Financial Intermediaries Versus Financial Markets: A South African Experience

Nicholas M. Odhiambo, University of South Africa (UNISA), South Africa

ABSTRACT

In this paper, a dynamic causal relationship between stock market development, bank-based financial development and economic growth in South Africa is examined during the period 1980:1-2007:3, using a trivariate Granger causality model. The study attempts to answer two critical questions. Does financial sector development Granger cause economic growth? Which sector leads in the process of financial development in South Africa – bank-based sector or stock market sector? Using a cointegration-based error-correction mechanism, the empirical results reveal that there is a distinct unidirectional causal flow from stock market development to bank development. The results also indicate that there is a bi-directional causal relationship between stock market development and economic growth. Similar results were also found on the causality between bank-based financial development and economic growth. The study, therefore, concludes that whilst both financial development and economic growth Granger cause each other, the development of the financial sector in South Africa is largely driven by the stock market activities.

Keywords: Financial Intermediaries; Financial Markets; Economic Growth; Causality

1. INTRODUCTION

The dynamic impact of financial sector development on economic growth has been investigated in a number of countries, but with conflicting results. From the empirical front, four views exist in the literature regarding the relationship between financial development and economic growth. The first view argues that financial development leads to economic growth (i.e. McKinnon, 1973; Shaw, 1973; Patrick, 1966 and Fry, 1973). This view posits that there is a supply-leading response between financial development and economic growth, and attaches greater importance to the role played by financial sector development in economic growth. The second view is that financial development follows economic growth. In other words, economic growth causes financial markets as well as credit markets to grow and develop. In this case, financial development is considered to be demand-driven. As opposed to the first view, in this case greater importance is attached to the development of the real sector rather than the financial sector. The third view maintains that there is a bi-directional causal relationship between financial development and economic growth. In other words, both financial development and economic growth granger cause each other. This view, as opposed to the first two views, attaches equal importance to both the financial and real sectors of the economy. The fourth view, however, posits that financial development and economic growth are not causally related. This implies that neither of the two sectors has considerable effect upon the other, and that even though economies may grow as the financial sector grows, the two sectors - financial and real - follow their own logic. In other words, the observed correlationship between financial development and economic growth may merely be as a result of a historical peculiarity (see Graff, 1999).

Although a number of studies have been conducted on the causal relationship between financial development and economic growth in many developing countries, the majority of these studies have used only bank development as a proxy for financial development. Specific studies addressing the dynamic causal relationship between bank-based financial development, stock market development and economic growth are very scant. Moreover, the majority of the studies have used a bi-variate framework to examine the causal relationship between financial development and economic growth. Yet, it is now clear that the results of the bi-variate causality test between financial development and economic growth may be invalid due to the omission of an important variable affecting both financial development and economic growth in the causality model. In other words, the introduction

of a third variable in the causality framework may not only alter the direction of causality but also the magnitude of the estimates. The current study, therefore, attempts to fill this lacuna by examining the causal relationship between bank development, stock market development and economic growth in South Africa using a trivariate framework. The study attempts to answer two critical questions. Does financial sector development Granger cause economic growth in South Africa? Which sector leads in the process of financial development - bank development or stock market development?

The rest of the paper is divided as follows. Section 2 gives an overview of the financial market reforms and development in South Africa. Section 3 highlights the theoretical and empirical linkages between bank-based financial development and economic growth. In Section 4, the role of stock market development in economic growth is explored, while in Section 5 the empirical model used in the study as well as the estimation techniques are presented. Section 6 concludes the study.

2 FINANCIAL MARKET REFORMS AND DEVELOPMENT IN SOUTH AFRICA

By the standards of emerging markets' economies, South Africa is considered to have one of the most developed and highly sophisticated financial systems. Financial markets in South Africa can be conveniently divided into two broad markets, namely the money market and the bond market. As in other countries, the money market in South Africa issues and trades in investments with a maximum tenor of only one year, while the bond market issues and trades in long-term securities. Money market instruments in South Africa include Treasury bills, government bonds, negotiable certificates of deposit and repurchase agreements, among others.

The South African capital market is robust, liquid and well developed. The Johannesburg Stock Exchange (JSE), formed in 1887 and a member of the Federation of International Stock Exchanges since 1963, is, in terms of market capitalisation, one of the largest stock exchanges in the world. The JSE is included in the Morgan Stanley Index and the International Finance Corporation (IFC) Emerging Markets Indices. It has also been a key role player in the African Stock Exchanges Association since its formation in 1993. Currently, South African securities are traded simultaneously in Johannesburg, London, New York, Frankfurt and Zurich. In 1990, the South African Futures Exchange (SAFEX) was also established. SAFEX consists of two divisions. The first is the financial markets division, which covers equity and interest rate futures and options markets. The second is the agricultural markets division, which covers soft commodities futures and options on maize, sunflower and wheat. In 1996, more than four million futures contracts, valued at US $62 billion, were traded, and in 1999 SAFEX moved from being the 22nd to the 18th largest volume exchange in the world.

The Bond Exchange of South Africa (BESA) was also licensed to trade in 1996. BESA was licensed as an exchange under the Financial Markets Control Act, 1989 (Act No. 55 of 1989), for the listing, trading and settlement of interest bearing loan stock or debt securities. In 1996/97, the same year it was registered, more than 430,000 stocks with a nominal value in excess of US $704 billion changed hands in BESA (See Investment South Africa). By 2001 the bond exchange enjoyed an annual liquidity of more than 38 times the market capitalisation. This made it one of the most liquid emerging bond markets in the world (See Investment South Africa; South African Year Book 2001).

For more than a century the securities stock industry in South Africa was highly regulated through practices that were enforced by the JSE. The JSE was conventionally based on a strict 'single-capacity' rule. Member firms were either brokers or principals in securities trading (e.g. equities and bonds) but could not be both simultaneously. Membership was also limited to South African citizens with unlimited liability. Banks, as limited liability companies, were thus excluded from membership. However, in November 1995, structural changes were imposed on the JSE that resulted in a 'Big Bang' in 1996[1]. By 2003, the number of listed companies in the JSE had risen to 472 and the market capitalisation was estimated at US $182.6 billion, while the average monthly traded value was US $6,399 million. As at September 2006, the market capitalisation of the JSE was US $579.1 billion. Currently, the JSE is the 16th largest stock exchange in the world.

[1] For more details, see SA Financial Sector Forum (1997), South Africa Yearbook (1993; 1999; 2000), Felkana et al (2001).

3. FINANCIAL INTERMEDIARIES, FINANCIAL MARKETS AND ECONOMIC GROWTH

Broadly speaking, a financial sector can be divided into two systems, namely bank-based system and market-based system. However, most economists believe that a bank-based financial system is better than a market-based system. In particular, it is argued that economic growth could be encouraged more in the bank-based system since it can induce longer-term investment in the real sector, whereas investment in the market-based system is too sensitive to the stock market prices (see Hoshi et al, 1990; Lee, 2001). Even in a recession, the intimate relationship between banks and business can allow firms to continue with investment without pushing them into bankruptcy (see Hoshi et al, 1990; Lee, 2001). Also, it is argued that government's industrial policies can be carried out more easily in a bank-based system because it provides government with more measures to intervene in the financial sector (i.e. interest rate regulation and credit policy) than does the market-based system (see Pollin, 1995).

However, the bank-based financial system has its own disadvantages. The bank-based system is vulnerable to problems such as inefficient capital allocation along with intimate relationship between banks and firms and, most of all, higher debt ratio. The moral hazard problem in the bank-based system is even worse. With the implicit government bailout, finance sometimes only does harm to the economy, making the system more fragile to financial crisis (Greenspan, 1999). The crisis in the East-Asian countries in the late 1990s is a case in point. Before the 1990s, many economists argued that the good performance of economies such as Japan, as opposed to many market-based economies, was due to the inefficiency of the market-based system, especially for long-term economic growth. However, with the emergence of the Asian crisis in the 1990s, this thinking was adversely challenged. As Greenspan (1999) puts it, if the capital market had been developed well in East Asia, the East Asia crisis would not have been that serious since the capital market can buffer the credit contraction in the banking sector. The current mainstream view, however, is that countries contemplating developing a highly sophisticated bank-based financial system should also develop a modest capital market that can complement the bank-based financial system[2].

4. EMPIRICAL MODEL SPECIFICATION AND ESTIMATION TECHNIQUE

In this section, a dynamic Granger causality test is used to examine the causal relationship between bank development, stock market development and economic growth in South Africa. Given the weakness associated with the bivariate causality framework, the current study employs a multivariate causality test to examine this linkage. Indeed, it is possible that the causal link between bank development and economic growth, stock market development and economic growth, and bank development and stock market development could be due to the omission of an important variable in the causality models. Consequently, a trivariate causality framework is used to examine the causal relationship between bank development (FDt), stock market development (STK) and economic growth (y/N). A trivariate causality model based on error-correction mechanism can be expressed as follows (see also Odhiambo, 2008):

$$Y_t = \lambda_0 + \sum_{i=1}^{m} \lambda_{1i} Y_{t-i} + \sum_{i=1}^{n} \lambda_{2i} FD_{t-i} + \sum_{i=1}^{n} \lambda_{3i} STK_{t-i} + \lambda_4 ECT_{t-1} + \mu_t \quad (1)$$

$$FD_t = \varphi_0 + \sum_{i=1}^{m} \varphi_{1i} Y_{t-i} + \sum_{i=1}^{n} \varphi_{2i} FD_{t-i} + \sum_{i=1}^{n} \varphi_{3i} STK_{t-i} + \varphi_4 ECT_{t-1} + \varepsilon_t \quad (2)$$

$$STK_t = \delta_0 + \sum_{i=1}^{m} \delta_{1i} Y_{t-i} + \sum_{i=1}^{n} \delta_{2i} FD_{t-i} + \sum_{i=1}^{n} \delta_{3i} STK_{t-i} + \delta_4 ECT_{t-1} + \nu_t \quad (3)$$

Where

ECT_{t-1} = error correction term lagged one period.

[2] For more details, see Lee (2001).

Y = real GDP per capita (y/N).

FD = the ratio of M3 to GDP (a proxy for bank development).

STK = the ratio of stock market capitalisation to GDP (a proxy for stock market development).

μ, ε and ν = mutually uncorrelated white noise residuals.

It is worth noting that in the error-correction based causality test, the short-run causal impact is measured through the F-statistics and the significance of the lagged changes in the independent variables, while the long-run causal impact is measured through the error-correction term (see also Howard, 2002).

4.1 Stationarity Tests

Table 1: Stationarity Tests of Variables on first Difference - Phillips-Perron (PP) Test

Variable	No Trend	Trend	Stationarity Status
Phillips-Perron (PP)			
DLM3/GDP	-8.86376***	-9.04021***	Stationary
DLSTK/GDP	-10.47466***	-10.49210***	Stationary
DLy/N	-12.6247***	13.16725***	Stationary

Note:
1)The truncation lag for the PP tests is based on Newey and West (1987) bandwidth.
2) ***, **, and * denote 1% , 5% and 10% level of significance, respectively.

Table 2: Stationarity Tests of Variables on first Difference – Dickey-Fuller - GLS Test

Variable	No Trend	Trend	Stationarity Status
DLM3/GDP	-2.48354***	-7.79800***	Stationary
DLSTK/GDP	-4.58070***	-9.07564***	Stationary
DLy/N	-2.47673**	-11.73184***	Stationary

Note:
1) Critical values for Dickey-Fuller GLS test are based on Elliot-Rothenberg-Stock (1996, Table 1).
2) ***, **, and * denote 1% , 5% and 10% level of significance, respectively.

Table 3: Stationarity Tests of Variables on first Difference –Ng -Perron Test

Variable	Ng-Perron Test Statistics (without Trend)				Stationarity Status
	MZ	MZt	MSB	MPT	
DLM3/GDP	-39.2408	-4.39552	0.11201	0.72077	Stationary
DLSTK/GDP	-34.7562	-4.15891	0.11966	0.73414	Stationary
DLy/N	-38.2648	-4.37354	0.11430	0.64179	Stationary
Asymptotic Critical Values – (Ng –Perron, 2001, Table 1)					
1%	-13.8000	-2.5800	0.17400	1.7800	
5%	-8.1000	-1.9800	0.23300	3.1700	
10%	-5.7000	-1.6200	0.27500	4.4500	
Variable	**Ng-Perron Test Statistics (with Trend)**				**Stationarity Status**
	MZ	MZt	MSB	MPT	
DLM3/GDP	-42.9891	-4.63021	0.10771	2.15122	Stationary
DLSTK/GDP	-44.5602	-4.71889	0.10590	2.05172	Stationary
DLy/N	-42.0867	-4.57881	0.10879	2.21031	Stationary
Asymptotic Critical Values – (Ng –Perron, 2001, Table 1)					
1%	-23.8000	-3.42000	0.14300	4.03000	
5%	-17.3000	-2.91000	0.16800	5.48000	
10%	-14.2000	-2.62000	0.18500	6.67000	

Just like in other time series data, the variables stock market development (STK/GDP), financial development (M3/GDP) and economic growth (y/N) must be tested for stationarity before running the causality test. For this purpose, the current study uses some of the most recent unit root tests. These include the Phillips-Perron following Phillips and Perron (1988), the Dickey-Fuller generalised least square (DF-GLS) de-trending test proposed by Elliot et al (1996) and the newly developed Ng-Perron test proposed by Ng and Perron (2001). The results of the stationarity tests at level (not presented here) show that all variables are non-stationary at level. Having found that the variables are not stationary at level, the next step is to difference the variables once in order to perform stationarity tests on differenced variables. The results of the stationarity tests on differenced variables are presented in Tables 1, 2 and 3.

The results reported in Tables 1, 2 and 3 show that after differencing the variables once, all the variables were confirmed to be stationary. The Phillips-Perron, DF-GLS and Ng-Perron tests applied to the first difference of the data series reject the null hypothesis of non-stationarity for all the variables used in this study. It is, therefore, worth concluding that all the variables are integrated of order one.

4.2 Cointegration Analysis

Having confirmed that all variables included in the causality test are integrated of order one, the next step is to test the existence of cointegration relationship. For this purpose, the study uses the Johansen-Juselius (maximum likelihood) cointegration test procedure. The results of Johansen-Juselius cointegration test are presented in Table 4.

Table 4: Maximum Likelihood Cointegration Test

Trace Test				Maximum Eigenvalue Test			
Null	**Alternative**	**Statistics**	**95% Critical value**	**Null**	**Alternative**	**Statistics**	**95% Critical value**
Cointegration Between LM3/GDP, STK/GDP and y/N							
$r = 0$	$r \geq 1$	48.25	24.3	$r = 0$	$r = 1$	38.52	17.9
$r \leq 1$	$r = 2$	9.733	12.5	$r \leq 1$	$r = 2$	8.422	11.4
$r \leq 1$	$r = 2$	1.312	3.8	$r \leq 1$	$r = 2$	1.312	3.8

Notes:
1) r stands for the number of cointegrating vectors
2) The lag structure of VAR is determined by the highest values of the Akaike information criterion and Schwartz Bayesian Criterion.

The results of the Johansen-Juselius cointegration test reported in Table 4 indicate the existence of a stable long-run relationship between stock market development, bank development and economic growth. Both the trace test and the maximum eigenvalue statistics reject the null hypothesis of no cointegration. Specifically, the results show that there is a unique cointegrating vector between STK/GDP, M3/GDP and y/N.

4.3 Analysis of Causality Test Based on Error Correction-Model

It is worth noting that although cointegration indicates the presence of Granger causality, at least in one direction, it does not indicate the direction of causality between the variables. The direction of the Granger causality can only be detected through the vector error-correction model (VECM) derived from the long-run cointegrating vectors. While the significance of the t-test of the lagged error-correction term indicates the long run causal effect, the F-test and the t-test of the explanatory variables indicate the "short-run" causal effect. A summary of the results of the error-correction model is presented in Table 5.

Table 5: Error-correction Model: Causality Test Between DLy/N, DLM3/GDP and DLSTK/GDP

Variables in equation	Dependent Variables		
	DLy/N	ΔLM3/GDP	ΔLSTK/GDP
Constant	-0.0020415(-1.376)	0.0022383(1.188)	0.0060509(0.592)
DLy/N-3		0.28666(1.860)*	
DLy/N-4	0.083348(0.820)	0.51547(3.450)***	1.3512(1.600)
DLy/N-5			2.4623(2.001)**
ΔLM3/GDP			0.092784(0.8615)
ΔLM3/GDP-4	0.15632(2.138)**	0.11754(1.124)	
ΔLSTK/GDP-1	0.032358(2.145)**		
ΔLSTK/GDP-2	0.029895(2.000)**		
ΔLSTK/GDP-3		0.018556(1.010)	
ΔLSTK/GDP-4	0.027294(1.895)*		0.096081(0.949)
ΔLSTK/GDP-5		0.035072(2.007)**	
ECM_{t-1}	-0.14454(-3.392)***	-0.11191(-3.111)***	-0.18399(-2.596)***
F-Test	1.9408 [0.0460]	2.4446 [0.0038]	1.3895 [0.1886]
R^2	0.210646	0.373	0.174
DW	2.57	1.79	1.93

Note: ***, **, and * denote 1% , 5% and 10% level of significance, respectively

The results reported in Table 5 reveal that there is a bi-directional causal relationship between the two proxies of financial sector development (i.e. bank sector development and stock market development) and economic growth. The short run causal flow from financial development to economic growth is confirmed by the coefficients of the lagged values of M3/GDP and STK/GDP in the economic growth function, which are positive and statistically significant. Likewise, the short run causal flow from economic growth to financial development is confirmed by the coefficients of the lagged values of economic growth in the bank development function (M3/GDP) and the stock market development function (STK/GDP), which are positive and statistically significant. The short run bi-directional causal relationship has also been supported by the F-statistics as reported in Table 5. The Long-run bi-directional causal relationship between financial development variables and economic growth, on the other hand, is supported by the coefficients of the error-correction terms in the economic growth function (y/N), the bank development function (M3/GDP) and the stock market development function (STK/GDP), which are all negative and statistically significant, as expected.

Regarding the causality between bank development and stock market development, the empirical results show that there is a uni-directional causal flow from stock market development to bank development. The short run causal flow from stock market development to bank development is confirmed by the coefficient of the lagged stock market development in the bank development function (M3/GDP) as well as the F-statistic, which are both positive and statistically significant. The long-run causal flow, on the other hand, is supported by the coefficient of the error-correction term in the bank development function (M3/GDP), which is negative and statistically significant, as expected. However, the reverse causal flow from bank development to stock market development has been rejected by the coefficient of the lagged bank development in the stock market function (STK/GDP), which is statistically insignificant. The findings of this study support Levine and Vervos (1996) argument that stock market development has more influence on economic growth than other financial indicators.

5. CONCLUSION

In this study, the direction of causality between bank development, stock market development and economic growth is estimated in South Africa during the period 1980:1-2007:3 - using a trivariate Granger causality model. The study attempts to answer two critical questions. Does financial sector development Granger cause economic growth? Which sector leads in the process of financial development in South Africa, bank development or stock market development? Using cointegration and error-correction model, the empirical results show that there is a bi-directional causal relationship between financial development and economic growth. In addition, the study reveals that there is a uni-directional causal flow from stock market development to bank development. This applies irrespective of whether the model is estimated in a short-run or in a long-run dynamic. The study, therefore,

concludes that while the financial and real sectors in South Africa Granger cause each other, the development of the financial sector is largely driven by the stock market activities. The empirical results lend more support for the market-based system in South Africa. The study recommends that the capital market sector in South Africa should be developed further in order to foster further growth in the financial sector.

AUTHOR INFORMATION

Prof Nicholas M Odhiambo holds a PhD (Economics) degree from Stellenbosch University (South Africa), and a Masters degree in Economics from the University of Dar-es-salaam (Tanzania), both of which were sponsored by the African Economic Research Consortium (AERC). Prof Odhiambo's research profile is broad, rich and multifaceted. During the past eight years, Prof Odhiambo has published more than 42 articles in 24 local and international journals. Prof Odhiambo is an NRF-rated researcher, and is listed in a number of international bibliographies and databases. He has also served on the Reviewers' Boards of a number of journals, and is currently a member of the Editorial Board of four prominent journals. Prof Odhiambo is currently working as Full Professor in the Department of Economics at the University of South Africa (UNISA).

REFERENCES

1. Elliot, G., Rothenberg, T. and Stock, J. (1996), "Efficient Tests for an Autoregressive Unit Root", *Econometrica* 64: 813-36.
2. Fry, M.J. (1973), "Manipulating Demand for Money, in Michael, Parkin (ed)", *Essays in Modern Economics*, Long man.
3. Granger, C.W.(1969),"Investigating Causal Relations by Econometric Models and Cross-Spectral Methods", *Econometrica*, Vol.37, pp.424-438.
4. Granger, C.W.(1988) "Some Recent Developments in a Concept of Causality", *Journal of Econometrics*, 39, pp.199-211.
5. Greenspan, Alan (1999), "Lessons from Global Crises, Before the World Bank and the IMF, Program of Seminars, Washington DC (September).
6. Hoshi, T., Kashyap, A. and Scharfstein, D. (1990), "The Role of Banks in Reducing the Costs of Financial Distress in Japan", *Journal of Financial Economics*.
7. Jensen, M.C. and Murphy, K.J. (1990), "Performance Pay to Top Management Incentives", *Journal of Political Economy* 98 (April): 225-64.
8. Johansen, S. (1988), "Statistical Analysis of Cointegration vectors", *Journal of Economic Dynamics and Control*, 12, pp.231-54.
9. Johansen, S. (1991), "Estimation and Hypothesis Testing of Cointegration vectors in Gaussian Vector Autoregressive Models", *Econometrica, 59, pp. 1551-80.*
10. Johansen, S. and Juselius, K. (1990), "Maximum Likelihood Estimation and Inference on Cointegration with Applications to the Demand for Money", *Oxford Bulletin of Economics and Statistics*, 52, pp.169-210.
11. Lee, Kongkook (2001) "Note on Study of the Changes of Financial System" Ref. 00.12-Department of Economics, University of Massachusetts.
12. Levine, R. and Zervos, S. (1996), "Stock Market Development and Long Run Growth" *World Bank Economic Review* 10 (2).
13. McKinnon, R.I. (1973), *Money and Capital in Economic Development*, The Brookings Institution, Washington D.C.
14. Newey, W.K. and West, K.D (1987), " A Simple, Positive Semi-Definite, Heteroskedasticity and Autocorrelation Consistent Covariance Matrix", *Econometrica* 55: 703-8.
15. Ng, S. and Perron, P. (2001), "Lag Length Selection and the Construction of Unit Root Test with Good Size and Power", *Econometrica* 69: 1519-54.
16. Odhiambo, N.M. (2008). Financial Depth, Savings and Economic Growth in Kenya: A Dynamic Casual Relationship. *Economic Modelling*, 25 (4), 704-713.
17. Patrick, H.T. (1966), "Financial Development and Economic Growth in Underdeveloped countries", *Economic Development and Cultural Change* 14(1): 174-189.
18. Phillips, P.C.B. and P. Perron (1988), "Testing for a Unit root in Time Series Regression", *Biometrika* 75: 335-346.

19. Pollin, Robert (1995), "Financial Structures and Egalitarian Economic Policy", *New Left Review* (214).
20. Shaw, E. S. (1973), *Financial Deepening in Economic Development*, New York, Oxford University Press.
21. South Africa Official Year Book, Various issues.

NOTES

