IS THE COST OF CAPITAL AN IMPORTANT DETERMINANT OF MARKET PERFORMANCE OF PRIVATE COMMERCIAL BANKS IN BANGLADESH?

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ABSTRACT
This paper empirically estimates the weighted average cost of capital for twenty four commercial banks in Bangladesh that are listed in the Dhaka Stock Exchange considering the period between January, 2006 and December, 2008. Attempts are made to examine what kind of relationship exists between cost of capital and stock market returns of private commercial banks in Bangladesh, and to what degree the returns on stocks can be explained by their respective cost of capital for the same period of time. Using statistical measures like, correlation and regression analyses, we find that a strong negative correlation is emerging between the cost of capital of commercial banks and their respective market returns as the capital market in Bangladesh is becoming more vibrant and efficient. The results also show that for the majority of the banks that are listed in Dhaka Stock Exchange the variation in the returns on stocks can be strongly explained by the variation of their respective cost of capital by the end of 2008. Therefore, our findings suggest that banks should try to lower their respective cost of capital in order to increase their market returns.

Keywords: WACC, Returns on Stocks, Dhaka Stock Exchange, Private Commercial Banks, CAPM

INTRODUCTION

Banking system has a vital role to play in the economic development of a nation. A healthy economy requires a sound banking system. In a developing country like Bangladesh, the banking system has a more important role to play in the progress of economic development. A bank is just like a heart in the economic structure and the capital provided by it is like blood in it. As long as blood is in circulation the organs will remain sound and healthy (http://www.blurtit.com/q197532.html). If the blood is not supplied to any organ then that part would become lifeless. So if capital is not provided to any sector of the economy, it will be obsolete. Capital provided by banks acts as a driving force to the producers to enhance production.

A number of studies have indicated that the banking sector plays a more important role than it was believed earlier (World Bank, 1996; Almeyda, 1996). There are four Nationalized Commercial Banks (NCBs) in Bangladesh, of which Sonali Bank is the largest. Pubali Bank is the leader among the twenty eight Private Commercial Banks operating in Bangladesh. Out of the twelve foreign banks, the Standard Chartered Bank is the largest in the country. Besides the scheduled banks, there are five Development Banks and four other banks, like Samabai (Cooperative) Bank, Ansar-VDP Bank, Karmasansthan (Employment) Bank and Grameen bank, which are integral parts of the financial sector of Bangladesh. In Bangladesh the number of total branches of all scheduled banks is 6,038 as of June 2000. Of the branches, 39.95 per cent (2,412) are located in the urban areas and 60.05 per cent (3,626) in the rural areas. Of the branches, NCBs hold 3,616, private commercial banks 1,214, foreign banks 31 and specialized banks 1,177 (Chowdhury and Ahmed, 2009).

Bangladesh emerged as an independent nation in 1971. After the independence, existing banks in the new-born state were taken over and nationalized by the Government through the Bangladesh Bank Nationalization Order, 1972 in order to meet macro and socio-economic objectives. With the change in economic policy of Government in 1975, “Socialism”, one of the state principles, was replaced by “Social Welfare”. This gave momentum to the private sector leading to denationalization of a few Nationalized Banks and establishment of a significant number of Private Commercial Banks. Studies have shown that denationalized banks showed better performance during the period after denationalization in terms of equity position, deposit-mobilization, loan and advances, and investment of fund both in nominal and real terms compared to the period after nationalization (Uddin and Quadir, 1998). It has also been observed that Private Commercial Banks have been showing a stable growth of branches, employees, deposits, loans and advances, net income, earnings per share till 2006 (Chowdhury and Ahmed, 2009). This rapid growth and significant contribution of Private Commercial Banks to the economy of Bangladesh have given us an incentive to study and gain a better understanding of their performances. So far, studies have evaluated these banks using criteria such as net income, earnings per share, employee strength etc. We want to see if the cost of capital of these Private Commercial Banks can reflect the performance, to be more specific, market performance, of these commercial banks as well, and hence, whether we can evaluate a private commercial bank on the basis of its cost of capital. The specific objectives of this paper are as follows:

a. Estimating Weighted Average Cost of Capital (WACC) for selected private commercial banks those are listed in Dhaka Stock Exchange.
b. Examining the relationship of WACC for each selected bank with their respective return on stocks.
c. Observing to what degree the return on stocks of selected commercial banks in Bangladesh can be explained by their respective cost of capital.

LITERATURE SURVEY

Starting from the late 1940s, experts in finance recognised that intelligent manipulation of debt and equity could enhance corporate value, via producing an optimal (or near-optimal) mix of capital. Over the 1950s, 1960s, and 1970s five concepts of finance theory were developed on this area, viz: (1) early gearing (leverage) models; (2) the model of Modigliani and Miller (MM); (3) Capital Asset Pricing Model (CAPM); (4) Arbitrage Price Theory (APT); and (5) Gordon model (Shubber and Alzafiri, 2008). Finance theories have shown that any use of capital imposes an opportunity cost on investors i.e. funds are diverted from earning a return on the next best equal-risk investment. Since investors have excessive numbers of financial market opportunities, there has to be something to benchmark corporate uses of capital against these capital market alternatives. This benchmark is provided by the cost of capital. Unless a firm can gain in excess of its cost of capital, it will not add value to its investors' wealth. A standard means of expressing a company's cost of capital is the weighted-average of the cost of individual sources of capital employed (Bruner et.al., 1998). For a firm using common stock (equity) and bond (debt) financing, with r_e and r_d as the cost of equity capital and the cost of debt capital, the WACC is expressed in Eq. (1):

$$WACC = r = w_d r_d (1 - t) + w_e r_e \qquad (1)$$

where, w_d (weight (proportion) of debt) = (value of debt/value of debt and value of equity), w_e (weight (proportion) of equity) = (value of equity/value of debt and value of equity), $w_d + w_e = 1$, and t = tax rate on corporate income. The component costs, r_e and r_d, as well as the weights are based on market values: r_e is frequently calculated as the risk free rate plus a risk premium, based on the capital asset pricing model, and r_d reflects the market rates on the firm's outstanding debt and on the r_d of similar firms. The standard treatment includes $(1-t)$ in the WACC calculation to reflect the deductibility of interest payments in the calculation of the corporate tax on the firm's income statement: the interest cost of debt, by this procedure, is reduced. Also, to avoid double counting the tax "advantage" of debt, the interest payments are not calculated in the prospective cash flows. This is the textbook treatment in calculating a firm's cost of capital. (Miller, 2006)

Guidance provided by finance theory does not protect practitioners from facing a number of difficult choices when it comes to estimating a company's cost of capital using the weighted-average expression. The most cumbersome component of WACC estimation is the cost of equity capital. While cost of debt is easily available, no observable counterpart usually exists for cost of equity. Practitioners, therefore, have to rely on more abstract and indirect methods to estimate the cost of equity capital. Common practice is to estimate the cost of equity applying the Capital Asset Pricing Model (CAPM) as presented by Truong, Parlington, and Peat (1998).

"….The traditional capital asset pricing model (CAPM), which is justified when equity returns are normally distributed, is commonly used to estimate the cost of equity …."

Though disagreements exist within and among groups on how to apply the CAPM to estimate cost of equity, the CAPM states that the required return (K) on any asset which can be expressed as: $K = R_f + ß (R_m - R_f)$; where, R_f = interest rate available on a risk-free bond; R_m = return required to attract investors to hold the broad market portfolio of risky assets; ß = the relative risk of the particular asset. According to CAPM then, the cost of equity, Kequity, for a company depends on three components: returns on risk-free bonds (R_f), the stock's equity beta which measures risk of the company's stock relative to other risky assets (b = 1.0 is average risk), and the market risk premium ($R_m - R_f$) necessary to entice investors to hold risky assets generally versus risk-free bonds. In theory, each of these components must be a forward looking estimate (Wen et. al., 1998).

American evidence suggest that the adoption of the CAPM in the practice of capital budgeting has been quite widespread (Graham and Harvey, 2001). However, Australian evidence on this issue is almost non-existent. While the CAPM was being increasingly adopted in practice, at least in the USA, it was also

coming under academic attack (Fama and French, 1992). The CAPM is the most popular method used in estimating the cost of capital in Australia. (Da, Guo, and Jagannathan, 2009). The determination of cost of capital has been an important and fruitful area of research in finance. Fama and French, in a series of papers, make a convincing case that CAPM fails to describe the cross-section of stock returns (Fama and French, 1992, 1996, 1997, 1999 and 2004). Among many other related works, Ferson and Locke (1998) find that the great majority of the error in estimating the cost of equity capital using the CAPM is due to the risk premium estimate; Pastor and Stambaugh (1999) show that the cost of equity estimation can be improved in a Bayesian framework; Ang and Liu (2004) discuss a general approach for discounting cashflows with time-varying expected returns. In spite of increasing criticism in the empirical academic literature, the CAPM continues to be the preferred model for classroom use in managerial finance courses in business schools, and managers continue to use it. This paper employs CAPM model in order to estimate cost of equity capital for selected private commercial banks that are listed in Dhaka Stock Exchange (DSE).

DATA AND METHODOLOGY

This study has been carried out to evaluate the relationship between market performance and cost of capital of selected private commercial banks in Bangladesh that are listed in Dhaka Stock Exchange. The selected 24 banks are: Arab Bangladesh Bank Limited (ABBL), The City Bank Limited (CBL), International Finance Investment and Commerce Bank Limited (IFICBL), Islami Bank Bangladesh Limited (IBBL), National Bank Limited (NBL), Pubali Bank Limited (PBL), Rupali Bank Limited (RBL), Uttara Bank Limited (UBL), Eastern Bank Limited (EBL), Al-Arafah Islami Bank Limited (AABL), Prime Bank Limited (PMBL), Southeast Bank Limited (SBL), Dhaka Bank Limited (DBL), National Credit and Commerce Bank Limited (NCCBL), Social Investment Bank Limited (SIBL), Dutch-Bangla Bank Limited (DBBL), Mutual Trust Bank Limited (MTBL), Standard Bank Limited (STDBL), One Bank Limited (OBL), Bank Asia Limited (BAL), Mercantile Bank Limited (MBL), Export Import Bank of Bangladesh Limited (EXMBL), ICB Islamic Bank Limited (ICBL), Jamuna Bank Limited (JBL). These banks are selected on the basis of the availability of required data. The relevant data and information are collected from Dhaka Stock Exchange, Audited Annual Reports of different private commercial banks of Bangladesh, Bangladesh Bank, Securities and Exchange Commission and websites of relevant private commercial banks of Bangladesh. Relevant articles and literature in this context have also been consulted.

This study employs after-tax cost of debt and cost of equity in order to estimate WACC for selected banks. The procedure of calculating after-tax cost of debt and cost of equity has been stated here in details. The cost of debt measures the cost of borrowing funds of the firm. In calculating the after-tax cost of debt of each bank for each year, the following estimation procedure has been used:

After-tax cost of debt = pre-tax cost of debt (1 – tax rate)

We have observed 'cost of fund' of each bank for each year as the pre-tax cost of debt. The relevant tax rate used to calculate the after-tax cost of debt is 45% since that is the rate at which all commercial banks are taxed in Bangladesh. The cost of equity for each bank of each year has been calculated by using the general form of the CAPM.

*Required rate of return on equity = risk-free rate + Beta * market risk-premium*

Where, risk-free rate is generally estimated by observing the yields of the Treasury Bonds (T-bonds) as the default risk is negligible for T-bonds. The same procedure has been followed here. It should be noted that for 2006, the risk-free rate has been calculated by averaging the yields of the 5 year T-bonds and 10 year T-bonds. However, for 2007 and 2008 the yields of 15 year T-bonds and 20 year T-bonds have also

been taken into consideration since the Bangladesh Bank has introduced the 15 year and 20 year bonds from 2007.

In computing the market risk-premium the data of DSE general index (Value Weighted Index) has been used as a proxy of the market portfolio. For each year, the average monthly return of the index has been calculated first, and then the average monthly returns have been converted into a yearly return. Finally, the realized market risk-premium for each year has been estimated by subtracting the risk-free rate of that year from the estimated return of the index. On the other hand, the standard procedure has been followed while estimating beta of each bank for each year which is to regress stock returns (R_j) against the market returns (R_m). A linear regression equation for estimating beta has been used as follows:

$$R_j = a + b\,R_m$$

Where, a = intercept from the regression and b = slope of the regression which corresponds to the beta of the stock and measures the riskiness of the stock. In this paper the monthly stock returns have been regressed against the monthly index returns for calculating the beta of each bank for each year.

Given all these estimations, the general form of the WACC equation has been used in calculating the WACC of each bank for each year.

$$WACC = D / (D+E) * \text{after tax cost of debt} + E / (D+ E) * \text{cost of equity} \quad \ldots. \quad (3)$$

Where, D is the total book value of the debt the bank has employed in a particular year and E is total book value of the equity the bank has employed in a particular year. For example, in case of Arab Bangladesh Bank Limited, the bank has total debt worth BDT 45,406,574,310 and total equity worth BDT 2,582,762,912 as of 31st December 2006. The after-tax cost of debt and the cost of equity have been estimated to be 0.05522 and -0.180580383, respectively. Therefore, the WACC for Arab Bangladesh Bank Limited has been estimated to be 0.042529337 as of 31st December 2006. (Please see Table 1 for details)

In order to examine the relationship between the WACC of each selected bank for a year and their respective yearly return on stocks, we have estimated monthly return of each bank first, as follows:

$$\text{Monthly return} = \frac{\text{monthly closing price} - \text{monthly beginning price}}{\text{monthly beginning price}}$$

The average monthly return of each bank for each year has been converted, finally, into the yearly return, which has been used as the estimated yearly return of each bank for each year. (Please see Appendix)

For evaluating the relationship between market performance and the cost of capital of selected private commercial banks in Bangladesh data has been analyzed through various statistical measures like the Karl Pearson's coefficient of correlation (r), the coefficient of determination (r^2), and regression analysis.

EMPIRICAL FINDINGS

One of the key objectives of this study is to estimate Weighted Average Cost of Capital (WACC) for selected private commercial banks in Bangladesh as no prior empirical study so far has been conducted in this regard in case of Bangladesh. Table 1 reports the detailed calculations of the estimated WACC (following Eq. 3) for 24 commercial banks of Bangladesh that are listed in Dhaka Stock Exchange for the period between January 2006 and December 2008.

Table 1: Estimated WACC (2006-2008)

	After-tax Cost of Debt-(2006)	Cost of Equity-(2006)	WACC-(2006)	After-tax Cost of Debt-(2007)	Cost of Equity-(2007)	WACC-(2007)	After-tax Cost of Debt-(2008)	Cost of Equity-(2008)	WACC-(2008)
ABBL	0.0552	-0.1806	0.0425	0.0580	1.5386	0.1631	0.0610	-0.0770	0.0500
CBL	0.0382	-0.0682	0.0325	0.0415	0.5496	0.0715	0.0380	0.0560	0.0393
IFICBL	0.0349	-0.0905	0.0292	0.0362	1.1519	0.1093	0.0337	0.0849	0.0372
IBBL	0.0514	0.1132	0.0555	0.0498	0.5967	0.0819	0.0526	-0.1002	0.0433
NBL	0.0338	0.0361	0.0340	0.0512	0.8275	0.1139	0.0543	0.0884	0.0572
PBL	0.0408	-0.0878	0.0308	0.0395	0.9000	0.1108	0.0480	0.0615	0.0492
RBL	0.0363	-0.3298	0.0347	0.0354	-0.1170	0.0559	0.0426	-0.1560	0.0623
UBL	0.0257	-0.0395	0.0227	0.0254	0.5245	0.1039	0.0273	0.1344	0.0340
EBL	0.0454	0.0159	0.0427	0.0437	-0.0268	0.0370	0.0512	0.1842	0.0627
AABL	0.0501	0.0056	0.0466	0.0604	0.0233	0.0579	0.0575	0.0551	0.0574
PMBL	0.0448	-0.0331	0.0399	0.0463	1.3482	0.1324	0.0470	0.0038	0.0444
SBL	0.0519	0.0035	0.0474	0.0517	1.0591	0.1479	0.0531	0.0507	0.0529
DBL	0.0618	0.0116	0.0592	0.0622	0.4761	0.0847	0.0634	0.0977	0.0653
NCCBL	0.0578	-0.0078	0.0535	0.0597	0.8303	0.1134	0.0640	0.0480	0.0629
SIBL	0.0491	-0.0103	0.0462	0.0487	-1.1219	-0.0307	0.0454	0.2807	0.0602
DBBL	0.0484	0.0773	0.0495	0.0464	0.3803	0.0622	0.0421	0.1886	0.0499
MTBL	0.0568	-0.0337	0.0502	0.0503	0.4652	0.0767	0.0560	0.0525	0.0558
STDBL	0.0629	-0.0392	0.0522	0.0641	0.6694	0.1371	0.0597	0.0196	0.0557
OBL	0.0460	-0.0063	0.0426	0.0459	1.0127	0.1104	0.0486	-0.0050	0.0447
BAL	0.0455	-0.0568	0.0389	0.0525	0.6499	0.0935	0.0541	-0.0089	0.0502
MBL	0.0495	0.0057	0.0468	0.0481	0.0965	0.0513	0.0505	0.0309	0.0493
EXMBL	0.0504	-0.0052	0.0463	0.0499	0.6114	0.0940	0.0524	0.0122	0.0494
ICBL	0.0614	0.0616	0.0614	0.0312	0.2141	-0.0555	0.0017	0.2589	-0.0365
JBL	0.0670	-0.0681	0.0565	0.0674	0.5511	0.0978	0.0687	0.0063	0.0644

The summary statistics of the estimated WACC of private commercial banks from 2006 to 2008 has been reported below in Table 2. It can be seen from the table that the average WACC of commercial banks for 2006, 2007 and 2008 are 4.42%, 8.42% and 4.84% respectively. It is also evident that there is more dispersion relative to the mean in WACC in 2008 compared with the WACC in 2006. However, the

relative dispersion in the WACC is highest in 2007 as the coefficient of variation (CV) suggests whereas it is lowest in 2006. The highest WACC estimated in 2006 is 6.14% whereas the lowest is 2.24%. These figures for 2007 and 2008 are 16.3% and -5.6%, and 6.54% and -3.65%, respectively.

Table 2: Descriptive Statistics of WACC

Measures	*WACC-06*	*WACC-07*	*WACC-08*
Count	24	24	24
Mean	0.04425	0.08417	0.04838
sample variance	0.00010	0.00253	0.00040
sample standard deviation	0.00998	0.05028	0.02006
Minimum	0.02273	-0.05553	-0.03646
Maximum	0.06136	0.16309	0.06534
Range	0.03863	0.21862	0.10181
Skewness	-0.29687	-1.23513	-3.49076
Kurtosis	-0.45372	2.16582	14.75322
coefficient of variation (CV)	22.56%	59.74%	41.47%

This study attempts to determine the degree of association or the strength of the relationship between the cost of capital and returns on stocks in case of private commercial banks in Bangladesh. Table 3 and Table 4 report the results of correlation and linear regression analysis, respectively, between the yearly estimated stock returns and the estimated WACC of 24 private commercial banks in Bangladesh considering the period between January 2006 and December 2008.

Table 3: Correlation Matrix

	WACC-06	**WACC-07**	**WACC-08**
Return-06	**-.260**		
Return-07		**.368**	
Return-08			**-.759***

*Superscript * indicate rejection of null hypothesis at 1% level of significance.*

Although it is observed that for both of the year 2006 and 2008 a negative correlation exist between the market return and WACC, the association between the variables is very strong in 2008 as the value of -0.759 is fairly close to -1.00 and statistically significant at 1 % level of significance. However, the results suggest that the relationship between the concerned variables is positive but statistically insignificant in 2007.

Table 4: Regression Analysis

Year	**Estimated Regression Equation**	**R-Sq**	**R-Sq (adj)**	**F**	***P*-Value**
2006	Return-06 = (0.683) – (13.4) WACC-06	6.8%	2.5%	1.60	0.219
2007	Return-07 = (0.178) + (4.22)** WACC-07	15.2%	11.3%	3.94**	0.060
2008	Return-08 = (0.453) – (16.6)* WACC-08	57.6%	55.7%	29.86*	0.000

*Superscripts** and * indicate rejection of null hypothesis at 10% & 1% level of significance.*

The yearly estimated regression equations are reported in Table 4. It is observed that the estimated regression coefficients for 2007 and 2008 (4.22 and -16.6, respectively) are statistically significant at 10%

and 1% level of significance, respectively which reject the null hypothesis that the regression coefficient of WACC is zero . In addition it is found that 57.6% variation in the market returns of the stocks can be explained, or accounted for, by the variation in the cost of capital in 2008 whereas only 6.8% of the variation of the returns of the stock can be explained by the variation in the cost of capital in 2006 and only 15.2% variation in the market returns of the stocks can be explained by the variation in the cost of capital in 2007.

From the findings it is seen that the cost of capital is becoming a strong force in explaining the market returns of the banking stocks. One of the key reasons behind this is that the capital markets of Bangladesh are becoming more and more vibrant and efficient. For example the market capitalization of the DSE has increased by many folds in the last three to five years and new players are entering the market everyday. Therefore if the cost of capital can be reduced the expected return can go up. It is pertinent to mention that a strange positive association exists between the cost of capital and returns of the stocks in 2007 which might be due to the state emergency that was in effect during that time for which the normal operation of the capital market of the country was adversely affected.

CONCLUSION

In this study, we have estimated Weighted Average Cost of Capital (WACC) for selected private commercial banks of Bangladesh that are listed in Dhaka Stock Exchange considering the period from January 2006 to December 2008. After estimating WACC for each bank for each year we have examined the strength of the relationship between the estimated WACC and estimated stock returns of DSE listed 24 commercial banks. The main findings of the paper suggest that private commercial banks should focus on reducing the cost of capital which can magnify the returns to their stockholders since at the end of 2008 a strong and statistically significant negative association has been emerged. Further study could be done on ways to reduce the cost of capital of commercial banks in Bangladesh.

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APPENDIX

Estimated Stock Returns of Commercial Banks in Bangladesh

	Stock Returns (2006)	Stock Returns (2007)	Stock Returns (2008)
ABBL	1.24387	1.43587	-0.80339
CBL	0.02051	0.29833	-0.37732
IFICBL	0.89226	1.56542	-0.62965
IBBL	-0.17991	0.69747	-0.82199
NBL	0.10934	0.82943	-0.33940
PBL	-0.39059	0.28236	-0.54699
RBL	1.79555	0.88037	-0.87187
UBL	-0.00745	0.97776	-0.14020
EBL	-0.30713	0.32910	-0.53685
AABL	-0.04194	-0.56148	0.12908
PMBL	-0.16827	0.74113	-0.46144
SBL	-0.50701	0.59180	-0.54213
DBL	0.08329	0.54531	-0.61976
NCCBL	0.02844	0.43404	-0.14941
SIBL	0.03594	0.00377	-0.66581
DBBL	-0.07425	1.83210	-0.12589
MTBL	-0.13979	0.41431	-0.49119
STDBL	-0.03025	0.15202	-0.35446
OBL	0.04757	0.76807	-0.42281
BAL	-0.02679	0.22284	-0.31634
MBL	0.00541	0.11116	-0.14417
EXMBL	-0.28594	0.08172	-0.18632
ICBL	0.01224	0.00000	1.35180
JBL	0.04679	0.16856	-0.33795