIC	HQ
1	179.326*	2.22e-18*	-26.491	-25.077*	-26.048*
2	21.900	4.36e-18	-25.984	-23.391	-25.172
3	17.794	1.02e-17	-25.628	-21.857	-24.447
4	21.758	1.29e-17	-26.624*	-21.673	-25.074

Note: * indicates the optimal lag length.

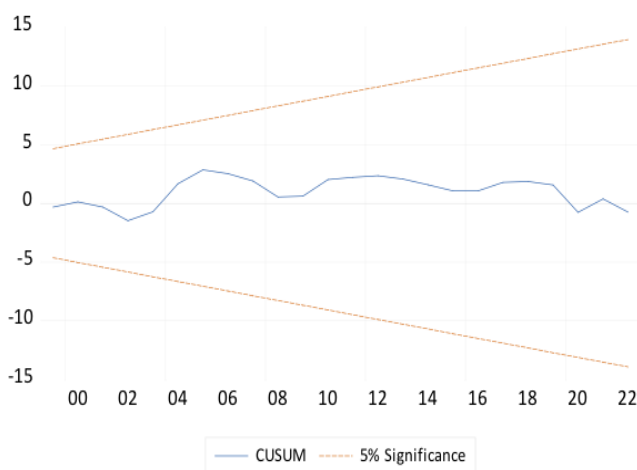
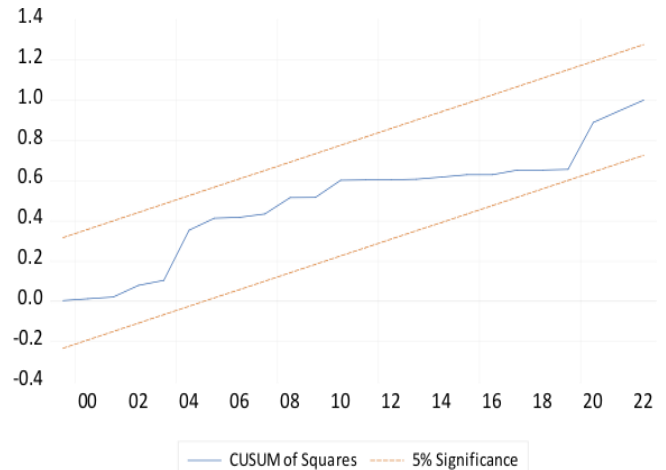
Table 6 expresses the estimation outcomes of the cointegration test. The findings show that the F-statistic value (4.642) exceeds the upper critical bound of 4.37 at the 1% significance level, thereby confirming the existence of cointegration among the LNFIN, LNEN, LNTR, LNEXP, and LNGDP series. This also implies a long-run link.

Diagnostic tests for the ARDL model, including tests for autocorrelation, heteroscedasticity, normality, and model specification, indicate that the model is appropriate. Furthermore, the CUSUM and CUSUM² test outcomes reveal that the values lie within the relevant bounds, verifying the stability of the parameters.

Table 6. Bounds Test Results

Optimal lag	[1,0,0,1,1]	
F-statistic	4.642***	
Critical values		
Significance level	Lower bound, $I(0)$	Upper bound, $I(1)$
1%	3.29	4.37
5%	2.56	3.49
10%	2.20	3.09
Diagnostic tests		
Breusch-Godfrey LM tests	1.007 (0.325)	
ARCH LM tests	0.120 (0.325)	
J-B normality tests	1.400 (0.496)	
Ramsey RESET tests	0.078 (0.782)	
CUSUM	Stable	
CUSUMsq	Stable	
R^2	0.989	
Adj.- R^2	0.986	
F -statistic	321.179***	
Probability	0.000	

Note: ***, indicates significance at the 1% level.

**Figure 2.** CUSUM Test**Figure 3.** CUSUM² Test

In the final stage, the parameters of each explanatory variable are estimated to analyze their impacts on the dependent variable. The outcomes of the FMOLS technique are presented in Table 7.

The first key finding is that the coefficient of LNFIN (0.486) is positive and significant. This indicates that a 1% increase in financial development leads to a 0.486% rise in economic growth, implying that financial development accelerates economic growth. This outcome is in line with the outcomes of Kalaycı & Özden (2020) proving the financial development-supported growth hypothesis. This outcome differs from the findings of Ayad et al. (2017), who tested MENA countries and did not support the financial development-driven growth hypothesis. Additionally, the findings of Elfaki et al. (2021) differ from our study. In other words, this study provides evidence that financial development hinders economic growth.

Secondly, the coefficient of LNEN (0.415) is positive and statistically significant, indicating that a 1% increase in energy efficiency leads to a 0.415% rise in economic growth. This suggests that energy efficiency serves as a growth-enhancing factor. This finding is parallel to the finding of Bayar & Gavriletea (2019).

Thirdly, the coefficient of LNTR (0.244) is also determined to be positive and significant. This reveals that a 1% rise in trade openness increases economic growth by 0.244%, demonstrating that trade openness is a crucial determinant of economic growth. This outcome differs from the empirical outcomes of Menyah et al. (2014), which fail to support the trade-led growth hypothesis. Our finding, unlike this study, is in the same direction as the finding of Khemakhem & Saidi (2024).

Finally, the coefficient of LNEXP is estimated at 0.235, which is again positive and significant. This indicates that a 1% rise in government expenditure contributes to a 0.235% rise in economic growth. Thus, like the other explanatory variables, government expenditure also positively impacts economic growth.

Table 7. FMOLS Estimates

Variables	Coefficients	Std. Error	Prob.
LNFIN	0.486***	0.075	0.000
LNEN	0.415***	0.077	0.000
LNTR	0.244***	0.066	0.000
LNEXP	0.235**	0.101	0.028
Constant	-2.224***	0.205	0.000

Note: *** and ** indicate statistical significance at the 1% and 5% levels, respectively.

5. CONCLUSION

The study econometrically investigates the determinants of economic growth in South Africa, which has witnessed significant economic developments in recent years. Specifically, it examines the link among economic growth and financial development, energy efficiency, trade openness, and government expenditure during the period 1990-2022. The study applies the Ng-Perron technique for stationarity analysis, the ARDL bounds test for cointegration, and the FMOLS estimator for long-run coefficient estimation.

The outcomes indicate a cointegration relationship among all the series. Financial development is found to stimulate economic growth. Additionally, energy efficiency, trade openness, and government spending are also detected to contribute positively to economic growth. Thus, financial development, energy efficiency, trade openness, and government expenditure are empirically confirmed as key drivers of economic growth in South Africa.

These findings offer meaningful insights for policymakers in South Africa. First, the empirical evidence that financial development enhances economic growth suggests that measures aimed at further developing the financial sector could accelerate growth. The financial sector—particularly banks—should continue to support productive projects and investments in the real economy. Moreover, the government should take necessary steps to reduce vulnerabilities within the financial system.

The positive impact of energy efficiency on economic growth reveals that policymakers should prioritize investments and projects aimed at improving energy efficiency. Energy efficiency not only prevents the wastage of existing energy resources but also ensures the optimal use of energy. Both the financial sector and the government should provide financial support for energy efficiency initiatives in the real economy. Such support may include low-interest and long-term loans, as well as tax incentives.

The finding that trade openness enhances economic growth highlights the importance of export and import strategies. In this regard, an export-led growth strategy should be implemented more robustly. Policies that promote high value-added export products should be accelerated. On the import side, priority can be given to the acquisition of technologically advanced capital goods, while imports of consumption goods can be restricted. This finding of our study is similar to the results of Fraihat et al. (2023) and Utkulu & Kahyaoglu (2005).

Finally, another outcome underscores the need for allocating more public resources to productive, efficient, employment-generating, and innovative investments in public and private sectors. Minimizing waste in government expenditures should also be considered as a crucial policy measure. Policy recommendations should not be limited to the variables discussed. Additionally, strengthening institutional structures and accelerating steps toward globalization could also support South Africa's economic growth.

The study's most significant limitations include its single-country nature, its failure to analyze different country groups, and its failure to model variables such as political risk, democracy, and institutional quality, which have recently become popular in economic growth studies. Future studies should be advised to design their studies with these limitations in mind.

AUTHORS' DECLARATION:

There is no need to obtain ethical permission for the current study as per the legislation.

AUTHORS' CONTRIBUTIONS:

Conceptualization, writing-original draft, editing – SSS and MÇ, data collection, methodology, formal analysis – SSS and MÇ, Final Approval and Accountability – SSS and MÇ.

REFERENCES

- Abiodun, S., & Temidayo, O. (2022). Role of financial sector development in the nexus between inclusive growth and poverty: A regional comparative analysis from Sub-Saharan Africa. *Research in Applied Economics*, 14(1), 18-9. <https://doi.org/10.5296/rae.v14i1.19855>
- Abu-Bader, S., & Abu-Qarn, A. S. (2008). Financial development and economic growth: The Egyptian experience. *Journal of Policy Modeling*, 30(5), 887-898. <https://doi.org/10.1016/j.jpolmod.2007.02.001>
- Adu, G., Marbuah, G., & Mensah, J. T. (2013). Financial development and economic growth in Ghana: Does the measure of financial development matter?. *Review of Development Finance*, 3(4), 192-203. <https://doi.org/10.1016/j.rdf.2013.11.001>
- Anwar, S., & Nguyen, L. P. (2011). Financial development and economic growth in Vietnam. *Journal of Economics and Finance*, 35(3), 348-360. <https://doi.org/10.1007/s12197-009-9106-2>
- Arestis, P., & Demetriades, P. (1997). Financial development and economic growth: Assessing the evidence. *The Economic Journal*, 107(442), 783-799. <https://doi.org/10.1111/j.1468-0297.1997.tb00043.x>
- Asteriou, D., & Spanos, K. (2019). The relationship between financial development and economic growth during the recent crisis: Evidence from the EU. *Finance Research Letters*, 28, 238-245. <https://doi.org/10.1016/j.frl.2018.05.011>
- Ayad, H., & Belmokaddem, M. (2017). Financial development, trade openness and economic growth in MENA countries: TYDL panel causality approach. *Theoretical and Applied Economics*, 24(1), 233-246. Available at: <https://store.ectap.ro/articole/1259.pdf>
- Badeeb, R. A., & Lean, H. H. (2017). Financial development, oil dependence and economic growth: Evidence from the Republic of Yemen. *Studies in Economics and Finance*, 34(2), 281-298. <https://doi.org/10.1108/SEF-07-2014-0137>
- Bayar, Y., & Gavriltea, M. D. (2019). Energy efficiency, renewable energy, economic growth: Evidence from emerging market economies. *Quality and Quantity*, 53(4), 2221-2234. <http://doi.org/10.1007/s11135-019-00867-9>
- Bist, J. P. (2018). Financial development and economic growth: Evidence from a panel of 16 African and non-African low-income countries. *Cogent Economics & Finance*, 6(1), 1449780. <https://doi.org/10.1080/23322039.2018.1449780>
- Calderón, C., & Liu, L. (2003). The direction of causality between financial development and economic growth. *Journal of Development Economics*, 72(1), 321-334. [https://doi.org/10.1016/S0304-3878\(03\)00079-8](https://doi.org/10.1016/S0304-3878(03)00079-8)
- Caporale, G. M., Rault, C., Sova, A. D., & Sova, R. (2015). Financial development and economic growth: Evidence from 10 new European Union members. *International Journal of Finance & Economics*, 20(1), 48-60. <https://doi.org/10.1002/ijfe.1498>
- Chang, T., & Caudill, S. B. (2005). Financial development and economic growth: The case of Taiwan. *Applied Economics*, 37(12), 1329-1335. <https://doi.org/10.1080/0003684042000338702>

- Cheng, C. Y., Chien, M. S., & Lee, C. C. (2021). ICT diffusion, financial development, and economic growth: An international cross-country analysis. *Economic Modelling*, 94, 662-671. <https://doi.org/10.1016/j.econmod.2020.02.008>
- Choong, C. K., & Chan, S. G. (2011). Financial development and economic growth: A review. *African Journal of Business Management*, 5(6), 2017-2027. <https://doi.org/10.5897/AJBM10.772>
- De Gregorio, J., & Guidotti, P. E. (1995). Financial development and economic growth. *World Development*, 23(3), 433-448. [https://doi.org/10.1016/0305-750X\(94\)00132-I](https://doi.org/10.1016/0305-750X(94)00132-I)
- Doğan, M., Tekbaş, M., & GURSOY, S. (2022). The impact of wind and geothermal energy consumption on economic growth and financial development: Evidence on selected countries. *Geothermal Energy*, 10(1), 19. <https://doi.org/10.1186/s40517-022-00230-6>
- Durusu-Ciftci, D., Ispir, M. S., & Yetkiner, H. (2017). Financial development and economic growth: Some theory and more evidence. *Journal of Policy Modeling*, 39(2), 290-306. <https://doi.org/10.1016/j.jpolmod.2016.08.001>
- Elfaki, K. E., Handoyo, R. D., & Ibrahim, K. H. (2021). The impact of industrialization, trade openness, financial development, and energy consumption on economic growth in Indonesia. *Economies*, 9(4), 174. <https://doi.org/10.3390/economies9040174>
- Fraihat, B. A. M., Al-Amarneh, A., Yaseen, H., Samarah, M. R., AlKhawaldeh, B. Y. S., & Buraik, O. (2023). Trade openness, energy consumption, and financial development influence on Jordan's economy: Evidence from ARDL and non-Granger causality test approach. *International Journal of Energy Economics and Policy*, 13(6), 659-665. <https://doi.org/10.32479/ijeep.14975>
- Fung, M. K. (2009). Financial development and economic growth: Convergence or divergence?. *Journal of International Money and Finance*, 28(1), 56-67. <https://doi.org/10.1016/j.jimonfin.2008.08.001>
- Guru, B. K., & Yadav, I. S. (2019). Financial development and economic growth: Panel evidence from BRICS. *Journal of Economics, Finance and Administrative Science*, 24(47), 113-126. <https://doi.org/10.1108/JEFAS-12-2017-0125>
- Hasan, H., Ali, B. J. A., Joseph, N., & Oudat, M. S. (2021). An investigation on financial development, trade openness and economic growth: VAR approach. *Journal of Contemporary Issues in Business and Government*, 27(2), 4289-4295. <https://doi.org/10.47750/cibg.2021.27.02.454>
- Hassan, M. K., Sanchez, B., & Yu, J. S. (2011). Financial development and economic growth: New evidence from panel data. *The Quarterly Review of Economics and Finance*, 51(1), 88-104. <https://doi.org/10.1016/j.qref.2010.09.001>
- Horky, F., & Fidrmuc, J. (2024). Financial development and renewable energy adoption in EU and ASEAN countries. *Energy Economics*, 131, 107368. <https://doi.org/10.1016/j.eneco.2024.107368>
- Ibrahim, M., & Alagidede, P. (2018). Effect of financial development on economic growth in sub-Saharan Africa. *Journal of Policy Modeling*, 40(6), 1104-1125. <https://doi.org/10.1016/j.jpolmod.2018.08.001>
- IMF Report (2022). *South Africa: Financial sector assesment program-financial system stability assessment*. IMF Staff Country Reports, No. 22/39. Available at: <https://www.imf.org/en/Publications/CR/Issues/2022/02/11/South-Africa-Financial-Sector-Assessment-Program-Financial-System-Stability-Assessment-513014>
- Islam, F., Shahbaz, M., & Rahman, M. M. (2013). Trade openness, financial development energy use and economic growth in Australia: Evidence on long run relation with structural breaks. *MPRA Paper*, No. 52546. Available at: <http://mpra.ub.uni-muenchen.de/52546/>
- Jianguo, D., Ali, K., Alnori, F., & Ullah, S. (2022). The nexus of financial development, technological innovation, institutional quality, and environmental quality: Evidence from OECD economies. *Environmental Science and Pollution Research*, 29(38), 58179-58200. <https://doi.org/10.1007/s11356-022-19763-1>
- Jóźwik, B., Doğan, M., & Gürsoy, S. (2023). The impact of renewable energy consumption on environmental quality in Central European countries: The mediating role of digitalization and financial development. *Energies*, 16(20), 7041. <https://doi.org/10.3390/en16207041>

- Jozwik, B., Sarıgül, S.S., Topcu, B.A., Çetin, M., & Dogan, M. (2025). Trade openness, economic growth, capital, and financial globalization: Unveiling their impact on renewable energy consumption. *Energies*, 18, 1244. <https://doi.org/10.3390/en18051244>
- Kalaycı, S., & Özden, C. (2020). The nexus between international trade, financial development and economic growth: The case of South Korea. *Revista Argentina de Clínica Psicológica*, 29(5), 715-725. <https://doi.org/10.24205/03276716.2020.1066>
- Kar, M., Peker, O., & Kaplan, M. (2008). Trade liberalization, financial development and economic growth in the long term: The case of Turkey. *South East European Journal of Economics and Business*, 3(2), 25-38. <https://doi.org/10.2478/v10033-008-0012-x>
- Khemakhem, M., & Saidi, S. (2024). Financial development, trade openness, and economic growth in Tunisia. *Iranian Economic Review*, 28(3), 975-990. <https://doi.org/10.22059/ier.2024.349122.1007548>
- Kwakwa, P. A., Dankwah, J. B., Adu Boahen, E., & Hammond, P. (2023). Financial development in South Africa: The role of natural resources, IT infrastructure, and government size. *Cogent Economics & Finance*, 11(2), 2281844. <https://doi.org/10.1080/23322039.2023.2281844>
- Levine, R. (1997). Financial development and economic growth: Views and agenda. *Journal of Economic Literature*, 35(2), 688-726. Available at: <https://www.jstor.org/stable/2729790>
- Liang, Q., & Jian-Zhou, T. (2006). Financial development and economic growth: Evidence from China. *China Economic Review*, 17(4), 395-411. <https://doi.org/10.1016/j.chieco.2005.09.003>
- Menyah, K., Nazlioglu, S., & Wolde-Rufael, Y. (2014). Financial development, trade openness and economic growth in African countries: New insights from a panel causality approach. *Economic Modelling*, 37, 386-394. <https://doi.org/10.1016/j.econmod.2013.11.044>
- Ng, S., & Perron, P. (2001). Lag length selection and the construction of unit root tests with good size and power. *Econometrica*, 69(6), 1519-1554. <https://doi.org/10.1111/1468-0262.00256>
- Nguyen, C. P., & Lee, G. S. (2021). Uncertainty, financial development, and FDI inflows: Global evidence. *Economic Modelling*, 99, 105473. <https://doi.org/10.1016/j.econmod.2021.02.014>
- Nguyen, H. M., Le, Q. T. T., Ho, C. M., Nguyen, T. C., & Vo, D. H. (2022). Does financial development matter for economic growth in the emerging markets?. *Borsa Istanbul Review*, 22(4), 688-698. <https://doi.org/10.1016/j.bir.2021.10.004>
- OECD Report (2025). *OECD economic surveys: South Africa 2025*. OECD Publishing, No. 2025/14. Available at: <https://doi.org/10.1787/7e6a132a-en>
- OECD. (2025). *OECD data*. Available at: <https://www.greenpolicyplatform.org/tools-and-platforms/oecd-green-growth-database>
- Ohlan, R. (2017). The relationship between tourism, financial development and economic growth in India. *Future Business Journal*, 3(1), 9-22. <https://doi.org/10.1016/j.fbj.2017.01.003>
- Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics*, 16(3), 289-326. <https://doi.org/10.1002/jae.616>
- Phillips, P. C., & Hansen, B. E. (1990). Statistical inference in instrumental variables regression with I(1) processes. *The Review of Economic Studies*, 57(1), 99-125. <https://doi.org/10.2307/2297545>
- Saadaoui, H., Dogan, M., & Omri, E. (2024). The impacts of hydroelectricity generation, financial development, geopolitical risk, income, and foreign direct investment on carbon emissions in Turkey. *Environmental Economics and Policy Studies*, 26(2), 239-261. <https://doi.org/10.1007/s10018-023-00384-y>
- Shahbaz, M., Van Hoang, T. H., Mahalik, M. K., & Roubaud, D. (2017). Energy consumption, financial development and economic growth in India: New evidence from a nonlinear and asymmetric analysis. *Energy Economics*, 63, 199-212. <https://doi.org/10.1016/j.eneco.2017.01.023>
- Tekbaş, M. (2022). The relationship between economic growth, financial development and income inequality in ASEAN-5 countries. *Journal of Mehmet Akif Ersoy University Economics and Administrative Sciences Faculty*, 9(2), 717-741. <https://doi.org/10.30798/makuiibf.691416>

- Ullah, A., Dogan, M., Topcu, B. A., & Saadaoui, H. (2023). Modeling the impacts of technological innovation and financial development on environmental sustainability: New evidence from the world's top 14 financially developed countries. *Energy Strategy Reviews*, 50, 101229. <https://doi.org/10.1016/j.esr.2023.101229>
- Utkulu, U., & Kahyaoğlu, H. (2005). *To what direction did trade and financial openness affect growth in Turkey?*. Turkish Economic Association Discussion Papers, No. 2005/13. Available at: https://www.tek.org.tr/pdf/698_9122022_203123.pdf
- Valickova, P., Havranek, T., & Horvath, R. (2015). Financial development and economic growth: A meta-analysis. *Journal of Economic Surveys*, 29(3), 506-526. <https://doi.org/10.1111/joes.12068>
- World Bank. (2005). *World Development Indicators*. Available at: <https://databank.worldbank.org/source/world-development-indicators>
- Zhang, J., Wang, L., & Wang, S. (2012). Financial development and economic growth: Recent evidence from China. *Journal of Comparative Economics*, 40(3), 393-412. <https://doi.org/10.1016/j.jce.2012.01.001>