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INVESTIGATING THE CAUSAL RELATIONSHIP BETWEEN STOCK MARKET AND AGGREGATE ECONOMIC PERFORMANCE OF SOUTH AFRICA

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ABSTRACT

Stock is one of the key securities traded in the capital markets and as such, has attracted the attention of researchers. While it is said to propel economic activities, empirical studies conducted on different countries present divergent outcomes. Thus, in this study we investigate the long-run and causal relationship between stock market and aggregate economic activities of South Africa using quarterly data from 1995Q_1 to 2013Q_4. We utilize the Augmented-Dickey Fuller (ADF) and Philips-Perron (PP)tests for unit root, the Johansen (1995) Maximum Likelihood cointegration technique and VEC Model. The study further employs Granger (1969) pair-wise causality test approach. It is noteworthy that the model variables have long-run relationship, but the causality test result suggests that non cause each other.

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Keywords: Stock, Economic, Relationship, Growth, Performance, Cointegration, Causal.
JEL Classification: C32. G14, N27.

Contribution/ Originality

This study contributes in the existing literature by utilizing stock turnover ratio to measure stock market performance and not all share index.

1. INTRODUCTION

It is pertinent to empirically investigate the role of stock market owing to a popular view in literature that a well-functioning stock market boosts economic activities. An efficient stock market attracts both domestic and foreign investors and increases a country's GDP. As a result, researchers have tried to provide insight into the link between stock market development and economic growth. According to Yartey (2008) in the time past, there has been growth in world's stock markets. This growth has been recorded by newly developing markets. Thus, developing countries have recorded huge growth in their financial markets and trading activities. This might be raising some expectations of a positive response from a country's economic growth. But does stock market development really matter for economic growth? Economists are interested and curious to gain insight into the nexus between stock market and economic growth. Their concern is on the nature of the relationship between the two, if there is any, and the direction of the causality, which is still controversial (Vacu, 2013).

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However, according to Chernor (2013), the aggregate performance of stock markets in Africa presents pertinent questions about how the markets hold up in terms of the gaps in their functional and operational efficiencies. The disparity between the various renowned and developed stock markets and that of Africa signifies a challenge for the financial base of the continent. For instance, in reviewing the performance of South African stock market established in 1887 and called the Johannesburg Stock Exchange (JSE) to help new mine investors to raise finance, Yartey (2008) is of the view that many companies listed now in the JSE are non-mining organizations contrary to its former objective.

Going forward in 2004, the aggregate market capitalization recorded in the JSE worth 182.6 billion US dollars pooled by an estimated 472 companies listed in the market and 6,399 million US dollars average monthly stock traded value. Using market capitalization as an indicator, the JSE is said to be the largest in Africa and ranks 17th in the world. As such, in the late 1990s new initiatives were introduced to make the market more efficient. The first major change occurred in November 1995, when the Stock Exchange Control Act changed stock dealings in South Africa, opened the market to non-South Africans and gave room for brokers' activities. Furthermore, trading in the market has been improved by technology known as STRATE (Share Transactions Totally Electronic). Buyers and sellers can transact business electronically. Another significant change in the market is the fact that the bond market has been licensed under the Financial Market Control Act to be distinct from the JSE and is called the Bond Exchange of South Africa. To ensure transparency and boost investors' confidence in the market, in 1997 a stock news service was launched to provide timely information about the market. Thus, companies listed in the JSE are obliged to make public any corporate news about the prices of their stocks on the service before going to any other media outlet (Yartey, 2008).

In 2001, the JSE merged with the South African Futures Exchange (SAFEX) and thus became the leader in equities and futures and options trading. There also exists new capital adequacy requirements, which have major financial implications for broking firms. These were necessitated by the European Union requirements, and involve the separation of clients' funds from those of brokers. The JSE's trading and information systems were replaced with that of the London Stock Exchange. The trading engine and information dissemination feed-handler is hosted in London and connected remotely to the JSE. The JSE also is patterned after that of Europe. This has led to the introduction of the FTSE/JSE Africa Index Series that makes the South African Indices comparable to similar indices worldwide. Trade information of instruments listed on the JSE can now be disseminated by the LSE (Yartey, 2008).

From the foregoing, it is save to conclude that some African stock markets have been able to record improvement in their performance and have contributed to the growth of their economies. Thus, attention has been turned to the investigation of the effect of stock market on economic growth and the causal link between the two variables. This study is motivated by the fact that there exists a debate in literature whether it is the stock market that causes economic growth or the reverse. Hence, the aim of the study is to investigate the long-run and causal relationships between stock market performance and economic growth in South Africa.

2. LITERATURE REVIEW

A few studies have been done in this area in different countries with differing findings. For instance, MacFarlane (2011) investigated whether macroeconomic variables drive future stock market returns in South Africa between 1965 and 2010. The study employed Johansen multivariate cointegration and Granger causality tests. The results suggest that the selected South African macroeconomic variables (exchange rate, M1 money supply, inflation, GDP, interest rate) do not significantly influence JSE All Share Index returns. The Granger causality test results further indicate that all the variables do not have any causal relationship with stock market All Share Index. Meanwhile, Vacu (2013) investigated the long-run relationship between stock market development and economic growth in South

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Africa for the period from 1990Q1 to 2010Q4. The study employed Johansen cointegration technique and Granger causality to capture causal relationship and VECM for short-run relationship. The results suggest that a long-run relationship exists between the two variables and that causality runs from economic growth to stock market development without feedback.

Gondo (2009) studied the relationship between financial development and economic growth in South Africa for the period from 1970 to 1999. The results suggest that credit extension to private sector and stock market liquidity have a complementary and statistically progressive impact on economic performance within the period covered. While in the short-run liquid liabilities exert a negative impact on economic growth. Further, the more active stock market and banking sector drive economic growth. Similarly, Chipaumire and Ngirande (2014) reported that stock market liquidity impacts growth in South Africa for the period from 1995 to 2010.

Jalloh (2015) examined the relationship between stock market capitalization and economic growth in fifteen African countries including South Africa for the period from 2001 to 2012. The study employed a dynamic panel estimation approach. The results suggest that raising stock market capitalization by a marginal average of 10% induces growth on average by 5.4% in countries studied. The positive and significant relationship between stock market capitalization and economic growth as reported in the study provides encouraging signals for African countries to explore stock markets as a potential avenue for expediting economic growth.

Paramati and Gupta (2011) studied the relationship between stock market performance and economic growth in India for the period from April, 1996 to March, 2009. The study employed Granger Causality test, Engle-Granger cointegration test and Error Correction Model. The monthly results of Granger causality test suggest that there is a bidirectional relationship between Index of Industrial Production and Stock prices (BSE and NSE) and quarterly results reveal that there is no relationship between GDP and BSE but in the case of NSE and GDP there is a unidirectional relationship that runs from GDP to NSE. The Engle-Granger residual based cointegration test suggests that there is a long-run relationship between stock market performance and economic growth.

Wild and Lebdaoui (2014) studied the relationship between stock market development and economic growth in Morocco for the period from 2000 to 2013 on quarterly basis. The study employed All Shares Index, market liquidity, market capitalization as proxies for stock market development and a principal component analysis based stock market development index. The results suggest that a long-run relationship exists between stock market development and economic growth, and a unidirectional Granger-causalities running from all share index, traded volume and stock market index to the real GDP, but no evidence is confirmed for a Granger-causality from capitalization to the real GDP. Similarly, Olweny and Kimani (2011) investigated the causal relationship between stock market performance and economic growth in Kenya for the period from 2001 to 2010, using quarterly data. The study employed Granger causality test based on the Vector Autoregressive (VAR) model. The study reported that the variables are cointegrated with at least one cointegrating vector. The findings further imply that the causality between economic growth and stock market runs in one direction from the NSE 20-share index to the GDP. N´zue (2006); Bayar *et al.* (2014) reported that there is a unidirectional causality running from stock market development to economic growth in Ivory Coast and Turkey respectively. While Anigbogu and Nduka (2014) for Nigeria reported that stock market performance and economic growth Granger cause each other.

3. THEORETICAL FRAMEWORK

The theoretical underpinning of the methodology of the study is anchored on the capital asset pricing model (CAPM) and endogenous growth model. The CAPM was made popular by Sharp (1964) and Lintner (1965). The CAPM is employed in testing the cost of capital and assessing the performance of portfolios. The popularity of the CAPM is due to the fact that it gives insight into how to measure risk. It states that the risk of a stock should be

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calculated in relation with market portfolio that involves tradable financial assets. On the other hand, Bencivenga and Smith (1991) and Levine (1991) are among the pioneers of endogenous growth models. These models were employed to investigate how stock markets affect long-run economic growth. They are of the view that stock markets help investors to diversify their risks. Thus, investment would increase as a result of accumulated savings. Consequently, more investment means more dividends, which in the long-run raises economic growth.

3.1. Model Specification

The study adopted the model employed by Anigbogu and Nduka (2014) for Nigeria with some modifications such as the exclusion of banking sector development and capital flows. This is to capture the peculiarity of the South African economy. This model is based on the endogenous growth model. Hence, we employed the Vector Autoregressive (VAR) framework to multivariate time series specified as follows:

$$y_t = A_1 y_{t-1} + A_2 y_{t-2} + \ldots + A_p y_{t-p} BX_t + E_t \ldots\ldots(1)$$

Equation (1) is specified in compact form, which follows the process of order P{VAR(P)}.

where y_t is a k vector of endogenous variables (in this study, vector y_t contains ry, vr, sr, if, tr, tsr, mr), X_t is a d vector of deterministic variable, A_1, …, A_p and B are matrices of coefficients to be estimated, and E_t is a vector of disturbances that may be contemporaneously correlated, but are uncorrelated with their own lagged value as well as all deterministic variables.

The matrix form of the $VAR_{(p)}$ in this study is specified below as:

$$\begin{bmatrix} ry \\ vr \\ sr \\ if \\ tr \\ tsr \\ mcr \end{bmatrix} = A(L) \begin{bmatrix} ry_{t-i} \\ vr_{t-i} \\ sr_{t-i} \\ if_{t-i} \\ tr_{t-i} \\ tsr_{t-i} \\ mcr_{t-i} \end{bmatrix} + \begin{bmatrix} \sum\sum ry \\ \sum\sum vr \\ \sum\sum sr \\ \sum\sum if \\ \sum\sum tr \\ \sum\sum tsr \\ \sum\sum mcr \end{bmatrix} \ldots\ldots\ldots(2)$$

Transforming the VAR equation into VECM specifications gives:

$$\Delta ry_t = \alpha_o + \alpha_{11}\sum_{j=1}^{k} \Delta ry_{t-1} + \alpha_{12}\sum_{j=1}^{k} \Delta if_{t-1} + \alpha_{13}\sum_{j=1}^{k} \Delta vr_{t-1} +$$

$$\alpha_{14}\sum_{j=1}^{k} \Delta sr_{t-1} + \alpha_{15}\sum_{j=1}^{k} \Delta tr_{t-1} + \alpha_{16}\sum_{j=1}^{k} \Delta tsr_{t-1} +$$

$$\alpha_{17}\sum_{j=1}^{k} \Delta mcr_{t-1} + \sigma ECM_{t-1} + \varepsilon_{1t} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(3)$$

$$\Delta if_t = \beta_o + \alpha_{21}\sum_{j=1}^{k} \Delta if_{t-1} + \alpha_{22}\sum_{j=1}^{k} \Delta ry_{t-1} + \alpha_{23}\sum_{j=1}^{k} \Delta vr_{t-1}$$

$$+ \alpha_{24}\sum_{j=1}^{k} \Delta sr_{t-1} + \alpha_{25}\sum_{j=1}^{k} \Delta tr_{t-1} + \alpha_{26}\sum_{j=1}^{k} \Delta tsr_{t-1}$$

$$+ \alpha_{27}\sum_{j=1}^{k} \Delta mcr_{t-1} + \theta ECM_{t-1} + \varepsilon_{2t} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(4)$$

$$\Delta vr_t = \gamma_o + \alpha_{31}\sum_{j=1}^{k} \Delta vr_{t-1} + \alpha_{32}\sum_{j=1}^{k} \Delta ry_{t-1} + \alpha_{33}\sum_{j=1}^{k} \Delta if_{t-1}$$

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$$+\alpha_{34}\sum_{j=1}^{k}\Delta sr_{t-1}+\alpha_{35}\sum_{j=1}^{k}\Delta tr_{t-1}+\alpha_{36}\sum_{j=1}^{k}\Delta tsr_{t-1}$$
$$+\alpha_{37}\sum_{j=1}^{k}\Delta mcr_{t-1}+\Psi ECM_{t-1}+\varepsilon_{3t}\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(5)$$

$$\Delta sr_t=\phi_o+\alpha_{41}\sum_{j=1}^{k}\Delta sr_{t-1}+\alpha_{42}\sum_{j=1}^{k}\Delta ry_{t-1}+\alpha_{43}\sum_{j=1}^{k}\Delta if_{t-1}$$
$$+\alpha_{44}\sum_{j=1}^{k}\Delta vr_{t-1}+\alpha_{45}\sum_{j=1}^{k}\Delta tr_{t-1}+\alpha_{46}\sum_{j=1}^{k}\Delta tsr_{t-1}$$
$$+\alpha_{47}\sum_{j=1}^{k}\Delta mcr_{t-1}+\lambda ECM_{t-1}+\varepsilon_{4t}\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(6)$$

$$\Delta tr_t=\eta_o+\alpha_{51}\sum_{j=1}^{k}\Delta tr_{t-1}+\alpha_{52}\sum_{j=1}^{k}\Delta ry_{t-1}+\alpha_{53}\sum_{j=1}^{k}\Delta if_{t-1}$$
$$+\alpha_{54}\sum_{j=1}^{k}\Delta vr_{t-1}+\alpha_{55}\sum_{j=1}^{k}\Delta sr_{t-1}+\alpha_{56}\sum_{j=1}^{k}\Delta tsr_{t-1}$$
$$+\alpha_{57}\sum_{j=1}^{k}\Delta mcr_{t-1}+\pi ECM_{t-1}+\varepsilon_{5t}\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(7)$$

$$\Delta tsr_t=\upsilon_o+\alpha_{61}\sum_{j=1}^{k}\Delta tsr_{t-1}+\alpha_{62}\sum_{j=1}^{k}\Delta ry_{t-1}+\alpha_{63}\sum_{j=1}^{k}\Delta if_{t-1}$$
$$+\alpha_{64}\sum_{j=1}^{k}\Delta vr_{t-1}+\alpha_{65}\sum_{j=1}^{k}\Delta sr_{t-1}+\alpha_{66}\sum_{j=1}^{k}\Delta tr_{t-1}$$
$$+\alpha_{67}\sum_{j=1}^{k}\Delta mcr_{t-1}+\Omega ECM_{t-1}+\varepsilon_{6t}\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(8)$$

$$\Delta mcr_t=\nu_o+\alpha_{71}\sum_{j=1}^{k}\Delta mcr_{t-1}+\alpha_{72}\sum_{j=1}^{k}\Delta ry_{t-1}+\alpha_{73}\sum_{j=1}^{k}\Delta if_{t-1}$$
$$+\alpha_{74}\sum_{j=1}^{k}\Delta vr_{t-1}+\alpha_{75}\sum_{j=1}^{k}\Delta sr_{t-1}+\alpha_{76}\sum_{j=1}^{k}\Delta tr_{t-1}$$
$$+\alpha_{77}\sum_{j=1}^{k}\Delta tsr_{t-1}+\mu ECM_{t-1}+\varepsilon_{7t}\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(9)$$

Where α_o, β_o, γ_o, ϕ_o, η_o, υ_o and ν_o, are the constant, α^s are parameters to be estimated, Δ is the difference operator, j is the lag length, ε_t is independent and identically distributed error term, k is the maximum distributed lag length. The parameter estimates of $\sigma, \theta, \Psi, \lambda, \pi, \Omega$ and μ are expected to be negative. Equations 3, 4, 5, 6,

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7, 8 and 9 can be specified in compact form as follows: $\Delta ry_t = \alpha_i + \beta_i \sum_{j=1}^{k} \Delta(ry\gamma)_{t-1} + \vartheta_i \sum_{j=1}^{k} \Delta X_{t-1} + \Theta ECM_{t-1} + \varepsilon_t$ …….(10

3.1.1. Definition of Variables

Ry = real GDP; vr = investment ratio; sr = savings ratio; if = rate of inflation; tr = turnover ratio; tsr = total value of shares traded ratio; mcr = market capitalization ratio. Data were sourced from the United Nations, International Monetary Fund and World Bank websites with some transformations, including interpolation and extrapolation. Economic growth is in this study captured by real gross domestic product (RGDP). According to Adenuga (2010) the expansion of an economy will create new demand for financial service in the demand-driven hypothesis. Investment ratio is the gross fixed capital formation divided by nominal GDP, while Savings ratio is measured as gross domestic savings as a percentage of GDP (Anigbogu and Nduka, 2014). Rate of inflation measures the rate at which the prices of necessary goods and services increase over a period of time. Low rate of inflation attracts more investment. In turn, more investment leads to high economic growth. Turnover ratio measures the rate at which stock changes hands. It is calculated as total value of shares traded divided by all-share index or market capitalization (Anigbogu and Nduka, 2014). Total value of shares traded ratio is calculated as the ratio of total value of shares traded to GDP (Anigbogu and Nduka, 2014). Market capitalization ratio is measured as market capitalization as a ratio of GDP (Anigbogu and Nduka, 2014).

4. EMPIRICAL RESULTS AND DISCUSSION

4.1. Unit Root Tests

To examine the time series characteristics of the model variables, the Augumented Dickey-Fuller (ADF) and Philips-Perron (PP) unit root tests were conducted. The null hypothesis of non-stationarity of each variable was tested against the alternative hypothesis of stationarity. The optimum lag length was tested based on Akaike information criterion, Schwarz Bayesian criterion and Hannan-Quin information criterion. Thus, the optimum lag length of 2 was selected based on Schwarz Bayesian Criterion. Table 1 below presents the unit root test results.

Table-1. ADF and PP Unit Root Tests, 1995Q1-2013Q4

Variable	ADF	PP	Order of integration
ry	2.909* (-2.409)	-3.471*(-3.196)	I(0)
vr	-2.906* (-1.646)	-2.901* (-2.435)	I(0)
sr	-3.476* (-3.045)	-2.901* (-2.901)	I(0)
if	-3.479* (-2.958)	-2.901(-2.672)	I(0)
tr	-2.906* (-2.043)	-2.901*(-1.748)	I(0)
tsr	-2.904* (-2.067)	-2.901*(-1.767)	I(0)
mcr	-2.906* (-1.707)	-2.901*(-2.278)	I(0)

Source: Researcher's computation. For both ADF and PP, the 5% critical values in bracket are below the test statistics. Asterisk (*) shows no unit root at 5% critical value.

The decision rule is to reject the null hypothesis if the ADF statistic value (in absolute term) exceeds the critical value at 5% level of significance. As such, the null hypothesis of non-stationarity of each variable was tested against the alternative hypothesis of stationarity. The variables exhibited mean reversion in level form. Thus, ADF and PP results suggest that the null hypothesis can be rejected for the variables in their level form at the 5% significance

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level. However, it is noteworthy that the PP test suggests that the saving ratio is stationary at level, while the ADF test indicates that it is stationary after first difference. This is not peculiar to the study, but shows the slight difference between ADF and PP tests.

4.2. Cointegration Test Results

To determine the long-run relationship amongst the model variables of interest, the Johansen cointegration approach was adopted. This technique utilizes two statistics tests namely: the trace test and the maximum Eigen value test. The variables of interest are ry (which captures economic growth), tr, tsr and mcr (stock market indicators). Thus, results of the unrestricted cointegration rank test when the three respective stock market indicators were estimated with economic growth are presented in table 2 below.

Table-2. Cointegration Test Results

Variable			Trace Statistics	Critical Value at 5 Percent	Null Hypothesis	Maximum-Eigen Value	Critical Value
ry & vr	Null Hypothesis	r = 0*	31.522	15.49	r = 0*	21.509	14.265
		r ≤ 1*	10.013	3.841	r ≤ 1	10.012	3.841
ry & sr	Null Hypothesis	r = 0*	28.252	15.495	r = 0	22.276	14.265
		r ≤ 1*	5.976	3.841	r ≤ 1	5.976	3.841
ry & if	Null Hypothesis	r = 0*	35.565	15.495	r = 0*	22.372	14.265
		r ≤ 1*	13.193	3.841	r ≤ 1*	13.193	3.841
ry & tr	Null Hypothesis	r = 0*	26.878	15.495	r = 0*	23.449	14.265
		r ≤ 1	3.429	3.841	r ≤ 1	3.429	3.841
ry & tsr	Null Hypothesis	r = 0*	26.963	15.495	r = 0*	22.802	14.265
		r ≤ 1*	4.162	3.841	r ≤ 1	4.161	3.841
ry & mcr	Null Hypothesis	r = 0*	30.259	15.495	r = 0*	21.628	14.265
		r ≤ 1	8.632*	3.841	r ≤ 1*	8.632	3.841

(*) denotes rejection of the hypothesis of no cointegrating vectors at 5% significance level, while r indicates number of cointegrating vectors.

Table-3. Error Correction Model Results

Variable	β's	ECM(-1)
vr	1.000000	-0.017
ry	-0.029	[-0.851]
	[-4.37]*	
c	0.755	
sr	1.000000	-0.00342
ry	2.216	[-0.805]
	[4.214]*	
c	-59.041	
if	1.000000	-0.00178
ry	-4.88E-12	[-0.2211]
	[-4.898]*	
c	1.141	
tr	1.000000	-0.002091
ry	3.17E-11	[-0.6107]
	[5.0305]*	
c	-28.136	
tsr	1.000000	-0.00094
ry	6.77E-11	[-0.388]
	[4.976] *	
c	-56.039	
mcr	1.000000	-0.0588
ry	-25.628	[-2.953] *
	[-4.373] *	
c	637.7115	

Note: Figures in parenthesis [] are the t-statistic, while * indicates significance at 5level.

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The cointegration test results indicate that long-run relationship exists between economic growth and investment ratio; saving ratio; inflation rate; turnover ratio; total value of shares traded ratio and market capitalization respectively. This finding is consistent with Vacu (2013) for South Africa.

4.3. Vector Error Correction Model (VECM) Results

Since it has been established that a long-run relationship exists between economic growth and stock market performance, we then conducted error correction model. This test is necessary due to disequilibrium in the long-run caused by some shocks inherent in the economy corrected in the short-run. Hence, the results are presented in table 3.

The error correction model results presented in table 3 have the expected negative sign. These results are in line with econometric theory. From the table, the vector error correction terms are -0.017; -0.00342; -0.00178; -0.002091; -0.00094 and -0.0588 for investment ratio; saving ratio; inflation rate; turnover ratio; total value of shares traded ratio and market capitalization respectively. These speeds of adjustment suggest that about 1.7%; 0.342% ; 0.178%; 0.2091%; 0.094% and 5.88% of the previous period's deviations from long-run in the South African stock exchange market are corrected each quarter. It is noteworthy that market capitalization exhibits the fastest adjustment from disequilibrium. This suggests that following a shock, it takes about six months for the stock market to return to long-run equilibrium. This indicates that the convergence between the variables is not instantaneous.

4.4. Granger Causality Test Results

To determine the direction of causal relationship between economic growth and stock market variables, the pairwise Granger (1969) causality approach was adopted. Granger (1969) is of the view that if causal relationship is established amongst variables, then these variables can be used to predict each other. Granger (1969) argued that a variable say Y causes another variable say Z, if and only if Z can be predicted from the past values of Y and Z better than from past values of Y alone. This causal relationship can be either uni-directional or bi-directional. The results of the Granger causality are presented in table 4:

Table-4. Pairwise Granger Causality Test Results

Null Hypothesis	F-Statistic	Inference
vr does not Granger Cause ry	0.045[0.956]	No Causality
ry does not Granger Cause vr	0.536[0.038]	No Causality
sr does not Granger Cause ry	0.536[0.587]	No Causality
ry does not Granger Cause sr	0.483[0.619]	No Causality
if does not Granger Cause ry	0.543[0.583]	No Causality
ry does not Granger Cause if	0.179[0.837]	No Causality
tr does not Granger Cause ry	0.520[0.597]	No Causality
ry does not Granger Cause tr	0.037[0.964]	No Causality
tsr does not Granger Cause ry	0.362[0.697]	No Causality
ry does not Granger Cause tsr	0.025[0.975]	No Causality
mcr does not Granger Cause ry	0.176[0.839]	No Causality
ry does not Granger Cause mcr	1.078[0.346]	No Causality

Note: Figures in parenthesis [] depict significance at 5% level and P-values respectively.

The results presented above indicate that there is no causal link between economic growth and stock market performance. These results validate MacFarlane (2011) for South Africa. This suggests that South African stock market performance cannot be used to predict the economy. That is, whatever happens in the economy, either increase or decrease cannot be associated with activities in the Johannesburg Stock Exchange (JSE). This may be due to the size of the market relative to the aggregate economy.

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5. CONCLUSION AND POLICY IMPLICATIONS

The study was carried out to empirically address the long-run, short-run and causal relationships between economic growth and stock market performance in South Africa from $1995Q_1$ to $2013Q_4$. The results show that all the variables are stationary at level form. The cointegration test results suggest that the stock market variables (turnover ratio, market capitalization and total value of shares traded) all have a long-run relationship with economic growth. Apart from the stock market variables, the results further show that economic growth has a long-run relationship with investment ratio; saving ratio and rate of inflation. The results of the vector error correction model indicate that all the variables adjust to their stable long-run equilibrium. In order to consider the parsimony principle and residual white noise property, lag interval of 2 was selected based on Schwartz Bayesian criterion. The lag length suggests that the adjustment of variables to their respective long-run equilibrium relationship is not instantaneous. This suggests that it will take about six months for any disequilibrium in the stock market to be corrected. Furthermore, the Granger causality test shows that there is no causal link between economic growth and stock market performance. To ensure investors' confidence, the government should ensure that appropriate institutional factors like rule of law, equity and fair trading policies are strengthened. There should be checks and balances in the market to avoid insider dealings and collusion.

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