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Policy makers have argued about the role of financial structure on economic growth. The bank-based, the market-based, and the financial services view are the three competing views of financial structure. Stock market development and the banking sector are regarded as avenues through which growth can be supported by providing liquidity for firm financing. Hence establishing the contribution of the financial structure on economic performance in South Africa is of crucial importance to policy makers and government officials. The study utilizes the autoregressive distributed lag model for econometric estimation. The data set covers the period 1975-2016. The results do not indicate a clear relationship between financial structure and economic growth in South Africa. The findings do not support the view that government should place an emphasis on improving one financial system (market-based system) as opposed to another (bank-based system). The contribution to the existing literature is that the results do not support the bank-based or the market-based system. A possible extension of the study will be to investigate the impact of the financial structure using household sectors (ratios of deposits, insurance, pensions, shares and other securities to GDP) on economic growth.

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DOES FINANCIAL STRUCTURE MATTER FOR ECONOMIC GROWTH: AN EVIDENCE FROM SOUTH AFRICA

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Policy makers have argued about the role of financial structure on economic growth. The bank-based, the market-based, and the financial services view are the three competing views of financial structure. Stock market development and the banking sector are regarded as avenues through which growth can be supported by providing liquidity for firm financing. Hence establishing the contribution of the financial structure on economic performance in South Africa is of crucial importance to policy makers and government officials. The study utilizes the autoregressive distributed lag model for econometric estimation. The data set covers the period 1975-2016. The results indicate financial structure does not matter for economic growth in South Africa. The results are robust to several sensitivity tests. The findings support the view that government should place an emphasis on improving the quality of the financial system as opposed to developing a particular financial system. The contribution to the existing literature is that the results support the financial services theory. Thus, financial structure does not matter for economic development even for an emerging country like South Africa which is predominantly market based. The implication of the results is that there is the need to enhance the quality of financial services to create real economic growth in South Africa.

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1. Introduction

This paper examines whether financial structure (measured by several indicators) matters for economic growth. Markets and banks both foster economic growth but the way in which they affect the business cycle differ considerably. The role of the financial structure on economic growth is still an important question that academics need to answer. Financial structure is broadly defined as a combination of financial institutions, financial markets and financial instruments.

All financial system comprises both bank-based and market-based intermediation. While banks perform intermediation on their balance sheet, markets on the other hand issue and trade debts and equity securities.

The blend of these 2 intermediation channels differs across countries. The early contribution of Boyd and Smith (1998), Levine and Servos (1998) argue that financial intermediaries and markets are both important for economic growth.

Other scholars such as Demirgüç-Kunt and Levine (1996) and Levine (2002) conclude that it is the overall provision of services by banks and financial markets that is important for growth. They stress that financial structure per se does not matter.

The third strand of view is more complex because it argues that the impact of financial structure depends on the level of economic growth and financial development (see Demirgüç-Kunt, Feyen and Levine (2011).

A cross-reading of the literature indicated that little studies has been committed to whether financial structure of countries matters for economic growth (Cihák, Demirgüč-Kunt, Feyen and Levine, 2013).

Most empirical literature on this issue attempt to investigate whether one type of financial system explains growth better than another. Those studies also focus on advanced economies (see Weinstein and Yafeh, 1998; Mork and Nakkamura, 1999). The contribution to the existing literature is twofold: First, the paper uses time series data for an emerging country like South Africa for the period 1975 to 2016 to determine whether financial structure matters for economic growth. This is important because panel study tend to ignore cross country heterogeneity which does not produce efficient results when endogeneity tests are not performed (Arestisa, Luintel, and Luintel, 2010).

Secondly, it uses an autoregressive distributed lag model (ARDL) which is free of serial correlation. This approach also distinguishes between the dependent and the independent variables using a single reduced form equation as opposed to other methods used in previous

studies which included South Africa (Luintel and Luintel, 2005; Rateiwa and Aziapkono, 2017). Thus, the study provides a useful insight for South Africa and for the rest of other African Countries.

The remainder of the article is organized as follows: In the next section we discuss the model specification, the methodology and the data. Section 3 presents the results. Section 4 concludes.

2. Model specification, methodology and the data

2.1 Model specification and methodology

We adopt a Cobb-Douglas production function to investigate the financial structure economic growth nexus. Following the work of Levine (2002), the standard growth model takes the following form.

$$Q = F(AL^{\alpha}K^{\alpha-1}) \quad (1)$$

Where A stands for technological efficiency, K and L measures capital and labour, respectively. We then take the logarithm form of equation (1) and we augment the above equation. This leads to the following empirical model;

$$Q_{it} = a_0 + a_1 SA_{it} + a_2 X_{it} + \varepsilon_{it} \quad (2)$$

Where i = 1,2,3,…N and t = 1,2,3,…T

SA_{it} = financial structure activity (total stock traded over bank lending)

X_{it} = control variables

ε_{it} = error term

We focus on equation (2) to determine the significance and the sign of a_1 because SA_{it} is used as the financial indicator variable. The choice for financial structure indicator is based on the discussions from the previous section. A significant a_1 means that financial structure matters for economic growth. A significant and positive value of a_1 implies that the financial system in South Africa is more of a market-based variety while a significant and negative value of a_1 means more of a bank-based system.

Determining the sources of growth is an open research question, and there is no definite conclusion on the set of explanatory variables that must be included in a growth regression model (Levine and Renelt, 1992). Empirical growth model studies predict that there are other factors contributing to economic growth besides capital and labour used in the Solow model (Solow, 1956).

We incorporate lagged GDP per capita growth as a dependent variable to control for potential endogeneity in the model. We also include human capital as an explanatory variable as suggested by Levin (2002). Hence in this study, based on the availability of data X_{it} represents a set of standard growth variables such as per capita real physical capital stock, human capital, inflation, foreign direct investment and economic openness. After incorporating the conditioning set, equation (2) is expressed as:

$$Qit = a_0 + a_1SA_{it} + a_2(K/L) + a_3HC_{it} + a_4INF_{it} + a_5FDI_{it} + a_6TO_{it} + \varepsilon_{it} \quad (3)$$

In many empirical studies related to Africa, financial structure is not significant in explaining growth. In the same vein, we expect financial structure to be insignificant to economic growth. Thus, we are interested in the significance of a_1 rather than his sign.

Per capita real physical capital is capital over population. We expect per capita real physical capital stock to be positively correlated to economic growth. This implies that a_2 should have a positive sign. Human capita is another important factor for economic growth. We expect a_3 to have a positive sign.

Inflation indicates stable macroeconomic environment. High inflation discourages productive activity and slow down economic development. We expect it to have a negative sign. This implies that a_4 should have a negative sign.

Foreign direct investment helps attract new capital for investment. This improves the balance of payment by raising potential exports. We expect a_5 to have a positive sign. Economic openness allows a country to benefit from comparative advantage. Thus, we expect trade openness to contribute to economic growth. This implies that a_6 should have a positive sign.

We employ the autoregressive distributed lag model (ARDL) to estimate both the short run and the long run dynamics of the underlying variables. The model is applicable when series are integrated of different orders I(1) and I(0) (Pesaran, Shin, and Smith, 1999). This helps to avoid classifying the variables in different orders of cointegration. The ARDL representation coefficient becomes more efficient if the Wald test establishes a single long run relationship.

We use the Akaike information criteria to determine the appropriate lag length criteria. The ARDL (1,1,1,1,1,1) is selected based on the lag selection criteria. The dynamic form of the ARDL is expressed as:

$$Q_{it} = \lambda Q_{it-1} + \delta_{10i}(K/L) + \delta_{20i}SA_{it} + + \delta_{30i}HC_{it} + \delta_{40i}INF_{it} + \delta_{50i}FDI_{it} + \delta_{60i}TO_{it} + \delta_{11i}(K/L) + \delta_{21i}SA_{it-1} + \delta_{31i}SA_{it-1} + \delta_{41i}INF_{it-1} + \delta_{51i}FDI_{it-1} + \delta_{61i}TO_{it-1} + \varepsilon_{it} \quad (4)$$

Expressing the dynamic equation above in the error correction model:

$$\Delta Q_{it} = \phi_i (Q_{it-1} - \phi_{oi}(K/L) - \phi_{1i}SA_{it} - \phi_{2i}HC_{it} - \phi_{i\,3i}INF_{it} - \phi_{i\,4i}FDI_{it} - \phi_{i\,5i}TO_{it}) + \delta_{i01}(K/L) + \delta_{i02}\Delta SA_{it-1} + \delta_{i03}\Delta HC_{it-1} + \delta_{i04}\Delta INF_{it-1} + \delta_{i05}\Delta FDI_{it-1} + \delta_{i06}\Delta TO_{it-1} + \varepsilon_{it}$$

Where $\phi_{0i} = \mu_i / (1 - \lambda_i)$ (5)

$\phi_{1i} = \delta_{10i} + \delta_{11i} / (1 - \lambda_i)$

$\phi_{2i} = \delta_{20i} + \delta_{21i} / (1 - \lambda_i)$

$\phi_{3i} = \delta_{30i} + \delta_{31i} / (1 - \lambda_i)$

$\phi_{4i} = \delta_{40i} + \delta_{41i} / (1 - \lambda_i)$

And $\phi_i = - (1 - \lambda_i)$

2.2 The data

The dataset used in the study initially covers 57 (1961-2016) observations. However, for some variables the data span is short. Data on human capital, foreign direct investment, structure activity and structure size are missing during the period 1961-1975. Hence our data sources consist of time series data for South Africa for the period 1975-2016. Data on Gross Domestic Product, total stock market traded, market capitalization, private credit by deposit bank, Human capital, Foreign direct investment, population and trade openness (imports plus exports) are obtained from the world bank development indicators. Data on inflation on the other hand is obtained from the IMF.

The main variables of interest comprise GDP per capita (GDP/ population) which is our proxy for economic growth and structure activity (total stock market traded/ private credit by deposit bank) which is our proxy for financial structure. Structure activity as suggested by Levin (2002) measures the activity of the stock market relative to the banks.

3. Empirical Results

3.1 Unit root tests

In order to test the order of integration of the series, we use the augmented dicker fuller and the Phillips-Perron unit roots tests. The unit root tests results are shown in Table 1 below.

Table 1: Unit root tests

ADF Chi-Square				
Variables	**Levels**		**First difference**	
	Intercept	**Trend and intercept**	**Intercept**	**Trend and intercept**
Y	0.8673	0.8330	0.0051*	0.0151**
K/L	0.0011*	0.0053*	0.0000*	0.0000*
HC	0.7060	0.7487	0.0000*	0.0000*
INF	0.5057	0.0023*	0.0000*	0.0000*
FDI	0.0239**	0.0012*	0.0000*	0.0000*
SAV	0.4819	0.7922	0.0000*	0.0000*
Govtcons	0.3868	0.5433	0.0000*	0.0000*
TO	0.3916	0.4759	0.0000*	0.0000*
S-A	0.9837	0.6231	0.0006*	0.0022*
S-S	0.0253**	0.0157**	0.0122**	0.0554***
PP Chi-Square				
Y	0.9389	0.9095	0.0046*	0.0177**
K/L	0.0014*	0.0072*	0.0000*	0.0000*
HC	0.5816	0.5606	0.0000*	0.0000*
INF	0.1003	0.0025*	0.0000*	0.0000*
FDI	0.0319**	0.0014*	0.0000*	0.0000*
SAV	0.5014	0.7913	0.0000*	0.0000*
Govtcons	0.3770	0.5606	0.0000*	0.0000*
TO	0.4309	0.5527	0.0000*	0.0000*
S-A	0.9837	0.6450	0.0006*	0.0022*
S-S	0.0302**	0.0151**	0.0000*	0.0000*

Where *,,*** indicates 1%, 5%, 10% significance level, respectively**

Source: Author's own calculations

The results show that all the variables are stationary at first difference. The next step is to determine whether there is a long run relationship among the variables.

3.2 Cointegration test

Cointegration tests show the existence of a single or multiple long run relationship between the variables (Brooks, 2014). We test the long run relationship between the underlying variables by computing the bound F-statistic. If there is a single long run relationship the ARDL model can be implemented. On the other hand if there is multiple long run relationship the Yohansen and Juselius becomes the appropriate method (Nkoro and Uko, 2016).

The bound F-statistic is carried out on each of the underlying variables. The lower bound critical bound assumes all the variables are I(0), thus there is no cointegration between the variables. The bound test results display in Table 2 show that cointegration exist between the underlying variables at the 1-percent level. Hence, there is a single long run relationship.

Table 2: Bound tests

Country		**F-statistic**
South Africa		**8.04**
Critical Value Bounds		
Significance	**I0 Bound**	**I1 Bound**
10%	**2.12**	**3.23**
5%	**2.45**	**3.61**
1%	**3.15**	**4.43**

Once the single long run relationship has been established and the ARDL method can be applied, the next step is to identify the appropriate lag length selection criteria. We use 3 selection criterion such as the Akaike Information Criterion (AIC), the Hannan-Quinn Information Criterion (HIC) and the Schwarz Information Criterion (SIC). The values of AIC, HIC, and SIC are displayed in Table 3.

Table 3: Lag selection criteria

Lag	FPE	AIC	HIC	SIC
ARDL (0,0,0,0,0,0)	473.72	26.02	26.12	26.35
ARDL (1,1,1,1,1,1)	0.205461*	18.16*	18.98*	20.83*

FPE: Final prediction error, AIC: Akaike information criterion, HIC: Hannan-quinn information criterion, SIC: Schwarz information criterion. * indicates optimum lag selection

3.3 Baseline results

The ARDL (1,1,1,1,1,1) is the preferred model because Table 3 shows that a maximum lag of 1 has a smallest AIC, HIC, and SIC. The baseline results are shown in Table 4.

Table 4: Baseline results

Variables	Coefficient	Std. Error	T-statistic	Prob.
Long run				
S-A	0.036	0.041	0.865	0.396
FDI	0.003	0.014	0.245	0.808
INF	-0.032**	0.011	-2.774	0.011
K/L	0.017**	0.008	2.123	0.045
HC	-0.009*	0.003	-2.843	0.009
TO	0.003	0.004	0.860	0.399
C	11.758*	0.708	16.606	0.000
Short Run				
COINTEQ01	-0.125*	0.040	-3.096	0.005
S-A	0.004	0.005	0.840	0.409
FDI	0.0004	0.001	0.250	0.804
INF	-0.004*	0.001	-3.680	0.001
K/L	0.001*	0.0004	3.116	0.005
HC	-0.001*	0.0003	-3.192	0.004
TO	0.002*	0.0005	3.632	0.001

Where *, indicates 1 % and 5% significance level, respectively**

The results show that structure activity is positive and has no significant effect on economic growth in the short run and the long run. The findings are consistent with the existing literature (see Mathenge and Nicholaidou, 2018; Levine, 2002). The findings support the existing literature in the sense that there is no economic relevance in classifying a country's financial system as bank-based or market based.

In the short run all the variables in the study except structure activity and foreign direct investment are significant at the 1-percent level. The influence of foreign direct investment on economic growth is null. This is supported by the findings of (Almfraji and Almsafir, 2014).

The error correction term is negative and significant, indicating that there is a stable long run relationship between the variables. In the long run the other controlled variables such as human capital, inflation and per capita real physical capital stock have the expected sign and are significantly correlated to economic growth. Inflation impact growth negatively while per capita real physical capital stock contributes positively to economic growth. This is similar to the study of Santos (2015) who show that foreign direct investment has an insignificant impact on economic growth. Economic openness is positive and significant in the short-run but it is not significantly related to growth in the long run. This is supported by the findings of (Mahonye and Ojah, 2014) who examine the role of financial structure on economic development. A possible explanation is that in the long run South Africa enters in a competitive market with other countries. Hence, only countries that have a comparative advantage in terms of trade will be able to fully utilize the exports opportunities.

The correlation coefficient (appendix A.2) results show that the measures of financial structure proxied by structure activity has a positive influence on economic growth. Structure activity is highly correlated with economic growth which means that the stock market activity dominates over the banking sector. Another measure of financial structure (structure size) has also a positive correlation with economic growth.

The correlation coefficient of inflation and human capital are negative. This means that higher inflation and human capital are negatively associated with economic growth. The other growth determinants, trade openness, foreign direct investment, and per capita real physical capital stock have a positive association with economic growth. Trade openness is highly correlated with economic growth. This strengthens the need to include this variable in our regression model.

3.4 Robustness Checks

In this section, we explore the sensitivity of the results using different estimation procedures. We first augment the model (see Table 5), by using different indicators for financial structure (see Table 6), and finally by using the simple ordinary regression model (Table 7).

The results are robust to the various sensitivity checks applied. From Table 5-7, the results are similar to the baseline result. This leads to the conclusion that financial structure does not matter for economic growth in South Africa.

In Table 5, we investigate the impact of financial structure on economic growth after controlling for government expenditure and savings.

Table 5: structure activity and economic growth including government consumption expenditure and saving

Variables	Coefficient	Std. Error	T-statistic	Prob.
Long run				
S-A	**0.024**	**0.029**	**0.840**	**0.407**
FDI	**0.005**	**0.0048**	**1.270**	**0.21**
INF	**-0.009****	**0.004**	**-2.215**	**0.034**
K/L	**0.008****	**0.005**	**1.566**	**0.127**
HC	**-0.0005**	**0.001**	**-0.299**	**0.766**
TO	**-0.010***	**0.003**	**3.280**	**0.002**
Govtcons	**0.0294****	**0.015**	**1.900**	**0.049**
SAV	**0.021****	**0.009**	**2.175**	**0.037**
C	**9.384***	**0.589**	**15.907**	**0.000**
Short Run				
COINTEQ01	**-0.220***	**0.055**	**-4.003**	**0.0004**
S-A	**0.005**	**0.006**	**0.855**	**0.399**
FDI	**0.001**	**0.0009**	**1.254**	**0.219**
INF	**-0.003****	**0.076**	**-2.326**	**0.038**
K/L	**0.002***	**0.0009**	**0.686**	**0.505**
HC	**-0.0001**	**0.0004**	**-0.294**	**0.770**
TO	**0.002***	**0.0007**	**2.916**	**0.006**
Govtcons	**0.006**	**0.003**	**1.645**	**0.110**
Sav	**0.004****	**0.239**	**2.522**	**0.050**

Where *, indicates 1 % and 5% significance level, respectively**

The results show that structure activity is not significant in the short and in the long run.

In Table 6, we examine the impact of financial structure on economic growth by using structure size which is another indicator of financial structure on the variables we used in Table 5.

Table 6: structure size and economic growth including government consumption expenditure and saving

Variables	Coefficient	Std. Error	T-statistic	Prob.
Long run				
FDI	**0.005**	**0.003**	**1.524**	**0.138**
INF	**-0.009*** **	**0.005**	**-2.485**	**0.010**
K/L	**0.008***	**0.004**	**1.748**	**0.090**
HC	**-0.0003**	**0.002**	**-0.183**	**0.855**
TO	**0.011*** **	**0.002**	**5.567**	**0.000**
Govtcons	**0.02**	**0.0155**	**1.347**	**0.187**
SAV	**0.015***	**0.009**	**1.748**	**0.090**
S-S	**0.104**	**0.067**	**1.561**	**0.128**
C	**9.447*** **	**0.490**	**12.255**	**0.000**
Short Run				
COINTEQ01	**-0.238*** **	**0.055**	**-4.331**	**0.0002**
FDI	**0.001**	**0.0008**	**1.499**	**0.144**
INF	**-0.002****	**0.0009**	**-2.411**	**0.022**
K/L	**0.0019****	**0.00087**	**2.104**	**0.043**
HC	**-0.0069**	**0.0004**	**-0.181**	**0.857**
TO	**0.002*** **	**0.0005**	**4.693**	**0.0001**
Govtcons	**0.005**	**0.004**	**1.248**	**0.221**
Sav	**0.003**	**0.0022**	**1.668**	**0.105**
S-S	**0.025**	**0.016**	**1.531**	**0.136**

Where *,,*** indicates 1 %, 5% and 10% significance level, respectively**

The structure size coefficient is not significant in both the short and the long run model implying that structure size does not impact economic growth.

In Table 7, we use the simple ordinary least square method. The probability of the estimation is significant and the R-squared is also high implying that the explanatory variables contribute significantly to economic growth.

Table 7: structure activity and economic growth (OLS results)

Variables	Coefficient	Std. Error	T-statistic	Prob.
S-A	**0.026**	**0.013**	**1.923**	**0.062**
FDI	**0.003**	**0.002**	**1.201**	**0.237**
INF	**-0.005****	**0.002**	**-1.942**	**0.05**
K/L	**-0.001**	**0.002**	**-0.626**	**0.535**
HC	**-0.002****	**0.001**	**-2.523**	**0.016**
TO	**0.007***	**0.001**	**4.796**	**0.000**
C	**10.649***	**0.208**	**51.021**	**0.000**
Prob > F = 0.000 **R-squared = 0.78** **Observations = 41**				

Where *,,*** indicates 1 %, 5% and 10% significance level, respectively**

The results show that financial structure does not significantly affect economic growth.

4. Conclusion

An argument often mentioned in the literature is that as development occurs in a country, its financial system tends to be predominantly market based. The study explores the relationship between financial structure and economic growth in South Africa in order to shed light on the debate. The results suggest that none of the financial structure (market-based indicators or bank-based indicators) matters for economic growth. The results are not aligned with the market based or the bank-based view of the financial system.

Hence the study recommends that policy makers should improve the quality of the market-based and the bank-based system to foster economic development. The findings can be applicable to other emerging African countries whose stock market is rapidly growing.

Another important notice in the study is that trade openness appears to be positive and significant in the short run for all our estimations. However, it becomes negative in the long run. This suggests that government should be cautious in relying on trade openness as a catalyst for sustainable economic growth.

Improving the quality of the financial system as a complement to the growing market based and banking system will play an important role in mobilizing and allocating resources to its most efficient use for a country like South Africa.

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APPENDIX

A.1: Description of the variables

Variables	Definition
Y	It is the logarithm of Real GDP per capita
Stock traded	It is the total number of shares traded both domestic and foreign multiplied by their respective prices
Private credit by deposit bank	It refers to financial resources provided to the private sector by other depository corporations
K/L	It is the logarithm of Gross capital formation over population
INF	It refers to annual growth rate of the Consumer Price Index or GDP deflator. We use the logarithm of inflation
HC	It is the gross intake ratio of the last grade of primary education. It is an upper estimate of the actual primary completion rate. We use the logarithm of human capital.
FDI	It is the net inflow of investment in an economy. It brings new capital for investment. We use the logarithm of FDI.
Population	It refers to all residents regardless of citizenship or legal status
TO	It is the total value of exports and imports expressed as a percentage of GDP. We use the logarithm of trade openness.
Market capitalization	It is the share value of all listed domestic companies
SAV	Gross Saving is gross national consumption minus consumption plus net transfer
Govtcons	It is final consumption expenditure which includes all government expenditure including compensation of employees. We use the logarithm of final consumption expenditure.
S-A	It is stock traded over private credit by deposit bank . We use the logarithm of Structure activity.
S-S	It is market capitalization over private credit by deposit bank. We use the logarithm of structure size.

Source: Compiled by author

A.2 Correlation coefficients

Panel B: Correlation matrix								
	Y	S-A	FDI	INF	K/L	HC	TO	S-S
Y	1							
S-A	0.679*	1						
FDI	0.600*	0.609*	1					
INF	-0.431*	-0.628*	-0.543*	1				
K/L	0.085	0.087	0.106	-0.127	1			
HC	-0.114	0.413*	0.295***	-0.561*	0.216	1		
TO	0.818*	0.566*	0.563*	-0.301***	0.232	-0.172*	1	
S-S	0.339*	0.527*	0.202	-0.170	-0.018	0.127	0.106	1
Where *,** indicates 1 % and 5% significance level, respectively								

A.3: Descriptive statistics

Variable	**N**	**Mean**	**SD**	**Min**	**Max**
Y	25	1.980	1.542	-1.395	5.090
S-A	25	0.353	0.192	0.056	0.943
FDI	25	1.340	1.345	-0.065	5.978
INF	25	6.718	3.209	0.209	14.650
K/L	25	3.192	5.361	-7.716	12.902
HC	25	87.760	9.573	65.006	103
TO	25	54.256	8.637	39.123	72.865