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Portfolio Management to Reduce the Risk of Stockholders in the Bangladesh Stock Market

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Author's contribution

This work was carried out by the author H-O-R-H designed the study, performed the statistical analysis, wrote the protocol, wrote the first draft of the manuscript, managed the analyses of the study, and managed the literature searches.

Research Article

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ABSTRACT

This paper deals with reducing the risk of stockholders investment by implementing portfolio management in Bangladesh's stock market. The Markowitz portfolio model derives the expected rate of return for a portfolio of stocks and a measurement of the expected risk, which is the standard deviation of the expected rate of return. The model showed that the expected rate of return of a portfolio is the weighted average of the expected return for the individual investments in the portfolio. The standard deviation of a portfolio is a function not only for a standard deviation for the individual investment but also the covariance between the rates of the return for all the pair of stocks in the portfolio. In a large portfolio, this covariance is an important factor. In this paper, seven years data of eight companies are used as a sample which are randomly collected the daily closing prices of their stocks from January 1, 2006 to June 25, 2012. These data are gathered from the Chittagong Stock Exchange (CSE), Bangladesh. Then these data are analyzed through the calculating expected return of the standard deviation or risk, covariance, correlation, and standard deviation of individual stocks, two stocks portfolio and also four stocks portfolio. Different analyses have shown that the combination of investment can reduce the risk of the investment.

Keywords: *Portfolio management; standard deviation; covariance; correlation.*

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1. INTRODUCTION

Portfolio is the combination of investment. Portfolio management is a professional management of various securities in order to meet specified investment goals for the benefit of the investors [1]. It true that diversification can reduce the risk of an investor which can also effect in the Bangladesh stock market. Bangladesh is a developing country and there are still lacks of various business opportunities. As a result, many people invest their capital to the stock market. But most they do not know about the risk of the stock market in Bangladesh. Last 2/3 years, thousands of investors lost their capital for the high deviation of the stock price. These are still running on the Bangladesh stock market. Hence, from the perspective of the Bangladesh stock market, it is very important to analyze the portfolio management for avoid the high risk of investors.

In the year 1960, the investment committee talks about the risk, but there was no specific measurement in the term to build a portfolio model, however, investors had to quantify their risk variable. The basic portfolio model was developed by Harry Markowitz (1952, 1959), who derived the expected rate of return for a portfolio of assets and expected risk measurement. Markowitz showed that variance of the rate of return was meaningful measure of a portfolio risk under a reasonable set of assumption and he derived a formula for computing the variance of a portfolio. This portfolio formula is not only indicated the importance of diversifying investments to reduce the total risk of a portfolio but also showed how to the effectively diversify. The Markowitz model is based on the several assumptions regarding investor behavior. First of all, investors ponder each investment alternative as being signified by a probability distribution of expected returns over some holding period. Besides, stockholder maximizes one-period expected utility and their utility curves show diminishing marginal utility of affluence. In addition, depositors estimate the portfolio on the basis of the erraticism of expected yield. Then, stockholders base judgments only on expected return and risk, so their utility curves a function of expected return and the expected variance (standard deviation) of returns solely. Moreover, for an assumed risk level, depositors prefer higher return to lower returns. Similarly, for a prearranged level of expected return, investor prefer less risk to more risk [2-3].

There are several articles to analyze about the portfolio management of the stock market for different countries [4-12]. In [4], the authors compares the performance of minimum-variance portfolios based on four different covariance matrix estimators, using daily return data from the German stock market. To assess whether investing in minimum-variance portfolios is a recommendable way to attain proficient portfolios in accordance with Markowitz's mean-variance optimization, the authors benchmark the four portfolios' performance against the German stock index DAX, which also determines the investable universe. In [5], examines the random walk hypothesis in the emerging Indian stock market using daily data on individual stocks. The statistical evidence in this paper rejects the random walk hypothesis. The results suggest that daily returns earned by individual stocks and by an equally weighted portfolio show significant non-linear dependence and persistent volatility effects. In [6], An empirical findings suggest that the incorporation of skewness into an investor's portfolio decision causes a major change in the resultant optimal portfolio. The empirical evidence indicates that investors do trade expected return of the portfolio for skewness. The portfolio management for the country, industry and Italian stock market is described in [7-9]. In [10], portfolio of Japan and U.S. stock market are analyzed, and in [11], Empirical results illustrate the practical value of large-scale numerical optimizations using return-based covariance matrix estimation methodologies, providing new perspective on the factor characteristics of low-volatility portfolios. Optimizations that go back to 1968 reveal that the

long-only minimum-variance portfolio has about three-fourths the realized risk of the capitalization-weighted market portfolio, with higher average returns. In [12], the author of this article provides a useful framework for explaining the risk–return benefits of adding stocks to a portfolio. The analysis uses Monte Carlo techniques to simulate total returns of equity portfolios with varying numbers of holdings for the seven–year period ending December 31, 1999. But still there is no portfolio management research on the Bangladesh stock market.

In this paper, to lessen the risk of stockholders investment, a portfolio management for Bangladesh's stock market is analyzed. The Markowitz portfolio model derives the expected rate of return for a portfolio of stocks and a measurement of the expected risk, which is the standard deviation of the expected rate of return. Total even years of data from eight companies are used as samples which are randomly collected the daily closing prices of their stocks from January 1, 2006 to June 25, 2012. These data are collected from the Chittagong Stock Exchange (CSE), Bangladesh. Different investigations have shown that the combination of investment (i.e. portfolio) can reduce the risk of the investment.

2. BACK GROUND

Harry Markowitz 1991, an American economist in the 1950s developed a theory of "portfolio choice," which allows investors to analyze risk relative to their expected return. For this work Markowitz, a professor at Baruch College at the City University of New York, shared the 1990 Nobel Memorial Prize in Economic Sciences with William Sharpe and Merton Miller.

Markowitz's theory is today known as the Modern Portfolio Theory, (MPT). The MPT is a theory of investment which attempts to maximize portfolio expected return for a given amount of portfolio risk, or equivalently minimize risk for a given level of expected return, by carefully choosing the proportions of various assets. Although the MPT is widely used in practice in the financial industry, in recent years, the basic assumptions of the MPT have been widely challenged.

The MPT, an improvement upon traditional investment models, is an important advance in the mathematical modeling of finance. The theory encourages asset diversification to hedge against market risk as well as risk that is unique to a specific company [13].

Investment portfolio theories guide the way an individual investor or financial planner allocates money and other capital assets within an investing portfolio. An investing portfolio has long-term goals independent of a market's day-to-day fluctuations; because of these goals, investment portfolio theories aim to aid investors or financial planners with tools to estimate the expected risk and return associated with investments.

Passive portfolio theories, on one hand, combine an investor's goals and temperament with financial actions. Passive theories propose minimal input from the investor; instead, passive strategies rely on diversification, buying many stocks in the same industry or market, to match the performance of a market index. Passive theories use market data and other available information to forecast investment performance [14].

Active Portfolio Theories come in three varieties. Active portfolios can either be patient, aggressive or conservative. Patient portfolios invest in established, stable companies that pay dividends and earn revenue despite economic conditions. Aggressive portfolios buy riskier stocks, those that are growing, in an attempt to maximize returns; because of the

volatility to which this type of portfolio is exposed, it has a high turnover rate. As the name implies, conservative portfolios invest with an eye on yield and long-term stability [15].

In any financial market analysis, if the objective of the analysis involves determination of stocks to buy and at what price, there are two basic methodologies: fundamental analysis, which maintains that markets may misprice a security in the short run but that the "correct" price will eventually be reached. Profits can be made by trading the mispriced security and then waiting for the market to recognize its "mistake" and re-price the security. Technical analysis, maintains that all information is reflected already in the stock price. Trends' are your friend' and sentiment changes predate and predict trend changes. Investors' emotional responses to price movements lead to recognizable price chart patterns. Technical analysis does not care what the 'value' of a stock is. Their price predictions are only extrapolations from historical price patterns.

3. METHODOLOGIES OF THE INVESTIGATION

3.1 Data and Data Sources

The study is carried out for eight CSE listed companies for the period of January 1, 2006 to June 25, 2012. These eight CSE listed companies are AB Bank Limited, Islami Bank Bangladesh Limited, IDLC Finance Limited, Prime Finance & Investment Ltd, Confidence Cement Ltd, Heidelberg Cement Bangladesh, Square Pharmaceutical Limited, and Advanced Chemical Industries Ltd. These eight companies were chosen from four industries and taken two companies for every industry randomly. Daily stock prices of these eight companies from the CSE by using primary sources. Besides, secondary sources of data are used for preparing the paper like- various site of internet, television news and many important books.

3.2 Risks and Returns Measurement

Actually, the financial investors' common impartial is to accomplish an optimal risk-return amalgamation [16]. In general, investors purchase stocks or assets because they expect to increase their prices or wealth. This expectation is possible if it earns positive rate of return. According to the finance, it assumes that individuals base their decisions on what they expect to happen and their assessment of how likely it is that what actually occurs will be close to what they expected to happen. When evaluating potential investments in financial assets, these two dimensions of the decision making process are called expected return and risk [17].

3.2.1 Expected return

Investors do not know with certainty whether the economy will be growing rapidly or be in recession because the future is uncertain. As such, they do not know what rate of return their investments will yield. Therefore, they can make their decisions based on the historical data or future prediction. But in this paper, historical data are utilized [2],[18].

The expected return can be calculated using the following equation,

$$E(R) = \left(\sum_{t=1}^T R_t \right) \div T \quad (1)$$

where, $E(R)$ is expected return on the stock, R_t is returns on the stock in the state t , and T is the number of states.

The expected return on a portfolio is computed as the weighted average of the expected returns on the stocks which comprise the portfolio. The weights reflect the proportion of the portfolio invested in the stocks.

3.2.2 Variance

Variance is a measure of risk. It is also called volatility, so this statistic can help determine the risk an investor might take on when purchasing a specific security. Variance measures the variability (volatility) from an average [19].

A measure of the spreading of a set of data points around their mean value. Variance is a mathematical expectation of the average squared deviations from the mean.

3.2.3 Standard deviation, σ

Standard deviation is way of measuring risks. Standard deviation is a statistical value used to determine how spreads out the data in a sample, and how close individual data points are to the mean or the average value of the sample. A standard deviation of a data set equal to the zero is indicated that all values in the set are the same. A larger value implies that the individual data points are farther from the mean value [20].

3.2.4 Covariance, (σ_{ij})

There are many estimators and model used econometrics that data are covariance stationary. There an absolute measurement of the extent to which two variables tends to move together [18]. Equation of the covariance for sample data is given as,

$$\sigma_{ij} = \left[\sum_{t=1}^T (R_{it} - E(R)_i)(R_{jt} - E(R)_j) \right] \div [T - 1] \quad (2)$$

3.2.5 Correlation coefficient, C_{ij}

The correlation coefficient is a standardized statistical measurement of the extent to which two variables are associated ranging from perfect positive correlation ($C_{ij} = +1.0$) to perfect negative correlation ($C_{ij} = -1.0$) [2].

4. RESULTS AND DISCUSSION

For measuring risks (are represented by Standard Deviation) and returns, this paper has been analyzed the six years historical data of each company. These companies are CSE listed [21]. In this paper, we have used eight different companies such as, AB Bank Limited (A), Islami Bank Bangladesh Limited (B), IDLC Finance Limited (C), Prime Finance & Investment Limited (D), Confidence Cement Limited (E), Heidelberg Cement Bangladesh (F), Square Pharmaceutical Limited (G), and Advanced Chemical Industries Limited (H). These A to H symbols are used for the next analyses to indicate the eight different companies.

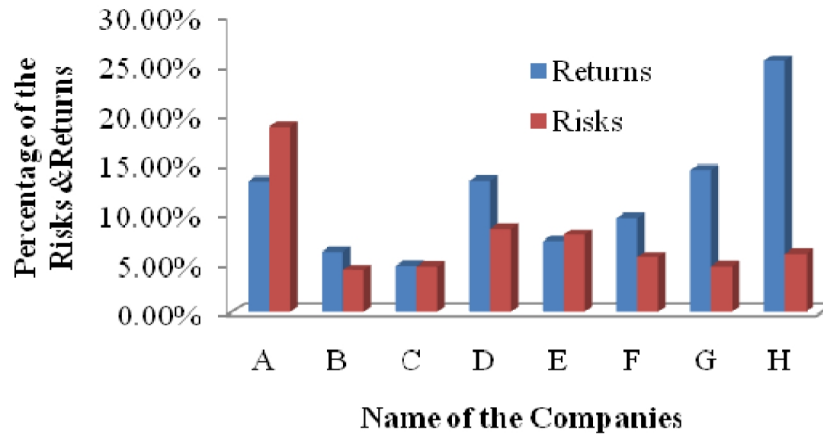


Fig. 1. Individual expected returns and risks

Table 1. Individual expected returns & risks (or standard deviation) and variance

Expected return of the individual company							
A	B	C	D	E	F	G	H
0.132118629	0.06103	0.04676	0.13294	0.071787	0.09528	0.14371689	0.25413
Percentages of the expected return							
13.21%	6.10%	4.68%	13.29%	7.18%	9.53%	14.37%	25.42%
Variance							
0.035157618	0.00183	0.00212	0.00711	0.006166	0.00314	0.00215058	0.00349
Standard deviation							
0.187503648	0.04282	0.04609	0.0843	0.078525	0.05603	0.0463744	0.05905
Percentages of the standard deviation							
18.75%	4.28%	4.61%	8.43%	7.85%	5.60%	4.64%	5.90%

Table 1 shows the expected returns and risks for each company. Fig. 1 (bar-chart) derives from the Table 1. From Fig. 1, as can be seen that the Advanced Chemical Industries Limited (H) is in the best position as compared with other companies according to the risk (5.90%) and expected return (25.42%). On the other hand, the AB Bank Limited (A) is in the worst position (i.e. risk (18.75%) and return (13.21%)). Conditions of Islami Bank Bangladesh Limited (B), Prime Finance & Investment Limited (D), Heidelberg Cement Bangladesh (F), and Square Pharmaceutical Limited (G) are in moderate positions as compared to the risks and returns measurement. The IDLC Finance Limited (C) has provided very little amount of return (4.68%) but AB Bank Bangladesh Limited (A) and Confidence Cement Limited (E) are shown the negative return (i.e. risks are higher than the returns) for the investors.

Table 2. Covariance of investments

Covar of A,D	-0.0021	Covar of B,C	0.00045
Covar of A,E	-0.0007	Covar of B,F	0.00021
Covar of A,H	-0.0018	Covar of B,G	-0.0005
Covar of C,E	-0.0007	Covar of D,F	0.00127
Covar of C,G	-0.0003	Covar of D,H	0.00086
Covar of E,G	0.00208	Covar of F,H	0.00098

Table 2 shows the covariance of investments. From Table 2, it is seen that the companies like- AB Bank Ltd. (A) and Prime Finance & Investment Ltd (D), AB Bank Ltd. (A) and Confidence Cement Ltd. (E), AB Bank Ltd. (A) and Advanced Chemical Industries Ltd. (H), IDLC Finance Ltd. (C), and Confidence Cement Ltd. (E), IDLC Finance Ltd. (C) and Square Pharmaceutical Ltd. (G), Islami Bank Bangladesh Ltd. (B) and Square Pharmaceutical Ltd. (G) are shown the negative covariance. On the other hand, Confidence Cement Ltd. (E) and Square Pharmaceutical Ltd. (G), Islami Bank Bangladesh Ltd. (B) and IDLC Finance Ltd. (C), Islami Bank Bangladesh Ltd. (B) and Heidelberg Cement Bangladesh (F), Prime Finance and Investment Ltd. (D) and Heidelberg Cement Bangladesh (F), Prime Finance & Investment Ltd. (D) and Advanced Chemical Industries Ltd.(H), Heidelberg Cement Bangladesh (F) and Advanced Chemical Industries Ltd. (H) are shown the positive covariance.

Table 3. Correlation of investments

Cor of A,D	-0.12974513	Cor of B,C	0.225550452
Cor of A,B	0.104623194	Cor of B,D	0.290104025
Cor of A,E	-0.04639044	Cor of B,F	0.085728371
Cor of A,C	-0.16594481	Cor of B,E	-0.12925112
Cor of A,H	-0.16686743	Cor of B,G	-0.25918754
Cor of A,F	-0.17483723	Cor of B,H	0.287473682
Cor of A,G	0.047361388	Cor of D,E	-0.28572544
Cor of C,E	-0.19901782	Cor of D,F	0.268829263
Cor of C,D	0.495877878	Cor of D,G	0.021791593
Cor of C,G	-0.16194178	Cor of D,H	0.17362469
Cor of C,F	0.284192349	Cor of E,F	-0.23704533
Cor of C,H	0.379580952	Cor of E,H	-0.57477891
Cor of E,G	0.570662988	Cor of F,H	0.297670786
Cor of F,G	-0.2011892	Cor of G,H	-0.75177071

Table 3 shows the correlation of the investments for different companies. From Table 3, it shows that AB Bank Ltd. (A) and Prime Finance & Investment Ltd. (D), AB Bank Ltd. (A) and Confidence Cement Ltd. (E), AB Bank Ltd. (A) and IDLC Finance Ltd. (C), AB Bank Ltd. (A) and Advanced Chemical Industries Ltd. (H), AB Bank Ltd. (A) and Heidelberg Cement Bangladesh (F), IDLC Finance Ltd. (C) and Confidence Cement Ltd. (E), IDLC Finance Ltd. (C) and Square Pharmaceutical Ltd. (G), Heidelberg Cement Bangladesh (F) and Square Pharmaceutical Ltd. (G), Islami Bank Bangladesh Ltd (B) and Square Pharmaceutical Ltd. (G), Islami Bank Bangladesh Ltd. (B) and Confidence Cement Ltd. (E), Prime Finance & Investment Ltd. (D) and Confidence Cement Ltd. (E), Confidence Cement Ltd. (E) and Heidelberg Cement Bangladesh (F), Confidence Cement Ltd. (E) and Advanced Chemical Industries Ltd. (H), Square Pharmaceutical Ltd. (G) and Advanced Chemical Industries Ltd. (H) are negatively correlated. On the other hand, AB Bank Ltd. (A) and Islami Bank Bangladesh Ltd. (B), AB Bank Ltd. (A) and Square Pharmaceutical Ltd. (G), IDLC Finance Ltd. (C) and Prime Finance & Investment Ltd. (D), IDLC Finance Ltd. (C) and Heidelberg Cement Bangladesh (F), IDLC Finance Ltd. (C) and Advanced Chemical Industries Ltd. (H), Confidence Cement Ltd. (E) and Square Pharmaceutical Ltd. (G), Islami Bank Bangladesh Ltd. (B) and IDLC Finance Ltd. (C), Islami Bank Bangladesh Ltd. (B) and Prime Finance & Investment Ltd. (D), Islami Bank Bangladesh Ltd. (B) and Heidelberg Cement Bangladesh (F), Islami Bank Bangladesh Ltd. (B) and Advanced Chemical Industries Ltd. (H), Prime Finance & Investment Ltd. (D) and Heidelberg Cement Bangladesh (F), Prime Finance & Investment Ltd. (D) and Square Pharmaceutical Ltd. (G), Prime Finance & Investment Ltd.

(D) and Advanced Chemical Industries Ltd.(H), Heidelberg Cement Bangladesh (F) and Advanced Chemical Industries Ltd. (H) are positively correlated.

Table 4. Calculated weight of two stocks portfolio

	A	D		B	C
W of A,D	0.31015	0.68985	W of B,C	0.51842	0.48158
	A	E		B	F
W of A,E	0.29518	0.70482	W of B,F	0.56683	0.43317
	A	H		B	G
W of A,H	0.2395	0.7605	W of B,G	0.51994	0.48006
	C	E		D	F
W of C,E	0.63012	0.36988	W of D,F	0.39927	0.60073
	C	G		D	H
W of C,G	0.50152	0.49848	W of D,H	0.41192	0.58808
	E	G		F	H
W of E,G	0.37129	0.62871	W of F,H	0.51311	0.48689

Weights have been calculated like-average price of the individual share is multiplied by total number of his shares, then get the total price of his shares. Thus, the total price of two individual shares calculates and sums of the two companies' total prices, and finally total price of individual company's share divided by total price of two companies' shares, and then it determines the weight of the company. Table 4 shows the weight of the two stocks portfolio.

Table 5 shows the two stocks portfolio for different companies, and Fig. 2 is derived from the Table 2. From the Table 5 and Fig. 2, the every portfolio provides more return then their risk. As compared with the individual investment (in Fig. 1), the portfolio shows the more return and can reduce the investment risk as well.

Table 5. Two Stocks portfolio risk & return

Two stocks Portfolio Risk (∂)					
		%			%
∂ Port of A,D	0.07672242	7.67%	∂ Port of B,C	0.03475272	3.48%
∂ Port of A,E	0.07643472	7.64%	∂ Port of B,F	0.03576495	3.58%
∂ Port of A,H	0.05796709	5.80%	∂ Port of B,G	0.02709858	2.71%
∂ Port of C,E	0.03676135	3.68%	∂ Port of D,F	0.05361899	5.36%
∂ Port of C,G	0.02992806	2.99%	∂ Port of D,H	0.0532015	5.32%
∂ Port of E,G	0.0516753	5.17%	∂ Port of F,H	0.04631642	4.63%
Two Stocks Portfolio Expected Return					
		%			%
Port Return of A,D	0.13269	13.27%	Port Return of B,C	0.05416	5.42%
Port Return of A,E	0.0896	8.96%	Port Return of B,F	0.07587	7.59%
Port Return of A,H	0.22491	22.49%	Port Return of B,G	0.10073	10.07%
Port Return of C,E	0.05602	5.60%	Port Return of D,F	0.11032	11.03%
Port Return of C,G	0.09509	9.51%	Port Return of D,H	0.20421	20.42%
Port Return of E,G	0.11701	11.70%	Port Return of F,H	0.17262	17.26%

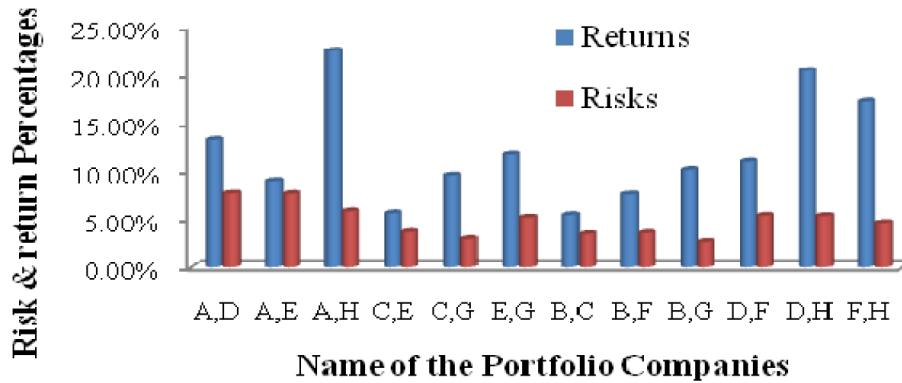


Fig. 2. Two stocks portfolio risk and returns

Table 6 shows the weights of four stocks portfolio. Like as the previous calculations, weight have been calculated as average prices of the individuals share multiplied by total number of shares, then the total price of shares is determined. Thus, the total price of four individual share is calculated-then sums of the four companies, total prices, and finally total price of individual company's share divided by total price of four companies' share, and then it determines the weight of the company.

Table 7 and Fig. 3 show the four stocks portfolio. In four stocks portfolio, it is noticed that every portfolio is profitable. E, F, G, H is most profitable followed by C, D, G, H as compared to the risk then A, B, F, G but A, C, E, H less profitable portfolio as compared to the other portfolios.

Table 6. Four stocks portfolio

Weights of Four Stocks Portfolios				
	A	B	F	G
W of A,B,F,G	0.12615	0.6416	0.02488	0.20737
	A	C	E	H
W of A,C,E,H	0.58927	0.29264	0.0399	0.07819
	B	C	E	G
W of B,C,E,G	0.69727	0.06809	0.00928	0.22536
	B	D	F	H
W of B,D,F,H	0.84465	0.10056	0.03275	0.02204
	A	B	C	D
W of A,B,C,D	0.13912	0.70755	0.06909	0.08424
	E	F	G	H
W of E,F,G,H	0.03317	0.09661	0.80522	0.065
	A	B	E	F
W of A,B,E,F	0.15746	0.80082	0.01066	0.03105
	A	B	G	H
W of A,B,G,H	0.12719	0.64686	0.20907	0.01688
	C	D	E	F
W of C,D,E,F	0.36328	0.44292	0.04953	0.14427
	C	D	G	H
W of C,D,G,H	0.17252	0.21034	0.57104	0.0461

Table 7. Four Stocks portfolio risk & return

Four stocks portfolio					
Portfolio risk	In %	Portfolio return	In %		
∂ Port of A,B,F,G	0.0575778	5.76%	Port return of A,B,F,G	0.1341364	13.41%
∂ Port of A,C,E,H	0.109898	10.99%	Port return of A,C,E,H	0.1142718	11.43%
∂ Port of B,C,E,G	0.0297158	2.97%	Port return of B,C,E,G	0.0787928	7.88%
∂ Port of B,D,F,H	0.0401854	4.02%	Port return of B,D,F,H	0.0736388	7.36%
∂ Port of A,B,C,D	0.0440385	4.40%	Port return of A,B,C,D	0.0759918	7.60%
∂ Port of E,F,G,H	0.0354061	3.54%	Port return of E,F,G,H	0.1438287	14.38%
∂ Port of A,B,E,F	0.0473805	4.74%	Port return of A,B,E,F	0.0734022	7.34%
∂ Port of A,B,G,H	0.0375613	3.76%	Port return of A,B,G,H	0.0906181	9.06%
∂ Port of C,D,E,F	0.0499045	4.99%	Port return of C,D,E,F	0.0931717	9.32%
∂ Port of C,D,G,H	0.0332154	3.32%	Port return of C,D,G,H	0.129813	12.98%

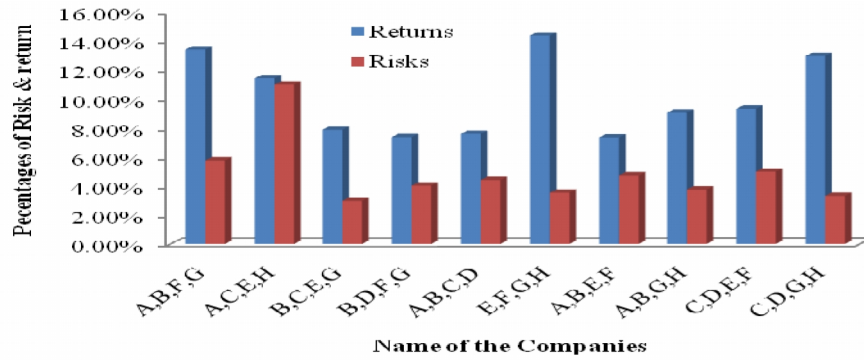


Fig. 3. Four Stocks portfolio risk & return

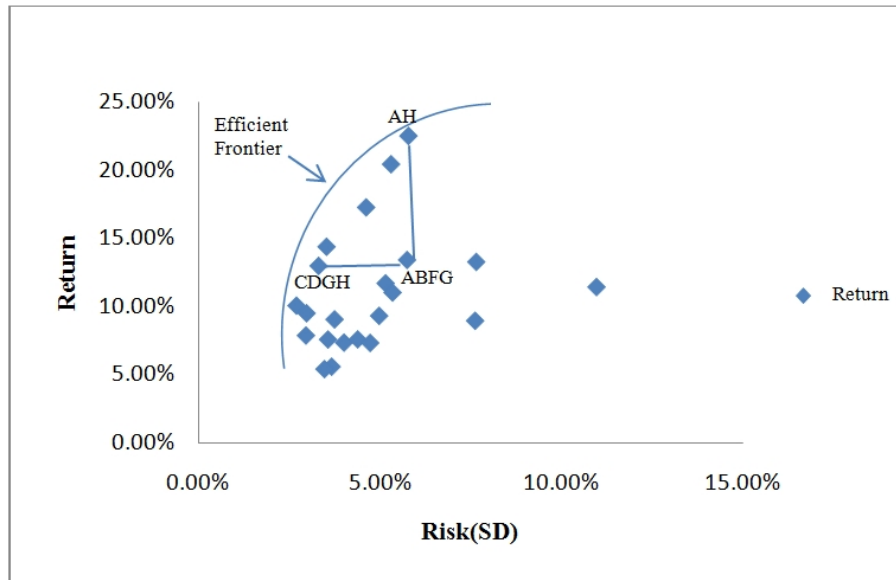


Fig. 4. Efficient frontier

Based on Tables 5 and 7, the efficient frontier is shown in Fig. 4. From this figure, every portfolio that lies on the efficient frontier has either a higher rate of the return for equal risk or lower risk for equal rate of the return. According to the Fig. 4, portfolio 'AH' dominates portfolio 'ABFG' because it has equal risk but a higher expected rate of return. Then portfolio 'CDGH' is superior to 'ABFG' because it has equal return but lower risk.

Table 8. Risks have been reduced by portfolio investment even two negative returns can be turn into positive return through portfolio

A		E		A & E		Weight		Correlation
ER	SD	ER	SD	ER	SD	A	E	A,E
13.21%	18.75%	7.18%	7.85	8.96%	7.64%	0.295176	0.704824	-0.04639

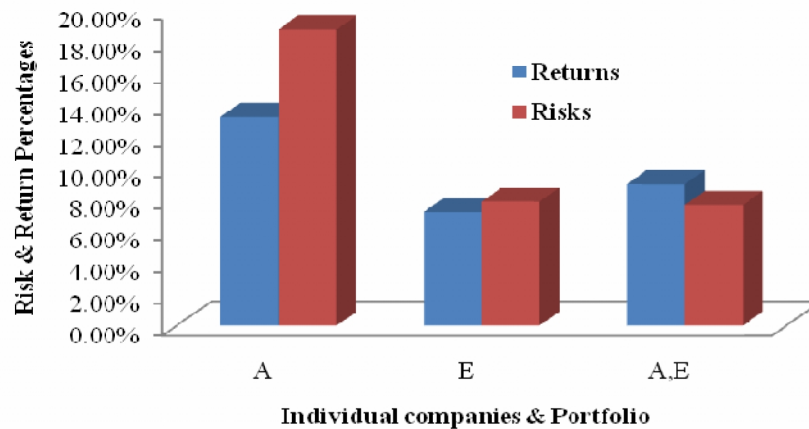


Fig. 5. Risks have been reduced by portfolio

Table 8 and Fig. 5 show the summary of the portfolio. From here, it is clear that both (A&E) investment opportunities are more risky then their return individually but when an investor makes the portfolio between these two stocks he or she gets more return then their risk. But it is not possible for all projects. These above two projects or companies are negatively correlated that is why it is possible to make positive return through two risky projects. However, it is true that a Bangladeshi investor can reduce the risks of investment by making portfolio which has proved in above discussions and graphical presentations.

5. CONCLUSION

Even, investment in two companies' share individually may provide negative return that means loss but interesting thing is when an investor makes portfolio to take these two companies' share it may provide positive return or gain to the investor. For example, (Fig. 5) if a person X invests in the stock of AB bank Ltd. (A), person Y invest in stock of Confidence Cement Ltd (E) and person Z invest in stock of AB bank Ltd. (A) & Confidence Cement Ltd (E) both, finally their risk 0.132118629, 0.07178713, 0.076434724 and Expected return 0.187503648, 0.078525294, 0.089595525, respectively. Therefore, it is seen that the individual investors (X&Y) have got less return compare to the risk and portfolio investor (Z) has gained or more return compare to the risk.

From the analyses of this paper, it is realized that combination of investment (or portfolio) can reduce the risk of investment. But it is true that investors need to knowledge about calculation of risk and return and also need to proper knowledge about combination of investment. Recently, Bangladesh Stock Market condition is downward. An investor may conquer this situation by making proper portfolio. If investors invest their money in a one project or one company's stock it may show high risk. So, an investor can avoid this high risk to make portfolio investment.

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COMPETING INTERESTS

Author has declared that no competing interests exist.

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