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SOUTH AFRICA'S SAVING AND ECONOMIC DEVELOPMENT LINKAGE: CAUSAL RELATIONSHIP EXAMINATION

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ABSTRACT

South Africa dreams of eradicating poverty and achieving equitable distribution of its scarce resources among its citizens by 2030. Economic growth sustained over time is crucial in achieving its developmental goals. Domestic savings provide a cheap source of resources for investment that would sustain economic growth. This study explored the relationship between South Africa's aggregate national savings and aggregate national income from 1987 to 2021. The study utilized Solow's bivariate model and error correction-centered causality to ensure the robustness of the study results while testing the relationship between saving and economic growth. The study confirmed that aggregate national saving was positively related to South Africa's economic growth. In the short run, deviations from the long-run paths were partly corrected in the present period. In addition, the study found aggregate national saving Granger caused short- and long-term economic growth. The general policy recommendation is that the Government of South Africa should remove bottlenecks to aggregate national saving mobilization efforts by implementing pro-saving fiscal and monetary policies. High saving rates will stimulate income growth through investments in productive sectors, reducing poverty and inequality.

Keywords: *Aggregate National Saving, Aggregate National Income, Granger Causality, South Africa*

JEL: D14; E12; E21; F63; O10

Introduction

Harrod and Domar (1946) in Todaro & Smith (2020) postulate that domestic savings are the prime mover of the economy; a country that needs to develop must save a certain proportion of its domestic income now for new future investments apart from using those saving for replacing worn-out capital goods. The South African economy enjoyed high saving rates in the 1960s and 1970s when gross domestic savings were around 30% of GDP (The World Bank, 2022a). Since then, the indicator has deteriorated and remained below 20% (The World Bank, 2023). South Africa's saving rate of 15% of GDP in 2020 is hugely below the world average of 26% (The World Bank, 2022a). South Africa's 2030 National Development Plan has set an annual saving rate target of 30% of GDP to meet its economic development objectives

(National Planning Commission, 2011). The saving and investment data show investment almost matching saving in absolute terms for the entire study period, with aggregate capital formation (investment) peaking at around 21% of GDP in 1989 and 2008 (The World Bank, 2023). The aggregate national saving peaked in 2021 at around 20.1% of GDP (The World Bank, 2022b). Between 1990 and 2021, aggregate national income peaked in 2006 at 5.6% and experienced more than four contractions, the largest of which were -2.1% and -6.4% during the pre-and post-pandemic periods, respectively (The World Bank, 2023).
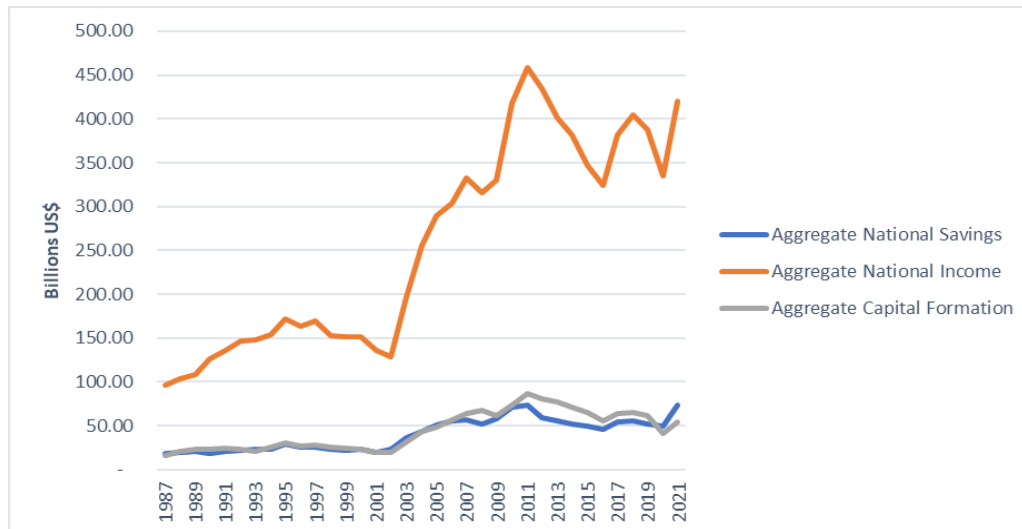

Figure 1: Saving, Investment, and Economic Growth for South Africa

The high unemployment rate, unequal income distribution, low education levels, high crime rate, and high government debt are some of South Africa's main socioeconomic challenges (Mitra, 2017). South Africa was the most unequal nation compared to other members of BRICS in 2018, with a Gini coefficient of 0.64. Other BRICS members had Gini coefficients of less than 0.5, except Brazil, which had a Gini coefficient of 0.55 (van Wyk & Kapingura, 2021). Present South Africa's 2030 National Development Plan seeks to eliminate poverty and reduce socioeconomic inequality by that year (National Planning Commission, 2011).

Achievement of these ambitious goals requires significant complementary social and economic investments. Ribaj & Mexhuani (2021) postulate that national saving provides resources for investment while investment leads to economic growth. Studies have established the mediating role of investment between aggregate national saving and aggregate national income expansion in nations like South Africa. Mitra (2017) re-examined the short- and long-term domestic saving-investment correlation for South Africa from 1960 to 2014. According to the study's findings, domestic saving rates have a favorable long-term impact on investment rates. Granger causality tests indicated a short-term bidirectional causal relationship between domestic saving and investment rates, and the study advised South Africa to develop and put into practice policies that encourage domestic investment. Similarly, van Wyk & Kapingura (2021) discovered that in both the short and long run, investment has a favorable and statistically significant impact on income growth, encouraging the creation of investment-enhancing policies to promote economic growth.

Several emerging and developing economies have discussed the dynamic link between aggregate national saving and aggregate national income growth (Pickson et al., 2017). Recent studies on saving in South Africa have explored factors determining household savings using

data from the National Income Dynamics Studies. Getachew (2015) used yearly data from 1960 to 2013 to explore the saving-economic growth relationship for South Africa using a trivariate model and found causality running from saving and economic growth to investment in the second and third lags of estimation. Literature examination reveals a knowledge gap on the effects of aggregate national saving on economic growth in South Africa. Previous studies on the saving and economic growth nexus in South Africa focused on exploring whether economic growth leads to higher savings. This study bridged the gap by examining whether higher saving rates lead to more economic growth using an error correction mechanism-centered causality from 1987 to 2021 in South Africa. The causality test was adopted in this study to identify appropriate target policy variables. Getachew (2015) contends that if aggregate national saving is found to cause economic growth, policymakers should target saving as a policy variable of interest such that policies should aim at removing constraints to saving promotion. If there is bidirectional causality, policymakers should equally target saving and economic growth variables for policy consideration.

Literature Review

Theoretical Review

The direction of causality has been the most crucial problem in the saving-income growth nexus, whether saving causes income or income causes saving (Tang & Tan, 2014). Two schools of thought attempt to explain the saving and income relationship, Keynesian and Solow-Swan. Solow (1956) contends that saving is a prerequisite for economic growth, i.e., an increase in the saving rate implies higher actual investment associated with a growth of output per worker as the economy transitions to a new steady state.

Rostow's modernization theory postulates five stages of development, of which the "preconditions for taking off" and "take off" stages require the mobilization of domestic and foreign savings to finance significant social-economic investments that propel economic growth (Musyoka & Ogero, 2021).

Aghion et al. (2016) argue that innovation permits domestic economic sectors to catch up with new technology in developing economies. Catching up needs knowledge transfer through foreign direct investment while the local entrepreneur provides knowledge of the local economic conditions to forge partnerships with foreign investors. In such circumstances, domestic savings are needed for local entrepreneurs to contribute equity in partnership, reducing the agency problem that would have prevented the foreign investor from joining the venture. In a developed economy, local entrepreneurs are assumed to be familiar with new technology and do not need to attract foreign direct investment to innovate. Therefore, domestic saving does matter for economic growth in developing countries.

While exploring determinants of saving, the Keynesian absolute income hypothesis claims that how much one saves depends on their income (Keynes, 2018). As a result, countries that want to increase their saving rates must raise their incomes first so that income growth increases aggregate domestic saving.

Empirical Review

Several authors have conducted studies to establish the correlation and causality between saving and economic growth in low and middle-income countries. The literature review has shown that the bivariate Solow-Shaw model has never been used to ascertain whether saving explains economic growth in South Africa. Recent studies in South Africa have focused on investigating household saving behaviors using the National Income Dynamics

Study data (Zwane et al., 2016; De Vos et al., 2020; Zwane, 2021). For instance, Zwane (2021) used a two-stage least squares estimation method to account for potential endogeneity issues and found landholding in rural areas, employment, and income positively associated with saving levels.

At a macro level, using multiple regression modeling, van Wyk & Kapingura (2021) discovered a short-run statistically positive relationship between saving and economic growth in South Africa. Similarly, Getachew (2015), using data from 1960 to 2013, found causality from economic growth and saving to investment in South Africa. It meant the government should focus on boosting economic growth and saving to promote domestic investment. Amusa (2014) used a multivariate analysis to study savings and economic growth linkage in South Africa. The study explored the impact of corporate, household, and government saving on economic growth in South Africa using the 1953-2008 annual data. Only corporate saving was positive and statistically significant in the short and long term, while household and government saving had statistically insignificant impacts.

While studying the effects of saving on economic development in Kosovo, Ribaj & Mexhuani (2021) uncovered a positive and statistically significant relationship between saving (deposits) and economic growth. The paper concluded that countries with high aggregate national saving rates do not depend on direct foreign investments, thereby minimizing the risk of volatile foreign direct investment.

Dinh et al. (2019) studied the effects of economic development and foreign direct investment in developing countries. The results of this study show that foreign direct investment had a positive and statistically significant influence on income growth in the long run. Similarly, domestic credit was found to affect economic growth positively. The authors argued that foreign direct investment is an alternative source of financing domestic investments for nations with a domestic saving-investment imbalance.

Using yearly data from 1970 to 2016, Keho (2019) examined the effect of domestic savings on economic development in Cote d'Ivoire. The study's results, which used cointegration and Granger causality tests, showed that domestic saving had a short- and long-run positive and statistically significant relationship with economic growth. Granger causality advocated that saving comes before economic growth in Core d'Ivoire, recommending pro-saving promotion policies to grow the economy.

Ganioğlu & Yalçın (2015) used 1993 to 2010 cross-country panel data to examine the domestic saving-investment gap and growth. The research assumed Aizenman et al. (2007) methodology in calculating cumulative saving-investment gaps in 46 low- and middle-income countries. The study's findings showed that raising the proportion of domestic savings to finance domestic investment explained the growth performance of the countries.

Nguyen & Nguyen (2017) examined the impacts of domestic savings on economic growth in Vietnam using annual data covering the period from 1986 to 2015. The results indicated that domestic saving and investment were positive and significant in the long run, while the dependency ratio negatively impacted economic development. However, all independent variables were statistically insignificant in the short run.

Using the autoregressive distributed lag model, Sellami et al. (2020) explored the effects of domestic saving on economic development in Algeria using annual data from 1980 to 2018. The study findings show a statistically significant and positive relationship between domestic saving and GDP growth rates in the short and long term.

Using a bivariate model, Pickson et al. (2017) investigated the correlation between aggregate national saving and GDP growth in Ghana to explore whether there was a long-term relationship between these variables. The Johansen cointegration test could not prove a long-term correlation between the model variables. However, a short-run bivariate model established a one-way causality from aggregate national saving to aggregate national income growth. The study recommended implementing monetary policies to stimulate saving and economic growth. Another bivariate regression model was conducted by Tang & Tan (2014) to establish the correlation between economic growth and saving in Pakistan from 1971 to 2011. The research discovered a long-term causal relationship between saving and economic growth where past saving values would predict future economic growth rates.

Olayiwola et al. (2021) embarked on a study to explore Nigeria's aggregate domestic saving and income growth linkages, focusing on the pre-and post-democracy periods, utilizing a vector error correction model. The research found a two-way causal relationship in the long term for both study periods. However, a one-way causality was established in the short term, from saving to gross domestic product growth in the post-democracy period. In contrast, there was no statistically significant causal link between variables during the pre-democracy period.

Odionye et al. (2016) used an augmented Granger causality test technique to investigate the relationships between domestic private savings and GDP growth in Nigeria from 1980 to 2013. The findings indicated a one-way causal relationship between domestic private savings and Nigeria's gross domestic product growth. Using a bivariate model, Nindi & Odhiambo (2014) studied the causal relationship between domestic saving and investment in Malawi from 1973 to 2011 using novel autoregressive distributed lag and error correction-centered approaches. The study results revealed a long-term one-way causal link between investment to saving. In the short term, a two-way causality was established.

Musyoka & Ogero (2021) investigated the factors influencing domestic saving in Kenya using ordinary least squares using 1989 to 2018 annual data. The findings reveal that the gross domestic product rate, lending interest, and inflation are statistically significant in determining the growth of domestic savings. At the same time, capital formation was statistically insignificant in influencing gross domestic saving mobilization. Using bounds testing and error correction mechanisms in Nigeria, Adeleke (2014) found saving and population growth as critical determinants of economic growth in the long term. In contrast, short-term statistically significant factors were oil revenue, human capital, saving, labor force, and population growth. In the long run, the study established a two-way causal relationship between domestic saving and economic expansion.

Using annual data from 1990 to 2019 and adopting the cointegration and error-correction mechanism regression technique, Ugah (2022) discovered that income level had a positive and statistically significant impact on saving in Nigeria. In contrast, financial depth had a negative and statistically significant impact, whereas inflation and deposit rates negatively affected domestic saving, but the results were due to chance. The study recommended that the Government of Nigeria create an enabling environment for domestic saving mobilization.

In their study of domestic saving in developing nations from 1995 to 2017, Tariq et al. (2022) used a panel autoregressive distributed lag model to predict the outcomes. The inflation rate and age dependency were negative and statistically significant, while GDP per capita and export earnings influenced domestic saving positively and significantly. Using annual data from 1997 to 2016, Abasimi & Martin (2018) looked into the factors influencing national saving in Ghana, Cote d'Ivoire, Burkina Faso, and Togo. The autoregressive distributed

lag model was conducted to learn national saving' short- and long-term determinants. The study's results demonstrate that while the age dependence ratio was negative and statistically insignificant, the gross domestic product, GDP per capita, and real interest rate were all statistically significant and positive. Most of these studies established a positive link between aggregate national savings and national income.

Methodology

Source of Data and Software

This study uses secondary data sets from 1987 to 2021 from an online World Bank Database. The stability test of the bivariate model revealed a structural break for the original data set from 1960 to 2021. The data series are aggregate national savings and aggregate national income. The study used E-Views 12.0 Student Version Lite software to conduct econometric analyses.

Model Specification

The study adopted a bivariate model Pickson et al. (2017) used to study the saving-income nexus. Solow (1956) in Pickson et al. (2017) postulated that savings increase leads to income growth which entails that aggregate national income is a function of saving. Mathematically, this model can be presented as follows:

$$Y_t = \alpha_0 + \alpha_1 S_t \qquad 0 < \alpha_1 < 1 \tag{1}$$

Equation three (1) is transformed into a log-log model to remove heteroscedasticity in the residuals.

$$\ln Y_t = \alpha_0 + \alpha_1 \ln S_t + u_t \tag{2}$$

where α_0 represents the constant, α_1 represents the slope coefficient measuring the responsiveness of the aggregate national income due to changes in saving, $\ln Y_t$ represents a log of aggregate national income (dependent variable), and $\ln S_t$ represents the log of aggregate national saving (independent variable), whereas u_t is an unbiased error term.

Results and Discussion

Descriptive Statistics

The minimum saving in South Africa between 1987 and 2021 was US$17.7, while the maximum saving was US$73.8 billion in absolute terms giving an average saving of US$39.9 billion. The minimum aggregate national income stood at US$96.5 billion, while the maximum was US$458 billion in absolute terms. During the reporting period, the minimum saving and minimum aggregate national income were recorded in 1987 with a saving-to-income ratio of 1:5, while the absolute maximum saving and maximum aggregated national income were recorded in 2011 with the saving-income ratio of 1:6, entailing a deterioration over time.

Table 1: Descriptive Statistics

	Mean	Median	Std. dev.	Min.	Max.	Shapiro-Wilk p
Aggregate national saving (Billion US$)	39.9	43.4	18.1	17.7	73.8	< 0.001
Aggregate national income (Billion US$)	256	256	119	96.5	458	0.001

Unit Root Test

The model's economic variables were subjected to a unit root test to ascertain how they behaved over time (Gujarati, 2012). This test is necessary to determine how many times a variable must be differenced before it becomes stationary. The Augmented Dickey-Fuller Test was used to perform the unit root test confirmed by Correlogram Test. All economic variables were non-stationary in levels but stationary after the first difference. The null hypotheses for all variables were rejected after the first difference. See Table 2 below, which summarises the test results.

Table 2: Unit Root Test

Variable Name	In levels (probability)	First difference (probability)
$\ln S_t$	0.7917	0.0033
$\ln Y_t$	0.6400	0.0027

Normality, Stability, Serial Correlation, Model Specification Tests

The normality, serial correlation, stability, and model specification tests were also applied (Gujarati, 2012). The adjusted R-squared indicates that the model explains around 79.6% variation in aggregate national income. A Ramsey Reset test accepts the alternative hypothesis of correct model specification (F-statistic= 0.1964). The Breusch-Godfrey LM Test showed no serial correlation (F-statistic of 0.5311). Similarly, the null hypothesis of heteroscedasticity in residuals was rejected at all statistically significant conventional levels (F-statistic of 0.3135). The Jaque Bera Normality Test verifies that the residuals have a normal distribution (Probability of 0.989791).
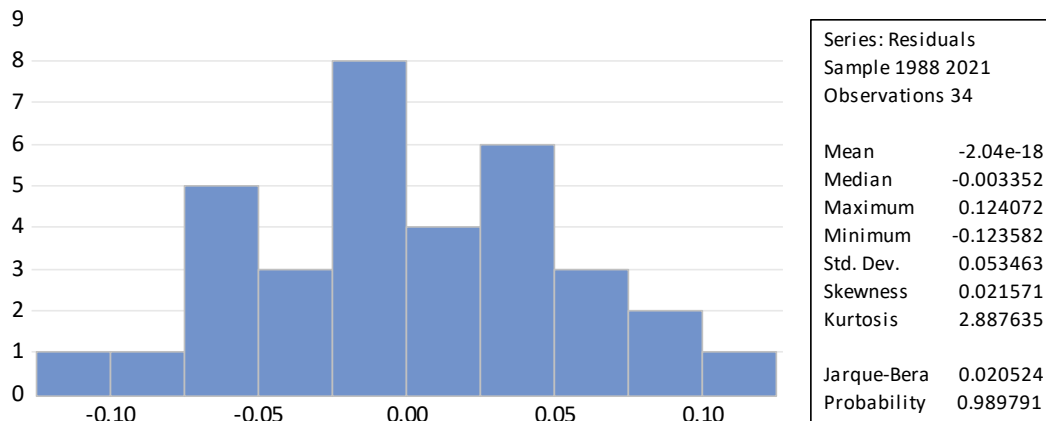

Series: Residuals	
Sample 1988 2021	
Observations 34	
Mean	-2.04e-18
Median	-0.003352
Maximum	0.124072
Minimum	-0.123582
Std. Dev.	0.053463
Skewness	0.021571
Kurtosis	2.887635
Jarque-Bera	0.020524
Probability	0.989791

Figure 2: Normality Test for Aggregate National Income-Aggregate National Saving Model

Stability Test

A model stability test was conducted to ascertain whether no major shocks occurred during the study period that would have split the model. The CUSUM of Squares procedure has confirmed the stability of both models over the 1987 to 2021 period (See Figure 3 below).
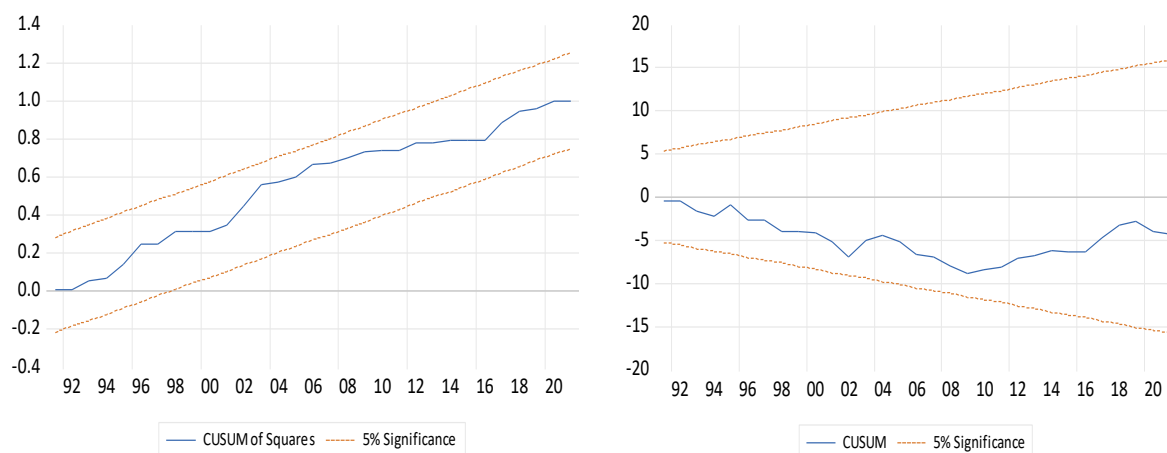
Figure 3: CUSUM of Squares and CUSUM Tests of Stability for Aggregate National Income-Aggregate National Saving Model

Cointegration Test

Noting that variables are stationary after the first difference (See Unit Root Tests above), it was possible to test for cointegration to determine whether two non-stationary time series have a long-term equilibrium relationship (Kasem & Al-Gasaymeh, 2022). The economic interpretation of cointegration is that if two or more series are connected to create an equilibrium relationship, even though the individual series may contain stochastic patterns, they will tend to move together closely over time. Their difference will be stationary (Nyasha & Odhiambo, 2019). The cointegration idea thus suggests a long-run equilibrium in which variables move together over time, and the error term is the disequilibrium error (Engle et al., 1987). The optimal lag length of two was determined to help carry out the Johansen cointegration test. A no-cointegration null hypothesis was rejected. The Max-Eigenvalue test shows one cointegrating equation at a 5% significance level.

Table 3: Unrestricted Cointegration Rank Test (Maximum-Eigenvalue)

Hypothesised No of CEs	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Mackinnon-Haug-Michelis (1999) P-values
None*	0.3678	14.6726	14.2646	0.0431
Atmost 1	0.0131	0.4233	3.8415	0.5153

The max-eigenvalue test indicates 1 cointegrating equation at the 0.05 level.

The Error Correction Mechanisms

Engle et al. (1987) demonstrated that the short-run disequilibrium relationship between the two variables can always be represented by the Error Correction Mechanism (ECM) if the variables are cointegrated. The ECM measures how quickly a disequilibrium model adjusts to reach long-term equilibrium (Adeleye, 2018). For ECM to hold, the cointegrating component should be statistically significant and negative (ibid).

The model $\ln Y_t = \alpha_0 + \alpha_1 \ln S_t + u_t$ results show that about 46% of short-run aggregate national saving deviations from long-term equilibrium are resolved in the present period, and the remaining portion of the deviation is corrected in the subsequent periods (See Table 4).

Table 4: Long-Run Regression Results of The Solow Model

$\ln Y_t$ is the dependent variable				
Variables	Coefficient	Std Error	t-Statistic	P-value
Constant	0.0188	0.0099	1.9071	0.0658
$\ln S_t$	0.6198	0.0677	9.1478	0.0000
ecmgdp(-1)	-0.4595	0.0943	-4.8718	0.0000
R-squared	0.8088			
Adjusted R-squared	0.7965			
F-Statistic	65.5843			
Prob (F-Statistic)	0.0000			
Durbin-Watson statistic	1.8391			

Causality Test

The Granger causality test was run to ascertain whether aggregate national income Granger causes aggregate national savings or vice versa in the short and long term. The null hypotheses are that aggregate national income does not Granger cause aggregate national saving and aggregate national saving does not Granger cause aggregate national income. The causality test accepts the null hypothesis that aggregate national income does not Granger cause aggregate national savings. However, the null hypothesis that aggregates national savings does not Granger cause aggregate national income in the long term has been rejected, meaning causality runs from aggregate national savings to aggregate national income in South Africa. The past values of aggregate national savings can be used to predict future income growth in the long run and that savings precede economic growth in the long run.

Table 5: Long Run Pairwise Granger Causality Test

Null hypothesis	Observations	F-Statistic	Probability
$\ln Y_t$ does not Granger cause $\ln S_t$	33	1.1608	0.3279
$\ln S_t$ does not Granger cause $\ln Y_t$		5.9183	0.0072

The study results have established a one-way causality from aggregate national saving to aggregate national income in the long term at a 1% statistical significance. Tang & Tan (2014) study of the linkages between saving and economic growth in Pakistan also uncovered a one-way causality from saving to economic growth.

The short-run causality tests were also performed. The null hypotheses are that aggregate national income does not Granger cause aggregate national saving and vice versa. Table 6 displays the findings. The short-run causality tests indicate a one-way causality from aggregate national saving to aggregate national income in South Africa at a 5% significance level.

Table 6: Short Run Pairwise Granger Causality Test

Null hypothesis	Observations	F-Statistic	Probability
$\Delta \ln Y_t$ does not Granger cause $\Delta \ln S_t$	32	1.7630	0.1907
$\Delta \ln S_t$ does not Granger cause $\Delta \ln Y_t$		3.8673	0.0333

The findings sharply contrast van Wyk & Kapingura's (2021) result, which established a one-way causality from income growth to domestic saving in South Africa. However, the

bivariate study conducted in Ghana by Pickson et al. (2017) established a one-way causality from gross domestic savings to gross domestic product covering 1972 to 2013, supporting the study results. Similarly, Olayiwola et al. (2021) established a one-way causality from domestic saving to economic development in the post-democracy era in Nigeria.

Discussion

The aggregate national saving positively impacts aggregate national income long-term (See Table 4). The regression analysis is statistically significant at all conventional levels. The interpretation of the regression result is that a 1% growth in aggregate national saving leads to a 0.62% growth in aggregate national income, ceteris paribus. The results support Solow's assertion that aggregate national savings positively influences aggregate national income. An empirical study by Tang & Tan (2014) uncovered a statistically significant positive influence of domestic saving on economic expansion in Pakistan. Other studies that established a positive influence of aggregate domestic saving on economic growth include Ribaj & Mexhuani (2021); Sellami et al. (2020); Dinh et al. (2019); Keho (2019); Nguyen & Nguyen (2017); and Ganioğlu & Yalçın (2015).

The Granger causality tests established causality running from saving to national income in both the short and long term, meaning saving precedes income growth. The study has established saving-led economic growth in South Africa. The increase in financial savings will lead to an increase in economic growth through the investment of saving in productive sectors. The research results align with Keho (2019), who studied the effect of domestic saving on economic development in Cote d'Ivoire and found that domestic savings had a short- and long-run positive and statistically significant relationship with economic growth.

Error correction mechanism indicates that around 46% of short-run aggregate national saving deviations from the long-run path are corrected in the current year. In comparison, 54% of deviations were corrected in the subsequent years.

Conclusion and Policy Recommendations

The study examined the effects of aggregate national saving on economic growth in South Africa following Solow's model. The literature review identified a gap; the impact of aggregate national saving on economic development has never been explored in South Africa before. Over the past ten years, most studies on saving and economic growth linkages have focussed on household saving. They are interested in determining the factors that lead to improved financial savings mobilization. The long-run regression equation established a positive and statistically significant correlation between aggregate national income and savings. The Granger causality tests reveal unidirectional causality from aggregate national saving to short-term and long-term economic growth. The study results support Solow's model, which contends that policymakers should target saving to stimulate economic growth.

Financial savings precedes economic growth, i.e., promoting domestic savings in South Africa will lead to growth in national income. The government of South Africa aspires to reduce poverty and income inequality by 2030. Attaining these developmental goals would require the government to grow the economy first, and economic growth would increase employment which is one direct way of reducing poverty. This study has identified aggregate national saving as a policy variable that needs to be targeted to grow the economy. The government has fiscal and monetary policy instruments to promote saving mobilization, such as tax policies, interest rate policies, inflation control, and retirement saving plans.

Limitations of The Study

The study used annual data to run the regression; quarterly data would have produced robust results.

Declaration

This article results from the researcher's work, and any information borrowed from others has been duly cited.

Conflict of Interest

There is no conflict of interest to declare.

Availability of Data and Materials

Data used in the study is available on request.

Authors' Contribution

The Author drafted the manuscript and addressed comments from the reviewers.

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References

Abasimi, I., & Martin, A. (2018). Determinants of National Saving in Four West African Countries. *International Journal of Economics and Finance*, *10*(5), 67–74. https://doi.org/10.5539/ijef.v10n5p67

Adeleke, A. M. (2014). Saving-Growth Nexus in an Oil-Rich Exporting Country: A Case of Nigeria. *Management Science and Engineering*, *8*(3), 72–78. https://doi.org/10.3968/5417

Adeleye, B. N. (2018). *Johansen Cointegration Test in EViews*. CrunchEconometrix. http://cruncheconometrix.blogspot.com/2018/03/time-series-analysis-lecture-4-part-1.html

Aghion, P., Comin, Di., Howitt, P., & Tecu, I. (2016). When Does Domestic Savings Matter for Economic Growth? *IMF Economic Review*, *64*(3), 381–407. http://www.jstor.org/stable/45212113

Aizenman, J., Kletzer, K., & Pinto, B. (2007). *Economic Growth with Constraints on Tax Revenues and Public Debt: Implications for Fiscal Policy and Cross-Country Differences* (NBER Working Papers, Issue 12750). National Bureau of Economic Research, Inc. https://econpapers.repec.org/RePEc:nbr:nberwo:12750

Amusa, K. (2014). Savings and economic growth in South Africa: A multivariate analysis. *Journal of Economic and Financial Sciences*, *7*(1), 73–88. https://jefjournal.org.za/index.php/jef/article/view/131/127

De Vos, C., Obokoh, L. O., & Abiola, B. A. (2020). Determinants of savings among non-Ricardian households in South Africa. *International Journal of Social Economics*, *47*(11), 1329–1343. https://econpapers.repec.org/RePEc:eme:ijsepp:ijse-11-2019-0692

Dinh, T. T., Vo, D. H., The Vo, A., & Nguyen, T. C. (2019). Foreign Direct Investment and Economic Growth in the Short Run and Long Run: Empirical Evidence from Developing Countries. In *Journal of Risk and Financial Management* (Vol. 12, Issue 4, pp. 1–11). https://doi.org/10.3390/jrfm12040176

Engle, R. F., Granger, C. W. J., & Grangeri, C. W. J. (1987). Co-Integration and Error Correction: Representation, Estimation, and Testing. *Econometrica*, *55*(2), 251–276. https://doi.org/10.2307/1913236

Ganioğlu, A., & Yalçın, C. (2015). Domestic savings-investment gap and growth: A cross-country panel study. *Central Bank Review*, *15*(1), 39–63. https://www3.tcmb.gov.tr/cbr/

Getachew, A. (2015). Domestic Savings And Economic Growth in South Africa. *MPRA Paper*, 1–18. https://mpra.ub.uni-muenchen.de/111057/1/MPRA_paper_111057.pdf

Gujarati, D. (2012). *Econometrics by Example*. Palgrave Macmillan. http://zalamsyah.staff.unja.ac.id/wp-content/uploads/sites/286/2019/11/7-Econometrics-by-Example-Gujarati.pdf

Kasem, J., & Al-Gasaymeh, A. (2022). A cointegration analysis for the validity of purchasing power parity: Evidence from middle east countries. *International Journal of Technology, Innovation and Management (IJTIM)*, *2*(1), 54–67. https://doi.org/10.54489/ijtim.v2i1.60

Keho, Y. (2019). Relationship Between Savings And Economic Growth In Cote D'Ivoire. *International Journal of Economics and Financial Issues*, *9*(6), 202–207. https://doi.org/10.32479/ijefi.8781

Keynes, J. M. (2018). *The General Theory of Employment, Interest, and Money* (1st ed.). Palgrave Macmillan Cham. https://doi.org/10.1007/978-3-319-70344-2

Mitra, R. (2017). Domestic Saving-Investment Correlation Puzzle Revisited: A Time Series Analysis for South Africa. *Economics Bulletin*, *37*(2), 1217–1225. https://econpapers.repec.org/RePEc:ebl:ecbull:eb-17-00186

Musyoka, J. M., & Ogero, M. (2021). Gross domestic savings: what influences it's growth in Kenya? *International Journal of Business, Technology and Organizational Behavior (IJBTOB)*, *1*(6), 461–468. https://doi.org/10.52218/ijbtob.v1i6.148

National Planning Commission. (2011). *National Development Plan 2030 Our Future-make it work*. Sherino Printers. https://www.gov.za/sites/default/files/gcis_document/201409/ndp-2030-our-future-make-it-workr.pdf

Nguyen, N. T. K., & Nguyen, H. H. (2017). Impacts of Domestic Savings on Economic Growth of Vietnam. *Asian Journal of Economic Modelling*, *5*(3), 245–252. https://doi.org/10.18488/journal.8.2017.53.245.252

Nindi, A., & Odhiambo, N. (2014). Savings and investment in Malawi: a causality test. *Investment Management and Financial Innovations*, *11*(4), 77–84. https://www.businessperspectives.org/index.php/journals/investment-management-and-financial-innovations/issue-97/savings-and-investment-in-malawi-a-causality-test

Nyasha, S., & Odhiambo, N. M. (2019). Does Remittance Inflow Granger-Cause Economic Growth in South Africa? A Dynamic Multivariate Causality Test. *The Review of Black Political Economy*, *47*(1), 86–103. https://doi.org/10.1177/0034644619885348

Odionye, J. C., Emerole, O. B., & Ugwuebe, U. S. (2016). Savings and Economic Growth Nexus: Evidence from Nigeria. *Developing Country Studies*, *6*(4), 112–118. https://core.ac.uk/download/pdf/234682777.pdf

Olayiwola, A. S., Okunade, S. O., & Fatai, M. O. (2021). Savings-Growth Nexus Revisited: An Empirical Analysis from Nigeria. *African Journal of Economic Review*, *9*(4), 223–237. https://www.ajol.info/index.php/ajer/article/view/214960

Pickson, R. B., Enning, K. D., & Siaw, A. (2017). Savings-Growth Nexus in Ghana: Cointegration and Causal Relationship Analyses. *Theoretical Economics Letters*, *7*(2), 139–153. https://doi.org/10.4236/tel.2017.72012

Ribaj, A., & Mexhuani, F. (2021). The impact of savings on economic growth in a developing country (the case of Kosovo). *Journal of Innovation and Entrepreneurship*, *10*(1), 1. https://doi.org/10.1186/s13731-020-00140-6

Sellami, A., Bentafat, A., & Rahmane, A. (2020). Measuring the impact of domestic saving on economic growth in Algeria using ARDL model. *Les Cahiers Du Cread*, *36*(4), 77–109. https://www.ajol.info/index.php/cread/article/view/203149

Solow, R. M. (1956). A contribution to the theory of economic growth. *Quarterly Journal of Economics*, *70*(1), 65–94. https://doi.org/10.2307/1884513

Tang, C. F., & Tan, B. W. (2014). A revalidation of the savings–growth nexus in Pakistan. *Economic Modelling*, *36*, 370–377. https://doi.org/https://doi.org/10.1016/j.econmod.2013.10.012

Tariq, M., Khalid, S., & Naz, M. (2022). The Determinants of Domestic Savings in Developing Countries. *European Journal of Natural and Social Sciences-Novus*, *1*(2), 8–14. https://ejnss.novuspublishers.org/wp-content/uploads/2022/05/01000107EJNSS.pdf

The World Bank. (2022a). *Gross domestic savings (% of GDP) - South Africa*. https://data.worldbank.org/indicator/NY.GDS.TOTL.ZS?locations=ZA

The World Bank. (2022b). *Gross savings (% of GDP)*. https://data.worldbank.org/indicator/NY.GNS.ICTR.ZS?name_desc=true

The World Bank. (2023). *South Africa Data*. https://data.worldbank.org/country/ZA

Todaro, M. P., & Smith, S. C. (2020). *Economic Development* (13th ed.). Pearson.

Ugah, J. (2022). Macroeconomic Determinant of Domestic Savings in Nigeria: A Cointegration Approach. *Research Square*, 1–15. https://doi.org/10.21203/rs.3.rs-1765419/v1

van Wyk, B. F., & Kapingura, F. M. (2021). Understanding the nexus between savings and economic growth: A South African context. *Development Southern Africa*, *38*(5), 828–844. https://doi.org/10.1080/0376835X.2021.1932424

Zwane, T. (2021). Determinants of Savings in Urban and Rural Households: Case of South Africa. *Demography and Social Economy*, *46*(4), 151–168. https://doi.org/10.15407/dse2021.04.151

Zwane, T., Greyling, L., & Maleka, M. (2016). The Determinants of Household Savings in South Africa: A Panel Data Approach. *International Business & Economics Research Journal*, *15*(4), 209–218. https://doi.org/10.19030/iber.v15i4.9758