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Nexus Unclassified Loans, Classified Loans, and Profitability: Evidence from Commercial Banks of Bangladesh

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Abstract

This study investigates the impact of some variables such as total revenue, total assets, total liabilities, total deposits, total unclassified loans, total classified loans, standard loans, special mention account loans, sub-standard loans, doubtful loans, and bad and loss loans on profit before tax. Unbalanced Panel Data were collected from the website of 45 Commercial Bank of Bangladesh from the year 2010 to 2018. Ordinary Least Square (OLS), Pooled Ordinary Least Square (POLS), Driscoll-Kraay (DK), Second Stage Least square (2SLS), Generalized Methods of Moments (GMM) methods are used in this study. This research found that total revenue had a significant positive relationship with profit before tax in all the models except DK and GMM models. Total unclassified loans had a significant positive relationship and total liabilities had a significant negative relationship with profit before tax in all the models. Special mention account loans had a significant positive relationship with profit before tax in OLS and DK models and total classified loans had a significant positive relationship with profit before tax in GMM model.

Keywords: PBT; Revenue; Assets; Liabilities; Classified; Unclassified; Standard; Sub-standard; Doubtful; Bad and Loss

JEL Classifications: G21; E44

Introduction

Banks' ability to make profits, according to J. Ugoani (2016), is hampered by their substantial nonperforming loan portfolio. Because of a huge nonperforming loan portfolio developed by bank promoters and management in the 1990s and beyond, many Nigerian banks were weak and unprofitable, eventually contributing to their demise. Insider trading was the main source of Nigeria's huge nonperforming credit portfolio, which includes overextending loans to promoters, directors, and other significant persons that eventually went bad and were irrecoverable.

R. Akter and J. K. Roy (2017) looked at the impact of non-performing loans (NPLs) on profitability while accounting for net interest margin (NIM). They identified the time series scenario of non-performing loans (NPLs), their growth, provisions, and link with bank profitability using specific parameters and an econometric technique. Non-performing loans (NPLs) as a percentage of total loans on Dhaka Stock Exchange (DSE) listed banks are exceptionally high, according to empirical data, with the DSE's 30 listed banks holding more than half of total non-performing loans (NPLs) from 2008 to 2013. Furthermore, it was one of the most important factors impacting bank profitability, with a statistically significant negative influence on listed banks' net profit margin (NPM) during the research period.

B. Duraj and E. Moci (2015) performed a literature review on the profitability of these major financial institutions, the banks, in order to investigate the determinants of profitability and present all of the disagreements. Evidence of internal and external factors and their relationship to banking sector profitability, as well as how institutional and structural elements influence this relationship, is an important aspect of macro-prudential research. Internal variables that influence bank profitability, on the other hand, are looked at.

The bank-specific variables that impact the profitability of Bangladeshi commercial banks were discovered by K. Mahmud et al., (2016). A total of 15 commercial banks' financial reports were analyzed from 2003 to 2013. Bank-specific parameters such as capital adequacy ratio, gearing ratio (risk), liquidity, non-performing loan ratio, operating expense ratio, and bank size were used as independent variables, while return on asset was employed as the dependent variable. The Prais-Winsten correlated panels corrected standard errors (PCSEs) model was used to remove any autocorrelation and heteroskedasticity problems in the panel data. Size, operating expense, gearing ratio, and capital are all significant elements that impact Bangladeshi bank profitability, according to the research. The other two variables were not important drivers for Bangladeshi commercial banks. The other three statistically significant indicators have a negative association with bank profitability, whereas capital has a positive correlation. Appropriate capital, minimum risk, good expenditure management, and rightsizing, according to empirical studies, all lead to increased performance and profitability in the Bangladeshi banking industry.

From 2013 to 2017, A. Psaila, J. Spiteri, and S. Grima utilized a purposive research design utilizing panel data from Thomson Reuters Eikon or annual reports of the 35 listed commercial banks in the Euro-Mediterranean area. They used descriptive statistics and four regression models in STATA/IC 15.1, including the Pooled OLS regression model, Fixed Effects (FE), Random Effects (RE), and Arellano-Bond (AB). They observed that NPLs had a negative impact on ROA, suggesting that problematic loans had a detrimental impact on the profitability of Euro-Mediterranean listed commercial banks. The Solvency Ratio was a term used to define the sole regulatory element (SLVT). The Solvency Ratio (SLVT) was also shown to be the only controllable factor capable of explaining significant differences in NPLs and ROA. These findings have significant consequences for the bank's financial stability in Euro-Mediterranean countries, as well as the risk management activities of publicly traded commercial banks.

From 1997 through 2004, A. Garca-Herrero, S. Gavilá, and D. Santabábara (2009) conducted an experiment to determine what factors contribute to Chinese banks' poor profitability. They found that banks with higher capital are more profitable. Banks with a greater deposit share and banks that are more X-efficient have similar results. Furthermore, a less concentrated banking system increases bank profitability, reflecting the reality that China's largest banks, the four state-owned commercial banks, have been the sector's primary drag. They observed that China's development banks (also known as Policy Banks), which are completely controlled by the Chinese government, have the same negative impact. Instead, more market-oriented institutions, such as joint-stock commercial banks, are more profitable, implying that government participation is a factor in explaining Chinese bank performance. These findings should come as no surprise to a banking

industry that has long been utilized to shift enormous quantities of money in order to achieve public policy goals.

Nwantto, I. O., and Oguezie, F. C. (2017) studied the connection between credit management and deposit money bank profitability (ROA) in Nigeria from 2006 to 2015. Secondary data was obtained from the Statistical Bulletins of the Central Bank of Nigeria, as well as all available DMB Annual Reports. The data was examined with the E-View 9 Econometric tool using the multiple regression technique, and the analysis was done using ordinary least square with the E-View 9 Econometric tool. Non-performing loans have a negative and small influence on profitability, whereas loans and advances, as well as loan loss provision, have a positive and modest benefit.

Literature Review

Banking includes obtaining money from the public in the form of Demand and Term Deposits and then lending it to people and companies at a higher rate, according to Chakraborty, S. A. (2017). Short and long-term loans are used to lend money. Advances are linked to credit or default risk. Non-performing assets are bank or financial institution loans or advances that turn out to be non-productive, non-rewarding, or non-remunerative (NPA). A nonperforming asset (NPA) is a borrower's asset or account that is designated as sub-standard, doubtful, or loss by a bank or financial institution, according to SARFAESI 2002. Indian banks are in horrible health, with enormous amounts of bad loans, and gross nonperforming assets have increased significantly (NPAs). In addition, it has been revealed that Indian banks have among the highest percentages of nonperforming assets (NPAs) in the world. The objective of his study was to see how non-performing assets affected the profitability of five large Indian commercial banks.

Y. Nagaraju and K. Boateng (2018) looked at how bank-specific and macroeconomic variables impact the profitability of Ghanaian savings and loans (S&L) businesses. From 2011 to 2016, data on bank-specific (internal) variables was acquired from S&L firms' financial statements, while macroeconomic (external) drivers were obtained from Ghana's central bank. The study looked at capital adequacy ratios, non-performing loan ratios, loans and advances to deposit ratios, and bank size. As macroeconomic indicators, the annual GDP growth rate and the CPI-inflation rate have been added. Data was analyzed using SPSS software and a multiple regression model to assess the connection between profitability and internal and external variables. Savings and loan profitability in Ghana were negatively impacted by capital adequacy, non-performing loans, bank size, inflation, and the GDP growth rate. The only element that had a positive influence on S&L's profitability was Loans and Advances. The findings are unclear because researchers have arrived to different conclusions about the elements that impact bank profitability. As a result, they proposed that further study be conducted on the profitability drivers of banks, particularly in the Savings and Loans sub-banking sector.

M. Lee and N. Iqbal (2018) investigated the influence of both bank-specific and macroeconomic factors on the performance of Dhaka Stock Exchange (DSE). The current study used panel data from 23 publicly traded conventional commercial banks over an eight-year period, from 2009 to 2016, to see if there was a connection. The GLS approach shows that total loan to total asset (TLTA), equity to total assets (EQTA), loan to deposit (LTDEP), and interest margin (INTMARGIN) have positive effects on both ROA and ROE, but logarithm of total assets (LNASSET) and GDP growth rate (GDPGR) have negative effects. Furthermore, the dummy variable indicating bank size has a positive influence on commercial bank performance, meaning that large commercial banks are more efficient in terms of operations. By providing information on the factors that impact bank profitability, the research would trace the needs of stakeholders, including top executives, regulators, and investors.

Profits research is important, according to Mohiuddin, M. (2017), not only because it provides information on the condition of the economy in a given year, but also because profits are a basic generator of financial and employment growth in the medium term. Because the key function of a financial system is to ease the gears that allow economic activities to run smoothly, this study looks at numerous determinants, including Spread ratio, Profit per employee, and Non-interest income, that have a positive relationship with profitability as measured by ROA for the entire period 2009-10 to 2011-12. Furthermore, as measured by ROA, the capital adequacy ratio and the operational costs ratio have a significant negative connection with profitability. The credit deposit ratio and business per employee, on the other hand, have an unusually unfavorable connection with ROA. This might be due to bad credit, loan defaulters, or over-deposit collection rather than credit creation, but it has a significant influence on the bank's profitability.

S. Afrin (2020) assessed the severity of "non-performing loans" and their negative impact on the performance and profitability of Bangladesh's banking industry. A comparison between state-owned commercial banks and private commercial banks is also part of her research. According to the previous analysis of NPL from Bangladesh's perspective, the number of defaulted loans has reached an alarming level, leading the banking system to degrade and the economy to stagnate. According to the comparative analysis, SOCBs had a higher total NPL, gross NPL ratio, and net NPL ratio than PCBs. SOCBs have a lower proportion of total assets in the industry, a lower share of deposits, and a lesser change in the contribution of industry assets when compared to PCBs. PCBs outperform SOCBs in terms of capital adequacy, capital to risk-weighted assets, ROA, ROE, and sustained provision. Active policy implementation, proper and sufficient supervision of SOCBs, qualified and neutral board members and non-executives, improved lending process, implementation of measures for unlawful activities, and, most crucially, a strong ethical outlook are some of the possible and effective recommendations that should be applied to remove the root of NPL from this rising economy.

W. Tarko (2015) investigated the effect of NPLs on the profitability of Dashen Bank. Bank loans contribute to the growth of the economy by supporting diverse sectors. NPLs, alternatively, wreak havoc on bank earnings as well as the country's economy. As a result, this study scrutinized the impact of NPLs on banks' profitability, taking into account both internal and external variables (Ethiopian inflation and GDP rate). The researcher has picked Dashen bank S.C. at random for this reason. The data for this study was gathered from secondary sources and covered the years 1999/00 through 2013/14.

This data was compiled using Dashen Bank S.C annual reports, memos, lending policy and practice, NBE directives, and CSA. A descriptive statics and linear regression model was also used to examine the impact of NPLs using SPSS version 20 software. The cause and effect correlations between the study variables and ROA were determined using an explanatory quantitative research technique in this study. The conclusions of this study are critical because understanding the impact of NPLs may aid management in developing suitable lending policies to avoid NPLs. In addition, the research suggested that the bank focus on loan management in order to minimize the number of nonperforming loans. Furthermore, loan officers should give financial coaching to clients on how to make the most use of their loans.

Abugamea, G. (2018) scrutinized the effect of bank-specific and major macroeconomic factors on the profitability of Palestine's banking industry using comprehensive bank balance sheet data from 1995 to 2015. This research uses the OLS technique to explore the impact of a bank's asset size, capital, loans, deposits, economic growth, and inflation on key bank profitability indicators including return on assets (ROA), return on equity (ROE), and net interest margin (NIM). The majority of research show that size has a positive impact on ROE. Capital and return on investment (ROI) have a positive connection. Loans have a positive relationship with both ROA and ROE. Deposits are negatively linked with both ROA and ROE. Furthermore, despite the fact that F-statistics values show that overall internal and external variables have a large impact, both internal and external factors do not have a significant effect on NIM. The banking industry has benefited little from the current inflationary environment or economic advances. These findings will help both academics and policymakers.

Non-performing assets (NPAs) are a "termite" in the banking industry, according to Singh, H. (2018). When assessing a bank's financial performance, non-performing assets (NPAs) are an essential factor to examine. It has a major influence on a bank's liquidity and profitability; moreover, it puts asset quality and bank survival at risk. Non-performing assets (NPAs) show a bank's capacity to pay its bills. Non-performing assets are money that the bank does not receive in exchange for issued loans.

As a result, a study of all Indian banks, split down by ownership, was performed to examine the effect of NPAs on bank profitability. Banks are now judged on the quality of their assets as well as the number of branches and deposits they receive. Nonperforming assets (NPAs) have a detrimental effect on a bank's profitability, liquidity, and solvency. This research looks at the state of nonperforming assets (NPAs) in banks such the State Bank of India (SBI), Nationalized Banks, Private Banks, and Foreign Banks. Four banks were chosen based on ownership for the study of the connection between Gross NPA and Net Profit. This study makes use of correlation. The discovery indicates a negative relationship between gross non-performing assets and net profitability for all other institutions. The information for this study came from the Report on the Progress of Banking in India, as well as websites, journals, and publications. The scope of the research is limited to a look of nonperforming assets held by public sector banks from 2014 to 2017.

Eljelly, A. M. (2013) looked at the elements that impact the profitability of Islamic banks in Sudan, one of the very few countries with a completely Islamic economic and financial system. Using a sample of Sudanese banks, the study revealed that only internal variables of these banks had a significant effect on bank profitability, as measured by return on assets (ROA), return on equity (ROE), and net financing margin (MARG). Cost, liquidity, and bank size, in particular, have been shown to have a positive and noteworthy effect on profitability. External macroeconomic factors, on the other hand, are thought to be superfluous and have little impact on profitability. Macroeconomic variables have little or only a minor influence on commercial bank performance, according to several country-specific researches, thus these conclusions are not new. Furthermore, the random effects model, rather than fixed effects or pooling estimating approaches, best fits the data, according to the study. Finally, in terms of liquidity, cost, and bank structure, the study has a number of implications for Sudanese banks, regulators, and depositors.

A well-planned, properly organized, and sustainable banking industry, according to Alam, J., and Riyadh, A. N. (2003), is the cornerstone of a country's financial infrastructure. This also serves as a catalyst for the country's economic development and progress. Examine the financial health and productivity of each bank, each kind of bank, and the banking sector as a whole to evaluate whether or not an active banking sector is efficient. The purpose of this article is to look at the present state of banking in Bangladesh, as well as the status of each banking category in terms of productivity and profitability in each area, as well as a comparison of the various sectors.

According to S. M. Akber (2019), Bangladesh's banking industry is currently regarded as the nerve center of economic activity. Bank performance is seen as an early indicator of a country's economic prospects. Banks are viewed as a significant role in reducing poverty and unemployment because of their capacity to invest more. However, in recent years, this potential business has struggled with an increase in nonperforming loans. The major objective of the research is to look into and quantify the effect of nonperforming loans (NPLs) on the profitability of Bangladesh's shari'a-based banks during the last five years (2014-2018). It worked with a consortium of five Islamic banks on this. In Excel, regression and ratio analysis were used to evaluate the bank's comparative financial performance and to find the variable that impacts the profitability of shari'ah-based banks in Bangladesh. According to the conclusions of this study, if bank authorities pay more attention to these issues, the banking industry will function better than before, and it will be able to contribute even more to the country's economic growth.

M. T. M. F. A. Haque and M. A. Alam (2016) studied the effect of bank- and economy-specific factors on the profitability of a sample of Bangladeshi State-owned Commercial Banks (SCB). Their research examines three major SCBs, six bank-specific factors, and two economy-specific variables using secondary data from 2007 to 2014. A number of financial measures and statistical approaches (descriptive statistics, Pearson's correlation, and regression analysis) were applied to evaluate the hypotheses. According to the findings, SCB profitability (Return on Assets) has positive relationships with capital adequacy ratio (CAR), cost of funds ratio (COF), cost to income ratio (CIR), GDP growth ratio (GDPR), and GDP growth ratio (GDPR), and negative relationships with classified loans to total loans ratio (CLTL), bank size (SIZ), and inflation (INFL). During the research period, CAR and GDPR were two of the most important factors of their profitability.

The Indian banking industry's deteriorating profitability, according to Tandon, D., Chaturvedi, A., and Vidyarthi, H. (2017), is due to a rise in stressed assets, willful defaulters, and loss-making assets, which result in enormous balance sheet bleeding. Aftereffects of the authorities' strictest surveillance, follow-up with banks, recovery procedures including Bankruptcy Laws 2016, corporate debt restructuring (CDR), high provisioning, and heavy pecuniary penalties to defaulters may now be seen. The authors estimated the effect of NPLs on bank profitability based on bank-specific macroeconomic factors. Fixed effect regression, modified OLS, and system GMM methods were used to undertake multivariate panel data analysis for 35 Indian public and private sector banks from 2007 to 2016. The conclusion was reached after analyzing comprehensive estimation data in public and private banks. In public sector banks, the management of nonperforming assets (NPAs) requires special attention since it has a major influence on efficiency and profitability.

The key word for banking businesses, according to Kiran, K. P., and Jones, T. M. (2016), is non-performing asset. Non-performing assets (NPAs) are a metric for how efficient a bank is. Non-performing assets are the funds that the bank does not receive in exchange for loans made. Non-performing assets affect not only the banking industry, but the whole financial system and, as a result, the economy of the country. As a consequence, a small sample of public sector banks in India was studied to see how non-performing assets

affect bank profitability. The link between gross non-performing assets and net profit was calculated for SBI and five nationalized banks for the research. According to the data, all other banks, with the exception of SBI, have a negative relationship between their gross NPAs and net profitability. Gross NPAs have no effect on SBI's net profit, since the firm is only profitable in the long run.

Matin, K. A. (2017) looked at the effect of several bank specific and macroeconomic variables on bank profitability in 47 Bangladeshi commercial banks from 2010 to 2015. Return on assets (ROA), return on equity (ROE), and net interest margin over total assets are the three profitability indicators used in the study (NIM). Individual bank annual reports, BFID annual reports, and various Bangladesh Bank and Bangladesh Bureau of Statistics publications provide the data. The Feasible Generalized Least Squares (FGLS) model for panel data was used to assess the impact of the explanatory variables.

NPLs, loan loss provisions, size of the bank, cost efficiency, and liquidity all had a large negative influence on ROA, but nontraditional acts including non-interest income, and off-balance sheet businesses had a big positive impact. The ROE model is significantly harmed by loan loss provision and cost efficiency. Equity capital, loan loss provision, non-interest income, cost efficiency, and liquidity all had a large positive impact on NIM, but size of the bank and off-balance sheet operations had a major negative impact. The macroeconomic parameters used in the models, such as the rate of real GDP growth and inflation, have no effect on profit. Bangladesh's financial soundness indices are comparable to those of Pakistan, India, Sri Lanka, Indonesia, Vietnam, Thailand, and China.

According to Patwary, M. S. H., and Tasneem, N., (2019) Bangladesh is primarily reliant on the banking industry for flawless financial intermediation as a developing country (2019). Nonperforming loans have long plagued Bangladesh's banking system. The aim of this research is to estimate the effect of NPL ratio, capital adequacy ratio, and provision maintenance ratio on the return on asset (ROA) of all banks using data from the previous twenty-one years. Their investigation also looks at the origins and impacts of NPLs. Secondary data is obtained from Bangladesh Bank's annual reports and analyzed using the Ordinary Least Square (OLS) approach and the Vector Auto Regression (VAR) model in STATA 14.2. The findings of their research show that variables have distinct directional short-run causality, and the OLS regression analysis reveals that two independent variables, the non-performing loan ratio and the provision maintenance ratio, are statistically significant for the dependent variable, return on asset (ROA).

During a five-year period, Imtiaz, M. F., Mahmud, K., and Faisal, M. S. (2019) obtained data for 12 different NBFIs (2013-2017). Explanatory or independent factors were firm size, capital adequacy ratio, loan ratio, NPL ratio, deposit ratio, net interest margin, non-interest income margin, and cost to income ratio, with return on equity as the dependent variable. The data was subjected to multiple regression analysis in order to assess the study hypotheses. According to the study's findings, the capital adequacy ratio, deposit ratio, non-performing loan ratio, and net interest margin were all statistically significant at the 5% level. Firm size, loan ratio, net interest margin, and non-interest income margin are all positive profitability indicators, but capital adequacy ratio, deposit ratio, non-performing loan ratio, and cost to income ratio are all negative indications. It has been observed that the NPL ratio and net interest margin have a substantial effect on NBF1 profitability. This is carried by the fact that NPLs generate no revenue, but net interest income is a financial institution's main source of income. NBFIs in Bangladesh should pay special attention to these areas, according to their study, in order to improve their financial performance.

The main problem that banks are presently experiencing, according to Sharma, S., Kothari, R., Rathore, D. S., and Prasad, J. (2020), is non-performing assets (NPAs), which are not just a burden for banks but also a worry for the whole financial system. Nonperforming assets (NPAs) that are increasing have an effect on operational efficiency, which has an influence on bank profitability, liquidity, and solvency.

The rise in nonperforming assets (NPAs) places a pressure on fund recycling and limits banks' ability to lend more, resulting in decreased interest revenue. In order for banks to enhance their efficiency and profitability, nonperforming assets (NPAs) must be minimized and controlled. NPAs are rising not just in public sector banks but also in private sector banks. In this research, an effort was made to determine the relationship between NPAs and bank profitability, taking into account significant public and private sector banks that are grappling with increasing NPAs.

S. F. Ahmed and N. Nargis (2019) investigated how non-performing loans (NPLs) influence Bangladesh's private commercial banks' financial outcomes in 2019. PCBs Data from 30 such banks listed on the Dhaka

Stock Exchange (DSE) between 2013 and 2017 was used in the study. The analysis indicates a rising trend in the number of PCB NPLs across the study's time periods, which is problematic for Bangladesh's banking system as a whole. The capital adequacy ratio has been demonstrated to improve return on asset (ROA) (CAR). Alternatively, the NPL ratio had a negative influence on the ROA of the PCBs under consideration (NPLR). The study also recommends that early NPL recovery, as well as appropriate legislative measures to address the NPL situation, be carefully explored.

While issuing credit facilities, precise tools and processes should be established under the supervision of Bangladesh Bank to identify between deliberate defaulters and true defaulters. As a result, the implementation of the "Credit Risk Grading (CRG) System" by an authorized body would improve the identification and monitoring of borrower risk in Bangladesh's credit environment.

In Indonesia, A. Putranto, A. Herwany, and E. Sumirat (2014) looked at the variables that impact bank profitability. A panel of 25 publicly traded Indonesian commercial banks was used as the sample from 2007 to 2012. In this study, the proxies for profitability were Return on Assets (ROA) and Return on Equity (ROE), and factors from three categories (internal, external, and market share variable) were investigated to see how they influenced them. They uncovered a number of interesting findings from their research, including the negative impact of CAR on profitability, suggesting that Indonesian banks' capitalization is beyond its optimum level. Then, contrary to common opinion, we observed that both the Loan to Deposit Ratio and Market Share of Credit had a negative impact, which appears to have been driven by the Global Financial Crisis of 2008-2010. Finally, we observed that inflation benefits profitability, which appears to be related to a demand-pull kind of inflation.

Yonjan Tamang, A. (2019) studied four Nepalese commercial banks during the last five fiscal years, from 2014 to 2018. The aim of the research was to find a relationship between nonperforming loans and commercial bank profitability in Nepal, therefore it took a descriptive method. The study is mostly dependent on secondary data obtained for the purpose of analysis. The research was analyzed using information, data, and statistics from the banks. To evaluate the data, the study used convenience sampling under the non-probability sampling technique. Among the example banks are Nabil Bank, Everest Bank Limited (EBL), Nepal Investment Bank Limited (NIBL), and Nepal State Bank of India (NSBI). A trend analysis of a single NPM bank revealed a variety of trends. In comparison, NABIL had an outstanding NPM performance in 2017, with a high of 39.22 percent, but NSBI had a poor performance in 2016, with a high of 25.56 percent. A trend analysis of a certain ROA bank revealed a variety of trends. NABIL, on the other hand, has a better track record, with a peak of 2.89 percent in 2014, NIBL at 2.25 percent in 2014, EBL at 2.25 percent in 2014, and NSBI at 1.97 percent in 2018. The NSBI has a low overall performance when compared to other banks. A trend analysis of a certain bank's ROE indicates that it is declining. A rise in NPL can have a significant impact on profits. That is to say, when NPLs rise, actual profitability falls, but overall lending plays a critical role in influencing the outcome. The trajectory of non-performing loans in a few institutions is trending downward, which is significant.

A nation's banking system, according to Gaba, M. A., and Kumar, R. (2018), permits financial fine-tuning of the latter's economic activities; it is a critical mechanism for an economy's development and advancement. Despite the fact that the Indian banking industry has grown and developed as a result of the Indian economy's liberalization, privatization, and globalization (LPG), the system still contains flaws that make it difficult to operate smoothly. The handling of nonperforming assets (NPAs) appears to be one of the more challenging issues or faults in India's contemporary banking system (non-performing assets). A high level of NPAs implies a large number of credit defaults, which has a negative influence on a bank's profitability and net worth as well as impacting liquidity. NPAs are a double-edged sword for banks since they obstruct not only revenue creation but also capital accruals, resulting in constrained lending ability. Nonperforming assets (NPAs) also have a detrimental impact on the overall economy, not only on bank balance sheets and performance. The goal of their research is to see how nonperforming assets (NPAs) affect the profitability of India's private banks. To arrive to this result, the evolution of NPAs in private sector banks was studied during a 15-year period, from 2001 to 2016.

The banking industry, according to Kumar (2016), is one of a country's leading indicators and one of the most important components of its capital. A loan is also one of the most significant components of a bank's overall assets because it is one of the banks' sources of income. The banks' performance is dependent on the rapid recovery of loan. When a loan's interest or principle is more than 90 days past due, it is classed as a nonperforming asset (NPA) and treated as a bad loan. These bad loans do not generate revenue for the

bank, which has a negative influence on its profitability. As a result, the non-performing loans ratio is a key indicator of a bank's success. A bank's primary function is to accept deposits, which are the bank's responsibility, and to provide loans, which are the bank's revenue source. The most important component of the banking system's basic viability is the quality of loan assets. A reduced level of non-performing assets helps the bank to strengthen its position and gives management efficiency credibility. The bank will not only evaluate the borrower's creditworthiness at the time of loan processing, but will also keep a careful eye on the borrower on a regular basis to help the bank reduce the number of nonperforming assets (NPA).

According to Sen, S., and Sen, R. L., NPA (2014) is a "termite" for the banking industry. It has a major influence on a bank's liquidity and profitability; moreover, it puts asset quality and bank survival at risk.

The whole structure of India's financial sector has changed during the reform period. The economy is no longer constrained by the country's boundaries. India's economic reforms were primarily aimed at attracting foreign investment and establishing a stable banking system. Their research examines profitability indicators using an empirical methodology, with a focus on commercial banks' non-performing assets (NPAs) in India. In this study, they describe NPA, as well as the factors that lead to it, its magnitude, and its impacts. The chapter finds, using an analytical perspective, that NPAs have a significant impact on bank financial performance in the current climate. NPAs, on the other hand, have reduced due to improvements in credit culture, risk management, and business conditions.

T. Aburime (2008) explored whether the composition and distribution of bank ownership had a significant influence on bank returns. Based on 478 data from 98 commercial and merchant banks for the 1989-2004 period, regression and t-test results demonstrate that the composition and distribution of ownership had no significant impact on bank profitability in Nigeria. As a result, the current endeavor by the Central Bank of Nigeria (CBN) to change the makeup of bank ownership in Nigeria is unsuccessful.

Internal factors that affect bank profitability were examined by A. Almazari (2014). The main goal was to evaluate the profitability of Saudi and Jordanian banks based on inner criteria. The required information was gathered from secondary sources. A total of 161 observations were gathered from a sample of twenty-three Saudi and Jordanian banks between 2005 and 2011. To assess the hypotheses and compare and contrast the sample banks based on their different properties, statistical methods such as Pearson's correlation, descriptive analysis of variance, and regression analysis were employed. The factors that impact profitability were studied empirically. The data indicated that Saudi banks' ROA has a significant positive relationship with the TEA, TIA, and LQR variables, as well as a negative relationship with the NCA, CDR, CIR, and SZE variables. Meanwhile, Jordanian banks' ROA has a high positive correlation with the variables LQR, NCA, TEA, and CDR, as well as a negative correlation with the variables CIR, TIA, and SZE. More empirical study in this area is recommended to investigate whether additional inner factors may have an impact on bank profitability.

Kosmidou, K., Tanna, S., and Pasiouras, F. (2005) examined the effect of bank-specific characteristics, macroeconomic conditions, and financial market structure on the profitability of UK-owned commercial banks from 1995 to 2002. The data explain that capital strength has a positive and dominant effect on these banks' profitability, with expenditure management efficiency and bank size also playing a role. Additional macroeconomic and financial market indicators of bank performance showed slight influence on these bank-specific factors, despite the fact that they append little to the explanatory power yet appear to have a positive effect on profitability.

Methodology

Composite step by step model based study had been conducted

- i) *Ordinary Least Squares (OLS)*: to define the relationship between PBT and some other variables using STATA 15, the OLS model had been used.
- ii) *Pooled Ordinary Least Squares (POLS)*: POLS method had been used to see the relationship between PBT and some other variables using STATA 15.
- iii) *Drisc/Kraay (DK)*: OLS method had been used to track the relationship between PBT and some other variables using STATA 15.
- iv) Two stage least square model (2SLS): To define the relationship between PBT and some other variables using STATA 15, the 2SLS model had been used.

- v) *Generalized Method of Moments (GMM)*: Multivariate regression methods had been used to track significant explanatory variables which can elucidate the reasons for relationship between PBT and some other variables using STATA 15.

Table 1: Variables and Description

Serial No.	Variable	Description	Unit
1	LnTR	Log normal of total revenue	BDT
2	LnTA	Log normal of total assets	BDT
3	LnTL	Log normal of total liabilities	BDT
4	LnTD	Log normal of total deposit	BDT
5	LnTUL	Log normal of total unclassified loans	BDT
6	LnTCL	Log normal of total classified loans	BDT
7	LnSL	Log normal of standard loans	BDT
8	LnSMA	Log normal of special mention account loans	BDT
9	LnSSL	Log normal of sub-standard loans	BDT
10	LnDL	Log normal of doubtful loans	BDT
11	LnBL	Log normal of bad and loss loans	BDT

Based on the above literature following hypotheses have been developed.

Table 2: Hypotheses

No.	Hypotheses
H ₁	There is significant positive relationship between profit before tax and total revenue.
H ₂	There is significant positive relationship between profit before tax and total assets.
H ₃	There is significant positive relationship between profit before tax and total liabilities.
H ₄	There is significant positive relationship between profit before tax and total deposit.
H ₅	There is significant positive relationship between profit before tax and total unclassified loans.
H ₆	There is significant positive relationship between profit before tax and total classified loans.
H ₇	There is significant positive relationship between profit before tax and standard loans.
H ₈	There is significant positive relationship between profit before tax and special mention account loans.
H ₉	There is significant positive relationship between profit before tax and sub-standard loans.
H ₁₀	There is significant positive relationship between profit before tax and doubtful loans.
H ₁₁	There is significant positive relationship between profit before tax and bad and loss loans.

Results and Discussion

After compilation of the data, it has been used in step by step approach. Firstly, data has been log normalized for ensuring normality in the data. All the independent variables have been log normalized to ensure the consistency in analysis with PBT. After that multivariate partial regression model has been applied for PBT based on different variables of a bank. The pattern of relationship of the explanatory variables has been scrutinized for every model. With some incongruities, most of the variables have been found to be consistent in their pattern of relationship with PBT. The nature and degree of relationship among the variables have been tested with robust regression models. These are Pooled Ordinary Least Squares (POLS), Driscoll Kraay, Two stage least square (2SLS) and Generalized Method of Moments (GMM). A cross assessment and matching have been used for every regression model to find out the uniformity in findings in these models. In the result section, firstly, descriptive statistics of the variables would be presented, and then pair-wise correlation matrix for the finding out variables of loan classification would be reported.

Descriptive Statistics

Summary of the descriptive statistics of all the variables used in the models of this research is given below. The table includes the number of observations, mean score, standard deviations, minimum and maximum score for each and every variable.

Table 3: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
PBT	347	3401.292	3511.268	4.49	34841.85
TR	347	8529.086	7140.954	23.25	39596.83
TA	347	208187.75	207128.63	1772.19	1306842.3
TL	347	129737.05	115251.89	34.71	805759.98
TD	347	173483.5	231518.21	120.11	2971172.8
TUL	347	116955.09	102850.6	34.71	772590.68
TCL	347	12654.049	22928.725	0	179185.74
SL	347	110480.66	96736.338	18.73	721606.08
SMA	347	3587.395	5963.729	0	50984.6
SSL	347	1284.373	2812.899	0	33782.68
DL	347	1146.686	4350.119	0	75577.78
BL	347	10141.343	19298	0	140424.19

Table 3 shows the summary of the data collected for 347banks, 10 years on 12 variables. With main dependent variable PBT is showing an average of 3401.292 thousand BDT for the countries studied along with a very high standard deviation of 3511.265 thousands BDT which indicates there is substantial inequality in PBT among the banks of Bangladesh. Table also shows total revenue average is 8529.086 thousands BDT while total assets, total liabilities and total deposits' average are 208187.75, 129737.05 and 173483.5 thousands BDT. The standard deviations of total revenue, total assets, total liabilities and total deposits' are 7140.954, 207128.63, 115251.89 and 231518.21 thousands BDT. On the other hand, average total unclassified loans and total classified loans are 116955.09 and 12654.049 thousand BDT whereas the mean value of standard loans, special mention account loans, sub-standard loans, doubtful loans and bad and loss loans are 110480.66, 3587.395, 1284.373, 1146.686 and 10141.343 thousand BDT respectively.

Pair-wise correlation matrix

With the objective to identify the effect of classified loans on PBT, first, we are going to examine the correlations among the variables we got from literature. A combined correlation matrix is given below to report the variables.

Table 4: Pair-wise correlations matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) PBT	1.000											
(2) TR	0.610	1.000										
(3) TA	0.508	0.882	1.000									
(4) TL	0.569	0.891	0.913	1.000								
(5) TD	0.394	0.704	0.785	0.746	1.000							
(6) TUL	0.557	0.887	0.853	0.984	0.707	1.000						
(7) TCL	0.365	0.498	0.767	0.611	0.578	0.462	1.000					
(8) SL	0.560	0.873	0.838	0.971	0.663	0.989	0.444	1.000				
(9) SMA	0.330	0.647	0.695	0.769	0.581	0.765	0.433	0.735	1.000			
(10) SSL	0.332	0.429	0.611	0.535	0.450	0.430	0.762	0.407	0.316	1.000		
(11) DL	0.124	0.130	0.242	0.209	0.176	0.156	0.350	0.153	0.142	0.388	1.000	
(12) BL	0.341	0.466	0.736	0.587	0.559	0.440	0.975	0.422	0.448	0.720	0.312	1.000

Table 4 shows slight correlation among the variables representing very low chance of endogeneity. Limited by the layout, only the correlation coefficient matrices and collinearity test results are presented here. Nevertheless, the findings meet the requisites of the correlation coefficient test and VIFs test. Also, the findings show significance at least at 0.10 for all the variables. No variable is showing correlation n over 0.90.

Econometric Models

Multiple regression models have been applied with the same dependent (LnPBT) and independent variables (LnTR, LnTA, LnTL, LnTD, LnTUL, LnTCL, LnSL, LnSMA, LnSSL, LnDL, LnBL). In the subsequent section the results of those models are shown and explained below.

Table 5: Ordinary Least Squares (OLS) model

	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
LnPBT							
LnTR	1.672	.282	5.94	0	1.118	2.226	***
LnTA	.316	.743	0.43	.671	-1.146	1.779	
LnTL	-7.844	1.157	-6.78	0	-10.12	-5.568	***
LnTD	-.54	.532	-1.02	.31	-1.586	.505	
LnTUL	7.852	1.166	6.73	0	5.558	10.145	***
LnTCL	.258	.264	0.98	.329	-.262	.778	
LnSL	-.47	.419	-1.12	.263	-1.295	.355	
LnSMA	.258	.13	1.99	.047	.003	.513	**
LnSSL	-.252	.185	-1.36	.173	-.616	.112	
LnDL	-.174	.163	-1.07	.287	-.495	.147	
LnBL	-.149	.223	-0.67	.503	-.588	.289	
Constant	.523	2.853	0.18	.855	-5.09	6.136	
Mean dependent var		6.411	SD dependent var			4.301	
R-squared		0.527	Number of obs			347.000	
F-test		33.918	Prob> F			0.000	
Akaike crit. (AIC)		1760.405	Bayesian crit. (BIC)			1806.596	

*** $p < .01$, ** $p < .05$, * $p < .1$

Table 5 shows total revenue, total unclassified loans and special mention account have significant positive relationship with PBT. The more the total revenue of a bank, the more will be profit before tax of that bank. Total unclassified loans also are the reasons for increase profitability of a bank. Sometime, special mention account loans have positive impact on bank's profitability. In contrast, a total liability has significant negative relationship with the PBT which explains that a bank is having more total liabilities cannot earn PBT more for that bank. Other variables stated in the table have mixed relationship with PBT but insignificant nature of relationship with PBT though the overall model is significant at 10% level. For more robustness of the results, the next model is run.

Regression results

Table 6: Pooled Ordinary Least Squares (POLS) model

	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
LnPBT							
LnTR	1.162	.278	4.19	0	.618	1.706	***
LnTA	.51	.743	0.69	.493	-.947	1.966	
LnTL	-8.512	1.251	-6.80	0	-10.964	-6.059	***
LnTD	-.377	.526	-0.72	.474	-1.407	.654	
LnTUL	8.409	1.251	6.72	0	5.958	10.861	***
LnTCL	.284	.26	1.09	.274	-.225	.793	
LnSL	-.347	.407	-0.85	.394	-1.145	.451	
LnSMA	.153	.13	1.18	.24	-.102	.409	
LnSSL	-.162	.179	-0.90	.367	-.513	.189	
LnDL	-.071	.155	-0.46	.645	-.375	.232	
LnBL	-.185	.218	-0.85	.395	-.611	.241	
Constant	.355	3.03	0.12	.907	-5.584	6.295	
Mean dependent var		6.411	SD dependent var			4.301	
Overall r-squared		0.520	Number of obs			347.000	
Chi-square		227.714	Prob> chi2			0.000	
R-squared within		0.108	R-squared between			0.701	

*** $p < .01$, ** $p < .05$, * $p < .1$

Table 6 shows total revenue and total unclassified loans have significant positive relationship with PBT. The more the total revenue of a bank, the more will be profit before tax of that bank. Total unclassified loans also

are the reasons for increase profitability of a bank. On the contrary total liabilities has significant negative relationship with the PBT which means that a bank having more total liabilities cannot earn PBT more for that bank. Other variables stated in the table have mixed relationship with PBT but insignificant nature of relationship with PBT though the overall model is significant at 10% level. For more robustness of the results, the next model is run.

Table 7: Driscoll-Kraay pooled OLS model

LnPBT	Drisc/Kraay					
	Coef.	Std.Err.	t	P>t	[95%Conf.	Interval]
LnTR	1.672	1.010	1.660	0.129	-0.579	3.923
LnTA	0.316	1.168	0.270	0.792	-2.285	2.918
LnTL	-7.844	1.068	-7.340	0.000	-10.225	-5.464
LnTD	-0.540	0.187	-2.890	0.016	-0.958	-0.123
LnTUL	7.852	1.340	5.860	0.000	4.866	10.837
LnTCL	0.258	0.222	1.170	0.271	-0.236	0.752
LnSL	-0.470	0.266	-1.770	0.107	-1.062	0.122
LnSMA	0.258	0.152	1.700	0.120	-0.080	0.596
LnSSL	-0.252	0.147	-1.710	0.118	-0.581	0.076
LnDL	-0.174	0.144	-1.210	0.255	-0.495	0.147
LnBL	-0.149	0.148	-1.010	0.338	-0.480	0.181
_cons	0.523	3.367	0.160	0.880	-6.978	8.025

Regression with Driscoll-Kraay standard errors	Number of obs	=	347
Method: Pooled OLS	Number of groups	=	45
Group variable (i): ID	F(11, 10)	=	187849.98
maximum lag: 2	Prob> F	=	0.0000
R-squared		=	0.5269
Root MSE	=	3.0062	

Table 7 shows total unclassified loans have significant positive relationship with PBT. The more the total unclassified loans of a bank, the more will be profit before tax of that bank. On the contrary total liabilities and total deposit have significant negative relationship with the PBT which indicates that a bank having more total liabilities and total deposits, cannot earn PBT more for that bank. Other variables stated in the table have mixed relationship with PBT but immaterial nature of relationship with PBT though the overall model is significant at 10% level. For more sturdiness of the results, the two stage least square model is applied.

Instrumental variables (2SLS) regression

Table 8: Two stage least square model

LnPBT	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
LnTR	1.672	.282	5.94	0	1.118	2.226	***
LnTA	.316	.743	0.43	.671	-1.146	1.779	
LnTL	-7.844	1.157	-6.78	0	-10.12	-5.568	***
LnTD	-.54	.532	-1.02	.31	-1.586	.505	
LnTUL	7.852	1.166	6.73	0	5.558	10.145	***
LnTCL	.258	.264	0.98	.329	-.262	.778	
LnSL	-.47	.419	-1.12	.263	-1.295	.355	
LnSMA	.258	.13	1.99	.047	.003	.513	**
LnSSL	-.252	.185	-1.36	.173	-.616	.112	
LnDL	-.174	.163	-1.07	.287	-.495	.147	
LnBL	-.149	.223	-0.67	.503	-.588	.289	
Constant	.523	2.853	0.18	.855	-5.09	6.136	
Mean dependent var		6.411	SD dependent var			4.301	
R-squared		0.527	Number of obs			347.000	
F-test		33.918	Prob> F			0.000	

*** $p < .01$, ** $p < .05$, * $p < .1$

Table 8 shows total revenue, total unclassified loans and special mention account have significant positive association with PBT. The more the total revenue of a bank, the more will be profit before tax of that bank. Total unclassified loans also are the reasons for increase profitability of a bank. Sometime, special mention

account loans have positive impact on bank's profitability. In contrast, total liabilities has significant negative relationship with the PBT which indicates that a bank having more total liabilities, cannot earn PBT more for that bank. Other variables stated in the table have mixed relationship with PBT but immaterial nature of relationship with PBT though the overall model is significant at 10% level. For more sturdiness of the results, the GMM model is run.

Regression results of system GMM model

Table 9: Generalized method of moments (GMM) model

LnPBT	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
L.LnPBT	-.251	.076	-3.30	.001	-.399	-.102	***
LnTR	.4	.3	1.33	.182	-.188	.987	
LnTA	-1.789	1.133	-1.58	.114	-4.01	.431	
LnTL	-6.18	2.493	-2.48	.013	-11.066	-1.295	**
LnTD	.42	.653	0.64	.52	-.86	1.7	
LnTUL	6.367	2.227	2.86	.004	2.001	10.733	***
LnTCL	.642	.299	2.14	.032	.055	1.228	**
LnSL	-.076	.352	-0.22	.829	-.767	.614	
LnSMA	-.141	.169	-0.84	.402	-.472	.189	
LnSSL	.051	.185	0.28	.783	-.312	.413	
LnDL	.131	.169	0.78	.438	-.2	.461	
LnBL	-.211	.224	-0.94	.347	-.649	.228	
Constant	16.91	6.279	2.69	.007	4.603	29.217	***
Mean dependent var		6.497	SD dependent var			4.288	
Number of obs		257.000	Chi-square			29.260	

*** $p < .01$, ** $p < .05$, * $p < .1$

Table 9 displays total unclassified loans and classified loans have significant positive relationship with PBT. Total unclassified loans as well as classified loans are the reasons for increase profitability of a bank. In contrast, total liabilities has significant negative relationship with the PBT which explains that a bank having more total liabilities, cannot earn PBT more for that bank. Other variables stated in the table have mixed relationship with PBT but immaterial nature of relationship with PBT though the overall model is significant at 10% level.

Conclusions

It is found that total revenue had significant positive relationship with profit before tax in all the models except DK and GMM models. Total unclassified loans had significant positive relationship and total liabilities had significant negative relationship with profit before tax in all the models. Special mention account loans had significant positive relationship with profit before tax in OLS and DK models and total classified loans had significant positive relationship with profit before tax in GMM model.

In brief, it can be concluded that the increase of classified loan in the banking sector of Bangladesh is considerably rising. The inclinations of classified loans are traced to be unbalanced during the research phase. It is also disclosed in the research that the classified loans have an untoward impact on the profitability for all the commercial banks in Bangladesh, and it creates additional severe problem in state owned banks somewhat than the private commercial banks. The profitability of the bank will get increasing trends if there is sliding movement of the classified loans in the banks.

Lending is the most profitable investment of banking sector in Bangladesh. But the alarming rate of increasing classified loan creates threats as classified loan has a negative relation with profit after tax. Bank's profitability depends on the great extent on the recovery of its advance. Most of the earning source of banking industry depends on the interest earning from loan disbursement. As a result, when the amount of classified loans is increased financial strength of bank get effected. It's high time to work with the classified loan because it is required to keep safety of clients' deposits.

If the clients lose their confidence of banking industry, they does not make any deposits in banks, which reduce the capacity of lending money, so reduced the interest earnings and affect profitability. But our present government takes immediate action take some crucial approaches for the reduction of classified loan. By the direction of government Financial Institutions Divisions (FID) under the ministry of finance has introduced a three-member team to recommend how to reduce the volume of classified loan in the country's banking system.

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Appendix: List of Banks used in the study

AB bank LTd	ICB Islami Bank
City Bank Ltd	Union Bank
Dhaka Bank Ltd	Bank Alfalah Ltd
Bangladesh Commerce Bank Ltd	Citi Bank NA
Bank Asia Ltd	HSBC
Standard Bank Ltd	Standard Chartered Bank
NRB Bank Ltd	State Bank of India
Uttara Bank	Agrani Bank
Brac Bank	BDBL
Southeast Bank Ltd	Basic Bank Ltd
Prime Bank Ltd	Janata Bank
Eastern Bank Ltd	Rupali Bank
One Bank	Sonali Bank Ltd
Mercantile Bank	BKB
Madhumoti Bank	Probashi Kallyan Bank
Pubali Bank Ltd	
Dutch Bangla Bank	
IFIC Bank	
Trust Bank	
National Bank	
Midland Bank	
United Commercial Bank	
NRB Global Bank Ltd	
NRBC Bank	
NCC Bank	
Islami Bank Bangladesh Ltd	
Shahjalal Islami Bank	
Exim Bank	
First Security Islami Bank	
Al-Arafah Islami Bank Ltd	