Determinants of Stock Price Movements: Evidence from Chittagong Stock Exchange, Bangladesh

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Abstract
Stock market plays a vital role in the economic development of an economy. It bridges up between savers and real manufacturers by raising funds from investors to companies. This process was broken down due to the 2010-2011 stock market crash in Bangladesh. Though the determinants of stock price have been settled empirically, the current paper aims to reexamine the relationship between stock price, dividend and retained earnings of 29 listed banks of Chittagong Stock Exchange, in the post-crash period. Cross-sectional data were collected from secondary sources. Using linear regression method, the study found that both, dividend and retained earnings of sample banks have strong influence over the stock price, though there was moderate explanatory power of those variables. After reviewing the causes of crisis 2010-2011, this study suggests the following: to control price manipulation, to publish proper financial statement, regulate the dividend policy, to ensure sufficient knowledge among investors, recruit technical expert and ensure proper settlement for transactions,
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prevent crises of stock market against speculation etc.

**Keywords:** Bangladesh, Chittagong Stock Exchange, dividend, retained earnings, share price.

**Introduction**

Bangladesh Stock Market faced a serious crash in 2010-2011. Economists and policy analysts identified several factors responsible for this crisis (Saha, 2012). Since Dhaka Stock Exchange (DSE) and Chittagong Stock Exchange (CSE) have been working in Bangladesh, stocks are therefore traded under those markets. Stock market crash was mainly realized by drastic fall in several indices published by DSE and CSE during late 2010 and early 2011. Many small investors lost their fund due to this crash. Empirically, some factors such as dividend, retained earnings, price earnings ratio, are identified as determinants of stock price; recent crisis did not perfectly reflect these factors in determining stock price in Bangladesh. The current study seeks to reexamine the stock price function in context of CSE and make comments on empirically tested factors after facing severe crisis.

The Chittagong Stock Exchange Limited was incorporated as a company on 1 April 1995, started its floor trading on 10 October in the same year from Chittagong City with the promise to create a state-of-the-art bourse in the country while this stock market launched its internet-based trading on 30 May 2004 (CSE website). Founder members of the proposed Chittagong Stock Exchange approached the Bangladesh Government in January 1995 and obtained the permission of the Securities and Exchange Commission on February 12, 1995 for establishing the country's second stock exchange. The Exchange comprised of twelve Board members, presided by Mr. Amir Khosru Mahmud Chowdhury (MP) and run by an independent secretariat from the very first day of its inception. CSE was formally opened by then Humble Prime Minister Begum Khaleda Zia on November 4, 1995. The main objectives of CSE are to develop a strong platform for the entrepreneurs for raising capital, a transparent market ensuring investor protection, to provide fully automated trading system, ensure quick, easy settlement system, attract non-resident Bangladeshis to invest in Bangladesh Stock Market, to develop a high standard of commercial
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practice and a research cell for analysis the status of the market. CSE offers buying, selling and dealing in shares securities, bonds, debentures, government papers and any other instruments through brokers and dealers. It is also involved in disseminating information to investors by publishing monthly portfolio and other necessary publications. The exchange is also involved in research and development activities pertaining to capital market.

Currently, CSE is managing several indices such as CSE All Share Price Index (CASPI), CSE Selective Categories Index (CSCX), CSE-30 Index (CSE-30) and Sector-wise Indices. All the indices of the CSE are calculated and maintained following Laspayers Method, which was considered as the most transparent and scientific at the time of its inception. Now it is required to adopt a modern and internationally accepted calculation methodology to provide a more sensitive, investable, tradable and transparently managed Index. The enhanced CSE indices will provide a platform for a wider range of investable and appealing opportunities.

**CSE All Share Price Index (CASPI):** The only index the CSE has been maintaining since 10th October 1995 is a CASPI using Chained Paasche method. It faces question of clarity. This index was subject to unusual ups and downs and without a distinct base value. Therefore in need of a clean slate, CSE finds the date 1 January 2000 is the best date to start new Indices. An CASPI with new formula and base date 30th December 1999 (the last day of the year) and new base index of thousand (to mark the millennium) will replace the existing one and a completely new Selective Index incorporating 30 scrips with base date 30th December 1999 and base index 1000. After studying the index of a number of bourses, we have found the Laspeyres Method to calculate index in a transparent and scientific way.

**CSE Selective Index (CSE-30):** At the beginning of the new millennium, a selective Index has been introduced, which is very popular in almost all the developed exchanges worldwide. It is to be used as a benchmark of performance. The criterion is that the movement of the index fully represents the aggregate movement of the index's constituent assets and that the index's returns are realizable by an investor who has held a portfolio identical to the asset mix of the index. Selection of stocks for the benchmark index must represent the whole market. In addition, it guarantees that the constituent stocks have high percentage coverage of the market in terms of market value. This makes
it difficult, if not possible for a few investors to manipulate the movement of the index.

**CSE Selective Categories Index (CSCX):** CSE launched a new index named CSCX comprised A, B & G category companies from 14th February 2004 to replace the earlier CSE Trade Volume Weighted Index. The Base Date of this index is 15th April 2001 (when A, B & Z category were introduced) and Base Value is set to 1000. The new index includes all, but not the Z category companies. This also excludes the companiesscrips which are debt securities, mutual funds, suspended for indefinite period and non-traded for preceding six months of review meeting. The index will be reviewed in the Index Committee Meeting after every six months like other two indices of CSE. The construction principle of this index is based on Laspeyres method like two other CSE indices, CASPI and CSE-30 Index. It may be mentioned here that the base value of these two indices was also set to 1000 with a base date 30th December 1999.

**CSE Selective Index (CSE-50) and CSE Shari’ah Index (CSI):** CSE launched two new Indices namely CSE-50 Index (Benchmark) and CSI on 12 October, 2014. CSE-50 has been developed by India Index Services & Products Limited (ISIL), as per the specifications and requirements of CSE.

As seen from the Table no. 1, based on total trade, CSE-30, CSCX, and CASPI, we can say that the market condition is improving during the period 2006-2010. From 2010 to 2012, all of the indices were falling down and recently major stock indices have been turning up, except trade variable. On the other hand, we could not show any trend in CSE-50 and CSI, as both of these indices where introduced very recently.
By selecting more representative indices such as total trade, CASPI and CSE-30 for the closer period to the stock market crash (from the period of 2009 to 2012), it can be inferred from the figure no.1 that CSE has fall in serious depression after the crash. However, now a total of 289 companies including bank, cement, ceramic, energy, engineering & electrical, foods & allied, general insurance, ICT, leasing & finance, leather & footwear, life insurance, papers & printing, pharmaceuticals &
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chemicals, services & property, telecommunication, textiles & clothing, corporate bond, mutual funds etc. are listed in CSE.

This paper is structured as follows: section two presents the research objectives, section three is a literature review, section four discusses the methodology used and section five the empirical results. Conclusions are in the last section.

Research Objectives

The prime objective of this study is to examine the determinants of market share price and to make comments on their functional relationships with the market price of common stocks trades in CSE, an emerging capital market of Bangladesh. The specific objectives are:

- To estimate the stock price function for some privatized commercial banks listed in CSE;
- To analyze the relationship between share price, dividend and retained earnings of those banks based on estimated parameters;
- To provide a viable directions for the stock market in general, and for the CSE in particular, so that the stock market can overcome the crisis in future.

Literature review

Present, past and future earnings of the company generally guide the shareholders’ expectations of dividends and capital gains. The portion of earnings into dividends and retained earnings is taken into account by the investors. Two major hypotheses are basically developed to explain the determinants of share price: Dividend hypothesis and Retained earnings hypothesis. The dividend hypothesis attributes the explanation of share prices to the proportion of earnings that are distributed as dividends. Share price of a company with higher dividend payout would be higher. Even, if earnings remain the same, share price will increase as dividend payout increases. Retained earnings hypothesis, on the other hand, contends that higher share prices are consequences of higher retained earnings. Retained earnings being an important source of internal financing for business expansion effect share prices by their influence on future earnings.

Kumar and Mohan (1975) hypothesized that the market price of share is a function of dividends and retained earnings. The coefficients they estimated for the two explanatory variables, dividends and retained
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earnings are more or less equally significant. They argued that the dividend hypothesis has a little superiority over the retained earnings in determining the share prices.

Uwuigbe, et al. (2012) built a model to show the effects of financial performance, dividend payout and financial leverage on the share price of listed firms operating in the Nigerian stock exchange market using the regression analysis method. The study concludes that firms’ financial performance, dividend payouts and financial leverage are strong determinants of the market value of share prices in Nigeria.

Hussainey, et al. (2011) studied the impact of dividend policy on Stock prices. The results of their study show the positive relation between dividend yield and stock price changes and the negative relation between dividend payout ratio and stock price changes. Their results further indicated that the firms’ earnings, growth rate, level of debt and size also cause the change in stock price of UK.

Baker and Powell (2012) used similar survey technique to take the opinion of Indonesian managers about the factors influencing dividend policy, dividend issues and explanations for paying dividends. The results of their survey shows that Indonesian managers consider stability of earnings and level of current and expected future earnings as the most important determinants of the dividend policy.

Naveed and Ramzan (2013) selected a sample of 15 banks from Karachi stock exchange (period 2008-2011). The analysis utilized the fixed effect regression model, the test includes regressing the dependent variable ‘share price’ and independent variables ‘size’, ‘dividend yield’, ‘return on asset’ and ‘asset growth’. Results show that ‘size’ has a positive significant relationship with the share price, while the other variables (Dividend yield, Asset growth, Return on assets) have insignificant relationship.

Mustafa, et al. (2013), based on the monthly data from January 1992 to June 2009, investigated the relationship between money supply, interest rate and stock prices. Using error correction model, cointegration and granger causality test to check the relationship between money supply and share prices, the study suggests that there exists unidirectional association between share prices and supply of money. This study also found that the money supply is not the strong determinant of stock prices and interest rates affect the share prices, which gives an idea about the monetary policy.
Nirmala, et al. (2011) identified the determinants of share prices in the Indian market. The study uses panel data pertaining to three sectors viz., auto, healthcare and public sector undertakings over the period 2000-2009 and employs the fully modified ordinary least squares method. The results indicate that the variables dividend, price-earnings ratio and leverage are significant determinants of share prices for all the sectors under consideration. Further, profitability is found to influence share prices only in the case of auto sector.

Islam, et al. (2014) compares the volatility of price between DSE and CSE. Result shows that CSE is more volatile than DSE and the general price is less volatile than CSE-30 and DSE-20. It implies that the top 20 and 30 securities influence the whole market. If the price of these securities increases, the price index increases. Ups and downs of the price of these securities in CSE are higher than that of DSE. Although investors are suffering from lack of information about the quality of securities, they take investment decision considering the general price index of two markets. Some time it may mislead the investor the differences of indexes of two markets.

Khan (2009) analyzed the empirical evidences which show that dividends, retained earnings and other determinants have dynamic relationship with the market share price. Findings also suggest that the overall impact of dividend on stock prices is comparatively better than that of retained earnings and expected dividends play an important role in the determination of stock prices whatever determinants, like lagged price earnings ratio or lagged price, are considered.

**Research Methodology**

**Sample**

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Sources of Data
Cross-sectional data has been collected from secondary sources such as official website of CSE and annual reports of sample banks. Data has been collected for the period of 2013. Stock price was calculated from annual average stock price and it was collected from CSE website. Dividend and retained earnings were collected from banks’ annual reports, where dividend represents cash dividend or stock dividend or combined. The reason behind choosing this year is that the Stock market experienced a crash in 2010-2011 in Bangladesh. To know the stock price determinants, we have chosen the post crash period for our study.

Dependent Variables, Independent Variable and Econometric Modeling
Generally, earnings of the company guide the shareholders expectations’ of dividends and capital gains. Two basic hypotheses are predominant in this case: dividend hypothesis and retained earnings hypothesis. In this paper, we hypothesize that the market price of share is a function of dividends and retained earnings. Therefore, a multi-variables linear regression model was run under which Ordinary Least Squares (OLS) method has been applied to estimate the parameters, and the stock price has been regressed on dividend per share of stock and retained earnings.

Model Specification
For our simplicity, we will estimate the following linear stock price equation.

\[ P_t = \alpha_0 + \alpha_1 D_t + \alpha_2 R_t + \varepsilon; \]  

\[ \text{Where,} \]

\[ P_t = \text{price of stock of } t\text{h bank at time } t; \]

\[ D_t = \text{dividend per share of stock of } t\text{h bank at time } t \]

\[ R_t = \text{retained earnings of } t\text{h bank at time } t \] and \[ \varepsilon = \text{error term} \]
Hypothesis
Based on the above model, the following hypotheses have been established.
Hypothesis 1: Share price does not depend upon the dividend
Hypothesis 2: Share price does not depend upon the retained earning
Since the number of observations lies below thirty (n < 30), t-test is the appropriate test statistic to test the null hypotheses (Kothari, 2008, p. 197).
\[ t = \frac{\bar{X} - \mu}{\sigma/\sqrt{n}} \]
where \( \bar{X} \) is the sample mean, \( \mu \) is the population mean, \( \sigma \) is the population variance, and \( n \) represents the size of sample.

‘Goodness of Fit’ Test
To test the explanatory power of the equation, coefficient of determination (R square) has been calculated in this model.

Multicollinearity Test
In this study, Pearson Correlation, Eigen Value (EV), Condition Index (CI), Variance Inflating Factor (VIF) was used to test the multicollinearity (Gujarati, et al. 2012, p. 358-359).

Condition Number,
\[ K = \frac{EV_{\text{max}}}{EV_{\text{min}}} \quad \text{and} \quad CI = \sqrt{\frac{EV_{\text{max}}}{EV_{\text{min}}} = \sqrt{k}} \]

In case of 100 < k < 1000, there is a moderate to strong multicollinearity and if k > 1000, there is a severe multicollinearity. Alternatively, CI lies in between 10 and 30, there is a moderate to strong multicollinearity.

The larger the value of VIF \( j \), the more collinear the variable \( X_j \). If the VIF of a variable exceeds 10, the variable is said to be highly collinear. In connection with this, Tolerance TOL \( j \) is another measure of multicollinearity where the closer TOL \( j \) is to zero, the greater the degree of collinearity of that with the other regressors.
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Analysis of Data
Statistical Software for Social Sciences (SPSS) was applied to produce suitable results such as estimates, t-value and standard error of estimates and accordingly the results were analyzed.

Empirical Results
Multicolinearity
In the following table, the Pearson Correlation is discussed.

Table no. 2. Pearson Correlation

<table>
<thead>
<tr>
<th></th>
<th>Stock Price</th>
<th>Dividend per Share</th>
<th>Retained Earnings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stock Price</td>
<td>1.000</td>
<td>0.669</td>
<td>-0.079</td>
</tr>
<tr>
<td>Dividend per Share</td>
<td>0.669</td>
<td>1.000</td>
<td>0.332</td>
</tr>
<tr>
<td>Retained Earnings</td>
<td>-0.079</td>
<td>0.332</td>
<td>1.000</td>
</tr>
</tbody>
</table>

From the Table no. 2, partial correlation between Stock price and dividend per share was found 0.669 and that between stock price and retained earnings was found -0.079. That is, the earlier two variables are positively correlated (though it is strongly correlated), and the later two variables are negatively correlated (and very poorly connected each other).

Table no. 3. Collinearity Test

<table>
<thead>
<tr>
<th>Collinearity Diagnostic</th>
<th>Collinearity Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimension</td>
<td>Eigen Value (k)</td>
</tr>
<tr>
<td>1</td>
<td>2.797</td>
</tr>
<tr>
<td>2</td>
<td>0.127</td>
</tr>
<tr>
<td>3</td>
<td>0.075</td>
</tr>
</tbody>
</table>

From the Table no. 3, it can be said that since the Eigen values falls below 100 and CI is less than 10, there is weak multicollinearity among explanatory variables. Also, having less than 10 VIF of each variable shows the poor connections among independent variables. The similar result also found from the Tolerance as it lies far from zero value.
Estimated Equation
Stock price behavior of the banks listed in CSE and its relation with dividends, retained earnings are analyzed. Actual data on variables in question are used for the estimation for the period of 2013 in this study. Data also take care of the short-term influences of transitory effects of the dependent and independent variables.
Equation (ii): Linear Relationship between Stock Price, Dividend per Share and Retained Earnings for Listed Banks in CSE for the Period 2013
\[ P_t = 3.440 + 2.145D_t - 0.011R_t \] ...........................(ii)
\[ t \ (0.508) (5.595) (-2.423) \]
\[ S_e (6.774) (0.383) (0.005) \]
\[ R^2 =0.549 \quad n=29 \]

From the above equation, it is seen that the relationship between stock price and dividend is positive, and we can say that a 1 Taka increase in dividend results 2.145 Taka increase in stock price. On the other hand, retained earning is inversely related with stock price, i.e. a 1 Taka increase in retained earnings causes 0.011 Taka decrease in share price. Finally, constant term of the estimated equation shows that other factors excluded from this model have also a positive influence on the share price.

Testing Hypothesis
From the calculated t value, it can be inferred that the relation between share price and dividend is statistically significant. That is, we can reject null hypothesis at 1 percent level of significance. The relation between share price and retained earning is also statistically significant. That is, we can reject null hypothesis at 5 percent level of significance. However, the constant term is statistically insignificant at even 1 percent level of significance.

Overall Explanatory Power
R-square equal to 0.549 means that more than 54 percent of variation in dependent variable is explained by dividend and retained earnings. This result proves that there is a moderate relation between share price and independent variables.
Conclusion

This study concludes that both dividend and retained earnings are strong determinants of stock price at significant level. But it can be inferred from the ‘goodness of fit’ test that other variables might have strong influence over the stock price. Based on our results, it should also suggest here that the concerned parties should be honest in dealing stock transactions.

The major findings of this study are:

*Price manipulation:* It has been observed that the share value of some profitable companies has been increased fictitiously some items that hampers the smooth operation of Stock market.

*Improper Financial Statement:* Many banks do not focus real position of the bank as some audit firms involve in corruption while preparing financial statement. As a result, the shareholders and investors do not have any idea about the position of those banks.

*Irregulation in Dividend:* Some banks do not hold Annual General Meeting (AGM) and eventually declare dividends that confused the shareholders about the financial positions of the bank.

*Lack of knowledge:* Like any other bank, people who invest or involved in capital market activities, have not sufficient knowledge about the market and product. Even, they do not know how to make a valuation of a share. As a result, they have to suffer losses.

*Manipulations and Scams:* The Environment around the capital market is full of rumors of scams and wrong dealings. Brokers are accused of manipulating prices. Banks are accused of miss-pricing their stocks of floating rumors and of misrepresentation of performance. It is impossible to determine the validity of the accusations.

*Selection of Membership:* Some members being the directors of listed companies of DSE, CSE look for their own interest using their internal information of share market.

*Delays in Settlement:* Financing procedures and delivery of securities sometimes take an unusual long time for which the money is blocked from nothing.

*Market Crash:* In the last century, the most significant stock market crashes occurred in USA in 1929 and 1987. The scenario of stock market crash in 1996 and those from the period 2010-2011 happened in Bangladesh are totally different from those crashes in USA. The number of BO account holders was only 300,000 and most of them were very new in the market. During the crash of 1996, paper shares used to be
sold in front of DSE and it was not easy for investors to identify fake and original shares. The market was enough developed to gain confidence of investors. There was no automated trading system, surveillance was not enough strong and no circuit breakers, as well as international protections. The main reasons of stock market crises are imbalance of demand and supply of shares. Investors didn’t have idea about financial report of listed securities or unfair audit report; buying shares based on rumor and without study, majority of general investors don’t have knowledge about capital market, intervention of Bangladesh Bank, over expectation of general investor, liquidity crisis, role of market regulators and their employees etc. In fact, the military-backed government could not cope up with this situation due to their political illegitimacy.

Based on the above-mentioned findings, the following suggestions are formulated for a stable and better stock market:

Controlling Price manipulation: Concerned authority should introduce automated monitoring system that may control price manipulation, malpractices and inside trading.

Proper Financial Statement: Each company must have to publish the proper financial positions of the shareholder. As a result, most of the people or investors can acquire the financial positions of the companies.

Regulation in Dividend: The Company must hold Annual General Meeting (AGM) and clearly declare the dividend during the period.

Sufficient Knowledge: The people or investors must know the financial position, the valuation of share price, dividend and paid up capital etc of the company.

Appointment of Technical Expert: The technical experts have to appointed for the system department, in order to minimize the work burden.

Proper settlement: Full computerized system should be introduced for the settlement of transactions.

Preventing crises of stock market: In order to prevent stock market crash, regulators should perform their job honestly and sincerely, SEC needs honest officials, insider trading should be prohibited, Omnibus should be converted to BO account, actions should be taken against those who were involved in this recent stock market crash, improving security laws and penalty for breaking those, balancing of demand and
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supply of shares, and follow-up the market and protect against any kind of manipulation.

*Islamic Rules against Speculation:* Instead of following trial and error method, Islamic norms and rules should voluntarily be followed by every player in the stock market to avoid *gharar* (uncertainty) and *jahala* (want of knowledge) (Tag el-Din, 2002). Stock market should also emphasize on the maximum price of share to be declared by the firm based on its actual position (Metwally, 1984). Professional knowledge over the non-professional experience in this regard should dominate to overcome those speculations though undesired.

*Motivate to invest into Eco-friendly Share:* Government, Stock market and Brokerage house should motivate investors to invest into shares and securities issued by environment friendly firms, though these firms does not offer maximum dividend or retained earnings.

**Future Research**

Enthusiastic research may find out the contribution of artificial speculation on the stock price by incorporating ‘rumor’ among investors, ‘speculative behavior’ by companies or gambler into the model in context of CSE or DSE or both.

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