

Determining the Growth Pattern of Securities Market in Bangladesh: A Case of Dhaka Stock Exchange Limited

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Abstract - This study aims to identify the growth pattern and evaluation of performance of Bangladesh stock market over the time period of 2001-2010. The study is undertaken based on the regression analysis and Kerl Pearson's Correlation Coefficient between the selected indicators of the market. The indicators used to determine the growth pattern and performance in terms of market capitalization, listed securities, issued capital, annual turnover, volatility in the market index. The findings of the study reveal that key indicators of the market growth are significantly correlated with each other. The findings of our study indicate that the Bangladesh's stock market is growing in terms of market capitalization to GDP, turn over ratio, value traded to GDP and number of listed companies. It is also found that the growth over the study period is not stable and has not been growing with any specific pattern yet. Considering the analysis authors of the paper conclude that Bangladesh stock market is still at a pioneering stage of its growth with a small market size relative to GDP and is characterized by poor market performance with highly volatile index movement.

Key Words: Growth Pattern, Security Market, Market Capitalization, Performance Indicators, Share Price Index, Regression Equation, Correlation Coefficient

JEL Classification: G1; G2; O43

1. INTRODUCTION

The stock exchange can be viewed as an association formed by brokers and licensed by the state or an Government agency thereof responsible for forming rules and regulations. The association has the right to control over the markets matter for granting securities to listing, for dealing in securities, stocks and shares so listed, and for regulating the conduct of their members. And the market where the financial securities are traded, called capital market is best described as the engine of growth for an economy. The securities market played a very critical role in mobilizing savings by acting as an intermediary between savers and companies searching for sources of financing for additional business expansion. It is basically support the capital formation and economic growth of the country by providing a reliable source of financing. In many developing countries like Bangladesh, unstable and underdeveloped speculated security market is still prevailing in the economy. The security market of Bangladesh still could not reach to its level and still struggling to gain investor's confidence.

Public sector fiscal dynamics and government regulations largely dictate the current state of affairs. We believe that Bangladesh's economic transformation is irreversible. And at this outset, greater efficiency in financial intermediation and capital mobilization is required to support investment and sustainable economic growth of the country. But achieving a sustainable level of economic growth and development will require structural changes in Bangladesh's financial market and the regulations regarding the control of financial market and capital mobilization as well. In order to boost the domestic saving and investment an efficient financial sector is required Stock exchanges were expected to operate in the national interest and enjoyed their monopoly only so long as they operated at all times as such.

The stock exchange facilitates the refinancing listed companies that need to collect finance for making larger investment to capitalize the growing market potential. In the systematic process of stock exchange under an established framework, the buyer does not need to know the seller, nor does the business of the company need to be interrupted for this exchange to be consummated. It is good to see that the capital market of Bangladesh is growing for last decade something like nothing before. Although the growth pattern may not be encouraging in financial and economic perspective, but besides the volatility of the stock market in Bangladesh it is encouraging that the market is taking it in new height. Since the inception of the Securities and Exchange Commission (SEC) in 1993 the capital market of Bangladesh has already seen a lot of developments therein. It will not hard to realize that after the capital market crash in 1996, the market has attracted a lot more significance, attention and restructuring, which have led to the infrastructural and legislative development we have in the market at present.

2. OBJECTIVES OF THE STUDY

The study primarily focuses on the determination of growth pattern of security market in Bangladesh. Beside the primary objective, more specifically the other objectives of the study are as follows:

- To determining the factors influencing the growth of Bangladesh stock market
- To identify various indicators of Bangladesh stock market and their relative importance for security market growth in Bangladesh.
- Development of an index of Bangladesh security market growth.

3. LITERATURE REVIEW

Yenshan (1996), for Taiwan also found that a change in margin requirements, which is one of the major interventions done by the stock market regulators, has contributed to make share price volatile. Razin, et al (1999) concluded that weak form of regulation promotes greater moral hazard and adverse selection problem in the stock market which in effect hinders possibilities of international investments. Raju and Ghosh (2004) in attempting to calculate the volatility of stock prices for a number of countries came into conclusion that both in Indian and Chinese stock market volatility is higher compared to other emerging economies. Döpke et. al. (2005) using monthly data of Germany concluded that volatility in the stock market can be explained by the performance of major macroeconomic indicators which have influence on business cycles. Uppal and Mangla (2006) empirically concluded that although the Indian regulatory agencies managed to control excessive market volatility to a large extent, the Karachi Stock Exchange demonstrated little success. They argued that market behavior due to regulatory responses depends both on the structure of industry and effectiveness of the regulations. In an attempt to find the determinants of stock volatility, Verma and Verma (2007) concluded that investors' irrational sentiments contribute more strongly to increase the stock volatility than to reduce it.

In between the competing strands of the rational bubble literature is the view that there may be heterogeneous agents, some rational and some not. An older literature (Baumol, 1957; Zeeman, 1974) recognized this and saw bubbles arising as the less rational trend chasers came to dominate an asset market, only to be chased out by the rational fundamentalists when the bubble would crash, and the balance going back and forth in any given market over time. This line of argument fell out of favor in the later 1970s and in the 1980s as the rational expectations revolution took hold, but with the apparent appearance of bubbles and crashes in many markets, beginning with the US stock market crash of 1987, this belief weakened. The idea that some agents might not be rational was also argued by Black (1985), and DeLong, Shleifer, Summers, and Waldmann (1991) showed that the supposedly irrational "noise traders" might actually do better (or at least some of them) than the rational fundamentalists and thus survive, the argument that such traders would lose money and be driven out of the market long being used to dismiss their possible existence.

More recent theoretical study in which agents switch strategies over time is due to Föllmer, Horst, and Kirman (2005). Such an approach has also been studied using agent-based modeling of heterogeneous agents as have been done by Chiarella, Gallegati, Leombrini, and Palestrini (2003), with Gallegati, Rosser, and Palestrini (2010) providing an example that can exhibit the phenomenon recognized by Minsky of a period of financial distress in a bubble, a period of gradually declining prices after a peak but prior to a full crash, which has been observed in many historical bubbles.

4. RESEARCH METHODOLOGY

4.1 Nature and Source of Data

This study is based on secondary data only. This study has covered 10 year time span-FYs 2000-2001 to 2009-2010 and included corporate securities only. SEC and DSE are the major sources of required data. Required information and data are extracted from the annual reports of SEC and downloaded from the official website of SEC. In addition, some of the information and data are culled from the reports of previous studies.

4.2 Models used

Simple analytical tools like percentage, growth rate, and correlation coefficient have been used to analyze the growth trend and performance of securities market. The following model has been used to work out the overall growth rate:

$$A_t = A_0 (1 + g)^n$$

Where,

A_t = values at the end of the FY

A_0 = values at the beginning of the FY

$n = t-1$, time period over which growth takes place

g = growth rate

The following linear equation is considered to determine the growth pattern:

$$Y = bX + a$$

For the purpose of testing the theoretical relationship between the indicators of capital market of Bangladesh, Karl Pearson's Correlation Coefficient (r) has been worked out using the following model:

$$r = \frac{\frac{\sum XY}{N} - \left(\frac{\sum X}{N}\right)\left(\frac{\sum Y}{N}\right)}{\sqrt{\frac{\sum X^2}{N} - \left(\frac{\sum X}{N}\right)^2 \times \frac{\sum Y^2}{N} - \left(\frac{\sum Y}{N}\right)^2}}$$

where:

- N represents the number of pairs of data
- $\sum$ denotes the summation of the items indicated
- $\sum X$ denotes the sum of all X scores
- $\sum X^2$ indicates that each X score should be squared and then those squares summed
- $(\sum X)^2$ indicates that the X scores should be summed and the total squared. [avoid confusing $\sum X^2$ (the sum of the X squared scores) and $(\sum X)^2$ (the square of the sum of the X scores)]
- $\sum Y$ denotes the sum of all y-scores
- $\sum Y^2$ indicates that each Y score should be squared and then those squares summed

$(\sum Y)^2$ indicates that the Y scores should be summed and the total squared

$\sum XY$ indicates that each X score should be first multiplied by its corresponding Y score and the product (XY) summed

The formula can be rewritten as follows:

$$r = \frac{n \sum xy - (\sum x)(\sum y)}{\sqrt{n(\sum x^2) - (\sum x)^2} \sqrt{n(\sum y^2) - (\sum y)^2}}$$

where n is the number of pairs of data.

Probable error is calculated using the following equation:

$$PE = 0.6745 \times \frac{1 - r^2}{\sqrt{n}}$$

5. ANALYSIS AND RESULT

Public issuance of new securities is made in the primary market. Issue of securities may be made especially through prospectus and/or offer for sale and private placement. As per the securities legislation, it is mandatory for corporate bodies to get their securities registered with the Securities and Exchange Commission (SEC). The SEC reviews the application and documents and gives issue approval of different class of securities such as equity shares, rights share, debentures, shares, mutual fund and unit schemes, which are in practice. Then companies can issue their securities to the public in the primary market. Public issue is carried out in order to raise long-term capital from the general public. The Initial Public Offering of Securities plays a very significant role in capital mobilization and overall market growth. In order to determine the growth pattern the study focus on two different aspect of security market growth, namely, growth of security market and performance of security market.

5.1 Growth of the Securities Market

5.1.1 Market capitalization to GDP

The first and most valuable indicator of security market growth is the Market capitalization ratio. It is the ratio between value of listed shares and the GDP. This ratio is most frequently used by market analyst as a measure of stock market size. In terms of economic significance, the assumption behind market capitalization is that market size is positively correlated with the ability to mobilize capital and diversify risk on an economy wide basis (Agarwal 2001). The size of the Bangladesh capital market in terms of Market Capitalization to GDP is shown in the Table-1 and Figure-1. Market capitalization ratio was 2.99% in 2000 and riches to a phenomenal value of 11% in 2006 and then eventually falls to 9.45% in 2010. Total market capitalization

reached to Tk. 350801 crore in 2010 from Tk. 6292.4 crore in 2000. The growth of market capitalization in these 10 years indicates a phenomenal cumulative increase of market capitalization. The linear trend shown in the figure-1 line shows an upward trend in market capitalization to GDP ratio in the study period.

Table 1. Summary of GDP and Market Capitalization to GDP

Year	GDP in Constant Prices, National Currency) (Crore Taka)	Market capitalization (Crore Taka)	Market capitalization to GDP
2000	210332	6292.4	0.029917
2001	220198	6522.28	0.02962
2002	231181	7126.2	0.030825
2003	244534	9758.7	0.039907
2004	259471	22492.3	0.086685
2005	275823	23307.5	0.084502
2006	293822	32336.8	0.110056
2007	312349	75395	0.241381
2008	330961	105953	0.320137
2009	350122	188718	0.539006
2010	371208	350801	0.945024

Source: Authors' calculation from various issues of Bangladesh Economic Review, Statistical Year Book of Bangladesh, Dhaka stock exchange (main board) and Securities and exchange commission (Annual report and quarterly review).

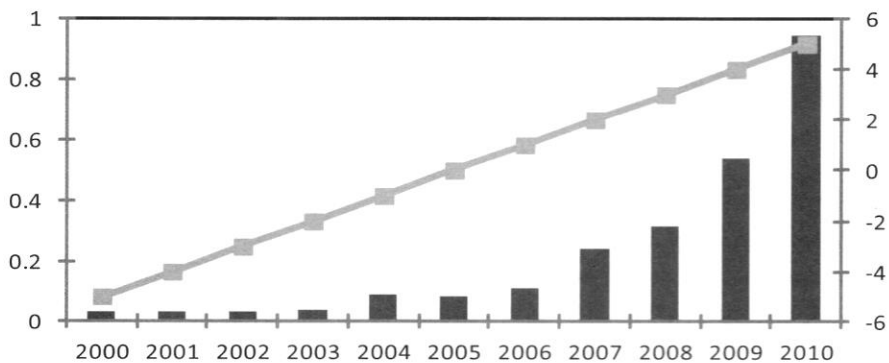


Figure 1. The Regression Equation of Market capitalization to GDP

5.1.2 Growth in No of Listed Securities and Issued Capital

The second indicator of security market growth used in this study is growth of no of listed securities and issued capital. The table-2 shows that Average Growth Rate of No. of Listed Securities is 6.6% and Average Growth Rate of Issued capital is

34.83%. With the Karl Pearson's Correlation Coefficient (R^2) 0.97 it implies that the relation between No of Listed Securities and Issued Capital is significant. The R^2 of the indicators is about 76 times of the estimated probable error of the correlation which implies a very significant correlation.

Table-2: Trading Operation in the Dhaka Stock Exchange

Calendar Year/ Month-End	No. of Listed Securities	Initial Public Offering (IPO)	Issued Capital (In crore Tk.)
2000	241	7	3119.20
2001	249	11	3345.43
2002	260	8	3520.30
2003	267	14	4605.50
2004	256	2	4953.20
2005	286	22	7031.30
2006	310	12	11843.70
2007	350	14	21447.00
2008	412	12	37215.60
2009	415	18	52209.90
2010	455	18	66434.00
Average Growth Rate of No. of Listed Securities			6.6%
Average Growth Rate of Issued Capital			34.83%
Regression Equation		$y = 289.37x - 73074$	
Karl Pearson's Correlation Coefficient (r)		0.97	
Probable Error (PE)		0.0127	

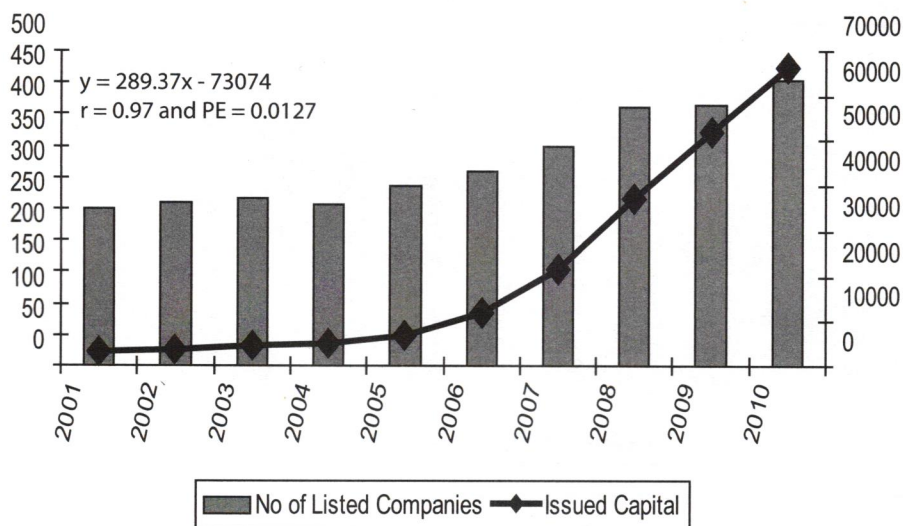


Figure-2. Growth Pattern of No of Listed Securities and Issued capital

5.1.3 Growth in No of Listed Securities and Market Capitalization

The next indicator of the study is the growth of no of listed securities and their correlation with the market capitalization. The data presented in Table-3 and Figure-3 indicates that the growth of listed securities and their impact on market capitalization is very accelerating in the study period.

Table 3: Correlation Between No of Listed Securities and M Cap

Calendar Year/ Month-End	No. of Listed Securities	Market Capitalisation (In crore Tk.)
2000	241	6292.40
2001	249	6522.28
2002	260	7126.20
2003	267	9758.70
2004	256	22492.30
2005	286	23307.50
2006	310	32336.80
2007	350	75395.00
2008	412	105953.00
2009	415	188717.70
2010	455	350800.60
Average Growth Rate of Market Capitalization		48.96%
Regression Equation		$y = 1289.167x - 338028$
Karl Pearson's Correlation Coefficient (r)		0.894
Probable Error (PE)		0.0427

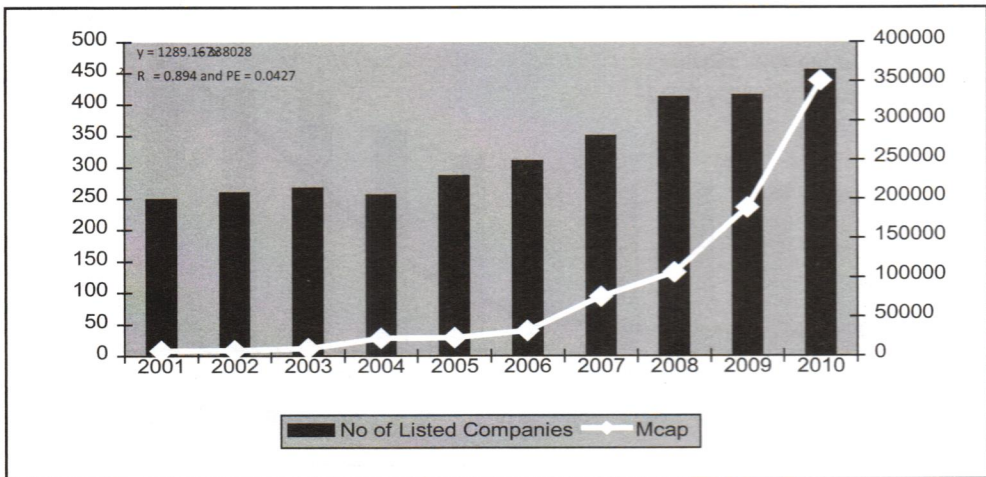


Figure 3. Growth Pattern of No of Listed Securities and Market Capitalizations

Having an average growth of 48.96% in market capitalization the correlation is 0.894, which is very significant. There is an upward graph in this indicator shows a positive growth trend in the study period.

5.1.4 Growth in No of Listed Securities and Annual Turnover

The market capitalization shows the growth relating it with the GDP. Now the next indicator is the annual turnover, which implies the overall growth of the market in terms of trade value. It was found that there is a phenomenal average growth of 58.59% in the annual turnover of the market. The annual turnover of the market is significantly correlated with the number of listed securities having the value of $r = 0.805$ and PE is 0.0752, which implies a very significant correlation between these two.

Table 4. Correlation Between No of Listed Securities and Turnover

Calendar Year/ Month-End	No. of Listed Securities	Turnover (In crore Tk.)
2000	241	4036.48
2001	249	3986.83
2002	260	3498.49
2003	267	1915.21
2004	256	5318.11
2005	286	6483.48
2006	310	6506.93
2007	350	32282.01
2008	412	66796.47
2009	415	147530.08
2010	455	400991.30
Average Growth Rate in Annual turnover		58.59%
Regression Equation		$y = 1319.18x - 362524$
Karl Pearson's Correlation Coefficient (r)		0.805
Probable Error (PE)		0.0752

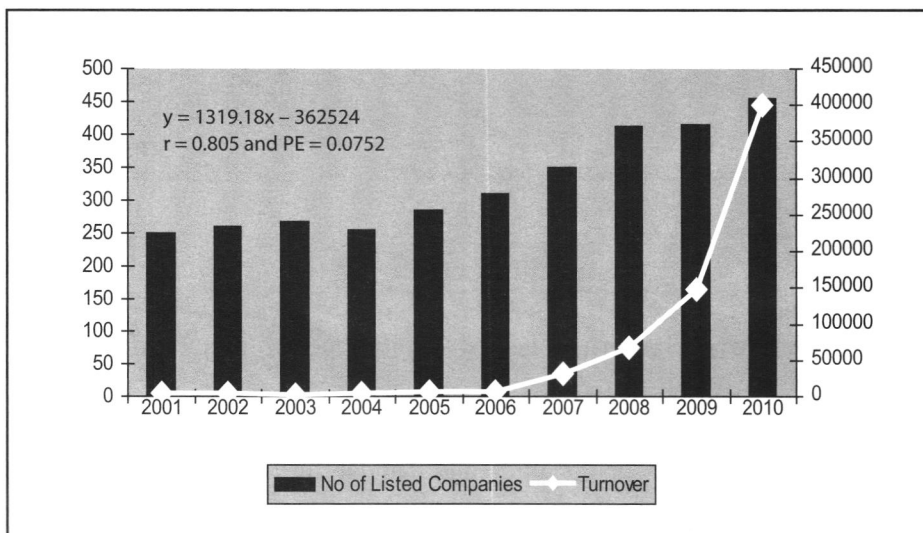


Figure 4. Growth Pattern of No of Listed Securities and Market

5.1.5 Growth in Issued Capital and Annual Turnover

Table 5. Correlation Between Issued Capital and Annual Turnover

Calendar Year/ Month-End	Issued Capital (In crore Tk.)	Turnover (In crore Tk.)
2000	3119.20	4036.48
2001	3345.43	3986.83
2002	3520.30	3498.49
2003	4605.50	1915.21
2004	4953.20	5318.11
2005	7031.30	6483.48
2006	11843.70	6506.93
2007	21447.00	32282.01
2008	37215.60	66796.47
2009	52209.90	147530.08
2010	66434.00	400991.30
Regression Equation	$y = 4.94x - 37557$	
Karl Pearson's Correlation Coefficient (r)	0.899	
Probable Error (PE)	0.0407	

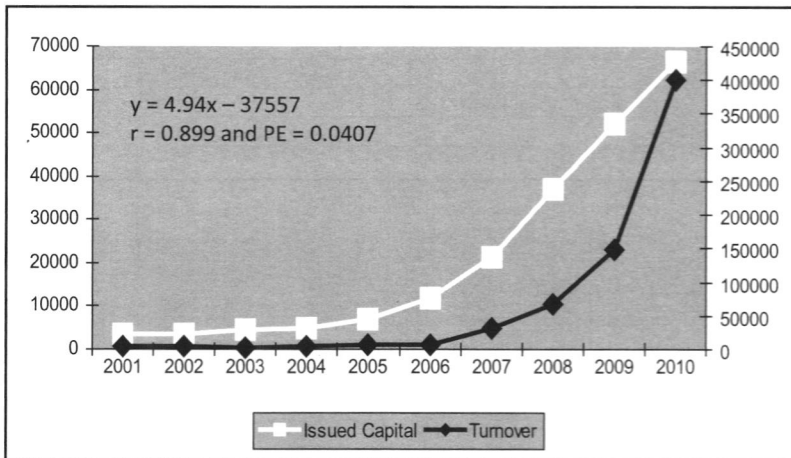


Figure 5. Growth Pattern of Issued Capital and Annual Turnover

It is fundamentally correct that the annual turnover is highly correlated with the issued capital of the market. This study also finds that there is a very strong correlation between the issued capital and annual turnover of the market. The regression equation shows a high level of correlation between the issued capital and annual turnover, with the Karl Pearson's correlation coefficient of 0.899 and PE of 0.0407, which implies that r is significant in this parameter of study.

5.1.6 Growth in Market Capitalization and Annual Turnover

Market Capitalization and annual turnover is considered to be the two most important parameters of market growth. It was found that both of these parameter have grown very significantly in the study period. In this part we analyze the correlation between these two indicators. The Karl Pearson's Correlation Coefficient (R2) is 0.981 with PE of 0.008, which implies a phenomenal correlation between the market capitalization and annual turnover of the market.

Table 6. Correlation Between Market Capitalization and Annual Turnover

Calendar Year/ Month-End	Market Capitalisation (In crore Tk.)	Turnover (In crore Tk.)
2000	6292.40	4036.48
2001	6522.28	3986.83
2002	7126.20	3498.49
2003	9758.70	1915.21
2004	22492.30	5318.11
2005	23307.50	6483.48
2006	32336.80	6506.93
2007	75395.00	32282.01
2008	105953.00	66796.47
2009	188717.70	147530.08
2010	350800.60	400991.30
Regression Equation	$y = 1.12x - 24260$	
Karl Pearson's Correlation Coefficient (r)	0.981	
Probable Error (PE)	0.008	

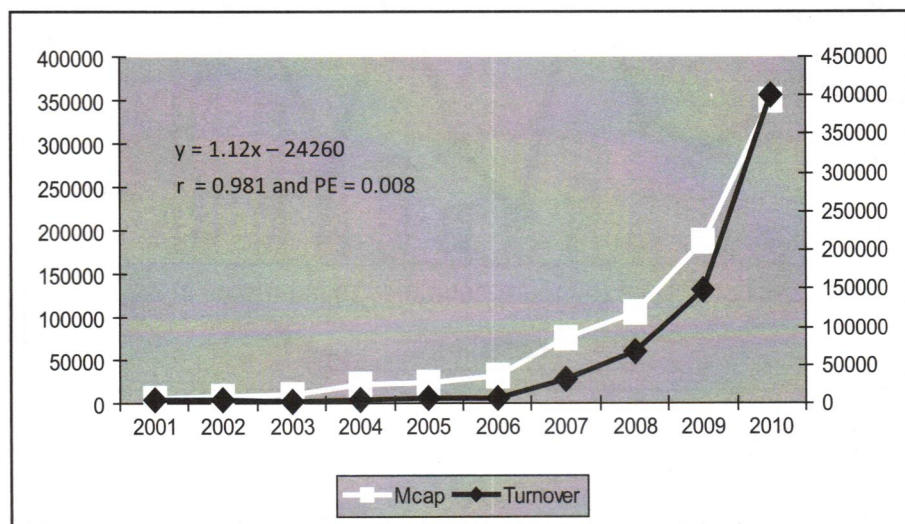


Figure 6. Growth Pattern of Market Capitalization and Annual Turnover

5.2 Market Performance

5.2.1 Average Growth of Price Index

Security Market Index is used to determine the trend of market growth in an economy and also used to analyze the market performance over a period of time.

Table 7. Average Growth of Price Index

Calendar Year/ Month-End	Price Index*	Annual Growth
2000	642.68	----
2001	817.79	27.24%
2002	822.34	0.56%
2003	967.88	17.70%
2004	1971.31	104%
2005	1275.05	- 35.32%
2006	1321.39	3.63%
2007	2535.96	91.92%
2008	2309.35	- 8.9%
2009	3747.53	62.28%
2010	6877.7	83.53%
Mean		2264.63
Standard Deviation		560
Average Growth Rate		23.73%

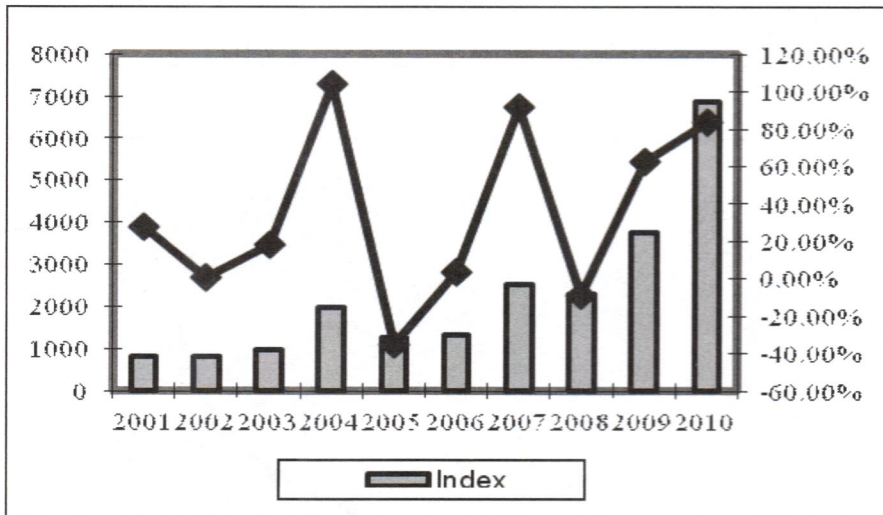


Figure 7. Growth Pattern All Share Price Index in DSE

The higher the index implies the increase in market price of securities and the better performance of listed companies and their traded securities in market. The pattern identified in the growth of market index implies that the security market was

highly volatile in the study period. DSE index at the beginning of 2001 was 817.79 and started to move upward till 2004 and riched to 1971.31. After 2004 it started to fall down in 2005 with a negative growth of -35.32% . The study found that the market was witnessed once more time a negative growth in the study period which was in the year 2008. The mean of the market index in the study period is found 2264.63 with a standard deviation of 560. The average growth in the study period of the market index is found 23.73% .

5.2.2 Correlation (R) and Probable Error (PE) between Issued Capital and Price Index

The correlation between the issued capital and market index is considered as another indicator to measure the market performance. The study and the analysis reveal that the issued capital and market index is heavily correlated with correlation coefficient (r) value of 0.925 and related PE of 0.031, which implies a significant correlation between Issued Capital and Price Index of the security market.

Table 8. Issued Capital and Price Index

Calendar Year/ Month-End	Issued Capital (In crore Tk.)	Price Index
2000	3119.20	642.68
2001	3345.43	817.79
2002	3520.30	822.34
2003	4605.50	967.88
2004	4953.20	1971.31
2005	7031.30	1275.05
2006	11843.70	1321.39
2007	21447.00	2535.96
2008	37215.60	2309.35
2009	52209.90	3747.53
2010	66434.00	6877.70
Regression Equation	$y = 0.075x + 662.64$	
Karl Pearson's Correlation Coefficient (r)		0.925
Probable Error (PE)		0.031

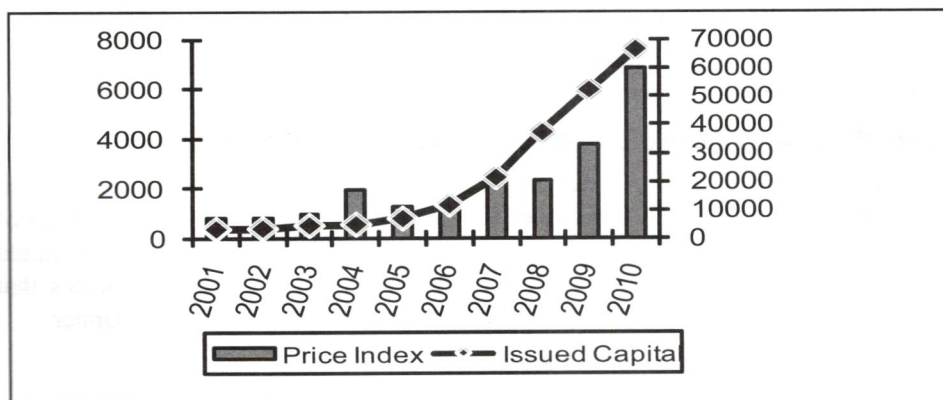


Figure 8. Growth Pattern of All Share Price Index to Issued Capital

5.2.3 Correlation (r) and Probable Error (PE) between Market Capitalization and Price Index

Table 9. Market Capitalization and Price Index

Calendar Year/ Month-End	Market Capitalization (In crore Tk.)	Price Index
2000	6292.40	642.68
2001	6522.28	817.79
2002	7126.20	822.34
2003	9758.70	967.88
2004	22492.30	1971.31
2005	23307.50	1275.05
2006	32336.80	1321.39
2007	75395.00	2535.96
2008	105953.00	2309.35
2009	188717.70	3747.53
2010	350800.60	6877.70
Regression Equation		$y = 0.017x + 898.75$
Karl Pearson's Correlation Coefficient (r)		0.985
Probable Error (PE)		0.0065

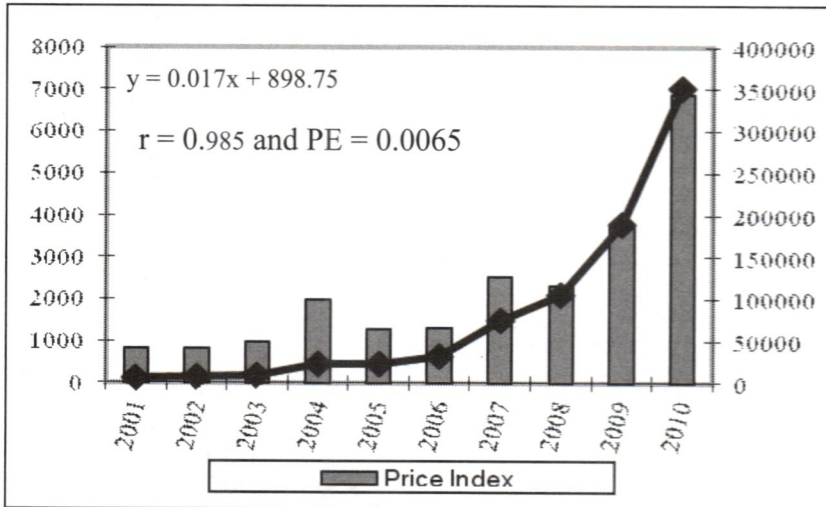


Figure 9. Growth Pattern of All Share Price Index to Market Capitalization

The next parameter used to determine the market performance is the correlation between Market Capitalization and Price Index of the security market. The findings of the study reveal that Market Capitalization and Price Index are significantly correlated with correlation coefficient value of 0.985 with PE of 0.0065, which indicates that market capitalization effects the volatility of the price index in remarkable manner.

5.2.4 Correlation (r) and Probable Error (PE) between Annual Turnover and Price Index

The next parameter used in the study to assess the market performance and growth pattern is the correlation between annual turnover and market price index. The regression equation based on the growth of annual turnover and price index indicates that the annual turnover was also volatile in response to the volatility of the price index. The correlation coefficient value of these two is found to be 0.971 with a PE of 0.012, which implies significant correlation between the annual turnover and price index. In such a high volatility of index movement the annual turnover is found to be consistent in the study period. The annual turnover also shows its movement as per the movement of the market price index movement.

Table 10. Annual Turnover and Price Index

Calendar Year/ Month-End	Turnover (In crore Tk.)	Price Index
2000	4036.48	642.68
2001	3986.83	817.79
2002	3498.49	822.34
2003	1915.21	967.88
2004	5318.11	1971.31
2005	6483.48	1275.05
2006	6506.93	1321.39
2007	32282.01	2535.96
2008	66796.47	2309.35
2009	147530.08	3747.53
2010	400991.30	6877.70
Regression Equation		$y = 0.014x + 1292.46$
Karl Pearson's Correlation Coefficient (r)		0.971
Probable Error (PE)		0.012

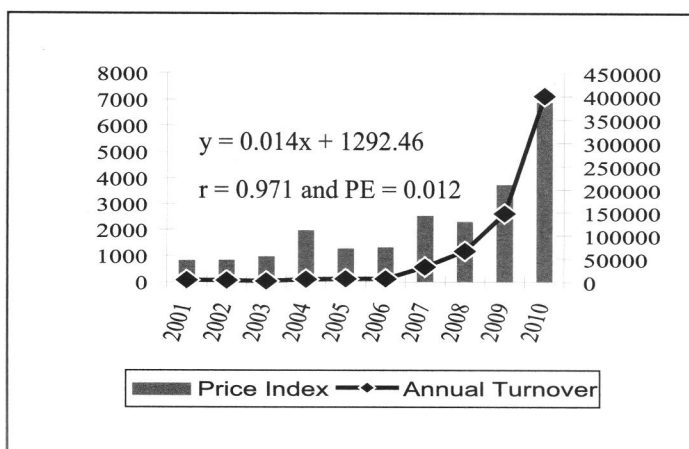


Figure 10. Growth Pattern of All Share Price Index to Annual Turnover

6. CONCLUSION

Fundamentally the securities market plays a crucial role in mobilizing savings and channeling them in productive purposes through investment in share and other financial securities traded in the floor of a security market. Considering our research objectives the study on security market growth and performance measurement reveals that there is no synchronization among different securities market performance indicators, but it is true that they almost have depicted an erratic trend during the observed period. The findings of our study indicates that the Bangladesh's stock market is growing in terms of market capitalization to GDP, turn over ratio, value traded to GDP and number of listed companies. It is also found that the growth over the study period is not stable and has not growing with any specific pattern yet. The performance analysis of the security market based on the indicators specifies that the market is witnessed with poor market performance with a highly volatile index movement. Considering the overall size of the economy the growth of market and security market size is not significant. After the market crash in 1996 and high volatility of the index movement may result on the lack of investor confidence on the market. These facts suggest that the Bangladesh capital market now is passing through a bearish situation. The growth and performance of Bangladesh securities market, even after the initiative of few modified market mechanism for the development of security market in Bangladesh.

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