Quantitative Factors affecting Stock Price Variability: An Evidence of Chittagong Stock Exchange

ACKNOWLEDGEMENT

This report is an integral part of academic course curriculum. The intention of this project report is to provide a practical essence of the financial market, which ultimately helps to diversity knowledge. Without support from a group of persons it was quit impossible for me to prepare this paper. I cordially like to thank them.

My cordial thanks and gratitude to M. Sayed Alam, Senior Lecturer, Department of Business Administration, East West University, for giving me the chance to conduct my project paper under his supervision and guidance. My next upstanding thanks to Md. Lutfur Rahman, Senior Lecturer, Department of Business Administration, East West University. His valuable guidelines and information were of utmost assistance for the successful completion of this report.

Last but not the least, I would like to thank all the officials of Chittagong Stock Exchange Ltd. for their kind assistance and for providing required information to complete the proposal.

Mehedi Ferdous

Mehedi Ferdous
ID: 2003-2-10-237

August 9, 2007

M. Sayed Alam
Senior Lecturer
Department of Business Administration
East West University

Subject: **Submission of Report on "Quantitative Factors affecting Stock Price Variability: An Evidence of Chittagong Stock Exchange".**

Dear Sir,

Here is the report on, **"Quantitative Factors affecting Stock Price Variability: An Evidence of Chittagong Stock Exchange"** as an integral part of ICMAB (Institute of Cost and Management Accounts of Bangladesh) course curriculum. It is my great pleasure and gratitude that I got the opportunity to prepare the report under your kind supervision and guidance.

This report highlights the concept of credit rating in details, present rating practice in Bangladesh and also some recommendations for the betterment of existing rating practice. While preparing this report, I have tried to analyze available literatures on Credit Rating besides getting practical experience from a renowned rating agency of Bangladesh. To prepare this report, I have given my level best effort despite some limitations.

Preparation of the report was a valuable experience for me and it helped me a lot to enrich my knowledge. I believe such a remarkable experience will augment my professional career.

Sincerely yours,

Mehedi Ferdous

Mehedi Ferdous
ID: 2003-2-10-237

TABLE OF CONTENTS

Background

ORIGIN OF THE REPORT:

This report has been primed as a requisite of academic project requirement under the supervision and guidance of M. Sayed Alam, Assistant Proctor and Senior Lecturer, Department of Business Department, East West University.

BACKGROUND OF THE STUDY:

With due consent of my supervisor, I have selected my area of interest in this particular aspect and set my project topic as "Quantitative Factors affecting Stock Price Variability: An Evidence of Chittagong Stock Exchange". I believe my work will add value to readers in conceptualizing the term 'Stock price variability' and to address some quantitative factors affecting or are responsible for stock price fluctuation.

OBJECTIVES OF THE STUDY:

Primary objective:

As a finance student, being more interested to know how the factors affecting the fluctuation of stock price that will help to take any investment decision. It is not enough to pass all the courses designed in their course curriculum rather an internship/project report is mandatory. So the primary objective of this study is to prepare and submit project report.

Secondary objectives:

- To conceptualize the term "Stock price variability".
- To obtain a comprehensive insight about the knowledge on stock exchange.
- To identify a quantitative reason responsible for stock price variability.
- To identify problems and limitations associated past and prospective research.
- To provide an idea regarding the secondary market efficiency in Bangladesh

SCOPE OF THE STUDY:

My study is noticeably for academic purpose. In my work I cover Chittagong Stock Exchange, a growing secondary market in Bangladesh. But the full concentration of the report is covering a specific area. I try my level best to cram all the problems associated with the past market research, how the extension can be done to make an effective solution and what are the additional factors should be included.

SOURCES OF INFORMATION:

Primary Sources:
Primary information is collected from Chittagong Stock Exchange Ltd.
Secondary Sources:
The major secondary source of information is published articles.

METHODOLOGY:

- A conceptual framework was developed first through review of existing literature on "Stock Price Variability" at different time dimension.
- An inductive method has been followed in preparing the report.
- The pioneer stock market has been selected for study rating practice.
- Data collection and sorting of data.
- Input configuration.
- Different forms of statistical tools and configurations such as statistical models, tables, have been used to make the study meaningful and realistic.
- Finally I provide my own opinion, limitation and further review of the judgment.

Quantitative Factors affecting Stock Price Variability: An Evidence of Chittagong Stock Exchange

ABSTRACT:

In this paper I have analyzed the prime and quantitative factors affecting the volatility of Stock Price. In this analysis I have applied the Heins & Allison (1966) methodology, assuming linear functional relationship between the relative fluctuation in a stock price and the general level of that price and other control variables e.g. earning variability, price earning ratio, average price of the stock and turnover. The fundamental conclusion of this report shows the coefficient of the variable was significant for 'B' and 'Z' category stock as the relationship of stock price variability exists with the average price and turnover of the stock. But the relationship of the control variables with the stock price variability is insignificant for the high category stock like 'A'. Thus the analysis provides the conclusion that the average priced (active) stock with high P/E ratio and stock turnover, experience higher price variability than more active stock. On the other hand lower priced or less active stock (Z) with high stock turnover experience moderate (average) price variability which is proportionate to the 'B' category stock.

INTRODUCTION

The argument regarding the factors influencing the volatility of stock price started from Louis H. Fritzemeier (1936) article. For many years the writer has read and has been told that low-priced stocks "move faster and farther" than high-priced ones. More specifically, it is said that low prices per share are conducive to volatility, that the percentage price fluctuation in a low-priced stock is commonly greater than it would be in a higher-priced stock of similar quality and prospects. The truth of the matter is that the percentage price fluctuations in most low-priced stocks are about the same as those in high-priced stocks of the same quality. The price instability which characterizes so many low-priced stocks should be attributed to their speculative quality. Many decades have passed but the conflict still continued. A country like Bangladesh where economy is emerging doesn't have any more evidence and the market efficiency is also facing question of giving a fruitful solution. In Bangladesh the observation focuses on the proportionate change in the variability behavior of stock price, whatever the category a stock holds. Although the decision has taken based on the quantitative analysis of a small segment of controllable variables but a significant influence of human behavior, seasonal impact, investor's perception, influence of institutional investors & political changes also place a vital role over the stock price variability. Thus a qualitative analysis for individual stock and informational symmetry can give an effective and sustainable solution for an emerging secondary market like Bangladesh that will provide a conclusive argument to 'stop' the debate on stock price variability.

LITERATURE REVIEW

The argument regarding the variability of stock price started form *Louis H. Fritzemeier (1936)* article on "Relative price fluctuation of industrial stocks in different price Groups". He has worked to identify the effect of price level of industrial stocks upon price fluctuations. The effort was to prove whether the price of low- priced stocks tends to fluctuate relatively more or relatively less than the price of high-price stocks or the price of low- price stocks tend to move up relatively more and down relatively less than the price of high-price stocks, or vice versa. The findings of his study was Low-price industrial stocks offer greater opportunities for speculative profits than high-price industrial stocks or Low-price stocks tend to fluctuate relatively more than high-price stocks.

John Clendenin's (1951) article proved a reverse solution indicating strongly that low-price stocks do not fluctuate more widely than high-price stocks, other factors being constant. Some writers in the area cling to the notion that low-price stocks have greater variability. In the third edition (1951) of the monumental *Security Analysis* the authors state clearly that low-price stocks have a probability of advancing or declining more than higher- priced stocks, and cite a *1936 study by Louis Fritzemeier* as authority for this claim. This statement is reproduced exactly in the fourth edition (1962), and the Fritzemeier study is again cited. Other post-1951 writers have similarly referred to the great variability of low-price stocks without accounting for the findings in the Clendenin article.

James Heins & Stephen L. Allison (1966) worked to determine the variability of stock price for different category stock. He concluded that stock price variability bears no relationship to the average price of stocks, if other factors are held properly constant. This is not a new finding, but it does formalize and reinforce the findings of the *Clendenin study of 1951.*

Rahman & Rahman (2006) in their *article "Stock Price Variability: Evidence from Dhaka Stock Exchange"* showed that, both the average price of the stock as well as turnover of the stock plays an important role to explain the relative price variability of high category stock where as low category stock exhibits no such kind of attribute and they concluded that high category stocks exhibits higher price volatility than low category stock that was consistent with the study of *Clendenin (1951) and Allison (1966)*

MODEL AND METHODOLOGY

To determine the impact of General level of price and other control variables over the stock price variability, we have assumed a linear function and estimated the parameters by the technique of multiple regressions.

The multiple regression analysis were run three category of stocks they are A, B, & Z.

Category		***Number of Observation***	***[%] of the Stock***
A	---------------------	89	.67
B	--------------------	21	.64
Z	--------------------	48	.61

Process:

The regression models were run for each of three (3) stock categories.

Relative price variability was measured as the difference between the high and low price of the stocks for the year under study as a percentage of the average price for the year. The average price of the stocks was taken as the arithmetic average of the high and low price for the year 2005.

In addition to the investment grade of stocks, the following control variables were employed in the regression analysis:

1. The average price of the stocks was taken as the arithmetic average of the high and low price for the year *2005.*
2. Variability in per share earnings of the stocks was measured by the difference between the high and low annual earnings per share for the year *(2000 - 2004)* as a percentage of the average annual earning per share for the 5 years period. A 5 years period was used because I felt it provided an adequate indication of the degree of earnings variability and yet was recent enough to provide a reasonable indication of future variability.
3. The price-earnings ratio of the stocks for the year *2005* has taken form the Chittagong Stock Exchange. It was not measured by the average price divided by the

latest annual earnings per share because it shows a large difference with the actual price earning ratio.

4. Activity or turnover in the stock was measured by the total shares traded during the year as a percentage of the number of shares of the stock outstanding for the year *2005.*

The data was obtained from the Chittagong Stock Exchange

Model:

The following regression equation were formed –

$\mathbf{V_A} = A + b_a X_a + b_e X_e + b_p X_p + b_t X_t$

$\mathbf{V_B} = A + b_a X_a + b_e X_e + b_p X_p + b_t X_t$

$\mathbf{V_Z} = A + b_a X_a + b_e X_e + b_p X_p + b_t X_t$

Where,

$\left.\begin{array}{l} \mathbf{V_A} = \text{Relative price variability of A rated stocks} \\ \mathbf{V_B} = \text{Relative price variability of B rated stocks} \\ \mathbf{V_Z} = \text{Relative price variability of Z rated stocks} \end{array}\right\} \quad \dfrac{\text{High - Low}}{\text{Average price}}$

A = constant term

$\mathbf{X_a}$ = Average price of the stock

$\mathbf{X_e}$ = Earnings variability

$\mathbf{X_p}$ = Price-earnings ratio of the stock

$\mathbf{X_t}$ = Activity or turnover of the

CATEGORY "A"

As shown by the regression result of 'A' category stock only 3% of the total variance is explained by the independent variable. Whereas 97% of the unknown factor that has not taken into consideration. Thus the overall variance is insignificant to the stock price variability with a 10% level of significance. With a 5% significance level the variance is insignificant to the stock price variability. The positive correlation exists for turnover but the proportion is so small that can't be taken into consideration. Thus overall consideration due to inefficiency of the market it can be concluded that the 'A' category stock experience low variability as there is insignificant relationship exists and any change in independent variable showing almost no significant change in the variability of stock price.

CATEGORY A

Regression Statistics	
R Square	0.03317
Unexplained Variance	0.9668
Multiple R	0.1821
Observations	89
F	Significance F
0.7204	0.5804

Coefficient Output				
	Coefficients	*P-value*	*Standard Error*	*t Stat*
Constant Term (A)	0.5224	4.56495E-13	0.061025205	8.559751018
Xa	6.470E-06	0.8590	3.63014E-05	0.178239153
Xe	-0.0032	0.5740	0.00575691	-0.564319971
Xp	-0.0045	0.30707	0.004379183	-1.027646787
Xt	0.0557	0.2589	0.048975388	1.136722468

Correlation							
	V_A	Xa	Xe	Xp	Xt	*Mean*	*STDEV*
V_A	1					0.476199	0.257901
Xa	-0.0087	1				552.7338	773.8169
Xe	-0.05274	-0.0300	1			1.053767	4.821178
Xp	-0.1200	0.1398	-0.0756	1		11.69026	6.435076
Xt	0.1349	-0.1155	0.0007	-0.1217	1	0.113062	0.572096

CATEGORY "B"

In case of 'B' category stock the variability is explained by the price-earning ration and turnover of the stock. Thus explaining 51% of the total variance. Thus these two variables have a significant relationship with the stock price variability for a 10% level of significance. For a 5% level of significance only the turnover of the stock is significant to the stock price variability. A significant relationship exists between price variability and P/E ratio of the stock, similarly stock turnover with price variability. The inter correlation between price – earning ratio and stock turnover are also acceptable Thus from the overall analysis it can be concluded that 'B' rated stock with large P/E ratio and stock turnover experience greater price variability.

CATEGORY B

Regression Statistics	
R Square	0.5177
Unexplained Variance	0.4823
Multiple R	0.7195
Observations	21
F	Significance F
4.2932	0.0151

Coefficient Output				
	Coefficients	*P-value*	*Standard Error*	*t Stat*
Constant Term (A)	0.17763644	0.0320	0.075597597	2.349763049
Xa	0.000355381	0.5908	0.00064773	0.548655486
Xe	0.00244069	0.6210	0.004840335	0.50423988
Xp	0.002148587	0.0891	0.001186919	1.810222417
Xt	1.306827219	0.0110	0.45428011	2.876699178

Correlation							
	V_B	Xa	Xe	Xp	Xt	*Mean*	*STDEV*
V_B	1					0.312645	0.233992
Xa	-0.0409	1				81.22024	69.42994
Xe	-0.0794	-0.0401	1			3.864683	8.658529
Xp	0.5041	0.1490	-0.1264	1		24.0009	36.98884
Xt	0.6184	-0.3341	-0.2117	0.2767	1	0.034545	0.10364

CATEGORY
"Z"

The 'Z' category stock shows a significant relationship with the turnover of the stock. Although is explaining only 14% of the total variance by the independent variables. Thus a significant relationship exists with the stock turnover and the average price of the stock. But the problem lie in the inter correlation of the turnover and average price of the stock which is negative. With a 10% level of significance the average price and stock turnover ratio is consistent with the stock price volatility. But with a 5% significance level only the stock turnover is consistent with the stock price variability. Thus we can conclude that 'Z' category stock with larger turnover ratio experience high stock price variability.

CATEGORY Z

Regression Statistics	
R Square	0.1440
Unexplained Variance	0.8560
Multiple R	0.3795
Observations	48
F	Significance F
1.8085	0.1447

Coefficient Output				
	Coefficients	*P-value*	*Coefficients*	*Standard Error*
Constant Term (A)	0.4308	4.05673E-11	0.430828312	0.049167211
Xa	0.0004	0.0678	0.000383546	0.000204713
Xe	-0.0002	0.7610	-0.00017676	0.00057748
Xp	-0.0005	0.7052	-0.000519665	0.001364375
Xt	0.5189	0.0556	0.518882688	0.263694153

Correlation							
	Vz	Xa	Xe	Xp	Xt	*Mean*	*STDEV*
Vz	1					0.312645083	0.233992
Xa	-0.0409	1				81.2202381	69.42994
Xe	-0.0794	-0.0401	1			3.864683149	8.658529
Xp	0.5041	0.1490	-0.1264	1		24.00089778	36.98884
Xt	0.6184	-0.3341	-0.2117	0.2767	1	0.034544764	0.10364

CONCLUSION

About all it can be concluded that. Some what more confidence can be shown in the findings for the 'B' and 'Z' category stock with respect to the effect of price earning ratio and turnover on category 'B' and turnover for category 'Z' on stock price variability which is consistent with the findings of *Louis H. Fritzmeier (1936),* low price stock experience higher variability than high priced stock.

Thus the analysis of this paper provides the conclusion that due to the impact of price earning ration and turnover of the stock the average priced (active) stock [B] experience higher price variability than more active stock [A]. On the other hand low priced or less active stock [Z] experience moderate (average) price variability than high category stock due to the impact of stock turnover But whatever the stock category, variability is proportionate regardless the category of the stock.

LIMITATION OF THE RESEARCH

A country like Bangladesh where economy is emerging, the secondary market activity can't be explained as the developed economy. This paper included only some quantitative factors based previous experience that are not enough consistent to explain the stock price variability. The factor influencing over a stock price to categorize is basically the dividend policy and performance of the stock. Due to irregularity in dividend declaration some high priced stock may categorized poorly that has not taken into consideration. Similarly the stock market crash during 1996 in Bangladesh was an experience for the researcher to take other quantitative and qualitative factors like human behavior and proportion of institutional investors those are influencing stock price volatility.

For further research this paper will give other researcher a room explaining the stock price variability covering different time dimension as well as considering other internal and behavioral factors.

REFERENCES:

ARTICLES –

1. **Some Factors Affecting Stock Price Variability**
   A. James Heins; Stephen L. Allison
   The Journal of Business, Vol. 39, No. 1, Part 1. (Jan., 1966), pp. 19-23.

2. **Quality Versus Price as Factors Influencing Common Stock Price Fluctuations**
   John C. Clendenin
   The Journal of Finance, Vol. 6, No. 4. (Dec., 1951), pp. 398-405.

3. **Relative Price Fluctuations of Industrial Stocks in Different Price Groups**
   Louis H. Fritzemeier
   The Journal of Business of the University of Chicago, Vol. 9, No. 2. (Apr., 1936), pp. 133-154.

DATA SOURCE:

CHITTAGONG STOCK EXCHANGE LTD.

Appendix:

The prime house of the country introduced "Group A" and "Group B" from July 2, 2000 based on its financial strength and performance to give clear information to investors for taking informed decision. Dhaka Stock Exchange (DSE) and Chittagong Stock Exchange (CSE) have further categorized the securities introducing "Group Z" which came into effect from September 26, 2000. The stock exchanges introduced another company category "Group G" on June 30, 2002. The categorization he a lot the investors in choosing companies before making investment decision.

Criteria of the share category are as follows:

"A" category companies: Number of instruments 133. Companies which are regular in holding their annual general meeting and have declared dividend at the rate of 10% or more in a calendar year.

"B" category companies: Number of instruments 33. Companies which are regular in holding their annual general meeting but have failed to declare dividend at least at the rate of 10% a calendar year.

Z" category companies: Number of instruments 91, Companies which have failed to hold the current annual general meetings or failed to declare any dividend or which are not in operation for more than six months or whose accumulated loss after adjustment of revenue reserve, if any, is negative and exceeded its paid up capital.

"G" category companies: Number of instruments 1: only Greenfield companies