Articles

Cause and Effect Analysis of Stock Market Crash during 2010-11 and Investors' Impression: The Case of Dhaka Stock Exchange

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Abstract

The stock market is one of the most important sources for companies to raise capital. This study's main objective is to find out cause and effect of stock market crash in Bangladesh especially in the year of 2010-11 when a massive crash took place in Dhaka Stock Exchange and to find out impression of investors about the capital market as an effect of the market crash. While conducting this research, 180 investors were selected from DSE and out of those 150 investors' responses properly. The response rate is 83 percent. A questionnaire has been prepared for this study that consists of different questions on four dimensions of investors for investment in DSE. In this study, some statistical measures such as factor analysis using Principal Component Analysis (PCA) with Varimax Rotation and Regression Analysis, mean, z test and proportion analysis are used to examine cause & effect of stock market crash during 2010-11 and investors' impression. This paper will help both investors and policy makers to know the cause and effect after stock market crash and to make proper decisions in the future.

Keywords: Stock Market, Investors, Market Crash, DSE, Factor Analysis, Regression Analysis.

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1.0 Introduction

Stock market is one of the most important financial institutions of any economy as well as Bangladesh. The background of this study is to find out the root causes of the stock market crash during the year 2010-11 and find the way to prevent the crash in the future. This section of the study describes about history, functions, mission and vision of Dhaka Stock Exchange Limited. Besides, in this part of the study represents current status of DSE and investors.

The Dhaka Stock Exchange (DSE) is registered as a public limited company under security and exchange commission act 1993 and company act 1994. Earlier Dhaka (East Pakistan) Stock Exchange was introduced in the early 1952.About 100 people was interested to form an exchange in the next year July 7, 1953. It was registered under company act 1913. At the time of incorporation its authorized capital was Rs. 3, 00,000 and divided into 150 shares. Currently DSE has 512 enlisted companies with a high volume of capital. Major functions of DSE are; i) Listing of companies, ii) Trading facilities, iii) Market Administration and Control, iv) Market Surveillance, v) Investors Investment Protections etc. The objectives of DSE are i) Achieve Sustainable Turnover, ii) Knowledge Development, iii) Human Resource Development. The vision of DSE is to be a leader exchange in the region and a key driver of the economy of Bangladesh. The mission of DSE are; i) Rapid Updated Technological Advancement and Increase High Standard of Investment Services, ii) Contribute Country's Economic Growth and Sustainable Development, iii) Ensure Superior Corporate Governance and iv) Investors' Confidence Enhancement, **(DSE & SEC: 2010, Literature Review of Stock Market, Dhaka: SEC", www.sec.gov.bd).**

1.1 Statement of the Problem

This papers shows the critical phenomena of stock market crash during the year 2010-11 and investors' impression toward DSE and investment decisions. It also shows investors' behavior is negative towards the market. As a result economic growth of the country decreases gradually, new industries are not establishing so unemployment rate increasing day by day.

1.2 Significance of the Study

This paper signifies to ensure integrity and efficiency of SEC members and staffs and also co-ordination between SEC and DSE. From this study commercial banks will be able to realize heavily on capital market by investing directly and indirectly (Margin Loans) that creates high risk on depositor's money. This study shows the importance on transparency in listing procedure. This study paper strongly focuses on the listing process as listing methods (Book Building methods and Direct Listing) played a vicious rule to damage the stability of the market; major change should be brought to make it acceptable and transparent. In this regard, SEC should promote only Fixed Price method as it lack less opportunity to manipulate the offer price. SEC can also use due diligence to fix the offer price under this method.

1.3 Scope of the Study

The present study is conducted to find out the cause and effect of stock market crash massively during the year 2010-11 and to know present impression of investors' in DSE. It has wide impact of analysis of investors' satisfaction level and impression towards DSE currently. This paper focuses to set up rules and regulation for preventing such kind of crash in the future.

1.4 Objective of the Study

The overall objective of the study is to find out cause and effect of stock market crash in 2010-11 on the case of DSE. To some extent, the specific objectives (**Malhotra, Naresh K et al., 2013**) are; i) To provide an overview of cause and effect of stock market crash during 2010-11 in DSE, ii) To focus on dimensions of stock market crash in Bangladesh and impression of investors' of DSE, iii) To test and analyze the cause and effect of crash, iv) To provide some suggestions to concern agencies for stabilizing and increasing good impression among investors of DSE.

1.5 Limitation of the Study

A number of respondents were reluctant to convey their opinion for the sake of confidentiality which, if were conveyed, would have made the study exact and more factual. The respondents were chosen randomly from Dhaka Metropolitan area for the convenience sampling of the study. So, the opinion presented in this study might seem as the prejudiced one. The study could not afford a number of potential respondents opinion as they were in rush during the trading hours or severely depressed recalling bitter memory of the market crash during 2010-11.

2.0 Research Methodology

Object oriented research methods are used to find out cause & effect and investors impression stock market crash during the years 2010-11. Specific statistical tools like Factor Analysis, regression analysis, z test, mean calculation and proportion analysis (**Chandra, Suresh & Sharma, Mohit Kr. 2011**) have been used for examining and analyzing data.5 Point Likert Scale has been used to collect responses of investors in DSE.

2.1 Research Design

Convenient sample technique has been used in this study. The target population of this research was investors in the Dhaka Stock Exchange in Dhaka city who were investing as investors since 2007. Among various brokerage houses, this study only considered 20 enlisted brokerage houses under Dhaka Stock Exchange in Dhaka city whose 500 investors were considered as population size. This research emphasizes on quantitative and qualitative data to analyze the cause and effect of stock market crash during the year 2010-11 in DSE.

2.2 Sampling Techniques

For conducting this research, 180 investors from the selected brokerage houses' were interviewed through a structured questionnaire and out of them 150 investors' response perfectly, the response rate is 83 percent. Stratified sampling technique (**Chandra, Suresh & Sharma, Mohit Kr. 2011**) has been applied for this study by which investors of DSE in Dhaka city partitioned into 4 strata or batches. Elements were selected from each spectrum or batch by a random sampling technique.

2.3 Sources and Data Collection

Both primary and secondary sources were used to collect data for this study. Primary data were collected through a structured questionnaire which was administered personally to the investors in the different enlisted brokerage houses under DSE in Dhaka city. A self-administrated questionnaire was developed by using a 5 point Likert Scale (**Malhotra, Naresh K et al., 2013**), where: 1= Very Dissatisfied, 2= Dissatisfied, 3= Neutral, 4= Satisfied, 5= Very Satisfied), open-ended and non-forced, balanced and odd numbered non-comparative item's questions asked to the respondents. On the other hand, secondary data were collected from various research articles, journals, websites, newspapers, books and from authentic other available sources.

2.4 Method of Data Analysis

Analyzing data from questionnaire which consists of different questions on four dimensions such as; exposure of banks & financial institutions, availability of authentic information for the investment, knowledge of risk management, efficiency of Securities and Exchange Commission to control over the stock markets. In this study, popular statistical measures such as: factor analysis using Principal Component Analysis (PCA) with Varimax Rotation and Regression Analysis are used to examine the cause and effect of stock market crash during 2010-11 in DSE. Besides, others tools like mean, z test and proportion analysis have been used to carry out the necessary assessments with the help of SPSS 23 version software.

2.5 Hypothesis Development

On the basis of the various factors affecting on stock market crash, following hypotheses are developed for cause and effect study;

$H_0:H_1$: Investors' are impressed on exposure of banks & financial institutions

$H_0:H_2$: Investors' are impressed on availability of authentic information for the investment

$H_0:H_3$: Investors' are impressed on knowledge of risk management

$H_0:H_4$: Investors' are impressed on efficiency of Securities and Exchange Commission

3.0 Literature Review

Review of literature is an integral part of conducting a research. Review of past literature helps conceptualization, formulation and choice of tools of analysis. It also helps in arriving at meaningful conclusions. With this view a brief review of past studies and concepts relevant to the present study are highlighted as follows.

Investors always seek to flawless and efficient capital market where they can invest without any hesitation. **Ahmed, S. (2004)** explained**,** "To enhance the efficiency of resource allocation in the capital market, the government lifted the restrictions on listing access and improved the delisting system of listed companies. This drew fund flows into value stocks and growth stocks, and led them away from junk stocks. The implementation of IPO reform in 2012 helped to guide rational investment. SEC launched the stock index futures in 2010 to provide a hedging mechanism for systemic risk, and launched the securities margin trading business in the same year to implement long and short two-way trading". Government and SEC try to rethink and reform guidelines for the stock market to minimize the systematic risks.

Behavioral finance plays a vital role to understand and study behavior of capital market for the period of time as far as market collapse is concerned. **Al-Jafari, Mohamed Khaled (2018),** explained that "Capital market has not always been influenced by the rational behavior; it is very often seen to be behaved as irrational behavior in terms of investors' investment decisions". It means that two factors such as; i) rationality and ii) irrationality of investment decisions' are considered to cause of market collapses over the years in Bangladesh.

In the DSE very often it is seen initial stock prices very much high that also lead to fall the price while entering into secondary market. **Alam Shahjarul (2012),**"Primary issue related problems was faulty listing methods, IPO overpricing. Secondly secondary market related problems stock split, manupulation etc." The methods are used to evaluate the prices of stock still not satisfactory for the investors.

Choudhury, Md Ariful Haque (2013) "Share market is considered as a place of investment by the investors of different levels. But the third world's share market is full of uncertainty and risks, especially in Bangladesh that has confronted two big crashes in 1996 and in 2010".

Overall scenario of the capital market is not uncovered yet by the investors. **Chowdhury, A. R. (2012)** argued that, "Gap between the demand and supply of stock, extraordinary overpricing of the stock, market manipulation, lack of knowledge of stock and investment management". This may cause again and again DSE massive crash.

Investors' faith is required to be stabilized stock market as it (DSE) lost many time and for so longer period of time. **Chowdhury, Neel. (2012)** said that "Security and Exchange Commission as well as government should properly guide and supervise all mechanisms of the stock market operations so that investors' can be impressed and feel safe in terms of investment decision making".

Every capital market in the world is based on a strong financial policy. **Ezez (2016),** demonstrated that "Policy factors are the primary reason for market movements in a similar period with 16 huge market fluctuations, whose amplitudes exceeded 20%". For the growth and stable market DSE's policy comes to the mind of general investors to make an investment decision.

Stake holders of the stock market need to be proactive and literate to the investment operation. **Hassan, M. K. & Rahman, S. (2011)** shown that "There is limited exposure of banks & financial institutions, lack of availability of authentic information for the investment, limited knowledge of risk management, and inefficiency of Securities and Exchange Commission which lead to stock market crash very often in Bangladesh". It is badly said that DSE fails again and again to protect investors' interest.

As an institution capital market in Bangladesh especially DSE always seems to be manipulated by unidentified manipulators for the general investors. **Islam Azizul (2014)** added,"Some policy makers have termed the market as 'wicked' and gambling casino". Bangladesh Economist's Forum, First BEF Conference, Radisson Blu Water Garden, Dhaka, 21-22 June, 2014. Therefore, DSE has limitation to protect its investors in the market crash frequently.

Islam, KM Anwarul and Mahbuba Zaman (2014), "Share market is considered as a place of investment by the investors of different levels. But the third world's share market is full of uncertainty and risks, especially in Bangladesh thathas confronted two big crashes in 1996 and in 2010-11".

Rahman, Md Tahidur et al. (2017), "After the cruel crash in 1996 Bangladesh stock market had started growing from 2006 due to listing of a few profitable government entities and Multinational Companies (MNCs). Together with individual investors nearly all commercial banks involved themselves intensely in stock market. Step by step, the bullish market transformed into a bubble and on December 05, 2010, the Dhaka Stock Exchange General Index (DGEN) reached at the record high of 8918.5, almost 5.6 times higher than December 2006. Concurrently, market capitalization and turnover increased by 11.1 times and 61.7 times respectively".

Saha, Sangit (2012), "A number of reasons for the stock market crash have been identified in addition of investigation report. Though many causes were identified, few factors emerged stronger in the recent stock market crash as those are pointed by majority of respondents. The causes includes over exposure of banks and financial institutions, poor monitoring of regulators, corrupted employees of regulatory organizations, margin loan, direct listing, insider trading, book building, lack of general investor´s knowledge, imbalance of share and intervention of Bangladesh Bank".

Sarker, M. M., and N. Nargis (2012), stated that "The stock market of Bangladesh was bullish before 2010. But in 2010, the market become bearish as there was a market crash. This situation turned millions of investors as bankrupt. The investors blamed the government for this crash as they believed that the crash was caused artificially to benefit some group of investors at the expense of some big players of the market. They lost their confidence on the fairness of the market. As a result, the market continued to fall".

Frequent changes of different financial principles and policies of the government and central bank may cause vulnerable capital market in Bangladesh. **According to Sultana, Israth et al. (2016)**, "Frequent changes in margin loan ratio, excess liquidity, opening a wide range of brokerage house are the main factors responsible for the instability in capital market of Bangladesh. As regards crash of capital market in 2010, the main reasons are increased SLR and CRR, fluctuating directives of SEC, and withdrawal of reserved money by banks, according to respondents. Lack of qualified and professional financial analyst in the capital market, knowledgeable manpower, administrative and other supportive activities, good scripts, better monitoring, and investor awareness program are some other major reasons causing the crisis." As a result during the year 2010-11 it was experienced massive crash in the capital market.

All agencies relating to the capital markets need to work together to build up a strong capital market for the interest of investors. **Ullah Hafij Md. et al.(2012),** "As an important part of the economy of the country, well-functioning of the capital market is a must for the industrialization process of a un-industrialized country like Bangladesh but un-stability in the same may negatively affect the total financial system. Therefore, all related corners including Government, Regulatory bodies, Listed Companies, Brokerage houses, institutional investors, and retail investors should act rationally to maintain the stability in the

capital market for the greater interest of the country". For sustainable and stable capital market it is mandatory to continue market activities smoothly.

4.0 Data Analysis and Discussion

Four dimensions such as; exposure of banks & financial institutions, availability of authentic information for the investment, knowledge about risk management, efficiency of Securities and Exchange Commission to control over the DSE have been considered for analysis. Factor Analysis and Regression Analysis have been conducted and discussed in this part.

4.1 Factor Analysis

Besides, researchers conduct factor analysis of dimensions that are responsible for stock market crash. To find out appropriateness of factor analysis model researchers rely on Kaiser-Meyer-Olkin (KMO) of sampling adequacy and Bartlett's Test of Sphericity (**Malhotra, Naresh K et al., 2007**).

4.1.1 KMO and Bartlett's Test of Sphericity

The value KMO ought to fall within 0 and 1, Kaiser 1974, provides some guidelines which indicate as a 'Rule of Thumb' when interpreting KMO statistics. In the guidelines, below .50 as a KMO value is 'unacceptable'. Even a result of .60 is 'mediocre'. It is only considered as a good result when it is .70 as 'middling'. Certainty of KMO values are .80 and .90 'meritorious' and 'marvelous' respectively.

Table: 1, KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.830
Bartlett's Test of Sphericity	Approx. Chi-Square	1642.505
	df	171
	Sig.	.000

Source: SPSS Data Analysis Output

In the Table: 1, shows KMO measure of sampling adequacy in this study provides a value .830 which indicates 'middling' or 'marvelous' result. It also implies that the sample size and data well fit for factor analysis. Besides, Bartlett's Test of Sphericity reveals that the probable Chi-square statistics 1642.505 with 171 degree of freedom (df) which is significant at .05 level. So the null hypothesis, population correlation matrix is an identity matrix, is rejected by Bartlett's Test of Sphericity.

4.1.2 Total Variance Analysis

The Table: 2, suggests that total variance caused by 19 components are equal to the number of 4 components. Component 1 accounts for variance 5.298 which is (5.298/19) or 27.88% of total variance explained. Likewise, components 2, 3 and 4 respectively are 20.512%, 12.028% and 8.136% of total variance. These components explain 68.560% of all variance out of 19 components.

Table: 2, also shows that out of 19 initial factors, only the factor with Eigenvalues above 1 were retained for the this study. Thus, 1, 2, 3, and 4 components were used for further study. Table is shown below.

Table: 2, Total Variance Explained

Component	Initial Eigen values			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.298	27.884	27.884	3.907	20.564	20.564
2	3.897	20.512	48.396	3.209	16.888	37.452
3	2.285	12.028	60.424	3.011	15.849	53.301
4	1.546	8.136	68.560	2.899	15.259	68.560
5	.854	4.497	73.057			
6	.796	4.188	77.244			
7	.629	3.311	80.555			
8	.548	2.885	83.440			
9	.450	2.370	85.810			
10	.396	2.083	87.893			
11	.361	1.898	89.791			
12	.338	1.780	91.571			
13	.315	1.660	93.231			
14	.297	1.564	94.795			
15	.259	1.361	96.156			
16	.241	1.267	97.424			

	1	2	3	4
17	.178	.937	98.361	
18	.163	.858	99.218	
19	.149	.782	100.000	

Source: SPSS Data Analysis Output

Extraction Method: Principal Component Analysis (PCA).

4.1.3 Rotated Component Matrix

It (Rotated Component Matrix[a]) requires achieving for simplicity in the interpretation (Malhotra, 2018). This is why principal component analysis with varimax rotation was chosen in the study to the factors and as a cause of market crash in 2010-11 in DSE and as an effect of volatile market left most of the investors from the market. In this study, the suggestion was taken from Stevens (1992) for using a factor leading cut-off of 0.40, regardless of sample size, has been followed for easy interpretation. Hence, variables with factors loading below 0.40 were not taken into consideration, shown in the Table: 3, below.

Table: 3, Rotated Component Matrix[a]

	Component			
	1	2	3	4
I_have_sufficient_knowledge_of_DSE		.780		
Confidence_on_Ability		.837		
Control_in_investment		.797		
I assume full responsibility of my investment		.686		
I Plan to increase investment in the next quarter because I reply upon my farsightness		.675		
Discussion with colleagues			.670	
Reliance_on_peers			.776	
Past_Investment_Success			.833	

	Component 1	Component 2	Component 3	Component 4
Reliance_on_Market_Participants			.809	
Preference_of_buying_stocks_when_many_buy_orders_are_placed			.577	
Selling_stocks_upon_Immediate_Price_falls				.804
Selling_stocks_upon_immediate_price_increase				.820
Less_dissappoinment_when_others_also_experience_loss				.825
Higher_Losing_disappoinment_if_friends_make_profit				.753
Holding_Stocks_Despite_their_Poor_Past_Performance	.845			
Holding_Stocks_Despite_Higher_Current_Price	.897			
Not_bothering_about_share_Price_Decline_Expecting_Quick_Recovery	.862			
Overtrusting_Market_Participants_During_Share_Purchase	.903			
Not_selling_Stocks_Despite_DSE_index_drop	.883			

Source: SPSS Data Analysis Output

Where, component: 1, Knowledge of risk management with high loading variable, it also explains most of 27.884% of other variables. Component: 2, on the other side, Availability of authentic information for the investment explains 20.512%. Likewise, component: 3, Efficiency of Securities and Exchange Commission with 12.028% and component: 4, Exposure of Banks & Financial Institutions with 8.136% plains among 19 independent variables.

4.2 Regression Analysis

This study uncovers the cause of market crash and shows the effect of the crash as a case of DSE in 2010-11. The Regression model in the Table:6, indicates positive correlation (R=.869) between independent variables i.e. four dimensions and dependent variable on investors impression towards investment in DSE. R square suggest that the strength of association between dependent and independent variables (Malhotra, 2018). So, R square =.756 in the model signifies that 75.60% variance in dependent variables is explained by the identified variables. Table is shown below.

Table: 4, Regression Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate

1	.869[a]	.756	.748	.22448

Source: SPSS Data Analysis Output

a. Predictors: (Constant), Efficiency of Securities and Exchange Commission, Knowledge of Risk Management, Availability of Authentic Information for Investment, Exposure of Banks & Financial Institutions

4.3 ANOVA Test

"ANOVA technique in context of two-way design when repeated values are not there: as we do not have repeated values, we cannot directly compute the sum of squares within samples as we had done in the case of one-way ANOVA. Therefore, we have to calculate this residual or error variation by subtraction", (Kothari 2011). Table 5, shows analysis of variance, it is evident that P value is less than .005 which is significance level in the Table: 5, ANOVA. So the null hypothesis (H_0: R square pop = 0) is rejected. This ultimately means that independent variables affect the dependent variable (cause of market crash and negative impression of investors to make investment decision in current market condition).

Table: 5, ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	61.860	4	15.465	25.734	.000[b]
Residual	87.140	145	.601		
Total	149.000	149			

Source: SPSS Data Analysis Output

➤ Dependent Variable: Effect of DSE Crash
➤ Predictors: (Independent Variables), Efficiency of Securities and Exchange Commission, Knowledge of Risk Management, Availability of Authentic Information for Investment, Exposure of Banks & Financial Institutions

4.4 Coefficients Analysis

The Table: 6, explains that all the chosen independent variables that represent the four identified components at 5% significance level. Among these components 1 plays the most devastating role of crashing market in 2010-11 as it has the highest beta coefficient value on Risk Management of Investors in DSE as follows:

Table: 6, Coefficients

| Model | Unstandardized Coefficients | | Standardized Coefficients | | |
	B	Std. Error	Beta	t	Sig.
1 (Constant)	5.927E-17	.063		.000	1.000
Knowledge of Risk Management	.367	.064	.367	5.772	.000
Availability of Authentic Information for Investment	.332	.064	.332	5.227	.000
Efficiency of Securities and Exchange Commission	.320	.064	.320	5.033	.000
Exposure of Banks & Financial Institutions	.262	.064	.262	4.120	.000

Source: SPSS Data Analysis Output

4.5 Histogram Analysis

It is usually the statistical tool explained the frequency of occurrence of specific phenomena which lie within a specific range of values which are arranged in consecutive and fixed intervals. The frequency of data occurrence is represented by bar, hence it looks like a bar graph

Figure: 1, Histogram
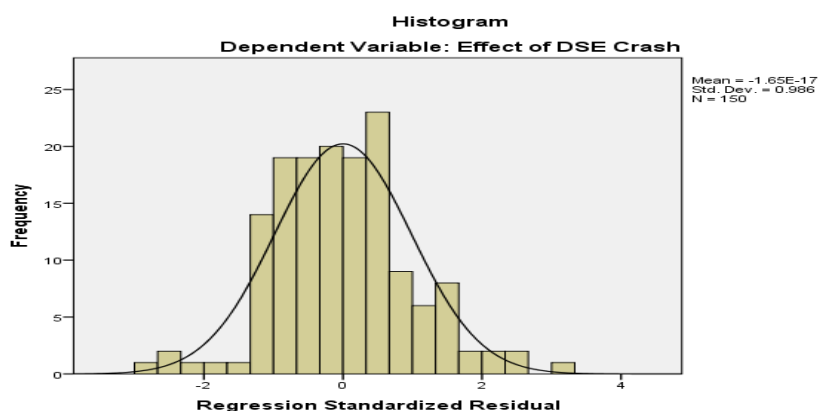
Source: SPSS Data Analysis Output

In the above histogram (Figure: 1), it shows that mean = -1.65 and standard deviation = .986 and as the curve sloping down from a high in the observed dimensions that cause market crash and lead to negative impression among the investors in investment decision in DSE. As a result many investors left from the market after crash had taken place in DSE in the year 2010-11.

5.0 Conclusion and Recommendation

The study uncovers the cause & effect and dimensions of investors' impression toward the stock market crash during 2010-11 in DSE. In this study there are considered four major factors which represent most of the causes of stock market crash. As an effect market was seemed to be mostly volatile for the investors as a result they were dissatisfied and left from the market. Security and Exchange Commission as well as government should properly guide and supervise all mechanisms of the stock market operations so that investors' can be impressed and feel safe in terms of investment decision making. The study finds major dissatisfactions of the investors after analyzing data such as; there is limited exposure of banks & financial institutions, lack of availability of authentic information for the investment, limited knowledge of risk management, and inefficiency of Securities and Exchange Commission which lead to stock market crash very often in Bangladesh. All the four dimensions of the study such as; exposure of banks & financial institutions, availability of authentic information for the investment, knowledge of risk management, efficiency of Securities and Exchange Commission indicate that majority of investors are not impressed on these dimensions. Through analysis and developed hypotheses show the calculated value is unacceptable to build a stable capital market which makes poor impression for the investors in investment decisions.

The study provides some recommendations for preventing stock market crash in the future such as; the regulators and government should have developed rules and regulations for the stock market protection. All other agencies relating to stock market need to introduce new tools, strategies, directives for market development and to prevent this kind of stock market crash frequently. It is also required to develop flawless accounting practices, recruiting honest officials, providing authentic information about stock market for the general investors. It is necessity to take strict actions against manipulators of the capital market. Training programs should be arranged for the investors and management officials so that they may have acquired knowledge on risk management for the investment in the stock market. Finally, this paper suggests that regulators of the stock market should review existing rules & regulations and increase investors' better impression toward investment opportunities to build up a strong and stable capital market in Bangladesh.

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