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A Panel Data Analysis for Evaluating the Profitability of the Banking Sector in Bangladesh

***Md. Thasinul Abedin*[1]**
***Md. Muzammel Dawan*[2]**

[1,2]Graduated from Accounting & Information Systems, Faculty of Business Studies, University of Dhaka, Bangladesh

(✉ *Corresponding Author)*

Abstract

This study attempts to evaluate the profitability for a panel of 29 listed commercial banks of Bangladesh. Panel GMM approach along with Pooled OLS and Random Effect OLS has been applied to discover the impact of key factors namely investment in government securities and shares, loan and advances, human resource, efficiency, and economy money supply growth on profitability using the data set from 2005-2015 for each bank. The study has found that loan and advances, human resource, efficiency, and economy money supply growth have significant positive impact on profit where investment in government securities and shares has significant negative impact. Therefore, more loan and advances, more human resource, more efficiency, and more money supply growth unlike investment in government securities and shares will eventually boost up the profitability of banks.

Keywords: Profitability, Commercial banks, Investment, Loan and advances, Human resource, Efficiency, Money supply growth, Panel GMM, Pooled OLS, Random effect OLS.
JEL Classification: C01, C33, C87, E22, G21.

Contents

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1. Introduction

A country's economic development largely depends on the banking sector. Banking sector accelerates the economic growth providing fund to business organization as and when necessary and performing other supporting activates such as payment mechanism, money transfer, assurance and guarantee in international trade, foreign exchange activities etc. In addition, commercial banks collect scattered idle money and help depositors to earn from their idle money and also help shareholders to earn smart amount using fund efficiently. That is, commercial banks accumulate segregated money from surplus unit of society and supply that fund to deficit unit. Thus idle money is invested and resources of society are utilized properly. Consumption loan increases living standard. Money multiplying activity of banks increases the money supply in the economy. In turn, employment opportunity increases in the economy. Central Bank implements its policy through commercial banks. Thus, commercial banks become the part and parcel of modern economy.

It is inevitable for banks to have profitability to uphold continuing activities and for theirs shareholders to have nondiscriminatory returns and at the same time it is also important for managers because it assures more flexible capital ratios even in the setting of a dicey business environment. Amandeep (1999) has revealed that it is essential to keep reliability on the institution by shareholders, long term creditors, and management. In this fashion profitability aids to discern the financial soundness of a bank. Therefore, a bank should raise more absolute amount of revenue and boost up its profit. Profitability, as a life blood of a bank, works as a bridge by providing extra loan disbursement facility to the bank so that it can meet up its long and short term goals.

Not an exception to generate profitability as a basic aim of a bank, it is also an important factor for the smooth running of a bank in today's competitive setting. It has a significant impact on the financial proficiency of the banks to drive the economic development. So to identify profit determinants, management can usually concentrate on it at the time of decision making to track the driving forces. The efficiency argument for profit maximization outlines that corporations and their managers should maximize profits because this is the course of action that will lead to an 'economically efficient' or 'welfare maximizing' outcome (Jensen, 2001; Jensen, 2002).

Now a days, Banking sector of Bangladesh is exploring day by day. The total number of bank operation in Bangladesh was forty-seven in 2012 but in 2014 this number is fifty-six. Among these banks, thirty banks listed in Dhaka Stock Exchange. Among commercial banks, Islami Bank Bangladesh Limited is the best performing bank with asset base of about BDT 65242 Crore. Islami Bank Bangladesh Limited (IBBL) is one of first 1000 banks in the world (Source: Bangladesh Bank). IBBL enjoys highest average after tax net profit, highest average loan & advances, highest average deposit & others and highest average paid up capital. Intellectual capital such as loyal customer base, loyal and efficient work force, ethical internal operating process, people's perception of its operation as true shariah based operation underlie the success of IBBL. Moreover, off late the loan and advance base of commercial banks is scaling up (Source: Bangladesh Bank). Due to high growth in loan and advances and investment in shares and government securities and increase in human resource, a question usually comes into the mind that are the banks performing optimally with the high growth in loan and advances and investment in government securities and shares base in line with increased human resource?

To answer this question, this paper has tried to discover the key determinants that affect profitability of banking sector by using econometric tools and techniques. Since banks deal with the public money (mainly depositors), it is the duty of the banks to ensure the safety of the money. Due to banks' default or suboptimal performance, a bulk portion of depositors may lose their life time savings. Hence, a bad intention of public may work on the entire banking sector or simply depositors may feel insecurity to keep their money in banks. Therefore, this paper will give a clear message to the public more specifically the depositors that whether keeping money in banks is relatively safe or not, whether banks are generating profit from their main sources of funding (loan and advances) to return depositors' money along with claimed return. This paper has been organized as follows- Section-1: Introduction, Section-2: Literature Review, Section-3: Data Source and Descriptive Statistics, Section-4: Econometric Methodology, and Section-5: Conclusion.

2. Review of Literatures

Profitability of commercial banks is a function of several key factors. Most of the academicians and researchers are still inquisitive to detect those factors accurately. This section summarizes the core finding of previous literatures on determinants of profitability of commercial banks. In this regard, Samad (2015) has found bank specific factors such as loan-deposit ratio, loan-loss provision to total assets, equity capital to total assets, and operating expenses to total assets have significant on profitability measured with Return on Asset (ROA). Bank size and GDP as macroeconomic variable have no impact on profitability (ROA). Islam (2010) has examined the impact of bank size (measured in total assets, total loans and total deposits) on bank profit performance using OLS and found that bank sizes and bank profitability were positively related in Bangladesh (see also- (Bourke, 1989; Molyneux and Thornton, 1992; Loyd-Williams *et al.*, 1994; Berger, 1995b; Angbazo, 1997; Iannotta *et al.*, 2007; Pasiouras and Kosmidou, 2007; Athanasoglou *et al.*, 2008; Alexiou and Sofoklis, 2009; García-Herrero *et al.*, 2009). Munyambonera (2013) has revealed that capital adequacy (eligible capital/total risk weighted assets), credit risk (growth in bank deposit), and inflation have positive and significant impact on profitability measured with Return on Average Asset (ROAA) and operational efficiency (cost/income), liquidity ratio (net loans/total assets), growth in GDP have negative and significant impact on Return on Average Assets (ROAA). Ali (2016) has revealed that financial risk (total liabilities / total assets), gearing ratio (debt / equity), asset management (operating income / total assets), bank size (LnTotal Assets), loan to total asset ratio (loan / total asset), and inflation have positive and significant impact on profitability measured by Return on Asset (ROA), operating efficiency (total operating expenses / total assets) of banks is negatively associated with Return on Assets (ROA), liquidity (liquid assets / total assets) has negative and significant association with return on assets (ROA), Non-performing loan(NPL) to total assets ratio (NPL / total assets), and real gross domestic product (RGDP) has a negative and insignificant impact on return on assets (ROA). Guru *et al.* (2002) have studied the determinants of banks' profitability where they have grouped the explanatory variables into

two classes such as the internal determinants and the external determinants. Internal determinants are liquidity, capital adequacy, and expenses management and external determinants are ownership, firm size, and economic conditions. The result showed that efficient expenses management was one of the most significant in explaining high profitability. Among the external indicators, high interest ratio had negative impact on profitability and inflation was positively related with banks' profitability. Sufiyan and Habibullah (2009) have examined the determinants of the profitability and found that liquidity, credit risk, and capitalization have positive impacts on the state owned commercial banks' (SOCBs) profitability, while the impact of cost on profitability is negative. Naceur and Omran (2008) have found that bank specific characteristics such as credit risk and bank capital have positive and significant impact on bank profitability. However, they found no evidence of impact of macroeconomic variables on bank profitability. Hefferman and Fu (2008) have found that macroeconomic variable such as inflation has positive impact on bank profitability. Mustaq *et al.* (2014) examined the determinants of profitability of commercial banks over the period from 2004 to 2010. They examined the impact of a set of explanatory variables on two dependent variables separately. They have found that equity to assets ratio, size of the bank, noninterest income to gross income have significant positive relation with Return on Equity(ROE) and deposit to total assets, and provision ratio have significant negative impact on Return on Equity (ROE). Loan to total assets and inflation have negative impact on Return on Equity (ROE). They have also found that equity to assets ratio, size of the bank, and provision ratio have significant positive impact on net interest margin and non-interest income to gross income and deposit to total asset have positive impact on net interest margin. Only Inflation has negative relationship with net interest margin. However, money supply as a determinant of inflation, has positive impact on banks' profitability (Bourke, 1989; Molyneux and Thornton, 1992). Zimmerman (1996) has found loan portfolio concentration is an important contributing factor in bank performance. Wall (1985) has concluded that a bank's asset and liability management, its funding management and the non-interest cost controls all have a significant effect on the profitability record.

Different studies have confirmed that banks' profitability are affected several factors and most of the studies have used traditional and weak econometric tools and techniques (namely OLS) and small sample sizes. Due to inborn weakness in traditional econometric tools and small sample sizes, the results of the previous studies are very mixed and still no one in Bangladesh has applied a panel GMM approach to find out the impact of key factors that usually affect banks' profitability. This paper in this regard will fill the gap in eliminating inborn weakness in traditional econometric tools by using modern econometric tools (Panel GMM) and as a first time comprehensive study based on Panel GMM in Bangladesh it will definitely be an excellent contribution in the field of literatures.

3. Data Source and Descriptive Statistics

All data have been collected from annual reports of each banks from 2005-2015 except economy money supply growth (MSG). The data of net profit (NETP), investment in government securities and shares (INV), and loan and advances (LOAN) are expressed in million BDT. Banks' efficiency (REX)[1] is a unit free measure. Broad money supply growth has been used as the economy money supply growth (MSG). The data of economy money supply growth has been collected from the World Bank Development Indicators. To check the stability of performance and efficiency of performance a few statistics are given below in Table-1**.**

Table-1. A few statistics to check stability and efficiency of performance

Banks and Panel	**Mean Profit**	**SD of Profit**	**CV of Profit**	**APTL**
Alarafah Islami Bank	1,337.66	817.43	61.11%	1.51%
AB Bank	1,666.51	1,089.98	65.40%	1.77%
Bank Asia	1,327.73	750.99	56.56%	1.89%
Dhaka Bank	1,225.48	635.68	51.87%	1.80%
First Security Islami Bank	418.12	326.29	78.04%	0.59%
Eastern Bank	1,622.51	889.29	54.81%	2.38%
Dutch Bangla Bank	1,533.47	927.45	60.48%	2.14%
City Bank	1,243.33	1,044.65	84.02%	1.88%
Prime Bank	2,074.93	925.71	44.61%	2.14%
Premier Bank	711.88	472.8626	66.42%	1.60%
United Commercial Bank	1,903.33	1,319.513	69.33%	1.98%
Trust Bank	630.27	505.8244	80.26%	1.23%
National Bank	2,798.04	2,082.49	74.43%	2.93%
Mutual Trust Bank	615.54	367.55	59.71%	1.37%
Rupali Bank	658.40	488.35	74.17%	0.85%
IFIC Bank	856.20	508.52	59.39%	1.46%
EXIM Bank	1,741.57	877.86	50.41%	1.82%
ONE Bank	1,087.36	689.71	63.43%	2.26%
NCC Bank	1,304.02	678.03	52.00%	2.06%
Jamuna Bank	864.35	526.17	60.87%	1.95%
Mercantile Bank	1,086.04	544.02	50.09%	1.59%
Islami Bank Bangladesh	3,406.71	1488.41	43.69%	1.21%
Pubali Bank	2,071.47	942.89	45.52%	2.34%
Brac Bank	1,204.86	736.67	61.14%	1.57%
Shahjalal Islami Bank	1,051.51	541.06	51.46%	1.84%
South East Bank	1,988.52	1,132.33	56.94%	2.11%
Social Islami Bank	838.12	748.27	89.28%	1.57%
Standard Bank	932.00	466.65	50.07%	1.97%
Uttara Bank	1,062.35	540.36	50.86%	2.20%
Panel	1,353.87	1,065.18	78.68%	1.76%

Note: SD stands for Standard Deviation, CV stands for Coefficient of Variation (stability of performance) and APTL stands for Average Profit to Average Loan and Advances Ratio (efficiency in performance).

[1]Efficiency has been defined as the total revenue divided by the sum of investment and loan and advances.

From the descriptive statistics, it has been observed that stability of performance of most of the banks has outperformed the stability of the entire banking sector performance (in terms of coefficient of variation, 76.68%). Here, the lower the coefficient of variation, the more stable a bank's performance. Islami Bank Bangladesh limited has experienced more stable performance during 2005-2015 (the lowest coefficient of variation of profit, 43.69%). In terms of efficiency (average profit to average loan and advances), several banks- Uttara Bank(2.20%), Standard Bank (1.97%), South East Bank (2.11%), Shahjalal Islami Bank (1.84%), Pubali Bank (2.34%), Jamuna Bank (1.95%), NCC Bank (2.06%), ONE Bank (2.26%), EXIM Bank (1.82%), National Bank (2.93%), United Commercial Bank (1.98%), Prime Bank (2.14%), City Bank (1.88%), Dutch Bangla Bank (2.14%), Eastern Bank (2.38%), Dhaka Bank (1.80%), and Bank Asia (1.89%) have outperformed the efficiency of the entire banking sector performance (1.76%). Eastern Bank has experienced most efficiency in performance during 2005-2015 (the highest average profit to average loan and advances ratio, 2.38%). Bank wise net profit from 2005-2015 has been highlighted in Figure-1.

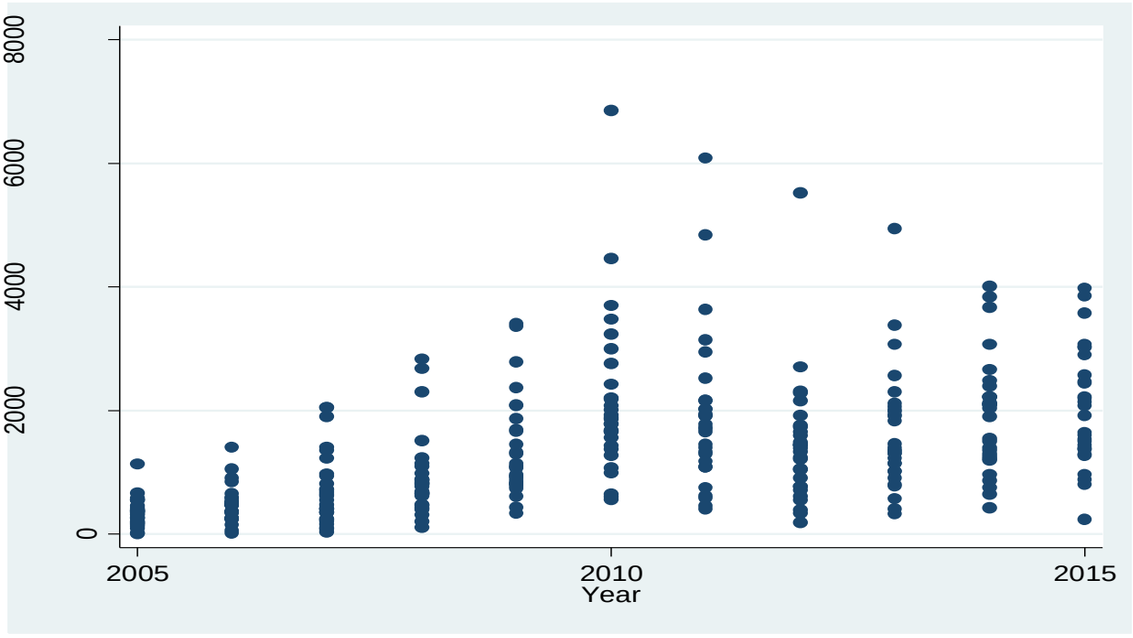

Figure-1. Bank wise net profit (BDT in MN) from 2005-2015 (29 Banks).

4. Econometric Methodology

In this section details of the model development, logic behind the selection of the dependent variables, model estimation, and results and interpretation have been provided.

4.1. Model Development

The impact of investment, loan and advances, human resource, efficiency, and economy money supply growth on net profit has been examined by the following model:

$$NETP_{it} = A_0 INV_{it}^{\alpha_{1i}} LOAN_{it}^{\alpha_{2i}} HR_{it}^{\alpha_{3i}} REX_{it}^{\alpha_{4i}} MSG_{it}^{\alpha_{5i}} e^{\varepsilon_{it}} \quad \textbf{(1)}$$

The logarithmic transformation of equation (1) is given by:

$$\ln(NETP_{it}) = \alpha_0 + \alpha_{1i}\ln(INV_{it}) + \alpha_{2i}\ln(LOAN_{it}) + \alpha_{3i}\ln(HR_{it}) + \alpha_{4i}\ln(REX_{it}) + \alpha_{5i}\ln(MSG_{it}) + \varepsilon_{it} \quad \textbf{(2)}$$

where, $\alpha_0 = \ln(A_0)$, the subscript i represents ith company and t represents time period for each company. NETP indicates net profit after tax for banks, INV indicates investment in government securities and shares for banks, HR indicates number of employees for banks, REX indicates the efficiency for banks, and MSG indicates the economy money supply growth. The parameters $\alpha_1, \alpha_2, \alpha_3, \alpha_4, \alpha_5$ represent the elasticities of net profit with respect to INV, LOAN, HR, REX, and MSG. The entire econometric analysis has been conducted in SATA and EVIEWS. All variables are expressed in logarithmic forms due to non-linear relationship among the variables. The scatter plotting of variables (with and without logarithms) is given in Figure-1a, 1b, 2a, 2b, 3a, 3b, 4a, 4b, 5a, 5b. Relatively deep cluster has been observed in Figure- 1b, 2b, 3b, 4b, and 5b than Figure-1a, 2a, 3a, 4a, and 5a. To get overwhelming conclusion, R^2 has been computed and given in Table-2. From Table-2, it has been concluded that better fitness has been observed after taking logarithm.

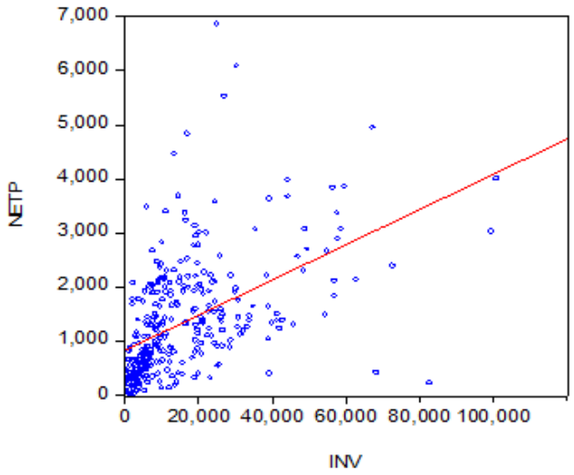

Figure-1a. Plotting between NETP and INV

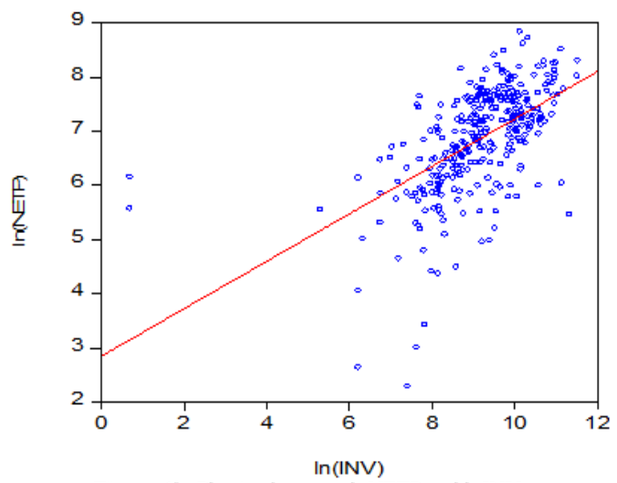

Figure-1b. Plotting between lnNETP and lnINV

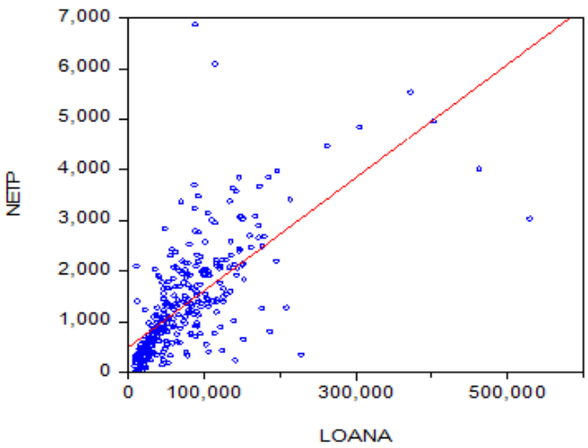

Figure-2a. Plotting between NETP and LOANA

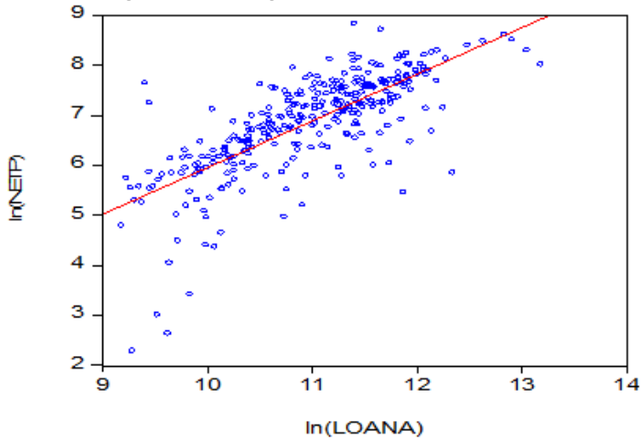

Figure-2b. Plotting between lnNETP and lnLOANA

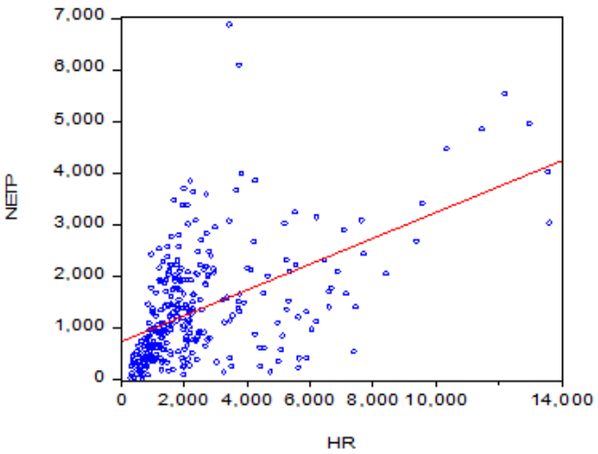

Figure-3a. Plotting between NETP and HR

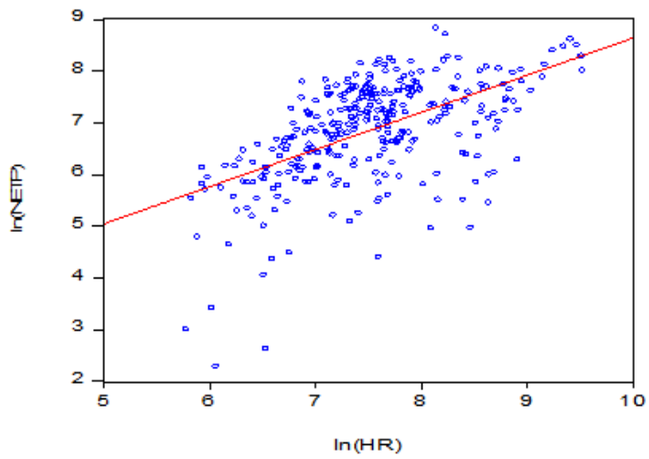

Figure-3b. Plotting between lnNETP and lnHR

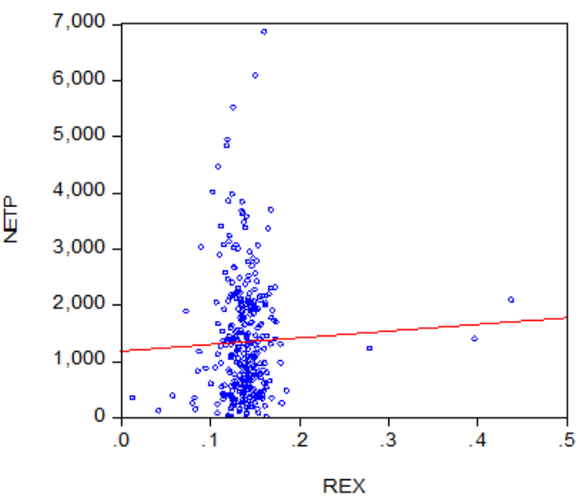

Figure-4a. Plotting between NETP and REX

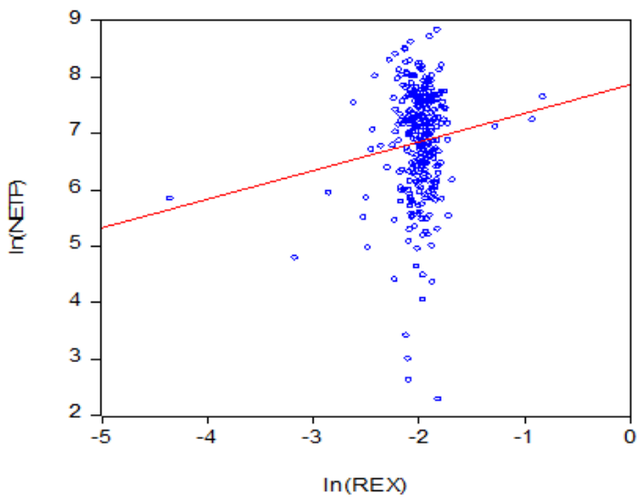

Figure-4b. Plotting between lnNETP and lnREX

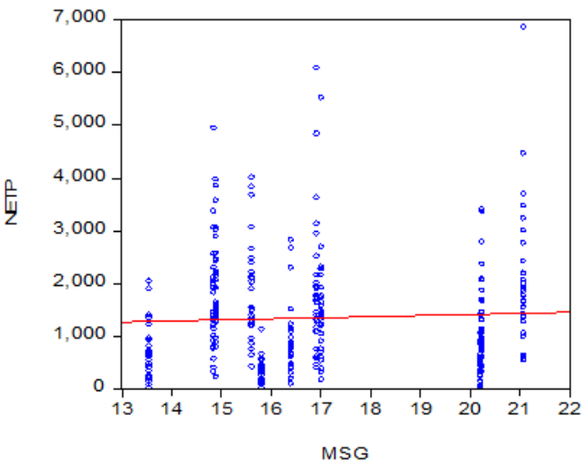

Figure-5a. Plotting between NETP and REX

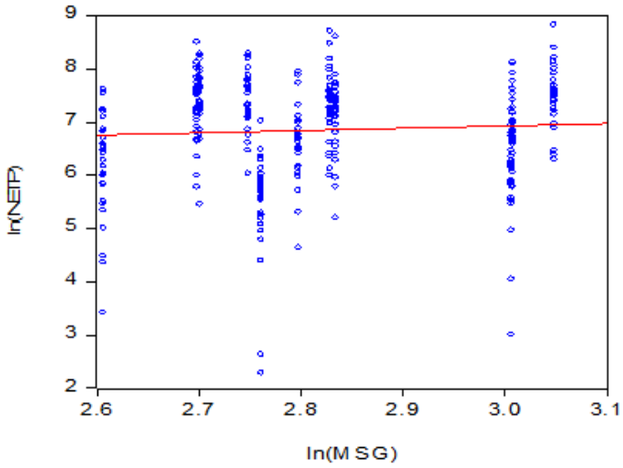

Figure-5b. Plotting between NETP and REX

Table-2. Summary of R^2

	INV	LOANA	HR	REX	MSG
NETP	0.2482	0.4601	0.2675	0.0012	0.0021
	lnINV	lnLOANA	lnHR	lnREX	lnMSG
lnNETP	0.3194	0.5523	0.3066	0.0142	0.0038

Since logarithm gives more importance to small value and less importance to large value, the problem of non-linearity will be fixed out with superior model fitness (Table-2). Logarithm sometimes helps to eliminate heteroscedasticity problem.

4.1.1. Logic behind the Selection of the Explanatory Variables

Loan and advances (LOANA): Alexiou and Sofoklis (2009); Angbazo (1997); Athanasoglou *et al.* (2008); Berger (1995b); Bourke (1989); García-Herrero *et al.* (2009); Iannotta *et al.* (2007); Loyd-Williams *et al.* (1994); Molyneux and Thornton (1992) and Pasiouras and Kosmidou (2007) have found that there is a positive relationship between banks' loan and advances and profitability.

Efficiency (REX): Alexiou and Sofoklis (2009); Athanasoglou *et al.* (2008); Dietrich and Wanzenried (2011); García-Herrero *et al.* (2009) and Pasiouras and Kosmidou (2007) have found a positive relationship between efficiency and profitability. The study has used Asset Turnover ratio as a proxy of efficiency.

$$\text{Assest Turnover} = \frac{\text{Total Revenue}}{\text{Lona and Advances} + \text{Investment is Shares and Govt. securities}}$$

Other variables namely total deposits, capital, and term loan have not been used as explanatory variables since loan and advances and investment in shares and government securities are the functions of total deposits, capital, and term loan.

- $\text{Loan and advances} = \text{F (Deposits, Term Loan, and Equity Capital)}$
- $\text{Investment in Shares and Government Securities} = \text{F (Deposits, Term Loan, and Equity Capital)}$

Therefore use of deposits, equity capital, and term loan as explanatory variables along with loan and advances and investment in shares and government securities will create multicollinearity problem.

Investment in shares and government securities (INV): Boyd *et al.* (1998); Park (2000) have found that equity investment has significant influence on profitability unlike (Santos, 1999).

Human resource (HR): Determining staffing levels is an important decision in retail operations. While the costs of increasing labor are obvious and easy to measure, the benefits are often indirect and not immediately felt. Ton (2009) has found that increasing the amount of labor is associated with an increase in profitability through its impact on conformance quality but not its impact on service quality. Molyneux (1999) found a positive relationship between staff expenses and total profits.

Money supply growth (MSG): Bourke (1989) and Molyneux and Thornton (1992) have found that money supply is significantly and positively related to banks' profitability.

$$\text{Money Supply Growth} = [\frac{\text{Money Supply}_t}{\text{Money Supply}_{t-1}} - 1] \times 100$$

Table-3. Explanatory variables and expected signs- **lnNETP as dependent variable**

Variables	Expected Sign	Suggested literatures
lnLOANA	+VE	Alexiou and Sofoklis (2009); Angbazo (1997); Athanasoglou *et al.* (2008); Berger (1995b); Bourke (1989); García-Herrero *et al.* (2009); Iannotta *et al.* (2007); Loyd-Williams *et al.* (1994); Molyneux and Thornton (1992) and Pasiouras and Kosmidou (2007).
lnREX	+VE	Alexiou and Sofoklis (2009); Athanasoglou *et al.* (2008); Dietrich and Wanzenried (2011); García-Herrero *et al.* (2009) and Pasiouras and Kosmidou (2007).
lnINV	+VE / -VE	Boyd *et al.* (1998); Park (2000) and Santos (1999).
lnHR	+VE	Ton (2009)
lnMSG	+VE	Bourke (1989) and Molyneux and Thornton (1992).

Test of multicollinearity : To check multicollinearity problem, correlation matrix and Variance Inflation Factor (VIF) have been used.

Table-4. Correlation Matrix

	lnNETP	**lnINV**	**lnLOANA**	**lnHR**	**lnREX**	**lnMSG**
lnNETP	1.0000					
lnINV	0.5652	1.0000				
LNLOANA	0.7432	0.7027	1.0000			
lnHR	0.5537	0.5746	0.6915	1.0000		
lnREX	0.1193	0.0271	-0.1836	-0.0549	1.0000	
lnMSG	0.0617	-0.1572	-0.1559	-0.0824	0.0792	1.0000

Table-5. Variance Inflation Factor

Variables	$\mathbf{VIF = \frac{1}{1 - R^2}}$	$\mathbf{\frac{1}{VIF} = 1 - R^2}$
lnLOANA	2.85	0.35
lnINV	2.15	0.47
lnHR	1.99	0.50
lnREX	1.10	0.91
lnMSG	1.04	0.96

From the result of correlation matrix and Variance Inflation Factor (VIF is greater than or equal to 10 determines the severe problem of multicollinearity), it can be concluded that there is no problem of multicollinearity.

4.2. Estimation of the Model

At first pooled ordinary least square considering heteroscedasticity has been performed without taking into account auto-correlation problem. At second step random effect estimation technique has been used based on Hausman (1978) test. Later heteroscedasticity, cross sectional correlation, and auto correlation consistent estimation has been used for robustness check. For heteroscedasticity, cross sectional correlation, and auto correlation consistent estimation, Arellano and Bond (1991) second step GMM (GMM-1 and GMM-2) has been used to remove endogeneity problem (the regressors may be correlated with the error terms) and to remove firm specific unobserved (inborn) fixed effects. Moreover, due to the presence of lagged dependent variable, auto-correlation problem may arise. Therefore, to get rid of the auto-correlation problem first difference lagged dependent variable is also instrumented with its past levels. One key problem of second step difference GMM estimation is that the standard errors of the estimates may have downward bias. To fix out this problem, White period robust standard errors have been used. It is also notable that if panel has small time dimension (T) and long firm dimension (N), Arellano and Bond (1991) estimation can be used even if it is not necessary (Roodman, 2006). Hayakawa (2009) has shown that Arellano and Bover (1995) orthogonal deviation (GMM-3 and GMM-4) tends to work better than the first difference GMM estimation.

4.3. Results and Interpretation

It has been found that money supply growth and loan and advances have significant positive impact on profitability of banks (suggested by Pooles OLS, Random Effect OLS, GMM-1, GMM-2, GMM-3, and GMM-4). Therefore, more loan and advances and economy money supply will scale up the profit of banks. Human resource has significant positive impact on profit (GMM-1, GMM-2, GMM-3, and GMM-4). Therefore, banks should increase the human resource in line with the increase in loan and advances. Investment has negative impact on profit (GMM-1 and GMM-2). Therefore, bank should control investment in shares and government securities to embrace more profit. More efficiency in Banks will eventually increase the profitability (Pooled OLS, Random Effect OLS, GMM-1, and GMM-2). As per heteroscedastic consistent Pooled OLS result, 100% increase in loan and advances, efficiency, and economy money supply growth, banks' profit will be increased by 98.15%, 106%, and 120% respectively and for 100% increase in investment in shares and government securities and human resource, profit will be increased by 1.4% and 3.95% respectively. The impact of loan and advances, efficiency, and economy money supply growth is significant at any level whether the impact of investment in shares and government securities and human resource is insignificant. As per Random Effect OLS result, 100% increase in loan and advances, efficiency, and economy money supply growth, banks' profit will be increased by 98.35%, 93.32%, and 116.44% respectively ,for 100% increase in investment in shares and government securities, profit will be decreased by 4.23%, and for 100% increase in human resource, profit will be increased by 10.29%. The impact of loan and advances, efficiency, and economy money supply growth is significant at any level whether the impact of investment in shares and government securities and human resource is insignificant. As per GMM-1 result, 100% increase in loan and advances, efficiency, and economy money supply growth, banks' profit will be increased by 65.61%, 42.78%, and 138.06% respectively, for 100% increase in investment in shares and government securities, profit will be decreased by 27.85%, and for 100% increase in human resource, profit will be increased by 89.32%. The impact of loan and advances, efficiency, economy money supply growth, investment in shares and government securities, and human resource is significant. As per GMM-2 result, 100% increase in loan and advances, efficiency, and economy money supply growth, banks' profit will be increased by 62.86%, 41.05%, and 138.92% respectively, for 100% increase in investment in shares and government securities, profit will be decreased by 27.57%, and for 100% increase in human resource, profit will be increased by 94.16%. The impact of loan and advances, efficiency, economy money supply growth, investment in shares and government securities, and human resource is significant. As per GMM-3 result, 100% increase in loan and advances, efficiency, and economy money supply growth, banks' profit will be increased

by 61.38% (55.91% in GMM-4) , 40.80% (31.90% in GMM-4) , and 136.98% (132.80% in GMM-4) respectively, for 100% increase in investment in shares and government securities, profit will be decreased by 21.88% (20.29% in GMM-4) , and for 100% increase in human resource, profit will be increased by 72.70% (64.82% in GMM-4). The impact of loan and advances, human resource, and economy money supply growth is significant unlike the impact of efficiency and investment in shares and government securities (same as GMM-4). The results have been provided in Table-6**.**

Table-6. Estimation results

Variables	Expected Sign	Pooled OLS	RE OLS	GMM-1	GMM-2	GMM-3	GMM-4
Constant		-5.5849*** (0.0000)	-5.7400*** (0.0000)				
lnINV	+VE / -VE	0.0140 (0.7140)	-0.0423 (0.3750)	-0.2785* (0.0488)	-0.2757* (0.0559)	-0.2188 (0.2340)	-0.2029 (0.2154)
lnLOAN	+VE	0.9815*** (0.0000)	0.9835*** (0.0000)	0.6561*** (0.0003)	0.6286*** (0.0004)	0.6138*** (0.0094)	0.5591*** (0.0089)
lnHR	+VE	0.0395 (0.5280)	0.1029 (0.3130)	0.8932** (0.0149)	0.9416** (0.0108)	0.7270** (0.0227)	0.6482** (0.0341)
lnREX	+VE	1.0664*** (0.0000)	0.9332*** (0.0000)	0.4278* (0.0570)	0.4105* (0.0626)	0.4080 (0.1633)	0.3190 (0.2495)
lnMSG	+VE	1.1974*** (0.0000)	1.1644*** (0.0000)	1.3806*** (0.0000)	1.3892*** (0.0000)	1.3698*** (0.0000)	1.3280*** (0.0000)
AR(2) Coefficient				0.1382 (0.8901)	0.1615 (0.8717)		
J Statistic				24.3085 (0.2784)	24.3166 (0.2780)	25.2009 (0.2385)	25.0619 (0.2445)

Note: ***Significant at 1% level, **Significant at 5% level, *Significant at 10% level. There is no existence of serial correlation in all four GMM techniques. The higher the p-value of J-statistic, the stronger the model is. RE (Random Effect) OLS has been applied based on the result of Hausman Specification test (Acceptance of Null Hypothesis). Later by taking into account serial correlation, heteroscedasticy, and cross sectional dependence, GMM has been applied. In GMM-1 and GMM-3 all transformed independent variables have been used as instruments along with dynamic panel instruments of dependent variables. In GMM-2 and GMM-4, all transformed independent variables, first lag of independent variables, and first lag of first difference independent variables have been used as instruments along with dynamic panel instruments of dependent variables. GMM-1, GMM-2, GMM-3, and GMM-4 are reasonably good models suggested by small J-statistic and its high p-value (>0.05). In GMM-1, GMM-2, GMM-3, and GMM-4, consecutive three lags of dependent variable have been used as explanatory variables to eliminate auto-correlation problem.

5. Conclusion and Policy Implications

To get superior model fitness, a non-linear model (double log model) has been used in this study. In the estimated model, severe problem of multicollinearity has not been observed. To check the consistency in estimation, four separate GMMs (GMM-1, GMM-2, GMM-3, and GMM-4) along with Pooled OLS and Random Effect OLS have been used. In four GMMs, the impact of loan and advances, human resource, and money supply growth on profit is consistent. From the estimated results from all techniques, it has been observed that both internal factors (Investment in shares and government securities, loan and advances, human resource, and efficiency) and external factor (for example economy money supply) affect profitability of banks. To embrace more profit, banks should give more emphasis on the increase in loan and advances in line with human resource, and efficiency while cutting down the dependency on investment in shares and government securities. Moreover, more money supply in economy will eventually increase the banks' profitability. Therefore, depositors may remain assured that more loan and advances will generate profit and they can fearlessly keep their money in banks. Therefore, depositors will get back their money along with required return.

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