Stokvel saving and banking sector liquidity in South Africa: cointegration and short-run dynamics

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ABSTRACT

Stokvel is a term used in South Africa to denote an informal saving club. A large population of South Africa are members of one stokvel or the other. A large amount of stokvel savings go unaccounted for in the banking sector resulting in distortions in the flow of funds in the banking sector. Thus, the objective of this paper was to establish the presence of a long-run relationship and causality between stokvel savings, money supply, gross domestic product growth rate and banking sector liquidity in South Africa. Applying the Autoregressive Distributed Lag (ARDL) and Error Correction Model (ECM) techniques on quarterly time series data for the period from 1987Q3 to 2020Q1, the study reveals that in the long run, stokvel savings and money supply were found to have a negative relationship with banking sector liquidity albeit insignificant, however, gross domestic product growth rate exhibited a negative and statistically significant relationship at 1%. The coefficient of the error correction model (ECM(-1)) was, as expected, negative and statistically significant thus providing evidence of a short-run relationship. This study concludes that informal savings must be included in the formal banking services to harness the cash that is held by the informal sector and thus improve banking sector liquidity while minimizing the prevalence of financial disintermediation.

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Introduction

Banks don’t grant credit to low- and middle-income households; as such, these households are regarded as unbanked and excluded from formal credit services due to high default probabilities (Ahmad and Ariff, 2007). 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 and Spurling, 1994; Bolnick, 1992). The banking sector, which provides a wide range of financial services, particularly in South Africa, seems inefficient when providing credit to low- and middle-income households (Mashigo, 2012). Banks have developed effective monitoring systems. These include investing in credit scoring models and other sophisticated techniques to discriminate between high and low-risk borrowers and thus overcome the information asymmetry problem. It is worth noting that banks will not grant poor households and unemployed credit. As a result of this structural deficiency of formal banking institutions, low- and middle-income households participate in stokvels, where they access credit and small amounts of loans (Kaseke and Matuku, 2014). In South Africa, the term ‘stokvel savings’ denotes informal household finance clubs. While, worldwide, stokvel savings are commonly known as rotating savings and credit associations (ROSCAs) (Bophela and Khumalo, 2019:26, Mashigo and Schoeman, 2012:50, Verhoef, 2001:259).

The current study main objective is to establish the presence of a long-run relationship between stokvel savings and banking sector liquidity in South Africa. Previous studies have shown that only small portions of populations in developing countries use formal credit (Mumtaz and Whiteford, 2021; Asiamah, Steel and Ackah, 2021; Cruz-García and Peiró-Palomino, 2019). Only a few studies
(Mashigo and Schoeman, 2012:50; Mashigo, 2009:1; Karlan, Savonitto, Thuysbaert and Udry, 2017:3079) examined how stokvel can be used to improve credit access by low- and middle-income households. Their studies found that group lending mechanisms improve social capital and reduce the barriers that deter access to credit. The study argues that there is no evidence of prior studies that considered the role of stokvel saving and banking sector liquidity. This study is noteworthy because it has tried to overcome the weaknesses of existing work which is available in South Africa, Africa and international level. Furthermore, this study contributes to and extends the existing literature by benchmarking low- and middle-income household credit; these are essential components of financial inclusion in South Africa.

The last four sections of the study have been separated. Section 2 provides evidence from the empirical literature. Section 3 carries out a methodology that shows econometric model specification, data, definition of variables and a priori expectation are described in this section. Section 4 explains the ARDL and ECM approach results in discussion and interpretation. Lastly, the study summary of the research.

**Literature review**

South African banks exclude most low- and middle-income households from access to formal credit finance (Biyase and Fisher, 2017:50; Kajiamo-Shakanu and Evans, 2006:23). However, stokvel provide easy access to credit and small loans from their savings to facilitate income-generating ventures of all-inclusive economic activities (Shuaib, 2018; Ngcobo and Chisasa, 2018).

Snow and Buss (2001:296) 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 (2010:152), loans given to the poor are minimal and are for a short-term period. Collateral is not needed, and borrowers are required to make weekly repayments. Similarly, Ngcobo and Chisasa (2018:240) study the characteristics of credit instruments issued by stokvels to households in South Africa. The study’s results show that stokvels issue short-term loans from less than three to six months. Thus, participating in a stokvel enhances the probability of accessing credit compared to the alternative of accessing credit from banks and similar formal lenders.

James (2017:281) examined how group lending can be used to improve access to credit by households. The study’s results revealed that group lending mechanisms improve social capital and reduce the barriers that deter access to credit. Similarly, Karlan, Savonitto, Thuysbaert and Udry (2017:3079) examined savings-led microfinance programmes in poor rural communities in developing countries to establish groups that save and then lend out the accumulated savings to each other. Their study’s results found that stokvels issue short-term loans from less than three to six months. Thus, participating in a stokvel enhances the probability of accessing credit compared to the alternative of accessing credit from banks and similar formal lenders.

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He 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, Lilléor, Lonborg and Rasmussen, 2016:70); Habumuremyi, Habamenshi and Mvuabo (2019:1) assessed the role of VSLAs in improving the social economic development of poor households in Murundi Sector in Karangi District of Rwanda. The findings revealed that VSLA promotes financial inclusion where the loan is proportional to savings. Ksoll, Lilléor, Lonborg and Rasmussen (2016:70) used a cluster randomised trial to investigate the impact of VSLAs in Northern Malawi over a two-year period. Their study found evidence of positive and significant intention to increase savings and CR obtained through the VSLAs, which has increased agricultural INVs and income from small businesses.

Owusu-Bempah, Bennet, Aamoako and Frempong (2013:108) examined the benefits of the informal sector to savings and loan companies. The research found that the informal sector is significant to savings and loan companies as the benefits of doing business with them far out-weighs the associated costs. Zondi (2016; ii) investigated why stokvel prevail as a credit and savings mechanism despite access to commercial financial services. The study found that there are interactions between stokvel groups and commercial banks in the form of monetary flow.

Osman, Eldaw, Mohamed, Albadaly and Eissa (2020:136) used the ARDL model for the period 1985–2018 in Saudi Arabia to investigate financial sector development on economic growth. The results showed that domestic credit to the private sector is statistically insignificant in explaining the per capita growth rate in both the short- and long-run. Using the same measure of long-term banking sector development, Ncanywa and Mabusela (2019:1) found that bank credit to the private sector and liquid liabilities positively influence economic development, with gross domestic savings exhibiting a negative influence in the sub-Saharan countries in the short- and long-run.

Kapaya (2020:46) used the ARDL model in Tanzania with bound testing procedures for the period 1980–2017. The purpose of their study was to empirically weigh the evidence for financial depth, liquidity and efficiency role to economic growth, and test for cointegration between financial development variables and economic growth. The study's results suggested that financial system depth is positively related to economic growth in the short-run and that financial system liquidity and efficiency are strongly and negatively associated with economic growth both in the short- and long-run. Moreover, it was found that banking sector development is cointegrated with economic growth.
In their study using the ARDL model in Nigeria for the period 1970–2015, Adeleke and Awodumi (2018:5) examined bank credit supply determinants. The results showed a long-run relationship between bank credit to the private sector, real GDP, foreign liabilities, inflation, exchange rate, money supply, interest rate spread and reserve requirement at all levels of significance.

Research and Methodology

This section is divided into three sub-sections, namely econometric model specification, data, definition of variables and a priori expectation.

Econometric Model Specification

the ARDL model is suitable as it addresses the potential endogeneity problem and residual serial correlation problem (Narayan and Smyth, 2008). The ARDL model is presented in equation [1] as follows:

$$
\Delta \ln BSL_t = a_0 + \beta_1 BSL_{t-1} + \beta_2 STOKVSAV_{t-1} + \beta_3 GDPG_{t-1} + \beta_4 M3_{t-1} + \sum_{k=1}^{m1} \alpha_{1k} \Delta BSL_{t-k} + \sum_{k=1}^{m2} \alpha_{2k} \Delta STOKVSAV_{t-k} + \sum_{k=1}^{m3} \alpha_{3k} \Delta GDPG_{t-k} + \sum_{k=1}^{m4} \alpha_{4k} \Delta M3_{t-k} + \omega_t
$$

[1]

The long-run and short-run parameters of the equations are estimated once the cointegrating relationship has been detected. The cointegration relationship is estimated as follows:

$$
\Delta BSL_t = \beta_0 + \beta_1 BSL_{t-1} + \beta_2 STOKVSAV_{t-1} + \beta_3 GDPG_{t-1} + \beta_4 M3_{t-1} + \mu_t
$$

[2]

After confirmation that there exists cointegration among the variables in the long-run, equation [3] will be estimated using the ECM as follows:

$$
\Delta \ln BSL_t = a_0 + \lambda_1 ECM_{t-1} + \sum_{k=1}^{m1} \alpha_{1k} \Delta BSL_{t-k} + \sum_{k=1}^{m2} \alpha_{2k} \Delta STOKVSAV_{t-k} + \sum_{k=1}^{m3} \alpha_{3k} \Delta GDPG_{t-k} + \sum_{k=1}^{m4} \alpha_{4k} \Delta M3_{t-k} + \omega_t
$$

[3]

where:

- $\Delta$ = first difference
- $B1, B2, B3$ and $B4 =$coefficients of the long-run impacts
- $\alpha1, \alpha2, \alpha3$ and $\alpha4 =$coefficients of the short-run impacts
- $\omega =$ error

Data, definition of variables and a priori expectation

Data

This study was based on quarterly time series secondary data, which was extracted South African Reserve Bank (SARB, 2020) and Old Mutual South Africa ranging from 1987Q3 to 2020Q1. Table 1 in section 4.2.2 summarises all the information about the data, data sources and variables used.

Definition of variables

The main variables of this paper include the proxies for banking sector development (BSD) and stokvel savings (STOKVSAV). The measure BSD used in this study is banking sector liquidity (BSL). The measures of STOKVSAV used in this study include gross domestic product growth (GDPG) and money supply (M3).

Banking sector liquidity (BSL)

BSL was used as the third proxy for BSD. In this study, BSL is denoted by BS liquid liabilities as a percentage of GDP (Singh and Sharma, 2016; Laštůvková, 2016; Marozva, 2013; Marozva, 2015). Banking sector liquidity is expected to have a direct relationship with stokvel savings. The higher the liquidity the higher the households' incomes which then promotes stokvel savings. On the other hand, stokvel savings are expected to positively influence banking sector liquidity. The higher the stokvel savings the higher the liquid liabilities of the bank.

Stokvel savings (STOKVSAV)

In earlier empirical work, several authors (Makori, Matundura, and Mose, 2022; Khan, Teng, Khan, Jadoon and Rehan, 2017; Jagadeesh, 2015; Turan and Gjergji, 2014; Prinsloo, 2000) identified STOKVSAV deposit as a percentage of GDP as the most
suitable proxy of STOKVSAV in the context of South Africa. This is because stokvel savings help maintain high growth rates through their effect on capital formation and investment from stokvel savings. Similarly, Naumovska, Jovanovski and Gockov (2015) argued that the ratio of STOKVSAV deposits as a percentage of GDP is the best indicator of savings mobilisation ability and the banking sector in the economy. Moreover, Remble, Marshall and Keeney (2013), and Prinsloo (2000) described STOKVSAV deposit (% of GDP) as a portion of current income that is put aside and not consumed after direct taxes and other expenses have been paid off.

**Gross Domestic Product Growth (GDGP)**

Gross Domestic Product is the total value of goods and services produced within the borders of an economy or a country during a given period of time measured in market prices (Ribaj and Mexhuani, 2021; Mogale, Mashamaite and Khoza, 2018; Zwane, Greyling and Maleka, 2016; Jagadeesh, 2015).

**Money Supply (M3)**

M3 includes both cash and deposits that can be used almost as quickly as cash (Mierau and Mink, 2013; Omodero (2019); Tenenbaum, 2021).

**Variables, proxies, data source(s) and expected signs**

It is evident from these factors that stokvel savings play a major role in influencing the development of the banking sector. Although there are arguments in the literature that stokvels, like other forms of savings, influence banking sector development, no study empirically tested the hypothesis that stokvels lead to banking sector development. Control variables were included in the model to gauge the partial independent correlation between stokvel savings and banking sector development.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Authors</th>
<th>Summary of the findings</th>
<th>Expected sign (+/-)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gross Domestic Product Growth (GDGP)</strong></td>
<td>Yartey and Adjasi (2007)</td>
<td>The increased economic growth improves the people's welfare, their gross domestic product (GDP) per capita, their appetite for investment products, their wealth levels and disposable income.</td>
<td>+</td>
</tr>
<tr>
<td><strong>Stokvel Savings (STOKVSAV)</strong></td>
<td>Fry (1980)</td>
<td>Noted that stokvel savings enhance the number of available funds that banks can channel towards lending to the economy’s productive sectors.</td>
<td>+</td>
</tr>
<tr>
<td><strong>Money Supply (M3)</strong></td>
<td>Jawaid, Qadri and Ali (2011)</td>
<td>A tool that boosts economic growth based on an unexpected increase in the money stock.</td>
<td>+/-</td>
</tr>
</tbody>
</table>

*Source:* Author’s construction

**Findings and discussions**

**Estimation of the long-run and short-run relationships**

The ARDL co-integration model was implemented with automatic lag selection using E-views version eleven. The estimated results are presented in Table 2, where BSL is the dependent variable when regressing against STOKVSAV, GDGP, and M3. All three explanatory variables were found to have a negative relationship with BSL, with GDGP registering a strong statistical significance at 1%.

In the second model, all three explanatory variables were found to have a statistically insignificant contribution to STOKVSAV. Notably, the coefficient for BSL was negative ($\beta$=-4.220597). This result may be attributed to the fact that most STOKVSAVs do not make it into the mainstream formal BS, thus compromising the liquidity of the BS.

The third model used gross domestic growth as the dependent variable. Only STOKVSAV was found to influence GDPG positively ($\beta$=0.023851). However, the relationship was statistically significant (p<0.01). Both BSL ($\beta$=0.700150) and money supply showed ($\beta$=-0.002536) a negative and statistically significant relationship with GDGP, suggesting that low liquidity and M3 will retard economic growth in the long-run.

In the final model, all three explanatory variables (BSL, STOKVSAV, GDGP) revealed a statistically insignificant relationship with M3. Other than BSL, STOKVSAV and GDGP were found to have a negative long-run relationship with M3.
Table 2: BSL ARDL Long run Result- Unrestricted Constant and Unrestricted Trend

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>St.Error</th>
<th>t.Statistic</th>
<th>Prob</th>
</tr>
</thead>
<tbody>
<tr>
<td>STOKVSAV</td>
<td>-0.004379</td>
<td>0.010109</td>
<td>-0.433203</td>
<td>0.6677</td>
</tr>
<tr>
<td>GDPG</td>
<td>-0.410864***</td>
<td>0.106951</td>
<td>-3.925747</td>
<td>0.0004</td>
</tr>
<tr>
<td>M3</td>
<td>-0.000403</td>
<td>0.000620</td>
<td>-0.650196</td>
<td>0.5201</td>
</tr>
</tbody>
</table>

Unrestricted Constant and Unrestricted Trend – STOKVSAV

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>St.Error</th>
<th>t.Statistic</th>
<th>Prob</th>
</tr>
</thead>
<tbody>
<tr>
<td>BSL</td>
<td>-4.220597</td>
<td>4.921211</td>
<td>-0.857634</td>
<td>0.3996</td>
</tr>
<tr>
<td>GDPG</td>
<td>2.849069</td>
<td>2.399166</td>
<td>1.187525</td>
<td>0.2466</td>
</tr>
<tr>
<td>M3</td>
<td>0.004418</td>
<td>0.009500</td>
<td>0.465070</td>
<td>0.6461</td>
</tr>
</tbody>
</table>

Unrestricted Constant and Unrestricted Trend – GDPG

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>St.Error</th>
<th>t.Statistic</th>
<th>Prob</th>
</tr>
</thead>
<tbody>
<tr>
<td>BSL</td>
<td>-0.700150**</td>
<td>0.317921</td>
<td>-2.202777</td>
<td>0.0395</td>
</tr>
<tr>
<td>STOKVSAV</td>
<td>0.023851**</td>
<td>0.011079</td>
<td>2.152793</td>
<td>0.0437</td>
</tr>
<tr>
<td>M3</td>
<td>-0.002536***</td>
<td>0.000798</td>
<td>-3.178686</td>
<td>0.0047</td>
</tr>
</tbody>
</table>

Unrestricted Constant and Unrestricted Trend – M3

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>St.Error</th>
<th>t.Statistic</th>
<th>Prob</th>
</tr>
</thead>
<tbody>
<tr>
<td>BSL</td>
<td>30.67825</td>
<td>53.05344</td>
<td>0.578252</td>
<td>0.5670</td>
</tr>
<tr>
<td>STOKVSAV</td>
<td>-0.544888</td>
<td>3.008125</td>
<td>-0.181139</td>
<td>0.8574</td>
</tr>
<tr>
<td>GDPG</td>
<td>-20.18658</td>
<td>11.93396</td>
<td>-1.691523</td>
<td>0.1002</td>
</tr>
</tbody>
</table>

Source: Author’s own compilations, data from SARB and Old Mutual South Africa (2022)

The error correction model (ECM)

To tie the short-run behaviour of BSD to its long-run value, the error correction term (ECT) was used for this purpose (Gujarati & Porter, 2009:764; Puatwoe & Piabuo, 2017:13). The ECT shows the speed of adjustment to restore the equilibrium in the long-run. In other words, the ECT coefficient shows how quickly variables converge to equilibrium. To confirm the short-run relationship, the coefficient of the ECT should be negative and statistically significant, as suggested by Pahlavani, Wilson and Worthington (2005). The ECM results are summarised in the table below.

Table 3: ECM Results

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>ECM(-1) Coefficient</th>
<th>T-Statistic</th>
<th>Prob</th>
</tr>
</thead>
<tbody>
<tr>
<td>BSL(D)</td>
<td>-0.704064</td>
<td>-2.287834</td>
<td>0.0283</td>
</tr>
<tr>
<td>D(STOKVSAV)</td>
<td>0.272158</td>
<td>0.832110</td>
<td>0.4110</td>
</tr>
<tr>
<td>D(GDPG)</td>
<td>-0.099717</td>
<td>-0.285860</td>
<td>0.0000</td>
</tr>
<tr>
<td>D(M3)</td>
<td>-0.854019</td>
<td>-4.790216</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

Source: Author’s own compilations, data from SARB and Old Mutual South Africa (2022)

The coefficient of the error correction term [ECT(-1)] for BSL was found to be negative and statistically significant (-0.704064; p<0.05), implying that approximately 70.4% of the disequilibrium is corrected automatically by the system in the following year. Similarly, when the model is run with STOKVSAV, GDPG, and M3 as the dependent variables, the coefficients for the ECT for DGDPG (β=-0.099717) and M3 (β=0.854019) were found to be negative and statistically significant at the 1% confidence level. The result implies that any variations from equilibrium will be corrected by approximately 10% and 85% in the year ahead. However, when STOKVSAV was used as the dependent variable, there was no evidence that a short-run relationship existed with BSL.
The objective of this paper to establish the presence of a long-run relationship between stokvel savings and banking sector liquidity. In the long-run the first model explanatory variables were found to have a negative relationship with BSL, with GDPG registering a strong statistical significance at 1%. In the second model STOKVSAV and GDPG relationship was statistically significant (p<0.01). Both BSL and money supply showed a negative and statistically significant relationship with GDPG, suggesting that low liquidity and M3 will retard economic growth in the long -run. In the final model, all three explanatory variables revealed a statistically insignificant relationship with M3. The coefficient of the error correction model (ECM(-1)) was, as expected, negative and statistically significant and fell within the lower and upper bounds of the ECM of -1 and 0. Though the results are not uniform, the interaction between stokvel saving and banking sector liquidity had a negative on low- and middle income households. The study therefore urges the South African Reserve Bank (SARB) and Treasury Department (TD) to implement policies that should be set in a manner which banks grant credit to low- and middle-income households.

Acknowledgments

This research paper is a product of my unpublished Doctor of Philosophy’s degree 2023 thesis entitled: “The role of stokvels in banking sector development in South Africa”. This thesis may be found in the UNISA repository but is unpublished material.

Author Contributions: Conceptualization, L.N., J.C. and M.T.MT.; methodology, L. N., J.C. and M.T.MT, validation, L.N.; formal analysis, L.N., J.C. and M.T.MT.; investigation, L.N.; resources, L.N.; writing—original draft preparation, L.N.; writing—review and editing, L.N., J.C. and M.T.MT

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Conflicts of Interest: The authors declare no conflict of interest.

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Conclusions

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