Risk Return Trade Off: Evidence from Monthly Return of Banking industry in Dhaka Stock Exchange

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Abstract

The paper aims at assessing the risk return relations of banking sector stock in Dhaka stock exchange. A sample of 29 listed banks were selected from Dhaka Stock Exchange. Various statistical tools were accompanied with risk adjusted performance measures suggested by Jenson, Treynor and Sharpe are employed widely known as Treynor ratio, Sharpe ratio, and Jensen's alpha. This study found that samplestocks was showndownward trend in regards to annualized monthly return in comparison to market return. According to CAPM about 60% of sample stocks were shown positive results but lower than risk free rate means no market risk premium to investors.Risk adjusted measures also shown that all stocks were under performing with less diversification opportunities. Correlation matrix shown that The City Bank and Uttara Bank Limited with 80% has an option to create portfolio.

Keywords:

Risk-Return Tradeoff, Holding period ReturnBeta CAPM, Sharpe Ratio, Treynor Ratio, Jensen Ratio.

JEL Classifications: C22; G12;

Introduction

The relationship between the conditional return and conditional variance of asset returns, also referred to as the risk-return relation, has key relevance in areas within financial economics such as optimal portfolio choice and risk analysis (Aslanidis et. al.,2013).Economic and financial theories assume that a rational investor would consider a number of factors in making aninvestment decisionOne of such considerations is the expected return on investment, which is premised on the factthat in embarking on any investment (Nwude, 2012)The concept of risk/return suggests that low levels of investment risk will result in potentially lower returns, while high levels of risk will generate potentially higher returns. Of course, there are no guarantees. While increased risk offers the possibility of higher returns, it also can lead to bigger losses.Thus, it is believed that no rational investor would deliberately embark on an investment, which would place him in a financial disadvantage. However, this is not to say that arational investor cannot invest in an instrument or venture, which would in the short-run yield no return or indeed result in losses. The anticipated future returns on such an investment should of course, outweigh

current losses. Rational investors always try to reduce the gap between return on investment and associated level of risk.

Return on investment (ROI) used as an indicator of measuring performance of investment as well as significant factor for investment decision as well. Every investment decision put into action on the basis of its risk return proposition, every acceptable investment shows less per unit risk with expected return of investment. Every rational investorconsiders numerous variables other than expect return and risk like investment area, time to tide up funds, socio economic conditions.

Literature review

The relationship between return and risk has motivated lots of research in both the theoretical and the empirical field for many years. Many of the asset pricing models are based on this fundamental financial relationship and a good comprehension of the dynamics of return and risk is essential to understand these models. One of the most cited theoretical works in the financial literature analyzing the relationship between return and risk is Merton's (1973) intertemporal capital asset pricing model (ICAPM).Despite the important role of this trade-off in the financial literature, there is no clearconsensus about its empirical evidence.

Harry Markowitz introduced new dimension of security return when he considered portfolio of securities insteadof finding out single security return and risk in 1952 published in Journal of Finance. Markowitz consideredoverall risk and return of the securities in a portfolio. He asserted that overall risk on the securities could beminimized by diversification.James Tobin (1958) advanced Markowitz's work by adding risk free asset in theportfolio. Sharp (1964) introduced the concept of CAPM, which notified that security return depends on themarket performance.

Nwude(2012) assess return on investment with evidence of banking sector indicating that

Mohammad, Serajul&Mustafa (2010) test the validity of CAPM covering period 1998 to 2008 of Dhaka Stock Exchange, study found that less significant implication of CAMP in determining expected return, it is happened due to limited variables.

Mostofa(2010) investigate return on investment on the basis of sector wise investment evidence from Dhaka stock exchange. Study found that out of 10 samples industry only banking industry shows higher expected return with significant influence by mice economic variables.

Narasimhan, Roman& Joshua (2010) investigate performance of private equity considering market price, study indicate that equity return is negatively related with book value of listed companies.

Grinblatt et al (1998:106) and Ross et al (1996:221) state that return is profit divided by amount invested which theystated as R= (D1+P1-P0)/P0 where P1 is the end of the period value of the investment(that is, the price one wouldreceive for the investment at the end of the period), P0 is the beginning of the period value of the investment(that isthe amount paid to acquire the investment), D1 is the cash reward received from the investment over the period. Tothem, return on asset is same as accounting rate of return, which is accounting profit earned on a project divided bythe amount invested to acquire the project's assets.

Problem of the study

This study tries to examine the relations between risk and expected return with likely trend over the period focusing selection of stock for investment with combination of different statistical tools.

Objective of the study

i) To measure the growth oriented Mutual Fund are earning higher returns than market Portfolio..

ii) To find out those stocks offering the advantages of diversification.

iii) To analyze the excess return per unit of risk evidenced by mutual fund of public sector and private sector.

Scope of the study

The scope of the study is limited to growth schemes in Bangladesh for the period **January '12 to June '13 and use 29 listed banks for the study out of 30 currently treaded in the market**.

Secondary Data: The study has been carried out entirely on the basis secondary source. The major sources of secondary data are as given below:

Daily General index obtained from Dhaka Stock exchange the proxy for the market return in the study.

Research Methodology

This study has been designed on the following ways

Research approach: Exploratory research methods apply in this connection and interpret the research outcome accordingly.

Sampling technique: in case of selecting sample for research purpose, here random sampling technique follow which means 29 banks are select on random basis considering one criterion such that schemes should treaded before January 01, 2012. For market return calculation DES all shares index consider as market representative and return uses as benchmark for comparison

Time horizon: The studies consider those banks which are

traded about last 18 months in the market. Research period started from 1st January, 2012 to 30th June, 2013

Sources of data: Both primary and secondary data has been collected in this regard. Mostly data collected from secondary sources. Primary data has been collected from direct interview of different market experts and investors.

Procedure of data analysis: Different statistical tools and financial models are used to evaluate the performance of mutual funds. Specially mean return, covariance, coefficient of correlation, beta coefficient, Sharpe index, Treynor index and Jensen alpha

Measuring risk and return of mutual funds

Risk-free rate of return: There are two basic criteria, one the security should be highly liquid and another is that it should be capable of generating a return, with negligible variation from expected returns. 91 days treasury bills falls within this yardstick. Return on 91 days T-bills has been taken as surrogate measure of risk-free return for the period from**January '12 to June '13**have been collected from the website of government securities.

Return

For each mutual fund scheme under study, the monthly returns are computed as: $R_i = \dfrac{p_1 - p_0}{p_0}$

Where,

R_i=Return of fund during period over 12 months

p_1=Value of the Fund at the end of period 1

p_0=Value of the Fund at the start of period

The market returns are computed on similar lines with General as benchmark. The return on the market portfolio is computed as:

$$R_m = \frac{Market\ Index_1 - Market\ Index_0}{Marekt\ Index}$$

Where, R_m - return on market

Risk

Standard deviation is measure of total risk. The square root of the variance is called the standard deviation $\sigma = Var\ (r)$. The standard deviation and the variance are equally acceptable and equivalent quantitative measures of an asset's total risk. The variance and standard deviation are computed from average monthly returns.

$$\delta = \sqrt{\frac{\sum_i^N [Ri - E(R)]2^{\square}}{n}}$$

Beta is measure of Systematic Risk or non-diversifiable risk. It measures the sensitivity of the stock with reference to a broad based market index.

$$\beta = \frac{Coveriance_{im}}{Variance_m}$$

Coefficient of Variation (CV):It means risk per unit of return i.e. standard deviation/mean. It measured the degree of variation relative to mean as a percentage.

Co-efficient of Determination (R2): i.e., the extent to which the movement in the fund can be explained by corresponding benchmark index

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Measuring performance of funds

For further evaluating the performance of mutual funds, the risk-return relation models given by Sharpe (1966), Treynor (1965) and Jensen (1968) have been applied

Jack **Treynor** (1965) conceived an index of portfolio performance measure called as reward to volatility ratio, based on systematic risk. He assumes that the investor can eliminate unsystematic risk by holding a diversified portfolio. Hence his performance measure denoted as T is the excess return over the risk free rate per unit of systematic risk, in other words it indicates risk premium per unit of systematic risk.

Treynor's index=$\dfrac{R_J - R_f}{\beta_{pi}}$

Where,

R_J=Portfolio returns over a period j

R_f=Risk-free return over a period f

p_0=Value of the Fund at the start of period

β = Market-risk, beta coefficient p

If TP of the mutual fund scheme is greater than $(R_m - R_f)$ then the scheme has out performed the market. The major limitation of the Treynor Index is that it can be applied to the schemes with positive betas during the bull phase of the market. The results will mislead if applied during bear phase of the market to the schemes with negative betas. The second limitation is it ignores the reward for unsystematic or unique risk.

Sharpe's Ratio

Sharpe (1966) devised an index of portfolio performance

measure, referred to as reward to variability ratio denoted by S He assumes that small investor invests fully in the mutual fundand does not hold any portfolio to eliminate unsystematic risk and hence demands a premium for the total risk.

Sharpe ratio $= \dfrac{R_J - R_f}{\sigma_{pj}}$

R_j=Portfolio returns over a period j

R_f=Risk-free return over a period

σ = Total risk, standard deviation of portfolio return j

If Sj of the mutual fund scheme is greater than that of the market portfolio, the fund has outperformed the market. The superiority of the Sharpe ratio over the Treynor ratio is, it considers the point whether investors are reasonably rewarded for the total risk in comparison to the market. A mutual fund scheme with a relatively large unique risk may outperform the market in Treynor's index and may underperform the market in Sharpe ratio. A mutual fund scheme with large Treynor ratio and low Sharpe ratio can be concluded to have relatively larger unique risk. Thus the two indices rank the funds differently

Jensen's Measure

Jensen (1968) has given different dimension and confined his attention to the problem of evaluating a fund manager's ability of providing higher returns to the investors. He measures the performance as the excess return provided by the portfolio over the expected (CAPM) returns. The performance measure, denoted by JP. He assumes that the investor expects at least CAPM returns.

(Rp) = Rf + βj x [(Rm) – Rf]

Where,

(Rp) = Expected portfolio return during a particular period j

Rf = Risk free interest rate

Rm = return on market/benchmark portfolio

βj= Volatility of portfolio return against that of marketPortfolio return or portfolio's market risk.

βj, is a measure of systematic risk of the portfolio and iscalculated using following equationA positive value of J would indicate that the scheme hasprovided a higher return over the CAPM return and lies aboveSecurity Market Line (SML) and a negative value wouldindicate it has provided a lower than expected returns and liesbelow SML. The Jensen model assumes that the portfolio isfully invested and is subjected to the limitations of CAPM.

Data analysis and Findings

Holding period yield (HPY) represents rate of earning from daily trade of securities means gap between beginning and ending price of stock.**Appendix - A:**shows annualized holding period yield on the basis of monthly return covering last 18 months of selected 29 listed banks in DSE. From table, it is obvious that every stock having negative annualized return for the last 18 months research period with market having also negative return of -12.21% indicating market is in the negative moved. As per annualized HPY least preferable investment in banking sector is National Bank Limited having return -76.54%, means stock price declined significantly and less price declined shows by Brac Bank Limited by 24.56%. Being rational investors, it is not worthwhile of having investment in banking sector considering last 18 months monthly return.

Appendix – B: Revealsthe relationship among different banking stocks with market, indicating movement of respective funds return with market return. Value of positive correlation indicates same way changes with market changes, which means changing return with market with proportion to degree of correlation and negative correlation indicates opposite directions movement against market return. Range of correlation coefficient of banking stocks with market from 0.14 to 0.44 and significant number of stocks correlation is approximate to 40%

From **Appendix – B:**it is manifested that **ISLAMI BANK BANGLADESH LIMITED** shows strong correlation **(0.44)** with market among all stocks and having shown least relations with market of **ICB ISLAMIC BANK LIMITED(0.14).** Notable factor from correlation between stocks with market that is all banking stocks are positively correlated means that banking stocks move with movement of market movement.

Value of correlation of determination shows variability of return with market return. Having higher (R^2) means higher diversification of the stock of portfolio that can easily contain market variability. It is shown from **Appendix – B:** that every stock having positive value of coefficient determination indicating having diversification opportunities.

Appendix – C: reveals risk in absolute term i.e., standard deviation and variance and return sensitivity i.e., beta in relation to market return movement. Higher standard deviation represent higher risk, from **Appendix – C:** it is obvious that **IFIC** having highest market sensitivity i.e., beta (**0.66**) followed by **ONE BANK LIMITED (0.55),RUPALI BANK LIMITED (0.53)** and**RUPALI BANK LIMITED (0.53)** lowest sensitivity shown by **ICB ISLAMIC BANK LIMITED (0.17).** it is notable here that all stocks are positively sensitive towards market return, with additional market return will increase stock return proportionately.

While considering absolute risk measurement i.e., standard

deviation, higher standard deviation indicates higher level of risk. Form **Appendix – C**: it is apparent that **ONE BANK LIMITED** having higher standard deviation **(65%)** followed by **IFIC (62%), RUPALI BANK LIMITED (62%) and** havinglowest standard deviation shownby**ISLAMI BANK BANGLADESH LIMITED** **(36%).**

Appendix – C: reveals that Coefficient of variation range from-83% to -216%. Considering value of coefficient of variation there is no preferable investment opportunities because of all stocks having higher percentage of risk with per unit of return.

Table 03: Calculation of Risk Free rate of Return

Months	91 days T-bill rates
January'12	10.50
February'12	11.00
March'12	11.00
April'12	11.26
May'12	11.34
June'12	11.37
July '12	11.36
August'12	11.3
September'12	11.20
October'12	10.18
November'12	9.59
December'12	9.21
January'13	10.06
February'13	9.91
March'13	9.16
April'13	8.38
May'13	8.34
June'13	8.37
Average	10.20%

Source: official website of Bangladesh Bank

Risk free return represents unsystematic risk tends to be zero i.e., no default risk in connection to return from investment. According to CAPM expected return of security depends on risk free return and portfolio premium.

Capital assets pricing modes is widely acceptable for determining return on stock considering market sensitivity with adjustment of risk free return. **Appendix - D:**exhibits expected return according to **CAPM** of stocks range from **6.25% to -4.10%.** It is also obvious that about 60%stocks having positive return according to CAPM estimation, although every stocks shown lower rate of return than risk free rate. Higherreturn showed by **ICB ISLAMIC BANK LIMITED (6.25%)**. It is found that risk premium is negative due to negative market return estimated over the time i.e., having lowest beta (0.17) of **ICB ISLAMIC BANK LIMITED** showedhighest expectedreturn **(6.25%).** All stocks of banking sector show lower rate of return in compare to risk free rate that means there is not additional risk premium for risky investment in the stock market. Such situation prevail due to market having negative return with all stocks positive beta which is less than 1 indicating stocks

are less sensitive towards market.It is truly unexpected situation for current invests and potential investor as well because of industry as a whole being under performed and rational investors do not get as expected return from investment

Risk adjusted performance measurement

Appendix – E: represents risk adjusted performance measurement index with application of widely accepted tools namely Sharpe ratio, Treynor index and Jensen's index.

Sharpe ratio indicates reward to variability ratio. It is an excess returns over risk free return per unit of risk i.e., per unit of standard deviation. Positive values of Sharpe ratio designate better performance. It is obvious from **Appendix –E**thatall stocks show negative index signposts lesser performed of those stocks **Brac bank limited** having higher Sharpe ratio**(-0.66)** followed by Pubali **Bank Limited(-0.74),**having Sharpe ratio negative indicating bad performance and lesser return from the investment. Positive value indicating all schemes are favorable option for investment for current and potential investors.

Treynor index indicates risk adjusted return i.e., excess return over risk free rate per unit of systematic risk means beta. In **Appendix – E**second column shows Treynor index of different banks and it is similar to Sharpe ratio that is all stocks having negative index. Among 29 banks Higher Treynor index shown by **Pubali Bank Limited (-.86)** followed by **Prime Bank (-.91)**even though it is exception to Sharpe ratio because higher Sharpe ratio indicating stock should show higher Treynor ratio. According to Sharpe ratio better performance represent by having higher positive value of Treynor index.

Jensen's alpha measures differential return of securities. It is the regression of excess return of the scheme (the dependent variable) with excess return of the market (the independent variable). Higher Jensen's alpha indicates better performance. Higher alpha value found in **Brac Bank limited (-.25), Pubali Bank Limited (-0.29), prime bank limited (-0.30)** indicating better performer among the selected mutual fund schemes.

Correlation matrix describes correlation among M variables. It is a square symmetrical MxM matrix with the (ij)th element equal to the correlation coefficient rij between the (i)th and the (j)th variable. The diagonal elements (correlations of variables with themselves) are always equal to 1.00.**Appendix - F**: exhibits correlation matrix among all stocks which gives an idea for selecting stocks in order to forming portfolio with strongly correlated stocks. From correlation matrix it is shown correlation among stocks range from 80% to 8%, strong correlation shows between **The City Bank and Uttara Bank Limited**, followed by **Eastern bank limited and AB Bank limited (0.75), Bank Asia And Southeast Bank Limited (0.70)**and having lowest correlation between **The Premier Bank limited and AB Bank limited (0.08**). Correlation matrix shows that significant numbers of stocks are moderately related having approximated to 0.65.

Conclusion

Banking industry is significantly dominated by private commercial banks and institutional performance immensely influence on stock price. Any decision taken by banks itself or by regulatory body has influence on stock price and eventually shake investors expectation. After stock market scandal in 2009 to2010, most of the investor are reluctant to go for investment further and the trend still carry on which is manifest from the research that is entire banking industry is still underperforming having negative annualized return with market negative trend. In order to change such unexpected market situation requires extensive deregulation steps with confident building program so that small investors can come up with investment in the market and market run with normal process without any manipulation.

Reference

Agrawal, D. (2006). Measuring Performance of Indian Mutual Funds. *Prabandhan*, 179-185.

Bernstein, L. A. (2000). *Analysis of Financial Statements*. New York: McGraw-Hill.

Grinblatt, M. & Titman, S. (1992), 'The persistence of mutual fund performance', Journal of Finance, vol. 47, pp.1977–84

Eugene F. Fama, K. R. (2003). *The CAPM: Theory and Evidence.* Chicago: Social Science Research Network.

Jensen, M. C. (1968). The performance of Mutual Funds in the period 1945-1964, *Journal of Finance*, 23(2),389-416

Jones, Charles P., Investments: Analysis and Management, Johnwiley& Sons, New York, 1988.

Mohammad, S. (2010). Test of CAPM in Emerging Stock Markets: A study on. *The Cost and Management*, 34-38.

M. Jaydev. (1996).Mutual Fund Performance: an analysis of monthly returns, *Finance India*, Vol. X No. 1,Pages-73-84.

Michael, C. J. (1967). The Performance of Mutual Funds in the period 1945-1964. *Journal of Finance*, 389-416

Sharpe, W. (1966).Mutual Fund Performance. *The Journal of Business*, 119

STOCKS, I. (2012). RETURN ON INVESTMENT: CONCEPTIONS AND EMPIRICAL. *Research Journal of Finance and Accounting*, Vol 3, No 8,.

Treynor, J. (1965). How to Rate Management of Investment Funds? *Harvard Business Review,* 63-75.

Appendix

Appendix A: Holding period Yield (HPY) of different banks

name of the scheme	Average Return	Rank according to return	be ow market return	above market return
AB BANK LIMITED	-52.14%	19	1	
AL-ARAFAH ISLAMI BANK LTD.	-54.48%	22	1	
BANK ASIA LIMITED	-45.67%	16	1	
BRAC BANK LTD	-24.56%	1	1	
DHAKA BANK LIMITED.	-38.37%	11	1	
DUTCH BANGLA BANK LTD.	-29.48%	5	1	
EASTERN BANK LIMITED.	-52.69%	20	1	
EXIM BANK OF BD. LTD.	-43.91%	14	1	
Jamuna Bank Ltd.	-48.04%	17	1	
ISLAMI BANK BANGLADESH LIMITED.	-24.58%	2	1	
MERCANTILE BANK LIMITED	-56.60%	26	1	
MUTUAL TRUST BANK LTD.	-44.17%	15	1	
NATIONAL BANK LIMITED.	-76.54%	29	1	
NCC BANK	-51.70%	18	1	
ONE BANK LIMITED	-60.73%	27	1	
PRIME BANK LTD.	-29.18%	4	1	
PUBALI BANK LIMITD	-28.45%	3	1	
RUPALI BANK LIMITED.	-41.47%	12	1	
SHAHJALAL ISLAMI BANK LTD.	-34.85%	7	1	
SOCIAL ISLAMI BANK LIMITED	-38.03%	10	1	
SOUTHEAST BANK LIMITED.	-37.75%	9	1	
STANDARD BANK LIMITED	-36.17%	8	1	
THE CITY BANK LIMITED.	-53.90%	21	1	
The Premier Bank Ltd.	-54.63%	23	1	
Trust Bank Limited	-42.92%	13	1	
UCBL	-54.98%	24	1	
UTTARA BANK LIMITED.	-56.34%	25	1	
IFIC	-62.19%	28	1	
ICB ISLAMIC BANK LIMITED	-33.15%	6	1	
Market Return	-12.21%			

Source: Author calculation by using spss-20

Appendix B: Coefficient Correlation and Correlation of Determination of banking sector with market

name of the scheme	Correlation coefficient	Correlation of Determination
AB BANK LIMITED	0.36	0.13
AL-ARAFAH ISLAMI BANK LTD.	0.36	0.13
BANK ASIA LIMITED	0.29	0.09
BRAC BANK LTD	0.31	0.10
DHAKA BANK LIMITED.	0.20	0.04
DUTCH BANGLA BANK LTD.	0.23	0.05
EASTERN BANK LIMITED.	0.40	0.16
EXIM BANK OF BD. LTD.	0.36	0.13
Jamuna Bank Ltd.	0.38	0.15
ISLAMI BANK BANGLADESH LIMITED.	**0.44**	**0.19**
MERCANTILE BANK LIMITED	0.29	0.09
MUTUAL TRUST BANK LTD.	0.39	0.15
NATIONAL BANK LIMITED.	0.24	0.06
NCC BANK	0.33	0.11
ONE BANK LIMITED	0.30	0.09
PRIME BANK LTD.	0.31	0.10
PUBALI BANK LIMITD	0.32	0.10
RUPALI BANK LIMITED.	0.32	0.10

SHAHJALAL ISLAMI BANK LTD.	0.30	0.09
SOCIAL ISLAMI BANK LIMITED	0.39	0.15
SOUTHEAST BANK LIMITED.	0.27	0.07
STANDARD BANK LIMITED	0.31	0.10
THE CITY BANK LIMITED.	0.34	0.11
The Premier Bank Ltd.	0.32	0.10
Trust Bank Limited	0.27	0.07
UCBL	0.34	0.12
UTTARA BANK LIMITED.	0.30	0.09
IFIC	0.38	0.14
ICB ISLAMIC BANK LIMITED	**0.14**	**0.02**

Appendix C: Beta, Variance and Standard Deviation and Coefficient of Variation

Name of the Scheme	BETA	standard deviation	variance	coefficient of variation
AB BANK LIMITED	0.51	0.57	0.32	-1.09
AL-ARAFAH ISLAMI BANK LTD.	0.35	0.45	0.21	-0.83
BANK ASIA LIMITED	0.40	0.48	0.23	-1.06
BRAC BANK LTD	0.47	0.53	0.28	-2.16
DHAKA BANK LIMITED.	0.31	0.53	0.29	-1.39
DUTCH BANGLA BANK LTD.	0.32	0.50	0.25	-1.69
EASTERN BANK LIMITED.	0.54	0.57	0.32	-1.08
EXIM BANK OF BD. LTD.	0.41	0.52	0.27	-1.18
Jamuna Bank Ltd.	0.43	0.52	0.27	-1.09
ISLAMI BANK BANGLADESH LIMITED.	0.23	**0.36**	0.13	-1.46
MERCANTILE BANK LIMITED	0.44	0.53	0.28	-0.94
MUTUAL TRUST BANK LTD.	0.41	0.52	0.27	-1.17
NATIONAL BANK LIMITED.	0.41	0.61	0.37	-0.80
NCC BANK	0.46	0.50	0.25	-0.97
ONE BANK LIMITED	0.55	**0.65**	**0.42**	-1.07
PRIME BANK LTD.	0.43	0.50	0.25	-1.72
PUBALI BANK LIMITD	0.45	0.52	0.27	-1.83
RUPALI BANK LIMITED.	0.53	0.62	0.38	-1.49
SHAHJALAL ISLAMI BANK LTD.	0.42	0.51	0.26	-1.45
SOCIAL ISLAMI BANK LIMITED	0.47	0.43	0.19	-1.14
SOUTHEAST BANK LIMITED.	0.37	0.49	0.24	-1.30
STANDARD BANK LIMITED	0.49	0.56	0.32	-1.55
THE CITY BANK LIMITED.	0.53	0.62	0.38	-1.15
The Premier Bank Ltd.	0.48	0.56	0.31	-1.02
Trust Bank Limited	0.41	0.53	0.28	-1.23
UCBL	0.55	0.57	0.32	-1.03
UTTARA BANK LIMITED.	0.47	0.55	0.31	-0.98
IFIC	**0.66**	0.62	0.39	-1.00
ICB ISLAMIC BANK LIMITED	**0.17**	0.44	0.19	-1.32

Appendix D: Calculation of Expected Rate of Return Using CAPM

Company m name	risk free rate	market risk premium	beta factor	Expected return	rank
AB BANK LIMITED	0.1021	-21.65%	0.51	-0.83%	23
AL-ARAFAH ISLAMI BANK LTD.	0.1021	-21.65%	0.35	2.69%	5
BANK ASIA LIMITED	0.1021	-21.65%	0.40	1.56%	7
BRAC BANK LTD	0.1021	-21.65%	0.47	0.07%	18
DHAKA BANK LIMITED.	0.1021	-21.65%	0.31	3.55%	3
DUTCH BANGLA BANK LTD.	0.1021	-21.65%	0.32	3.27%	4
EASTERN BANK LIMITED.	0.1021	-21.65%	0.54	-1.57%	26
EXIM BANK OF BD. LTD.	0.1021	-21.65%	0.41	1.24%	11
Jamuna Bank Ltd.	0.1021	-21.65%	0.43	0.99%	13
ISLAMI BANK BANGLADESH LIMITED.	0.1021	-21.65%	0.23	5.14%	2

MERCANTILE BANK LIMITED	0.1021	-21.65%	0.44	0.71%	15
MUTUAL TRUST BANK LTD.	0.1021	-21.65%	0.41	1.36%	9
NATIONAL BANK LIMITED.	0.1021	-21.65%	0.41	1.35%	10
NCC BANK	0.1021	-21.65%	0.46	0.16%	17
ONE BANK LIMITED	0.1021	-21.65%	0.55	-1.67%	28
PRIME BANK LTD.	0.1021	-21.65%	0.43	0.88%	14
PUBALI BANK LIMITD	0.1021	-21.65%	0.45	0.53%	16
RUPALI BANK LIMITED.	0.1021	-21.65%	0.53	-1.23%	24
SHAHJALAL ISLAMI BANK LTD.	0.1021	-21.65%	0.42	1.09%	12
SOCIAL ISLAMI BANK LIMITED	0.1021	-21.65%	0.47	-0.06%	20
SOUTHEAST BANK LIMITED.	0.1021	-21.65%	0.37	2.17%	6
STANDARD BANK LIMITED	0.1021	-21.65%	0.49	-0.48%	22
THE CITY BANK LIMITED.	0.1021	-21.65%	0.53	-1.28%	25
The Premier Bank Ltd	0.1021	-21.65%	0.48	-0.20%	21
Trust Bank Limited	0.1021	-21.65%	0.41	1.43%	8
UCBL	0.1021	-21.65%	0.55	-1.67%	27
UTTARA BANK LIMITED.	0.1021	-21.65%	0.47	-0.03%	19
IFIC	0.1021	-21.65%	0.66	-4.10%	29
ICB ISLAMIC BANK LIMITED	0.1021	-21.65%	0.17	6.52%	1

Appendix – E: **Sharpe Ratio, Treynor Ratio and Jensen Alpha**

NAME OF Bank	SHAPE RATIO	Treynor Ratio	Jensen Alpha
AB BANK LIMITED	-1.1003	-1.22	-0.5131
AL-ARAFAH ISLAMI BANK LTD.	-1.4223	-1.86	-0.5717
BANK ASIA LIMITED	-1.1580	-1.40	-0.4723
BRAC BANK LTD	-0.6561	-0.74	-0.2462
DHAKA BANK LIMITED.	-0.9089	-1.58	-0.4192
DUTCH BANGLA BANK LTD.	-0.7964	-1.24	-0.3275
EASTERN BANK LIMITED.	-1.1039	-1.16	-0.5112
EXIM BANK OF BD. LTD.	-1.0487	-1.31	-0.4516
Jamuna Bank Ltd.	-1.1120	-1.37	-0.4903
ISLAMI BANK BANGLADESH LIMITED.	-0.9680	-1.49	-0.2972
MERCANTILE BANK LIMITED	-1.2540	-1.52	-0.5731
MUTUAL TRUST BANK LTD.	-1.0549	-1.33	-0.4553
NATIONAL BANK LIMITED.	-1.4174	-2.12	-0.7789
NCC BANK	-1.2297	-1.33	-0.5186
ONE BANK LIMITED	-1.0884	-1.29	-0.5905
PRIME BANK LTD.	-0.7850	-0.91	-0.3006
PUBALI BANK LIMITD	-0.7414	-0.86	-0.2899
RUPALI BANK LIMITED.	-0.8348	-0.98	-0.4024
SHAHJALAL ISLAMI BANK LTD.	-0.8917	-1.07	-0.3595
SOCIAL ISLAMI BANK LIMITED	-1.1100	-1.02	-0.3796
SOUTHEAST BANK LIMITED.	-0.9794	-1.29	-0.3992
STANDARD BANK LIMITED	-0.8257	-0.94	-0.3569
THE CITY BANK LIMITED.	-1.0371	-1.21	-0.5262
The Premier Bank Ltd.	-1.1626	-1.35	-0.5443
Trust Bank Limited	-1.0044	-1.31	-0.4435
UCBL	-1.1522	-1.19	-0.5331
UTTARA BANK LIMITED.	-1.2038	-1.41	-0.5631
IFIC	-1.1648	-1.10	-0.5809
ICB ISLAMIC BANK LIMITED	-0.9904	-2.54	-0.3966

Appendix F: Correlation Matrix

	AB BANK LIMITED	AL-ARAFAH ISLAMI	BANK ASIA	BRAC BANK LTD	DHAKA BANK LIMITED.	DUTCH-BANGLA BANK	EASTERN BANK	EXIM BANK OF BD.	Jamuna Bank Ltd	ISLAMI BANK	MERCAN TILE	MUTUAL TRUST	NATIONAL BANK	NCC BANK	ONE BANK	PRIME BANK	PUBALI BANK	RUPALI BANK	SHAHJALAL AL ISLAMI	SOCIAL ISLAMI	SOUTHEAST BANK	STANDARD D BANK	THE CITY BANK	The Premier Bank	Trust Bank	UCBL	UTTARA BANK	IFC	ICB ISLAMIC
1 AB BANK LIMITED	1																												
2 AL-ARAFAH ISLAMI BANK LTD	0.51	1.00																											
3 BANK ASIA LIMITED	0.54	0.46	1.00																										
4 BRAC BANK LTD	0.35	0.24	0.22	1.00																									
5 DHAKA BANK LIMITED.	0.55	0.42	0.51	0.22	1.00																								
6 DUTCH BANGLA BANK LTD.	0.59	0.44	0.55	0.27	0.46	1.00																							
7 EASTERN BANK LIMITED.	0.75	0.46	0.54	0.33	0.51	0.48	1.00																						
8 EXIM BANK OF BD.. TD.	0.58	0.56	0.48	0.26	0.54	0.49	0.49	1.00																					
9 Jamuna Bank Ltd.	0.61	0.71	0.51	0.25	0.52	0.45	0.49	0.59	1.00																				
10 ISLAMI BANK BANGLADESH LIMITED.	0.38	0.33	0.25	0.21	0.24	0.31	0.27	0.33	0.33	1.00																			
11 MERCANTILE BANK LIMITED	0.65	0.51	0.58	0.33	0.66	0.59	0.64	0.61	0.59	0.32	1.00																		
12 MUTUAL TRUST BANK LTD.	0.62	0.58	0.59	0.31	0.50	0.57	0.60	0.62	0.62	0.32	0.59	1.00																	
13 NATIONAL BANK LIMITED.	0.49	0.40	0.46	0.19	0.45	0.53	0.45	0.50	0.48	0.25	0.54	0.53	1.00																
14 NCC BANK	0.68	0.53	0.47	0.30	0.45	0.56	0.55	0.60	0.62	0.28	0.61	0.61	0.52	1.00															
15 ONE BANK LIMITED	0.69	0.55	0.56	0.31	0.56	0.59	0.59	0.58	0.59	0.32	0.63	0.61	0.54	0.66	1.00														
16 PRIME BANK LTD.	0.52	0.48	0.50	0.37	0.56	0.43	0.46	0.47	0.51	0.32	0.55	0.49	0.40	0.52	0.51	1.00													
17 PUBALI BANK LIMITD	0.53	0.38	0.46	0.34	0.44	0.49	0.52	0.43	0.40	0.23	0.70	0.47	0.43	0.46	0.71	0.41	1.00												
18 RUPALI BANK LIMITED	0.60	0.48	0.43	0.29	0.40	0.54	0.54	0.54	0.53	0.34	0.53	0.60	0.45	0.39	0.58	0.49	0.41	1.00											
19 SHAHJALAL ISLAMI BANK LTD.	0.38	0.43	0.34	0.20	0.33	0.41	0.36	0.43	0.43	0.31	0.41	0.42	0.35	0.42	0.42	0.37	0.33	0.40	1.00										
20 SOCIAL ISLAMI BANK LIMITED	0.50	0.53	0.42	0.26	0.36	0.42	0.41	0.58	0.55	0.33	0.52	0.52	0.43	0.49	0.49	0.40	0.41	0.45	0.40	1.00									
21 SOUTHEAST BANK LIMITED.	0.65	0.53	0.70	0.30	0.68	0.63	0.59	0.61	0.62	0.35	0.75	0.60	0.52	0.67	0.54	0.49	0.53	0.55	0.42	0.49	1.00								
22 STANDARD BANK LIMITED	0.59	0.54	0.54	0.28	0.50	0.52	0.54	0.52	0.56	0.33	0.64	0.64	0.49	0.60	0.49	0.42	0.42	0.57	0.46	0.52	0.64	1.00							
23 THE CITY BANK LIMITED.	0.66	0.55	0.51	0.32	0.52	0.56	0.56	0.61	0.62	0.34	0.62	0.63	0.50	0.64	0.50	0.50	0.50	0.63	0.43	0.50	0.62	0.65	1.00						
24 The Premier Bank Ltd	0.08	0.63	0.46	0.27	0.45	0.52	0.57	0.63	0.64	0.34	0.64	0.64	0.56	0.67	0.49	0.30	0.49	0.61	0.44	0.42	0.61	0.66	0.71	1.00					
25 Trust Bank Limited	0.23	0.33	0.59	0.51	0.18	0.24	0.25	0.25	0.31	0.19	0.25	0.19	0.13	0.21	0.21	0.19	0.21	0.25	0.17	0.26	0.33	0.36	0.28	0.25	1.00				
26 UCBL	0.69	0.59	0.57	0.28	0.55	0.58	0.57	0.66	0.72	0.35	0.66	0.65	0.57	0.68	0.52	0.51	0.52	0.65	0.46	0.46	0.64	0.69	0.78	0.76	0.30	1.00			
27 UTTARA BANK LIMITED.	0.67	0.55	0.50	0.31	0.47	0.54	0.57	0.59	0.65	0.43	0.59	0.62	0.52	0.65	0.53	0.52	0.52	0.62	0.53	0.52	0.58	0.64	0.70	0.70	0.31	0.78	1.00		
28 IFC	0.57	0.51	0.42	0.28	0.47	0.45	0.49	0.62	0.61	0.33	0.55	0.57	0.47	0.57	0.42	0.42	0.42	0.55	0.52	0.48	0.51	0.64	0.65	0.62	0.25	0.66	0.63	1.00	
29 ICB ISLAMIC BANK LIMITED	0.37	0.32	0.34	0.08	0.31	0.37	0.35	0.49	0.33	0.23	0.39	0.36	0.36	0.40	0.36	0.32	0.30	0.39	0.29	0.29	0.40	0.42	0.39	0.42	0.08	0.45	0.41	0.42	1.00

Appendix F: Correlation Matrix