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Volatility of Stock Return in the Dhaka Stock Exchange

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Abstract

This note examines the volatility in stock prices in the Dhaka Stock Exchange (DSE) during 2003-2007. Excessive volatility and fluctuations in stock price fail to provide the correct signal on company's real worth although stock prices generate useful information to ensuring efficiency of markets in the real world. Stock price volatility, however, is not an evidence of irrational market behavior or inefficient markets. The absence of price variation may result in a loss of investors' interest to participate in the market. It is important for the concerned authority to intervene when the market experiences excessive volatility since high volatility can lead to a general erosion of investors' confidence and flow of capital away from the equity market.

1. Introduction

The stock market is an important ingredient of the financial system in Bangladesh. It is an important avenue for channeling funds to investors through mobilizing resources from individuals. In view of the rapidly increasing role of the stock market, volatility in stock prices can have significant implications on the performance of the financial sector as well as the entire economy. There exists important link between stock market uncertainty and public confidence in the financial market. The policy makers usually rely on the market estimate of volatility as the barometer of the vulnerability of the stock market. Stock return volatility represents the variability of day-to-day stock price changes over a period of time, which is taken as a measure of risk by the relevant agents. High volatility, unaccompanied by any change in the real situation, may lead to a general erosion of investors' confidence in the market and redirect the flow of capital away from the stock market. Excessive volatility also reduces the usefulness of stock price as a reflector of the real worth of the firm. Volatility, however, is not an evidence of irrational market behavior or inefficient markets. Stock return volatility is usually asymmetric in its response to past negative price shocks compared with the positive shocks, but what factors drive volatility over time is not clear. Moreover, increase in firm-specific risk appears to adversely affect its stock valuation. This note analyzes the volatility in stock

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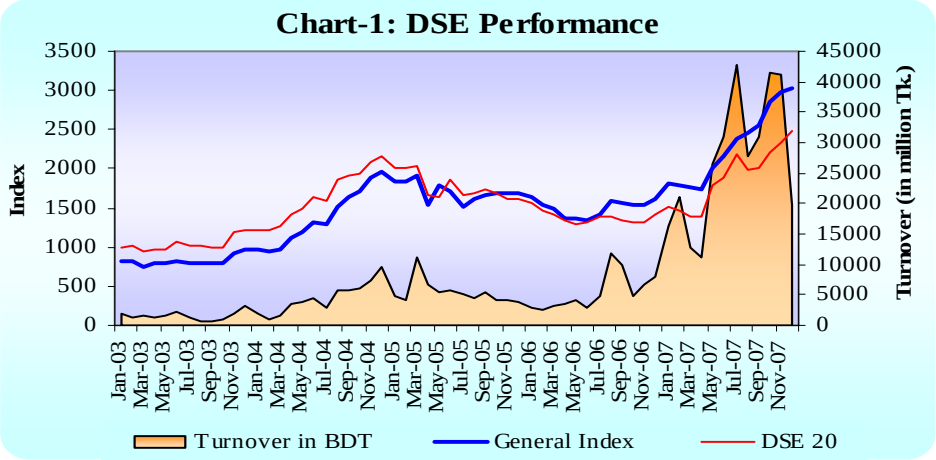
return in the Dhaka Stock Exchange (DSE) during 2003-2007 and draws some policy implications.

2. Recent Developments in DSE

Total market capitalization of all listed securities in DSE increased substantially (by around 133 percent) in end of December, 2007 to Tk. 753.9 billion which, as a share of GDP, reached a new height in 2007 of nearly 16.0 percent as against 2.3 percent in 2003. In December 2007, a total of 350 securities were listed at DSE comprising 266 companies, 14 mutual funds, 8 debentures, 61 treasury bonds, and 1 corporate bond as opposed to a total of 267 securities comprising of 248 companies, 11 mutual funds, and 8 debentures in December 2003. Thus during the last four years only 43 new companies got listed in the DSE of which only three were listed by direct listing route, and the rest were listed through public offering.



Source: Monthly Review, DSE

Market indicators started to show new dynamism from November 2003 and reached new heights at the end of December 2003 as the daily average turnover jumped to Tk.136.9 million from the recorded low of Tk 30.3 million in September 2003 (Chart 1). The DSE general index also started to rise from November 2003 which continued till the end of December 2004, as the DSE-Gen index reached its peak at 1971.3. These developments owed significantly to the banking sector performance, as indicated by market capitalization and total turnover. Declaration of lucrative incentives in the FY04 national budget, floatation of shares of some profitable companies through Initial Public Offer (IPO) along with several important reform measures initiated by the Securities and Exchange Commission (SEC) helped to regain investor's confidence back to the capital

market. The FY04 national budget exempted the purchasers of listed equities of any queries as to the source of fund so long as purchased shares were not sold or transferred within two years of purchase. This was made effective for a limited period (FY04 to FY05). In addition, dividend-income tax was exempted and a new dividend distribution tax was imposed on the companies paying dividend.[1] One important development in the capital market in 2004 was the initiation of electronic settlement through the Central Depository System (CDS) in January 2004. In order to prevent market manipulation by in-house officials of listed companies, SEC banned the purchasing or selling of shares of a company by its owners during an interim period (from the date of the financial year closure and the day of approval of accounts by the company's board). De-listing of 13 companies in August 2004 by DSE due to their repeated failure in complying with the listing rules was also an important step toward bringing discipline in the stock exchange.

The trading of Bangladesh Government Treasury Bonds (BGTBs) started in DSE from January 2005. However, in order to temper the rising trend of stock index and control excess liquidity in the capital market, SEC temporarily suspended the credit facility extended by brokers to their clients.[2] At the same time, SEC also increased the members' trade margin requirements by reducing the free trading limit from Tk. 10 million to Tk. 5 million. As a result, secondary market activities became quiet during January-February 2005 and the daily average turnover declined to Tk. 245 million from Tk. 402 million in November-December 2004. However, the daily average turnover of DSE increased to Tk. 447 million in March 2005, which significantly surpassed the level of daily average transactions during the FY03-FY05 period.[3] Considering the interest of the investors, SEC amended the margin rule in February 2004 by increasing the free limit to Tk. 10 million; and withdrew the order relating to the suspension of margin rule in April 2005. At the end December 2005, the stock index stood at 1,677.3. The market observed a downward trend during January-June 2006 and then turned positive from July 2006. In August 2006, the daily average turnover at DSE reached Tk. 561 million, where Dhaka Electric Supply Company (DESCO) and Rupali Bank Limited accounted for around 13

[1] In order to attract companies into the capital market, several other steps were also taken. The corporate tax rate for non-listed companies was fixed at 37.5 percent and for listed companies it remained unchanged at 30 percent (and 45 percent on banks, insurance, and financial institutions). However, 10 percent tax rebate was allowed for companies declaring 20 percent or more in dividend.

[2] The DSE-general index increased by 52 percent during July to December 2004 and the daily average turnover increased from Tk. 140 million in March-July 2004 to Tk. 316 million in August-December 2004.

[3] Around 59 percent of the turnover was attributed to the banking sector.

and 4 percent of the total turnover respectively.[4] In the wake of political instability, the market witnessed fluctuations during the last two quarters of 2006; the index however rose to 1,609.5 at the end of 2006.

Sign of vibrancy in DSE started from the beginning of 2007 and continued till the last trading day of the year. All the market barometers significantly rose during 2007 reflecting regained investors' confidence after 1996 stock market bubble. The increasing trend of DSE-Gen index started in January 2007 and continued over the year except for a short period covering February-April 2007. The DSE-Gen index crossed the 3,000 mark for the first time and closed at 3,017.2 on the last trading day in 2007. In October 2007, the daily average turnover at DSE reached Tk. 2,297 million, but declined to Tk. 1,244 million in December 2007 mainly due to SEC intervention.[5]

3. Measuring Stock Return Volatility

Volatility is a measure of the degree of price movements of a stock. It shows how active a stock price typically is over a certain period of time. Usually, historical volatility is measured by taking the daily (close-to-close) percentage price changes in a stock and calculating the average over a given time period. Historical volatility is often referred to as *actual volatility* or *realized volatility*. For calculating historical volatility, several steps are followed:

- A day-to-day price change is calculated using the natural log of the ratio (R_t) of a stock's price (P) from the current day (t) to the previous day (t-1) as:

$$R_t = Ln\frac{p_t}{P_{t-1}}$$

  The result corresponds closely to the percentage price change of the stock.

- The average day-to-day changes over a certain period (say, one month) is measured by adding together all changes for a given period (n) and calculating the average (Rm) as:

$$R_m = \frac{\sum R_t}{n}$$

- Price variation from the average, that is the historical volatility (HV) is the average variance from the mean (standard deviation), and is estimated as:

[4] DSE General Index stood at 1587.1 in August 2006 from 1339.5 in June 2006. Rising prices of Rupali Bank Limited and selected power sector securities partly contributed to raising the index. It is worth to note that DESCO was the first state owned enterprise to be listed in the DSE under direct listing regulation of 2006.

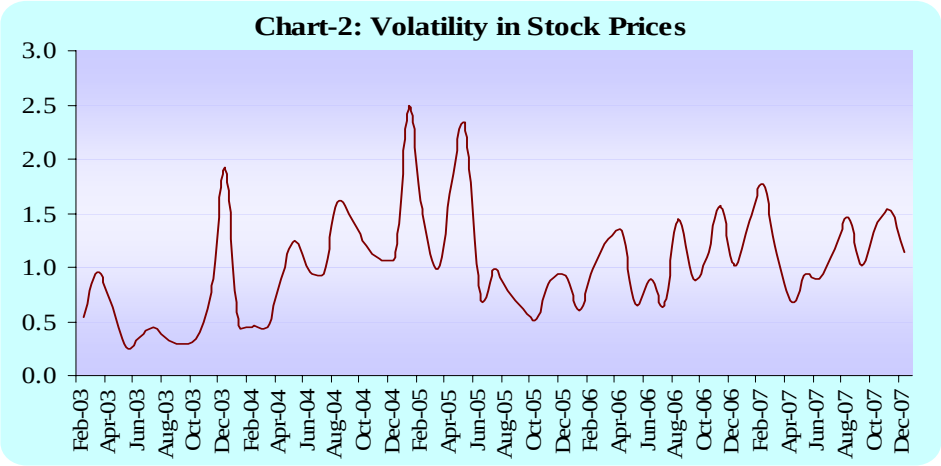
[5] In order to check the rapidly rising trend of stock index and control excess liquidity in the capital market, SEC suspended the credit facility extended by brokers and merchant banks to their clients until further notification.

$$HV = \sqrt{\frac{\sum (R_t - R_m)^2}{n-1}}$$

Thus, historical volatility provides a measure of how far the day-to-day price change swings from the average price change over a given period.

4. Volatility in Stock Return in DSE

The monthly average volatility based on daily closing index data was 1.01 percent in the DSE during January 2003 to December 2007. The highest volatility of 2.5 percent was observed in January 2005 and the lowest of 0.3 percent in May 2003.



The volatility in stock return in DSE seems to follow clustering at particular points; there are periods of high volatility followed by periods of low volatility (Chart 2). During January-November 2003, volatility remained somewhat stable and stayed below the monthly average level of the period 2003-2007. In December 2003, the stock market experienced a high volatility of 1.9 percent which was much higher (by 91 basis points than the average 1.01% during 2003-2007) than the average level. The volatility was mainly driven by the demand side pressure following the lag effect of the declaration of the tax administration allowing investment of undisclosed money in listed securities without asking questions on the source of the fund and efforts at rebuilding investors' confidence through introducing script-less electronic security trading system under the Central Depository Bangladesh Limited (CDBL). The volatility started to ease from January 2004 and continued up to March 2004. The stock market became volatile afterwards and volatility reached a peak of 2.5 percent in January 2005.[6] Volatility then started to moderate till February 2006 except in April-May 2005. The stock market

[6] DSE General Index declined from 1999.71 in 1 January 2005 to 1843.95 on the last trading day of January 2005.

witnessed more volatility in March-April 2006 (1.3 percent and 1.4 percent respectively which are above the monthly average volatility) compared with the earlier months of 2006. From October 2006 to December 2006, volatility in the stock market remained above the monthly average level. After declaration of the emergency, DSE witnessed more volatility which continued till March 2007. From April 2007, the stock market was more stable.

5. Factors Influencing Stock Price Volatility

The above analysis shows that the stock market volatility changes significantly over time. The volatility of stock return is determined by the fluctuations in stock index. Fluctuation in the stock index also depends on the demand for and supply of securities traded in the stock exchange. Sometimes the stock return volatility is driven by trading volume following new information and by the process that incorporates new information into market prices. At the aggregate level, stock return volatility rises sharply during stock price declines following bad news than in periods of stock price increase following good news. While relating changes in stock market volatility with a number of economic factors, such as financial leverage, corporate bond yields, corporate earnings and dividend yields, stock trading activity, volatility of interest rates, bond prices, and other macroeconomic variables, Schewert (1987) concludes that "none of these factors … plays a dominant role in explaining the behavior of stock volatility over time".

The supply and demand situation in the DSE shows that the supply side variable (issued capital) fluctuates less than the demand side variable, market capitalization (Table 1).

Table 1: Trend in Demand and Supply at DSE

(billion Taka)

Year	New listing (number)	Issued capital	Market cap.	Turnover	Volatility	Yearly growth (percent)		
						Issued capital	Market cap.	Turnover
2003	14	45.77	97.44	19.15	0.61	32.04	41.29	-45.25
2004	4	49.39	224.16	53.18	0.98	7.92	130.04	177.70
2005	12	56.59	228.57	64.84	1.20	14.57	1.97	21.93
2006	13	70.85	271.12	65.08	1.03	25.21	18.61	0.37
2007	14	91.93	630.98	322.87	1.21	29.75	132.73	396.11

Source: Monthly Review, DSE and authors' calculation.

In 2003 and 2004, market capitalization grew at higher rates than the growth in issued capital which led to a yearly average volatility in the DSE of 0.61 percent and 0.98 percent respectively. On the other hand, issued capital grew by 12.6 percentage points and 6.6 percentage points more than the growth in market capitalization in 2005 and 2006 respectively which led to a high 1.2 percent 1.0 percent volatility. In 2007, market

capitalization grew by 103 percentage points more than issued capital which led to an annual average volatility of 1.2 percent. This shows that the volatility during the years 2003, 2004 and 2007 came mainly from demand side pressure (upward price adjustment) while excess supply resulted in sharp fall in the price index in 2005 and 2006.[7]

6. Some Policy Implications

Volatility in stock prices is a common phenomenon in the equity market. Individual stock price undergoes ups and downs which is a regular feature of an efficient stock market. In the absence of price volatility, potential investors lose interest to participate in the stock market. However, careful monitoring of volatility by the concerned authority is needed in DSE which is yet to achieve maturity especially when high volatility exists in the market. If necessary, there should be effective intervention when the market experiences excess volatility. During unpredictable movements of individual stock prices, it would be useful for the authority to identify the factors behind such price movements and quickly disseminate the information to interested stakeholders. In addition, the authority may take measures to make available all relevant information relating to real worth of the companies experiencing excess volatility in stock prices, especially to the investors. It is also important to ensure adequate supply of stocks through active participation of the government in the capital market particularly to dampen the excess demand. The endeavor should be to make the market more liquid, and the government can directly contribute to this by floating more treasury bonds. The availability of risk-free instruments would allow the investors to diversify their portfolios that carry lower risks. Of course, greater awareness and the development of stock market infrastructure are essential to stock market development. In addition, it is necessary to ascertain enforceable regulations that would ensure financial transparency, stop financial malpractice, and prevent any form of market manipulation. Capital market participation, in the form of floating debt and equity or asset securitization, remains the acceptable options of financing and materializing these options. As a financial product, securitization has gained popularity in Bangladesh for providing a method of issuing bonds that ensure maximum safety for investors. Most importantly, securitization addresses the fundamental asset liability maturity mismatch problem by providing true long-term funds.

[7] General index grew by 14.43 percent, 103.0 percent and 90.59 percent respectively during 2003, 2004 and 2007.

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