

# **An Econometric Analysis of the Impact of Monetary Policy on Stock Market Performance in Bangladesh**

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*The paper investigates the effect of monetary policy variables on the performance of the stock market of Bangladesh using monthly data over the period of January, 2006 to July, 2012. The objective of the study is to consider the effectiveness and consequence of various monetary variables of monetary policy commenced by central bank on the stock market performance of Bangladesh. As a dependent variable, DSE General(DGEN) Index has been used as a proxy for stock market performance and four independent variables-money supply, repo rate, inflation rate and three-month Treasury bill rate have been used as proxy for monetary variables. Employing Cointegration technique it is observed that in the long run, a one percent increase in inflation, in money supply, in T-bill rate and in repo rate contributes 1.69 %, 0.38 % and 1.09 % increase and 2.37% decrease in market index respectively. The ECM model indicates that 26 % of the deviations of stock returns are corrected in the short run. Finally, Granger causality analysis suggests the existence of unidirectional causality from inflation, money supply and T-bill to market index. Therefore, it is suggested that investors should consider the impact of monetary policy during constructing their portfolios and making investment decisions.*

**Field of Research:** Finance

**JEL Codes:** E52, E44

**Keywords:** Monetary Policy, Dhaka Stock Exchange, DGEN Index, Money Supply, Unit Root test, Cointegration, ECM, Granger Causality

## **1. Introduction**

The relationship between monetary policy and the stock market performance has been a subject of interest among economists and policymakers over a long period of time. As a key component of financial system, the stock market performs a crucial role for the economic development of a country. On the other hand, monetary policy is a measure designed to control the supply of money and credits, to adjust interest rate with objective to influence the overall level of economic activity. Money market and Capital market are two different markets but both are interlinked. Stock prices are generally believed to be affected by several macroeconomic variables such as interest rate, inflation, money supply which are transmitted by different economic policies. So, it is necessary for central bank to determine the impact of monetary variables such as money supply, inflation rate and interest rate on stock market performance.

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Especially after the recent stock market crash in Bangladesh, the issue of the role of monetary policy toward market performance has been gained much more attention from researchers and policymakers. This paper attempts to determine the impact of monetary policy on stock market of Bangladesh through different econometric approaches.

Dhaka Stock Exchange (DSE) is the country's first stock exchange which was established in 1954 and commenced its operation in 1956. On September, 2012 there are total 284 companies listed in DSE. The total market capitalization is Taka 2530790.12 million. On the other hand, Bangladesh Bank is the central bank and the supreme regulatory body for the country's monetary and financial system which was established in 1971.

The present study aims at investigating the impact of monetary variables considering interest rate, inflation rate, repo rate and money supply on the performance of stock market of Bangladesh. Thus the objectives of the study are:

- To ascertain the relationship between monetary policy variables and stock market performance of Bangladesh.
- To determine the impact and consequence of various monetary policy variables on the stock market performance.

For this purpose the paper employs different econometrics techniques in analyzing statistical phenomenon of these variables. The rest of the paper proceeds as follows: section two provides a brief survey of the literature review, section three describes the data and methodology, section four shows the empirical findings with analysis. The last section of the paper provides concluding remarks along with limitations.

## **2. Review of Literature**

The existing literature provides a number of theories demonstrating the relation between stock market and economic activity proxied by different macroeconomic variables. On the basis of some asset price channels of the monetary policy transmission mechanism, it is generally agreed that restrictive monetary policy leads to lower stock prices and expansionary monetary policy leads to higher stock prices. This is strongly supported by several models like Tobin's q-theory and Modigliani's wealth effect model. Using Tobin's q theory, Tobin (1969) demonstrated that the association between money supply and stock price is positive. Modigliani (1971) and Mishkin (1977) point that lower interest rates increase stock prices which in turn leads to increased business investment. Normally, a low interest rate leads higher capital flows to the stock market in expectation for a higher rate of return where a high interest rate encourages more savings in banks and consequently reduces the flow of capital to the stock markets. Fama and Schwert (1977) found negative slope coefficients in regressions of common stock returns on Treasury-bill rates. Through monetary policy, Central bank not only influences interest rates but also inflation expectations. An unanticipated rise in inflation may lead to a decline in stock prices, as expectations of more restrictive monetary policy will increase. In fact, inflation is positively related to interest rates and negatively related to stock prices (Fama & Schwert 1979).

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To determine the effect of monetary policy on stock and bond return, Booth and Booth (1997) used two variables of monetary policy. One is discount rate and another is federal fund rate. The findings of their study show that a decrease in monthly return of both large and small bond and stock portfolio is associated with a restrictive monetary policy. Using monthly data from 1971 to 1990, Mukherjee and Naka (1995) studied the association between stock prices and macroeconomic variables including money supply, inflation, index of industrial production, exchange rate and interest rates in Tokyo Stock market. Their Vector Error Correction Model of the study suggests a positive relationship for all other variables except for inflation where interest rates were in a mixed relationship. Using cointegration test, Granger causality and Impulse response analysis Hasan and Tarij (2009) explore the long-term relationship between Pakistan equity prices and monetary variables including the money supply, foreign exchange rate, Treasury bill rate, the CPI; and the study reveals a long run relationship between the equity market and the monetary variables. A Unidirectional causality is also found from the monetary variables to the equity market. They also show that the relationship of the interest rate and the exchange rate with equity returns is negative whereas the relationship between the money supply and the equity market return is positive.

Few studies regarding the relationship of monetary variables and stock returns can be found in case of Bangladesh. Hossain and Moosarof (2006) reported that growth rate of GDP, amount of import, amount of export, amount of foreign exchange reserve, rate of inflation, volume of money supply and interest rate on advance affect the DSE index. Applying Cointegration test, Vector Error Correction Model and Granger Causality test, Imam and Amin (2004) examined the association between DSE stock index and a set of macroeconomic variables comprising money supply, GDP, interest rate, 91 day T-bill rate and Industrial production index. In the VECM test, they found that the lagged stock index was adjusted to long run equilibrium by 43.82 percent by the combined lagged influence of all the selected macroeconomic variables. The study also discovered a unidirectional causality from interest rate change to stock market return. The study of Ali and Chowdhury (2010) reveals that inflation and foreign remittance have negative influence whereas industrial production index, market P/Es and monthly percent average growth in market capitalization have positive influence on stock returns at DSE.

It is found that most of the researches on this issue have been conducted in others countries which type of research is still absent in Bangladesh. Thus the major contribution of the paper is to apply the study in an emerging market like Bangladesh. Moreover, few studies have been conducted for the economy of Bangladesh considering different macroeconomic factors as independent variables in which a very few monetary policy variables have been incorporated with those macroeconomic factors to determine the effect of those factors on stock market. It is the article that considers all monetary policy variables together to show the consequence of only those variables on stock market performance of Bangladesh.

### 3. Data & Methodologies

The study investigates the relationship between stock market performance represented by DSE General Index with others variables related to monetary policy namely money supply, repo rate, Treasury bill rate and inflation rate. The data set comprises of monthly time series data for Bangladesh over the total 79 sample

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periods of January, 2006 to July, 2012. The sources include “monthly economic trends” published by Bangladesh Bank and Dhaka Stock Exchange website.

The DSE General (DGEN) Index, the dependent variable of the study, has been chosen as the measure of stock market performance which captures the daily price movements of equities at the stock exchange. Money supply (in Crore taka) comprises of the sum of currency outside banks, demand deposits other than those of the central government, and the time, savings, and foreign currency deposits of resident sectors other than the central government i.e. M2. Inflation rate reflects change in the cost to the average consumer of acquiring a basket of goods and services over a certain period of time (Base year 1995=100). Inflation rate is announced by Bangladesh Bank on monthly basis. Repo rate is the rate at which the central bank lends short-term money to the commercial banks against securities. Finally, short-term interest rates are proxied by the three-month Treasury bill (T-Bill) rate. This money market instruments can probably capture the opportunity cost of investing in the capital market.

The structural model to estimate the relationship between stock market performance and monetary policy variables is stated below:

$$Y_t = \beta_0 + \beta_1 INF_t + \beta_2 MS_t + \beta_3 REPO_t + \beta_4 TBILL_t + \varepsilon_t$$

Where, Y is the DSE General Index (DGEN), INF is the Inflation Rate, MS is the Broad money supply i.e. M2, REPO is the Repo Rate and TBILL is the three month Treasury bill rate.

$\beta_0$  and  $\beta_i$  are the parameters known as the intercept and slope coefficient and  $\varepsilon$  is the classical random disturbance term. Data were transformed in logarithms to smoothen the data. L is added prior to each variable name to indicate the inclusion of natural logs. Thus above equation can be represented in the following linear logarithmic regression form,

$$LY_t = \beta_0 + \beta_1 LINF_t + \beta_2 LMS_t + \beta_3 LREPO_t + \beta_4 LTBILL_t + \varepsilon_t$$

In order to avoid a spurious regression situation the variables in a regression model must be stationary or co-integrated. Among different stationary tests, we followed correlogram method which is rather pictorial one showing lag wise autocorrelation coefficient and also unit root test using Augmented Dickey and Fuller (ADF) model. The null hypothesis for correlogram is that data is stationary. If P value of Q-stat is greater than 5% then we will accept the null hypothesis of stationary. On the other hand, ADF is performed by adding the lagged values of the dependent variable  $\Delta Y_t$ . The following regression is for ADF test purpose:

$$\Delta Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + \alpha_i \sum \Delta Y_{t-i} + \varepsilon_t$$

Where  $\varepsilon_t$  is a white noise error term and  $\Delta Y_{t-1} = (Y_{t-1} - Y_{t-2})$  and so on are the number of lagged difference term which is empirically determined. Using Schwarz Information Criterion (SIC) the lag length is selected automatically by E-views software. The null hypothesis of ADF test states that a variable is non-stationary

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and the null hypothesis of non-stationary is rejected if the calculated ADF statistics is less than the critical value.

Our next step is to determine whether the variables have a stable and non-spurious cointegrating relationship among themselves. For the purpose of testing Cointegration we have chosen the Johansen procedure and selected 2 as a lag order on the basis of Schwarz Bayesian Criteria (SBC). The Johansen approach of Cointegration test is based on the following Vector Autoregressive model:

$$Y_t = \phi D_t + \Pi_1 Y_{t-1} + \dots + \Pi_k Y_{t-k} + \varepsilon_t$$

Where  $D_t$  is deterministic term,  $Y_t$  is an (n x 1) vector of I (1) variables,  $\Pi_t$  is (n x n) matrix of parameters and  $\varepsilon_t$  is (n x 1) vector of white noise error.

If there is at least one cointegrating relationship among the variables, then the causal relationship among these variables can be determined by estimating the Vector Error Correction Model (VECM). The Error Correction Model (ECM) is based on following regression:

$$\Delta Y_t = \alpha + \beta \Delta X_t + \beta U_{t-1} + \varepsilon_t$$

Where U is the one period lagged value of the residual and the error correction component of the model which measures the speed at which the prior deviations from equilibrium are corrected and  $\Delta$  represents first-differences operator. The final step of our analysis is to test for causality between market index and its determinants in the long run using Granger causality test.

## 4. Analysis and Findings

### 4.1 Test for Multicollinearity

To check the existence of multicollinearity among the independent variables, a correlation analysis has been conducted. The result of the correlation analysis is reported in Table-1. As none of the correlation coefficient between independent variables is greater than 0.80; so, no multicollinearity problem amongst independent variables exists.

**Table1: Pearson Coefficient of Correlation Matrix**

	<b>LINF</b>	<b>LMS</b>	<b>LREPO</b>	<b>LTBILL</b>
<b>LINF</b>	1.000000			
<b>LMS</b>	-0.376651	1.000000		
<b>LREPO</b>	0.241053	-0.629827	1.000000	
<b>LTBILL</b>	0.700483	-0.781088	0.646124	1.000000

### 4.2 Stationarity Test

The Table-2 shows ADF test statistic used to examine the null of a unit root in the study variables.

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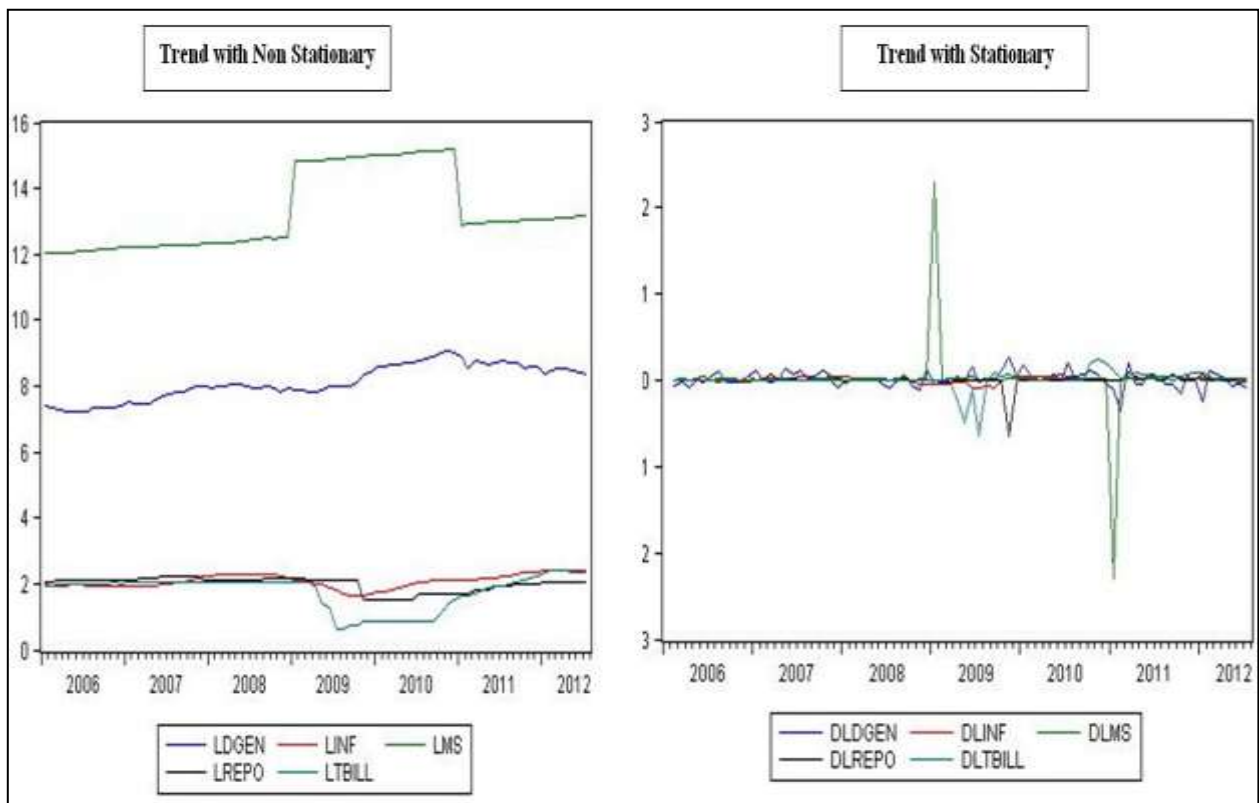
**Table2: Results of ADF test**

Variables	ADF Test Statistic		Critical Values of ADF Test		
	Level	First difference	@ Level		
LDGEN	-0.782963	-8.231711***	1%	5%	10%
LINF	-3.244554*	-----	-4.08002	-3.46845	-3.16106
LMS	-1.390686	-8.667290***	@ First Difference		
LREPO	-1.646851	-8.597180***	1%	5%	10%
LTBILL	-1.728289	-3.335084**	-3.51784	-2.89961	-2.58713

**Note:** \*\*\*, \*\* and \* indicate statistically significant at the 1%, 5% and 10% level, respectively.

The results in Table 2 show that ADF tests fail to reject the null of non-stationary for all of the variables except LINF which is stationary at level. After first differencing the result shows that LDGEN, LMS and LREPO became stationary at the 1% significance level where and LTBILL became stationary at the 5% significance level, implying that these four variables are integrated of order 1 that is I (1). The following graph shows the trends of stationarity among variables.

**Figure 1: Trend with stationary and non stationary**



In addition to ADF test, the correlogram method has also been used to test the stationarity and is shown in Appendix-2. From the figures we see that at level, the Autocorrelation (AC) functions of all the variables start at a very high value at first lag and decline very slowly and the graphic view of AC shows the same output of slow decay in the trend. After first lag, the Partial Autocorrelation (PAC) function drops dramatically and does not show spike. Moreover, the probabilities of the Q-statistics are less than 0.05, so we reject the null hypothesis of stationary implying

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that all these time series data are nonstationary at level. On the other hand, from the visual diagnostic we see that at first difference, the pattern of AC and PAC show stationary trend. As, the probabilities of the Q-statistics are more than 0.05, so we can not reject the null hypothesis of stationary implying that all these time series data are stationary at first difference. This result is confirmed by ADF test earlier.

### 4.3 The Ordinary Least Square (OLS) Regression Models

The log-transformed DGEN index and others causative factors of market index have been used in developing the OLS models. The OLS result has been presented in the following Table no 3.

**Table 3: OLS Regression results**

	<b>Coefficient</b>	<b>Std. Error</b>	<b>t-Statistic</b>	<b>P-Value</b>
C	5.638100	0.660565	8.535266	0.0000
LINF	1.906272	0.187191	10.18354	0.0000
LMS	0.116951	0.034330	3.406710	0.0011
LREPO	-1.221882	0.148903	-8.205917	0.0000
LTBILL	-0.336100	0.112382	-2.990700	0.0038
R-squared	0.853639	Mean dependent var	8.109963	
Adjusted R-squared	0.845727	S.D. dependent var	0.526015	
S.E. of regression	0.206606	Akaike info criterion	-0.254805	
Sum squared resid	3.158772	Schwarz criterion	-0.104840	
Log likelihood	15.06480	Hannan-Quinn criter.	-0.194725	
F-statistic	107.8994	Durbin-Watson stat	0.405339	
Prob(F-statistic)	0.000000			

The estimation of the equation by direct OLS gives the following equation:

$$LDGEN = 5.64 + 1.91 \text{ LINF} + 0.12 \text{ LMS} - 1.22 \text{ LREPO} - 0.34 \text{ LTBILL}$$

The slope coefficients of all the independent variables are statistically significant at 1% level. It is found that the relationship of DGEN index with inflation and money supply is positive and with repo rate and T-bill rate is negative. Moreover,  $F = 107.89$  and  $P = 0.000$  imply that the regression model significantly fits the data. Finally,  $R^2$  indicates that about 85 percent variation of LDGEN can be explained by the total variations in independent variables. But the nonstationarity of variable biased the previous estimation. With  $k=4$  and sample size of 79, the upper and lower bounds for D-W (Durbin-Watson) critical values is  $d_L=1.38$  and  $d_U= 1.59$ ; and  $d_L=1.52$  and  $d_U= 1.74$  at the 1% and 5% significant level respectively. Since our calculated DW value (0.41) is lower than 1.38 and also 1.52 at both probability levels, so there exists positive autocorrelation.

To confirm the autocorrelation problem we also followed Breusch-Godfrey Serial Correlation LM Test and presented in Table-4.

**Table 4: Breusch-Godfrey Serial Correlation LM Test**

F-statistic	133.6519	Prob. F	0.0000
Obs*R-squared	51.09317	Prob. Chi-Square(1)	0.0000

The null hypothesis of the LM test is that there is no serial correlation up to lag order  $m$ , where  $m$  is equal to 1 in this case and the Obs\*R-squared statistic is the Breusch-Godfrey LM test statistic. The result indicates that we can reject the null hypothesis of no serial auto correlation at 1% significance level. So there exist autocorrelation among the variables and the previously estimated model is a sign of spurious regression.

#### 4.4 Testing Cointegration

The next step in our empirical analysis is to test for Cointegration. To explore the number of cointegrating vectors, the study employs both trace ( $\lambda_{trace}$ ) statistics and the maximum eigenvalue ( $\lambda_{max}$ ) statistics. The results of Trace statistics and Maximum Eigenvalue are shown in Table-5. The result shows that the null hypothesis of no cointegrating relationship can be rejected at the five percent level and the study concludes that there exists a relationship among the proposed variables.

**Table 5: Unrestricted Cointegration Rank Test**

Hypothesized	Eigen value	Trace Statistic	0.05 Critical Value	Prob.*	Max-Eigen Statistic	0.05 Critical Value	P-value**
No. of CE(s)				*			
None *	0.48130 5	113.769 6	69.81889	0.000 0	49.8894 2	33.87687	0.0003
At most 1 *	0.42656 6	63.8802 2	47.85613	0.000 8	42.2644 9	27.58434	0.0003
At most 2	0.16831 2	21.6157 3	29.79707	0.320 4	14.0066 3	21.13162	0.3645
At most 3	0.06275 7	7.60909 8	15.49471	0.508 1	4.92579 1	14.26460	0.7512
At most 4	0.03469 1	2.68330 8	3.841466	0.101 4	2.68330 8	3.841466	0.1014

Trace test and Max-eigenvalue test both indicate 2 cointegrating eqn(s) at the 0.05 level

\*\*MacKinnon-Haug-Michelis (1999) p-values

\* denotes rejection of the hypothesis at the 0.05 level

The Trace statistic and Maximal Eigen statistic both identified two cointegrating vectors. After normalization the cointegrating vector on LDGEN, normalized cointegrating coefficients were estimated as reported in Table-6.

**Table 6: Normalized cointegrating coefficients**

LDGEN	LINF	LMS	LREPO	LTBILL
1.000000	-1.693524	-0.384513	2.370764	-1.098904
<b>Std. Error</b>	0.40062	0.09153	0.47132	0.24730
<b>t-value</b>	-4.22726	-4.20095	5.03005	-4.44361
<b>P- value</b>	0.024213**	0.02462**	0.01514**	0.02119**

Note: \*\* indicates statistically significant at the 5% level



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The above signs of coefficients are reversed because of the normalization process. The estimation of the equation by Cointegration gives the following one:

$$\text{LDGEN} = 1.69 \text{ LINF} + 0.38 \text{ LMS} - 2.37 \text{ LREPO} + 1.09 \text{ LTBILL}$$

This clearly shows that in the long run inflation, money supply and T-bill rate have a positive impact on market index. On the other hand, in the long run repo rate has a negative impact on market index. The relationship between market index and all others independent variables are found statistically significant at the 5% level. The result is implying that in Bangladesh, a one percent increase in inflation, in money supply, in repo rate and in T-bill rate contributes 1.69 % increase, 0.38 % increase, 2.37 % decrease and 1.09 % increase in market index respectively.

### 4.5 Error Correction Model

In order to find the short run relationships among the variables, vector error correction mechanism has been applied. The results of VECM were shown in Table-7.

**Table 7: Error Correction Model**

Variable	Coefficient	Standard Error	t-Statistic	P-value
ECM <sub>t-1</sub>	-0.263439	0.08035	-3.27868	0.0818*
Δ LDGEN(-1)	-0.141740	0.11894	-1.19167	0.3556
Δ LINF(-1)	0.827609	0.39432	2.09884	0.1707
Δ LMS(-1)	0.078706	0.02918	2.69685	0.1143
Δ LREPO(-1)	-0.056598	0.12407	-0.45617	0.6930
Δ LTBILL(-1)	-0.125666	0.09501	-1.32266	0.3169
<b>C</b>	0.010142	0.00967	1.04855	0.4044
R-squared	0.255667			
Adj. R-squared	0.180155			
Akaike AIC	-2.056146			
F-statistic	3.385784			
Prob(F-statistic)	0.069614			

**Note:** \*\* indicates statistically significant at the 10% level

The estimated error correction coefficient indicates that 26.34 percent deviation of the DGEN index from its long run equilibrium level is corrected each period in the short run. The result imply that in the short run the association of DGEN index with inflation and money supply is positive and with repo rate and T-bill rate is negative, although they are not statistically significant in all equations.

### 4.6 Granger Causality Test

We carry out granger causality tests pairwise on series LDGEN, LINF, LMS, LREPO, and LTBILL with lag length 2.

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**Table 8: Granger Causality Test**

Null Hypothesis	F-Statistic	P-Value	Granger Causality
LINF does not Granger Cause LDGEN	4.80490	0.0110**	Yes
LDGEN does not Granger Cause LINF	0.78200	0.4613	No
LMS does not Granger Cause LDGEN	5.74208	0.0049***	Yes
LDGEN does not Granger Cause LMS	1.36195	0.2627	No
LREPO does not Granger Cause LDGEN	0.98333	0.3790	No
LDGEN does not Granger Cause LREPO	1.96189	0.1480	No
LTBILL does not Granger Cause LDGEN	5.90975	0.0042***	Yes
LDGEN does not Granger Cause LTBILL	1.66264	0.1968	No

**Note:** i) No. of Obs. =77 ii) \*\*\*, \*\* and \* indicate statistically significant at the 1%, 5% and 10% level respectively.

Granger-causality results suggest that the null hypotheses that LINF does not Granger cause LDGEN is rejected at 5% significance level; and LMS does not Granger cause LDGEN and LTBILL does not Granger cause LDGEN both are rejected at 1 % significance level which means there is a uni-directional causality running from inflation to DGEN index, money supply to DGEN index and T-bill to DGEN index. Finally, there is no causality exist in either direction between repo rate and DGEN index.

## 5. Conclusion

This study attempts to analyze the impact of different monetary variables on the performance of stock market of Bangladesh for the last few periods using different econometric frameworks. The results of the analysis reveal that money supply, inflation and T-bill rate have a positive where repo rate has a negative impact on the market index. The coefficients of all the explanatory variables are found statistically significant at the 5% level. In the short run, the coefficient of error correction term suggesting 26.34 percent monthly adjustment towards long run equilibrium. Evidence from Granger causality analysis suggests the existence of unidirectional causality from inflation to market index, money supply to market index and T-bill to market index.

As there are no such papers for the country of Bangladesh, so the study fails to compare the findings of this study with those of other studies for the same country. Besides, stock market of Bangladesh is believed to be affected more by investors' psychological behaviour than the others factors. The study did not incorporate this issue in analyzing the causal relationship between the study variables. However, the study could be more rigorous if the longer time periods could be used. The study can be proceed further by using longer time periods and the results can be compared to the other countries of the same region as well as developed countries which is left for future research.

This paper attempts to contribute empirically to the ongoing debate on the effect of monetary policy on stock market performance. At the policy level, the findings of the study need to be considered properly as it provides some insights of the effectiveness and consequence of monetary policy on the market performance. As monetary target variables like money supply , inflation and interest rate have significant bearing on the long run movement of stock prices , therefore policy

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holders especially Bangladesh Bank shall give due consideration on the prospective consequences of such monetary targets variables on stock market movement. This implies that proper coordination between capital market and money market regulators are of paramount matter in order to properly integrate their policies for achieving economic sustainability.

### References

- Ali, MB & Chowdhury, TA 2010, 'Effect of Dividend on Stock Price in Emerging Stock Market: A Study on the Listed Private Commercial Banks in DSE', *International Journal of Economics and Finance*, vol. 2, no. 4, pp. 52-64.
- Booth, J & Booth, L 1997, 'Economic factors, monetary policy, and expected returns on stocks and bonds', *Federal Reserve Bank of San Francisco, Economic Review*, no.2, pp. 32-42.
- Fama, EF & Schwert, GW 1977, 'Asset returns and inflation', *Journal of Financial Economics*, vol. 5, pp. 115-46.
- Fama, EF & Schwert, GW 1979, 'Inflation, Interest, and Relative Prices', *Journal of Business*, vol. 52, pp. 183-209.
- Hasan, A & Tarij, JM 2009, 'An Empirical Investigation of the Causal Relationship among Monetary Variables and Equity Market Returns', *The Lahore Journal of Economics*, vol.14, no.1, pp. 115-137.
- Hossain, H & Mosarof, M 2006, 'Empirical evidence from determinants of stock price and return on Dhaka Stock Exchange', *Journal of finance and Banking*, vol.8, no.1 & 2, pp.111-132.
- Imam, MO & Amin, ASMM 2004, 'Volatility in the stock Return: Evidence from Dhaka Stock Exchange', *Journal of the Institute of Bankers Bangladesh*, vol. 51, no.1, pp. 01-08.
- Mishkin, F 1977, 'What Depressed the Consumer? The Household Balance Sheet and the 1973-1975 Recession', *Brookings Papers on Economic Activity*, vol. 1, pp. 123-164.
- Modigliani, F 1971, 'Monetary policy and consumption: linkages via interest rate and wealth effects in the FMP model', In: Federal Reserve Bank of Boston, Consumer Spending and Monetary Policy: the Linkages, Conference Series, 1971 June, no. 5, pp. 9-84.
- Mukherjee, TK & Naka, A 1995, 'Dynamic Relations between Macroeconomic Variables and the Japanese Stock Market: An Application of Vector Error Correction Model', *The Journal of Financial Research*, vol. XVIII, no. 2, pp. 223-237.
- Tobin, J 1969, 'A general equilibrium approach to monetary theory', *Journal of Money, Credit, and Banking*, vol. 1, pp. 15-29.

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### Appendix-1: Summary statistics of the study variables

	DGEN Index	Inflation Rate	Money Supply	REPO Rate	T-BILL Rate
Mean	3796.881	8.141013	1210985.	7.582278	6.550000
Median	3010.260	8.100000	421461.5	8.500000	7.550000
Maximum	8602.440	10.96000	3992790.	9.250000	11.40000
Minimum	1339.530	5.110000	165425.2	4.500000	1.860000
Std. Dev.	1927.505	1.595251	1409452.	1.495035	2.612999
Skewness	0.600868	0.117844	0.912443	-0.963295	-0.396275
Kurtosis	2.304216	2.061698	1.965282	2.536328	2.449780
Jarque-Bera	6.347280	3.080869	14.48614	12.92552	3.064139
Probability	0.041851	0.214288	0.000715	0.001560	0.216088
Sum	299953.6	643.1400	95667802	599.0000	517.4500
Sum Sq. Dev.	2.90E+08	198.4963	1.55E+14	174.3402	532.5654
Observations	79	79	79	79	79

### Appendix-2: Stationary Test-The Correlogram Method

Fig: The correlogram of LDGEN @ Level						Fig: The correlogram of LDGEN @ First Difference							
Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob	Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob		
. *****	*****	1	0.972	0.972	77.559	0.000	-.	-.	1	0.046	0.046	0.1739	0.677
*****	. .	2	0.939	-0.110	150.89	0.000	-.	-.	2	0.044	0.042	0.3315	0.847
*****	. .	3	0.903	-0.067	219.59	0.000	-.	-.	3	0.044	0.041	0.4949	0.920
*****	. .	4	0.861	-0.118	282.89	0.000	-.	-.	4	0.043	0.038	0.6525	0.957
*****	-.	5	0.817	-0.040	340.67	0.000	-.	-.	5	0.071	0.065	1.0874	0.955
*****	-.	6	0.771	-0.060	392.79	0.000	-.	-.	6	0.058	0.048	1.3829	0.967
*****	-.	7	0.725	0.002	439.52	0.000	-.	-.	7	0.008	-0.005	1.3881	0.986
*****	-.	8	0.680	-0.011	481.18	0.000	-.	-.	8	0.130	0.121	2.9036	0.940
*****	. .	9	0.629	-0.119	517.36	0.000	-.	-.	9	0.082	0.066	3.5180	0.940
*****	. .	10	0.576	-0.080	548.10	0.000	-.	-.	10	-0.017	-0.040	3.5447	0.968
*****	. .	11	0.520	-0.067	573.53	0.000	-.	-.	11	0.174	0.161	6.3488	0.849
*****	. .	12	0.459	-0.107	593.68	0.000	-.	-.	12	-0.169	-0.206	9.0552	0.698
*****	-.	13	0.406	0.129	609.68	0.000	-.	-.	13	-0.184	-0.214	12.320	0.502
*****	-.	14	0.358	0.060	622.31	0.000	-.	-.	14	-0.090	-0.104	13.110	0.518
*****	-.	15	0.312	-0.005	632.05	0.000	-.	-.	15	-0.243	-0.278	18.979	0.215
*****	-.	16	0.272	0.034	639.55	0.000	-.	-.	16	-0.047	-0.070	19.201	0.258
*****	-.	17	0.236	0.029	645.29	0.000	-.	-.	17	0.007	0.023	19.207	0.317
*****	-.	18	0.204	0.005	649.63	0.000	-.	-.	18	-0.113	-0.072	20.529	0.304
*****	-.	19	0.173	-0.005	652.84	0.000	-.	-.	19	-0.025	0.010	20.594	0.360
*****	-.	20	0.143	-0.027	655.07	0.000	-.	-.	20	-0.148	-0.086	22.958	0.291
*****	-.	21	0.117	0.030	656.59	0.000	-.	-.	21	-0.050	0.089	23.227	0.332
*****	-.	22	0.097	0.035	657.64	0.000	-.	-.	22	-0.118	-0.081	24.714	0.311
*****	-.	23	0.082	0.051	658.40	0.000	-.	-.	23	-0.040	0.146	24.898	0.356
*****	-.	24	0.068	-0.063	658.94	0.000	-.	-.	24	-0.073	0.076	25.510	0.378
*****	-.	25	0.055	-0.048	659.30	0.000	-.	-.	25	0.111	0.138	26.960	0.358
*****	-.	26	0.039	-0.111	659.49	0.000	-.	-.	26	-0.155	-0.090	29.859	0.273
*****	-.	27	0.028	0.064	659.58	0.000	-.	-.	27	0.145	0.115	32.443	0.216
*****	-.	28	0.014	-0.086	659.61	0.000	-.	-.	28	0.034	-0.079	32.588	0.251
*****	-.	29	-0.001	0.008	659.61	0.000	-.	-.	29	0.024	0.013	32.664	0.292
*****	-.	30	-0.018	-0.091	659.65	0.000	-.	-.	30	0.099	0.036	33.936	0.283
*****	-.	31	-0.042	-0.135	659.69	0.000	-.	-.	31	0.016	0.000	33.970	0.326
*****	-.	32	-0.064	-0.021	660.45	0.000	-.	-.	32	-0.013	-0.131	33.992	0.372

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**Fig: The correlogram of LMS @ Level**

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob	
. *****	*****	1	0.945	0.945	73.242	0.000
. *****	.. ..	2	0.890	-0.029	139.03	0.000
. *****	.. ..	3	0.835	-0.026	197.71	0.000
. *****	.. ..	4	0.781	-0.025	249.69	0.000
. *****	.. ..	5	0.726	-0.035	295.23	0.000
. *****	.. ..	6	0.671	-0.028	334.72	0.000
. ****	.. ..	7	0.616	-0.035	368.50	0.000
. ****	.. ..	8	0.562	-0.033	396.96	0.000
. ****	.. ..	9	0.507	-0.040	420.44	0.000
. ***	.. ..	10	0.452	-0.032	439.41	0.000
. ***	.. ..	11	0.397	-0.043	454.25	0.000
. **	.. ..	12	0.343	-0.033	465.45	0.000
. **	.. ..	13	0.288	-0.041	473.49	0.000
. **	.. ..	14	0.233	-0.049	478.82	0.000
. *	.. ..	15	0.178	-0.039	481.99	0.000
. *	.. ..	16	0.123	-0.051	483.52	0.000
. ..	.. ..	17	0.068	-0.048	483.99	0.000
. ..	.. ..	18	0.013	-0.047	484.00	0.000
. ..	.. ..	19	-0.041	-0.049	484.19	0.000
. ..	.. ..	20	-0.094	-0.042	485.14	0.000
. ..	.. ..	21	-0.147	-0.060	487.52	0.000
. ..	.. ..	22	-0.200	-0.064	492.00	0.000
** ..	.. ..	23	-0.253	-0.070	499.33	0.000
** ..	.. ..	24	-0.306	-0.070	510.25	0.000
** ..	.. ..	25	-0.312	0.388	521.79	0.000
** ..	.. ..	26	-0.319	-0.041	534.04	0.000
** ..	.. ..	27	-0.325	-0.034	547.06	0.000
** ..	.. ..	28	-0.333	-0.042	560.97	0.000
** ..	.. ..	29	-0.340	-0.035	575.79	0.000
*** ..	.. ..	30	-0.348	-0.033	591.59	0.000
*** ..	.. ..	31	-0.355	-0.041	608.43	0.000

**Fig: The correlogram of LMS @ First Difference**

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob	
. ..	.. ..	1	-0.001	-0.001	5 E-05	0.994
. ..	.. ..	2	-0.004	-0.004	0.0014	0.999
. ..	.. ..	3	-0.005	-0.005	0.0038	1.000
. ..	.. ..	4	0.006	0.006	0.0068	1.000
. ..	.. ..	5	-0.000	-0.000	0.0068	1.000
. ..	.. ..	6	0.001	0.001	0.0070	1.000
. ..	.. ..	7	-0.001	-0.001	0.0072	1.000
. ..	.. ..	8	0.005	0.005	0.0098	1.000
. ..	.. ..	9	-0.004	-0.004	0.0111	1.000
. ..	.. ..	10	0.005	0.005	0.0139	1.000
. ..	.. ..	11	-0.003	-0.003	0.0149	1.000
. ..	.. ..	12	-0.002	-0.002	0.0152	1.000
. ..	.. ..	13	0.006	0.006	0.0187	1.000
. ..	.. ..	14	-0.007	-0.007	0.0228	1.000
. ..	.. ..	15	0.004	0.004	0.0247	1.000
. ..	.. ..	16	-0.001	-0.001	0.0247	1.000
. ..	.. ..	17	-0.003	-0.003	0.0254	1.000
. ..	.. ..	18	-0.007	-0.007	0.0306	1.000
. ..	.. ..	19	0.001	0.001	0.0307	1.000
. ..	.. ..	20	-0.000	-0.000	0.0307	1.000
. ..	.. ..	21	-0.001	-0.001	0.0308	1.000
. ..	.. ..	22	0.000	0.001	0.0308	1.000
. ..	.. ..	23	-0.002	-0.002	0.0311	1.000
**** ..	**** ..	24	-0.505	-0.505	29.470	0.203
. ..	.. ..	25	0.006	0.006	29.474	0.245
. ..	.. ..	26	-0.000	-0.006	29.474	0.290
. ..	.. ..	27	0.008	0.003	29.481	0.338
. ..	.. ..	28	-0.007	-0.001	29.487	0.388
. ..	.. ..	29	0.002	0.002	29.487	0.440
. ..	.. ..	30	-0.002	-0.004	29.488	0.482
. ..	.. ..	31	0.004	0.003	29.490	0.544
. ..	.. ..	32	-0.004	0.002	29.493	0.594

**Fig: The correlogram of LINF @ Level**

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob	
. *****	*****	1	0.972	0.972	77.575	0.000
. *****	**** ..	2	0.917	-0.518	147.51	0.000
. *****	** ..	3	0.840	-0.253	206.97	0.000
. *****	* ..	4	0.746	-0.141	254.50	0.000
. *****	* ..	5	0.641	-0.075	290.00	0.000
. *****	* ..	6	0.526	-0.084	314.27	0.000
. ****	* ..	7	0.406	-0.095	328.88	0.000
. ****	.. ..	8	0.282	-0.057	336.07	0.000
. ****	.. ..	9	0.160	-0.043	338.41	0.000
. ..	.. ..	10	0.044	0.025	338.58	0.000
. ..	.. ..	11	-0.064	-0.006	338.97	0.000
. ..	.. ..	12	-0.160	0.018	341.41	0.000
** ..	.. ..	13	-0.242	0.007	347.09	0.000
** ..	* ..	14	-0.312	-0.066	356.66	0.000
*** ..	* ..	15	-0.372	-0.133	370.50	0.000
*** ..	* ..	16	-0.424	-0.096	388.74	0.000
*** ..	* ..	17	-0.467	-0.081	411.29	0.000
**** ..	.. ..	18	-0.502	-0.039	437.75	0.000
**** ..	.. ..	19	-0.527	-0.009	467.37	0.000
**** ..	.. ..	20	-0.542	-0.025	499.23	0.000
**** ..	.. ..	21	-0.548	-0.025	532.34	0.000
**** ..	.. ..	22	-0.545	-0.024	565.73	0.000
**** ..	.. ..	23	-0.534	0.002	598.36	0.000
**** ..	.. ..	24	-0.513	0.058	629.00	0.000
**** ..	.. ..	25	-0.482	0.016	656.51	0.000
**** ..	.. ..	26	-0.440	0.013	679.92	0.000
**** ..	.. ..	27	-0.388	0.057	698.40	0.000
**** ..	* ..	28	-0.328	-0.086	711.93	0.000
** ..	.. ..	29	-0.264	-0.013	720.84	0.000
* ..	.. ..	30	-0.194	0.045	725.74	0.000
* ..	.. ..	31	-0.120	0.028	727.66	0.000
. ..	.. ..	32	-0.045	0.015	727.93	0.000

**Fig: The correlogram of LINF @ First Difference**

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob	
. *	*	1	0.093	0.093	0.6960	0.404
. ..	.. ..	2	-0.040	-0.049	0.8228	0.663
. *	*	3	0.093	0.102	1.5308	0.675
** ..	** ..	4	-0.247	-0.275	6.6338	0.157
* ..	.. ..	5	-0.070	0.000	7.0459	0.217
. ..	.. ..	6	0.048	0.017	7.2440	0.299
. ..	.. ..	7	0.025	0.078	7.2977	0.399
. *	*	8	0.181	0.105	9.5889	0.295
* ..	** ..	9	-0.149	-0.229	11.587	0.238
. ..	.. ..	10	0.039	0.128	11.724	0.304
. ..	** ..	11	-0.155	-0.252	13.940	0.236
**** ..	**** ..	12	-0.539	-0.438	41.163	0.000
. *	*	13	0.114	0.191	42.403	0.000
. *	.. ..	14	0.075	0.022	42.945	0.000
. ..	.. ..	15	-0.033	0.019	43.053	0.000
. *	* ..	16	0.208	-0.080	47.371	0.000
. *	*	17	0.075	0.157	47.937	0.000
. *	* ..	18	-0.124	-0.145	49.633	0.000
. ..	.. ..	19	-0.058	-0.020	49.891	0.000
* ..	* ..	20	-0.141	-0.107	51.999	0.000
. *	*	21	0.106	0.063	53.210	0.000
. ..	.. ..	22	-0.025	-0.014	53.278	0.000
. ..	* ..	23	0.071	-0.165	53.850	0.000
. ..	** ..	24	0.042	-0.329	54.054	0.000
* ..	*	25	-0.147	0.132	56.582	0.000
. ..	.. ..	26	-0.034	0.088	56.720	0.000
. *	*	27	0.083	0.025	57.557	0.001
* ..	* ..	28	-0.114	-0.111	59.170	0.001
. ..	.. ..	29	0.001	0.024	59.170	0.001
. ..	* ..	30	0.051	-0.103	59.505	0.001
. ..	.. ..	31	0.031	-0.020	59.631	0.001
. ..	.. ..	32	0.071	-0.023	60.315	0.002

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**Fig: The correlogram of LREPO @ Level**

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob	
*****	*****	1	0.938	0.938	72.170	0.000
*****	. .	2	0.875	-0.039	135.79	0.000
*****	. .	3	0.810	-0.047	191.08	0.000
*****	. .	4	0.742	-0.064	238.09	0.000
*****	. .	5	0.672	-0.054	277.20	0.000
*****	. .	6	0.602	-0.047	308.95	0.000
****	. .	7	0.531	-0.050	333.97	0.000
****	. .	8	0.459	-0.050	352.92	0.000
****	. .	9	0.410	0.147	368.28	0.000
****	. .	10	0.360	-0.045	380.32	0.000
***	. .	11	0.309	-0.058	389.28	0.000
***	. .	12	0.254	-0.078	395.45	0.000
**	. .	13	0.199	-0.053	399.28	0.000
**	. .	14	0.144	-0.050	401.32	0.000
**	. .	15	0.089	-0.043	402.11	0.000
. .	. .	16	0.034	-0.062	402.23	0.000
. .	. .	17	-0.006	0.124	402.23	0.000
. .	. .	18	-0.039	0.016	402.39	0.000
. .	. .	19	-0.075	-0.085	402.99	0.000
. .	. .	20	-0.099	0.047	404.04	0.000
. .	. .	21	-0.122	-0.050	405.68	0.000
. .	. .	22	-0.145	-0.041	408.03	0.000
. .	. .	23	-0.157	0.044	410.85	0.000
. .	. .	24	-0.182	-0.157	414.68	0.000
. .	. .	25	-0.205	0.026	419.67	0.000
**	. .	26	-0.226	0.001	425.83	0.000
**	. .	27	-0.236	0.026	432.70	0.000
**	. .	28	-0.246	0.002	440.28	0.000
**	. .	29	-0.256	-0.053	448.64	0.000
**	. .	30	-0.261	-0.009	457.55	0.000
**	. .	31	-0.267	-0.008	467.04	0.000
**	. .	32	-0.269	-0.064	476.87	0.000

**Fig: The correlogram of LREPO @ First Difference**

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob	
. .	. .	1	0.007	0.007	0.0043	0.948
. .	. .	2	0.008	0.008	0.0100	0.995
. .	. .	3	0.028	0.028	0.0770	0.994
. .	. .	4	0.010	0.009	0.0950	0.999
. .	. .	5	0.006	0.005	0.0881	1.000
. .	. .	6	0.006	0.005	0.0914	1.000
. .	. .	7	0.010	0.010	0.1011	1.000
. .	. .	8	-0.190	-0.190	3.3057	0.914
. .	. .	9	0.007	0.010	3.3106	0.951
. .	. .	10	0.015	0.018	3.3323	0.972
. .	. .	11	0.032	0.043	3.4259	0.984
. .	. .	12	0.003	0.006	3.4270	0.992
. .	. .	13	0.001	0.002	3.4272	0.996
. .	. .	14	-0.009	-0.010	3.4347	0.998
. .	. .	15	0.008	0.011	3.4413	0.999
. .	. .	16	-0.127	-0.171	5.0560	0.995
. .	. .	17	-0.054	-0.052	5.3550	0.997
. .	. .	18	0.031	0.042	5.4526	0.998
. .	. .	19	-0.107	-0.087	6.6580	0.996
. .	. .	20	-0.000	0.008	6.6580	0.998
. .	. .	21	-0.007	-0.002	6.6641	0.999
. .	. .	22	-0.082	-0.086	7.4188	0.998
. .	. .	23	0.111	0.133	8.8093	0.997
. .	. .	24	-0.009	-0.075	8.8187	0.998
. .	. .	25	-0.003	-0.022	8.8197	0.999
. .	. .	26	-0.088	-0.071	9.7522	0.998
. .	. .	27	-0.005	-0.038	9.7555	0.999
. .	. .	28	0.001	0.013	9.7557	0.999
. .	. .	29	-0.037	-0.032	9.9257	1.000
. .	. .	30	0.002	-0.034	9.9263	1.000
. .	. .	31	-0.033	0.033	10.072	1.000
. .	. .	32	-0.076	-0.121	10.849	1.000

**Fig: The correlogram of LTBILL @ Level**

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob	
*****	*****	1	0.967	0.967	76.887	0.000
*****	** .	2	0.915	-0.305	146.24	0.000
*****	** .	3	0.844	-0.264	206.20	0.000
*****	. .	4	0.765	-0.035	256.16	0.000
*****	. .	5	0.688	0.078	297.12	0.000
*****	. .	6	0.609	-0.084	329.67	0.000
*****	. .	7	0.531	-0.074	354.73	0.000
****	. .	8	0.453	-0.032	373.25	0.000
****	. .	9	0.376	-0.041	386.17	0.000
****	. .	10	0.299	-0.075	394.43	0.000
****	. .	11	0.221	-0.074	399.01	0.000
. .	. .	12	0.141	-0.077	400.92	0.000
. .	. .	13	0.060	-0.093	401.27	0.000
. .	. .	14	-0.024	-0.118	401.33	0.000
. .	. .	15	-0.110	-0.109	402.54	0.000
. .	. .	16	-0.192	0.036	406.27	0.000
**	. .	17	-0.263	0.053	413.43	0.000
**	. .	18	-0.323	0.015	424.36	0.000
***	. .	19	-0.371	-0.034	439.02	0.000
***	. .	20	-0.408	-0.000	457.08	0.000
***	. .	21	-0.434	0.046	477.84	0.000
***	. .	22	-0.448	0.039	500.38	0.000
***	. .	23	-0.453	-0.005	523.81	0.000
***	. .	24	-0.454	-0.090	547.81	0.000
***	. .	25	-0.452	-0.031	572.01	0.000
***	. .	26	-0.447	0.001	596.13	0.000
***	. .	27	-0.439	-0.018	619.88	0.000
***	. .	28	-0.429	-0.042	642.97	0.000
***	. .	29	-0.415	-0.026	665.05	0.000
***	. .	30	-0.398	-0.027	685.69	0.000
***	. .	31	-0.374	-0.006	704.38	0.000
***	. .	32	-0.346	-0.014	720.72	0.000

**Fig: The correlogram of LTBILL @ First Difference**

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob	
. .	. .	1	0.430	0.430	14.958	0.000
. .	. .	2	0.432	0.304	30.287	0.000
. .	. .	3	0.177	-0.112	32.893	0.000
. .	. .	4	-0.027	-0.251	32.954	0.000
. .	. .	5	0.036	0.131	33.064	0.000
. .	. .	6	0.022	0.156	33.104	0.000
. .	. .	7	0.052	-0.017	33.339	0.000
. .	. .	8	0.050	-0.093	33.560	0.000
. .	. .	9	0.054	0.044	33.824	0.000
. .	. .	10	0.047	0.075	34.027	0.000
. .	. .	11	0.060	0.027	34.361	0.000
. .	. .	12	0.078	0.008	34.930	0.000
. .	. .	13	0.098	0.052	35.852	0.001
. .	. .	14	0.091	0.024	36.668	0.001
. .	. .	15	-0.068	-0.238	37.133	0.001
. .	. .	16	-0.153	-0.194	39.475	0.001
**	. .	17	-0.251	-0.028	45.927	0.000
**	. .	18	-0.239	0.069	51.868	0.000
. .	. .	19	-0.166	-0.018	54.781	0.000
. .	. .	20	-0.113	-0.086	56.160	0.000
. .	. .	21	-0.086	-0.065	56.964	0.000
. .	. .	22	-0.074	0.018	57.576	0.000
. .	. .	23	-0.076	0.017	58.235	0.000
. .	. .	24	-0.072	-0.019	58.831	0.000
. .	. .	25	-0.054	-0.005	59.176	0.000
. .	. .	26	-0.039	0.021	59.362	0.000
. .	. .	27	-0.049	-0.035	59.651	0.000
. .	. .	28	-0.070	-0.060	60.264	0.000
. .	. .	29	-0.085	0.038	61.185	0.000
. .	. .	30	-0.122	0.021	63.119	0.000
. .	. .	31	-0.090	-0.007	64.183	0.000
. .	. .	32	-0.070	-0.072	64.852	0.001