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Causal Relationship between financial sector development and economic growth: a case of Zimbabwe

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Abstract: *This paper aims to investigate the impact of financial sector development on economic growth in Zimbabwe, the reason being that no such research has been carried out in Zimbabwe. The research utilized secondary data for the period 1995 to 2008.Granger causality test is used to test the causality between economic growth and four financial sector development indicators. Johansen co-integration approach is used to test the long run relationship between economic growth and financial sector development indicators. The paper found out that granger causality runs from economic growth to financial sector development. The results support some empirical evidence that postulates that the granger relationship runs from economic growth to financial development and is there is a positive relationship in the long run. The study provides empirical evidence that economic growth granger causes financial sector development and there are positively related in the long run. Therefore, it is important that the government of Zimbabwe should implement policies that fosters economic growth and this will subsequently promotes financial sector development*

Keywords: *Economic growth, financial sector development, granger causality, ZIMBABWE.*

I. Introduction

The relationship between the financial development and economic growth is not a new invention. Many researches have been carried out to conceptualize how the development and the structure of the financial sector can affect savings mobilization, investment, , capital accumulation, technological advancement and hence economic growth and to test empirically the direction of causality.

Since Schumpeter (1911) set the topic into motion and the topic has been debated widely and is still a discussion in literature. Researchers such as Schumpeter (1911), Gurley and Shaw (1955), Goldsmith (1969) and McKinnon (1973) all emphasised the pivotal role of financial sector development in growth. Finance has been perceived to have a extended role in the endogenous theories, through its impact on the levels of capital accumulation (Romer 1986), or technological innovation Aghion and Howaitt (1992), Romer (1990) and Grossman and Helpman (1991). Apergis, Filippidis and Economidou (2007) and Goldsmith (1969) also emphasized that there is a robust effect that runs from the financial sector development to economic growth through efficiency of capital accumulation or investment rate.

However, researchers such as Robinson (1952) argued that "where enterprise leads, finance follows". He implied that financial sector development does not cause economic growth but it responds to the demand from the real sector. On the opposite extreme are researchers such as Lucas (1998) who discharged that finance is an "overstressed" determinate of economic growth. In between the two competing views is the view sanctions reciprocal impact of finance and growth. Demetriades and Hussein (1996) and Greenwood and Smith (1997) are some of the researchers that provide evidence for bi-directional causality.

On the other hand, the problem of low economic growth and financial sector development remains the most pressing dilemma in Zimbabwe. Economic growth and financial sector development has been the major policy objectives of the Zimbabwean government since independence in 1980. During the first decade, the government introduced the following economic policies and strategies*: Growth with equity*, 1981; *Zimbabwe Transitional National Development Plan*, 1982-1985 and *Zimbabwe Plan*, 1986-1990. From these policies, economic growth and financial sector development were given great priority. However, during this period economic growth was low.. From 1990, the government introduced Economic Structural Adjustment Programme (ESAP) and other economic policies in an effort to revamp the economy and this did not yield anticipated economic results.

It is against this background that the study seeks to investigate the contribution of the financial sector in Zimbabwe to economic growth. Above all, to come up with recommendations and policies that are aimed at enhancing financial sector development, promoting economic growth in Zimbabwe and thereby enhancing living standards of the Zimbabwean populace.

This paper is divided onto five sections including the introduction. Section II describes the review of theoretical and empirical literatures. Section III reports the data and methodology that is employed in the study. Section IV presents the findings and discussion. Finally, section V presents the conclusions and policy implications.

II. Literature review

Economic literature posits that a well-developed and functioning economy should be anchored on a well-functioning financial sector (Shaw, 1973). Financial sector is crucial to the allocation of resources in a modern economy. It channels household savings to the corporate sector and allocate investment funds among firms; they allow inter temporal smoothing of consumption by households and expenditures by firms; and they enable households and firms to share risks (Levine R.,1997). These functions are common to the financial systems of most economies. However, the form of these financial systems differs extensively.

Some studies on developed countries on finance-growth nexus came up with evidence that supports that there is a positive relationship between financial sector development and economic growth.(e.g Ghirmay,2006;Galindo and Micco, 2004 and Calderon and Liu ,2002). Ghirmay (2006), when studying USA carried out Vector Auto-Regression and Granger non causality using time series data form a sample period of 1970 to 2001 and found out that financial development affects growth by increasing the level of investments and productivity.

On other hand, Vazakidis and Adamopoulos (2009) showed that the relationship runs from economic growth to financial development in Greece. They used annual data for the period 1978-2007 and Granger test based on Vector Error Correction Model (VECM). The researchers used indictors of financial development such as domestic bank credits to private sector as a percentage of GDP and stock market index, and Industrial Production Index as a measure of industrial sector growth and its effect on economic growth. They concluded that economic growth has a positive effect on financial development through industrial production growth.

Some studies have been done on less developed countries on the finance-growth nexus. Gries, Kraft and Meierrieks (2009) studied 16 Sub-Saharan African countries using Hsiao- Granger method, bivariate and trivariate vector autoregressive (VAR) or vector error correction models (VECMs) for the period 1960s to 2004.The authors found out insignificant evidence to support the popular hypothesis that finance led growth. They concluded that financial deepening has little influence on economic growth. Another study by Khan and Qayyum (2006) on Pakistan, conducting a Bound testing approach to co-integration within the framework of Autoregressive distributed Lag (ARDL) and concluded that there is a positive long run relationship between real GDP and financial development.

Allen and Ndikumana (2000) carried out a research to whether there is a relationship between financial and economic growth using Southern African countries. The researchers used several indicators of financial development and real per capita growth. The results lend some support to the hypothesis that financial development is positively related economic growth.

Motivated by the fact that evidence from African countries is infancy, Esso (2010), examined co-integration and casual relationship between financial development and economic growth in ECOWAS countries covering the period of 1960 to 2005. The results showed that there is a positive relationship between financial development and economic growth.

Aziakpono (2005a) used the Zellner Seemingly Unrelated Regression Estimation Method to study the effects of two financial indicators (Liquidity liabilities and private credit) of financial intermediation to economic growth on SACU countries. The researcher found out mixed results across countries. The results revealed that there is a strong relationship between financial development and economic growth in South Africa and it is weak for Botswana and Lesotho..

It is quite evident from empirical review that there is a relationship between financial sector development and economic growth, however, this relationship varies among countries mainly because of factors such as regulation, level of government participation in the economy, trade openness level of income, time periods etc (De Gregorio and Guidotti, 1995). However, there is no consensus to whether financial development spurs or follows growth.

III. Research Methodology

Sources of data

The study utilized secondary data in its analysis. It was difficult to obtain all the data from one source therefore data was obtained from various sources. For the sake of reliability and authenticity of the data, the data was obtained from reliable sources such as ZimStats, Reserve Bank of Zimbabwe, Ministry of Finance, IMF and World Bank The study used annual time series data which was readily available for all the variables.

The data collected include four financial sector development indicators such as liquidity liabilities, domestic credit to private sector, stock capitalization scaled to GDP, stock trade turnover scaled to GDP and GDP. Lastly, poverty Real Growth Rate was used as a proxy for economic growth. The other dataset was mainly annual data that runs from 1995 to 2008.

Causality Test

The study employs Granger causality test (Granger, 1969) and Johansen co-integration test (Johanson, 1995) to trace the nexus between financial sector development and economic growth in Zimbabwe on annual data for the period. The specific model used is as follows:

$$RGDP_t = \alpha_0 + \sum_{i=1}^{m} RGDP_{t-i} + \sum_{j-1}^{n} FIND_{\alpha_j} \quad (1)$$

$$FIND_t = \alpha_0 + \sum_{i=1}^{m} FIND_{t-1} + \sum_{j-1}^{n} RGDP_{\alpha_j} \quad (2)$$

Where: RGDP is real gross domestic product and is a proxy for economic growth
FIND is financial sector development indicators.

However, the first and essential pretest for the above model is to test for stationary and hence Augmented Dickey Fuller Test (Dickey & Fuller, 1981) is used.Augmented Dickey –Fuller Test (ADF) is employed so as to ascertain the number of unit roots (if any).
The testing procedure for the ADF unit root test was applied to the following model.

$$\Delta y_t = \alpha + \beta_t + \gamma y_{t-1} + \sum_{j=1}^{\rho} \delta_j \Delta y_{t-j} + \varepsilon_{it} \quad (3)$$

Where β is the coefficient on a time series, α is a constant, ϒ is the coefficient of y_{t-1} , ρ is the lag order of autoregressive process, $\Delta y_t = y_t - y_{t-1}$ are first differences of y_t , y_{t-1} are lagged values of order one of y_t , y_{t-j} are changes in lagged values and ε_{it} .

Furthermore, the critical value from the Dickey-Fuller tables is compared with the F test statistic in order to reject or not to reject the null hypothesis. If the F test statistic is greater than the critical value, we do not reject the null hypothesis. If the null hypothesis is rejected it means that the residuals are stationary and hence the variables under investigation are co-integrated.

Granger Causality test

The Granger Causality test was carried out so as to determine the direction of the relationship between variables (Granger & Newbold, 1974). According to the test , if there is no co-integration between the variables, Granger test can be used without including an error term. If there is co-integration between variables, the error will be included.

Using the Granger Causality test on the time series data was made by estimation of the following equations below with the Least Square Method:

$$X_t = \alpha + \sum \beta_j X_{t-j} + \sum \phi Y_{t-j} + U_t \quad (4)$$

$$Y_t = \alpha + \sum \beta_j Y_{t-j} + \sum \phi X_{t-j} + U_t \quad (5)$$

According to the Granger causality test , there are basically three possible situations which are:
One directional causality from x to y or y to x
Opposite direction between x and y or one affecting the other.
An independency of x and y from each other (Granger , 1969).
To apply the test on the variables under study, the research uses the following equation:

$$\Delta (RGDP) = \alpha_0 + \sum \propto_1 \Delta (RGDP)_{t-j} + \sum \beta_1 \Delta (FID)_{t-j} + U_t \quad (6)$$

The test is used to determine causality direction between variables in the long run using the F-test. Finally, the direction of causality can be either positive or negative (Granger & Newbold, 1974).

Co-integration Test

After having established the stationary of the time series under consideration, the researcher tested for long run equilibrium using the Johansen co-integration methodology (Johansen, 1988). In order to employ the Johansen approach the researcher used appropriate lag of the VAR model so as to ensure that serial problem does not exist. E-Views software package was used to determine the number of lags length using Akaike Information Criterion (AIC).

In order to determine the cointegration of two time series, the time series were differenced by first order in order to make them stationary using the following equation:

$$Y_t = \beta X_t + U_t \quad (7)$$

The hypothesis is as follows:

H_0: $\beta = 0$ (there is no co-integration between the time series) (8)

H_1: $\beta \neq 0$ (there is co-integration between the series) (9)

The decision rule was to reject the null hypothesis if the variable statistical value is greater than critical value.; implying that there is co-integration between the series moving together in the long run.

In order to determine the number of co-integration, two test statistics which are based on a likelihood ratio test (LR) namely trace test and the maximum eingvalues test statistic were employed (Johanson, 1995). The trace test is defined by the following formula:

λ_{trace} (r) = -T $\sum_{i=r+1}^{n} In\ (1 - \lambda_i)$ (10)

The null hypothesis is that the number of co-integration is ≤ r against the alternative hypothesis that the number of co-integration is = r.

The maximum eign values test is defined as:

λ_{max} (r , r+1) = - T In (1- λ_{r+1}) (11)

And it test the null hypothesis that the number of co-integration vectors = r , against the alternative that they are r+1.

IV. Findings and Discussion

Unit roots test Results

The stationary conditions of a financial sector development and real economic growth time series data was examined using the –Augmented Dickey-Fuller unit root test as shown in table I below. According to the test, all the series are stationary in their first difference rather than their level. As a result, the equations were tested using the differences rather the level of the time series data. The unit root results are reported as follows:

Table I : Augmented Dickey-Fuller Results For Financial Development indicators and Real GDP

Variable	ADF test statistic	t-statistic	Lag	P- values *	Test critical values
Liquidity liabilities scaled to GDP	-2.068435	-3.098896	1	0.2582	5%
Stock Market capitalization scaled to GDP	-2.298937	-4.004425	1	0.1852	1%
Stock Trade Total Value scaled to GDP	-4.232295	-4.004425	1	0.0067	1%
Domestic Credit to which private sector	-2.317478	-3.144920	1	0.1820	5%
Real GDP	-1.627749	-4.121990	1	0.4394	1%

Source: RBZ, ZSE *Notes: D = first difference operator P* are McKinnon (1996) one sided p-values Note: The ADF statistic value is greater than the critical values at 1%, 5% and 10% so that we do not reject the null at conventional test sizes and associated one-sided p-values*

According to table 1, all the four financial sector development indicators were found to be stationary at lag 1 and at 1% level of significance. In addition, real gross domestic product was also stationary at lag 1 and at 1 %. After the stationarity test, the Granger causality test was done to ascertain the causality and the results are presented on the following sub-section

Granger Causality Test Results

Causality test between financial sector development and economic growth were done using the Granger Causality Test. Four financial sector development indicators were used to test the null hypothesis that financial sector development granger cause economic. The test results are presented in table II.

Table II : Results of Granger Causality Test on Financial Sector Development Indicators and Economic growth

Financial Sector Development Indicator	Economic growth Indicator	Null hypothesis	Lag	F-Statistic	Prob	Conclusion
Liquid Liabilities scaled to GDP (LL)	Real Gross Domestic Product (RGDP)	- LLB does not Granger Cause RGDP -RGDP does not Granger Cause LLB	1	0.26639 0.30780	0.7736 0.445	We cannot reject the hypothesis that LL does not granger cause the RGDP. However, we do reject the hypothesis that RGDP does not cause LL. Therefore, it appears that granger causality runs one way from economic growth to liquid liabilities.
Stock capitalization to GDP	RGDP	- STOCK_CAP does not Granger Cause RGDP -RGDP does not Granger cause STOCK_CAP	1	0.15609 0.75290	0.9205 0.5754	Granger causality runs from one way from economic growth to stock capitalization
Stock trade total value/GDP	RGDP	STOCK_TRADE does not Granger Cause RGDP -RGDP does not Granger cause	1	0.43227 2.64557	0.7416 0.1853	Granger causality runs from economic growth to financial sector

		STOCK_TRADE				
Domestic credit to which is private sector	RGDP	- RGDPT does not Granger Cause DOMESTIC_CREDIT - RGDPT does not Granger Cause DOMESTIC_CREDIT	1	0.9610 0.01460	0.4280 0.9855	Granger causality runs from economic growth to financial sector

From the table II it can be seen that granger causality runs from economic growth to financial sector development. This is in contrast with some empirical evidence provided by some studies on developed countries on finance-growth nexus that postulate that there is a positive relationship between financial development and economic growth which runs from financial development to economic growth.(e.g Ghirmay,2006;Galindo and Micco, 2004 and Calderon and Liu , 2002). However, these studies are constant with results by Vazakidis and Adamopoulos (2009) that showed that the granger relationship runs from economic growth to financial development in Greece.

Cointegration between financial sector development and economic growth

In order to determine the long run relationship between financial sector development and economic growth, four financial sector development indicators were tested using Johansen Cointegration Approach against Real Gross Domestic Product and the results are discussed as follows:

Liquid Liabilities-GDP Ratio (LL) and Real Gross Domestic Product (RGDP)

The research assumed a linear deterministic trend and tested the variables in their first difference as it is mostly used in various empirical works. It was observed that both variables were integrated by first order i.e I(1). According to results in **Annexure 1,** the Trace Test indicates that there is one cointegration equation in the long run between LL and RGDP since Trace value is greater than the critical value at 5% level of significance. Furthermore, Max-Eigen Test also confirmed that there is one cointegration equation in the long run. This is also supported by low p-values which indicates that the cointegration equation is significant.

Based on the normalised coefficient in the Annexure 1, RGDP has a positive coefficient of 6.11810 which implies that LL and RGDP are positively related in the long run. Therefore, the financial sector development and economic growth are positively related in the long-run.

Stock Capitalization/GDP and Real Gross Domestic Product

The study also assessed whether there is a long run relationship between the stock market as approximated by Stock Capitalization scaled to GDP and Real Gross Domestic Product**.** The research also assumed a linear deterministic trend**.** From the Trace Test and Maxi-Eigen value indicated that there exist two cointegration equations at 5% level of significant. In addition, low p-values confirmed that the two equations were significant.

The normalised coefficient in the **Annexure 1**, indicated that RGDP has a positive coefficient of 11.157 which implies that Stock Capitalization/GDP and RGDP are also positive related in the long run.

Stock traded Value/GDP and Real Gross Domestic Product

In order to determine the long run relationship between the Value of Stock Traded/GDP and RGDP, the research assumed a linear deterministic trend and tested the variables in their first difference. The results showed that both variables were integrated by first order i.e I(1). According to results in **Annexure 1,** Trace Test indicates that there are cointegration equation in the long run between Stock traded Value/GDP and RGDP since Trace value is greater than the critical value at 5% level of significance. Furthermore, Max-Eigen Test also confirms that there are two cointegration equations in the long run. This is also supported by low p-values which indicate that the cointegration equation is significant.

Based on the normalised coefficient in the Annexure 1, RGDP has a positive coefficient of 1.321 which implies that M2 and RGDP are positive related in the long run.

Domestic Credit to which is private sector and Real Gross Domestic Product

The results revealed that both variables were integrated by first order i.e I(1). According to results in **Annexure 1,** Trace Test indicates that there is one cointegration equation in the long run between LL and RGDP since Trace value is greater than the critical value at 5% level of significance. Furthermore, Max-Eigen Test also confirms that there is one cointegration equation in the long run. This is also supported by low p-values which indicate that the cointegration equation is significant.

Normalised coefficient in the Annexure 1, RGDP has a positive coefficient of 1.41238 which implies that Domestic credit and RGDP are positive related in the long run. Therefore, the financial sector development and economic growth are positively related in the long-run.

In a nutshell, from the empirical evidence above it can be concluded that the financial sector development and economic growth are positively related in the long-run.

V. Conclusions and policy implications

The study investigated causal relationship between financial sector development on economic growth in Zimbabwe. The study revealed that economic growth granger cause financial sector development and are positively related in the long run. Based on the findings, it can be concluded that economic growth in Zimbabwe granger causes financial.

Policy Implication

Promotion of economic growth policies

The study above suggested that economic growth Granger cause financial development. It is of paramount importance that the government should promote policies that promote economic growth. Firstly, the government should ensure that there is price stability in the economy since these negatively affect the financial sector development and increase incidences of poverty. As such saving levels are restricted due to low disposable income and hence investment is also reduced and eventually economic growth.

It also important that the country should also address macroeconomic fundamentals such as volatile exchange rate, huge government expenditure, low wages etc. A favourable macroeconomic environment enable banks to operate effectively thereby mobilize savings and encourages investment and hence economic growth. An increase in economic growth will enable reduction in poverty especially if it is pro-poor.

Financial sector development

As noted from empirical evidence gathered above, the level of financial sector development, both the banking sector and the stock market, was very low. Therefore, the study recommends that the government and in consultation with the banking sector should come up with policies that promote financial sector development. Banks are encouraged to lend at a concessionary rate so as promote the productive sector, the banks should be encouraged to come up with new and innovative financial products so as to attract a large clientele.

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Annexure 1

Sample (adjusted): 4 14
Included observations: 11 after adjustments
Trend assumption: Linear deterministic trend
Series: DOMESTIC_CREDIT_TO_WHICH RGDP
Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.962449	39.27874	15.49471	0.0000
At most 1	0.250799	3.176229	3.841466	0.0747

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.962449	36.10251	14.26460	0.0000
At most 1	0.250799	3.176229	3.841466	0.0747

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

DOMESTIC_CREDIT_TO_WHICH	RGDP
0.001192	16.83803
0.007113	4.287621

Unrestricted Adjustment Coefficients (alpha):

D(DOMESTIC_CREDIT_TO_WHICH)	-37.62459	-31.39420
D(RGDP)	-0.052579	0.010029

1 Cointegrating Equation(s): Log likelihood -28.76072

Normalized cointegrating coefficients (standard error in parentheses)

DOMESTIC_CREDIT_TO_WHICH	RGDP
1.000000	1.412385
	(1177.97)

Adjustment coefficients (standard error in parentheses)

D(DOMESTIC_CREDIT_TO_WHICH)	-0.044855

	(0.03366)
D(RGDP)	-6.27E-05
	(1.2E-05)

Date: 08/28/12 Time: 02:44
Sample (adjusted): 4 14
Included observations: 11 after adjustments
Trend assumption: Linear deterministic trend
Series: LL RGDP
Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.972492	42.02456	15.49471	0.0000
At most 1	0.203190	2.498523	3.841466	0.1140

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.972492	39.52604	14.26460	0.0000
At most 1	0.203190	2.498523	3.841466	0.1140

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

LL	RGDP
-0.000192	-11.70625
0.005215	-21.43446

Unrestricted Adjustment Coefficients (alpha):

D(LL)	337.3526	-171.9840
D(RGDP)	0.066777	0.007609

1 Cointegrating Equation(s): Log likelihood -49.44206

Normalized cointegrating coefficients (standard error in parentheses)

LL	RGDP
1.000000	61118.10
	(4902.80)

Adjustment coefficients (standard error in parentheses)

D(LL)	-0.064615
	(0.03304)
D(RGDP)	-1.28E-05
	(1.7E-06)

Sample (adjusted): 4 14
Included observations: 11 after adjustments
Trend assumption: Linear deterministic trend
Series: M2 RGDP
Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.934830	30.35201	15.49471	0.0002
At most 1	0.028109	0.313630	3.841466	0.5755

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.934830	30.03838	14.26460	0.0001
At most 1	0.028109	0.313630	3.841466	0.5755

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

M2	RGDP
0.000230	13.27608
0.007347	5.135089

Unrestricted Adjustment Coefficients (alpha):

D(M2)	-50.18929	15.88773
D(RGDP)	-0.065710	0.001367

1 Cointegrating Equation(s): Log likelihood -35.93783

Normalized cointegrating coefficients (standard error in parentheses)

M2	RGDP
1.000000	5.775308
	(6733.58)

Adjustment coefficients (standard error in parentheses)

D(M2)	-0.011537
	(0.00984)
D(RGDP)	-1.51E-05

(2.0E-06)

Sample (adjusted): 4 14
Included observations: 11 after adjustments
Trend assumption: Linear deterministic trend
Series: STOCK_CAP RGDP
Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.994428	63.84379	15.49471	0.0000
At most 1 *	0.458835	6.754338	3.841466	0.0093

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.994428	57.08945	14.26460	0.0000
At most 1 *	0.458835	6.754338	3.841466	0.0093

Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

STOCK_CAP	RGDP
1.273193	14.20529
5.753652	8.567756

Unrestricted Adjustment Coefficients (alpha):

D(STOCK_CAP)	-0.056373	-0.201525
D(RGDP)	-0.068566	0.017007

1 Cointegrating Equation(s): Log likelihood 39.37440

Normalized cointegrating coefficients (standard error in parentheses)

STOCK_CAP	RGDP
1.000000	11.15722
	(0.31601)

Adjustment coefficients (standard error in parentheses)

D(STOCK_CAP)	-0.071773
	(0.16942)
D(RGDP)	-0.087298
	(0.01459)

Sample (adjusted): 4 14
Included observations: 11 after adjustments
Trend assumption: Linear deterministic trend
Series: STOCK_MARK RGDP
Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.972880	47.42903	15.49471	0.0000
At most 1 *	0.505523	7.746803	3.841466	0.0054

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.972880	39.68222	14.26460	0.0000
At most 1 *	0.505523	7.746803	3.841466	0.0054

Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

STOCK_MARK	RGDP
9.828396	12.98466
30.64806	-4.782172

Unrestricted Adjustment Coefficients (alpha):

D(STOCK_MARK)	-0.033479	-0.045722
D(RGDP)	-0.061612	0.015027

1 Cointegrating Equation(s): Log likelihood 47.50677

Normalized cointegrating coefficients (standard error in parentheses)

STOCK_MARK	RGDP
1.000000	1.321138
	(0.10503)

Adjustment coefficients (standard error in parentheses)

D(STOCK_MARK)	-0.329049
	(0.28372)
D(RGDP)	-0.605544
	(0.10331)

Sample (adjusted): 4 14
Included observations: 11 after adjustments
Trend assumption: Linear deterministic trend
Series: STOCK_MARKET_TOTAL_VALUE RGDP
Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.961389	51.49152	15.49471	0.0000
At most 1 *	0.759932	15.69517	3.841466	0.0001

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.961389	35.79635	14.26460	0.0000
At most 1 *	0.759932	15.69517	3.841466	0.0001

Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

STOCK_MARKET_ TOTAL_VALUE	RGDP
13.42147	14.71817
34.78387	4.495288

Unrestricted Adjustment Coefficients (alpha):

D(STOCK_MARKET_TOTAL_VALUE)	-0.020658	-0.038698
D(RGDP)	-0.066759	0.020363

1 Cointegrating Equation(s): Log likelihood 48.84064

Normalized cointegrating coefficients (standard error in parentheses)

STOCK_MARKET_ TOTAL_VALUE	RGDP
1.000000	1.096614
	(0.08089)

Adjustment coefficients (standard error in parentheses)

D(STOCK_MARKET_TOTAL_VALUE)	-0.277255
	(0.26760)
D(RGDP)	-0.896007
	(0.16158)