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Md. Mohiuddin, Md. Didarul Alam and Abdullah Ibneyy Shahid

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Authors

Md. Mohiuddin

Lecturer, Institute of Business Administration
University of Dhaka
Dhaka 1000
Phone:9661920 Ext.8376 (Off)
Mobile01552441240
E-mail:mohiuddiniba@yahoo.com

Md. Didarul Alam

Student of BBA Program
Independent University, Bangladesh

Abdullah Ibneyy Shahid

Student of MBA Program
Institute of Business Administration
University of Dhaka

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ABSTRACT

Literature strongly supports vibration of the stock price as a consequence of various macroeconomic factors (Darrat, 1990; Fama & Schwert, 1977; Jaffe & Mandelker, 1976; Nelson, 1976; Pearce & Roley, 1985; Ripley, 1973). This study has investigated the explanatory power of various macro-factors such as inflation rate, exchange rate, interest rate, money supply and production index on the variability of the stock price in Bangladesh. Multiple regression analysis has been conducted to assess the relationship between the stated macro economic factors with stock price. All share price index of the Dhaka Stock Exchange has been used as a proxy for stock price, the dependent variable of the study. No significant relationship has been found between the stock price and any of the macroeconomic factors. The study bodes well for advanced empirical models with additional macroeconomic variables.

1. INTRODUCTION

Government alone can not provide all the funds needed for the industrial development especially in a developing country like Bangladesh. The private sector plays a vital role to accumulate the necessary fund as well. In such accumulation, stock exchange plays a sine qua non in mopping up the necessary idle money of the savers to make a strong industrial base. Sachdeva (1994) stated "The importance of stock exchanges may very well be gauged from the fact that it is a major institution not only in a capitalist economy but also in a socialistic economy. Even the former Union of Soviet Socialist Republics (USSR) acknowledged the vital role of stock exchanges in the development of its economy." Chen, Roll, and Ross (1986) asserted, "A rather embarrassing gap exists between the theoretically exclusive importance of systematic "state variables" and our complete ignorance

of their identity. The co-movements of asset prices suggest the presence of underlying exogenous influences, but we have not yet determined which economic variable, if any, are responsible". Securities affected by such undiversifiable risk factors should then earn risk premium in a risk-averse economy (Ross, 1976). Also, Flannery and Propapadakis (2002) stated that macroeconomic variables are excellent candidates for these extra market risk factors, because macro changes simultaneously affect many firms' cash flows and may influence the risk-adjusted discount rate. Economic conditions may also influence the number and types of real investment opportunities. Moreover, Yasaswy (1994) states, "to gain an insight into the complexities of the stock, one needs to develop a sound economic understanding and be able to interpret the impact of important economic indicators on stock markets"

Pearce and Roley (1985) found that there is significant relationships exist between the money supply and stock market price. Weak support has been found relationship between the stock market price and inflation rate, index of production. This paper extends this research by adding two other macro-variables such as interest rate and exchange rate in context of Bangladesh Economy. Hence, the objective of the study is to find out the significant relationship between the stock market index and macroeconomic factors, if there is any.

2. REVIEW OF THE RELATED LITERATURE

2.1 Money Supply, Interest Rate, Inflation Rate, Exchange Rate, and Stock Market Return, and Index of Production

Ahuja (2004) states, "By money supply we mean the total stock of monetary media of exchange available to a society for use in connection with the economic activity of the country". According to the standard concept of money supply, it is composed of two elements (1) currency with the public and (2) demand deposit with the public." Mankiw (2000) defines interest rate as, "the market price at which resources are transferred between the present and the future". He further adds that interest rate is the return of saving and the cost of borrowing. Also, Mankiw (2000) defines inflation rate as, "an increase in the overall level of prices." Exchange rate has been concisely defined by Gordon (1993) as, "the

exchange rate is the price of foreign currency." Stock market return can be defined in this paper by following Pearce and Roley (1985). They calculated the stock market return by taking the daily percentage changes in an index of closing stock prices. The definition of index of production can be drawn from Anderson, Sweeney, and Williams (2002) who state that Index of industrial production is a quantity index that is designed to measure changes in the physical volume or production levels of industrial goods over time.

2.2 Relationship between the Dependent and Independent Variables

A number of evidences exist as to the relationship between the stock market index and various macroeconomic variables.

Ripley (1973) found in 19 developed countries that stock prices were affected by interest rate movements and that the equalization of national interest rates will result in co variation between national stock price indices. Jaffe and Mandelker (1976) and Nelson (1976) added newer perspectives by asserting a negative relationship between the stock market rates of return and expected inflation.

Fama and Schwert (1977) showed that a direct, negative effect could emerge if a positive surprise in announced inflation induces agents to raise their level of expected inflation. The finding is still in dispute. Modigliani and Cohn (1979) argued that investors incorrectly use inflation-swelled nominal interest rates to capitalize corporate earnings. Feldstein (1980) and Summers (1981), on the other hand, asserted that the tax treatment of depreciation charges and inventory changes results in inflation, reducing real after-tax corporate profits and hence lowering stock prices. They also added that unexpectedly high inflation might lead to more restrictive policies, which in turn would lead to reduced cash flows for firms and lower stock prices.

Fama and Schwert (1977) also found negative slope coefficients in regressions of common stock returns on Treasury-bill rates. Chawla and Srinivasan (1980) found that money supply and interest rate bear correct and significant relation in explaining the variations in security prices. Impact of money supply on security price was stable across seasons.

Pearce and Roley (1983) asserted that stock prices respond only to the unanticipated change in the money supply as predicted by the efficient markets hypothesis. They further argued

that an unanticipated increase in the announced money supply depresses stock prices while an unanticipated decrease elevates stock prices. They also added that the stock price response does not depend on the relationship of the money supply to the long run and the stock price response is essentially complete early in the subsequent trading day.

In a later study, Pearce and Roley (1985) again examined the daily response of stock prices to announcements of the narrowly defined money stock, the consumer price index, the producer price index, the unemployment rate, industrial production and the Federal Reserve's discount rate. Except for the discount rate, survey data on market participant's expectations of these announcements were used to identify the unexpected component of the announcement in order to test the efficient market hypothesis that only the unexpected part of any announcement, the surprise, moves stock prices. The empirical results supported this hypothesis and indicated further that surprises related to monetary policy significantly affect stock prices.

Chen, Roll, and Ross (1986) found in the US market that several macroeconomic variables, most notably, industrial production, changes in the risk premium, twists in the yield curve, and somewhat more weakly, measures of unanticipated inflation and changes in expected inflation significantly explain expected stock returns during periods when the macro-variables were highly volatile. Also, Cutler, Poterba, and Summers (1989) found that industrial production growth was significantly positively correlated with real stock returns over the period 1926-1986, but not in the 1946-1985 sub periods.

Darrat (1990) found in Canadian Stock Exchange that when the volatility of interest rates begins to rise, investors would want to shift out of bonds and into equities, exerting upward pressure on stock prices. He also found that industrial production index exhibited a significant negative coefficient and a negative relationship existed between the inflation rate and stock returns. Atindehou and Gueyie (2001) stated that exchange rate risk seems to be a determinant of banks' stock returns. They also found that investors seem to react more to negative changes than to positive changes. Likewise, Joshep and Vezos (2006) asserted that Foreign exchange (FX) rate and interest rate risks are important financial and economic factors affecting the value of common stocks.

3. THEORITICAL FRAMEWORK AND RESEARCH HYPOTHESES

This study has used the following model.

$$MR = \beta_1 + \beta_2MS + \beta_3IP + \beta_4IF + \beta_5ER + \beta_6IR + v_i$$

Where, MR= Quarterly percentage change in the stock market index

MS= Quarterly change in the money supply

IP= Quarterly percentage change in the index of production

IF= Quarterly percentage change in the consumer price index

ER= Quarterly change in the exchange rate

IR= Quarterly change in the interest rate

v_i = Error term

On the basis of the literature review, the following hypotheses have been generated.

- There is a significant relationship between the money supply and stock market return in context of Bangladesh.
- There is a significant relationship between the index of production and stock market return in context of Bangladesh.
- There is a significant relationship between the inflation rate and stock market return in context of Bangladesh.
- There is a significant relationship between the interest rate and stock market return in context of Bangladesh.
- There is a significant relationship between the exchange rate and stock market return in context of Bangladesh.

4. METHODOLOGY

4.1 Sampling and Data Collection Procedure

The sampling period for the paper begins from January, 1987 and ends in December, 2005.

Macro variables are collected from the monthly report named "Economic Trends" which is

published by the Bangladesh Bank. The Dhaka Stock Exchange (DSE) all general share price index is collected from the dataset of the Dhaka Stock Exchange library.

4.2 Measures of Variables

4.2.1 Stock Market Return

The particular stock index employed is all general share price index of DSE. Firstly from the daily closing price index, the three-month-average price index is calculated. Then, the stock market return is calculated by the following formula (Pearce & Roley, 1985).

$$MR = \{(Q_t - Q_{t-1}) / Q_{t-1}\} * 100$$

Where, Q_t = Average Quarterly Closing price index of t time

Q_{t-1} = Average Quarterly Closing price index of t-1 time

Thus the dependent variable is the quarterly percentage change of closing values of the DSE all general share price index.

4.2.2 Money Supply

Changes in quarterly money supply have been used and calculated by the following formula (Flannery & Propakandis, 2002; Pearce & Roley, 1985).

$$MS = (M2_t - M2_{t-1})$$

Where $M2_t$: Quarterly money supply (M2) in time t

$M2_{t-1}$: Quarterly money supply (M2) in time t-1

4.2.3 Index of Production

Percentage change in quarterly index of production has been used and calculated by the following formula (Pearce & Roley, 1985).

$$IP = \{(IP_t - IP_{t-1}) / IP_{t-1}\} * 100$$

Where IP_t : Quarterly index of production in time t

IP_{t-1} : Quarterly index of production in time t-1

4.2.4 Inflation Rate

Inflation rate has been calculated from Consumer Price Index as per the following formula (Pearce & Roley, 1985).

$$IF = \{(CPI_t - CPI_{t-1}) / CPI_{t-1}\} * 100$$

Where CPI_t : Quarterly CPI in time t

CPI_{t-1} : Quarterly CPI in time t-1

4.2.5 Exchange Rate

Quarterly change in weighted average exchange rate (the buying rate of the US dollar) is used and calculated by the below-mentioned formula (Joseph & Vezos, 2006).

$$ER = (ER_t - ER_{t-1})$$

Where ER_t : Quarterly weighted average exchange rate in time t

ER_{t-1} : Quarterly weighted average exchange rate in time t-1

4.2.6 Interest Rate

Quarterly change in interest rate is used. The rate, at which people keep money at the Scheduled Banks, is considered. It is the weighted average deposit rate of the quarter end. Money switching from the bank to share market happens if stock return is high and the exact opposite case may occur if deposit rate is high. The following formula is as follows (Joseph & Vezos, 2006).

$$IR = (IR_t - IR_{t-1})$$

Where IR_t : Quarterly interest rate in time t

IR_{t-1} : Quarterly interest rate in time t-1

5. ANALYSIS OF RESULTS AND INTERPRETATION

The following table presents the descriptive statistics of the study variables.

TABLE 1
SUMMARIZATION OF THE VARIABLES

Variables	Observations	Mean	Std. Dev.	Minimum	Maximum
MR	76	4.12	19.81	-35.45	111.78
MS	76	1236.31	5871.98	-46999.9	7744.2
IP	69	1.32	9.90	-30.18	45.77
IF	73	1.02	1.40	-2.48	5.88
ER	76	0.46	0.59	-0.58	2.6
IR	67	-0.05	0.29	-0.94	0.6

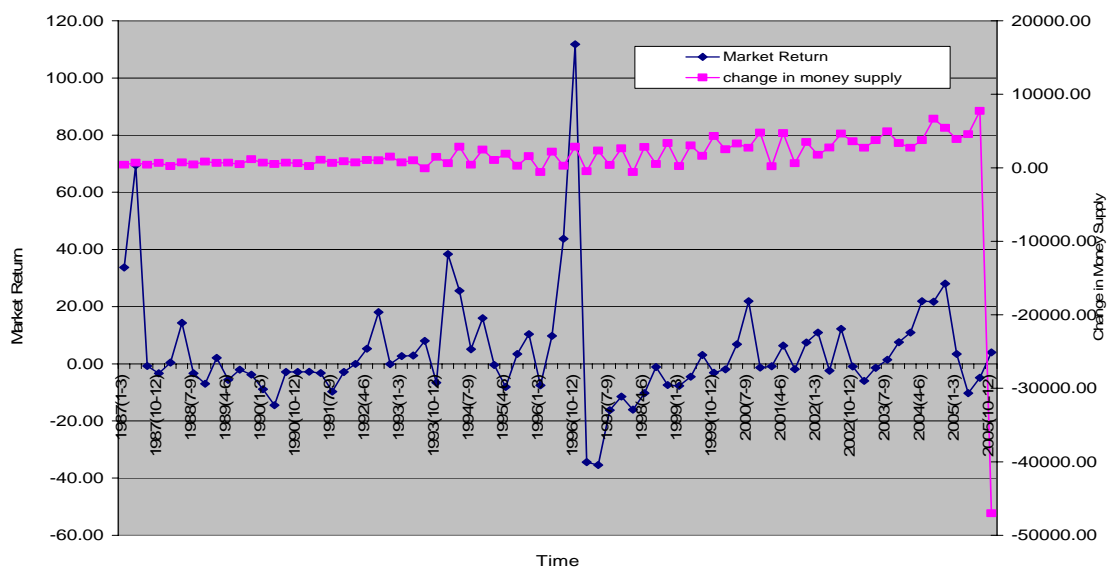
Table 1 shows that the number of observation for the market return is 76 and the average of the market return is 4.12 and the dispersion from the mean is 19.81. The maximum value is

111.78 and the minimum value is -35.45. The observations of the money supply are 76 and the mean value of money supply is 1236.31 and the standard deviation is 5871.98. The maximum value is 7744.2 and the minimum value is -46999.9. Index of production is based on the 69 observations. The mean value is 1.32 and the dispersion from the mean is 9.90. The maximum and the minimum value are 45.77 and -30.18 respectively. Number of observations for the inflation rate is 73 and the mean value is 1.02. The standard deviation is 1.40. The minimum and maximum value is -2.48 and 5.88 respectively. Exchange rate is based on the 76. The mean value is 0.46 and the standard deviation is 0.59. The maximum and the minimum value is 2.6 and -0.58 respectively. Interest rate is based on the sample of 67. The mean value is -0.05 and the dispersion from the mean is 0.29. The maximum and minimum value is 0.6 and -0.94 respectively.

Now the relationship between the dependent variable with each independent variable has been show in graphs. Comparative trend in graph between the dependent variable and independent variables gives an opportunity to visualize the trend and apparent relationship between the variables.

FIGURE 1

COMPARATIVE TREND BETWEEN THE CHANGE IN STOCK MARKET PRICE AND CHANGE IN MONEY SUPPLY



A first look at Figure 1 suggests that fluctuation of the money supply is low but fluctuation of market return is very high. If a closer look is taken, the total time frame can be divided in the two time frames: before 1996 and after 1996. Before 1996, money supply was not fluctuating but the fluctuation of the market return was high. In 1996, the market return was high. At that particular point, market return was increasing. After that, when the market return had fell suddenly, supply of money had also fell. After 1996, money supply was in increasing trend and market return was also in increasing. But in a recent year, 2005, the market return was increasing though the market return fell drastically.

FIGURE 2

COMPARATIVE TREND BETWEEN THE CHANGE IN STOCK MARKET PRICE AND CHANGE IN INDEX OF PRODUCTION

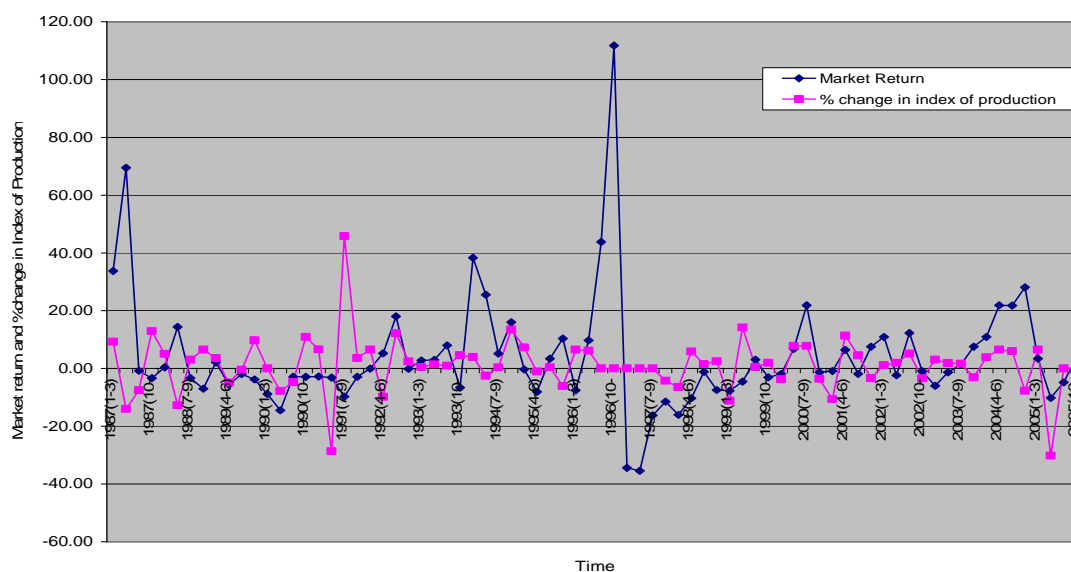


Figure 2 shows that in 1987, both index of production and market return were increasing. This phenomenon continued till 1989. From 1998 to the middle of 2001, when market return was increasing, index of production was also increasing. Again an inverse relationship was observed in the middle of 2001 to beginning of 2002. Again most of the times in 2002, they moved in the same direction. After 2003, a similar trend was observed but in the middle of 2004, contrast relationship was observed. Again in 2005, same trend is observed. So,

graphical analysis shows that there is no specific relationship between the market return and index of production.

FIGURE 3

COMPARATIVE TREND BETWEEN THE CHANGE IN STOCK PRICE AND INFLATION RATE

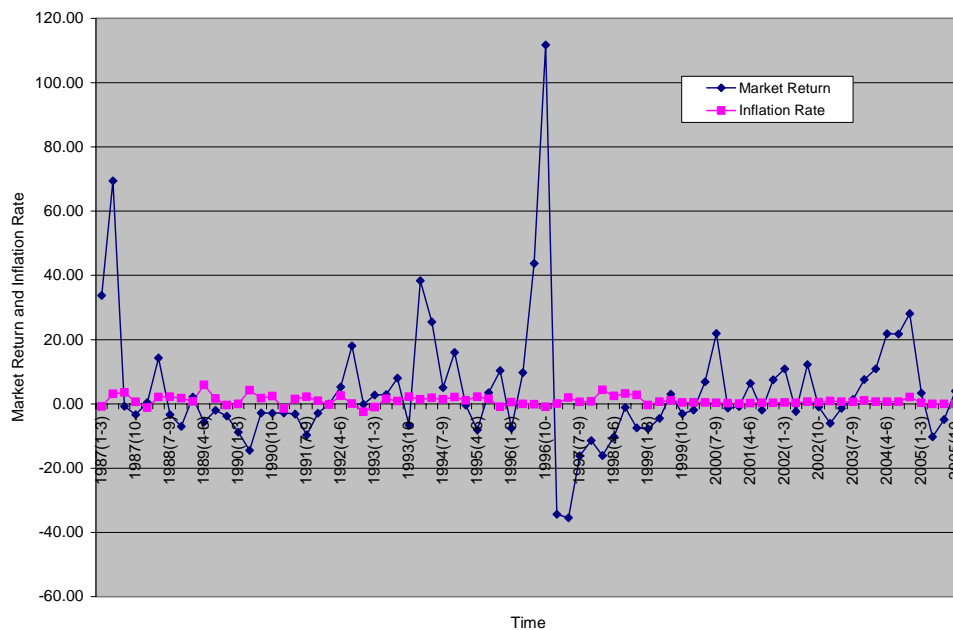


Figure 3

shows that before 1996, there were high fluctuations in the inflation rate. In 1987, both the inflation rate and the market return were increasing. But in 1989, when the inflation rate was increasing, market return was decreasing. Again, immediately after 1990, the inflation rate was increasing but market rater was decreasing. In 1991, inverse relationship was found. Again, in the year 1993, both were increasing. From the end of 1993 to end of 1996, inflation rate was more or less same but the fluctuation of the market return was high. Again, from the end of 1997 to the start of 1999, inverse relationship was portrayed in the graph. After that, inflation curve took a parallel look but the market return curve was fluctuating.

FIGURE 4

**COMPARATIVE TREND BETWEEN THE CHANGE IN STOCK MARKET PRICE AND
CHANGE IN EXCHANGE RATE**

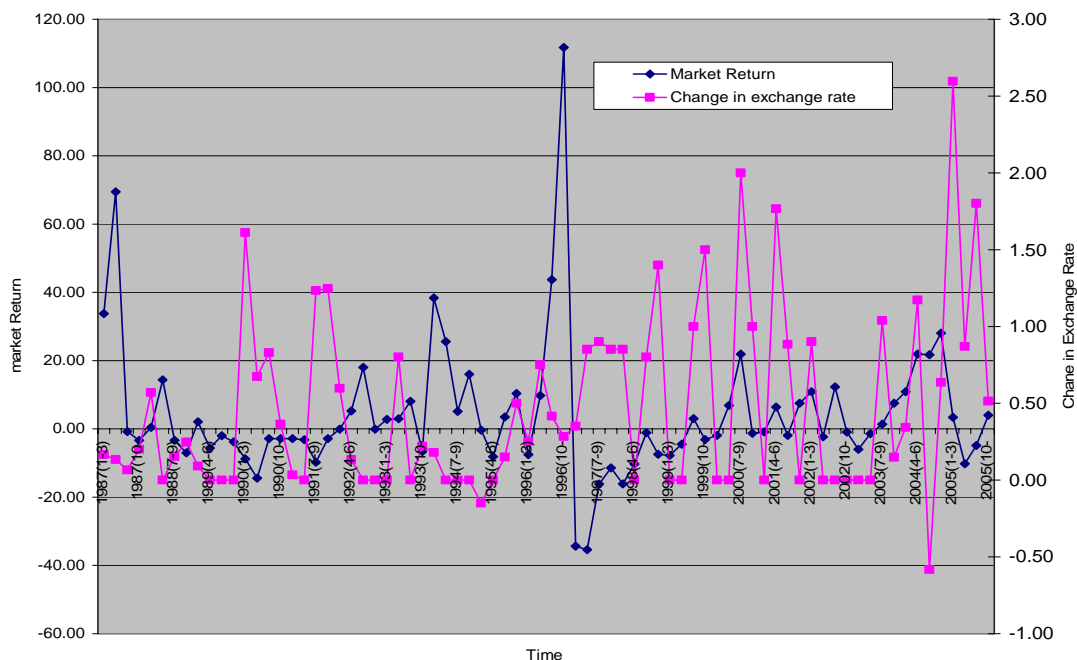
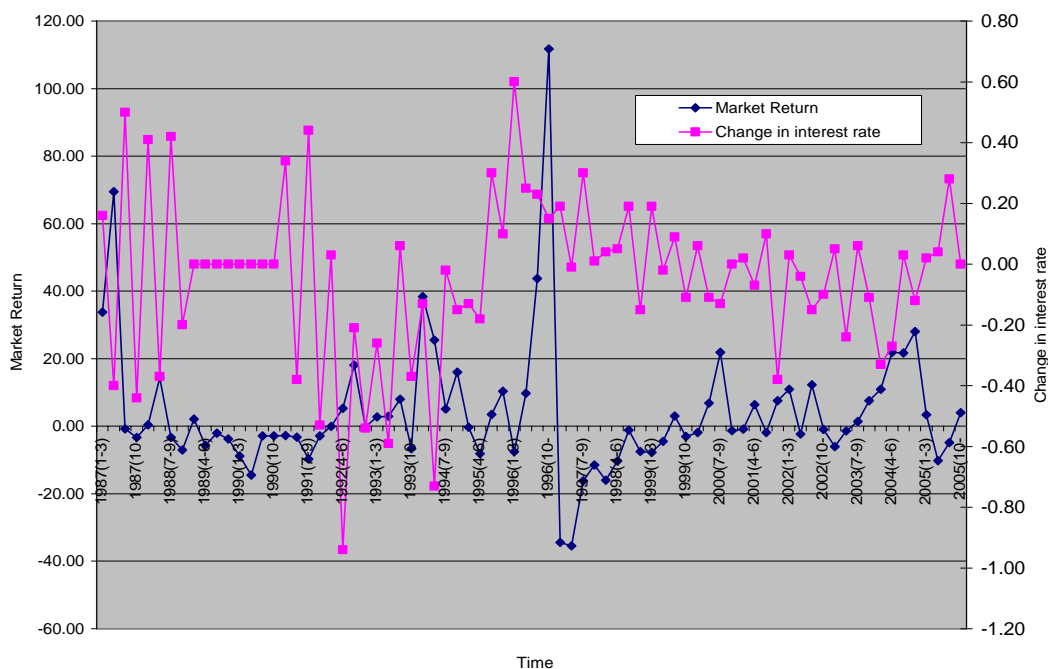


Figure 4 shows that exchange rate and market return were fluctuating but fluctuation sometimes had the same trend. In 1987, the market return was increasing, but exchange rate was decreasing. In 1990, the exchange rate was increasing but market return was decreasing. In the end of 1990, when the exchange rate was decreasing, market return was increasing. Again from 1991 to 1995 there was an inverse trend between the market return and exchange rate. Again, from the second quarter of 1995 to the middle of 1996, both exchange rate and the market returns were increasing simultaneously. This phenomenon continued from 1998 to the beginning of 2002. From the end of 2002 to end of 2005, the market return demonstrated an increasing trend but exchange rate was fluctuating. After that, inverse relationship was observed again.

FIGURE 5

COMPARATIVE TREND BETWEEN THE CHANGE IN STOCK MARKET PRICE AND
CHANGE IN INTEREST RATE



In the beginning of 1987, it was found market return and the interest rate were inversely moving but at the end of 1987, they were moving in the same direction. Again, in the second quarter of the 1988, it had an inverse move. From middle of the 1989 to end of 1990, the data were not available. From the third quarter of 1991 to end of 1992, there was an increasing trend in the market return curve, but the interest rate was moving in both directions. In the last quarter of 1993, it was observed that they were moving in the same direction. After that time period up to the end of 2002, most of the times, market return and interest rate were moving in the opposite directions. From the end of 2002 to the end of 2004, the market return was moving upward but interest rate was fluctuating. Thereafter, an inverse trend in the exchange rate and market return was observed.

The following table shows the correlation among the studied variables in a correlation matrix.

TABLE 2
Correlation Matrix for the Study Variables

Variable	MR	MS	IP	IF	ER	IR
MR	1.0000					
MS	0.0385 0.7415	1.0000				
IP	-0.0327 0.7898	-0.0182 0.8818	1.0000			
IF	-0.1667 0.1585	-0.1229 0.3004	-0.1868 0.1272	1.0000		
ER	-0.1222 0.2929	0.0716 0.5389	0.1472 0.2275	-0.0184 0.8772	1.0000	
IR	-0.1352 0.2753	-0.1335 0.2814	0.2266* 0.0791	-0.0928 0.4446	0.0109 0.9275	1.0000

Note: *p value is less than 0.10

Correlation matrix among the studied variable in this paper are listed in Table 2. Second row of the every variable shows the significance level of each correlation coefficient. No significant association was found among the variables in the 5%, 1% and 0.1% level. Significant association of index of production with interest rate was found at the 10% level.

The following table shows the results of the regression analysis.

Table 3
ESTIMATION RESULTS AND SUMMARY STATISTICS FROM THE MULTIPLE REGRESSION MODEL

Statistics	Estimated coefficients						Summary	
	β_1	β_2	β_3	β_4	β_5	β_6	R ²	D-W
MR	3.10 (3.36)	0.0009 (0.001)	-0.08 (0.21)	-0.002 (1.49)	-1.59 (3.20)	-10.42 (6.65)	0.0826	1.28
MR _r	1.44 (3.88)	0.001 (0.001)	-0.12 (0.17)	0.53 (1.48)	0.57 (2.87)	-7.99 (5.96)	0.0957	2.07
MR _h	3.10 (3.05)	0.0009 (0.001)	-0.08 (0.21)	-0.002 (1.76)	-1.59 (2.50)	-10.42* (5.21)	0.0826	1.28

Notes: *p value less than 0.10

Standard error is shown in the parentheses. D-W: Dublin- Watson d-statistic.

MR_r: After eliminating the problem of autocorrelation.

MR_h: After eliminating the problem of heteroscedasticity

In the first row, Market return (MR) represents the coefficient before the removing the problem of autocorrelation and heteroscedasticity. In that case, R^2 is 0.0826. It means that 8.23% variability of the market return can be explained by the market return, index of production, inflation rate, exchange rate and interest rate. No significant relationship is found at the 5%, 1%, and 0.1% level. Even no significant relationship is found at the 10% level also. So it is found that beta coefficients are not individually statistically different from the zero. Again d statistics is 1.28. Presence of positive autocorrelation is found. Removing the problem of autocorrelation the beta coefficients are presented in the second row.

In the second row beta coefficients are given after taking the remedial measures. After the remedial measures d statistics has been improved. It is near to 2 which means 'no autocorrelation'. In this scenario, R^2 has been improved. It is 0.0957. It means that after eliminating the autocorrelation, 9.6% variability of the market return can be explained by the explanatory. It also found that estimated coefficient does not improve. Those estimated coefficients individually are not statistically different from zero at the 10% level.

In the third row, the estimated coefficients are presented after taking the remedial measures for the heteroscedasticity. In this case, the R^2 is found which the same as is before eliminating the problem of autocorrelation. In this scenario, the estimated coefficient of interest rate is significant at the 10% level. It shows a negative relationship with the market return. When the interest rate increased by 1 unit, holding other variable constant, market return decreased by 10.42 units. Other estimated coefficients are not statistically different from the zero.

6. CONCLUSION

The hypotheses that macroeconomic developments have significant relationship with stock market return has strong intuitive appeal but almost no strong empirical support in context of the economy of Bangladesh. Though Pearce and Roley (1985) found a relationship of change in money supply, change in index of production, and inflation rate with the market return in the U. S Economy, such relationships do not hold in context of Bangladesh. Again, Atindehou and Gueyie (2001) found that stock returns were related with interest rate and exchange rate

in Canadian Economy. Such findings do not match with the empirical findings of this study. It is note, however, that after removing the problem of heteroscedasticity, the interest rate is related with the market return at the 10% significance level, supporting the research of Atindehou and Gueyie (2001) in Canadian economy.

The study is limited by a number of factors. First, in the literature review, researchers found a relationship between the t-bill rate and the stock market. But in Bangladesh, the three-month t-bill rate is not available for the time length considered in this study. So, weighted average deposit rate was used as a proxy for t-bill rate. Second, previous researchers used a simple basket of 10 major currencies equally weighted instead of using one foreign currency, US dollars. In this study, it was not possible to use a foreign currency basket. Such kind of a currency basket or information on all the necessary currencies is not available for the time frame of this paper. Third, this research investigated the relationship of only five macro factors with stock market index. However, a lot of other factors could be included in the research model for the study. Fourth, many previous researchers conducted their studies on the basis of weekly data. For the economy of Bangladesh, weekly data are available only for the market index. Hence, quarterly data were used instead.

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APPENDICES

**Appendix-1
Data Table**

Time	MR	MS	IP	IF	ER	IR
1987(1-3)	33.73	418.20	9.24	-0.84	0.17	0.16
1987(4-6)	69.47	698.70	-14.01	3.13	0.13	-0.40
1987(7-9)	-0.75	426.10	-7.58	3.52	0.07	0.50
1987(10-12)	-3.36	662.60	12.95	0.63	0.20	-0.44
1988(1-3)	0.41	247.30	5.10	-1.18	0.57	0.41
1988(4-6)	14.35	723.30	-12.73	2.15	0.00	-0.37
1988(7-9)	-3.37	448.97	3.01	2.18	0.15	0.42
1988(10-12)	-7.02	836.73	6.52	1.75	0.25	-0.20
1989(1-3)	2.11	645.07	3.59	0.75	0.09	N/A
1989(4-6)	-5.65	703.33	-4.89	5.88	0.00	N/A
1989(7-9)	-2.02	498.03	-0.43	1.69	0.00	N/A
1989(10-12)	-3.79	1145.60	9.68	-0.35	0.00	N/A
1990(1-3)	-8.86	691.87	0.00	-0.07	1.61	N/A
1990(4-6)	-14.47	516.10	-7.84	4.30	0.67	N/A
1990(7-9)	-2.85	686.20	-4.68	1.77	0.83	N/A
1990(10-12)	-2.87	613.43	10.94	2.40	0.36	N/A
1991(1-3)	-2.82	241.83	6.64	-1.43	0.03	0.34
1991(4-6)	-3.19	1079.00	-28.68	1.47	0.00	-0.38
1991(7-9)	-9.75	672.27	45.77	2.26	1.23	0.44
1991(10-12)	-2.89	866.97	3.63	0.96	1.25	-0.53
1992(1-3)	-0.05	735.97	6.48	-0.23	0.60	0.03
1992(4-6)	5.25	1041.00	-9.87	2.54	0.13	-0.94
1992(7-9)	18.04	1010.40	12.23	0.08	0.00	-0.21
1992(10-12)	-0.11	1513.00	2.44	-2.48	0.00	-0.54
1993(1-3)	2.74	721.00	0.48	-1.05	0.00	-0.26
1993(4-6)	2.92	1009.90	1.42	1.63	0.80	-0.59
1993(7-9)	8.01	-83.60	0.93	0.88	0.00	0.06
1993(10-12)	-6.66	1478.30	4.63	2.20	0.22	-0.37
1994(1-3)	38.36	614.80	3.98	1.41	0.18	-0.13
1994(4-6)	25.54	2857.90	-2.55	1.83	0.00	-0.73
1994(7-9)	5.12	395.50	0.44	1.45	0.00	-0.02
1994(10-12)	15.99	2491.10	13.48	2.09	0.00	-0.15
1995(1-3)	-0.37	1034.30	7.28	1.12	-0.15	-0.13
1995(4-6)	-8.10	1888.40	-1.07	2.23	0.00	-0.18
1995(7-9)	3.44	264.40	0.36	1.57	0.15	0.30
1995(10-12)	10.35	1597.10	-6.12	-0.96	0.50	0.10
1996(1-3)	-7.57	-589.60	6.51	0.48	0.25	0.60
1996(4-6)	9.75	2206.30	6.12	0.00	0.75	0.25
1996(7-9)	43.75	253.80	N/A	-0.11	0.42	0.23
1996(10-12)	111.78	2853.60	N/A	-0.96	0.28	0.15
1997(1-3)	-34.40	-493.40		0.05	0.35	0.19

			N/A			
1997(4-6)	-35.45	2323.00	N/A	1.94	0.85	-0.01
1997(7-9)	-16.19	366.40	N/A	0.64	0.90	0.30
1997(10-12)	-11.45	2650.50	-4.31	0.74	0.85	0.01
1998(1-3)	-16.06	-597.50	-6.50	4.34	0.85	0.04
1998(4-6)	-10.27	2822.20	5.88	2.50	0.00	0.05
1998(7-9)	-1.13	509.80	1.52	3.22	0.80	0.19
1998(10-12)	-7.46	3376.70	2.49	2.74	1.40	-0.15
1999(1-3)	-7.75	219.10	-11.17	-0.37	0.00	0.19
1999(4-6)	-4.52	3052.00	14.21	0.65	0.00	-0.02
1999(7-9)	3.04	1627.20	0.48	1.01	1.00	0.09
1999(10-12)	-3.09	4330.20	1.90	0.41	1.50	-0.11
2000(1-3)	-1.91	2493.50	-3.74	0.45	0.00	0.06
2000(4-6)	6.84	3284.80	7.77	0.41	0.00	-0.11
2000(7-9)	21.90	2736.10	7.81	0.36	2.00	-0.13
2000(10-12)	-1.30	4784.90	-3.62	0.22	1.00	0.00
2001(1-3)	-0.88	188.20	-10.69	0.04	0.00	0.02
2001(4-6)	6.40	4702.50	11.33	0.27	1.77	-0.07
2001(7-9)	-1.90	613.37	4.51	0.36	0.88	0.10
2001(10-12)	7.51	3518.77	-3.34	0.35	0.00	-0.38
2002(1-3)	10.94	1779.53	1.15	0.44	0.90	0.03
2002(4-6)	-2.37	2746.00	1.99	0.35	0.00	-0.04
2002(7-9)	12.26	4652.40	5.16	0.66	0.00	-0.15
2002(10-12)	-0.93	3609.53	-3.45	0.52	0.00	-0.10
2003(1-3)	-6.02	2730.63	3.02	0.87	0.00	0.05
2003(4-6)	-1.38	3738.90	1.87	0.70	0.00	-0.24
2003(7-9)	1.41	4944.40	1.70	0.63	1.04	0.06
2003(10-12)	7.56	3376.73	-3.09	1.02	0.15	-0.11
2004(1-3)	10.93	2731.00	3.85	0.69	0.34	-0.33
2004(4-6)	21.88	3757.17	6.52	0.69	1.17	-0.27
2004(7-9)	21.74	6654.93	6.00	0.73	-0.58	0.03
2004(10-12)	28.08	5426.00	-7.70	2.12	0.64	-0.12
2005(1-3)	3.40	3878.57	6.50	0.34	2.60	0.02
2005(4-6)	-10.23	4565.60	-30.18	N/A	0.87	0.04
2005(7-9)	-4.83	7744.20	N/A	N/A	1.80	0.28
2005(10-12)	4.00	-46999.90	N/A	N/A	0.51	N/A

Where, MR= Quarterly percentage change in the stock market index.

MS= Quarterly change in the money supply

IP= Quarterly percentage change in the index of production.

IF= Quarterly percentage change in the consumer price index.

ER= Quarterly change in the exchange rate.

IR= Quarterly change in the interest rate.

Appendix-2

Calculation of the Formulae

Consumer Price index and Index of Production:

In both cases, the Laspeyers base weighted index formula has been used. The formula is given below.

$I = P_n Q_0 \div P_0 Q_0$ is used in the construction of the index.

The working formula in the modified form is:

$$I = \frac{\sum P_n/P_0 \times w_i}{\sum W} \times 100$$

Where, I = index

P_n = Current Price

P_0 =Base Price

w_i = weight of the individual item

W = Weight of the group

Formula for the Index Calculation for the Dhaka Stock Exchange All General Share

Price Index:

01. The current index at any time during the trading day is calculated using the following formula specified by IOSCO (International Organization of Securities Exchange Commissions)

$$\text{Index Value} = \frac{\text{Yesterday's Closing Index} \times \text{Current Capitalization}}{\text{Opening Capitalization}}$$

Current Capitalization is the sum of the Current Market Price \times No. of Indexed Shares for every instrument included in the index. It is highlighted in TESA BRS (7-2), that is "last trade price" in state of "Current Market Price".

Yesterday's Closing Index × Final Capitalization

02. Final Index = -----

Opening Capitalization

Final Capitalization is the sum of the Closing Price × No. of Indexed Shares for every instrument included in the index.

03. All Share Price Index (DGEN) is calculated in every 15 minutes and it is continually shown in ATS Score Board in TWS and same in graphically.

Calculation of the M2:

Net Foreign Assets		Bangladesh Bank (1)	Deposit Money Bank (2)	Total (3) = 1+2
Domestic Credit	Government	Bangladesh Bank (4)	Deposit Money Bank (5)	Total (6)* = 4+5
	Other Public Sector	Bangladesh Bank (7)	Deposit Money Bank (8)	Total (9)= 7+8
Private Sector (10)				
Total domestic credit(11) = 6+9+10				
Net Other Assets (12)				
Net Domestic Assets (13) = 11+12				
Broad Money (M2)(14) = 3+13				

*Government excludes government deposits.