The finance-growth nexus in Namibia

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ABSTRACT

This paper tests the causal relationship between financial development and economic growth in Namibia for the period 1980 to 2007. The analysis shows that there is evidence which points that financial development causes economic growth. It also shows that economic growth causes financial development. This suggests that Namibia should promote financial development or financial deepening as a strategy to enhance economic growth. At the same time, the country should also develop its real sector in order to promote economic development.

1. INTRODUCTION

The causality between financial development and economic growth is not without controversy both theoretically and empirically. The relationship between financial development and economic growth has been analysed and debated extensively. At the centre of this debate is whether financial development leads economic growth or whether it just follows growth which is generated by other sectors. Schumpeter (1911) argues that the development of the financial system is important because it improves productivity and economic growth through the functions that are part of the financial system, and which include capital allocation, mobilisation of savings, evaluation and monitoring of borrowers. The financial sector is important in transferring deposits to financial assets and channelling funds from surplus to deficits units. It therefore facilitates the creation of wealth, trade and the formation of capital. There is a general consensus that financial development impact positively on economic growth. The validity of this general consensus should be investigated empirically and theoretically.

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There is an extensive literature on the relationship between financial development and economic growth for both developed and developing countries and now generally agreed that financial development is important for economic growth. However, there is no consensus on the direction of causality between financial development and economic growth. Knowing the direction of causality is important because it has different implications for policy development.

Despite the fact that the relationship between financial development and economic growth is important for policy development, empirical studies on Namibia are limited (however, there is one study on financial development and growth in the Common Monetary Area by Aziakpono, 2004). The purpose of this paper is to analyses the causal relationship between financial development and economic growth in Namibia. The paper is organised as follows. Section 2 briefly discusses the financial system in Namibia. Section 3 discusses the literature on financial development and economic growth. Section 4 discusses Granger causality theory, while Section 5 outlines the estimation technique and empirical methodology. Section 6 presents the results and Section 7 concludes.

2. BRIEF OVERVIEW OF THE FINANCIAL SYSTEM IN NAMIBIA

The financial system in Namibia is one the most highly developed and sophisticated in Africa. It is also highly advanced by developing countries' standards. It consists of four private commercial banks, about thirty insurance companies, 500 pension funds, the stock exchange, a number of asset management and unit trust management companies (IMF, 2007). It also consists of several specialised institutions and several micro lending institutions.

The financial system is dominated by a sound banking industry, and figures from the central bank, the Bank of Namibia indicate that prudential indicators such as non-performing loan ratio is about 2.4 percent. Other indicators show that commercial banks in Namibia are profitable and well-capitalised. In 2006, the capital adequacy ratio was 15 percent and return on equity at 28 percent. These indicators compare favourably with other banks in Sub-Saharan Africa and specifically Southern Africa. Although Namibia is ranked after South Africa when it comes to population per bank, the geographic distribution of the banks is skewed in the central parts of the country. However, banks and other financial institutions continue to expand their operation to most parts of the country.

Many of the financial institutions have significant ownership of and links to South Africa. Since 1990, the government has encouraged and required financial institutions to localise their operations. The government effects Namibianisation in several ways such as the requirement that foreign banks and insurance companies set up subsidiaries in order to conduct their operations in Namibia. The Banks are required to maintain 100 percent of their liabilities in local assets (see IMF, 2007). The government has also made efforts to widen access to specific financial products through specialised financial institutions. With the exception of the Post Bank, many of these specialised financial institutions (such as Agricultural Bank or Agribank and National Housing Enterprise) had limited success because of the problem associated with economies of scale.

In order analyse the role of the financial or banking sector in the economy, it is important to look the ratio of broad money supply as a ratio of the GDP. The ratio of broad money supply to GDP gives a rough indication of financial deepening and the size of the banking or financial industry in relation to the economy.

Figure 1 shows that the ratio of broad money (M2) to GDP follows an increasing trend between 1980 and 2007. This increasing trend shows that the banking and financial sector has been able to raise capital for growth in the economy. Despite this increasing trend, various Annual Reports of the Bank of Namibia indicated that the major beneficiaries of capital were larger established corporate bodies, but access to credit for small and medium enterprises in both rural and urban areas is still a main obstacle. The ratio of M2 to GDP is a rough and simple measure of financial deepening and its increase may indicate extensive currency rather than increase in deposits at financial institutions. Ghali (1999) argues that most developing countries are characterised by large components of M2 held outside the banking system. This may indicate the extent to which transactions are monetised rather than the degree of financial intermediation. Hence, it is important to look at other measures of financial intermediation such as credit extended to the private sector as a ratio of GDP. Credit extended to the private sector as a ratio of GDP is a more direct measure of financial intermediation. Figure 1 shows that the ratio of private sector credit to GDP follows an increasing trend from less than 20 percent in 1980 to more than 50 percent in 2007. The increase in this ratio is interpreted as financial deepening in Namibia and suggests that the financial sector is playing an increasing role in the country's economy. Private sector credit accounts for a very high share of domestic credit compared to credit extended to the government sector.

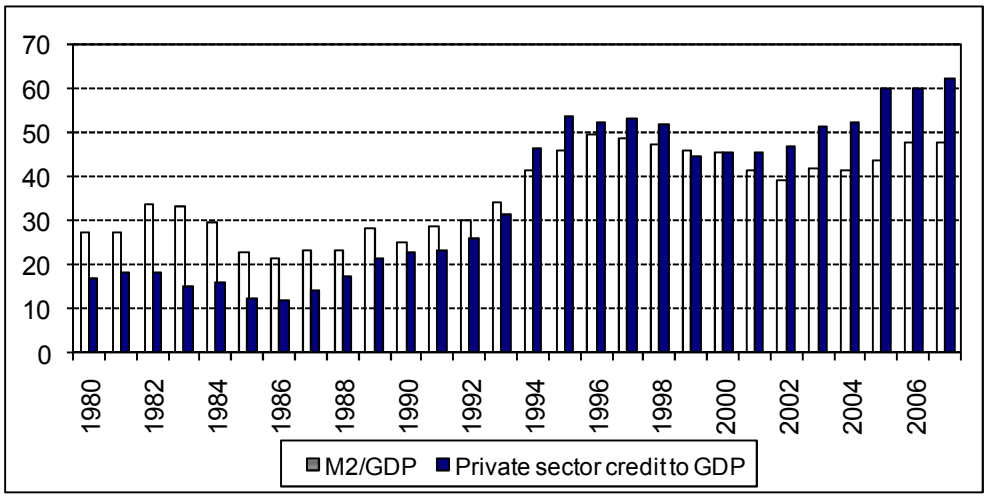

Figure 1. Ratio of M2 to GDP and ratio of private sector credit to GDP
Source: Data for the figure are obtained from the Bank of Namibia

As presented in Table 1, commercial banks credit is dominated by credit extended to individuals. During the period 2004 to 2007, credit granted to individuals accounts for more than half of the total credit. Credit extended to the commercial and service sector accounts for the second highest share after individuals. The commercial and services sector accounts for about 30 percent of total credit during the same period. Although the mining sector contributes 12 percent to the GDP and 45 percent to total commodity exports, it accounts for a very low share of domestic credit (2 percent of total credit). Credit extended to the agriculture, manufacturing and fishing sectors was very low, each accounting for less 4 percent of the total credit. This indicates that the sectors that are more productive (fishing, mining, agriculture, manufacturing and construction) collectively account for less than half of the total commercial banks' credit. This is not appropriate, and it is important that more resources should be allocated to the productive sectors of the economy.

Table 1. Direction of domestic credit (percent shares)

	2004	2005	2006	2007
Agriculture	4	4	3	3
Fishing	4	4	2	2
Mining and Quarrying	2	2	1	2
Manufacturing	2	2	2	2
Building and Construction	5	1	1	1
Commercial and Services	27	30	31	31
Other resident sectors and Others (individuals)	56	57	60	58
Total	100	100	100	100

Sources Data obtained from the Bank of Namibia

3. LITERATURE

The theoretical relationship between financial development and economic growth dates back to Schumpeter (1911) who emphasised that the services provided by the financial intermediaries are important for innovation and development. This theoretical relationship was extended and developed further by Fry (1978, 1980) and Galbis (1977). The two studies analysed the effect of government intervention on the development of the financial system. They proposed that government intervention to impose restrictions such as credit ceilings and high reserve requirements on the banking system can impact negatively on the development of the financial sector and thus on economic growth.

Other theoretical developments include Greenwood and Smith (1997) and Levine (1997) that offer support for the positive relationship between financial development and economic growth. They argue that in a developing financial sector, the creation of credit causes an increase in economic growth. The creation of credit should not be constrained by the supply of deposits because there exists an idle balance in the banking system and the possibility of borrowing from the money market or central bank. Ghali (1999) contributed to this view by arguing that the availability of money in the financial system translates into the creation of credit to finance economic activity and this will cause high economic growth.

Considerable emphasis on the contribution of financial development to economic growth was caused by the emergence of the endogenous growth theory and this resulted in the expansion of the literature on the finance-growth nexus. There are two main views in the literature on the relationship between financial development and economic growth. The first one states that financial development has a positive effect on economic growth. According to this view, the effect runs from financial development to economic growth. This effect is caused either by an improvement in the efficiency of capital accumulation or an increase in the rate of savings as well as the rate of investment. This view is called supply-leading view, and was initiated by Schumpeter (1911) and supported by among others, King and Levine (1993) and Calderon and Liu (2003), Gurley and Shaw (1967) and Jung (1986).

The second view states that financial development responds to changes in the real sector and is called demand-leading view.

The postulation of this view is that the causality runs from economic growth to financial development. An increase in real economic growth causes a rise in the demand for financial services and this result in the expansion of the financial sector. This means that financial development respond to economic growth. The demand-following view is supported by among others, Jung (1986) and Ireland (1994). There are two other views between the supply-leading and demand-leading hypotheses (views). The first one postulates that there is mutual impact between financial development and economic growth. The second one is that there is no relationship between financial development and economic growth.

It has been assumed that the supply-leading view dominates the demand-leading view, which implies that financial development causes economic growth. However, a stage of development view was suggested by Patrick (1966). Patrick argues that the causal relationship between financial development and economic growth depends on the stage of economic development. In the early stages of economic development, supply leading view can stimulates real capital formation. The development of new financial services creates new opportunities for savers and investors and causes an increase in economic growth. The supply-leading view become less important as financial and economic development proceeds and gradually, the demand-leading view starts to dominate. Patrick states that one industry can be encouraged financially on the basis of supply-leading view, and when it develops, its financing shift to demand-leading view. Other industries that are still at a low level of development will remain in the supply-leading phase.

There is a lot of empirical work on the relationship between financial development and economic growth. Some empirical studies support the supply-leading view, while others provide evidence of demand-leading view. There are also some empirical studies which show that there is a bi-directional causality between financial development and economic growth. Jung (1986) tested the causality between financial development and economic growth for developed and developing countries. The results showed that developing countries have a supply-leading causality pattern more frequently than demand-leading pattern. Developed countries on the other hand have a demand-leading causality. The results provided support for Patrick (1966) hypothesis of stage development.

Choe and Moosa (1999) examine the relationship between financial development and economic growth for Korea. The study focused on relative development of financial intermediaries and capital markets. Causality test shows that financial development in general leads to economic growth. King and Levine (1999) and Ghali (1999) also found evidence that the causality runs from financial development to economic growth. These studies provide evidence that support Schumpeter's view that financial development leads to economic growth.

Odhiambo (2004) investigated the direction of causality between financial development and economic growth for South Africa using a vector error correction model. The investigation revealed that the supply-leading hypothesis is rejected for South Africa. There is a strong evidence of demand-leading hypothesis for South Africa. This implies that the causality runs from economic growth to financial development and shows that economic growth drives financial development in South Africa.

Luintel and Khan (1999) examined the long-run relationship between financial development and economic growth using multivariate vector autoregression for 10 countries. The examination revealed that there is a bi-directional causality between financial development and economic growth for all sampled countries.

Calderon and Liu (2003) also found evidence of bi-directional causality between financial development and economic growth. Apergis et al. (2007) and Odhiambo (2005) test results support the view that there is bi-directional causality between financial development and economic growth.

Aziakpono (2004) examined whether financial integration matters in integrated financial market for SACU countries. Two indicators of financial intermediation were used and Zellner seemingly unrelated regression results gave mixed evidence for the importance of domestic financial intermediation across these countries. South Africa is the dominant economy within SACU the results demonstrated that financial intermediation is important in promoting economic growth. The evidence was weak for Botswana and Lesotho. For Swaziland, the results indicate that the role of domestic financial institutions is becoming less important in stimulating economic growth.

4. GRANGER CAUSALITY THEORY

Granger causality test was developed by Granger (1969), and according to him, a variable (in this case financial development) is said to Granger causes another variable (GDP) if past and present values of financial development help to predict GDP. To test whether financial development Granger cause GDP, this paper applies the causality test developed by Granger (1969). A simple Granger causality test involving two variables, financial development (FI) and GDP is written as:

$$FI_t = \sum_{j=1}^{p} \alpha_j FI_{t-j} + \sum_{j=1}^{p} \beta_j GDP_{t-j} + u_t \quad (1)$$

$$GDP_t = \sum_{j=1}^{p} \eta_j FI_{t-j} + \sum_{j=1}^{p} \gamma_j GDP_{t-j} + v_t \quad (2)$$

The null hypotheses to be tested are:

$H_1 : \eta_j = 0,\ j = 1.....p,$ this hypothesis means that financial development does not Granger causes GDP.

$H_2 : \beta_j = 0,\ j = 1.....p,$ this hypothesis means that GDP does not Granger cause financial development. If the first hypothesis is rejected, it shows that financial development Granger causes GDP. Rejection of the second hypothesis means that the causality runs from GDP to financial development. If none of the hypothesis is rejected, it means that financial development does not Granger causes GDP and GDP also does not Granger cause financial development. It indicates that the two variables are independent of each other. If all hypotheses are rejected, there is bi-directional causality between financial development and GDP.

The traditional Granger causality test uses the simple F-test statistic. Several studies such as Chow (1987), Marin (1992), Pomponio (1996), McCarville and Nnadozie (1995), Darat (1996) have used the traditional (F-test) to test for causality. The use of a simple traditional Granger causality has been identified by several studies (such as Engle and Granger, 1987; Toda and Yamamoto, 1995; Zapata and Rambaldi, 1997; Tsen, 2006; Ahmad, 2006) as not sufficient if variables are I(1) and cointegrated.

If time series included in the analysis are I(1) and cointegrated, the traditional Granger causality test should not be used, and proper statistical inference can be obtained by analysing the causality relationship on the basis of the error correction model (ECM). Many economic time-series are I(1), and when they are cointegrated, the simple F-test statistic does not have a standard distribution. If the variables are I(1) and cointegrated, Granger causality should be done in the ECM and expressed as:

$$\Delta FI_{t-1} = \sum_{j=1}^{p} \alpha_j \Delta FI_{t-j} + \sum_{j=1}^{p} \beta_j \Delta GDP_{t-j} + \phi_1 \varepsilon_{1t-1} + u_t \tag{3}$$

$$\Delta GDP_{t-1} = \sum_{j=1}^{p} \eta_j \Delta FI_{t-j} + \sum_{j=1}^{p} \gamma_j \Delta GDP_{t-j} + \phi_2 \varepsilon_{2t-1} + v_t \tag{4}$$

where ε_{1t-1} and ε_{2t-2} are the lagged values of the error term from the cointegration equations.

5. ECONOMETRIC TECHNIQUE AND EMPIRICAL METHODOLOGY

The univariate characteristics which show whether the variables are stationary or non-stationary are the first step before estimation. If the variables are non-stationary, their order of integration is tested. This paper uses the Augmented Dickey-Fuller (ADF) and Phillips-Perron statistics to test the stationarity or non-stationarity of the variables and their order of integration. If the variables are I(1), the next step is to test whether they are cointegrated. This is done by using the Johansen (1988; 1995) full information maximum likelihood. This econometric methodology corrects for autocorrelation and endogeneity parametrically using a vector error correction mechanism (VECM) specification. The Johansen procedure is described as follows. Defining a vector x_t of n potentially endogenous variables, it is possible to specify the data generating process and model x_t as an unrestricted vector autoregression (VAR) involving up to k-lags of x_t specified as:

$$x_t = \mu + A_1 x_{t-1} + ... + A_k x_{t-k} + \varepsilon_t \qquad u_t \sim IN(0, \sum), \tag{5}$$

where x_t is (n x 1) and each of the A_i is an (n x n) matrix of parameters. Sims (1980) advocates this type of VAR modelling as a way of estimating dynamic relationships among jointly endogenous variables without imposing strong a priori restrictions (see also Harris, 1995). This is a system in reduced form and each variable in x_t is regressed on the lagged values of itself and all the other variables in the system. Equation (5) can be re-specified into a vector error correction model (VECM) as:

$$\Delta x_t = \mu + \Gamma_1 \Delta x_{t-1} + ... + \Gamma_{k-1} \Delta x_{t-k+1} + \Pi x_{t-k} + \varepsilon_t \tag{6}$$

where $\Gamma_i = -(I - A_1 - ..... - A_i), (i = 1, ..., k-1)$ and $\Pi = -(I - A_i - ..... - A_k)$, I is a unit matrix, and $A_i (i = 1, ...p)$ are coefficient vectors, p is the number of lags included in the system, ε is the vector of residuals which represents the unexplained changes in the variables or influence of exogenous shocks. The Δ represents variables in difference form which are I(0) and stationary and μ is a constant term. Harris (1995: 77) states that specifying the system this way has information on both the short and long-run adjustment to changes in x_t through estimates of Γi and Π respectively. In the analysis of VAR, Π is a vector which represents a matrix of long-run coefficients and it is of paramount interest. The long-run coefficients are defined as a multiple of two (n x r) vectors, α and β', and hence $\Pi = \alpha\beta'$, where α is a vector of the loading matrices and denotes the speed of adjustment from disequilibrium, while β' is a matrix of long-run coefficients so that the term $\beta' x_{t-1}$ in Equation (6) represents up to (n-1) cointegrating relationships in the cointegration model. It is responsible for making sure that the x_t converge to their long-run steady-state values. Evidence of the existence of cointegration is the same as evidence of the rank (r) for the Π matrix. If it has a full rank, the rank r = n and it is said that there are n cointegrating relationships and that all variable are I(0). If it is assumed that x_t is a vector of nonstationary variables I(1), then all terms in Equation (6) which involves Δx_{t-i} are I(0), and Πx_{t-k} must also be stationary for $\varepsilon_t \sim$ I(0) to be white noise. The cointegrating rank is tested with two statistics, the trace and maximum eigenvalue.

If there is cointegration, it shows evidence of a long-run relationship between the variables and appropriateness of proceeding to test the direction of causality as illustrated in Equations (3) and (4). Cointegrated variables share common stochastic and deterministic trends and tend to move together through time in a stationary manner even though the two variables in this study may be non-stationary. It is important to note that there are four possible cases (see also Mohapi and Motelle, 2007):

- The rank of Π can be zero. This takes place when all elements in the matrix Π are zero. This means that the sequences are unit root processes and there is no cointegration. The variables do not share common trends or move together over time. In this case, the appropriate model is a VAR in first differences involving no long-run elements.
- The rank of Π could be full (in this study, rank =2). In this case, the system is stationary and the two variables can be modelled by VAR in levels. It represents a convergent system of equations, with all variables being stationary.
- The rank of Π can be a reduced (in this study, rank =1). In this case, even if all variables are individually I(1), the level-based long-run component would be stationary. In this case, there are n-1 cointegrating vectors. The appropriate modelling methodology here is a VECM.
- One variable can be I(1) and the other one I(0). The appropriate modelling method here is to difference the I(1) variable and do the analysis with all the variables stationary.

6. DATA AND ESTIMATION RESULTS

6.1 Data

6.1.1 Data Sources and Description

This study uses annual data which covers the period 1980 to 2007. The data are sourced from various issues of Annual Report of the Bank of Namibia, and the Central Bureau of Statistics of Namibia. In the causal relationship between financial development and economic growth studies, economic growth is measured by real GDP growth, real GDP per capita growth or log of real GDP. As discussed in Section 2, the mineral sector accounts for only 2 percent of the total credit. Mineral GDP is excluded in this study. Hence, the paper adopts log of non-mineral GDP (LNRGDP) as a measure of growth. The ratio of broad money M2 to nominal GDP is the most common used proxy of financial development. The study uses the ratio of M2 to nominal non-mineral GDP (LNM2GDP).

This study acknowledges that although the ratio of M2 to GDP is the most common used measure of financial development in many empirical studies (such as King and Levine, 1993; Odhiambo, 2004; Odhiambo, 2005; Mohapi and Motelle, 2007), an increase in this ratio may reflect liquidity rather than bank deposits. This study uses two additional proxies for financial development. The first one is ratio of private sector credit to non-mineral GDP (LNPRIVGDP). This measure assumes that credit which is granted to the private sector creates increases in investment and productivity than credit allocated to the public sector. It is also assumed that credit to the private sector is granted more stringently and improved quality of investment resulting from financial intermediaries' evaluation of viability for projects is significant in the private sector than in the public sector. The second alternative proxy of financial development is the ratio of bank deposits liabilities to non-mineral GDP (LNDEPGDP). This proxy excludes currency in circulation from the broad money stock. It reflects the degree to which banks create deposits, and this represents financial intermediation.

6.1.2 Data Limitations

The data and their analysis must be treated with caution because Namibia became independent in 1990, and prior to that period all decisions related to financial development (for example money supply, interest rate among others) were conducted by the South Africa Reserve Bank. Hence interpretation of the data and results should take that into account. It is also important to state that there are limitations in this study imposed by limited data, as the study only uses annual data for the period 1980 – 2007. This means there are only twenty eight observations. The limited number of observation implies that some advanced tests (as discussed under Section 6.2.1) cannot be done because they require more data or observations.

6.2 Estimation Results

6.2.1 Univariate Characteristics of Variables

The first step before estimation is univariate characteristics of the data and involves unit root test. This paper applies Augmented Dickey Fuller and Phillips-Perron statistics to test for unit root.

The paper acknowledges that these two statistics have limitations in the sense that they have low power. However, because of the limited sample size, other tests (such as KPSS, Elliot-Rothernberg-Stock Point-Optimal and Ng-Perron) are not applied because they require many observations. The results of unit root test are presented in Tables 2 and 3.

Table 2. ADF unit root test

Variable	Model Specification	Test statistic	
		Levels	Difference
LNRGDP	Intercept and trend	-1.203	-4.473***
	Intercept	-1.211	-4.329***
	none	4.873	1.147
LNM2GDP	Intercept and trend	-2.395	-5.421***
	Intercept	-1.234	-5.512***
	none	0.090	-5.573***
LNPRIVGDP	Intercept and trend	-2.513	-3.503*
	Intercept	-0.181	-3.590**
	none	0.935	-3.435***
LNDEPGDP	Intercept and trend	-2.382	-3.924**
	Intercept	-2.734*	-3.737***
	none	-1.189	-3.807***

Notes: */**/***/ significant at 10%/5%/1% level

Table 3. Phillips-Perron unit test

Variable	Model Specification	Test statistic	
		Levels	Difference
LNRGDP	Intercept and trend	-3.221	-7.728***
	Intercept	-1.464	-7.932***
	none	6.535	-7.354***
LNM2GDP	Intercept and trend	-2.446	-5.388***
	Intercept	-1.394	-5.455***
	none	0.080	-5.512***
LNPRIVGDP	Intercept and trend	-2.519	-3.504*
	Intercept	-0.485	-3.591***
	none	0.874	-3.414***
LNDEPGDP	Intercept and trend	-2.468	-3.910**
	Intercept	-3.061**	-3.702**
	none	-1.000	-3.775***

Notes: */**/***/ significant at 10%/5%/1% level

Tables 2 and 3 indicate that LNRGDP, LNM2GDP and LNPRIVGDP are non-stationary in levels, and stationary in first differences. LNDEPGDP is stationary in levels and first differences.

The next step is to test for cointegration using Johansen's full information maximum likelihood. The lag length was set, based on the Akaike information criterion, log likelihood ratio, final prediction error, Schwartz information criteria, and Hannan-Quinn information criterion. The lag length for cointegration between LNRGDP and LNM2GDP was set at 2, and between LNRGDP and LNPRIVGDP was set at 1. For cointegration between LNRGDP and LNDEPGDP the lag length is also 1. The results for cointegration test are presented in Tables 4, 5 and 6.

Table 4. Cointegration between LNRGDP and LNM2GDP

Null hypothesis	Alternative hypothesis	Test statistic	0.05 critical value	Probability value[b]
		Trace statistic		
r=0	r=1	34.811[a]	20.262	0.000
r=1	r=2	7.425	9.165	0.106
		Maximum Eigenvalue statistic		
r=0	r>0	27.386[a]	15.892	0.000
r≤1	r>1	7.425	9.165	0.106

[a] Denotes rejection of the null hypothesis at 0.05 level
[b] MacKinnon-Haug-Michelis (1999) p-values

Table 5. Cointegration between LNRGDP and LNPRIVGDP

Null hypothesis	Alternative hypothesis	Test statistic	0.05 critical value	Probability value[b]
		Trace statistic		
r=0	r=1	26.577[a]	20.262	0.000
r=1	r=2	5.930	9.165	0.196
		Maximum Eigenvalue statistic		
r=0	r>0	20.647[a]	15.892	0.008
r≤1	r>1	5.930	9.165	0.196

[a] Denotes rejection of the null hypothesis at 0.05 level
[b] MacKinnon-Haug-Michelis (1999) p-values

Table 6. Cointegration between LNRGDP and LNDEPGDP

Null hypothesis	Alternative hypothesis	Test statistic	0.05 critical value	Probability value[b]
		Trace statistic		
r=0	r=1	33.040[a]	20.262	0.000
r=1	r=2	8.581	9.165	0.064
		Maximum Eigenvalue statistic		
r=0	r>0	24.458[a]	15.892	0.002
r≤1	r>1	8.581	9.165	0.064

[a] Denotes rejection of the null hypothesis at 0.05 level
[b] MacKinnon-Haug-Michelis (1999) p-values

Tables 4, 5 and 6 show that there is one cointegrating vector between LNRGDP and measures of financial development. The diagnostic tests are performed on the VAR for stability, serial correlation, heteroscedasticity and normality. The results indicate that they passed all diagnostic statistics. The VAR is stable, no serial correlation no heteroscedasticity and the residuals are multivariate normal. The diagnostic statistics are not presented here because of space limitation, but are obtainable from the author on request.

The unit root test results elucidated that all variables, except LNDEPGDP are I(1) and this means that the direction of causality is tested by using the vector error correction model (VECM). However, the causal relationship between LNRGDP and LNDEPGDP is tested using one variable (LNRGDP) in difference form because the other variable (LNDEPGDP) is I(0), and there is no need for VECM in this case. The results are presented in Tables 7 and 8.

Table 7. Error Correction Model of LNRGDP and Measures of Financial Development.

Causality Test Between D(LNRGDP) and D(LNM2GDP)

Variables in the Equation	*Dependent Variables*	
	D(LNRGDP)	D(LNM2GDP)
D(LNRGDP(-1))	0.664 (2.302)**	-0.283 (1.159)
D(LNRGDP(-2))	-0.466 (-1.439)	1.362 (4.966)***
D(LNM2GDP(-1))	0.163 (3.166)***	0.071 (0.294)
D(LNM2GDP(-2))	0.072 (2.124)**	0.110 (0.542)
ECM(-1)	-0.078 (-5.207)***	0.044 (3.489)
R-squared	0.824	0.823
Durbin-Watson	1.954	1.988

Notes: ***/**/* statistically significant at 1%/5%/10% levels.
The t-statistics are in brackets.

Causality Test Between D(LNRGDP) and D(LNPRIVGDP)

Variables in the Equation	*Dependent Variables*	
	D(LNRGDP)	D(LNPRIVGDP)
D(LNRGDP(-1))	0.430 (1.799)*	0.507 (1.112)
D(LNPRIVGDP(-1))	0.156 (1.972)*	0.389 (1.612)
ECM(-1)	-0.078 (-5.170)***	0.071 (1.722)*
R-squared	0.562	0.523
Durbin-Watson	2.102	1.951

Notes: ***/**/* statistically significant at 1%/5%/10% levels.
The t-statistics are in brackets.

Table 8. Results of D(LNRGDP) and LNDEPGDP

Variables in the equation	*Dependent variable*	
	D(LNRGDP)	LNDEPGDP
D(LNRGDP(-1))	0.493 (1.676)	0.207 (1.190)
LNDEPGDP (-1)	0.908 (4.287)***	-0.211 (0.800)
R-Squared	0.979	0.794
Durbin-Watson	1.982	1.896

Notes: ***/**/* statistically significant at 1%/5%/10% levels.
The t-statistics are in brackets.

Table 7 shows that the coefficients of the lagged error correction term (ECM) are negative and significant. The significance of the lagged ECM shows that there is a long-run causal relationship between economic growth and measures of financial development. It also indicates that each measure of financial development and economic growth are adjusting to their long-run equilibrium relationships. The negative coefficients (and the magnitudes) of the ECM indicate the speed of adjustment to the long-run equilibrium relationship. Table 8 presents the results of D(LNRGDP) or the difference form of LNRGDP, and LNDEPGDP.

There is no ECM in Table 8 because all variables in the equation are stationary (LNRGDP was differenced to become stationary because the other variable, LNDEPGDP is stationary. This was estimated in line with the suggestion of Mohapi and Motelle (2007)). The results also indicate a significant relationship between financial development and economic growth. The results in Tables 7 and 8 passed all diagnostic statistics. The diagnostic statistics can be obtained from the author on request. Causality test results are presented in Table 9.

Table 9. Granger causality test results

H_0	Wald test/Chi-square	Conclusion
LNM2GDP does not Granger cause LNRGDP	7.473 (0.024)**	Reject the null hypothesis. There is causality from LNM2GDP to LNRGDP
LNRGDP does not Granger cause LNM2GDP	0.809 (0.667)	Fail to reject the null hypothesis. There is no causality.
LNPRIVGDP does not Granger cause LNRGDP	1.970 (0.160)	Fail to reject the null hypothesis. There is no causality.
LNRGDP does not Granger cause LNPRIVGDP	6.774 (0.009)***	Reject the null hypothesis. There is causality from LNRGDP to LNPRIVGDP.
LNDEPGDP does not Granger cause LNRGDP	3.554 (0.059)*	Reject the null hypothesis. There is causality from LNDEPGDP to LNRGDP.
LNRGDP does not Granger cause LNDEPGDP	0.067 (0.795)	Fail to reject the null hypothesis. There is no causality.

*/**/*** Significant at 10/5/1 percent level
Notes: probabilities are in parenthesis

The causality test results in Table 9 provide evidence of causality from financial development to economic growth and also from economic growth to financial development. When the ratio of M2 to nominal non-mineral GDP is used as a proxy for financial development, the causality comes from financial development to economic growth. Using the ratio of private sector credit to nominal non-mineral GDP as a proxy for financial development indicates that the causality runs from economic growth to financial development. When the ratio of deposit liabilities to nominal non-mineral GDP is used, the causality comes from financial development to economic growth. These results provide evidence of supply-leading and demand-leading hypothesis in Namibia. The results suggest that Namibia should continue developing its financial sector and similarly, the country should enhance its real sector development in order to accelerate development.

7. CONCLUSION

The purpose of this paper was to investigate the causal relationship between financial development and economic growth in Namibia. It applied Granger causality through cointegrated vector autoregression methods. Three measures of financial development and one measure of economic growth was used, and the estimation covered the period 1980 to 2007. The paper found that when the ratio of M2 to nominal non-mineral GDP and ratio of deposit liabilities to nominal non-mineral GDP are used as proxies for financial development, the causality runs from financial development to economic growth. However, using the ratio of private sector credit to nominal non-mineral GDP indicate that the causality comes from economic growth to financial development.

These results provide evidence of supply-leading and demand-leading hypotheses or views for Namibia. The results suggest that Namibia should promote financial deepening as a strategy to enhance economic growth. At the same time, the country should also develop its real sector in order to enhance economic development. The results and their analysis should be interpreted with caution as the study used limited annual data with only 28 observations.

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