

## **THE RELATIONSHIP BETWEEN STOCK RETURNS AND INFLATION RATES IN NIGERIA FROM 1995 to 2014**

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### **Abstract**

*This study focused on determining the relationship between inflation rate and stock returns using the Consumer Price Index and the All Share Index on the Nigerian Stock Exchange covering the period 1995 to 2014. The data were analyzed for evidence of co-integration and causality using Error Correction and Granger co-integration model. The Pearson Correlation result shows that, there is significant negative relationship between stock returns and inflation rates in Nigeria. Augmented Dickey Fuller result shows that the series are non-stationary in their level form and are integrated of order one. Johansen co-integration test result shows evidence of co-integration implying that there is a long run relationship between stock market returns and inflation rates in Nigeria. Furthermore, there is significant negative impact of inflation*

*rates on stock market returns in Nigeria. The pair-wise Granger causality test shows that there is a strong unidirectional causality. Also, result from the Error Correction Model suggests that about 43% of the variations in stock returns are accounted for by inflation rates. The study recommends economic reforms that target macroeconomic stability in the country, removal of structural twist, and creation of business-friendly environment that ensures price stability as these will encourage investment in stocks in Nigeria.*

*Keywords: Stock Returns, Inflation Rates, Consumer Price Index, All Share index, Nigeria*

## **INTRODUCTION**

There is no gainsaying that stock market performs a catalytic role of energizing a nation's economic growth and development. Hailstorm and Smith, (1996) and Nwude, and Agbo (2013) all strongly emphasized the need for nations to maintain sustainable stock market stability to ensure that all stakeholders make meaningful and attractive investment that could guarantee easy and faster divestment. Sustaining market liquidity highly rests on stable equity pricing which is greatly influenced by the purchasing power of the both domestic and foreign investors. Investors' purchasing power which is driven by the inflation rate at a given time in turn determines the level of market liquidity as well as market yield achievable from stock market. According to Fisher (1930) expected nominal returns on asset have a long tradition of equating to their expected real return as well as the ruling inflation rate in the economy which could translate to economic growth. Fieldstein, (1980) also noted that inflation generates artificial capital gain which is normally subjected to capital gains tax and the presence of tax liability, as well as rising inflation can particularly engender adverse corporate growth and efficiency. Omotor, (2011) however argued that a rising inflation rate increases riskiness of asset investment consequently and advised rational domestic and foreign portfolio investors to always incorporate inflation effect when choosing equities as long term holdings due to their potential of hedging against inflation erosion of purchasing power as well as real return on investment.

Similarly, the work of Park and Ratti (2000) demonstrated that contractionary monetary policy shocks generate significant movements in inflation and expected real stock returns that go in opposite directions thereby causing output decline and in turn reinforces greater economic uncertainty. But some schools of thought however believe that product prices which go up during rising inflation tend to translate to increased profitability for companies as well as bullish stock market trend. They contend that stock market investment remains a potential long term hedge against inflation risk as revenue and earnings should significantly do rise at

approximately same pace as inflation. Corroborating this, Ross et al (2017) argue that, economist, businessmen and even politicians maintain that, some level of inflation are needed to drive consumption, and it is assumed that higher level of spending are crucial for economic growth. Keynes (1930) and Fletcher (1989) on their part believed that some level of inflation is necessary to prevent paradox of savings - whereby consumer prices are allowed to fall due to higher level of production being achieved during economic boom. Buttressing his point he noted that inflation makes loan repayment by debtors easier as they need to pay back less valuable money than they borrowed. This study therefore attempts to econometrically appraise the level and direction of flow interrelationship existing between inflation rates and stock market returns in Nigeria.

### **Statement of Problem**

Price stability helps in determining when an economy is stable or not. Inflation creates uncertainty in the economy and makes both domestic and foreign investors unwilling to invest (Mobolaji 2008). Inflation impacts negatively on the savings ability of citizens and as a result, low savings leads to a fall in the demand for stocks and equities as financial wealth. This decrease in demand causes the price of equities to decline thereby reducing returns on equities and stocks (Joyce 2012). At the same time, the prices of stocks determine how capable the stock market allocates shares and equities based on preference and availability of market information. The increase or decrease in the price of stocks create uncertainty for the investors and in turn, affect the demand and supply of stocks (Omosola&Taofik 2013). Generally, increase in price level affect people's investment decision which has a negative impact on the total returns on stocks in the economy at large. Past studies on this, observed that this situation is common in the Nigerian economy (Hoesli 2000 & Omosola 2013). The relationship that exists between inflation rates and stock returns has been examined by several financial economists around the world. However, the relationship has not been widely examined in the Nigerian Stock Market. More so that the stock market is an integral part of the financial sector; its performance is very vital to growth process of the Nigeria's economy, given the current drive towards making the country's economy less oil dependent. There is, therefore, the need to examine the impact of inflation on stock returns and its implication on investment in Nigeria.

## **LITERATURE REVIEW**

### **Theoretical Framework**

The relationship between inflation rates and stock returns is based on the economic theory that postulates that inflationary pressures scrape away the worth of money, thus making a given unit

of money, purchase fewer goods (Ahmed & Igbinovia 2015). A strong relationship is presumed to exist between stock returns and inflation rates. If the worth of money contracts during high inflation, then inflation rate influences stock market risk. The risk here is defined in terms of the decline in return of securities, since the worth or return of securities is expressed in monetary terms, then a fall in the worth of money during high inflation implies a contracting level of stock returns. This is because the worth of money upon which stock returns are based is scraped, and as such people no longer find it profitable to invest in stocks. On account of this, people would stop purchasing shares and in some cases, direct their investments which would reflect in reduced trading volumes and traded values of most securities in the market. This eats up into corporate profit which in turn makes dividends to decline. If dividends decrease, the expected returns of stocks decrease, thereby causing stocks to depreciate in value (Fama 1981).

### **The Stock Market**

Brown (2013) noted that the stock market is referred to as the equities market. Companies, from time to time, issue shares which define the main part of their ownership structure and these shares, also known as stocks, are either offered to the public when the company is listed or to individuals for privately owned entities. Companies most often, issue shares to raise money, to buy fixed assets or to invest into a business venture rather than using it for recurrent expenditure. A share, according to Hoesli and Macgregor (2000) is a paper asset that carries with it a hold on the capital and income of the company and also a share in the management of the company through voting rights proportional to number of shares held.

### **The Stock Prices and Inflation Rates**

Previous studies suggest that inflation rate influences stock returns because in times of high inflation, people easily recognize that stock market is in a state of distress. At the same time, people are dismissed from their jobs, which could cause reduction in output. If people are dismissed, they tend to switch their resources to consumption of essential items and forego investment in capital market. This is because the worth of money upon which stock returns are based is been rubbed away, and as such people tend not to find it profitable to invest in stocks. On account of this, people would stop buying shares and direct their investments to other projects. This eats up into corporate profit which in turn, makes dividends to diminish. If dividends decrease, the expected returns of stocks decreases, thereby causing stocks to depreciate in value. (Fama 1981; Graham 1996; Hoesli 2000 & Omosola 2013).

The negative relationship between stock returns and inflation rate throughout the cause of the post-world war II period was worrisome because it appears to contradict Fisher's (1930) hypothesis, which states that nominal asset returns move one-for-one with the expected inflation so that real stock returns are determined by real factors independently of the rate of inflation. Fisher (1930), assets which represent claims to physical or real assets, should offer a hedge against inflation. However, some studies show that the relationship could have been either positive or negative depending on different time horizons, across countries or even across different industries (Schotman and Schweitzer, 2000, Ryan, 2006). More so, in the last ten years, there has been upsurge in the increase of the activities of the stock market, which has also fostered rapid competitiveness in stock trading in securities (stocks). In an increasing world of finance, the overall performance of the stock market is critical to viability of investment and in turn economic growth. In the face of Nigeria's dwindling oil revenues and its adverse effects on the economy therefore, the inflation-stock market nexus is a critical issue in the stock market returns. On the average, inflation rate in Nigeria has maintained a double digit, the magnitude of which may have significant adverse effect on the investors, particularly in the context of fixed nominal interest rate (Omosola and Taofik 2013).

### Empirical review of previous studies

Author (s)/Date	Title/ Objective	Methodology	Variables/ Scope	Results	Comments
Ozurunba Benedict (2012)	The Impacts of Stock Market Returns on Foreign Portfolio Investment in Nigeria / To determine the relationship between foreign portfolio investment and stock market return, inflation rate and stock market returns	Multiple linear regression analysis and Granger causality tests	Inflation Rates, Foreign Portfolio Investment and Stock Market Returns / 1991 – 2010	The results showed that foreign portfolio investment has a positive and significant impact on stock market returns while inflation rate has positive but insignificant impact on stock market returns. In the case of causality test, evidence of the result showed that there is a unidirectional causality running from stock market returns to foreign portfolio investment in the economy, which in turn will foster stock market returns in Nigeria.	It was observed that policies that would attract foreign portfolio investment should be pursued to enhance stock market returns. As Omosola (2013), investment had significant positive effects on stock returns.

Douglason Omotor (2012)	Relationship between Inflation and Stock Market Returns: Evidence from Nigeria / To investigate the relationship between inflation rates and stock market returns	Ordinary Least Squares, Correlation and Augmented Dickey-Fuller (ADF) tests	Monthly and quarterly data on Stock Price Index, All Share Index and Money Supply the period 1985 to 2008.	The correlation coefficients of the full period of analysis were positive. The results of the trace test suggest the existence of one cointegrating equation (or long-run relation) between stock returns and inflation rates. The maximum eigenvalue test equally report the existence of one cointegrating equation between stock returns and inflation.	This paper seems to suggest that stock market returns may provide an effective hedge against inflation in Nigeria. This was also supported by Akinlo (2013)
Ibrahim Tajudeen (2013)	The Relationship between Stock Returns and Inflation in Nigeria	Ordinary Least Squares, Co-integration and Causality Tests	Monthly Consumer Price Index / 1995 – 2011	The study found a negative relationship between Inflation Rates and Stock Returns. High inflationary rates grander cause lower stock returns and vice versa.	Findings from this study contrasted Fisher's Effect, Emenike (2013) but supports Douglason (2012)
Nicola Osagie (2013)	Stock Returns and Inflation: the Impacts of Inflation Targeting	VAR-GARCH models	Stock price Index, Consumer Price Index / 1991 – 2004	The empirical results shed some further light in the debate about the relative benefits of inflation targeting. The major changes in the spillovers from past onto current volatilities following the introduction of inflation targeting were identified. Inflation had negative impacts on stock returns	The magnitude of volatility spillovers between inflation and stock returns was lower. This is similar to Omosola (2013)
Emenike Kalu (2013)	Does Stock Returns Protect Investors against Inflation in Nigeria? / It investigates whether stock market returns	Engle and Granger two steps Co-integration model and Error Correction Model	Monthly All-share Index and Monthly Consumer Price Index / January 1985 to March 2011	Results showed that stock returns and inflation are co-integrated. Similarly, results of the error correction model suggest that stock returns and inflation converge to long-run	The study concludes that the Nigerian stock market protects investors' wealth against inflation in the long-run but not in the short-run

	protect investors against inflation			equilibrium but the speed of adjustment to equilibrium is slow. The results also suggest that inflation does not have significant short-term effects on stock returns.	
Omosola Agbaje & Taofik Mohammed (2013)	The Relationship between Stock Returns and Inflation in Nigeria / To examine the long-run relationships and dynamic interactions between stock returns and inflation in Nigeria	The analytical technique of Autoregressive Distributed Lag (ARDL)	All Share Price Index, Consumers Price Index / 1997 – 2010	From the results, it was evident that there was the existence of a long run relationship between stock returns and inflation. The short run dynamic model also reveals that the speed of convergence to equilibrium is moderate implying that there is a short run relationship between stock returns and inflation.	The observed relationship could be attributable, perhaps, to the instability of prices of stocks noticed over the time period
AkinloOlayinka (2013)	Stock Prices and Inflation: Evidence from Nigeria	Vector Error Correction Model	Inflation Rates, Stock Prices / 1986 – 2010	There was existence of long run relationship between inflation and stock price index. The findings suggest that stocks are good inflation hedges both in the short and long run	The results provide evidence in support of Fisher effect in the short run and long run
Ahmed Uwubanmwun & Igbinovia Eghosa(2015)	Inflation Rate and Stock Returns: Evidence from the Nigerian Stock Market / To ascertain whether stock prices effectively predict stock returns in the Nigerian stock market	Ordinary Least Square Regression Model	Inflation Rate, Stock Returns, Stock Price / 1995 – 2010	The result indicates that the inflation rate has a negative but weak impact on stock return; hence, inflation is not a strong predictor of stock returns in Nigeria. Inflation variable appears to significantly respond to stock price changes.	Caution should be exercised in interpreting this, particularly as it may not suggest that stock prices determines inflation or that inflation be anchored on the activities in the stock market in the course of policy perspective

## METHODOLOGY

This empirical study employs descriptive statistics such as graphical and tabular illustrations for the trend analysis of Stock Returns, being the dependent variable in this study. To empirically establish the relationships between Stock Returns and Inflation rates in Nigeria, regression model and Granger Causality test would be employed to establish the direction of causality running from inflationary trends to stock returns in the economy. Also, Augmented Dickey-Fuller (ADF) unit root tests would be used to examine the variables' order of integration to achieve stationarity.

### Model Specification

In this study, we apply a simple model in the estimation of the relationship between stock returns and inflation, following the study of Spyrou (2001) as:

$$ASI = a + CPIb + \varepsilon$$

Where, ASI is the stock returns and CPI is the rate of inflation.  $a$  is a constant, and  $b$  is the slope coefficient that captures the sensitivity of the stock returns to inflation level.  $\varepsilon$  is the stochastic (error) term.

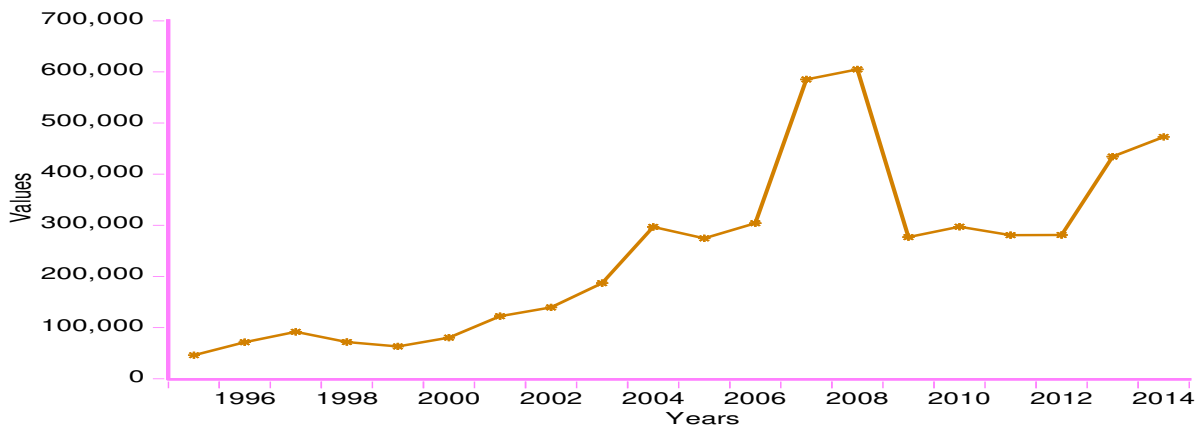
Economic theory as implied in the Fisher effect supports the existence of linear relationship. Previous studies that have estimated this form of linear relation include Choudhry (2001), Omotor (2011), and Alagidede and Panagiotidis (2006) among others. The *A priori* relationship is expected to be positive. The reason is because for Nigeria, as an emerging economy unlike industrialized economies as previous empirical studies have shown, inflation are primarily caused by money rather than real activity and the effect may appear less pronounced (Marshall, 1992).

### Data Source and Measurement

The data set consists of yearly stock from 1995 to 2014. Data for this study were obtained from the Central Bank of Nigeria (CBN) Statistical Bulletin. And they include yearly observations on Stock Price Index measured as the Nigerian Exchange's All Share Index simply ASI and the Consumer Price Index (CPI) which measures the rate of changes in consumer prices.

## ANALYSIS AND DISCUSSION OF RESULTS

The data set was subject to both descriptive as well inferential statistics. Statistical software *EViews 8.0* was used for inferential analysis.

Figure 1. All Share Index (Stock Returns)  
ASI

Author's Computation using EVIEWS 8.0

The trend in Stock Returns, using the All Share Index on the Nigerian Stock Exchange, has been fluctuating over the years. It began on a slight but consistent rise in the year 1995 and this continued till the year 2004 when a temporary decline was observed. Between the years 2006 and 2009, a sharp rise and fall in Stock Returns was noticed. Ever since 2009, the ASI has exhibited a fluctuating trend, rising and falling, though slightly. The Increase or decrease in price of stock and the returns therein create uncertainty for the investors and in turn affect the demand and supply of stocks. The effects of inflationary trends, measured by the Consumer Price Index (rate of changes in consumer prices) in the All Share Index are examined here.

Table 1. Descriptive Statistics

STATISTICS	INF	ASI
Mean	15.14369	249108.0
Median	11.55783	275809.6
Maximum	72.83550	605096.4
Minimum	5.382224	45781.40
Std. Dev.	14.61495	171605.5
Skewness	3.307091	0.671409
Kurtosis	13.53602	2.509487
Jarque-Bera	128.9627	1.703136
Probability	0.000000	0.426745
Sum	302.8739	4982161.
Sum Sq. Dev.	4058.340	5.60E+11
Observations	20	20

Author's Computation using EVIEWS 8.0

As shown in the table 1, All Share Index (ASI) has a mean value of 249,108billion and maximum and minimum values of 605,096billion and 45,781 billion respectively at SD equals 171605.5. For the INF, the mean value was 15.14% +/-14.61%. The table further shows the deviations from the mean as well as the maximum and minimum values for the other time series data gathered for this study. Kurtosis coefficient are 13.54 (INF) and 2.50 (ASI). Jarque-Bera statistic shows that all the variables have insignificant p-values. The Kurtosis and Jarque-Bera statistic confirms that the time series data were normally distributed. Hence, the data are suitable for analysis on parametric considerations.

Table 2. Correlational Relationship between Stock Returns and Inflation Rates

Statistic	Years		
	1995 – 2004	2005 – 2014	1995 – 2014
Pearson Correlation Coefficient	-0.274; p=0.444	-0.557; p=0.004	-0.368; p=0.010
Observations	10	10	20

*Author's Computation using EViews 8.0*

The relationship between Stock Returns and Inflation rates is examined using the Pearson Correlation Coefficient. Results showed the short-run (1995 – 2004) and the long-run (2005 – 2014) relationships between the variables. For the 1995 – 2004, the correlation coefficient of their relationship was -0.274 at p=0.444. In the period 2005 – 2014, it was -0.557 at p=0.004 and for the entire period under study, it was -0.368 at p=0.010. It shows that stock returns and inflation rates have inverse relationships. This means that they are negatively related. Increases in Inflation rates have been negatively impacting stock returns on the Nigerian Stock Exchange.

## Long-run relationship between Inflation and Stock Market Returns

### Stationarity test and cointegration

Table 3. Augmented Dickey Fuller Unit Root Test

Variables	Test Critical Values			At Level	At First Difference	At Second Difference	Order of Integration
	1%	5%	10%				
<b>ASI</b>	-3.8868	-3.0522	-2.6666	-	-4.2026 (0.00540)	-	I(1)
<b>CPI</b>	-3.8315	-3.0300	-2.6552	-	-11.4546 (0.0000)	-	I(1)

*Author's Computation using EViews 8.0*

To test if the two time series are non-stationary, Augmented Dickey Fuller (ADF) unit root test is employed. The Table 3 presents the results of the tests for levels as well as first differences of the variables. The null hypothesis is that the series are non-stationary, meaning that, there is, presence of a unit root and the alternative hypothesis is that they are stationary - that is, absence of a unit root. The test statistics shows that the levels of the series are not stationary but the first differences of the series are stationary; thus accepting the null hypothesis of an I(1) process. This implies that the series are integrated of order one and can be tested for co-integration in the Johansen sense.

Table 4. Johansen's Co-Integration Test

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.650759	20.87142	15.49471	0.0070
At most 1	0.101952	1.935570	3.841466	0.1641
Trace test indicates 1 cointegratingeqn(s) at the 0.05 level				
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.650759	18.93585	14.26460	0.0085
At most 1	0.101952	1.935570	3.841466	0.1641
Max-eigenvalue test indicates 1 cointegratingeqn(s) at the 0.05 level				

*Author's Computation using EVIEWS 8.0*

The Johansen result system of maximum likelihood approach to cointegration analysis are presented in Table 4. Johansen's trace test, which aimed at determining whether a long-term relation exists between the two series starts with the null hypothesis that there is no cointegration and if this hypothesis cannot be accepted, we test the alternative hypothesis that there is at most one cointegrating equation. Since there are only two variables in the model, we test if the number of cointegrating equations is zero, one, or two (Anari and Kolari, 2001). From the analysis, the result of the trace test suggests that there is the existence of one cointegrating equation (or long-run relation). The maximum eigenvalue test equally reveal the existence of one cointegrating equation between stock returns and inflation. It is worthy to note that

Cointegration implies that causality exists between the variables in at least one direction but does not indicate the direction of causal relationship (Erdal, et.al. 2008). Hence, the Causality test below.

### Granger causality

Table 5. Pairwise Granger Causality Tests

Sample: 1995 2014			
Null Hypothesis:	Obs	F-Statistic	Prob.
CPI does not Granger Cause ASI	18	41.26355	0.0000
ASI does not Granger Cause CPI		1.08091	0.1922

*Author's Computation using EVIEWS 8.0*

As earlier noted, co-integration implies that causality exists between the variables in at least one direction but does not indicate the direction of causal relationship. To avoid miss-specifying the model, we include the one period lagged error correction term following Chontanawat *et. al.* (2006) in the estimating the Granger causality test. The empirical result as presented in Table 5 suggests long-run uni-directional causal relationship from inflation to stock market returns and not the other way round. The null hypothesis stating that "ASI does not Granger Cause CPI" is accepted at  $p=0.1922$  while the one stating that "CPI does not Granger Cause ASI" is rejected. This means that the Inflation rates measured by the Consumer Price Index (CPI) cause significant changes in Stock returns. The direction of this effect is examined using the Error Correction Model below;

Table 6. Vector Error Correction Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CO-INTEq1	-0.098369	0.043159	-2.279236	0.0344
CPI (-)	-0.432780	2572.807	-1.681743	0.0199
C (-)	314631.8	53490.17	5.882049	0.0000
R-squared	0.435790	Mean dependent var		249108.0
F-statistic	2.828261	Durbin-Watson stat		1.154034
Prob(F-statistic)	0.009886			

*Author's Computation using EVIEWS 8.0*

The model equation is  $ASI = -0.0984 - 0.4328CPI$ . This represents the relationship between stock returns and inflation rates between 1995 and 2014. As shown in the model, inflation rates had significant negative effects on stock returns. A unit increase in inflation rates results into about 43% ( $-0.4328 \times 100$ ) decrease in stock returns in Nigeria. Results showed that this variable (inflation rates) was a significant predictor of stock returns given its sig. value at 0.0199. The model had an F-value at  $p=0.009886$ . This shows the goodness of fit of the model.

## CONCLUSION

Results from the Pearson Correlation shows that there is significant negative relationship between stock returns and inflation rates in Nigeria. This contrasts Akinlo (2013) but supports Ahmed & Igbinovia (2015). The ADF results show that the series are non-stationary in their level form, therefore random walk series and are integrated of order one. Johansen co-integration test result shows evidence of co-integration implying that there is a long run relationship between stock market returns and inflation rates in Nigeria. Furthermore, there is significant negative impact of inflation rates on stock market returns in Nigeria. The pair-wise Granger causality test shows that there is a strong unidirectional causality running from inflation rates to stock market returns in Nigeria. Result from the Error Correction Model suggests that about 43% of the variations in stock returns are accounted for by inflation rates (R-squared = 0.435790). These findings were consistent with those of Fama 1981; Graham 1996; Hoesli 2000 & Omosola 2013.

## POLICY RECOMMENDATIONS

1. Since inflation rates have negative effects on stock returns, economic reforms must target macroeconomic stability in the country, removal of structural twist and creation of business-friendly environment that ensures price stability
2. It is advisable that, anti- inflationary policy like non- expansionary monetary and fiscal policies as well as inflation-adjusted interest rate policy should be pursued to attract investment in stocks.
3. Finally, efforts should be made in Strengthening of supervisory and regulatory bodies in the financial system.

## SCOPE FOR FURTHER STUDIES

1. Aside the linear relationship of the two variables, upcoming researchers in this field should extend their study by including variables like stock price, interest rates, and other

relevant variables. Thus this study recommendation for further studies is that all these should be incorporated for wider discussion on this topic.

2. The scope of this study was for the period 1995 - 2014. For further studies, it is strongly recommended that the scope be expanded to start from 1986. At least for the period to be minimum of 30 years for better analysis of the result.

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