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Shadow financial services and firm performance in South Africa

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Abstract: The last two decades have seen a sharp increase in shadow banking activities in both advanced and emerging economies. Shadow banks have therefore become an important part of financial markets due to their credit creation and capital allocation roles. This study investigates the impact of shadow banking on firm profitability in South Africa and evaluates the linkages between shadow banking and real economic activity. We employ single-equation cointegration methods and three measures of firm profitability in our analyses, and several macroeconomic and bank-specific variables are used as control variables. Our results are mixed showing that shadow banking has a negative impact on traditional banks' profitability whilst on the other hand it positively impacts non-financial firms and the overall measures of firm profitability. Our results indicate that both non-financial firms and non-bank financial institutions could be benefiting from the expansion in shadow banking activities. Targeted, functional regulation is suggested in order to promote economic activities in the shadow banking sector whilst at the same time limiting possible risks that may arise.

Sheunesu Zhou

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PUBLIC INTEREST STATEMENT

The shadow banking sector is an important component of financial markets globally and its growth has accelerated in the past decades. Shadow banks, which are financial institutions outside the formal banking sector involved in credit extension, play an important role in increasing finance available to borrowers. Shadow banks provide financing at a lower cost and on special contractual agreements, which are usually less stringent than formal banks. Therefore, shadow bank credit is expected to increase the profitability of non-financial firms. On the other hand, the participation of formal banks in shadow banking activities leads to a trade-off between formal banking and shadow banking activity. Thus, increased shadow banking should decrease bank profitability. The findings of this study show that these two propositions hold for South Africa. Shadow banking positively influence non-financial firm profitability and negatively impacts bank profitability.

Subjects: Economics; Monetary Economics; Econometrics; International Finance; Development Economics; Corporate Finance; Banking

Keywords: shadow banking; firm profitability; cointegration; macro-economic variables
JEL classification: C33; E44; G23

1. Introduction

The main argument for proliferation and growth of shadow financial services is that financial innovation promotes economic activity by enabling economic agents to ameliorate financial market imperfections (FSB, 2013; Henderson & Pearson, 2011). Any kind of financial innovation should therefore improve efficiency and effectiveness of financial markets. Shadow banking[1] literature argue that capital can be sourced at a lower cost and efficiently from shadow banks (Tang & Wang, 2015). By construct, firms should find capital from shadow banks relatively cheaper compared to mainstream capital markets and banks. Theoretically, this provides an alternative capital source to the two most reviewed in literature, mainly bank based and market-based capital (Boot & Marinč, 2010). Following this argument, one is persuaded to conclude that firms' profitability increases with an up-surge in shadow banking activity (Lu, Guo, Kao, & Fung, 2015). We test this proposition in this paper for South Africa using a unique data set on the growth of Other Financial Intermediaries (OFI). Our choice of variable is necessitated by lack of data on the more relevant function based narrow measure of shadow banking that is constructed by the Financial Stability Board (FSB).

The spirit of this paper is to provide empirical evidence on the impact of shadow banking on the real economy. Whilst several studies have investigated the relationship between firm profitability/performance and broad measures of financial development, no evidence is available that link shadow banking to firm performance. Studies by Lu, Guo, Kao, and Fung (2015) and Acharya, Khandwala, and Öncü (2013) argue that shadow banks have the propensity to finance non-financial firms and hence enhance the profitability of such firms. On the contrary, Pozsar and Singh (2011) establish that shadow banking is only an activity between shadow banks and traditional banks for the United States of America (US). We submit, therefore, that differences in structure of financial markets and regulatory environment are important determinants of the effect that shadow banking has on the economy. It is on this backdrop that this study analyses the impact of shadow banking on firm profitability in South Africa.

Studies closer to ours investigate the impact of macroeconomic factors on firm performance (Francis, 2013; Hirsch, Schiefer, Gschwandtner, & Hartmann, 2014; Kandir, 2008; McNamara & Duncan, 1995). Whilst these studies provide linkages between firm profitability and several macroeconomic and financial variables, no evidence exists that link shadow banking to firm performance. Our contribution is twofold, firstly, we analyse the impact shadow banking has on firm profitability. Furthermore, we disaggregate firm profitability in South Africa by considering banks and non-financial firms separately. Thus, we use industry data on banks and non-financial firms to reveal whether shadow banking benefits non-financial firms or banks only. To the extent of our knowledge, this is the first study that provides an analysis of the relationship between shadow banking and various measures of profitability.

This section is of an introductory nature. The rest of the paper proceeds as follows: Section 1.1 provides a concise description of shadow banking activities, with a special reference to South Africa. Section 2 provides empirical literature on the determinants of firm profitability and illustrate theoretically linkages between shadow banking and firm profitability. Measures of firm profitability are also reviewed. Sections 3 and 4 provides the methodology used in the study and estimation results, respectively. The paper concludes in Section 5.

1.1. Shadow banking activities in South Africa

Shadow banking as a term only became popular after McCulley (2009)'s paper in which he referred to financial activities done outside the normal banking sector. Several other studies have explored the growth and characteristics of shadow banking activities, with more literature focusing on

advanced economies (Meeks, Nelson, & Alessandri, 2017; Pozsar, Adrian, Ashcraft, & Boesky, 2013; Pozsar & Singh, 2011; Xiang & Qianglong, 2014). Recent studies have however centred on emerging markets as there has been a surge in shadow banking activities in these markets in the aftermath of the Global Financial Crisis (GFC). The Financial Stability Board (FSB) reports that shadow banking grew by an average of 10% between 2016 and 2017 compared to an increase averaging 6% in advanced economies (FSB, 2017). In South Africa specifically, shadow banking assets grew by a staggering R4.5 billion during the same period. Figure 1 shows that there has been a gradual increase in shadow banking assets from the year 2002. From Figure 1 one can see that during the crisis, there was a decrease in shadow banking growth but after the crisis, there is an upward trend again.

Of importance is the growth in assets of shadow banks relative to the growth rate of formal banks' assets. Prior to 2003, banks' share of financial assets has always been higher and growing compared to other financial institutions. Available data, however, shows that from 2003 the proportion of bank assets to total assets of the financial services sector has gradually dropped. Contrary to this is a gradual increase in the proportion of shadow banks assets. Is there a trade-off between shadow banking and formal banking or it is only a coincidence? Theoretically, a trade-off should exist between shadow banking and formal banking (Meeks et al., 2017). Two explanations support this trade-off, firstly, when there is shortage in funding, innovative financial agents introduce new ways of providing finance, usually outside mainstream banking activities (Adrian & Ashcraft, 2016). This could be a result of regulatory arbitrage or new technology. The second explanation hinges on profit incentive where formal banks are driven to engage in shadow banking activities, including securitisations and other forms of credit creation in expectation of higher earnings (Meeks et al., 2017; Tang & Wang, 2015). Formal banking institutions may direct more of their assets toward shadow banking activities with the expectation of earning higher profits whilst concurrently reducing assets for mainstream banking activities. Figure 2 illustrates the growth of shadow banking assets compared to other assets in the South African financial sector. One can clearly see from the diagram that as the proportion of assets held by traditional banks decreases, there is an increase in assets owned by shadow banks.

Furthermore, the pool of activities classified as shadow banking is wide and heterogeneous across countries owing to differences in the regulatory environment (FSB, 2017). Pozsar et al. (2013) undertake a comprehensive analysis of activities and firms classified under shadow banking in the US. They compare shadow banking to commercial banks of the early 1900, which operated without a public backstop and argue for possible benefits that can be derived from shadow banking. Shadow banking activities include asset securitisation, credit from non-bank firms, wholesale funding, enhanced credit intermediation and direct lending from finance companies (Acharya et al., 2013;

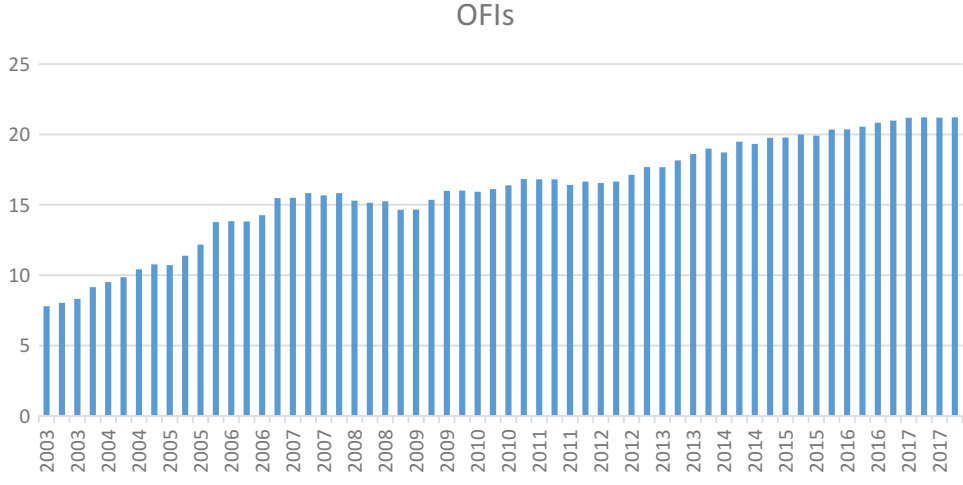

Figure 1. Growth of assets of other financial intermediaries.

Source: South African Reserve Bank

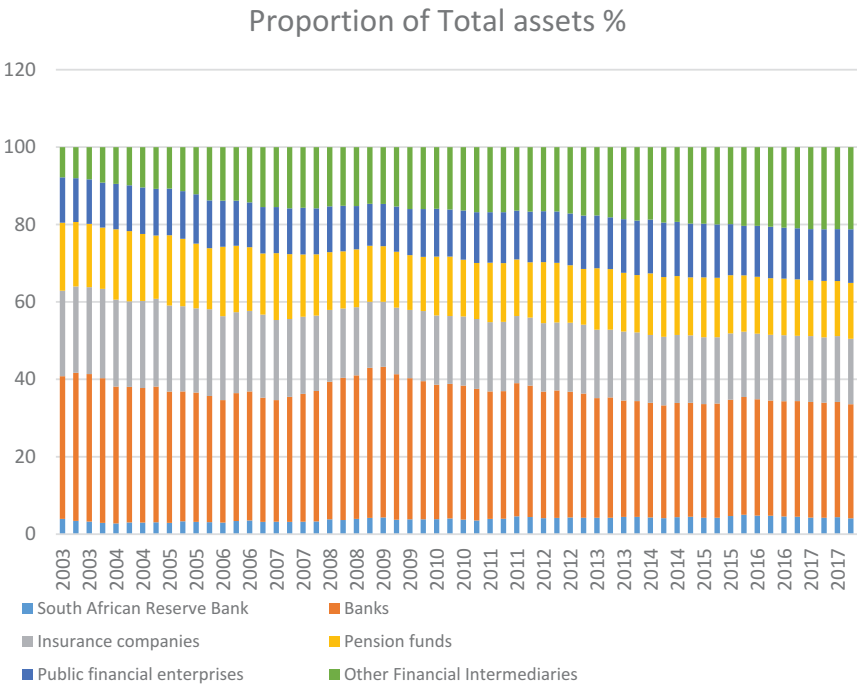

Figure 2. Proportion of OFIs to total assets of the financial sector.

Source: South African Reserve Bank

Pozsar et al., 2013). In addition, shadow banking institutions can also be identified including finance companies, money market funds (MMFs), hedge funds, other investment funds, real estate investment trusts and real estate funds (hereafter REITS), central counterparties, money lenders, structured finance vehicles, trust companies, and captive financial institutions and broker-dealers (FSB, 2017). The FSB report (FSB, 2017) shows that in South Africa major shadow banking activities consists of multi-asset funds, funds of funds, money market funds, vehicle financing and securitisations amongst others. These are illustrated by importance in Figure 3.

Shadow banks also undertake the three main functions of banks; namely, maturity, liquidity and credit transformation, albeit without the use of any government backstop or deposit insurance (Pozsar et al., 2013). In addition, shadow banks employ high levels of leverage. There is no homogeneity however, in the extent to which a particular type of shadow bank can undertake these functions. Under its economic function 1 category, for instance, the FSB (2016) reports that

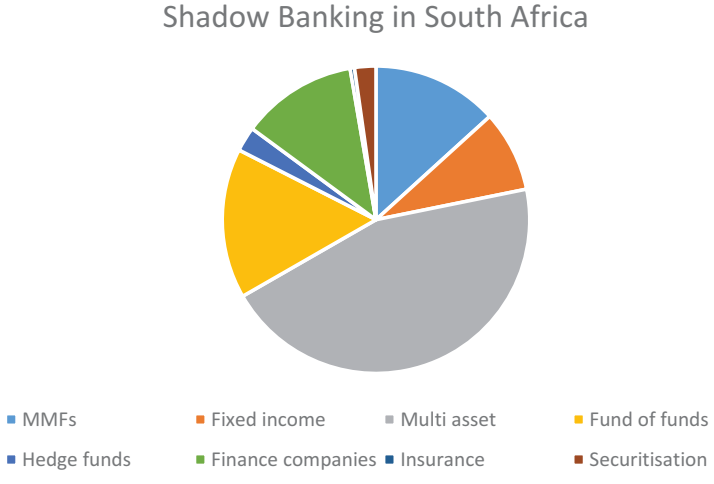

Figure 3. Composition of shadow banking in South Africa.

Source: South African Reserve Bank

credit intermediation is high for fixed income funds, MMFs and Mortgages. Liquidity transformation is also high for fixed income and MMFs whilst leverage is low for these categories. Thus, different types of risks could be associated with each type of shadow bank.

Literature also offers several arguments for the growth of shadow banking with regulatory arbitrage being the main explanation (Barbu, Boitan, & Cioaca, 2016; Pozsar et al., 2013; Pozsar & Singh, 2011). Limits to growth imposed by regulation often drive market participants to find ways of expanding income that by-pass regulations. Tang and Wang (2015) also suggest a profit motive. The profit incentive as suggested in Tang and Wang (2015) implies that financial institutions including commercial banks prefer shadow banking activities to traditional banking because it is highly profitable. Due to lack of regulation, shadow banking markets are deemed more efficient and allow capital to be availed to investors at low cost, however at high risk (Pozsar et al., 2013). Other reasons for the growth of shadow banking includes worsening liquidity conditions, increased risk appetite and flight to safe assets (Barbu et al., 2016). Considering the reasons behind the growth of shadow banking, several authors have argued that benefits of shadow banking may surpass the risk associated with its growth (Adrian & Ashcraft, 2016; Claessens, Ratnovski, & Singh, 2012). Thus, the growth of shadow banking activities and assets should have a positive impact on both financial firm's profit and profitability of non-financial firms.

1.2. Determinants of firm profitability

In this section, we briefly review the literature on the determinants of firm performance and link it to shadow banking. The basic premise of this relationship is that shadow banking increases credit available to firms, both in the financial sector and to non-financial sectors (Adrian & Ashcraft, 2016; FSB, 2017). This claim can only be robust if two central theories of finance hold, the perking order theory and Modigliani Miller capital structure proposition. The pecking order theorem suggests that firms prefer debt to equity. Thus, in the absence of internally generated funds, there is an incentive to increase debt and shadow bank credit provides a cheaper source of debt. Modigliani and Miller proposition argues that in the presence of taxes and other constraints capital structure does have an impact on firm performance. Increased access to debt through shadow banks should positively impact firm profitability.

Three sets of factors are used to account for changes in firm profitability, firm-specific factors, industry factors and macroeconomic factors (Hirsch et al., 2014; Issah & Antwi, 2017). Stylised macroeconomic determinants of firm profitability include money supply growth, inflation rate, interest rate, saving and investments and exchange rate changes (Broadstock, Shu, & Xu, 2011; Issah & Antwi, 2017; Zeitun, Tian, & Keen, 2007). Issah and Antwi (2017), McNamara and Duncan (1995) and Broadstock et al. (2011) derive macroeconomic factors using principal component analysis (PCA) from a range of macroeconomic variables covering business cycle indicators, monetary variables, financial factors and supply factors. All three studies find that the derived macroeconomic factors have statistical significance in determining firm profitability when employed in regression models.

Other studies use specific macroeconomic variables to explain the variation in firm profitability. Zeitun et al. (2007) use several macroeconomic aggregates for a panel sample of 167 firms. Macroeconomic variables used include the nominal interest rate, changes in money supply, the production manufacturing index, inflation, exports and availability of credit. Their results show that unexpected changes in the interest rate have a significant negative effect on profitability. Production manufacturing index and Islamic credit have a positive and significant effect on firm profitability. Inflation, money supply and other commercial bank credit do not have a significant effect on profitability.

Asma'Rashidah Idris et al. (2011) investigates the determinants of banks' profitability in the case of Malaysia. Their study uses return on assets as a measure of profitability and bank-specific variables as regressors. They employ a panel (GLS) technique and find that only bank size has

a statistically significant influence on bank profitability. Other variables considered are liquidity, capital adequacy, credit risk and expenses management. Ali, Akhtar, and Ahmed (2011) and Panayiotis, Athanasoglou, and Delis (2008) consider bank-specific, industry-specific and macroeconomic factors as determinants of banking firm profitability. Inflation rate and GDP are used as macroeconomic factors. Panayiotis et al. (2008) find that surprise inflation and the output gap both positively impact the output gap. These findings are supported by Ali et al. (2011) who find a positive relationship between economic growth and profitability. Contrary to this, however, Naceur (2003) does not find a significant relationship between profitability and both inflation and growth for Tunisia.

Literature that links shadow banking to economic performance is still in its infancy, mostly as a result of the unavailability of data for shadow banking in Emerging markets and even in advanced economies (Adrian & Ashcraft, 2016). However, several studies have analysed the growth and impact of shadow banking on financial stability stemming from the role shadow banks played during the GFC (Bengtsson, 2013; Hsu, Li, & Qin, 2013; McCulley, 2009; Meeks et al., 2017). More so only a handful of studies have linked shadow banking to macroeconomic or firm-specific variables, although shadow banking is encouraged on the premise that it affords firms to acquire capital at low cost (Barbu et al., 2016; Tang & Wang, 2015). This is due to reduced transaction and finance costs associated with shadow bank financing.

Lumpkin (2010) posits that financial innovations are neither totally harmful or absolutely beneficial. Thus, whilst shadow banking has been blamed for its role in the GFC, others have argued for growth and proper regulation of shadow banks to allow market agents to derive economic benefits stemming from shadow banking activities (Claessens et al., 2012; Pozsar et al., 2013). The study by Tang and Wang (2015) investigates the effect of shadow banking on Chinese banks' return and risk-adjusted return. Their study employs return on average assets (ROAA) and the Sharpe ratio as measures of return and risk-adjusted return respectively within Ordinary least squares (OLS) and Generalised least squares (GLS) regressions. They find that shadow banking activities increase commercial banks' return. Their finding supports earlier literature on financial innovation that argues for the positive effect of financial innovations on the economy (Beck, Chen, Lin, & Song, 2016; Boot & Marinč, 2010). According to this strand of literature, shadow banking's higher returns come on the backdrop of higher risk and regulation is required to ensure that the benefits of shadow banking are not eroded by costs from heightened risks.

Agostino and Mazzuca (2011) and Barbu et al. (2016) empirically analyse the determinants of securitisation and shadow banking, respectively. Agostino and Mazzuca (2011) consider bank-specific and market-related ratios as influences of the decision for a bank to securitise in a - given year. Securitisation is measured with a dummy variable and the authors employ probit regressions. They find that Italian banks securitise as way of diversification, funding and capital arbitrage. In Barbu et al. (2016) macroeconomic determinants of shadow banking are analysed using quarterly data for 15 countries covering 2008 to 2015. Their study uses panel Generalised method of moments technique and find a negative relationship between shadow banking and GDP growth, short-term interest rates and money supply. On the other hand, stock index and long-term interest rates positively influence shadow banking.

1.3. Interconnectedness of shadow banking with the corporate sector

Whilst proponents of the financial instability view of shadow banking concentrate on instability channelled through interconnectedness of shadow banks with the traditional banking sector, literature shows three ways in which shadow banking can be linked to the corporate sector profitability.

The first channel is through traditional banks. Harutyunyan, Massara, Ugazio, Amidzic, and Walton (2015) suggest that banks in the formal system also engage in shadow banking activities such as securitisations. By removing a bank's assets from its balance sheet, banks can be provided with more capacity to issue new credit and hence allow more non-bank corporates to access loans. This is supported by evidence from the FSB (FSB, 2017) showing that OFIs account for higher shares

in formal banking sector liabilities. In addition, net positions in the wholesale market have tilted towards OFIs, who have a positive net position in the repo market, signifying that they are net suppliers of financing to the rest of the financial system. This suggests shadow banks directly supply credit to other financial institutions who in turn fund non-financial firms. Both explanations lead to higher access to credit by non-financial firms.

Secondly, shadow banks have linkages with the non-financial corporates through direct lending to non-financial firms. Barbu et al. (2016) show that MMFs pool financial resources, which can be directly channelled to the real sector. In this case, MMFs can finance firms directly and therefore contribute more to money supply in the economy. In the FSB report (FSB, 2017) loans extended by shadow banks (OFIs) increased with more than 10% between 2011 and 2015 in South Africa and other countries. Large public and private non-financial corporates also participate in the wholesale market directly through treasuries. For instance, participation of non-financial corporates in the repo market is acknowledged in South Africa and other countries (Pozsar et al., 2013).

The third channel can be termed the "asset" channel where firms are holders of financial assets issued by shadow banks. Using the FSB Economic Function 3 (EF3) measure, activities dependent on short-term funding such as short-selling securities and financing client securities are undertaken by shadow banks. These could be important in determining asset value of securities held by non-financial firms, resulting in changes in firm profitability. In addition, shadow banks can issue Asset-Backed Securities (ABS) in tranches, which investors, including non-financial firms purchase. The impact on net income of this channel will however depend on the accounting treatment of the asset, where recognition in the accounting Income Statement (profit and loss) could result in a higher net income for the firm. On the other hand, if the investment returns are recognised in Other Comprehensive Income, the holding may not have a significant effect on either return on assets (ROA) or return on equity (ROE).

1.4. Measuring firm performance

ROA is the most widely applied measure of profitability in firm-level studies (Issah & Antwi, 2017). ROA is an accounting profitability ratio computed by dividing a firm's net income by its total assets. It measures the ability of the firm to generate income using its assets and may demonstrate management's efficiency.

$$ROA = \frac{Net\ Income}{Total\ Assets}$$

The current paper uses the ratio of net profit before tax to book value of fixed assets as reported by Statistics South Africa (Statssa) as a proxy for ROA of non-financial firms. ROA for banks follows the above definition.

Unlike McNamara and Duncan (1995)'s assertion that ROA has limited the effects of earnings management, ROA is susceptible to earnings smoothing by the management of the firm. For instance, off-balance sheet activities can result in an overstated ROA ratio. However, it is preferable for analysis as it is the most popular and available measure in terms of data availability (Issah & Antwi, 2017).

Other variables in use for measuring firm performance include ROE, net profit margin and Earnings per share. ROE is the net income of the firm expressed as a percentage of a firm's equity capital. It signifies the return to the suppliers of equity share capital (Panayiotis et al., 2008).

$$ROE = \frac{Net\ Income}{Equity\ capital}$$

The present study uses ROA as a measure of profitability for both banks and non-financial firms. Further, the study also employs the stock market index, Johannesburg Stock Exchange All-Share Index (JSEASLI) to measure the profitability of all listed firms (financial and non-financial).

2. Methodology

The current study employs quarterly data on the growth of shadow banking assets from the South African Reserve Bank (SARB). Our sample uses data from the 1st quarter of 2006[2] to the 4th quarter of 2016. Profitability is measured using data on Return on assets (ROA) and the JSE all share index. Other variables used in the model are shown in Table 1. Shadow banking[3] is measured using the broad measure, which takes into account all assets of Other Financial Institutions (OFIs) (FSB, 2018). The data for shadow banking is obtained from the SARB and is defined as the percentage of OFIs assets to total financial assets of all financial institutions.

2.1. Variable description and model

The variables used in the study are explained in Table 1.

Following Panayiotis et al. (2008) we specify a model in which current profit is determined by the previous period's profit, shadow banking and macroeconomic influences. We specify our model as follows:

$$\Pi_t = \varphi + \beta_1 \Pi_{t-1} + \beta_2 SB_t + \sum_{j=1}^{j} \beta_j X_{it} + \varepsilon_t$$

where Π_{t-1} is the lagged profit for the industry and SB_t is the ratio of shadow bank assets to total assets of the financial sector. X_i are macroeconomic variables. φ is a constant and βs are slope coefficients in the regression. The error term ε_t is assumed to be independently and identically distributed (i.i.d), with a constant variance and zero mean.

In order to meet our objectives, we specify three distinct but related models. The choice of variables for each model is driven by theoretical considerations on the determinants of profitability in both the banking sector and the non-bank sector. Model 3 uses variables that have an impact on all firms, regardless of them being in the financial industry or otherwise. In addition, we also consider robustness and statistical validity of our results in selecting the variables for the three models.

Model 1: Investigates the effect of shadow banking and macroeconomic influences on non-financial firms' profitability measured by the logarithm of ROA for non-financial firms ($LROA_{NONFIN}$).

$$LROA_{NONFIN} = f\left(\begin{matrix} LROA_{NONFINt-1},\ shadow\ banking, unemployment,\ interest\ rate\ spread, \\ inflation,\ bank\ credit,\ GDP\ growth \end{matrix}\right) + e_t$$

Model 2: Investigates the effect of shadow banking, bank-specific and macroeconomic factors on the profitability of banks in South Africa.

Table 1. Variable description

Variable	Abbreviation	Data Source
Return on assets	ROA	Statistics South Africa, Federal Reserve of St. Louis
Shadow Banking	OFI	South African Reserve Bank
Inflation	INFLATION	Statistics South Africa
Gross Domestic Product	GROWTH	South African Reserve Bank
Unemployment	UNEMP	Statistics South Africa
Total bank assets	LTA	South African Reserve Bank
Bank credit	CREDIT	South African Reserve Bank
Interest rate spread	INTSPR	South African Reserve Bank
JSE All-Share Index	ALSIJSE	Johannesburg Stock Exchange

$$LOG(ROABNK)_t = f\left(LOG(ROABNK)_{t-1},\ shadow\ banking,\ inflation,\ total\ bank\ assets,\ GDP\ growth\right) + e_t$$

Model 3: Analyses the impact of shadow banking, bank-specific factors and macroeconomic factors on the profitability of all South African firms using the JSE all share index (*ALSIJSE*) as a proxy.

$$LALSIJSE_t = f\left(LALSIJSE_{t-1},\ shadow\ banking,\ inflation,\ interest\ rate\ spread, unemployment,\ GDPgrowth,\right) + e_t$$

2.2. Data analysis and pre-estimation tests

Choosing the appropriate time series technique depends on the characteristics of the data itself. Thus, firstly, data in rand terms are transformed into logarithms to reduce the impact of outliers and also the possibility of heteroscedasticity. Furthermore, parameters can be interpreted as elasticities. After the transformation, we present individual statistical characteristics of individual variables as shown in Table A2 in the appendix. Table A3 presents the correlation matrix. We use this information to define *a priori* expectations on relationships of various variables. In addition, it also aides in avoiding multi-collinearity by selecting variables that are not highly correlated for three individual models.

Both financial and macroeconomic time series often resemble characteristics of unit root series (Bispham, 2005). It is therefore important to test the series for unit roots. We use three unit roots tests and report the results in Table A1 in the appendix. In summary, we find that all variables are integrated of order one, I (1). Since all variables are I (1), we test for cointegration among the variables. However, because we are going to run different estimates, we group the variables in three groups. Thus, we test for cointegration for variables in the three models. We use residual-based cointegration tests, namely the Engle–Granger and Phillips–Ouliaris tests. Both tests employ unit root tests on the residuals from ordinary least squares regression but differ in accounting for serial correlation in the residuals, with Engle–Granger using a parametric approach whilst Phillips–Ouliaris use a non-parametric approach (Schwert, 2009). The null hypothesis in both tests is that there is no cointegration in the series. Our cointegration results presented in Tables 2–4 below. Results for the three models show that the series are cointegrated.

In all the three models, we find that the series are cointegrated at either 1%, 5% or 10% level of significance implying a long-run relationship exists.

Table 2. Model 1. Cointegration test

Specification: $LROA_{NONFIN}$, *shadow banking*, *unemployment*, *interest rate spread*, *inflation*, *bank credit*, *GDP growth*

Null hypothesis: Series are not cointegrated

	Engle-Granger		Phillips-Ouliaris	
	Value	**Prob.***	**Value**	**Prob.***
Tau-statistic	−6.05	0.030	−6.12	0.026
z-statistic	−38.77	0.035	−37.92	0.044

Table 3. Model 2. Cointegration test

Specification: $LOG(ROABNK)$, *shadow banking*, *inflation*, *total bank assets*, *GDP growth*

Null hypothesis: Series are not cointegrated

	Engle-Granger		Phillips-Ouliaris	
	Value	**Prob.***	**Value**	**Prob.***
Tau-statistic	−5.39	0.068	−5.72	0.030
z-statistic	−31.07	0.077	−34.14	0.061

Table 4. Model 3. Cointegration test

Specification: *LALSIJSE, shadow banking, inflation, interest rate spread, unemployment, GDPgrowth*

Null hypothesis: Series are not cointegrated

	Engle-Granger		Phillips-Ouliaris	
	Value	**Prob.***	**Value**	**Prob.***
Tau-statistic	−5.95	0.026	−5.56	0.051
z-statistics	−61.14	0.000	−13.12	0.920

3. Estimation results

The preceding finding points out to the use of cointegrated techniques in estimating the models. Our main results are estimated using the Fully Modified ordinary least squares (FMOLS) technique of (Phillips & Hansen, 1990). The FMOLS uses semi-parametric correction to correct for endogeneity and bias in the OLS estimator. The FMOLS estimator is unbiased and has fully efficient mixture normal asymptotics. However, to confirm the robustness of results, we also present results from Canonical regression (CCR) of Park (1992). The results for all the three models are presented in Table 5. All models estimated are subjected to diagnostic checks, which show that the residuals are normally distributed, there is no serial correlation and parameters are stable as shown by the CUSUM test in appendix A1. We discuss the results from each model separately for clarity purposes.

3.1. Model 1—impact of shadow banking on non-financial firms' profitability

Model 1 relates shadow banking to performance of non-financial firms. Estimation results for model 1 are reported in columns (1) and (2) of Table 5. The data for firm profitability is obtained from Statistics South Africa as reported earlier and covers Manufacturing, Mining and quarrying, Transport, storage and communication industry, Real estate and other business services industry (excluding financial intermediation and insurance) and Trade industry. As reported in Table 5, we do find convincing evidence that shadow banking positively impacts the performance of non-financial firms in the long-run in South Africa. The coefficient of shadow banking takes a positive and statistically significant sign at 5% level in both FMOLS and CCR estimations. Specifically, a 1 percentage change in shadow banking (OFI) results in a 0.043 percentage change in non-financial firms' profitability. The results could indicate that non-financial corporates in South Africa borrow from non-bank financial firms directly.

Growth in bank credit to the private sector *(CREDIT)* has a positive and significant impact on firm profitability as expected. This is in line with the Modigliani–Miller theorem, which suggests an increase in profitability as a firm employ more debt capital due to tax advantages of debt over equity capital. Contrary to our findings however, Zeitun et al. (2007) do not find a statistically significant relationship between credit and firm profitability. This could be indicative of dependence on bank credit by the firms in our industry sample. On the other hand economic growth also has a positive impact on firm profitability, which supports the findings of Issah and Antwi (2017). Inflation and unemployment have negative and significant relationships with non-financial firm profitability. The negative sign on inflation is expected from literature as higher prices tend to increase a firm's costs and reduce its mark-up (Wamucii, 2010). In addition, we find that an increase in the interest rate spread negatively affects the profitability of non-financial firms.

3.2. Model 2—impact of shadow banking on bank profitability

Column 3 and 4 of Table 5 presents the results for Model 2. Shadow banking has a negative and significant association with bank profitability in South Africa. A 1 percentage increase in shadow banking assets, result in a −0.025% change in bank profit. The result is important in particular as it confirms the presence of a trade-off between shadow banking and traditional banking. However, this is also contrary to the notion that banks also participate in shadow banking to increase their profits (Harutyunyan et al., 2015; Tang & Wang, 2015). In essence, this important finding shows

Table 5. *Estimated long-run coefficients*

	Model 1		Model 2		Model 3	
Dependent variable:	***(2006Q1-2016Q4)*** $LROA_{NONFIN}$ **(1) (2)**		***(2008Q1-2016Q4)*** ***LOG(ROABNK)*** **(3) (4)**		***(2006Q1-2016Q1)*** ***LALSIJSE*** **(5) (6)**	
Independent variables	**FMOLS**	**CCR**	**FMOLS**	**CCR**	**FMOLS**	**CCR**
INFLATION	−0.065*** [−3.75]	−0.042** [−2.43]	−0.009*** [−2.86]	−0.011** [−2.42]	−0.064*** [−2.86]	−0.053 [−1.11]
OFI	0.043** [2.72]	0.054*** [4.74]	−0.025*** [−2.45]	−0.024** [−2.58]	0.037*** [2.21]	0.042* [1.75]
Intspr	−0.147*** [−5.26]	−0.099*** [−4.21]			−0.196*** [−5.51]	−0.196*** [−4.63]
$LOG(ROA_{NONFIN}\ (-1))$	0.157** [2.01]	0.293*** [3.82]				
Credit	0.690*** [3.51]	0.583*** [3.98]				
LTA			0.215*** [−2.86]	0.247* [1.77]		
LALSIJSE(−1)					0.383*** [4.18]	0.254** [2.17]
UNEMP	−0.185*** [−7.87]	−0.160*** [−6.22]			−0.195*** [−6.40]	−0.212*** [−4.04]
GROWTH	0.085** [2.69]	0.097*** [2.99]	0.033*** [5.00]	0.034*** [3.37]	0.101*** [2.52]	0.196** [2.47]
$LOG(ROA_{bank}(-1))$			0.923*** [23.41]	0.936*** [24.43]		
Constant	−6.668** [−2.51]	−5.946*** [−2.87]	−2.825* [−1.77]	−3.299 [−1.64]	2.418*** [3.62]	2.329** [1.86]
D_{200902}	0.349** [−2.32]	0.272*** [2.09]			0.880*** [5.87]	0.834*** [4.64]

, **, * imply 10%, 5% and 1% level of significance, respectively. Values in parenthesis are t-statistics. The reported results, especially the parameter signs are robust to changes in estimation techniques and models (adding or removing other variables).*

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that traditional banking activities in South Africa do not directly benefit from shadow banking activities, but instead as assets are directed towards shadow banking activities, traditional banking assets are reduced. Further bank profitability is found to be determined by its own lagged value, total bank assets and macroeconomic variables. Total bank assets (LTA) have a positive and significant impact on profitability contrary to the findings of Panayiotis et al. (2008) who do not find a significant relationship. The finding however supports evidence in Asma'Rashidah Idris et al. (2011) and Ali et al. (2011).

3.3. Model 3—impact of shadow banking on the profitability of all firms (listed)

This model uses the JSE all share index as a measure of firm profitability and estimates the determinants of firm profitability in South Africa for listed firms, including shadow banks. Column 5 and 6 of Table 5 reports the results for Model 3. Shadow banking is found to be positively related to firm profitability and the coefficient is significant at 1% level. Specifically, a 1 percentage change in the proportion of shadow bank assets results in a 0.037 percentage change in firm profitability. This could be indicative of the role shadow banks play amongst listed firms.[5] It would suggest that the JSE listed firm sample is dominated by non-bank financial firms and other firms that benefit from shadow banking activities. Meanwhile, macroeconomic variables, economic growth and unemployment take positive and negative signs respectively as expected. Again this finding is in line with several studies that have sought to analyse the relationship between firm profitability and macroeconomic variables (Broadstock et al., 2011; Issah & Antwi, 2017; Zeitun et al., 2007). The coefficient of the interest rate spread is positive and statistically significant.

4. Conclusion

The present study investigates the relationship between shadow banking growth and various measures of profitability in South Africa. Our findings show that the growth of shadow banking negatively affects the profitability of traditional banks and positively affects non-financial firms. These findings confirm the trade-off between expansion of shadow banking activities and formal banking activities. Furthermore, shadow banking is expected to increase non-financial firm profitability through credit creation. In addition, shadow banking positively impacts the profitability of all firms in aggregate. Thus, overall shadow banking has a positive effect on firm profitability in South Africa.

We recommend continued efforts in monitoring the growth of shadow banking, considering its interconnectedness with the rest of the financial system and other economic sectors. Targeted regulation should be implemented to monitor shadow banking activities by both formal banking institutions and non-bank financial institutions. Furthermore, regulation should be reviewed from time to time to consider new financial products and processes which may be lying outside the regulatory framework. This study provides new evidence on the relationship between shadow banking and economic performance. Further research could focus on how specific shadow banking assets and activities can be used to finance productive sectors of the economy.

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Notes

1. Shadow Banking is defined following the FSB (2016) definition as, "credit intermediation involving entities and activities (fully or partly) outside of the regular banking system".
2. Sample size is restricted by data availability on profitability measures.
3. Our choice of variable is driven by the lack of high-frequency data on the narrow measure, which is computed by the FSB. Data on the narrow measure of Shadow Banking is currently available at an annual frequency and for a limited time series (2010 to 2016). The nature of our model requires estimation of a number of parameters, and we find the shorter nature of the time series inhibitive for that purpose and in order to increase the degrees of freedom, we opt for quarterly data on OFIs covering 2002Q1 to 2016Q4.

4. Diagnostic tests were conducted using residuals for each model to validate the model specification and check consistency with OLS assumptions. We find that the residuals are normally distributed and there is no serial correlation is detected. These tests are available on request.
5. Caution should be taken in interpreting these results as the growth of both shadow banking and the security index could emanate from price appreciation rather than any causal link between the two.

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Appendix

Table A1. Unit root tests

Variable	ADF statistic	PP Statistic	Breakpoint Test statistic	Overall Decision
ROA_{bnks}	−2.829181	−2.861533	−6.3505***	Non-stationary
LA -liquidity	−1.971224	−2.001135	−2.9170	Non-stationary
OFI	−2.048543	−2.115549	−3.1549	Non-stationery
Lnlp	−0.516984	0.151419	−3.5479	Non-stationary
Unempl	−2.120973	−4.775994**	−2.5127	Non-Stationary
Intspr	−1.633763	−1.419061	−4.7628**	Non-stationary
ROA_{nonfin}	−1.927473	−3.345827**	−3.6350	Non-Stationary
ljsealsi	−3.125611	−2.244967	−3.9381	Not-stationary
TA—size	−1.893555	−2.012227	−4.0133	Non-stationary
LGDP	−0.921866	−0.921866	−5.5549**	Non-stationary
LCPI	−3.415133*	−1.650872	−4.0502	Non-stationary
LCREDIT	−1.865791	−1.865791	−4.4963	Non-stationary
lM2	−3.272219*	−3.161027	−3.6560	Non-stationary
Δ*ROAbnks*	−4.475975***	−3.576334**		Stationary
Δ*lnlp*	−1.838436*	−3.357227***	−5.5014***	Stationary
Δ*OFI*	−6.593332***	−6.594361***	−7.0706***	Stationary
Δ*LA*	−5.920028***	−5.920028***	−6.5985***	Stationary
Δ*LTA*	−4.346587***	−5.632513***	−5.8365***	Stationary
Δ*LGDP*	−7.063738***	−7.105128***		Stationary
Δ*LCPI*	−4.805467***	−7.180994***	−4.9231**	Stationary
Δ*intspr*	−5.025978***	−4.988335***	−4.7628***	Stationary
Δ*ljsealsi*	−4.270336***	−3.773391**	−4.3603***	Stationary
Δ*lcred*$	−6.591382***	−6.595619***	−7.0102***	Stationary
Δ*Unempl*	−9.098188***	−9.300893***	−9.3524***	Stationary
ΔProfitall	−8.776279***	−8.856430***	−8.7399***	Stationary

Table A2. Descriptive statistics

	GROWTH	INFLATION	OFI	INTSPR	CREDIT	LTA	UNEMP	ROANONFIN	LALSIJSE
Mean	0.388889	5.647222	17.65748	1.769444	227,852.7	15.09530	24.74167	0.070539	10.49941
Skewness	−0.970796	0.217487	0.202628	−1.655125	0.137314	0.372148	−0.417962	1.499741	−0.235105
Kurtosis	4.372449	3.322967	1.699881	4.512447	2.275865	1.877506	3.227514	5.155234	1.886443
Jarque–Bera	8.480098	0.440266	2.781811	19.86788	0.899689	2.720952	1.125797	20.46288	2.191658
Probability	0.014407	0.802412	0.248850	0.000049	0.637727	0.256539	0.569556	0.000036	0.334262
Sum	14.00000	203.3000	635.6693	63.70000	8,202,698.	543.4308	890.7000	2.539400	377.9788
Sum Sq. Dev.	13.07556	75.20972	134.2681	79.04579	2.93E+10	1.086975	52.20750	0.016805	3.133741
Observations	36	36	36	36	36	36	36	36	36

Table A3. Correlations

Covariance Analysis: Ordinary

Sample: 2008Q1 2016Q4

Included observations: 36

Correlation	GROWTH	INFLATION	OFI	INTSPR	CREDIT	LTA	UNEMP	ROANONFIN	LALSIJSE
GROWTH	1.0000								
INFLATION	−0.5488	1.0000							
OFI	−0.0177	−0.1602	1.0000						
INTSPR	0.3557	−0.7238	0.4711	1.0000					
CREDIT	0.4960	−0.6057	−0.4038	0.4679	1.0000				
LTA	−0.2131	−0.0140	0.9540	0.3435	−0.5435	1.0000			
UNEMP	0.1081	−0.5585	0.7405	0.6233	0.0084	0.6702	1.0000		
ROANONFIN	0.1008	0.3598	−0.5545	−0.6312	−0.0366	−0.5292	−0.7097	1.0000	
LALSIJSE	0.1035	−0.1973	0.9579	0.4770	−0.3382	0.8893	0.6898	−0.4563	1.0000

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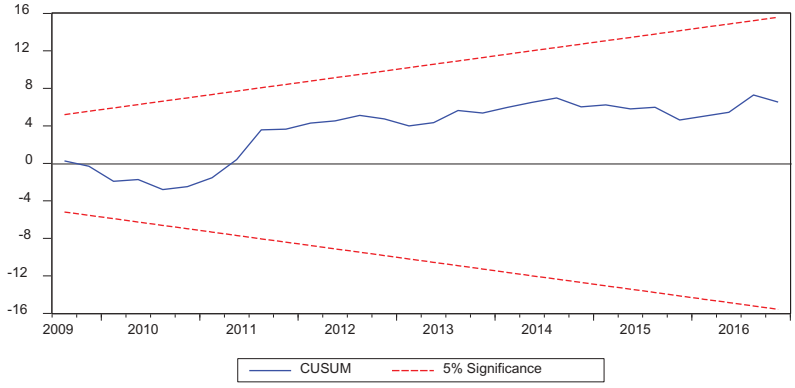
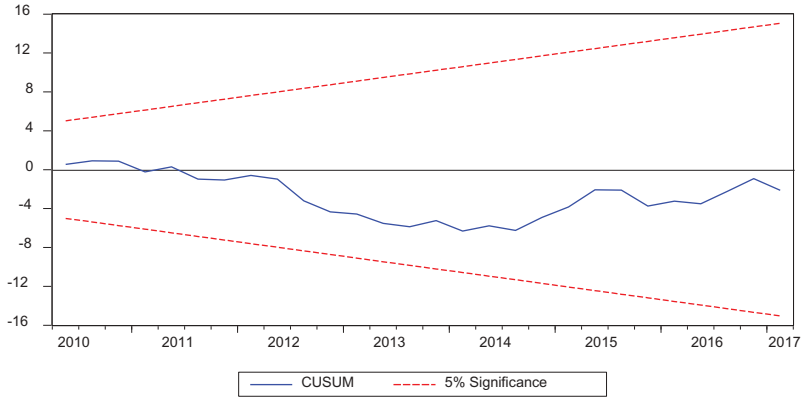
Figure A1. Parameter stability tests (CUSUM test).

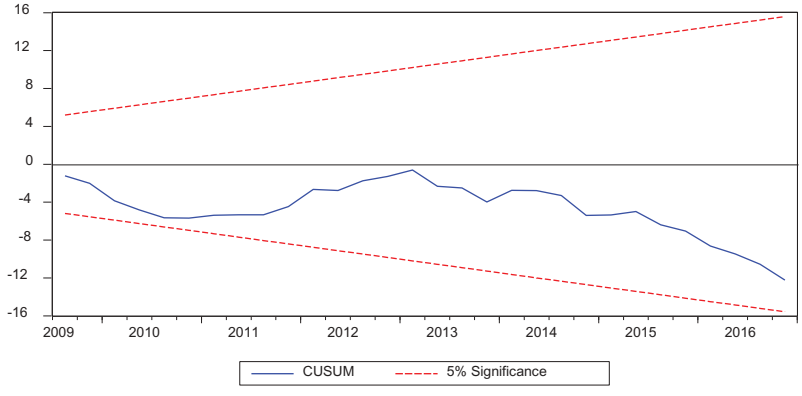
Model 1



Model 2



Model 3



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