

Short Run and Long Run Determinants of Financial Performance: Evidence from a Panel of 29 Listed Commercial Banks in Bangladesh

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***Abstract:** As the most important and indispensable sector of Bangladesh, banking sector has to perform efficiently by developing sustainable profit base to operate better in a highly competitive environment. This study attempts to evaluate the performance of a panel of 29 listed commercial banks of Bangladesh. The long run and short run analyses have been conducted using the data set from 2005-2015 for each bank to find out the impact of key factors namely investment in government securities and shares, loan and advances, human resource, and number of branches on financial performance of banks. From the estimated results of panel VEC model, it has been found that short run bidirectional causality exists between net profit and number of branches and short run unidirectional causality exists from investment to loan and advances, human resource to loan and advances, net profit to human resource, and number of branches to human resource. The test results suggest the existence of long run relationship among the variables in equation (2). In the long run, more loan and advances and more investment in government securities and shares unlike more branches and employees will give more boost to the performance of the banking sector even though the impacts of investment in government securities and shares, human resource, and number of branches on performance are insignificant. It has been found that loan and advances have significant positive impact on performance both in the short run and in the long run.*

***Keywords:** Net Profit, Commercial Banks, Investment in Shares and Government Securities, Loan and Advances, Human Resource, Number of Branches, and Panel VEC Model*

***JEL Classification:** C01, C33, C87, E22, G21*

1.0 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

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when necessary and performing other supporting activities such as payment mechanism, money transfer, assurance and guarantee in international trade, foreign exchanges 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 area of society and supply that fund to deficit area. 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.

The 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. In 2006-07 fiscal year banking sector contributed 2.61 percent of the GDP of Bangladesh. After that banking sector's contribution to the GDP of Bangladesh followed a downward trend for three consecutive years but from 2010-11 this contribution rate started to increase gradually. And at FY' 16 its contribution to GDP is 2.88 percent and the average rate of contribution is 2.59 percent. Banking sector also helps in building up capital from the saving or income surplus from general people and provides them as credit for performing different economic activities. Economy of Bangladesh is greatly dependent on its agro base activities. So now banking sector is giving more importance on forestry, agriculture and fisheries and distributed 41.79 percent more loans and advances on such areas in 2014-15 than that of 2013-14. Banking sector are now giving loans and advances in different priority sectors such as 33.14 percent in business and commerce, 22.32 percent in working capital, 19.73 percent in industries 7.53 percent in real estate, 1.84 percent in transportation and communication and 1.64 percent in electricity, gas and water supply. Banking sector of Bangladesh is now focusing on including root level people of the society like farmers, physically challenged people, RMG workers, and hard core poor people and so on under the banking network. For the implementation of such goal banking sector has taken different sort of initiatives and No-frill account operation is one of them. Banks have collected about 1.60 crore up to March 2016 through non-frill account operation. As per the data of 2014 for per 1, 00,000 adults there are about 8.21 commercial bank branches for operation and it is following increasing trend. Banks are also playing vital role for assist in import payment and export receipt. Among 56 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, 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? This paper helps to answer the question in line with the investigation of short run and long run determinants of banks' financial performance. However, the increase in the number of branches and with number of employees has raised the question that "can the banks successfully make adequate profit after meeting all the operating expenses?" It is well known that due to increase in human resource and number of branches, the operating expenses of the banks will scale up.

The main objective of this paper is to find out the key determinants that affect financial performance of banks both in the short run and in the long run by using modern econometric tools and techniques that attempt to keep minimum bias in conclusion and policy implications. More specifically, this paper tries to investigate the short run and long run dynamics of banks' financial performance. The existing literatures in Bangladesh have given more emphasis on short run dynamics of financial performance of the banking sector. This paper in this regard will fill out the gap. This paper also considers the importance of operational efficiency on the financial performance of the banking sector. Therefore, this paper attempts to investigate the short run and long run impact of human resource and the number of branches along with loan and advances and investment in government securities and shares of public limited companies as key revenue generating assets on the financial performance. The 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 and Policy Implications.

2.0 Literature Review

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. However, almost all of the empirical studies on banking sector of Bangladesh have been concentrated on short run dynamics of financial performance and a few studies in abroad focus on the long run dynamics of the banks' financial performance. This section summarizes the core finding of previous literatures on determinants of profitability of commercial banks in national country and abroad. For example, 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. 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 (log total 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 had positive impacts on the state owned commercial banks' (SOCBs) profitability, while the impact of cost on profitability was negative. Ben Naceur and Omran (2008) have found that bank specific characteristics such as credit risk and bank capital had positive and significant impact on bank profitability. However, they found no evidence of impact of macroeconomic variables on bank profitability. In these studies, due to the use of pooled OLS and other simple econometric techniques (suffering from empirical bias), the conclusions drawn are questionable. Another major limitation in these studies is that there exists endogeneity problem due to reverse causalities among the variables. This paper takes into account all these issues and successfully addresses endogeneity problem by using DOLS (Dynamic Ordinary Least Square). DOLS uses leads and lags that automatically control endogenous feedback.

Moreover, 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. Oke (2012) has found that positive relation exists between profitability of banks and loans & advances. Ahmed *et al.* (2014) has shown that advances of banks' have very strong and significant positive impact on banks profitability. This finding is also very much consistent with Kurawa and Garba (2014). Ameer (2015) has shown that maximization of profitability is possible with the increase in the amount of loans provided by commercial banks. But Kargi (2011) in Nigeria has found that loans and advances control profitability of banks negatively.

Moreover, few studies have been found giving emphasis on the impact of human resource and number of branches on banks' financial performance in abroad and also there is no study in Bangladesh which has given emphasis on the importance of human resource and branches to boost up the banks' financial performance. The studies in this regard will fill out the gap by considering the impact of human resource and number of branches along with the key revenue generating assets of banks namely loan and advances and investment in government securities and shares of public limited companies.

A bunch of the studies have confirmed that banks' profitability is affected by several key factors by giving more emphasis on the short run. These studies have used weak econometric tools and techniques and small sample sizes. Due to inborn weakness in traditional econometric tools and use of small sample sizes, the results of the previous studies are very mixed and questionable. Moreover, the weak econometric tools cannot keep the bias in the minimum level in drawing conclusions and policy implications. It is notable that still no one in Bangladesh has conducted panel log run and short run analyses to find out the impact of key factors that usually affect banks' performance. Moreover, few studies have been found giving emphasis on the impact of human resource and number of branches on banks' financial performance in abroad and also there is no study in Bangladesh which has given emphasis on the importance of human resource and branches to boost up the banks' financial performance. This paper in this regard will fill out the gap in eliminating inborn weakness in existing literatures by using modern econometric tools and large sample size and by giving emphasis on short run and long run determinants of financial performance with consideration of the importance of human resource and number of branches along with the key revenue generating assets namely loan and advances and investment in government securities and shares of public limited companies. As a first time comprehensive study in Bangladesh it will definitely be an excellent contribution in the field of literatures in home and also in abroad.

3.0 Data Source and Descriptive Statistics: All data have been collected from annual reports of each banks from 2005-2015. The data of net profit (NETP), investment in government securities and shares (INV), and loan and advances (LOAN) are expressed in million BDT. 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	1,319.51	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	658.4	488.35	74.17%	0.85%
IFIC Bank	856.2	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	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%

Source: Annual Reports of Banks.

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).

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%).

4.0 Econometric Methodology

The long run impact of investment, loan and advances, human resource, and number of branches on net profit has been examined using the following model:

$$\text{NETP}_{it} = A_0 \text{INV}_{it}^{\alpha_1} \text{LOAN}_{it}^{\alpha_2} \text{HR}_{it}^{\alpha_3} \text{NOB}_{it}^{\alpha_4} e^{\varepsilon_{it}} \quad (1)$$

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

$$\ln(\text{NETP}_{it}) = \alpha_0 + \alpha_1 \ln(\text{INV}_{it}) + \alpha_2 \ln(\text{LOAN}_{it}) + \alpha_3 \ln(\text{HR}_{it}) + \alpha_4 \ln(\text{NOB}_{it}) + \varepsilon_{it} \quad (2)$$

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, and NOB indicates total number of branches for banks. The parameters $\alpha_1, \alpha_2, \alpha_3,$ and α_4 represent the long-run elasticities of net profit with respect to changes in INV, LOAN, HR, and NOB. The panel dynamic relationship among investment, loan and advances, human resource, number of branches, and net profit is examined in three steps. In the first step, the stationarity of each panel variable is examined. If the variables are found to contain a unit root, then the long-run cointegrating relationship among the panel variables will be examined. If a long-run relationship among the panel variables is found to exist, a panel vector error correction model will be estimated in order to determine the causal relationship between the variables.

The short-run and the long-run impact on net profit with respect to investment, loan and advances, human resources, and number of branches will also be examined using the DOLS (Dynamic Ordinary Least Square) (Stock and Watson, 1993). The entire econometric analysis has been conducted in RATS and EVIEWS.

4.1 Unit Root Tests: The order of integration of the panel variables is determined by three unit root tests namely Im, Pesaran and Shin (IPS, 2003), Maddala and Wu (MW, 1999) and Choi (2006) to reach at a strong conclusion. In, Im, Pesaran and Shin (IPS, 2003) test, the null hypothesis of the existence of a unit roots in each series is to be tested against the alternative hypothesis that some of the individual series have not unit root problem. The Maddala and Wu (1999) test, unlike IPS (2003), does not depend on the lag length in the individual ADF regressions. Maddala and Wu (1999) performed Monte Carlo simulations showing that their test is superior to that proposed by IPS (2003). The test results are given below in Table 2.

Table-2: Panel Unit Root Tests Results

Model with constant and trend terms [Level form]						
Variables	IPS Test	P-value	MW Test	P-value	Choi Test	P-value
lnNETP	0.5067	0.6938	53.8792	0.6292	0.4118	0.6597
lnINV	0.4301	0.6664	55.8216	0.5567	0.5441	0.7068
lnLOAN	1.0854	0.8611	51.9083	0.6999	1.4643	0.9284
lnHR	0.4482	0.6730	64.3659	0.2637	1.3795	0.9161
lnNOB	1.2878	0.9011	55.1538	0.5818	2.0094	0.9778
Model with only constant term [Level form]						
lnNETP	-2.8854***	0.0020	87.3433***	0.0076	-3.0600***	0.0011
lnINV	0.1705	0.5677	62.9592	0.3052	1.0060	0.8428
lnLOAN	-1.1637	0.1223	80.4267***	0.0273	-1.1368	0.1278
lnHR	-3.8681***	0.0001	116.3420***	0.0000	-3.2723***	0.0005
lnNOB	-0.3646	0.3577	80.5172	0.0296	0.12871	0.5512
Model with only constant term [First differenced form]						
Δ lnPGDP	-6.6911***	0.0000	159.6290***	0.0000	-7.2330***	0.0000
Δ lnOPN	-8.2371***	0.0000	181.5850***	0.0000	-8.4228***	0.0000
Δ lnFAID	-5.3461***	0.0000	131.6870***	0.0000	-5.5532***	0.0000
Δ lnDIV	-4.6198***	0.0000	124.2900***	0.0000	-4.7871***	0.0000
Δ lnEXD	-4.5985***	0.0000	122.0340***	0.0000	-5.0673***	0.0000

***: Indicates significant at 1% level, **: Indicates significant at 5% level, *: Indicates significant at 10% level. Appropriate lag length for each test has been selected by AIC and SBIC criteria.

The results (Table-2) indicate that all the panel variables are integrated of order one (I(1)).

4.2 Co-integration Test: The results of the three unit root tests indicate that the each panel variable is integrated of order one (I (1)). The Kao (1999) ADF type test and Pedroni (1999) bunch of tests are then performed to identify the co-integrating relationships among the panel variables. Both the Kao test and the Pedroni test results (Table-3) have confirmed co-integrating relationships among the panel variables.

Table-3: Co-integration Test Results

Kao Test				
Test type	t-statistic	P-value		
Panel ADF	-6.6827***	0.0000		
Pedroni Test (within dimension)				
Test Type	Statistic	P-Value	Weighted Statistic	P-value
Panel V	-2.8695	0.9979	-5.4977	1.0000
Panel Rho	5.7050	1.0000	6.0120	1.0000
Panel PP	-13.4025***	0.0000	-15.9805***	0.0000
Panel ADF	-6.4410***	0.0000	-6.0411***	0.0000
Pedroni Test (between dimension)				
Test Type	Statistic		P-value	
Group Rho	7.6836		1.0000	
Group PP	-22.9451***		0.0000	
Group ADF	-6.8724***		0.0000	

***: Indicates significant at 1% level, **: Indicates significant at 5% level, *: Indicates significant at 10% level. Appropriate lag length for each test has been selected by AIC and SBIC criteria. The co-integration tests have included both intercept and trend.

4.3 Granger Causality Test: The direction of causality between the panel variables is examined by performing the Engle and Granger (1987) test on the first differenced variables. In order to capture the long-run relationships, an error correction term (ECM) is included in the VAR system. The augmented form of the Granger causality test in a multivariate VECM framework is presented below:

$$\begin{bmatrix} \Delta \ln \text{NETP}_{it} \\ \Delta \ln \text{INV}_{it} \\ \Delta \ln \text{LOAN}_{it} \\ \Delta \ln \text{HR}_{it} \\ \Delta \ln \text{NOB}_{it} \end{bmatrix} = \begin{bmatrix} C_1 \\ C_2 \\ C_3 \\ C_4 \\ C_5 \end{bmatrix} + \sum_{j=1}^p \begin{bmatrix} \beta_{11j} & \beta_{12j} & \beta_{13j} & \beta_{14j} & \beta_{15j} \\ \beta_{21j} & \beta_{22j} & \beta_{23j} & \beta_{24j} & \beta_{25j} \\ \beta_{31j} & \beta_{32j} & \beta_{33j} & \beta_{34j} & \beta_{35j} \\ \beta_{41j} & \beta_{42j} & \beta_{43j} & \beta_{44j} & \beta_{45j} \\ \beta_{51j} & \beta_{52j} & \beta_{53j} & \beta_{54j} & \beta_{55j} \end{bmatrix} \begin{bmatrix} \Delta \ln \text{NETP}_{it-j} \\ \Delta \ln \text{INV}_{it-j} \\ \Delta \ln \text{LOAN}_{it-j} \\ \Delta \ln \text{HR}_{it-j} \\ \Delta \ln \text{NOB}_{it-j} \end{bmatrix} + \begin{bmatrix} \lambda_1 \\ \lambda_2 \\ \lambda_3 \\ \lambda_4 \\ \lambda_5 \end{bmatrix} \text{ECM}_{it-1} + \begin{bmatrix} \epsilon_{1it} \\ \epsilon_{2it} \\ \epsilon_{3it} \\ \epsilon_{4it} \\ \epsilon_{5it} \end{bmatrix} \quad (3)$$

The C's, β 's and λ 's are the parameters of the model (Equation-3); Δ stands for the first difference in a variable; ECM_{it-1} represents the one period lagged error term derived from the long-run co-integrating equation estimated by DOLS; ε 's are serially independent with mean zero and constant variance-covariance matrix. The F test is applied to determine the direction of short run causality between the variables. Investment does not Granger cause net profit in the short run if and only if all the β_{12j} 's are not significantly different from zero. The significance of λ 's which are coefficients of ECM_{it-1} represents the long-run causality between the panel variables. The short-run and long-run Granger causality test results are reported in Table 4.

Table-4: Granger Causality Test Results

	$\Delta \ln \text{NETP}$	$\Delta \ln \text{INV}$	$\Delta \ln \text{LOAN}$	$\Delta \ln \text{HR}$	$\Delta \ln \text{NOB}$	ECM [t-test]
$\Delta \ln \text{NETP}$		1.7838 (0.1830)	0.0615 (0.8044)	1.6917 (0.1947)	10.9939*** (0.0010)	-7.7502*** (0.0000)
$\Delta \ln \text{INV}$	0.4238 (0.5157)		1.0507 (0.3065)	2.2189 (0.1377)	1.1463 (0.2855)	2.3451*** (0.0199)
$\Delta \ln \text{LOAN}$	0.1465 (0.7023)	24.4535*** (0.0000)		3.8412** (0.0512)	2.0737 (0.1512)	2.2912*** (0.0229)
$\Delta \ln \text{HR}$	3.9671*** (0.0476)	0.0234 (0.8787)	0.1718 (0.6790)		4.6007*** (0.0330)	-0.7322 (0.4648)
$\Delta \ln \text{NOB}$	9.6696*** (0.0021)	0.1612 (0.6885)	0.0020 (0.9643)	2.2646 (0.1338)		-2.2573*** (0.0250)

***: Indicates significant at 1% level, **: Indicates significant at 5% level, *: Indicates significant at 10% level. Value under parenthesis represents P-value and value above P-value represents test statistic.

From Granger Causality test results (Table-4), it has been found that there is a short run bidirectional causality between net profit and number of branches ($\text{LnNETP} \leftrightarrow \text{LnNOB}$), short run unidirectional causality from investment to loan and advances ($\text{LnINV} \rightarrow \text{LnLOAN}$) and from human resource to loan and advances ($\text{LnHR} \rightarrow \text{LnLOAN}$), short run unidirectional causality from net profit to human resource ($\text{LnNETP} \rightarrow \text{LnHR}$) and from number of branches to human resource ($\text{LnNOB} \rightarrow \text{LnHR}$). The significance of ECM test statistics has confirmed the existence of long run causality between the variables.

4.5 Short-Run Equation: The following error correction model is estimated to examine the short-run impact on net profit due to changes in investment, loan and advances, human resource, and number of branches:

$$\Delta \ln \text{NETP}_{it} = \beta_1 \Delta \ln \text{INV}_{it} + \beta_2 \Delta \ln \text{LOAN}_{it} + \beta_3 \Delta \ln \text{HR}_{it} + \beta_4 \Delta \ln \text{NOB}_{it} + \lambda \text{ECM}_{it-1} + \omega_{it} \quad (4)$$

Here, $\beta_1, \beta_2, \beta_3,$ and β_4 determine the short-run impacts of investment, loan and advances, human resource, and number of branches on net profit. The coefficient of ECM_{it-1} measures the speed of adjustment for short-run to reach in the long-run equilibrium. The ECM_{it-1} has been derived from the long run equation estimated by the DOLS (Stock and Watson, 1993). The DOLS (Stock and Watson, 1993) will automatically fix out diagnostic problems in short run equation. The short run equation also has been estimated by the DOLS (Stock and Watson, 1993).

Table-5: Results of Short run Equation

Variables	Coefficients	Standard Error	t-statistic	p-value
$\Delta \ln INV$	-0.0847	0.0801	-1.0574	0.2915
$\Delta \ln LOAN$	0.5642***	0.1179	4.7868	0.0000
$\Delta \ln HR$	0.1431	0.3051	0.4689	0.6396
$\Delta \ln NOB$	0.4702*	0.2843	1.6540	0.0995
$ECM(-1)$	-0.4988***	0.0553	-9.0149	0.0000

***: Indicates significant at 1% level, **: Indicates significant at 5% level, *: Indicates significant at 10% level.

From the estimated short run equation (Table-5), it has been found that loan and advances and number of branches have significant positive impact on net profit. Investment has negative impact on net profit even though it is insignificant. Human resource has insignificant positive impact on net profit. The coefficient of error correction term ($ECM(-1)$) is negative with high magnitude and significant at any significance level. The coefficient of $ECM(-1)$ with expected negative sign denotes if there is any shock to the net profit, it will adjust by almost 50% in the first year. The full convergence process will take around two years. Therefore, the speed of adjustment is very high if there is any shock to net profit of the banking sector.

4.6 Long run Equation: The long-run impacts of investment, loan and advances, human resource, and number of branches on net profit are examined by estimating the following model:

$$\ln NETP_{it} = \mu + \alpha_1 \ln INV_{it} + \alpha_2 \ln LOAN_{it} + \alpha_3 \ln HR_{it} + \alpha_4 \ln NOB_{it} + \sum_{j=p}^p \lambda_{ij} \Delta \ln INV_{it-j} + \sum_{j=q}^q \delta_{ij} \Delta \ln LOAN_{it-j} + \sum_{j=r}^r \gamma_{ij} \Delta \ln HR_{it-j} + \sum_{j=k}^k \varphi_{ij} \Delta \ln NOB_{it-j} + \omega_{it} \quad (5)$$

ω_{it} is the random error; $\alpha_1, \alpha_2, \alpha_3, \alpha_4$ are the parameters representing the long-run elasticities of net profit with respect to investment, loan and advances, human resource, and number of branches. The long run equation has been augmented with lead and lagged

differences of the regressors to control endogenous feedback. Both AIC and SBIC are used to determine the optimal lag-length, and the DOLS (Stock and Watson, 1993) technique is used to estimate the long run equation. The DOLS (Stock and Watson, 1993) will automatically fix out diagnostic problems in the long run equation. The results of the long run equation are provided in Table-6.

Table-6: Results of Long-run Equation

Variables	Coefficients	Standard Error	t-statistic	P-value
lnINV	0.0424	0.0497	0.8532	0.3943
lnLOAN	0.7251***	0.0728	9.9581	0.0000
lnHR	0.0332	0.0823	0.4041	0.6865
lnNOB	0.0620	0.1005	0.6175	0.5375

***: Indicates significant at 1% level, **: Indicates significant at 5% level, *: Indicates significant at 10% level.

From the estimated results of long run equation (6), it has been observed that for 100% in investment in government securities and shares, loan and advances, human resources, and number of branches, performance (net profit) will be increased by 4.24% [*ceteris paribus*], 72.51% [*ceteris paribus*], 3.32% [*ceteris paribus*], and 6.20% [*ceteris paribus*] respectively. The impact of loan and advances on performance is significant at any significance level.

5.0 Conclusion and Policy Implications

The main objective of this study is to evaluate the financial performance of a panel of 29 listed commercial banks of Bangladesh. The long run and short run analyses have been conducted using the data set from 2005-2015 to find out the impact of key factors namely investment in government securities and shares, loan and advances, human resource, and number of branches on performance of banks.

From the estimated result of panel VEC model, it has been found that short run bidirectional causality exists between net profit and number of branches and short run unidirectional causality exists from investment to loan and advances, human resource to loan and advances, net profit to human resource, and number of branches to human resource. The test results suggest the existence of long run relationship among the variables in performance equation. In the long run, more loan and advances and more investment in government securities and shares, and more branches and employees will give more boost to the performance of the banking sector even though the impact of investment in government securities and shares, human resource, and number of branches

on performance is insignificant. Therefore, banking sector should give more emphasis on increase in loan and advances to enjoy more profit. Since in the long run, the impact of human resource and number of branches on performance is relatively smaller than that of short run, banks should control number of branches and human resources to have better performance. It is notable that, if there is any shock to the performance of the banking sector it will adjust almost 50% in the first year and the entire convergence process will take around two years to reach into the equilibrium. Therefore, in the long run banks should give emphasis on the increase in loan and advances as key revenue generating assets. Even though investment in government securities and shares in public limited companies has insignificant positive impact on financial performance of banks, it is still positive in the long run unlike that of short run. Therefore, in the long run banks should give emphasis on the increase in investment in government securities and shares of public limited companies. Therefore, for the blessing of the economy, banks should control the number of branches and human resources in the long run. In given scenario, banks in Bangladesh are giving importance on the increase of the number of branches and employees. Therefore, this is the time banks should be more careful and more prudent in stepping ahead. Relatively smart planning in operation is necessary to have better financial performance in the banking sector. Controlling human resources and number of employees can be one of the strategy banks can adopt.

However, among all the issues, trust is most crucial for banking business than any other sort of business. Commercial banks have always to remember that they are doing business with public money and proper maintenance of this money is needed to complete their stewardship like responsibility. So any catastrophe or mismanagement will hit the public interest along with the other close stakeholders of bank and will damage stature of that particular bank which is very much precious in any competitive environment. Eventually in the long run any similar sort of bank related cataclysm will put a question mark on the trustworthiness of the overall banking sector of Bangladesh.

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