The Relationship Between Stokvels and Banking Sector Efficiency: An ARDL Approach

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Abstract

This study examines the cointegration relationship long-run between stokvels and banking sector development measured by banking sector efficiency in South Africa by using the ARDL approach technique with economic time series data ranging from 1987Q3 to 2020Q1. This study reveals that in the long-run, stokvel savings has a negative relationship with banking sector development. In the short run results are negative and significant coefficient. This study reveals implications for policymakers should promote and advance the social and economic welfare of South Africans, promote a fair, transparent, competitive, sustainable, responsible, efficient, effective and accessible credit market and industry, and promote consumers.

Keywords: stokvels, banking sector efficiency, ARDL approach

1. Introduction

Stokvels are community-based savings schemes, aimed at improving the lives of low- and middle-income earners (Ngcobo & Chisasa, 2018; Van Wyk, 2017; Kaseke & Matuku, 2014; Floro & Seguino, 2002). The rate of access to savings and credit by stokvels in the banking sector remains a challenge. For instance, the banking sector in South Africa does not cater for the credit needs of stokvels due to information asymmetry and has no knowledge of what stokvels demand in terms of banking services. Figure 1 provides a trend analysis of the proxies for banking sector development of the South African Reserve Bank from 2009Q4 to 2020Q2.
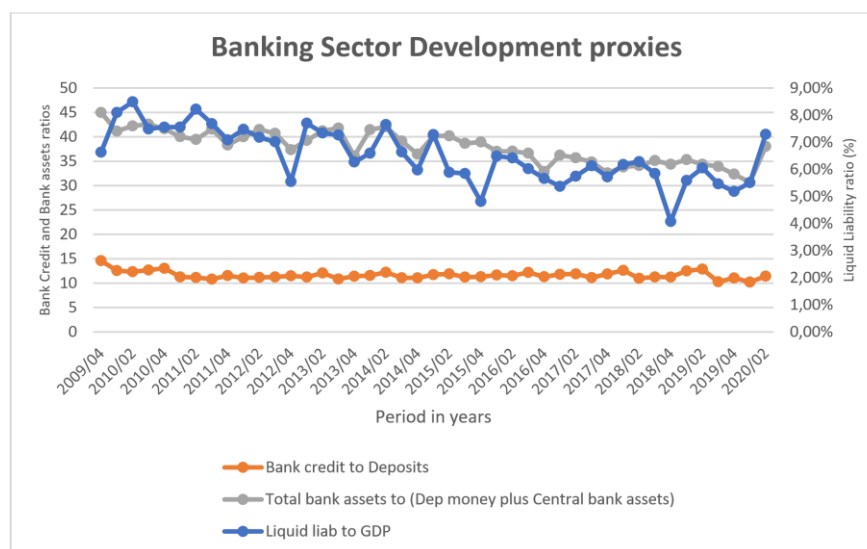

Figure 1. Trends of banking sector development proxies in South Africa

Source: South African Reserve Bank (2020).

When using the ratio of bank credit to total deposits, the results show that banking sector development slowed down, especially from 2009Q4 to 2011Q4. This decline may be attributed to the global financial crisis of 2008/2009 which resulted in the introduction of restrictions on credit growth in response to a steep rise in defaulting debtors (Verick & Islam, 2010). Since then, relative stability has been observed.

On 1 March 2020, the South African Reserve Bank cut the repo rate by 25 basis points. Bureau information from the National Credit Regulator notes that the number of consumers with impaired credit records increased as at 2019Q3 (GCR Ratings, 2020). However, financing conditions for stokvels by the banking sector remain uncertain, contributing to currency weakness. Furthermore, the banking sector experienced stress and was forced to reduce the supply of credit to the economy. This could have an impact on stokvels (GCR Ratings, 2020). The advent of the Covid-19 pandemic has caused a negative impact on asset quality for the banking sector in South Africa (GCR Ratings, 2020).

This article is organized as follows: Section 2 provides evidence from the empirical literature. Section 3 describes the data collection methodology of this study. Section 4 explains the ARDL approach results in discussion and interpretation. Lastly, the study summary of the research.

2. Empirical Literature Review

Due to a lack of access to formal credit markets, low- and middle-income households turn to other lenders, relatives, acquaintances and loan sharks for their financial needs (Saito, Mekonnen, & Spurling, 1994; Bolnick, 1992). (Loan sharks are called *mashonisa* in South Africa. Literally translated, it means making someone bankrupt) The banking sector, which provides a wide range of financial services, particularly in South Africa, seems to be inefficient when providing credit to low- and middle-income households (Mashigo, 2012). As a result of this structural deficiency of formal banking institutions, the low- and middle-income households participate in stokvels, where they access credit and small amounts of loans (Matuku & Kaseke, 2014). Similar results were reported by Otchere, Senbet, and Simbanegavi, (2017) and Allena, Carletti, Culle, Jun, Senbeth, and Valenzuelaj (2013) in Africa, Cotler and Woodruff (2008) in Mexico.

James (2017) examined how group lending can be used to access credit by poor households. The findings from the study revealed that group lending mechanisms improve social capital and reduce the barriers that deter access to credit. Group lending appears to be better equipped when dealing with issues of adverse selection and moral hazard, collateral constraints as well as high transaction costs. However, Vokorokosva and Peller (2013) sought to identify the determinants of household credits in Slovakia. They observed that credits are granted to households from banking institutions. Credits to households are positively influenced by disposable income and negatively influenced by the unemployment rate, real interest rate and earnings from property. It is not surprising that many households participate, in large numbers, in informal financial groupings.

Biyase and Fisher (2017) investigated the determinants of access to formal credit by poor households in South Africa. The results of their study suggested that the age of the household head, race, educational level, gender, employment and geographic location affect the propensity to borrow by low- and middle-income households in South Africa. However, Quach, Mullineux, and Murinde (2014), using cross-sectional data from the two households' surveys undertaken for the period 1992/1993-1997/1998, analysed the effect of household credit on the economic welfare of households. The results of the study found that credit has a greater positive effect on the economic welfare of poorer households. They also found that the age of the household head, the household size, land ownership, and savings and the availability of credit at village level are key factors that affect household borrowing. Inherently, one is inclined to motivate the view that the development of the banking sector would be incomplete without accounting for these attributes of the, otherwise, financially excluded sections of society.

Sekyi (2017) focused on the determinants of access to credit and loans by rural households in the Wa Municipality. The empirical results showed that gender, age, farming and trading occupations, credit history and household income are significant determinants of rural households' credit access. To ease rural credit constraints, informal financial institutions should increase their presence in the rural communities. By extension, opportunities are evident for the formal financial sector to develop credit and other financial products that meet the profile of the unbanked populations across the world.

In the present situation, and as Nawai and Shariff (2010) postulate, the character of the borrower's collateral requirements, capacity or ability to repay, and condition of the market should be considered before giving loans to the borrowers. Similarly, Rubaszek and Serwa (2012) applied a life-cycle model with individual income uncertainty to investigate the determinants of credit to households. The results of the study showed that the value of household credit to GDP ratio depends on (i) the lending-deposit interest rate spread, (ii) individual income uncertainty, (iii) individual productivity persistence and (iv) generosity of the pension system.

Snow and Buss (2001) view microcredit as a method for linking the formal and informal sectors of African economies to increase the reach of the formal sector. However, according to Nawai and Shariff (2010), loans given to the poor are very small and are for a short-term period. Collateral is not needed, and borrowers are required to make weekly repayments.

The majority of the world's poor live in rural areas of developing countries, with little access to financial services. Setting up Village Savings and Loan Associations (VSLAs) has become an increasingly widespread intervention, aimed at improving local financial intermediation. Ksoll, Lilleor, Lonborg, and Rasmussen (2016) using a cluster randomised trial, investigated the impact of VSLAs in Northern Malawi over a two-year period. The results of their study found evidence of positive and significant intention to treat effects on several outcomes, including the number of meals consumed per day, household expenditure as measured by the USAID Poverty Assessment Tool and the number of rooms in the dwelling. This effect is linked to an increase in savings and credit obtained through the VSLAs, which has increased agricultural investments and income from small businesses.

Baiyegunhi, Fraser, and Darroch (2010) examined the effect of credit constraints on household welfare among the clients of the Eastern Cape Rural Finance Corporation (ECRFC), in the Amathole District Municipality of the Eastern Cape Province. Credit constrained households are identified based on direct elicitation of credit status from survey questions, and then an endogenous switching regression model is used to analyse the effect of credit constraints on the welfare of a representative sample of 150 households. The empirical results of the study indicated that households with older household heads, more access to land, higher value of assets and higher debt repayment capacity are less likely to be credit constrained, and that increased access to credit can improve the welfare of credit constrained households.

Chen and Jin (2017) explored Chinese households' credit using data from the 2011 China Household Financial Survey. Over half of the sample (53,21%) reported using credit and only 19,77% of the sample used formal credit. The use of formal credit was associated with the socio-economic characteristics of household heads (e.g., employment and education) and of households (e.g., income and net worth). Their study findings suggested that promoting financial inclusion in China, involves expanding access to formal credit among socially and economically disadvantaged households.

Earlier studies by Okurut and Schoombee (2007), using household data in Uganda for the period 1999-2000, investigated the individual and household characteristics that influenced access to the credit market. Their study results suggested that access to the credit market was significantly influenced by gender, household wealth, age, regional location and urban/rural location. Their results suggested that in Uganda, at the national level, lenders' credit rationing behaviour is negatively and significantly influenced by the borrowers being male. Since males, arguably, control household resources in Uganda, this makes them more creditworthy and reduces their probability of being rationed in credit markets. Their results suggested that there is gender discrimination against women in Ugandan credit markets. Their results are consistent with those of Zeller (1994), who observed that being female has a significant negative effect on credit access in rural Gambia.

3. Research Methodology

3.1 Data Description and Variables

This study used quarterly time series secondary data ranging from 1987Q3 to 2020Q1, which was extracted from South African Reserve Bank (SARB). The main variables of this study include banking sector efficiency and measures of stokvels used in this study are categorised into two, namely, (1) household savings as per percentage of GDP, and (2) savings deposits as a ratio of GDP. The measures of banking sector efficiency discussed in this section are (1) domestic credit to private sector by banks (% of GDP), (2) domestic credit by banks to all economic sectors (% of GDP), (3) financial sector credit to the private sector (% of GDP), (4) average return on equity ratio, (5) total costs to total income of all commercial banks ratio and (6) commercial-central bank assets ratio.

3.1 Pre-Estimation Diagnostics

Three types of pre-estimation diagnostic analytical techniques were conducted, in this study, to understand the nature and character of the data before analysing it, namely, descriptive statistical analysis, correlation analysis and ooptimal lag lengths, using both E-views and Stata software packages. The chosen pre-estimation diagnostics software packages are not complicated to use and do not require any prior programming (Rykov, Balakrishnan, & Nikulin, 2010, p. 369).

3.1.1 Descriptive Statistical Analysis

Descriptive statistics were utilized to define the features of stokvels and banking sector efficiency factors during the study period. The mean, median, minimum, maximum, standard deviation and observation values connected with the variables under examination were employed as descriptive statistics in Table 1 shows the descriptive statistics for stokvels and banking sector efficiency variables considered in this analysis from 1987Q3 to 2020Q1, as well as the economic time series data.

Table 1. Descriptive statistics for South Africa

Variables	Mean	Median	Maximum	Minimum	Std. Dev.	Observations
TBAD	7,95	38,2	44,98	30,65	3,39	43,00
SSI	0,03	0,03	0,04	0,01	0,01	43,00
SS 'Millions'	18 428,67	17 782,41	30 985,12	4 609,58	7 289,30	43,00
SGDP	(0,01)	0,00	0,03	(0,07)	0,03	43,00
RRCB 'Millions'	79 790,05	79 871,00	116 875,00	48 963,00	20 854,31	43,00
NEXGDP	(0,01)	(0,01)	0,03	(0,03)	0,01	43,00
LLGDP	0,07	0,06	0,08	0,04	0,01	43,00
IR	0,10	0,10	0,11	0,07	0,01	43,00
GDPG	0,01	0,02	0,07	(0,16)	0,03	43,00
CPI	0,05	0,05	0,07	0,02	0,01	43,00
BCD	11,65	11,43	14,60	10,23	0,79	43,00

Source: Author's compilation from E-views.

Note. ***; **; * indicates statistical significance at 1%, 5% and 10%, respectively. TBAD is the total bank assets to deposit, SSI is the stokvel savings as a percentage of income, STOKVSAVS is stokvel savings, SGDP is the savings to GDP, RRCB is the Bank's Required Reserves with the central bank, NEXGDP is the net exports to GDP, LLGDP is the liquid liability to GDP, IR is the interest rate, GDPG is the GDP growth rate, CPI is the consumer price index, BCD is the bank credit to deposit.

3.1.2 Correlation Analysis

The correlation matrix presented in table 2 shows that the real interest rate (RIR) has a very strong correlation of 0.7160 with stokvel savings STOKVSAV. There is a positive significant relationship between RIR and STOKVSAV in South Africa. The positive correlation between RIR and STOKVSAV is articulated in research done by Shaw (1973), McKinnon (1973) and Xaba (2018). Shaw (1973) and McKinnon (1973) stated that real interest rates have a positive impact on economic growth and savings. Shaw (1973) and McKinnon (1973) suggested that the South African government should lessen restrictions and regulations, which would lead to an increase in real interest rates, would result in an increase in stokvel savings and ultimately lead to economic growth.

Table 2. Correlation matrix

Variable	TBAD	SSI	SGDP	RR	NEXGDP	IR	GDPG	CPI	BCD
TBAD	1.0000								
STOKVSAV	-0.6450***	1.0000							
SGDP	-0.1932	0.0934	1.0000						
RR	-0.8340***	0.7160***	0.0629	1.0000					
NEXGDP	0.3223**	-0.3964***	0.1393	-0.2897*	1.0000				
IR	-0.3751**	0.0527	0.1319	0.3191**	0.3076**	1.0000			
GDPG	0.1392	-0.1997	-0.0887	-0.3313**	-0.1547	0.3266**	1.0000		
CPI	0.1574	-0.1307	-0.0642	-0.2812*	-0.2354	0.1620	0.3645**	1.0000	
BCD	0.3822**	-0.3311**	-0.0586	-0.2838*	0.5714***	0.3056**	0.0055	-0.0541	1.0000

Source: Author's compilation from E-views.

Note. ***; **; * indicates statistical significance at 1%, 5% and 10%, respectively.

TBAD is the total bank assets to deposit, STOKVSAV is the stokvel savings of income, SGDP is the savings of GDP, RR is the real rate with the Central Bank, NEXGDP is the net exports to GDP, LLGDP is the liquid liability to GDP, IR is the interest rate, GDPG is the GDP growth rate, CPI is the consumer price index, BCD is the bank credit to deposit.

3.1.3 Optimal Lag Lengths

An important preliminary step in model building, cointegration analysis and impulse response analysis is the selection of the VAR lag order. This study uses the commonly used lag order selection criteria to choose the lag order, such as LR, final prediction error (FPE), Akaike Information Criterion (AIC), Schwarz Bayesian Criterion (SBC) and Hannan-Quinn information criterion (HQ).

Table shows the results of lag length, where the lag length 3 is suggested by the criteria LR, FPE, AIC, SC and HQ. To select the optimal lag order for the VAR from table 5.5, it is important to select the high enough lags to ensure that the optimal order is not exceeded. This study VAR lag order selection criteria it is established that the optimal lag length is 3 chosen by criteria's model, because the choice of lag length can drastically affect the results of the cointegration analysis (Brooks, 2008).

Table 3. Optimal lag lengths

Lag length selection – Bank Credit						
Banking Sector Efficiency						
Lag	Log	LR	FPE	AIC	SC	HQ
0	50.98163	NA	0.000192	-2.881272	-2.791487*	-2.850653*
1	54.60542	6.608079	0.000197	-2.859142	-2.589784	-2.767283
2	60.95780	10.83641*	0.000172	-2.997517	-2.548588	-2.844420
3	65.45244	7.138550	0.000168*	-3.026614*	-2.898113*	-2.812277
4	69.21159	5.528169	0.000173	-3.012447	-2.204374	-2.736871
5	72.53115	4.491158	0.000184	-3.972420	-1.984775	-2.635605
6	73.78544	1.549421	0.000224	-2.810908	-1.643691	-2.412854
7	78.97878	5.804326	0.000219	-2.881105	-1.534316	-2.421811
8	81.64149	2.662707	0.000253	-2.802441	-1.276080	-2.281908

Source: Author's own compilations, data from SARB (2020).

LR: sequential modified LR test statistic (each test at 5% level); FPE: Final prediction error; AIC: Akaike information criterion; SC: Schwarz information criterion; HQ: Hannan-Quinn information criterion.

4. ARDL Long-Run Results

4.1 Bounds F-Test for Integration

The study used banking sector efficiency proxy for banking sector development. In this section, the long-run relationship between stokvel savings and banking sector development was examined. The ARDL bounds testing procedure was applied for this purpose. After determining the lag length of 3, the bounds F-test was used to establish the presence of a long-run relationship of the variables under examination. The results presented in table 4 show that the computed F-statistics are greater than the upperbound critical values at the 1% level. Thus, it can be concluded that there is a long-run relationship between stokvel savings and banking sector development.

Table 4. Bounds F-test for integration

Dependent variable		Function	F-test statistic	Lower and Upper Bounds
Model	Stokvel savings and banking sector efficiency	STOKVSAV(BSE)		
BSE		STOKVSAV (BSE)	22.9758***	6.84 – 7.84
STOKVSAV		BSE(STOKVSAV)	16.2888***	6.84 – 7.84

Source: Author's own compilations, data from SARB (2020).

4.2 Estimation of Short-Run Relationship

The results of the short-run relationship between banking sector development measured by banking sector efficiency and stokvel savings are presented in table 5. The error correction model portrayed the expected negative and significant coefficient of -0,715873 (p<0,05). The result suggests that a deviation from banking sector equilibrium will be adjusted at a speed of approximately 72% in the ensuing period. Similar results are observed when the model is run with stokvel savings as the dependent variable. The ECT portrayed a negative and statistically significant coefficient of -0,421153. This means that variations in the system will adjust to

equilibrium by approximately 42%. Thus, it can be concluded that in the short-run, stokvel savings and banking sector development, measured by the ratio of bank credit to total deposits, are cointegrated.

Table 5. The short-run relationship between BSD measured by BSE and STOKVSAV

	Short-run coefficient							
	Dependent Variable: D(DSTOKVSAV)				Dependent Variable: D(DBANK CREDIT TO DEPOSITS)			
Variable	Coefficient	Std. Error	t-Statistic	Prob.	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000194	0.000868	0.223395	0.8245	0.056253	0.122148	0.460534	0.6479
D(DBANK_CREDIT_TO_DEPOSITS(-1))	-0.000642	0.000644	-0.996954	0.3254	0.219917	0.154093	1.427168	0.1621
D(DSTOKSAV(-1))	0.212150	0.160002	1.325924	0.1932	-1.683511	14.72103	-0.114361	0.9096
ECT(-1)	-0.421153	0.072957	-5.772657	0.0000	-0.715873	0.108579	-6.593106	0.0000
R-squared				0.611931				0.709483
Adjusted R-squared				0.579591				0.685274

Source: Author's own compilations, data from SARB (2020).

4.2 Diagnostic Statistics

4.2.1 Model Efficiency Test: LM Test

In order to ensure that the empirical model is correctly specified, the Breusch-PaganGodfrey Serial Correlation LM Test and Heteroskedasticity Test: Breusch-Pagan-Godfrey were conducted. The results are in the sections below.

The results in table 6 show that there is no presence of serial correlation in the estimated model, since the p-values of the observed R-squared for banking sector efficiency 6,255570 are greater than the 0,05 level of significance.

Table 6. Breusch-Pagan-Godfrey serial correlation LM test

	Bank Credit BSE
F-statistic	3.058784
Obs*R-squared	6.255570
Prob. F(2,27)	0.0604
Prob. Chi-square(2)	0.0538

Source: Author's own compilations, data from SARB (2020).

4.2.2.1 Test for Heteroskedasticity

The second diagnostic test is for heteroskedasticity where the null hypothesis (H_0) is that residuals are homoscedastic. The alternative hypothesis is that the residuals are heteroskedastic and, thus, the variance is not constant. The rejection rule states that the null hypothesis should be rejected if the probability value of observation R-squared is less than the 0,05 level of significance. The probability of Chi-square 0,0814 is greater than 0,05 and the test fails to reject the null hypothesis of constancy of variance among the residuals in the model and, thus, are deemed to be homoscedastic. The results are presented in table 7 below.

Table 7. Heteroskedasticity test

	Bank Credit BSE
F-statistic	2.288960
Obs*R-squared	8.294115
Scaled explained	6.615932
Prob. F(8,29)	0.0793
Prob. Chi-square(8)	0.0814
Prob. Chi-square(8)	0.1576

Source: Author's own compilations, data from SARB (2020).

4.2.2.2 Stability test in ECM

The results of the stability tests depicted in figure 1 show the blue lines within the 5% level of significance, thus, there is long-run stability between the variables in the study model. To assess the stability of the long-run and short-run relationship between stokvel savings and banking sector efficiency, the CUSUM applied at 5% level of significance. When the CUSUM line lies in between the red lines, it shows that the model is stable. However, variables are unstable when the CUSUM line is out of the two lines. Therefore, the study confidently concludes that, in South Africa, the relationship between banking sector development and its predictors is long-run in nature (see Figure 2).
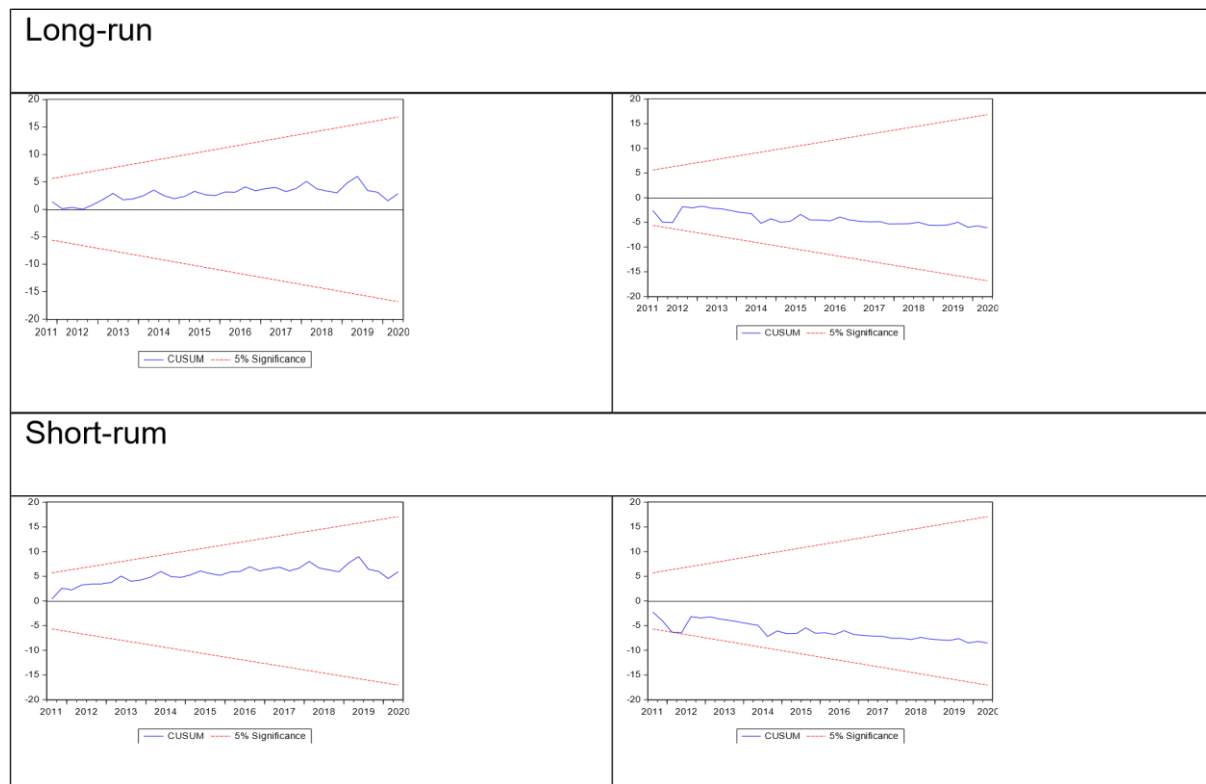
Figure 2. CUSUM stability test

5. Conclusion

The long-run relationship between stokvels and banking sector development was estimated using banking sector efficiency as the proxy for banking sector development. It was observed that in the long-run, stokvel savings has a negative relationship with banking sector development. However, its negative influence is insignificant. This may be attributed to the fact that only a fraction of informal savings is deposited into the banking system, thus negative banking sector development initiatives. The results of the error correction model for the ratio of bank credit to total deposits, the measure for banking sector efficiency expected negative and significant coefficient. Further research on a similar study can be conducted with inclusion of all banks that make up the banking sector and their impact on South Africa's economic growth, is recommended by the study.

Acknowledgments

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