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Stock Prices and Microeconomic Variables: T-Y Granger Causal Evidence From Dhaka Stock Exchange (DSE)

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Abstract:

This study examines the long-run equilibrium relationship and the direction of causality between stock prices at Dhaka Stock Exchange (DSE) and a set of four stock market oriented factors technically can be defined as microeconomic variables. Through utilizing the methods of Unit-Root tests, Johansen and Juselius (1990) Cointegration test and the long-run Granger Causality test proposed by Toda and Yamamoto (1995), we have investigated the long-run equilibrium relationship as well as causal relationships between the DSE all share price index (DSI) and the four microeconomic variables (i.e. market dividend yield, market price-earnings multiples, monthly average market capitalization and monthly average trading volume) using monthly data from the period January 2000 to December 2010. Significant findings include long-run equilibrium relationship among the variables under study. However, DSI, in any way, do not granger cause dividend yield; but DSI has bi-directional causal relation with market price-earning multiples and the first lag of the monthly average trading volume. On the other hand, unidirectional causality is found from DSI to the first lag of monthly average market capitalization but no causality is found from the opposite direction.

Keywords: *Microeconomic Variables, Unit Root Test, Cointegration, T-Y Granger Causality*

1. Introduction:

Many developing economies have attempted to develop capital markets, not only to raise capital rather capital markets are expected to meet two basic requirements: it should support industrialization through savings mobilization, investment funds allocation and maturity transformation. Besides, it must be safe and efficient in discharging the aforesaid function. In emerging economies like Bangladesh, stock markets are expected to function like a barometer of the financial performance of the organizations, efficiency of the financial markets and an icon of the development of economic activity. But such conditions do not usually exist due to prevalence of informal credit markets that tend to limit the capacity to mobilize financial savings, a low degree of ownership-management separation associated with the drawbacks of informational asymmetry and low level of accumulated of financial assets making maturity transformations difficult. Of course, these conditions differ widely from country to country (Ahmed, M.F. 2002).

Investors invest in financial securities for competitive and satisfactory returns. They generally consider the ex-post and ex-ante returns of the securities while making and investment decision. This is because the investment in financial assets is always associated with different types of risks which are expected to be driven partly by company oriented factors, partly by industry factors, partly by market oriented factors and partly by macroeconomic factors. A clear knowledge about the volatility and sensitivity of each and every factor with respect to behavior of the stock prices help an investor to enjoy a competitive advantage over those who do not have such knowledge in the process of generating satisfactory return from investment in financial assets. That's why researchers and academicians from all over the world have given their effort to identify those real factors that significantly contributes to the volatility of stock prices. They developed and explained different theories and models to identify the factors truly responsible to the volatility of stock prices. Their results also differ with respect to developed economy and those of emerging economy. This study is an attempt to identify long run equilibrium relationship as well as causal relationship between stock prices and a set of four market oriented variables which can be technically defined as microeconomic

variables in an emerging economy like Bangladesh. Bangladesh stock markets are represented by two stock exchanges, viz., Dhaka Stock Exchange (DSE) and Chittagong Stock Exchange (CSE). Both DSE and CSE are corporate bodies under Companies Act 1994. Although DSE was first established in 1954, its activities were suspended for a brief period from 1971 to 1976 due to introduction of a socialistic approach of development during this period. DSE started functioning with 9 listed companies in 1976; however the number has reached to 218 on 2010.

The purpose of this paper is to scrutinize the long run equilibrium relationship as well as causal relation between the stock price and four market oriented variables technically known as microeconomic variables (i.e. market dividend yield, market price-earnings multiples, monthly average market capitalization and monthly average trading volume), in the context of the Bangladesh economy for the period from January 2000 to December 2010 (132 monthly observations) which also witnessed commencement of economic liberalization. The analysis of the interrelationship runs in terms of Efficient Market Hypothesis. The Efficient Market Hypothesis (semi-strong form), states that in a semi strong efficient market, everyone has perfect knowledge of all publicly available information and these are fully reflected in stock prices. Otherwise, the market participants are able to develop profitable trading rules and the stock market will not channel financial resources to the most productive sectors.

The use of Granger Causality Test in examining market informational efficiency has recently been found unable to capture many of the time series properties. This paper makes use of the most recently available econometric technique, as proposed by Toda and Yamamoto (1995), which overcomes the technical problems associated with the traditional Granger Causality test. The contribution of this paper lies first of all, in focusing on stock market efficiency with respect to four stock market oriented variables commonly known as microeconomic variables which acts like determinant factors of equity returns and secondly in applying the Toda and Yamamoto causality technique which is superior to traditional Granger Causality Test.

A survey of the existing literature including empirical evidences on the nature of causal relationships between stock prices and stock market oriented variables has been discussed in Section 2.0; Section 3.0 discusses the methodology employed and presents the variables and data descriptions. Section 4.0 analyses the empirical results followed by concluding observation in Section 5.0.

2. Review of Literature:

A good number of empirical evidence is found in developed economies to examine stock price behavior and efficiency of the stock market. The evidence of stock price behavior and market efficiency using fundamental factors, industry factors and macroeconomic factors are still not satisfactory. Numerous empirical studies have been carried out to determine the stock market reactions to dividend announcements. Aharony and Swary (1980), Kwan (1981), Eades (1982), and Woolridge (1982), have found a significant positive association between announcement of dividend changes and the stock return, using the dividend announcement made in isolation of other firm news report. Gordon (1962 and 1963) and Walter (1963) support the dividend relevance doctrine. They suggest that dividend policy and investment policy are inter-linked. Investment policy can not be separated from dividend policy and the choice of an appropriate dividend policy affects the value of the firm.

The leading proponents of the bird-in-the-hand theory (Gordon, 1962; and Lintner, 1962) found that stockholder value a dollar received in dividend more highly than dollar earnings retained. Therefore, dividend policy is relevant to the value of shares. Miller and Scholes (1981) have argued that the observed relationship between common stock returns and dividend yields as attributed to the favorable information contained in the knowledge that a firm will actually declare any dividend. Dhillon and Jhonson (1994) examine the stock and bond price reaction to dividend changes. The positive stock market response to dividend increases has several potential explanations, two of the more commonly discussed being information content and wealth redistribution between stockholders and bondholders. The evidence presented by Dhillon and Jhonson (1994) support the wealth redistribution hypothesis but does not rule out the information content hypothesis. Typically, Dhillon and Jhonson (1994) found that the bond price reaction to announcement of large dividend changes is opposite to the stock price reaction. Their result

differs from those of Handjinicolaou and Kalay (1984) who analyzed bond returns around dividend changes, and reported that the bond prices are not affected by dividend increases but the bond prices react negatively to dividend reductions. Dhillon and Jhonson (1994) argue that their data supports the information content hypothesis. In contrast, Jayaraman and Shastri (1988) find insignificantly negative bond price reactions to dividend announcement.

Ahmed M. F., (1991) investigates the dividend policy of the enterprises listed on Dhaka Stock Exchange (DSE) and to draw an analogy between that of Japanese and Bangladeshi enterprises. He comment that both dividend and retained earnings convey a return to the stockholders but in Bangladesh dividend rate demonstrate a declining trend while that of Japanese enterprises appears to be somewhat stable. Thus lower dividend yield in Bangladesh is attributable to both lower dividend rate and higher market capitalization while it is mostly due to higher market capitalization in Japan. He also found that dividend rate and yield in Bangladesh is lower than time deposit interest rate whereas in Japan although dividend yield is lower than interest rate but dividend rate is higher than that of. It is also found that companies paying regular dividend have higher P/E ratio than those paying irregularly which ultimately implies that market regards regular dividend policy and regular dividend stimulate the price.

Ahmed M. F., (2000) investigate the relative importance of dividend and retained earnings to explain the stock price variation in Bangladesh. The findings reveal that both dividend and retained earnings influence the stock price and they have their impact ignoring their usual expectation of stronger dividend impact on non-growth industries and retained earnings impact on growth industries. In most cases, dividend hypothesis appears to be stronger than the retained earnings hypothesis. Dividends convey valuable information to the investors and it has been documented that the managers' behavior also appears to be consistent with this view thus supporting Dividend Relevance Theory (Lintner, 1956). Although other alternative exists through which managers can disseminate information but dividends are highly visible compared to other announcements in addition to its credibility of cash signals.

Pu Shen (2000) examines the historical relationship between price-earnings ratios and subsequent stock market performance. The author finds strong historical evidence that high price-earnings ratios have been followed by disappointing stock market performance in the short and long term. Specifically, high price-earnings ratios have been followed by slow *long-run* growth in stock prices. Moreover, when high price-earnings ratios have reduced the earnings yield on stocks relative to returns on other investments, *short-run* stock market performance has suffered as well.

Hamid and Chowdhury (2005) used two measures i.e. daily market- adjusted abnormal return (MARR) and daily cumulative abnormal return (CAR) to study the impact of dividend announcement on shareholders' value. They explained MARR as an indicator of the relative daily percentage price change in the dividend paying stocks compared to the change in average market price. Whereas CAR has been defined as a measure of the investors' total return over a period starting from well before the announcement of dividend to well after the dividend announcement day. They have taken 137 samples of dividend paying companies listed on Dhaka Stock Exchange and found that MARR on the day of dividend announcement was not statistically significant which entails that the market reacts earlier than the actual announcement of dividend. On the other hand, the findings of CAR results that investors lost more value in the ex-dividend period than the value gained in the pre-dividend period. These findings also suggest that dividend announcement does not carry information about the future earnings and cash flows of the companies. Anderson K. and Brooks C. (2006), found that P/E calculated from multiple years of earnings is a better predictor of returns than the traditional one-year P/E.

Hossain. M. (2006) examined the determinants of stock price and return movements of listed companies of Dhaka Stock Exchange (DSE). He used several factors like number of listed securities, number of initial public offerings, earnings per share, dividend per share dividend pay out ratio and also used some macroeconomic variables like gross domestic product (GDP), per capital income, savings, investment, export, import, foreign exchange reserve, inflation rate, money supply, consumption, deposit interest rate, advance interest rate as influential factors for determining the price of stock. He found a negative relation in between dividend yield and the price of any stock.

Rahman, Z. and Rahman, L. (2008) in their study of stock price behavior around ex-dividend date from DSE found an increase of stock prices. They have made a conclusion that ex-dividend price increased instead of dropped in DSE that implies a clear preference for capital gains without having any focus of dividends by the stockholders.

Vorek M. (2009) examines that the investments into stocks with low price to earnings ratio achieved higher than average returns. This paper focuses on the other side of that relation, whether the high price to earning ratio predicts the future falls in stock prices and whether the price to earnings ratio could act as an indicator of the coming bear market. The Author concluded that P/E ratio in a role of an indicator of the future stock markets falls does not result in clear conclusion.

Ali M.B. and Chowdhury T.A, (2010) examined the impact of dividend announcement on stock market prices of 25 listed commercial banks in Dhaka Stock Exchange (DSE). They have employed an standard even study methodology to analyze the stock price reaction for dividend announcement and found 11 out of 25 banks' stock price declines, 6 bank's stock price raises and no change in 8 banks. Finally they agreed with the dividend irrelevance theory and conclude that dividend announcement itself has no influence on share price.

Ong, T.S., Yichen, Y.N., Teh, B.H., (2010) examine the capability of the average PE ratio to forecast future stock market returns. They also test whether PE ratio can be used to predict future stock market declines and whether PE ratio can serve as a parameter of the coming bear market in the Malaysian Equity Market. Their investigation reveals that the null hypothesis of PE ratio as not a useful predictor of KLCI index was rejected. A linear positive slope exists between the annualized return of the KLCI and PE ratio, thus suggesting that an increase in PE ratio could have led to a subsequent rise in the KLCI. In this case, a decline in PE ratio could have resulted in a subsequent fall in the KLCI, henceforth, serving as an indicator of the coming bear market in Malaysia. In sum, the hypothesis that high levels of PE ratios will lead to future decline

Ali M. B. (2011) investigates the impact of changes in selected microeconomic and macroeconomic variables on stock returns at Dhaka Stock Exchange (DSE). A Multivariate Regression Model computed on Standard OLS Formula has been used to estimate the relationship. Regression coefficient reveals that inflation and foreign remittance have negative influence and industrial production index; market P/Es and monthly percent average growth in market capitalization have positive influence on stock returns. All the independent variables can jointly explain 44.48 percent variation in DSE all share price index. No unidirectional Granger Causality is found between stock prices and all the predictor variables except one unidirectional causal relation from stock price and market P/Es. Finally, lack of Granger causality between stock price and selected micro and macro variables ultimately reveals the evidence of informationally inefficient market.

3. Methodology:

3.1 Research Methods:

This study basically tries to examine the causal relationship between Dhaka Stock Exchange (DSE) all share price index (DSI) and a set of 4 stock market oriented variables usually described as microeconomic variables like market dividend yield (DY), market price earnings multiples (MKTPE), first lag of monthly average market capitalization (MAMCAP(-1)) and first lag of monthly average trading volume (MATVM (-1)). Market dividend yield and market price-earnings multiples are considered to be fundamental parameter that significantly influence stock prices and which is also supported by different Finance Theories and empirical evidence examined by different researchers and academicians. On the other hand, (MAMCAP(-1)) and (MATVM (-1)) are expected to be influential behavioral factors that are also closely associated with stock prices.

At the beginning, Granger causality (1988) test was thought to be the most appropriate test for this study. To explain, in brief, a simple definition of Granger Causality, in the case of two time-series variables, X and Y: "X is said to Granger-cause Y if Y can be better predicted using the histories of both X and Y than it can by using the history of Y alone."

We can test for the absence of Granger causality by estimating the following VAR model:

$$Y_t = a_0 + a_1 Y_{t-1} + \dots + a_p Y_{t-p} + b_1 X_{t-1} + \dots + b_p X_{t-p} + u_t \quad (1)$$

$$X_t = c_0 + c_1 X_{t-1} + \dots + c_p X_{t-p} + d_1 Y_{t-1} + \dots + d_p Y_{t-p} + v_t \quad (2)$$

Then, testing $H_0: b_1 = b_2 = \dots = b_p = 0$, against H_A : 'Not H_0 ', is a test that X *does not* Granger-cause Y .

Similarly, testing $H_0: d_1 = d_2 = \dots = d_p = 0$, against H_A : 'Not H_0 ', is a test that Y *does not* Granger-cause X .

In each case, a rejection of the null implies there is Granger causality. But later on we identify two major drawbacks of using Granger Causality test when more than two variables are considered:

Granger Causality test consider only two variables to examine the causal relation between them. But it does not consider the effects of other associated variables which are subject to possible specification bias. As pointed out by Gujarati (1995), causality is sensitive to model specification and the number of lags. It would reveal different results if any variable (s) was relevant and was not included in the model. Therefore the empirical evidence of a two variable Granger-Causality is fragile because of this problem.

Time series data are often non-stationary. This situation could exemplify the problem of spurious regression. Gujarati (1995) also said that when variables are integrated, the F-test procedure is not valid, as the test statistics don't have a standard distribution. Although researchers can still test the significance of individual coefficients with t-statistics, one may not able to use F-statistics to jointly test the Granger-Causality. Enders (2004) proved that in some special cases, using F-statistics to jointly test first differential VAR is permissible. First differential VAR also has its limitations, which can not be employed universally.

To sum up, because of the probable shortcomings of specification bias and spurious regression, this study does not carry out traditional Granger-Causality procedure to test the relationship between more than two variables. Later on we have decided to use Toda- Yamamoto (1995) procedure to examine the causal relation for our selected variables. Toda and Yamamoto (1995) proposed a simple procedure requiring the estimation of an 'augmented' VAR, even when there is cointegration, which guarantees the asymptotic distribution of the MWald statistic. This method is applicable "whether the VAR's may be stationary (around a deterministic trend), integrated of an arbitrary order, or cointegrated of an arbitrary order" (Toda and Yamamoto: Journal of Econometrics 66, 1995, pp. 227). This procedure has two important advantages over the standard causality tests. First, it conducts Granger causality tests with allowance for the long-run information often ignored in systems that requires first differencing and pre-whitening.² Secondly, this methodology is useful because it bypasses the need for potentially biased pre-tests for unit roots and cointegration, common to other formulations such as the vector error correction model (VECM).

Toda and Yamamoto (1995) procedure involve a modified Wald (MWALD) test in an augmented VAR model, and do not require pretesting for cointegration properties of the system. The idea underlying the Toda-Yamamoto (TY) test is to artificially augment the true lag length (say, p) of the VAR model by the maximal order of integration (d_{max}) that might occur in the process. Then, one can estimate the VAR model with a $(p + d_{max})$ order, ignoring the coefficients of the last d_{max} lagged vectors, and test the linear or nonlinear restrictions on the first k coefficient matrices by the standard Wald test. Toda and Yamamoto (1995) prove that the Wald statistic used in this setting converges in distribution to a χ^2 random variable, no matter whether the process is stationary or nonstationary. The preliminary unit root and cointegration tests are not necessary to implement the DL test, since the testing procedure is robust to the integration and cointegration properties of the process.

Consider the following VAR(p) model:

$$Y_t = \gamma + A_1 Y_{t-1} + \dots + A_p Y_{t-p} + \varepsilon$$

where, y_t , c , and $\varepsilon_t \sim (0, \Omega)$ are n -dimensional vectors and A_k is an $n \times n$ matrix of parameters for lag k . To implement the T-Y test the following augmented VAR($p+d$) model to be utilized for the test of causality is estimated,

$$Y_t = \hat{\gamma} + A_1 \hat{Y}_{t-1} + \dots + A_p \hat{Y}_{t-p} + A_{p+d} \hat{Y}_{t-p-d} + \hat{\varepsilon}$$

where the circumflex above a variable denotes its ordinary least squares (OLS) estimate. The order p of the process is assumed to be known, and d is the maximal order of integration of the variables. Since the true lag length p is rarely known in practice, it can be estimated by some consistent lag selection criteria. Note that if the maximal order of integration $d=1$, then the T-Y test becomes similar to the DL test. The j th element of Y_t does not Granger-cause the i th element of Y_t , if the following null hypothesis is not rejected:

H_0 : the row i ; column j element in A_k equals zero for $k = 1, \dots, p$

The null hypothesis is tested by a Wald test which is termed as modified Wald (MWALD) test in case of the augmented VAR outlined above.

3.2 Data and Data Sources:

This study concentrates on investigating the Granger Causal Relation proposed by Toda-Yamamoto (1995) between Dhaka Stock Exchange (DSE) all share price index and a set of 4 stock market oriented variables usually defined as micro economic variables (i.e. market dividend yield, market price earnings multiples, the first lag of the monthly average market capitalization and first lag of monthly average trading volume). For the purpose of this study DSE all share price index (DSI) data was collected for the period from January 2000 to December 2010 (132 monthly observations). The data source of DSE all share price index is the 'Monthly Review' publication issued by Dhaka Stock Exchange (DSE). Monthly data for the set of selected microeconomic variables for the same period were collected from same source of 'Monthly Review' published by DSE. But it is very important to mention that the market variables used in this study are absolutely total market oriented secondary data regardless of any specific industry. These entire market oriented microeconomic variables are selected to ensure conformity with the DSE all share price index which also works like an indicator of stock market price movement.

4. Empirical Result:

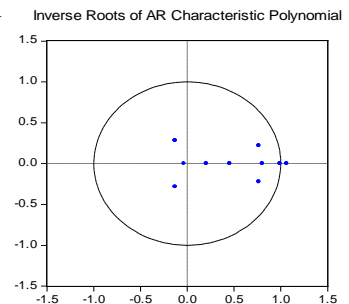
4.1 Unit Root Test:

T-Y procedure of Granger Causality proposes to test the order of integration in all the variables under each investigation. In the econometrics literature, there have been a variety of unit root test that can be used for identifying the order of integration (for example Dickey and Fuller, 1979; Sargan and Bhargava, 1983; Phillips and Perron, 1988; Kwiatkowski, Phillips, Schmidt, and Shin, 1992 among the others) and each has been widely used in the applied economics literature. In this study Augmented Dickey-Fuller (ADF) Test, Phillips and Perron Test (P-P) test and Kwiatkowski, Phillips, Schmidt, and Shin (KPSS) test has been used to identify the order of integration in each and every variable. ADF and P-P test assumes the identical null hypothesis of nonstationary data series against an alternative hypothesis of stationary data series. On the other hand, KPSS assumes stationery data series as null hypothesis and nonstationary data series in the alternative hypothesis. The basic reason for selecting this three types of unit root test is to ensure a cross check in estimating the order of integration in each variables. Table-1 presents the test result of the order integration under ADF test, P-P test and KPSS test. Test result reveals that, under ADF test DSI, DY, MKTPE, and MATVM (-1) all are first order integrated data series and MAMCAP (-1) is the only second order integrated data series. Under P-P test, we have found that all the data series under study hold the order of integration one. Whereas, KPSS test result shows that same output about the order of integration in each of the variables. So, in terms of test result ADF and KPSS reveals the same output but P-P shows slightly different result which is very insignificant. Similarity in the order of integration is significant in T-Y Granger Causality procedure because it is expected that when variables are integrated of the same order,

they must have a cointegration relation that also contribute to have Granger Causal relation among the variables.

4.2 Selection of Lag length by Information Criteria:

When we know that 4 out of total 5 variables are I (1) then we set up a VAR model using all the variables regardless of the order of integration in the time series. In this case, an optimum lag length is selected based on VAR lag order selection criteria which are presented in Table 2. According to this estimated presented on table: 2, sequential modified LR test statistic (LR), final prediction error (FPE) and Akaike information criterion (AIC) shows that optimal lag length is 7 but Schwarz information criterion (SC) and Hannan-Quinn information criterion (HQ) shows that optimal lag length is 1 and 3 respectively. After considering majority we finally proceed with optimal lag length 7. We also test the VAR model in respect of serial correlation with lag order 7. Table: 3 presents VAR residual serial correlation LM test result which also show that at lag order 7 the VAR model is not affected by serial correlation problem. At this level, the VAR with lag order 7 is found to be dynamically stable presented above.



4.3 Johansen-Juselius Cointegration Test

The Johansen method applies the maximum likelihood procedure to determine the presence of cointegrating vectors in non-stationary time series as a vector autoregressive (VAR). Consider a VAR of order p

$$Y_t = A_1 Y_{t-1} + A_2 Y_{t-2} + \dots + A_p Y_{t-p} + B X_t + \epsilon$$

where Y_t is a k-vector of non-stationary I(1) variables, X_t is a d vector of deterministic variables, and ϵ is a vector of innovations. We can rewrite the VAR as:

$$\Delta Y_t = \Pi Z_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta Y_{t-i} + B X_t + \epsilon$$

Where

$$\Pi = \sum_{i=1}^p A_i - 1 \quad \text{and} \quad \Gamma_i = \sum_{j=i+1}^p A_j$$

Here Y_t is a vector of nonstationary variables. The information on the coefficient matrix between the levels of the series Π is decomposed as $\Pi = \alpha\beta'$ where the relevant elements of the α matrix are adjustment coefficients and the β matrix contains the cointegrating vectors. Johansen and Juselius (1990) specify two likelihood ratio test statistics to test for the number of cointegrating vectors' The first likelihood ratio statistics for the null of exactly r cointegrating vectors against the alternative of r+1 vectors is the maximum eigen value statistic. The second statistic for the hypothesis of at most r cointegrating- vectors against the alternative is the trace statistic. Critical values for both test statistics are tabulated in Johansen and Juselius (1990). The number of lags applied in the cointegration tests is based on the information provided by the SC and HQ information criteria.

The test of cointegration based on Johansen and Juselius (1990) has been performed assuming a linear deterministic trend with an optimum lag length 7. At first, the unrestricted cointegration rank among the variables under study is examined through the use of trace statistics and eigenvalue statistics. Trace statistics test the null hypothesis of $r = 0$ or $r \leq 1$ against alternative hypothesis of $r \geq 1$ or $r = 2$. On the other hand maximum eigen value statistics test the null hypothesis of $r = 0$ or $r = 1$ against alternative hypothesis of $r = 1$ or $r = 2$. Table -4 reveals that trace statistics reject the null hypothesis of no cointegrating relationship among the variables. An examination of trace statistics with that of critical value at 5 percent indicates that there are three cointegrating equation among the variables. Another important test to identify the number of cointegrating vectors is examination of maximum eigen value. This test (see Table: 4) also reveals the identical result that there is three cointegrating equation among the variables.

However, 4 out of 5 variables are stationary at first difference. This means that $d_{max} = 1$. So, the study estimate a system of VAR at levels with a total of $k+d_{max}= 7+1 = 8$ lags in the model. Now a VAR model has been estimated with lag 7 for each and every endogenous variables and additional one lag (i.e. due to $d_{max} =1$) is used for all the variables as exogenous variables.

4.4 T-Y Granger Causality Test

The empirical results of Granger Causality test based on Toda and Yamamoto (1995) methodology is estimated through MWALD test and reported in Table: 5. The estimates of MWALD test shows that the test result follows the chi-square distribution with 7 degrees of freedom in accordance with the appropriate lag length along with their associated probability.

According to this estimates DSI, in any way, has no causal relation with DY. This finding supports “*Dividend Irrelevance Theory*” which theorizes that the dividend itself has no influence over stock return. This finding is supported by other empirical evidence [Black and Scholes (1974), Hamid and Chowdhury (2005), Ali M. B. and Chowdhury T.A. (2010) etc.]. The test estimates also shows that DSI has bi-directional causal relation with MKTPE. This findings is also supported by another study by Pu Shen (2000), Vorek M. (2009), Ong, T.S., Yichen, Y.N., Teh, B.H., (2010), Ali M. B. (2011) etc. On the other hand T-Y granger causal relation is found from DSI to MAMCAP(-1) but no causal relation from MAMCAP(-1) to DSI which simply implies that investors at Dhaka Stock Exchange (DSE) are influenced by the lagged performance of the monthly stock market capitalization. Finally, DSI has bi-directional causality with MATVM (-1) which is an evident that lagged value of the trading volume contributes to upcoming stock prices and stock prices could be a parameter to estimate lagged trading volume.

5. Conclusion:

This paper applies unit-root test based on ADF, PP and KPSS and Johansen and Juselius Cointegration test (1990) and VAR based Granger Causality Test proposed by Toda-Yamamoto (1995) to investigate long run equilibrium relationship and granger causality between DSE all share price index and a set of four macroeconomic variables from January 2000 to December 2010. It is found that the variables under study have long-run equilibrium relationship among themselves. Stock returns in Bangladesh are, therefore, predictable using past information. After then, Granger Causality among the variables are tested based on T-Y methodology and test result reveals that stock prices, in any direction, doesn't granger cause market dividend yield. Bi-directional granger causality has been found between stock index and market price-earnings multiples and the first lag of the monthly average trading volume. At the same time unidirectional granger causality is also found from stock index to the first lag of the monthly average market capitalization. All the test result found here is highly supported by Finance Theories, Behavioral Finance and empirical evidence. Moreover, with the liberalization of the market, foreign investors with their domestic counterparts may influence the prices usually at their advantage. The relative small size of the stock market and the limited number of literate market participants are likely to constrain the free market play and thereby impacting the usual price behavior of the market and economic growth in Bangladesh.

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Table – 1 : Test of Order of Integration																
Variables	Augmented Dickey-Fuller Test						Phillips-Parron Test						KPSS Test			Critical Value @ 1 %
	ADF Test Stat						P-P Test Stat						I(0)	I(1)	I(2)	
	I(0)		I(1)		I(2)		I(0)		I(1)		I(2)					
	t-stat	prob	t-stat	prob	t-stat	prob	Adj t-stat	prob	Adj t-stat	prob	Adj t-stat	prob	LM Stat.	LM Stat.	LM Stat.	
DSI	2.122	1.00	-8.687	0.00			1.7358	1.00	-8.6761	0.00			0.2240	0.1649		0.216000
DY	-1.802	0.69	-10.08	0.00			-1.9707	0.61	-10.0942	0.00			0.1197	0.0933		
MKTPE	-2.534	0.31	-10.32	0.00			-2.8236	0.19	-10.3571	0.00			0.1054	0.0348		
MAMCAP (-1)	2.875	1.00	-0.052	0.999	0.995	0.002	7.2144	1.00	-5.4107	0.00			0.2915	0.2383	0.162	
MATVM (-1)	3.761	1.00	-12.88	0.00			2.7348	1.00	-12.8801	0.00			0.3237	0.1635		

Table 2: VAR Lag Order Selection Criteria						
Endogenous variables: DSI DY MKTPE MAMCAP(-1) MATVM(-1)						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	-6965.464	NA	1.15e+43	113.3409	113.4552	113.3873
1	-6209.902	1437.410	7.98e+37	101.4618	102.1477*	101.7404
2	-6170.841	71.13549	6.36e+37	101.2332	102.4907	101.7440
3	-6129.243	72.37335	4.88e+37	100.9633	102.7924	101.7063*
4	-6101.540	45.94643	4.72e+37	100.9194	103.3200	101.8945
5	-6053.447	75.85373	3.29e+37	100.5439	103.5161	101.7512
6	-6025.583	41.68369	3.21e+37	100.4973	104.0411	101.9368
7	-5990.210	50.03936*	2.81e+37*	100.3286*	104.4440	102.0003
8	-5973.336	22.49892	3.35e+37	100.4607	105.1477	102.3646

Table 3: VAR Residual Serial Correlation LM Tests

Null Hypothesis: no serial correlation at lag order h

Lags	LM-Stat	Prob
1	56.78838	0.0003
2	74.87943	0.0000
3	32.52651	0.1433
4	58.81361	0.0002
5	75.28658	0.0000
6	74.50472	0.0000
7	26.84967	0.3634
8	43.85127	0.0113
9	29.59949	0.2396
10	52.47458	0.0010
11	43.14681	0.0135
12	45.68855	0.0070

Table- 4 : Unrestricted Cointegration Rank Test (Trace) and (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Trace Statistic	0.05 Critical Value	Prob.**	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	148.0925	69.81889	0.0000	61.06181	33.87687	0.0000
At most 1 *	87.03072	47.85613	0.0000	41.14278	27.58434	0.0005
At most 2 *	45.88794	29.79707	0.0003	31.94995	21.13162	0.0010
At most 3	13.93798	15.49471	0.0847	13.88762	14.26460	0.0573
At most 4	0.050363	3.841466	0.8224	0.050363	3.841466	0.8224

Table 5 :T-Y Granger Causality Test

Direction of Causality			df.	Chi-sq.	Prob.
DSI	~	DY	7	11.81580	0.1068
DY	~	DSI	7	3.534857	0.8315
DSI	→	MKTPE	7	15.41360	0.0310
MKTPE	→	DSI	7	17.40174	0.0150
DSI	→	MAMCAP(-1)	7	19.10271	0.0079
MAMCAP(-1)	~	DSI	7	10.11659	0.1821
DSI	→	MATVM(-1)	7	44.02571	0.0000
MATVM(-1)	→	DSI	7	20.17998	0.0052

* sig. at 5 percent level

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