Economic Growth Impact of Indian Stock Market: An Econometric Investigation

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Abstract

This study investigates the Impact of stock market on economic growth of India. ADF Unit Root test result shows all variables to be integrated of order one, that is they became stationary after taking first difference. Johansen Cointegration test shows the presence of long run relationship among the variables. Long run estimation result showed a positive and significant relationship between investment, labour and education with GDP, while stock market and GDP were found to be negatively related. Vector Error Correction Model (VECM) short run dynamics showed stock market to have a short run positive impact on economic growth of India. Impulse Response Function (IRF) shows the response of GDP to a shock in stock market and interest rate to be negative, while the response to shocks in labour, investment and education was positive. Policy recommendations includes putting in place measures aimed at reducing shocks in the stock market and making it have a positive impact on the economic growth of India.

Key Words: Stock Market, Economic Growth, India

JEL Classification: O16, G10

Introduction

Stock market as argued by several economists is believed to exert an impact on the economic growth of a nation for it provides a platform where capital can be raised for the establishment of new projects by companies or expansion of their operations. As Osho (2014) noted, stock market plays a major role as an economic institution which enhances efficiency in capital formation and allocation, it allows corporations and the government to raise long term capital which enables them to finance new projects or expand its activities. In support of the foregoing argument, Jecheche (2011) sees the stock market to provide the avenue for growing companies to raise capital at lower cost and also, companies in countries with developed stock markets are less dependent on bank financing, which can reduce the risk of credit crunch.

Although stock market is seen as a stream for capital formation, its impact on economic growth might not necessarily be significant. Mark (2000) quoted Keynes as saying "the stock market is not simply an efficient way to raise capital and advance living standards, but can be linked to a casino game or game of chance". Keynes arguments stems

in the fact that speculators exhibit irrational short term animal spirits by dumping liquidity stocks in favour of liquidity when crises looms. In the same vein, Ted et al (2005) and Baotai and Ajit (2013) did not find enough evidence to link stock market to economic growth.

India stock market has two major stock exchanges, the Bombay Stock Exchange (BSE) which was established in 1875 (oldest in Asia) and the National Stock Exchange (NSE) which was founded in 1992. Both stock exchanges have been thriving, but the extent to which they affect economic growth of India is what the study intends to investigate.

Objective

The objective of the study is to examine the short run and long run impacts of stock market development on economic growth of India.

Literature Review

Jecheche (2011) employed the ARDL approach to examine the effect of stock exchange on economic growth of Zimbabwe. His findings suggest a positive short run and long run relationship between efficient stock market and economic growth.

Gevit(2007) in his paper "The Relationship Between Stock Market and the Economic Growth: Evidence from International Markets" examined the causal relationship between stock market prices and economic growth using the Granger Causality test. Findings from the study showed a unidirectional causal relationship between stock prices and GDP running from Stock prices to GDP for all the countries under study except Germany. A reverse causality from GDP to stock prices was not established.

Osho (2014) investigated the role of stock market on economic development of Nigeria using OLS regression. Finding of the study shows stock market development to be positively correlated with the development of financial intermediaries and consequently economic growth.

Ted et al (2005) in their study "Is The Indian Stock Market a Casino" examined the association between stock market development and economic growth. Their findings show no support that the Indian stock market development is associated with economic growth for the period 1981 to 2001. They thus concluded that the Indian stock market is a casino.

Sudharshan and Rakesh (2011) investigated whether stock market performance leads to economic growth of India using both monthly and quarterly data for the period 1996 to 2009. Monthly Granger Causality test result suggest a bi-directional causal relationship between IIP and stock prices, while quarterly result reveals that there is no relationship between GDP and BSE, but in case of NSE and GDP, a unidirectional causality was found, running from GDP to NSE.

Kwame (2012) employed the GLS technique to investigate the impact of stock market primarily on economic growth using panel data. Yields from the study showed the presence of positive effect of stock market development on economic growth in some economies and sectors. The effect varies per region and time periods.

Abu (2009) investigated the impact of stock market development on economic growth of Nigeria using the error correction approach as to whether stock market development raiseseconomic growth. Econometric results suggest stock market development to raise economic growth in Nigeria.

Baotai and Ajit (2013) examined the impact of stock market development on economic growth of China using the cointegration framework. Results of their findings showed the relationship between stock market development and economic growth to be negative.

Hamid and Sumit (2008) investigated the relationship between stock market development and economic growth using the dynamic panel methodology for twenty one countries. Results of the study suggest a positive relationship between several stock market indicators and economic growth both directly and indirectly through boosting private investment behaviour.

Methodology and Data

The study adopted the Vector Error Correction Model (VECM) methodology in estimating the long run and short run relationship among the Variables. The studystarted by testing for stationarity of the data, and when variables were found to be stationary only after taking their first difference, the Johansen Cointegration test was adopted to determine whether or not the variables have long run relationship. Having found the variables to be cointegrated, the VECM model was run where the short run relationship among the variables and short run dynamics of the model were estimated. As a further tool of analysis, impulse response function (IRF)was also adopted by the study.

Data on the variables were sourced from the Handbook of Statistics on Indian Economy, 2014 and World Bank Indicators. The data are in annual series and were collected for the period 1982 to 2013.

Model Specification

In examining the impact of stock market on economic growth of India, the model is specified as:

GDP = f (INV, LAB, EDU, MCAP, INT)

Where; GDP= Real GDP, used as a proxy for economic growth.

INV = Domestic Investment.

LAB = Total Labour Force.

EDU = Human Capital (Secondary School Enrolment).

MCAP = Stock Market Capitalization, a proxy for stock market.

INT = Interest Rate.

(Note that all variables are in their logarithmic form).

The VAR specification of the model is given as:

$$Y_t = C + \sum_{i=1}^{k} \Pi_i Y_{t-i} + \varepsilon_t$$

$$\begin{pmatrix} \text{GDP} \\ \text{INV} \\ \text{LAB} \\ \text{MCAP} \\ \text{INT} \end{pmatrix}$$

Where: Y_t = Vector of Endogenous Variables.

C = Vector of Constant terms.

Π = Coefficient Matrices.

ε_t = Vector of error term.

The Vector Error Correction Model (VECM) is specified as:

$$\Delta Y_t = C + \sum_{i=1}^{k} \Gamma \Delta Y_{t-1} + \gamma(U_{t-1}) + \varepsilon_t$$

Where C = Vector of Constant terms.

Y_t = Vector of Endogenous Variables.

Γ = Short run coefficient matrices.

γ = Error correction term/ speed of adjustment.

Δ = Short run operator.

U_{t-1} = One lag of long run cointegrating equation.

ε_t = Vector of error term.

Findings and Discussion

Stationarity Test

As a first step in time series analysis, we need to check the order of integration of our variables, that it, whether or not they are stationary. The Augmented Dickey Fuller (ADF) unit root test was adopted to check stationarity of the data, the results are presented below.

Table 1.0 Stationary Test Result

Variables	Level		First Difference		Order
	Intercept	Int & Trend	Intercept	Int & Trend	
GDP	2.89	-1.23	-4.61**	-5.05**	I(1)
INV	1.25	-1.50	-6.13**	-6.53**	I(1)
LAB	-1.34	-0.77	-4.50**	-4.64**	I(1)
EDU	0.14	-2.02	-4.38**	-4.39**	I(1)
MCAP	-1.91	-2.58	-8.11**	-8.43**	I(1)
INT	-2.41	-3.40	-5.01**	-4.91**	I(1)

Source: Author's own computation.

H0: Series is non-stationary.* and** indicates rejection of H0 at 5% & 1% significance level.

From the stationary test result (table 1.0), all our variables were found to be integrated of order one I(1) that is, they became stationary only after taking their first difference. Since all the variables are non-stationary at level, to proceed with our analysis, we will have to check whether or not the variables have long run association.

5.2 Cointegration Test

Since our variables were all found to be integrated of order one, we will have to check if they are cointegrated, that is, if they have long run relationship. To do this, the Johansen Cointegration test was applied and the results are presented below.

Table 2.0 Johansen Cointegration Test Result.

Hypothesized No. of CE(s)	TRACE TEST		MAX EIGEN VALUE TEST	
	Trace Statistic	0.05 Critical Value	Max-Eigen Statistic	0.05 Critical Value
None	114.2503*	95.75366	47.29235*	40.07757
At most 1	66.95795	69.81889	24.81663	33.87687
At most 2	42.14131	47.85613	18.61669	27.58434
At most 3	23.52462	29.79707	10.70237	21.13162
At most 4	12.82225	15.49471	9.171343	14.26460

Source: Author's own computation.

* denotes rejection of the hypothesis at the 0.05 level

From the Johansen cointegration test result presented in table 2.0, the null hypothesis is rejected if the test statistic is greater than the critical value. Both the Trace statistic and Max-Eigen value statistic shows the rejection of the no cointegration (none) hypothesis; we could thus conclude that there exist the presence of one cointegrating relation among the variables. The findings of the cointegration test suggest the presence of long run relationship or association among our variables.

Long Run Relationship

After establishing the presence of cointegration among the variables, the next step is the examination of the long run relationship among the variables, this can be presented below.

GDP= -5.27 + 0.35INV* + 1.59LAB* - 0.08MCAP* - 0.06INT + 0.96*

From the long run relationship above, INV is found to have a significant positive relationship with GDP, a percentage

change in INV leads to a 0.35 percentage change in GDP. The relationship between LAB and GDP was also found to be significantly positive, a percentage change in LAB leads to a 1.59 percentage increase in GDP. However, stock market (MCAP) was found to have a significant negative relationship with GDP, a percentage change in MCAP leads to a 0.08 percentage decrease in GDP. The relationship between INT and GDP was found to be negative, but statistically insignificant. Consequently, EDU was seen to have a positive and significant relationship with GDP, a percentage increase in EDU leads to a 0.96 percentage increase in GDP.

Vector Error Correction Model (VECM)

After examining the long run relationship among the variables, we now examine the short run dynamics of the model as well as the speed of adjustment. To do this, we estimate the VECM and the result are presented below.

Table: 3.0 Vector Error Correction Representations.

Variables	Coefficients	T- Statistic
ECT	-0.401	-5.08**
D(MCAP)	0.018	2.14*
D(INT)	-0.041	-1.56
D(INV)	-0.108	-2.04
D(LAB)	-0.223	-0.82
D(EDU)	-0.582	-4.23**
C	0.078	5.99
R SQUARED	0.59	
F-STAT (PROB)	4.53 (0.00)	

Source: Author's own computation.
** and * indicates statistical significance at 5% and 10%.

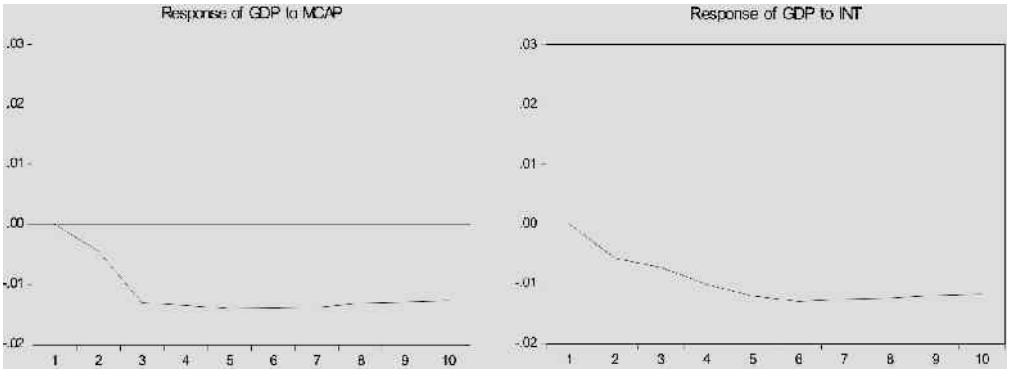
From the short run result presented in table 3.0, the negative and significant value of the speed of adjustment (ECT) further buttress the presence of long run relationship among the variables. The ECT coefficient (0.40) explains that about forty percent correction towards long run equilibrium is completed in a year following a shock in the economy. Short run dynamics shows a positive and significant relationship between stock market (MCAP) and GDP, a percentage change in MCAP leads to about 0.02 percentage increase in GDP. The impact of EDU on GDP was found to be significantly negative, while the short run impacts of INV. LAB and INT was statistically insignificant. R- Squared shows the explanatory power of the independent variables on the dependent variable. The R-squared value shows that about sixty percent variations in the dependent variable is explained by the independent variables. The F-statistic showed the model to have an overall statistical significance.

Residual Diagnostics

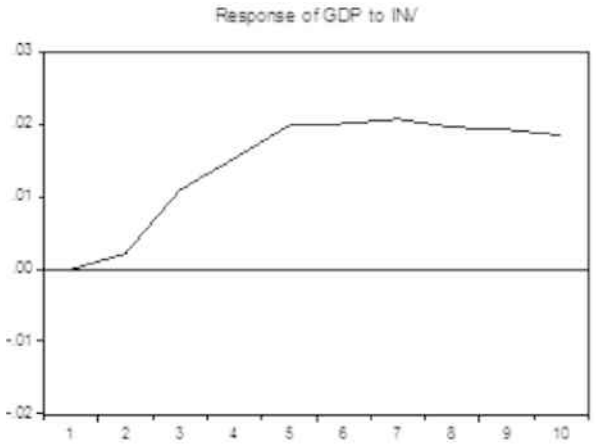
For a model to be accepted, it must satisfy the residual diagnostics. The Jarque-Bera Normality test shows the residuals of the model to be normally distributed (see appendix one). Breuch-Pagan-Godfrey Hetroskedasticity test shows the absence of hetroskedasticity in the residuals (see appendix two). Breuch LM serial correlation test shows the absence of serial correlation on the model (see appendix three).

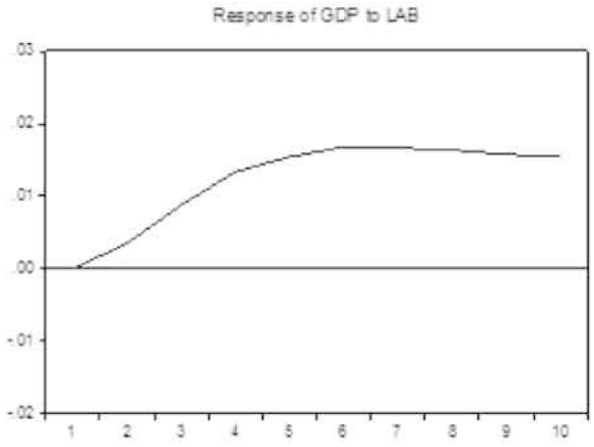
Impulse Response Function (IRF)

The IRF shows the response of a variable to a unit standard innovation or shocks to itself and other variables in the model. The IRF of the model is presented below.

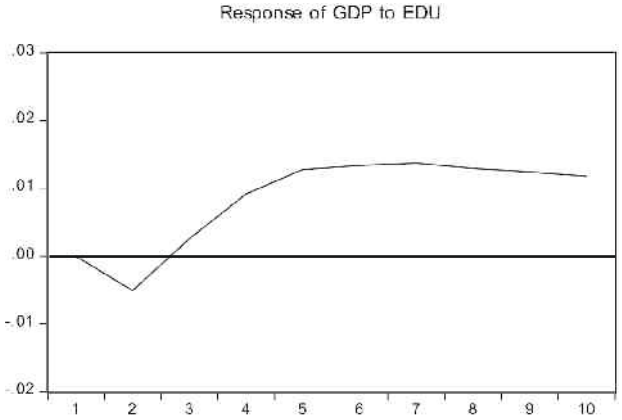


The graphs above shows the time path response of GDP to shocks in MCAP and INT. GDP was found to have a negative response to shocks in MCAP, from the first period the negative shock was continuously increasing, it bottomed out after the third period and remained negative until the end of the tenth period. The response of GDP to shocks in INT was also found to be negative all through the periods under study. We could thus infer that both MCAP and INT have a negative effect on economic growth of India.





The IRF above shows the response of GDP to shocks in INV and LAB. From the graphs above, GDP was found to have an increasing positive responseto shocks in GDP and LAB throughout the period under consideration. We could thus infer from the above that INV and LAB have a positive impact on GDP.



The graph above shows the response of GDP to shocks in EDU. The response was negative in the first and second period, but from the third period, the response became positive upto the end of the tenth period. We could thus say that EDU has an overall positive impact on GDP.

Conclusion

The study examined the impact of stock market on the economic growth of India, findings of the study showed stock market to have a negative effect on economic growth in the long run, while in the short run, it is found to have a positive effect on economic growth of India. The short run impact can be attributed to it being a source of finance to enterprises, but however, the long run negative impact of stock market development can be viewed from the angle of its high level of volatility and casino-like operation which entails a lot of speculative activities. The findings of the study support the works of Ted et al (2005) and Baotai&Ajit(2013). As a policy recommendation, government should pursue policies aimed at creating some semblance of stability in the market and also try to minimize shocks of economic fluctuations. The government should

also stipulate clear rules for investment and also provide incentives to attract lasting foreign equity investment.

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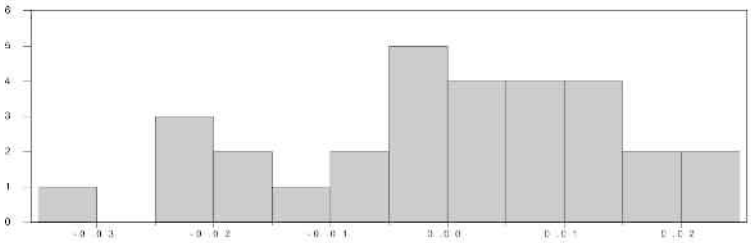
APPENDIX ONE



APPENDIX TWO

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.513736	Prob. F(12,17)	0.8778
Obs*R-squared	7.983866	Prob. Chi-Square(12)	0.7864
Scaled explained SS	2.788757	Prob. Chi-Square(12)	0.9969

APPENDIX THREE

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	2.165330	Prob. F(3,19)	0.1256
Obs*R-squared	7.643543	Prob. Chi-Square(3)	0.0540