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Jalil, Abdul and Wahid, Abu N. M. and Shahbaz, Muhammad

Tennessee State University

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Abdul Jalil
Abu N. M. Wahid
Muhammad Shahbaz

Corresponding Author:
Abu N.M. Wahid, Ph.D.
Editor, *the Journal of Developing Areas*
Professor, Department of Economics and Finance
Tennessee State University
330 10th. Ave. North
Nashville, TN 37203-3401
USA
Tel: 615-963-7149
Fax: 615-963-7139
awahid@tnstate.edu

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Abstract
The objective of this article is to investigate the relationship between development of the financial sector and economic growth for South Africa. For this purpose, we data for 1965-2007 and set the estimation strategy under the ARDL framework. Importantly, four indicators for the financial developments are utilized to accomplish our tasks. We find a positive monotonic relationship between financial development and economic growth for South Africa. Trade openness and per capita real capital are found as the other important determinants of economic growth in South Africa.

JEL classifications: G21, O40
Keywords: Financial Development, Trade, Growth, South Africa, ARDL, Monotonic relationship

Introduction

The theorists and practitioners of development economics produced a vast literature on the importance of developing the financial sector to boost economic growth. Now, it is well documented that a well functioning financial sector has a positive impact on economic growth (See for example, Schumpeter (1911), Mckinnon, (1973); Roubini and Sala-i-Martin, (1992); King and Levine, (1993); Easterly, (1993); Khan and Senhadji, (2000); Pagano and Volpin, (2001); Leveine *et al,* (2000); Chritopoulou and Tsinas, (2004)). However, the degree of effectiveness may differ according to the size and efficiency levels of the financial markets (Rioja and Valev 2004).

But most of the above mentioned works are based on panel data, either heterogeneous or homogenous, and cross sectional pooled data. In this situation, the existence of positive monotonic relationship between financial sector development and economic growth does not imply that only financial development will solve economic growth problems automatically for a specific country. On the other hand, the time-series data of a single country, may be able to account for historic experience such as economic growth, financial sector development, development of trade relations, and other exogenous factors (Stern et al., 1996). Thus, the current study contributes to the discussion on the analysis of financial development and economic growth linkages for a growing country such as South Africa, which is the most developed economy with the most development financial sector in the sub Saharan Africa.

The South African financial sector presents an ideal case study to investigate the relationship between financial sector development and macro economic activities. Prior to 1994, under the apartheid government, the financial sector of South Africa was consisting of small number of big institutions. Those were practically supposed to serve a very small number of people. Almost 55 percent of the population did not have access to banking facilities. Then the democratic government launched very successful reforms series to bail out the financial system from intricacies of inefficiencies. Despite these tremendous developments, the finance-growth nexus was not well researched for the South African economy. This is a major motivation for the present study.

To accomplish our task, we use the well established model of Christopoulos and Tsionas (2004), well defined financial development indicators by Rioja & Velv

(2004) and Levine et al.,(2000) over the period of 1965 to 2006 and a newly developed econometric technique that is popularized by Pesaran et al (2001). In a sense, this work is a replication of the existing literature. But, indeed, the replication is an essential part of scientific methodology and it should naturally invite skepticism about empirical results that are reported in economics journals (Dewald et al 1986). Our study also finds some new evidences for South Africa and explains and attempts to explain them.

Brief Literature Review

Indeed, the research on finance-growth nexus is controversial. Researchers argue that finance may positively contribute to promote economic growth. For example, Schumpeter (1911), in his pioneering study, poses that a well functioning financial system encourages technological innovations by increasing funding to entrepreneurs which ultimately leads to economic growth. And then, a lot of important empirical studies on the subject show that that a well functioning financial system may stimulate current and future economic growth, improve physical capital accumulation, and enhance productivity (see for example Hicks, (1969); Goldsmith, (1969); Mckinnon, (1973); Gelb, (1989); Roubini and Sala-i-Martin, (1992); King and Levine, (1993); Easterly, (1993); Khan and Senhadji, (2000); Pagano and Volpin, (2001); Leveine *et al,* (2000); Chritodoulou and Tsinas, (2004) and Apergis et al (2007).

On the contrary, the equally prominent scholars such as Robinson (1952), Kuznets (1955), and Friedman and Schwartz (1963) suggest that the financial system developes as a result of economic growth. Lucas (1988) thinks that "the importance of financial matters is badly over stressed". Similarly, Ram (1999) mentions that there is no relationship between financial development and economic growth. Ironically Stern (1989) does not even mention financial development as a source of economic growth in his excellent survey of development economics. On the other hand, Levine (1997) provides an outstanding overview of the literature on economic growth and financial development.

These contradictory results and arguments encourage researchers to investigate the finance-growth relationship on country specific basis. Importantly, the time series analyses provide an opportunity to study the causality pattern. Gupta (1984), by using quarterly data, and Jung (1986), by using annual data, discuss the causality issue. But the comprehensive study in this regards was conducted by Demetriades and Hussein (1996). They examine the causality issue from a time-series perspective using recently developed econometric techniques. They utilize cointegration tests based on both Engle and Granger (1987)'s two-step procedure and Johansen (1988)'s maximum likelihood method. Moreover, their analysis is based on 16 countries, using a comprehensive set of variables that reflect financial development. They find evidence for both causal directions. More recently, Rousseau and Vuthipadadorn (2005) confirmed their finding using data of 10 Asian countries. The present study also utilizes time series data for South Africa to investigate the finance-growth nexus.

South African Financial System

As mentioned earlier, the South African financial sector is one of the most developed in the sub-Saharan continent. It presents an ideal case study in financial sector development because of its dual nature. Specially, it has been growing fast over the past few years. When democratic government came to power in 1994, and inherited a financial sector that was developed within the context of inward looking policies, designed to protect and benefit only a few. At that time, it was fully recognized that the prevailing macroeconomic policies repressed the financial sector of the country. Therefore, democratic government adopted a new stabilization policy to bail out the country from these intricacies and, especially, to spur the economic growth. The main objectives of these reform policies were to establish competitive financial institutions, competitive financial markets, governance and supervisions based institutions and monetary, credit, and exchange management.

Since then, the new government has been working hard to promote the deepening of the financial market and the provision of a wide range of financial services to previously disadvantaged South Africans. The key challenge the new government faced was to reconcile the first world banking sector, characterized by well established infrastructure and technology, but limited participation, with the enormous demand for financial services-with over 60% of the adult population excluded from any formal financial services prior to 1994. Almost 53 percent (16.4 million) of South Africa's adult population have been excluded from formal financial services and do not have a bank account (FinScope Survey 2006). These 16.4 million people are marginalized or formally excluded from the credit market. Ninety nine percent of those without access are black, 49% live in rural areas, and 55% are women.

The reform process was launched by the democratic government after 1994 to bring more and more adults into the network of banking services. Only the original identity card was required to open a bank account. This policy, along with the others, resulted in great success. For example, the banking population grew 20 percent between 2006 and 2007. Three million people joined the banking network. By 2007, about 63 percent people started to receive benefits form banking services. Additionally, banks have made enormous strides in targeting lower income groups in this period. These massive improvement, indeed, in the banking sector of South Africa motivate us to investigate the impact of financial sector on the growth.

AK **Model for Finance-Growth Nexus**

Schumpeter (1911) disagrees with the neo-classical growth theorists that the technological progress is exogenous. On the contrary he believes that it is an endogenous process. According to him, the mechanics of this endogenous process is that a *well functioning* financial system encourages investment, promotes technological innovation that ultimately leads to, economic growth. Thus, we take up the endogenous growth model. In this regard, we follow Pagano (1993) by using the *AK* model of Rebelo (1991)

$$Y = AK_t \tag{1}$$

Where, Y, A, and K_t are the out put, total factor productivity and capital respectively. In this model, only capital is subject to constant return to scale. To estimate the capital stock, we use the perpetual inventory method, which argues that the stock of capital is the accumulation of the stream of past investments. If we assume capital to depreciate at a rate of δ then $K_{t+1} = I_t + (1-\delta)K_t$. Using the concept of initial capital stock $K(0)$, we follow Nehru and Dhareshwar (1993) in the construction of the capital stock series: $K_{t+1} = (1-\delta)^t K(0) + \sum_{i=0}^{t-1} I_t (1-\delta)^i$ where, δ is the rate of depreciation and $K(0)$ is the initial stock in period zero. Initial capital stock can be estimated in a number of ways. Nehru and Dhareshwar (1993) use a modified Harberger (1978) method to compute $K(0)$. The value of investment in the first period is estimated through a linear regression of the log of investment against time. The fitted value of initial investment is used to calculate initial capital stock using the following equation: $K_t = I_t/(g+\delta)$. Here, g is the rate of growth of output (GDP) and δ is depreciation rate of capital. The other important estimate needed is depreciation rate. Many studies [such as Nehru and Dhareshwar (1993) and Collins and Bosworth (1997)] have chosen 4 percent per year rate of depreciation, and, we also use the same arbitration. Finally, if there is no population growth, then the model can be expressed in terms of per capita[1].

Pagano (1993) assumes that a certain proportion of savings, $(1-\lambda)$ with $0 < \lambda < 1$, is the cost of financial intermediation per unit of savings, therefore, the fraction (λ) of total savings can be used to finance investment. This cost indicates inefficiency in the financial systems. It is generally believed that lesser the cost, the more efficient is the financial system. Therefore, the saving-investment relationship can be written as $I_t = \lambda S_t$. The economic growth rate g_y can be expressed as:

$$g_y = g_A + g_K \qquad (2)$$

Where $g_K = \frac{K_{t+1} - K_t}{K_t} = \frac{I_t + (1-\delta)K_t - K_t}{K_t} = \frac{\lambda S_t}{K_t} - \delta = A\lambda s_t - \delta$

Where $s_t = S_t/Y_t = S_t/AK_t$

Equation 2 expresses that economic growth depends on the total factor productivity (*A*), the efficiency of financial intermediation (λ), and the rate of savings (*s*). Importantly, when the rate of depreciation δ is assumed to be constant, economic growth depends on financial development. Moreover, King and Levine (1993) point out that the financial depth can be increased by positive real interest through the increased volume of financial saving mobilization and promote growth through increasing the volume of productivity of capital. Additionally, high real interest rates put forth a positive effect on the average productivity of physical capital by discouraging investors from investing in low return projects [World Bank (1989) and ; Fry (1997)].

The model outlined thus far, is not complete to represent a transitional and open economy. One of the major limitations is that, it represents a closed economy. One can include the openness indicators to overcome the said problem. This is not an intutuive argument, but a positive relationship between trade and economic growth which has been well documented and have show that trade openness, finance, and growth are interrelated (Beck 2002; Do and Levchenko, 2004). Specifically, Beck (2002) points out that financial development results in higher level of exports and trade balance of manufactured goods, which, in turn, imply higher economic development. Similarly, Do and Levchenko (2004) predict that trade is positively

[1] So Rebelo (1991) is not ignoring the labor force here.

associated with financial system expansion in countries with higher level of economic development.

Hence, the econometrically estimatable equation is specified by Christopoulos and Tsionas (2004):

$$Y_t = \alpha_0 + \alpha_1 FD_t + \alpha_2 K_t + \alpha_3 R_t + \alpha_4 TR_t + u_t \qquad (3)$$

Where Y is natural log of real per capita GDP, FD is a proxy to financial development. K is natural log of real per capita capital, R is real deposit rate and TR is total trade to GDP ratio.

Defining Variables

The standard practice, (e.g.Gelb 1989; Roubini and Sala-i-Martin, 1992; King and Levine 1993, Demetriades and Hussein 1996, and Levine *et al*, 2000) is being folled by taking natural logarithm of per capita real GDP as an indicator of economic growth that is denoted by *Y*. Real GDP per capita figure is superior to total real GDP figure, because some of the errors inherent in the estimation of the level of GDP and of population tend to be offsetting (Heston, 1994).

Recently, the literature has used the development of a stock market, along with the banking sector development, as an indicator of financial depth. But, the net flows through stock exchanges are relatively small in most of the developing countries (Rojas-Suarez and Weisbord, 1995). Therefore, stock markets at best play a minor role. More often, they resemble gambling casinos and may actually slow down growth in developing countries (Singh, 1997). Hence this study deliberately focuses on the banking sectors of both countries.

Here, several indicators have been used to measure the financial development in the finance-growth literature. For example, Gelb (1989) and King & Levine (1993) use broad money (M_2) ratio to nominal GDP for financial depth. Demetriades and Hussein (1996) think that in developing countries, M_2 contains a large portion of currency. Therefore, the rise of M_2 will refer to monetization instead of financial depth. Hence, the ratio of liquid liabilities to nominal GDP (*LLY*) is a more applicable variable in this situation (Rioja and Velv 2004, and Levine *et al*., 2000). Nevertheless, it is possible that credit to private sector remains stagnant, even if the deposits are increasing and, indeed, the supply of credit to private sector is important for the quality and quantity of investment (Demetriades and Hussein 1996). Thus, the ratio of credit to private sector to nominal GDP (*PRIVO*) should be used to see the clear picture of impact of financial development on economic growth (Levine *et al*., 2000).

King and Levine (1993) also include the central banks along with the commercial banks in the measurement of financial sector indicators. This is more relevant in the case of developed countries, where the private markets are thin and monetary authorities have a significant role to handle the financial markets. King and Levine (1993) introduce Commercial-Central Bank (*BTOT*) that is the ratio of commercial bank assets to the sum of commercial bank and central bank assets. It is a proxy for the advantage of financial intermediaries in channeling savings into investment, monitoring firms influencing corporate governance and undertaking risk management, relative to the central bank (Huang 2005). Besides this, the real interest rate, R is the deposit rate minus the inflation rates, while the trade ratio TR is the total value of exports and imports as share of nominal GDP. The capital series 'K' is constructed from the investment flows through the perpetual inventory method.

By definition all three indicators of financial development are directly related to each other. One can expect a very high correlation among these indicators. The dilemma in this situation is to have or to drop a relevant variable. If we drop one variable, then there is a possibility of loss of information. In addition, there is also controversy in the finance literature about the appropriateness of the measure of financial development. The other option is that we use all the indicators at the same time in a single model. But, in that case, there is a high possibility of multicollinearity by putting all variable simultaneously in the model. Moreover, variables are highly collinear, so that, econometric concerns would be subject to over-parameterization and a chance of loss of degree of freedom (Ang and McKibbin, 2007). This is even more severe in the context of developing countries where quarterly data are limited within the recent period. To overcome this problem of multicollinearity and over parameterization, following Creane *et al.* (2003), we calculate the principal components of the selected financial development variables.

The eigenvalues indicate that the first principal component explains about 55 percent of South Africa, of the standardized variance (see Table 1).

Table: 1 Principal Component Analysis

Principal Component	Eigenvalues	% of Variance	Cumulative %
1	1.656	0.552	0.552
2	0.971	0.324	0.876
3	0.372	0.124	1
Variable	**Factor Loadings**	**Cummunalities**	**Factor scores**
PRIVO	0.561	0.598	0.41
LLY	0.443	0.489	0.361
BTOT	0.699	0.775	0.34

The first principal component is explaining the variations of the dependent variable better than any other linear combination of explanatory variables. It is a more relevant measure of financial development in the case of both countries. Therefore, only information related to the first principal component is presented. The factor scores suggest that the individual contributions of *PRIVO*, *LLY,* and *BTOT* to the standardized variance of the first principal component are 41.0 percent, 36.1 percent and 34.0 percent respectively in the case of South Africa. We use these as the basis of weighting to construct a financial depth index, denoted by *IFD.*

For a comparison purpose, we utilize international data sources. World development Indicator (2007) is used for the real variables like GDP, gross fixed capital formation, and trade. While International Financial Statistics 2007 (IFS) is used for the financial variables- like broad money, deposits, and credit to private sectors.

Estimation Strategy

A number of techniques are available to test the existence of a long run equilibrium relationship - cointegration- among the time series variables. The most widely used techinques include the residual based Engel-Granger (1987) test and maximum likelihood based Johensen (1988, 1991) and Johensen and Juselius (1990) tests. However, our study use the newly developed technique, relative to others, that is popularized by Pesaran and Pesaran (1997), Pesaran and Smith (1998), Pesaran and Shin (1999) and Pesaran at el (2001). This methodology is named as Autoregressive

Distributed Lag model (ARDL), which is based on the general to specific modeling technique. The ARDL has several advantages to the other techniques of cointegration. For example, it can be applied irrespective of whether the variable are I(0) , I(1) or fractionally cointegrated (Pesaran and Pesaran 1997). The other is the model takes sufficient number of lags to capture the data generating process in general to specific modeling framework (Lauranceson and Chai2003). Furthermore, the error correction model (ECM) can be derived from ARDL through a simple linear transformation (Banerjee et al 1993). ECM integrates short run adjustments with long run equilibrium without losing long run information. Moreover, small sample properties of ARDL approach are far superior to that of the Johensen and Juselius's cointegration technique (Pesaran and Shin 1999).

ARDL framework of Equation 1 is as follows:

$$\Delta Y_i = \beta_0 + \sum_{i=1}^{p} \delta_i \Delta Y_{t-i} + \sum_{i=1}^{p} \phi_i \Delta FD_{t-i} + \sum_{i=1}^{p} \gamma_i \Delta K_{t-i} + \sum_{i=1}^{p} \varpi_i \Delta R_{t-i} + \sum_{i=1}^{p} \theta_i \Delta TR_{t-i} + \alpha_1 Y_{t-1} + \alpha_2 FD_{t-1} + \alpha_3 K_{t-1} + \alpha_4 R_{t-1} + \alpha_5 TR_{t-1} + U_t \quad (4)$$

where β_0 is drift component and U_t white noise. Furthermore the terms with summation signs represent the error correction dynamics. While the second part of the equation with α_i corresponds to long run relationship.

The ARDL model testing procedure starts with bound test. The first step in the ARDL bounds test approach is to estimate Equation 2 by ordinary least square (OLS) method. The F-test is conducted to test the existence of long run relationship among the variables.

The null hypothesis in the equation is $H_0 : \alpha_1 = \alpha_2 = \alpha_3 = \alpha_4 = \alpha_5 = 0$. This means the non existence of long run relationship. While the alternative hypothesis is $H_1 : \alpha_1 \neq 0, \alpha_2 \neq 0, \alpha_3 \neq 0, \alpha_4 \neq 0, \alpha_5 \neq 0$

The calculated F-statistics value is compared with two sets of critical values are given by the Pesaran et al (2001). One set assumes that all variables are I (0) and other assumes they are I (1). If the calculated F-Statistic exceeds the upper critical value, then null hypothesis of no cointegrateion will be rejected irrespective of whether the variables are I(0) or I(1). If it is below the lower value, then the null hypothesis of no conitegeration cannot be rejected. If it falls inside the critical value band, the test is inconclusive. At this stage of estimation process, the researchers may have to carry out the unit root tests on variables entered into the model (Pesaran and Pesaran 1997). In order to choose optimal lag length for each variable, the ARDL method estimate $(p+1)^k$ number of regressions. Where *p* is the maximum number of lags and k is the number of variable in the equation. The model can be selected on the basis Schawrtz-Bayesian Criteria (SBC) and Akaike's Information Criteria (AIC). The SBC is known as parsimonious model, as selecting the smallest possible lag length. While AIC is known for selecting maximum relevant lag length.

In the second step, the researchers estimate the long run relationship using the selected ARDL model through AIC or SBC. When the long run relationship exists among the variable, then there is error correction representation. So, the following error correction model is estimated is the third step.

$$\Delta Y_i = \beta_0 + \sum_{i=1}^{p} \delta_i \Delta Y_{t-i} + \sum_{i=1}^{p} \phi_i \Delta FD_{t-i} + \sum_{i=1}^{p} \gamma_i \Delta K_{t-i} + \sum_{i=1}^{p} \varpi_i \Delta R_{t-i} + \sum_{i=1}^{p} \theta_i \Delta TR_{t-i} + \eta ECM_{t-1} + U_t \quad (5)$$

The error correction model results indicate the speed of adjustment back to long run equilibrium after a short run shock. To establish the stability of the ARDL model, sensitivity analysis is also conducted that examines the serial correlation, functional form, normality and heteroscedisticity associated with the model. The stability test is conducted by employing the cumulative sum of squares of recursive residuals (CUSUMsq).

Empirical Results

We have four variables, as described in section 4, to measure the financial sector development. The rational behind this comparison is that, this exercise will clarify whether the economic growth of South Africa may be driven by a specific area of the financial development represented by a specific measure or by financial development broadly defined measured by an index through principal component analysis. ARDL methodology facilitates us to estimate the under consideration of the regression line without reckoning that whether the under considering data series are I(o) or I(1). Ouattara (2004) points out that testing of the stationarity properties are still valid because the computed F-statistics provided by Pesaran et al (2001) will be invalid in the presence of I(2) or beyond the variables. The reason is that the computed F-statistics provided by Pesaran et al (2001) are based on the assumption that the variables are I(0) or I(1) or mutually cointegrated. We apply Augmneted Dicky fuller test to ensure the stationary hypothesis for all series under consideration. It is concluded from the test statistics that *Y, K, TR, R, PRIVO,LLY, BTOT* and *IFD*are both level non stationary and trend non-stationary

Table 2: Unit Root Tests

	ADF	*k*		ADF	*k*
Y	-1.87	0	*ΔY*	-6.71***	1
PRIVO	-1.45	2	*ΔPRIVO*	-3.97***	2
LLY	-0.89	1	*ΔLLY*	-4.57***	0
BTOT	-1.99	2	*ΔBTOT*	-6.44***	1
IFD	1.01	2	*ΔIFD*	-5.42***	1
R	1.66	2	*ΔR*	-6.03***	1
TR	-1.75	0	*ΔTR*	-3.60**	1

Notes: ADF, augmented Dicky-Fuller test. *k* is the degree of augmentation that is automatically determined by following the procedure of Campbell and Perron (1991). *, ** and *** represent 10, 5 and 1-percent level of significance, respectively.

To carry out the bound tests, we have to estimate Equation 4 through OLS procedure and compute the F statistics for the joint significance of lagged levels of variables for long run relationship. As we are using different variables for the financial sector development, therefore, we have to calculate the F-statistics for each variable for financial development. The computed F statistics for each order of lags are given in Table 3. It is evident from the table that computed F-values for each indicator for financial sector development is much higher than the above critical bounds. Thus, there is a strong evidence of long run relationship among the financial development and economic growth. To ensure the causality, we apply the Granger no causality test for all variables. It is found that the causality runs from financial development to economic growth. The results are not presented here keeping brevity in mind.

Table No: 3 Bounds Tests for the Existence of a Long Relationship

	F-statistic	1 % Critical bounds	
PRIVO	5.8794	4.29	5.61
LLY	7.2145	4.29	5.61
BTOT	6.965	4.29	5.61
IFD	7.124	4.29	5.61

source of critical values: Pesaran et al(2001)

In the next step, we estimate Equation 4, following the ARDL cointegration methodology for the long run estimates. The total number of regression estimated $(2+1)^5 = 243$. This stage utilizes the $\overline{R^2}$ criterion, Hannan Quinn Criterion, AIC Criterion, and SBC Criterion to find the coefficient of the level variables. All four models are estimated. The long run and short run results of all models are almost identical. Hence, we present here only the result of model that is selected on the basis of SBC. Because, SBC is known as parsimonious model, as selecting the smallest possible lag length and it minimizes the loss of degree of freedom as well. The total number of regression estimated $(2+1)^5 = 243$. The long run results for are presented in Table 3. It is evident from the table *PRIVO*, *LLY*, *BTOT*, *IFD*, *K* and *TR* is contributing in the economic growth of South Africa. However, we let our discussion on the results for a while. Furthermore, the statistical signs of for *R*, are also interesting to discuss.

These results show that the hypothesis "finance leads to growth" cannot be rejected in the case of South Africa. These results are more relevant in the case of South Africa, because South Africa has a healthier and market oriented financial sector. The statistically significant positive sign shows that R also has a significant role to increase in economic growth. But, the channel is not straightforward for the other indicators. As mentioned above, the positive coefficient of *R* implies that it might capture indirectly the productivity effect on growth. The repressionist school of McKinnon (1973) and Shaw (1973) proposes that *R* is positively correlated with savings in developing countries because the positive substitution effect dominates the negative income effect. Substitution effect means that the higher interest rates encourage savings, and, therefore, reduce consumption and income effect means that higher interest rates also increase income, for those with high levels of savings.

The short run results as depicted in Table 5 show that all financial indicators have positive and significant role the economic activites of ΔK is positive and significant impact on economic growth in the country. The error correction term ecm_{t-1}, which measures the speed of "modification to restore equilibrium" in the dynamic model, appears with negative sign and is statistically significant at 5 percent level, ensuring that long run equilibrium can be attained [Bannerjee et al., (1993) & Bannerjee et al., (1998)]. Kremers et al, (1992); Bannerjee et al., (1993) & Bannerjee

Table No:4 Long Run ARDL Estimates

Regressor	1	2	3	4
PRIVO	0.5879***	NA	NA	NA
	(3.6540)	NA	NA	NA
LLY	NA	0.9654**	NA	NA
		(2.3145)	NA	NA
BTOT	NA	NA	0.8954***	NA
	NA	NA	(4.5421)	NA
IFD	NA	NA	NA	0.21***
	NA	NA	NA	(3.546)
R	0.13245**	0.5462*	0.2154	0.545***
	(1.965478)	(1.85479)	(1.5487)	(2.987)
TR	2.1245*	1.124***	0.7584***	1.2564
	(1.8457)	(2.564)	(2.5412)	(1.542)
Intercept	1.2145***	1.1332***	1.9326**	0.3641***
	(4.3254)	(2.9654)	(1.9874)	(2.6987)
Diagnostic Test Statistics				
CHSQ(1)	0.0195	0.0160	0.0186	0.0185
CHSQ(2)	2.4078	1.9700	2.2983	2.2874
CHSQ(1)	1.4466	1.1836	1.3808	1.3743
CHSQ(1)	0.0125	0.0102	0.0120	0.0119

Note: *, ** and *** represent 10, 5 and 1-percent level of significance, respectively. t-student values are presented in parenthesis

Bannerjee et al., (1998) hold that a highly significant error correction term is a further proof of the existence of stable long run relationship. Indeed, he has argued that testing the significance of ecm_{t-1}, which is supposed to carry a negative coefficient, is a relatively more efficient way of establishing co-integration. Nearly 12 percent of the disequilibria, in the case of *IFD*, in GDP growth of the previous year's shock adjust back to the long run equilibrium in the current year. R^2 indicates that it is a relatively good fit.

To check the stability, we apply CUSUM and CUSUMQ techniques. Figure 1 and Figure 2 show that both statistics CUSUM and CUSUMSQ are within the critical bounds, indicating that all coefficients in ARDL error correction model are stable. Therefore, the preferred economic growth model can be used for policy making purposes. The impact of policy changes considering the explanatory variables of growth equation will not cause major distortion in the level of growth. Because, the parameters in this equation seem to follow a stable pattern during the estimation period.

Table No: 5 Short Run ARDL Estimate

	1	2	3	4
Regressor				
ΔPRIVO	0.2347***	*NA*	*NA*	*NA*
	(6.5857)	*NA*	*NA*	*NA*
ΔLLY	*NA*	2.5894***	*NA*	*NA*
	NA	(3.5725)	*NA*	*NA*
ΔBTOT	*NA*	*NA*	0.0011	*NA*
	NA	*NA*	(1.4992)	*NA*
ΔIFD	*NA*	*NA*	*NA*	0.2189**
	NA	*NA*	*NA*	(1.9899)
ΔR	-0.2542*	-1.2595***	0.5232	0.8978***
	(-1.8243)	(-3.5396)	(1.1616)	(2.3761)
ΔTR	1.3354**	1.7017***	0.2036**	0.9310**
	(2.1623)	(4.2373)	(2.2832)	(2.3154)
Δ Intercept	7.5009	3.5354***	1.7003*	0.2312**
	(1.361)	(6.8354)	(1.8517)	(2.0032)
ecm(-1)	-0.4037***	-0.2577***	-0.1316***	-0.1250**
	(-2.3654)	(-4.3250)	(-2.3899)	(-2.1998)
Diagnostic Test Statistics				
R-Squred	0.6792	0.5617	0.5446	0.4766
R-bar- Squred	0.6032	0.4361	0.4630	0.3700
F	11.6628	4.3602	7.2314	3.6996
DW	1.9808	2.1361	1.7919	1.8125
Ecm=*Y*-0.5879**PRIVO*-0.1324**R*-2.1245**TR*-1.2145				
Ecm=*Y*-0.9654**LLY*-0.5462**R*-1.1240**TR*-1.1332				
Ecm=*Y*-0.8954**BTOT*-0.2154**R*-0.7584**TR*-1.9326				
Ecm=*Y*-0.2100**IFD*-0.5450**R*-1.2564**TR*-0.3641				

Note:2: *, ** and *** represent 10, 5 and 1 percent level of significance. t-student values are presented in parenthesis

Conclusion

This research is conducted with the objective to search an evidence for the relationship between financial development and economic growth. We use ARDL methodology to accomplish this task. We find a positive monotonic relationship between financial development and economic growth. The different indicators of financial development, like *PRIVO*, *LLY*, *BTOT*, are utilized. Here we also attempt to search the exact channel of banking sector that have a significant impact on the economic growth. This is a very relevant exercise especially in the case of South Africa for, the government is concentrating to increase the usage of the banking system through increasing the number of accounts and extending the service to black community. We find that all three variables have positive impacts on the economic growth. More importantly, the banking sector as a whole, measured by an index of the financial development, by using the principal component analysis, indicates that financial development leads to growth. Additionally, the other determinants of economic growth are trade openness and per capita real capital is also.

Our empirical investigation suggests some interesting policy measures for South Africa as well as for other developing countries, in general. As concluded, the financial sector reforms have increased markedly the financial depth in South Africa. Therefore, a sound financial sector is important for the country. Hence, it is vital that further institutional reforms are brought into effect for more efficient allocation of resources. A way of increasing competition and creating profitable banks would be to open up the banking sector to foreign competition.

The positive sign of R suggests that the government of a developing country should maintain a liberal and positive real interest rate to enhance savings and investment. The non-financial factors of growth, like capital and trade also reinforce the argument of more liberal rate of interest.

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