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The Determinants of Profitability of Private Banks in Bangladesh: An Empirical Analysis

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Abstract: The study of profits is important not only because of the information it provides about the health of the economy in any given year, but also because profits are a key determinant of growth and employment in the medium-term. As the main role of a financial system is to lubricate the gears facilitating the economic operations, this dissertation represents several determinants, for the entire period 2009-10 to 2011-12, such as Spread ratio, Profit per employee, and Non-interest income that show a positive association with profitability measured in terms of ROA. As well as Capital adequacy ratio and Operating expenses ratio bears a significant negative association with profitability measured in terms of ROA. But Credit deposit ratio, and Business Per Employee have a negative association with ROA which are not the usual case but could cause due to the bad credit, loan defaulter and high deposit collection rather than credit creation but significantly affected the bank's profitability.

Keywords: Financial system, profitability, rate on asset, private banks, emprical analysis.

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Bangladeş'teki Özel Bankaların Kârlılıklarının Belirleyicileri: Ampirik Bir Analiz

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Öz: Kârın incelenmesi, yalnızca herhangi bir yılda ekonominin sağlığı konusunda sağladığı bilgi birikimi değil, aynı zamanda kazançların orta vadede büyümenin ve istihdamın önemli bir belirleyicisi olması nedeniyle önemlidir. Bir finansal sistemin ana rolü, ekonomik operasyonları kolaylaştıran vitesleri yağlamaktır; bu tez, Spread oranı, Çalışan başına kâr ve Faizsiz gelir gibi 2009-10 ve 2011-12 dönemleri için birçok belirleyiciyi temsil etmektedir Kârlılık ile ROA açısından ölçülen olumlu bir ilişki olduğunu göstermektedir. YSK ile ölçülen kârlılık ile Sermaye yeterliliği oranı ve İşletme giderleri oranı gibi önemli bir negatif ilişki vardır. Ancak, Kredi mevduat oranı ve İş Başına Şirket oranı, ROA ile olumsuz bir ilişki içindedir; bu, her zamanki durum değil, ancak kredi yaratma yerine kötü kredi, borç ödeme ve yüksek mevduat tahsilatı nedeniyle bankanın kârlılığını önemli ölçüde etkilemiş olabilir.

Anahtar Kelimeler: Finansal sistem, kârlılık, varlık oranı, özel bankalar, ampirik analiz.

Introduction

In providing financial intermediation and economic acceleration by converting deposits into productive investments, an efficient financial system accelerates economic growth. By balancing between income, savings and consumption, *improving profitability*, increasing volume of funds flowing from savers to borrowers, *collecting current knowledge* of all those factors and *by providing better quality services for consumers in an economy*. Typically financial sector refers to mainly banking sector of any country. *Unlike developed* nations where financial markets as well as the banking system work in unison to channel those funds, *financial markets in developing* countries financial markets are undersized and sometimes completely absent.

A research conducted by Ross Levine (1996)[2] has shown that the efficacy of financial intermediation can also affect economic growth. Crucially, financial intermediation affects the *net returns* to savings, and the gross return for investment. The existence, growth and survival of a business organization mostly depend upon *the profit it makes*. It is true that when *profitability* increases the value of shareholders may increase to considerable extent.

The term profitability refers to the ability of the business organization to maintain its profit year after year. The profitability of the organization will definitely contribute to the economic development of the nation by way of providing additional employment and *tax revenues* to government exchequer. Moreover, it will contribute the income of the investors by having a higher dividend and thereby improve the standard of living of the people.[1]

In Bangladesh, the financial intermediation system is the 4th highest sector in term of market capitalization, considering

[1] Ross Levine (1996). Financial development and economic growth: views and agenda. Policy Research Paper 1678, The World Bank. http://papers.ssrn.com/sol3/papers.cfm?abstract-id=604955.

ownership the sector can be classified in to four major categories - such as Nationalized Commercial Banks (NCBs), Specialized Banks (SPBs), Private Commercial Banks (PCBs), and Trans-National Banks (TNBs). *The contribution of this industry to the economy* has been emerging and as facts suggest the curiosity of investors has significantly increased. The growing financial performance of this sector has a colossal effect *on whole economic performance*. Consequently the financial performance of this sector's company has been in stakeholder's prime apprehension in recent times. As Bangladesh has been categorized as a developing nation in the World Economic Outlook report published by IMF, *the economy of Bangladesh possesses the similar characteristics such as high liquidity crisis, insufficient monitoring, political confliction and uncontrolled price hiking, of other developing economy*. Since banking is actually the business of receiving deposits and issuing debt securities on the one hand and creating or investing in assets on the other hand (Fama, 1980), the business environment of a developing economy like Bangladesh has a significant impact on the profitability and performance of the banks. The reason behind this is that the main goal of operating banks is to earn profits, which are subject to market risks, credit risks, etc.

This research paper was initiated by a series of question: Why are some commercial banks more successful than others? To what extent are discrepancies in bank's profitability due to variation in endogenous factors under the control of bank management and to what extent, do external factors impact the financial performance of these banks? Answers to the questions would be helpful to identify the determinants of successful Bangladeshi commercial banks in order to formulate policies for improved profitability of these institutions.

The banks are now facing a number of challenges such as frequent changes in technology required for modern banking, stringent prudential norms, increasing competition, worrying level of NPA's, rising customer expectations, increasing pressure on profitability,

assets-liability management, liquidity and credit risk management, rising operating expenditure, shrinking size of spread and so on. The reforms in banking sector have also brought the profitability under pressure. Hence, profitability has become *a major area* of concern for bank's management. In fact, profit is an *important criterion* to measure the performance of banks in addition to productivity, financial and operational efficiency. This is only possible through research studies conducted by researchers, economists and analysts. The major objective of the paper is to provide a framework to investigate the factors or indicators intrinsic in the bank's asset structure that had impacted on their profitability, and performance for that matter in Bangladesh. That is,

1. To specify the relationships among the influencing factors and the profitability of the private bank in Bangladesh in terms of ROA.

2. To estimate whether the determined relationship are significant or not.

3. To apply econometric techniques and to compare if there is any significant factor that really breaks down the profitability range.

The Present Banking Scenario of Bangladesh

The present situation of banking sector has been deteriorating in terms of growth of credit and disbursement and risk management. Besides this backdrop, questions are being raised concerning the far-sighted deregulation of the financial sector. For example[3], the government requires investment rate to rise at 32.0 percent of GDP for achievement of 7.2 percent rate of growth in GDP in FY 2013-14,

Growth of credit in private sector registered at 11.07 percent in September 2013 over September 2012, and it was lower than the growth of 19.88 percent witnessed at the same period in the previous year.

Low level of demand for credits by the private sector is

manifested in the increasing situation of liquidity of the banking sector. Excess of liquidity of the banking business reached over Tk. 83000 crore at the end of November 2013 whereas this was Tk. 80000 crore in July, 2013. Furthermore, the loan-deposit ratio (LDR) has been on a declining trend for the past one year. In September 2013, LDR of the banking business stood at 71.65 percent, meaning that a bank has lent Tk. 71.65 against a deposit of Tk. 100. This ratio was 77.85 percent in the same period of the previous year.

State owned commercial banks (SCBs) have achieved nearly zero percent of return on assets (ROA) over the period of 2007 to 2012, which should have been more than 1 percent according to Basel-2 accord. In 2012, overall ROA in the banking sector was 0.60 percent whereas it was 1.3 percent in 2011.

The share of percentage of classified loan to total outstanding loan has been increasing in every six months. At the end of September 2013, the share of percentage of classified loan to total outstanding loan was 12.79 percent, whereas it was 11.91 percent at the end of June, 2013. Finally, the interest rate spread has seen many ups and down in this year and in the month of October 2013, the rate was below 5 percent. But the fact is that, in April 2013, it was also seen below 5 percent and after that it increased as earlier trend. In both of the cases, it is seen that advances remain relatively too high and this is the obstacle of taking loan by the business community.

Domestic credits recorded an increase of 11.52 percent at the end of September, 2013 against the increase of 17.72 percent in corresponding period of the last year. Growth of credit in private sector has been declining over the years after October-December, 2012 and projection says that in the first quarter of the 2013, and in the last quarter of the 2014 rate of growth of credit in private sector might decline from 2.21 percent in July-September, 2013 to 1.98 percent in October-December, 2013.

Besides, at the end of Sep-2013 total liquid assets stood Tk.182439.61 crore compared to Tk.174171.33 crore at the end of

June 2013. At the same time the incremental capital output ratio that measures investment required to GDP has deteriorated for the past few years. For example the govt. would require investment rate to rise at 32% of GDP to acquire 7.2% GDP growth in FY 2013-14.Return on Assets (ROA) indicates the productivity of the assets i.e. how much income is earned from per unit of assets. According to Basel-2 accord, ROA should be more than 1 percent. State owned commercial banks (SCBs) have achieved nearly zero percent of ROA over the period of 2007 to 2012. In 2012, overall ROA in the banking sector was 0.60 percent where as it was 1.3 percent in 2011. It these trends continue then overall ROA in the banking sector might decrease to 0.55 percent in 2013. Reduction in growth of credit is affecting the trends of investment of the country.

The problem of lower profitability of bank is that it might reduce the tax and thus make a trace on fiscal system where bank is the number one source of tax under large tax unit of NBR. Although liberalization policy has been pursued for years, the result is still far from the expected ones .Interest rate is still too high (above 15 percent) which is not favorable to business entities. Therefore, channeling sufficient loan to productive sectors and investors should be a major aim of the reform activities. Additionally, non-performing loans need to be focused exclusively in an efficient and creative way. A medium- to long- term financial sector strategy should be developed that lays out further reforms based on previous reform experiences.

In 2011 and 2012, the situation continues worsening and projection reveals that in 2013 it might further deteriorate. Furthermore, several loan and scams occurred in this sector but no proper action is taken yet. So steps should be taken to make the banking sector stable; otherwise country might miss the target of revenue collection because a large amount of tax comes from this source.

Literature Review

There have been many studies undertaken that deal with the performance of banks. Most of these studies were endeavors to find out the determinants of the performance of banks focus their analyses on single countries. The empirical results of the studies vary, as datasets, time periods and the investigated environment and countries differ. However, there exist some mutual elements that allow to further categorize the determinants of banking profitability.

During 1966, Hester and Zoellner included number of branches as one of the independent variables in their profitability study and conclude that number of branches had no effect on profitability.

In order to measure the effects of management, size, location and time on profitability of commercial banks, Haslem (1968) used 64 operating ratios. His findings indicated that all variables tested were significantly related to profitability.

According to Vernon in 1971, location had a significant relationship with profitability. Fraser and Rose (1971) found that loan rate, time deposit rate, loan-to-deposit ratio, service charges and portfolio selection had no effect on profitability. Fraser et al (1974) considered operating costs, deposit and loan compositions as factors within the control of management. They found that the factor which had the biggest influence on bank performance is bank cost followed by bank's deposit and loan composition.

Kwast and Rose's (1982) study, however, claimed that operating efficiency had nothing to do with profitability. They established that there was no compelling evidence that high-profit banks were characterized by a greater level of efficiency than low-profit banks.

Smirlock (1985) confirmed that demand deposits were a cheaper source of funds and had a positive impact on bank profits. In 1985, Swamy and Vasudevan used per employee

deposits, advances, profits, etc. and found them to be significant to measure the performance level of a bank.

However, Hossain and Bhuiyan (1990) stated that there is no universally accepted operational definition of performance measures, but in broad sense performance level of an enterprise can be measured by 'the extent to which its work is carried out within established specifications for goods and services produced.

Bhatt and Ghosh (1992) observed that the profitability of commercial banks depend on endogenous factors like control of expenditure, expansion of banking business, timely recovery of loans and productivity, and exogenous factors consisting of direct investments such as SLR (Statutory Liquidity Ratio), CRR (Cash Reserve Ratio) and directed credit programs. In 1995, Berger found that Capital adequacy of banks also affects the profitability position. Therefore he conveyed that the more the capital the lesser would be the chances of bankruptcy and hence more profitability.

According to Al-Shamrnari and Salirni (1998), profitability ratios, especially return on equity (ROE), signals the earning capability of the organization. Siddique and Islam (2001) confirmed that the average profitability of all Bangladeshi banks collectively was 0.09% during 1980 to 1995, from which he concluded that the banks were, on average, profitable.

The general theoretical framework by Guru et al in 2002, suggests that the reduced expenses and overheads lead to more profitability. Chowdhury (2002) also emphasized the importance of profitability and the relationships between variables like market size, bank's risk and bank's market size with profitability while measuring a bank's performance.

A huge amount of unpaid loans would have negative effect on the profitability of banking business was suggested by Badola and Verma in 2006.

Jahangir, Shill and Haque (2007), on the other hand, stated

that the loan-to-deposit ratio works as a very good indicator of banks' profitability, as it depicts the status of asset-liability management of banks. Chowdhury and Islam (2007) stated that deposits and loan advances of Nationalized Commercial Banks (NCBs) are less sensitive to interest changes than those of Specialized Banks (SBs).

In 2009, Singh and Chaudhary examined that the liquidity position affects bank's profitability in a positive way. However, extreme liquidity without sufficient credit creation would not be favourable for bank's performance.

Davydenko (2010) examines a panel of individual banks' financial statements from 2005 to 2009 to the overall profitability of Ukrainian banks. According to the empirical results, Ukrainian banks do not manage to extract considerable profits from the growing volume of deposits as they suffer from low quality of loans. In 2012, the study by Bhatia, Mahajan & Chander finds evidence that spread ratio, provision and contingencies, non-interest income, credit deposit, operating expense, business per employee, profit per employee, capital adequacy ratio bear effective relationship to profitability.

In 2013, Aremu ,Ekpo, Mustapha confirmed that Bank Size, Cost Efficiency did not significantly determine bank profitability in Nigeria. However, Credit Risk and Capital Adequacy) was found to be significant drivers which affected bank profitability both in the long run and short run respectively. That means a huge works have done on the performance of financial sector with a suggestion of huge reform policy. Although this sector several time faces to unusual challenges. Thus my paper wants to examine if there is any usual factor behaves normally but could create unusual circumstances and hence low performance of banks or low profitability.

Conceptual Framework of Profitability

Profit, in effect, is a simple residual concept but its level is determined by the complex interaction of a multitude

of factors (Nugent, 1998). A company remains in operation because it expects to make profits. Once that expectation is confirmed unattainable, the most rational decision is to close shop or exit the business. Three indicators, namely: Net Interest Margin (NIM), Return on Assets (ROA) and Return on Equity (ROE) were identified by Ahmed (2003) to be widely employed in the literature to measure profitability. However, there are divergent views among scholars on the superiority of one indicator over the others as a good measure of profitability. For instance, Goudreau and Whitehead (1989) and Uchendu (1995) believed that the three indicators are all good. Hancock (1989) used only ROE to measure profitability in her study. Also, Odufulu (1994) used only the gross profit margin in measuring profitability. Ogunleye (1995) did not believe that profit level per se could constitute a good Measure of profitability and therefore used ROA and ROE. Profitability measures, according to Akinola (2008) include Profit Before Tax (PBT), Profit After Tax (PAT), ROE, Rate of Return on Capital (ROC) and ROA. Sanni (2009) used Earnings Per Share (EPS). For this study, we shall limit profitability to the widely used measures namely Return on Asset (ROA) as this study is built on the work of Krakah and Ameyaw (2010).

Data Base and Methodology

Sample

To explain the determinants of the inflow of PROFIT, that is rate on asset (ROA), in Bangladesh, this study uses the **Least Square method** (LS) as a methodology. A sample of 21 private sector banks in Bangladesh has been taken. The private sector has been chosen because banks in private sector have emerged as dominating entities in the era of liberalization, privatization and globalization.

Time Period

The determinants affecting the profitability in banks

have studied for 3 years, that is, 2009-10 to 2011-12. This period is relevant because it represents the post-recession period during which the banks in developed nations like USA have been affected badly. An assessment of profitability in the Bangladeshi banks too needs to be made during this relevant time period.

Data Source

The information pertaining to the dependent and independent variables has been taken from the statistics available at the websites of Bangladesh Bank and Chittagong Stock Exchange, Dhaka Stock Exchange, and the brochure from the associated bank.

VARIABLES

Dependent Variables

Return on Assets (ROA) is taken as the dependent variable as it reflects as to how well a bank's management is using the banks real investment resources to generate profits. It is calculated as:

ROA= Net Income/Total Assets

Independent Variables

1. Spread Ratio: Spread represents the difference of Interest received and interest paid. The ratio is calculated as a percentage spread to total assets. The higher the ratio, the more will be the profitability. It can be written as, Spread Ratio= Spread/Total Assets.

2. Non-Interest Income: This represents income of a bank from its allied and non-banking activities. Banks should operate at lower cost to increase profitability. This is calculated as, Non-interest income/Total Assets.

3. Credit Deposit Ratio: it is calculated as, Total advances/total deposits. However, a lower ratio may indicate that the deposits are merely serving as a burden to the banking business.

4. Operating Expense Ratio: It is calculated as, Operating Expenses/Total expenses. The ratio has a negative relationship with profitability as it high ratio highlights operational inefficiency of a bank.

5. Profit per employee: It is calculated as, Net profits/total number of employees. The ratio has a positive relation with profitability and depicts employee efficiency.

1. 6. Business per employee: The ratio is calculated as, Deposits+ Advances/ Total number of employees. The ratio bears a positive relation with profitability as it highlights the efficiency of human resources in relation to the core business of banking.

6. Investment Deposit Ratio: This is calculated as, Investments/Deposits. The ratio highlights the efficiency of a bank to invest its deposits and surplus cash so as to generate profits.

7 . Capital Adequacy Ratio: This is calculated as, Capital/ Risk Weighted Assets of a

2. Business.

8. Type of Bank: The total sample of 2 1 banks is represented. The data for the entire period 2009-10 to 2011-12 has been averaged for the dependent and independent variables.

Hypotheses of the Study

The hypotheses of the study are:

- H_1: The higher the spread ratio, the more will be the profitability.
- H_2: Non Interest Income bears a positive relationship with profitability.
- H_3: Credit Deposit ratio bears a positive relationship with profitability.
- H_4: Operating Expense ratio has a negative relationship with profitability.

- H_5: Profit per Employee has a positive relation with profitability and depicts employee efficiency
- H_6: Business per employee bears a positive relation with profitability.
- H_7: Investment Deposit ratio bears a positive relation with profitability as more the profitable investments, more would be the profitability.
- H_8: Capital Adequacy ratio bears a negative relationship with profitability.

Statistical Tools Used

Least Square Regression Analysis has been used to find the impact of determinants of profitability on the performance of banks in India. E-views version 6.00 of the software has been used. The following regression model has been framed which is assumed that the relationship among the variables is linear:

$$Y^* = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + u_t$$

Where,

Y*= The natural logarithm of Profit or Rate on Asset (ROA)

X_1= the natural logarithm of Spread Ratio.

X_2= the natural logarithm of Non-Interest Income.

X_3= the natural logarithm of collecting loans of the banks.

X_4= the natural logarithm of Operating Expenses Ratio

X_5= the natural logarithm of Profit per employee

X_6= the natural logarithm of Business per employee

X_7= the natural logarithm of Investment Deposit Ratio.

X_8= the natural logarithm of Capital Adequacy Ratio

u_t= Disturbance term which is surrogate for all those variables that are omitted from the model but that collectively affect Y

1. Empirical Analysis

1.1. The Unit Root Test

We use Augmented Dickey-Fuller (DF) test to operate the unit root test. We consider following equation;

$\Delta Y_t = \beta_1+\beta_2 t+\partial Y_{t-1}+U_t$

Where, t is trend variable in each case, both hypothesis is that,

H_0: $\partial = 0$ [Time series is non-stationary]

H_a: $\partial < 0$ [Time series is stationary]

If the null hypothesis is rejected, it means that Y_t is a stationary time series. The computed τ value is less than even the 10 percent critical τ value in absolute terms then null hypothesis is accepted and conclusion is that the time series is non-stationary. The unit root test results are shown in Table 1.

VARIABLE	NULL HYPOTHESIS	TEST STATISTIC	ASY. CRITICAL VALUE 10%	DECESION
ROA	A(1)=0, T-TEST	-7.6579	-2.593	H_0 rejected
SR	A(1)=0, T-TEST	-6.9969	-2.593	H_0 rejected
NII	A(1)=0, T-TEST	-3.4592	-2.593	H_0 rejected
CDR	A(1)=0, T-TEST	-7.5177	-2.593	H_0 rejected
OER	A(1)=0, T-TEST	-10.780	-2.593	H_0 rejected
PPE	A(1)=0, T-TEST	-9.0900	-2.593	H_0 rejected
BPE	A(1)=0, T-TEST	-8.8606	-2.593	H_0 rejected
IDR	A(1)=0, T-TEST	-9.0671	-2.593	H_0 rejected
CAR	A(1)=0, T-TEST	-6.5591	-2.593	H_0 rejected

Table-1: Results of unit root test

Here dependent variable ROA and other independent variables such as SR, NII, CDR, OER, PPE, BPE, IDR, and CAR all are individually I(1); that is they are stationary and does not contain a unit root. So the regression of a stationary time series

on other non-stationary time series will not produce a spurious regression.

1.2. Descriptive Statistics of Major Variables

With the help of E-VIEWS (Version 6.0), the descriptive statistics of ROA, SR, NII, OER, PPE, BPE, IDR, CAR, and NPA are as follows:

Name of variable	N	Mean		Standard Deviation	Skewness	Kurtosis
	Observation	Statistic	Std. Error	Statistic	Statistic	Statistic
ROA	62	-4.24823	0.071528	0.56321	-0.51097	3.12291
SR	62	-3.58677	0.039965	0.314688	-1.20375	5.02524
NII	62	-3.50452	0.044158	0.347698	-0.34322	3.125814
CDR	62	-0.10613	0.016349	0.128731	2.790011	13.39249
OER	62	-1.27952	0.040348	0.317699	0.144313	2.054028
PPE	62	13.57548	0.087514	0.689087	-0.65577	3.180755
BPE	62	18.19581	0.056023	0.441126	-0.87872	2.892787
IDR	62	-1.90403	0.072469	0.570618	-0.73386	2.747115
CAR	62	-2.19807	0.018587	0.146353	-0.60545	6.085399

Table-2: Descriptive statistics of the major variables

From the Table-1, it is seen that the frequency distributions of all major variables are not normal. The skewness coefficient

is less then unity, except for CDR variable, generally taken to be fairly extreme (Chou, 1988, P.109). Statistician Kendall (1943) calculated the expected normal kurtosis equal to 3(n-1)/(n+1), where, n=Sample Size. According to this rule in a Guassian distribution, it can be calculated for these data to have a kurtosis co-efficient of 2.9047 for all the major variables respectively. Kurtosis generally either much higher or lower than the above calculated values indicates extreme leptokurtic or extreme platykurtic. In this data set, the value of 2.054028, 2.892787, and 2.747115 for OER, BPE, and IDR respectively fall under the extreme platykurtic distribution. Generally values for skewness zero (β_1=0) and kurtosis value 3 (β_2=3) indicate that the observed distribution is perfectly normally distributed. Therefore skewness of major variables on ROA indicates that the distribution is normal except CDR and OER and platykurtic frequency distribution of major variables on ROA indicates that the distribution is not normal except BPE, IDR and OER.

1.3. Analysis of Results

Estimated results with Least Square method has been reported in Table -3.

Model	Estimated Co-efficient	Std. error	T	Prob.
Constant	-0.167640	0.485579	-0.345237	0.7313
SR	0.111401	0.032961	3.379748	0.0014
NII	0.152854	0.034150	4.475982	0.0000
CDR	-0.400316	0.065723	-6.090906	0.0000
OER	-0.118249	0.045100	-2.621916	0.0114
PPE	0.996943	0.019098	52.20246	0.0000
BPE	-0.941298	0.033880	-27.78306	0.0000
IDR	-0.051080	0.016747	-3.050185	0.0036
CAR	-0.071574	0.052106	-1.373625	0.1753

Table-3: Regression Results ---

Table 4 shows the summary of the above model.

R-squared	Adjusted R-squared	Std. Error of the Estimate	Durbin-Watson	Akaike info criterion	Schwarz criterion
0.992150	0.990966	0.053533	1.517472	-2.883	-2.574

Table-4: Model Summary

Table -5 shows the ANOVA for the model.

Model	Sum of Squares	df	Mean Square	F	Value	Probability
Regression	ESS=19.1983	8=k-1	$\frac{ESS}{K-1}$=2.400	Anova F-test (8,53)	837.3675	0.00
Residual	RSS=0.152	53=n-k	$\frac{RSS}{n-k}$=0.00			0.00
Total	TSS=19.350	61=n-1				

Table-5: ANOVA

The fitted line is reasonably good. The goodness of fit, R^2 shows that the independent variables explain about 99.22% of the variations in the dependent variable. The value of adjusted R^2 is 0.9909 which states that 99.09% variation in ROA is explained by variations in independent variables. The value of F statistics is 837.3675 and its ρ-value shows the overall significance or explanatory power or the fitness of the model. The most of the estimated coefficients have all expected sings except IDR, BPE, and CDR. The coefficient of the SR is 0.1114 , implying that a one percent increase in total SR increases the Rate of Asset by 0.11 percent. Similarly a one percent increase in NII will increase the Rate of Asset by 0.153 percent. Similarly a one percent increase in PPE will increase the Rate of Asset by near 1 percent. On the other hand, a one percent increase in CDR decreases the Rate of Asset by 0.40 percent. Similarly one percent

increase in OER will decrease Rate of Asset inflow by 0.12 percent. Again a one percent increase in BPE will decrease Rate of Asset by 0.94 percent, if all other variables remaining constant. The estimated regression equation is reproduced below (standard error in parentheses).

ln ROA= -0.167640+0.111lnSR+0.153lnNII -0.40lnCDR -
0.11.8lnOER+0.997lnPPE -0.941lnBPE-.051lnIDR-0.072lnCAR

(0.485) (0.033) (0.034) (0.065) (0.045) (0.02)
(0.033) (0.0167) (0.052)

The results show that PPE(natural log of Profit per Employee) is the most significant factor affecting ROA into the banking sector of Bangladesh. Operating expenses ratio (OER), which is the indicator of the overall financial performance of the host country, affect negatively and significantly. Besides, Non-Interest Income (NII) has a highly significant positive influence on inflow of PROFIT Business per Employee (BPE) is found to impact negatively on PROFIT inflow but perfectly significant. The value of the F-statistic indicates that R^2 is statistically significant.

1.3.1. The "F" test

To test the significance of the complete regression, we must decide between two hypotheses.

The null and alternative hypotheses are:

H_o: $\beta_1 = \beta_2 = \ldots\ldots\ldots\ldots\ldots = \beta_7 = 0$

H_a: $\beta_1 = \beta_2 = \ldots\ldots\ldots\ldots\ldots = \beta_7 \neq 0$ (i.e. β_1, β_2,……., β_8 are not simultaneously zero)

Under H_0, the test statistics is,

$$F = \frac{ESS/k-1}{RSS/n-k} = 837.3675 \text{ with } (8/53) \text{ d.f.}$$

At 5% level of significance, the calculated F-value is 16855.98 which is greater than the tabulated $\mathbf{F}_{.05,\ 8/53} = 2.10$. So, we can reject H_0. This means the complete regression test is significant, even if it is significant at 1% level of significance.

2. Diagnostic Tests

The diagnostic tests confirm the validity of the inference as the presence of multicollinearity, serial or auto-correlation or heteroscedasticity, though estimated parameters are unbiased, their standard errors are substandard and so are the t-ratios.

2.1. Tests for Multicollinearity

For detecting multicollinearity in our model, we use E-VIEWS (version 6.0) and consider some rules of thumbs.

	ROA	SR	NII	CDR	OER	PPE	BPE	IDR	CAR
ROA	**1**								
SR	.379	**1**							
NII	.451	-0.047	**1**						
CDR	.387	0.174	0.201	**1**					
OER	.154	0.428	0.492	-0.036	**1**				
PPE	.778	0.007	0.256	0.515	-.335	**1**			
BPE	-.016	-0.465	-.166	0.240	-.761	0.604	**1**		
IDR	-.160	-0.267	0.486	0.096	0.233	-.095	-.009	**1**	
CAR	-.084	.0155	-.065	-.0133	-.204	0.017	0.117	0.21	**1**

Note: Significant at 5% level respectively.

Table-6: Matrix of Pearson Coefficient of Correlation

Table 6 shows the matrix of correlation that studies the problem of multicollinearity. If the value is 0.80 or more then there exists a problem of multicollinearity. It states that multicollinearity is an issue of concern in the case of Business per Employee (BPE) and Rate on Asset (ROA). The variables BPE and PPE have coefficient of correlation of 0.778 which is also significant at 5% level of significance and near but less than 0.80. Thus, the problem of multicollinearity does not exist between these measures for the period.

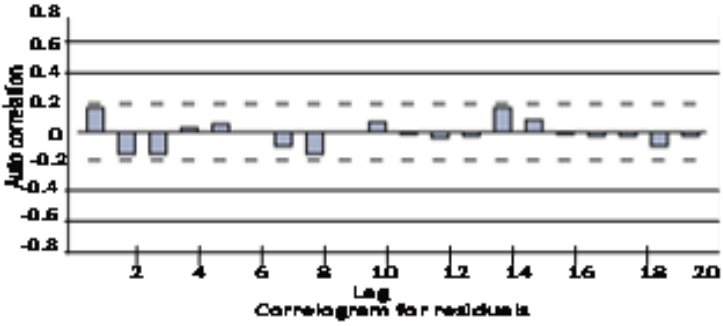
2.2. Test for Autocorrelation

2.2.1. Durbin-Watson Test

The test procedure is as follows: Ho: ρ=0 (No auto correlation)

Ha: ρ≠ 0 (auto correlation)

For this model, we have estimated d= 1.5174, against for n=62, k=8 and α=1%, the d_L= 1.186 and d_u= 1.720. Since the calculated value $d_L<d<d_u$ i.e. 1.1860< 1.5174<1.720. So no decision is inconclusive. But as 2 rule of thumb, if d is found to be about 2 in an application, one may assume that there is no first order autocorrelation either positive or negative.



2.2.2. Correlogram

The correlogram is a diagrammatic representation of the significance of autocorrelation. Let n-th order population autocorrelation be denoted by ρ_n. Then when the null hypothesis H_0: ρ_n=0 is true, it turns out that r_n has an approximately normal distribution with mean zero and variance $\frac{1}{T}$ and the test statistic is $Z=\frac{r_n}{\sqrt{\frac{1}{T}}}=\sqrt{T}\ r_n \sim N(0,1)$

The product of the square root of the sample size n and sample autocorrelation r_k has an approximate standard normal

distribution. An autocorrelation r_n will be significantly different from zero at a 5% significance level if $r_n \geq 1.96/\sqrt{T}$ or if $r_n \leq -1.96/\sqrt{T}$.

The graph of the correlogram of the residuals up to 20 lags for the supply response of the equation. In figure the heights of the bars represents the correlations and the horizontal lines drawn at $\pm 2/\sqrt{62}$=0.249 are the significance bounds. The residuals from the rate on asset are not auto correlated as no bars crossed the significance bounds. There is no auto correlation up to 20 lags.

2.3. Tests for Heteroskedasticity

To test heteroscedasticity, we have used the Breusch-Pagan-Godfrey test.

Ho: There is no heteroscedasticity

Ha: There is heteroscedasticity.

The formula of the Breusch-Pagan-Godfrey test shows as follows: $\theta = \frac{1}{2}(ESS) \sim_{asy} \lambda^2_{(m-1)}$

Where ESS is explained sum of square and λ^2 shows chi-square distribution with (m-1) degrees of freedom. Our observed λ^2= 3.144. Now, we find that for 8 df and 5% level of significance, critical λ^2 = 14.0671 and the 1% critical λ^2 = 18.4753. Thus the observed λ^2= 3.144 is not significant at 1% as well as 5% level of significance. So the model is free from heteroscedasticity problem.

2.4. Tests for Normality

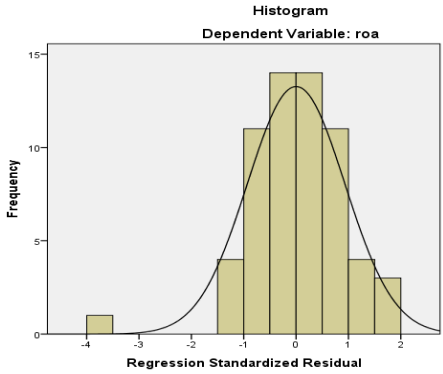
2.4.1. Visual Examination

A histogram or P-P plot of the residuals will help us to check the assumption of normality of the error term. The shape of the histogram should approximately follow the shape of the normal curve. This histogram is acceptable as it is close to the normal curve.

2.4.2. Normality Probability Plot

A comparatively simple graphical device to study the shape of

the probability density function (PDF) of a random variable is the normal probability plot (NPP) which makes use of normal probability paper. Since the fitted line in the NPP is approximately a straight line, it can conclude that the residuals are normality distributed.



2.4.3. Jarque Bera Test

We can compute Jarque-Bera test statistic using the following rule:

$JB=n[S^2/6+ (K-3)^2/24]$

Where S represents skewness and K represents kurtosis. In our model, skewness and kurtosis values of residuals are -0.510 and 3.12 respectively. By using Jarque-Bera test computed $\lambda^2=2.736$, which is less than the critical value of 9.21 at 1% and 5.99 at 5% level of significance with 2 df. So this model does not violate the normality assumption.

2.5. Test for Functional form and Omitted Variables

Ramsey's "RESET" test can be used to this purpose.

The test procedure is as follows: Firstly the original equation, run and from the estimated equation fitted values of ln(ROA) i.e. ln(ROA) is obtained.

$$\ln ROA = \beta_0 + \beta_1 \ln SR + \beta_2 \ln NII + \beta_3 \ln CDR + \beta_4 \ln OER + \beta_5$$

$\ln PPE + \beta_6 \ln BPE + \beta_7 \ln IDR + \beta_8 \ln CAR + u_t$

And then the following regression is run:

$\ln ROA = \beta_0 + \beta_1 \ln SR + \beta_2 \ln NII + \beta_3 \ln CDR + \beta_4 \ln OER + \beta_5 \ln PPE + \beta_6 \ln BPE + \beta_7 \ln IDR + \beta_8 \ln CAR + u_t + \varphi_1 \ln(ROA)^2 + + \varphi_2 \ln(ROA)^3 + V_t$

Now if $\varphi_1$and φ_2 is statistically insignificant then it can be concluded that there is no problem with functional form or omitted variables.

For this new model, φ_1 and φ_2 found to be significant at 14.46% and 15.89% level of significance respectively, i.e. φ_1 and φ_2 is not statistically significant. So, we can say that this model does not contain serious problem of functional form and omitted variable.

Discussion

Our hypothesis (H_1), that is, higher the spread ratio, the more would be the profitability has been accepted. Obviously, the hypothesis satisfies the rationality behind it. As the spread represents the difference between interest received and interest paid by a bank on its loan and deposits respectively, so it ought to result in a positive association with profitability unless the banks have a problem of asset liability mismatch. Angbazo (1997) supports our results and found a positive association between spread and net interest margins on a sample of US banks. Our results are also in conformity with *Bhatia, Mahajan & Chander* (2010) who highlighted a positive association between spread and net profits in case of Public sector banks in India. The hypothesis (H_2) that states that non- interest income is positively related with ROA has been accepted. It is supported by Manoj (2010) who suggests a positive association between Operating Profit Ratio and Non –interest income in case of old private sector banks in Kerala. Our results with respect to non-interest income are also similar to Angbazo (1997) in case of USA banks.

Banks these days tend to diversify into non core areas,

popularly known as the fee based services of banking industry, thus generating non -interest income to banks. Also, all banks in order to increase profitability should focus on reducing operating expenses. Hence, hypothesis (H_4) that operating expenses have a negative impact on profitability too has been accepted. The results of present study corroborate with Guru *et al I* (2002) who stressed on effective expense management to increase profitability. Hypothesis (H_5) that suggested a positive association between Profit per employee and ROA too has been accepted. This is supported by Anaseiff et al (2002) in his study who suggested that those banks who tried to improve labor productivity generated. Hypothesis (H_8) that Capital Adequacy Ratio has negative relationship with profitability too has been accepted. A higher capital ratio tends to reduce the risk on equity and therefore lowers the expected return on equity that investors seek. In other words, a high capital ratio signifies that a bank is operating over-cautiously and ignoring potentially profitable trading opportunities. Our results coincide with those given by *Bhatia, Mahajan & Chander* (2010).

Our hypothesis ($H_{3)}$ that credit deposit ratio bears a positive relationship with profitability has been rejected. Our results show a negative and a significant association between credit deposit ratio and ROA. The results of present study are contradictory to *Bhatia, Mahajan & Chander* (2010) found a significant positive association between Investment deposit ratio and profitability in case of both public sector and private sector banks in India. This difference is perhaps because at the study period 2010-12 which exactly represents the post-recession phase of the economy. Perhaps during this period of time the credit approval is not on employment status, credit history, other outstanding debts and others. The borrowers were in deep financial trouble, the approved credit turned out as a bed credit or it would take little longer to repay the credit with full rate of interest. Shortly thereafter, when the borrower became bankrupt

as predicted, he sued the bank under a specious premise that had the bank lent more money his business might have survived. Hypothesis (H_6) that suggested a positive association between Business per employee and ROA too has been rejected That is, an unexpected increase in capital tends to lead to a decrease in the bank's profitability. This connection is conventional wisdom in banking. However, our hypothesis (H_7) that investment deposit ratio bears a positive relationship with profitability has been rejected. Our results show a negative and a significant association between Investment deposit ratio and ROA. The results of present study are contradictory to Singh and Chaudhary (2009) who found a positive association between Investment deposit ratio and profitability in case of both public sector and private sector banks in India. The period of our study is from 2009-10 to 2011-12, which exactly represents the post-recession phase of the economy. Perhaps during this period of time the investments were not repaying many profits due to the spillover effects of recession in various sectors of the economy including the stock markets. However, our results can be suggested to be supported by Manoj (2010), though indirectly who found a strong negative association between investment in government securities and net interest margin in case of old private sector banks in case of banks in India. Moreover, *Bhatia, Mahajan & Chander* (2010) found a significant negative relationship between investment deposit ratio and the profitability of banks in India.

Conclusion

This study is a modest attempt to establish the empirical evidence on the determinants of profitability for the Bangladeshi banking industry. The study involved basically three stages: Firstly, analysis of the hypotheses which explain the most important determinants of a bank's profitability; secondly, application of a suitable methodology which overcomes the classical econometric problems involved in this kind of studies; and finally, empirical testing of the hypotheses.

A bird's eye view of results as shown in Table 7 compares the expected relationship of independent variables with profitability in terms of ROA and the results of the present study.

Independent variables	Level of significance	Expected relationship with profitability (ROA)	Results of the present study
Spread	Significant at 0.1%	Positive	Positive
Non-Interest Income	Significant at 0%	Positive	Positive
Credit deposit ratio	Significant at 0%	Positive	Negative
Operating Expenses	Significant at 01%	Negative	Negative
Profit Per Employee	Significant at 0%	Positive	Positive
Business Per Employee	Significant at 0%	Positive	Negative
Investment Deposit Ratio	Significant at 0.4%	Positive	Negative
Capital Adequacy Ratio	Significant at 17%	Negative	Negative

Table 7: A snap shot of results (comparison of expected relationship and actual results)

As can be seen from Table 7, the actual results coincide with the expected results in terms of major variables as Spread ratio, Profit per employee, and Non-interest income that show a positive association with profitability measured in terms of ROA. Besides, Capital adequacy ratio and operating expenses ratio bears a significant negative association with profitability measured in terms of ROA. However, one variable, that is, Investment deposit ratio although has a negative relationship with profitability against the expected relationship, could be usual if the economy was passing through a phase of global recessionary pressures where the bank's investments could not

prove very fruitful. *(Bhatia, Mahajan & Chander* -2012) . However, private sector banks need to be cautious with respect to their investments as the Investment Deposit Ratio has a strong bearing on a banks' asset-liability management in the long run. In fact, Berger (1995b) points out that this negative relationship has an intuitive appeal and is consistent with the stand alone one-period model with asymmetrical information between the bank and its individual investors.

However Credit Deposit Ratio, and Business Per Employee which always maintains a positive association with ROA reversed in direction in this study. Due to bad credit disbursing, raising loan defaulter and collecting high deposit rather than creating appropriate credit a significant amount of the bank's profitability can be affected. This is the present scenario of Bangladesh. There is huge evidence where several banks of Bangladesh have no liquidity crisis but there per annum profit decrease as the available liquidity are not invested or utilized or the clients are unwilling to accept credit at higher rate of interest. According to Bangladesh Bank, the amount of idle money in banking sector of Bangladesh exceeds eighty three thousands crore taka at the end of November 2013 whereas this was Tk. 80000 crore in July, 2013. Hence, banks should take measure to reduce defaulter, bad loan and to increase their credit possibilities with a provision to achieve higher profitability.

Banks are an integral part of the financial system of any country. And this financial system has expanded from national to international boundaries. Moreover, there is a pattern of shift in marketing philosophy from the rising focus towards quality of service for customers. From traditional functions of accepting deposits and granting loans and advances banks have diversified into allied businesses. There is rising stress on improving operational efficiency rather than just focusing on profitability.

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