

Accepted Manuscript

Financial performance of commercial banks in the post-reform era:
Further evidence from Bangladesh

Iftekhar Robin, Ruhul Salim, Harry Bloch

PII: S0313-5926(17)30205-9
DOI: <https://doi.org/10.1016/j.eap.2018.01.001>
Reference: EAP 209

To appear in: *Economic Analysis and Policy*

Received date: 20 September 2017
Revised date: 3 January 2018
Accepted date: 4 January 2018

Please cite this article as: Robin I., Salim R., Bloch H., Financial performance of commercial banks in the post-reform era: Further evidence from Bangladesh. *Economic Analysis and Policy* (2018), <https://doi.org/10.1016/j.eap.2018.01.001>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



**Financial performance of commercial banks in the post-reform era:
Further evidence from Bangladesh**

Iftekhar Robin¹

Ruhul Salim^{2*}

Harry Bloch²

¹ Bangladesh Bank, Motijheel, Dhaka, Bangladesh

² School of Economics and Finance, Curtin Business School, Curtin University, Australia

* Corresponding address: School of Economics & Finance, Curtin Business School, Curtin University, Perth, WA 6845. Phone: +61 8 9266 4577, Fax: +61 8 9266 3026, E-mail: Ruhul.Salim@cbs.curtin.edu.au

Financial performance of commercial banks in the post-reform era: Further evidence from Bangladesh

Abstract

This paper examines the financial performance of the commercial banks in Bangladesh in terms of profitability measures before, during and after a period of financial liberalization. Employing a panel data regression framework, the study uses bank-level annual data from major commercial banks in Bangladesh for the period 1983-2012. Empirical results show financial reform has not had significant effect on the return on asset (ROA) or return on equity (ROE) for the banks, but the net interest margin (NIM) has increased. The results further indicate that capital strength and asset quality are the main drivers of profitability. Therefore, an appropriate banking policy aimed at raising capital base and asset quality is vital for ensuring a viable banking sector in Bangladesh.

Keywords: Financial reform, banking, panel data, profitability

JEL Classification: G28, G21, C23

1. Introduction

The global banking industry has experienced remarkable changes in recent decades due to international integration of financial markets, deregulation and innovations of technology in banking services. These have created both opportunities for growth and challenges for banks to remain profitable in the current increasingly competitive environment. A profitable and enduring banking sector helps a country to withstand negative economic shocks (e.g., financial crisis) and contributes to the stability of the whole financial system.

Research on financial performance of banks typically focuses on the analysis of determinants of bank profitability. Studies concerning bank profitability to date, including Staikouras and Wood (2004), Athanasoglou et al. (2008), Garcia-Herrero et al. (2009), Goddard et al. (2004), Short (1979) and Bourke (1989) have examined the effect of bank-specific (e.g., capital ratio, bank size etc.), industry-related (e.g., concentration, ownership etc.) and macroeconomic (e.g., inflation, GDP growth etc.) determinants on bank performance. More recently, Mia and Ben Soltane (2016) use panel data from 50 South Asian microfinance institutions to show improved annual average productivity by 2.1% due to financial, economic and institutional reforms. Also, Cox and Wang (2014) attribute US bank failures during the period from 2007 to 2010 to 'poor investment decisions and large exposure to systemic risk channels'. However, studies examining the impact of financial reform policies on profitability are very few, especially for a developing country like Bangladesh.

The banking sector in Bangladesh has undergone a series of legal, policy and institutional reforms since 1980s. Bangladesh implemented reform programs largely during 1990-1995, though some reform initiatives occurred on ad hoc basis as early as 1983. Although it has been more than two decades since implementation of these reform measures, no research has been done so far to examine whether the banking sector has become more or less profitable due to these reforms. Therefore, it is timely to evaluate the financial performance of the banking sector in Bangladesh in terms of profitability measures before, during and after financial liberalization. Such evaluation should also help policy makers to understand the limitations of the reform policies taken and formulate accommodative policies in light of the evolving contemporary challenges, especially due to the recent global financial crisis.

The banking sector contributes about 74 percent of the total financial intermediation in Bangladesh (Bangladesh Bureau of Statistics, 2013). The command economy structure in the pre-reform period was characterized by inefficient allocation of financial resources (Salim, 1999). Government ownership and excessive interference directed credit to selected sectors including state-owned enterprises at subsidized rates. Monopoly power by banks resulted in high interest rates on private lending. Absence of prudential regulations and inadequate legal support for debt recovery resulted in the banking sector being burdened with non-performing loans (GOB, 1986). Although financial reform policies have brought significant changes in the banking environment, still the industry is facing challenges in terms of maintaining required capital adequacy and provisioning against non-performing loans.

The purpose of this study is to examine the effects of financial reform policies on the profitability of commercial banks in Bangladesh employing a panel regression framework. The study uses a unique balanced panel data set containing bank-level annual data of major banks that have both pre- and post-reform operation history. Unlike many empirical studies on profitability, corporate governance and financial reform period dummy variables are included in the regression analysis as along with variables controlling for other bank-specific, industry-related and macroeconomic factors. This article contributes to the literature by providing the empirical evidence on the effects of financial liberalization on the profitability of Bangladesh banking.

The remainder of the paper is structured as follows. Section 2 presents an overview of financial and banking policy reforms in Bangladesh, followed by a critical review of the literature on banking performance in Section 3. Section 4 discusses profitability measures and determinants of profitability, followed by a discussion of the data and methodology in Section 5. Section 6 analyses empirical results, while Section 7 provides robustness check of the empirical results. Section 8 concludes.

2. Financial and banking policy reforms in Bangladesh: an overview

The financial reform programs initiated in the late 1980s aimed at improving the overall performance of the financial sector in Bangladesh through competition and

better corporate governance. The program was implemented in several phases; the main phase titled 'Financial Sector Reform Program (FSRP)' was implemented during the period, 1990-1995. The reform initiatives addressed issues on several fronts, including the transition from directed sectoral lending at directed interest rates to unified credit markets with market-based interest rates, transition from direct to indirect tools for monetary management, revision of loan classification and reform of provisioning criteria. These reforms also included, revision of legal provisions and procedures for enforcing loan recovery, availability of credit information for loan risk assessment, transition from segmented exchange markets with multiple exchange rates to a unified foreign exchange market with a single market-clearing exchange rate, and upgrading of technology and human resources skills in banks. The program also focused on greater autonomy of the central bank (Bangladesh Bank, BB), enhancement of BB's capacities, strengthening prudential regulations and supervision, restructuring the management and internal processes of the state-owned commercial banks (SCBs) toward privatization, and improving money and debt markets (Kazemi, 1998).

As part of the reform measures, repurchase agreement (repo) and reverse repo were introduced in July 2002 and April 2003, respectively, for day-to-day liquidity management in response to temporary and unexpected disturbances in the supply and demand for money.¹ The Bangladesh currency 'Taka' was floated in May 2003 without any disturbance in the foreign exchange market. In order to strengthen the prudential regulation and supervision, Bangladesh Bank has made additional institutional reforms. These include revisions of capital adequacy ratios, deposit insurance, loan classification and provisioning modalities, single-borrower exposure limit, appointment procedure of bank CEOs, introduction of a new loan ledger and International Accounting Standard (IAS-30) for scheduled banks and disclosure of financial information to public media. By and large, the reform programs have emphasized key areas, enhancement of management capacity and governance, strengthening banking regulations and improving the supervision mechanism. A

¹ 'Repo' is a 'rep(urchase agreement)' with 'o' as suffix (occurring as the final element in informal shortening of nouns). Repos are used as a monetary policy instrument where central banks sell securities to banks and financial institutions with an agreement to buy them back at a higher price (adding an interest amount) on a specified date.

snapshot of different phases of the financial reform program and subsequent outcomes is presented in Appendix I.

Although the financial liberalization program aimed to increase financial intermediation and efficiency of the financial institutions, the policy measures did not take the economy to the expected level because of inherent structural rigidities in terms of regulations and bureaucratic complexities (Salim, 1998). The management of both public and private sector banks have not been completely freed from undue influences. Bangladesh Bank as a regulatory authority also has not been entrusted with absolute autonomy. Consequently, an independent monetary policy execution is still far from the reality. However, modernizing the banking infrastructure and payment systems have likely reduced systemic risks and increased efficiency, while both public and private sector banks have been using advanced technology in providing competitive banking services in the post-reform era.

3. Literature on bank performance: profitability

The literature on bank performance has focused on the key indicators of profitability, net interest margin (NIM), return on assets (ROA), and return on equity (ROE) (Flamini et al., 2009, Naceur and Omran, 2011). Ho and Saunders (1981) in a seminal paper present a theoretical framework (dealership model) for the determinants of NIM. The authors find the interest margin depends on both the degree of market competition and interest rate risk. A decrease in NIM indicates an improved functioning of the banking system (Kasman et al., 2010). However, it may not always reflect improved efficiency, as it may reflect a reduction in bank taxation or higher loan default rate (Demirguc-Kunt and Huizinga, 1999).

Many empirical studies examine the determinants of bank performance (e.g., Bourke, 1989; Molyneux and Thornton, 1992; Athanasoglou et al., 2008; Dietrich and Wanzenried, 2011; Salim et al., 2010, 2016). The determinants may be internal or external. The internal determinants are related to bank-specific management decisions, for example, level of liquidity, credit exposure, capital ratio, operational efficiency and bank size. The external determinants are industry related, such as reform policies or regulations, ownership or concentration, and macroeconomic indicators, e.g., inflation, GDP growth and broad money growth.

Bank capital plays an important role in determining profitability. Among others, Bourke (1989) and Molyneux and Thornton (1992) find a positive relationship between the level of capital (capital ratio) and profitability. Well-capitalized banks may need less borrowing and, therefore, the cost of funding is low. Moreover, well-capitalized banks may enjoy access to cheaper sources of funds (Berger, 1995b). Similarly, profits may lead to higher capital, if the earned profit is reinvested (Flamini et al., 2009). An empirical study on 23 Greek banks, utilizing time-series data for 1990-2002, reveals a higher level of ROA is associated with well-capitalized banks and also efficient expense management (Kosmidou, 2008).

Bourke (1989) reports higher concentration in banking markets encourages banks to hold less risky assets. This indicates that higher level concentration is associated with higher bank profits emanated from low-risk asset portfolio. However, Berger (1995a) argues the profit-concentration relationship is a spurious one since the relationship may be affected by other factors. The author finds a negative relationship between concentration and profitability once the other effects, for example, efficiency and market share, are controlled. Kosmidou (2008) also finds a statistically significant negative relationship between bank concentration and ROA in Greek banking. Pasiours and Kosmidou (2007) find that bank-specific characteristics, financial market structure and macroeconomic conditions, have significant impact on profitability, but no significant relationship between profitability and bank concentration for domestic banks. However, Williams (2003) suggests concentration in domestic market may reduce foreign bank profits.

Profitability may differ with bank size. Bank size has a significant positive impact on the interest margin (Demirguc-Kunt and Huizinga, 1999). Larger and more profitable banks may have a higher level of technical efficiency. An empirical study on MENA banks suggests a positive correlation between bank size and accounting profitability (Olson and Zoubi, 2011). However, large banks may experience poor performance as a consequence of declining quality of asset portfolio. High-risk loans generate higher accumulation of default loans, and eventually, lower the profitability (Miller and Noulas, 1997, Miller and Noulas, 1996). Applying the GMM regression technique to data for a panel of Greek banks for the period 1985-2001, Athanasoglou et al. (2008) provide evidence that the profitability of Greek banks is shaped by

bank-specific and macroeconomic factors without bank size and other industry structure variables having any significant effect on profitability.

Various macroeconomic indicators, for example, economic growth, can impact profitability (Kosmidou, 2008). Higher economic growth increases the credit flow of banks in the economy and, consequently, increases bank earnings. Further, Kosmidou (2008) finds that inflation has a significant negative impact on profitability in Greek banking during the EU financial integration. However, Perry (1992) argues that the effect of inflation depends on whether the inflation is anticipated or unanticipated. If inflation is unanticipated, banks may take time to adjust their interest rates which results a faster increase in bank costs compared to its revenues and, eventually the banks lose. On the other hand, if inflation is fully anticipated, bank interest rates increases due to inclusion of inflation premium while the liabilities of the bank fall in real terms and the banks gain.

3.1. Financial reform and bank profitability

Empirical findings of the impact of financial reform policies on bank profitability are inconclusive. Hsiu-I Ting (2017) finds that financial liberalization reduces bank profitability. Similarly, Iftikhar (2016) provides evidence that financial reform has a significant negative impact on bank interest margins in a cross-country study on 1300 banks of 76 countries for the period 2001-2005. However, Heffernan and Fu (2010) suggest reform policies have significant positive effect on NIM compared to ROA or ROE. Naceur and Goaied (2008) find partial liberalization negatively affects interest margin whereas complete liberalization strengthens the ability of Tunisian banks to generate profit margins. The mixed evidence suggests the relationship between financial reform and banking performance is an empirical issue.

One study, Sufian and Habibullah (2009), finds a positive impact of some bank-specific characteristics on the determinants of profitability for the period 1997-2004. However, there is no study so far investigating the impact of financial deregulation on profitability of the commercial banks in Bangladesh. This paper examines the effect of financial deregulation on financial performance on profitability measures by including reform period (pre-reform, transition and post-reform) dummies and corporate governance variables in the estimated model along with bank-specific, industry and macroeconomic variables.

4. Rationale of the selected variables: profitability measures and determinants

Bank performance evaluation involves assessing the interaction among internal operations, industry characteristics and macroeconomic environment. In the backdrop of increased innovation and deregulation in the financial industry, both internal and external competitiveness have become crucial in evaluating performance. While the internal determinants are related to the bank's management decisions and policy objectives, external determinants reflect economic and industry conditions. This section provides the rationale for including each of the internal and external variables, both dependent and independent, selected for our empirical model estimation.

4.1 Profitability measures: dependent variables

The profitability measures considered are: net interest margin (NIM), return on assets (ROA), and return on equity (ROE). ROA is the net profit expressed as a percentage of average total assets. The bank profitability literature suggests ROA as an appropriate measure of the ability of a bank to generate returns on its asset portfolio (Rivard and Thomas, 1997, Pasiouras and Kosmidou, 2007), while ROE reflects how effectively a bank management is using its equity capital. A bank's ROE may be affected by its ROA and also the degree of financial leverage or equity ratio (equity/asset). A bank with a higher equity ratio will have a higher return on assets and a lower return on equity than with a lower equity ratio, assuming other influences remain the same (Demirguc-Kunt and Huizinga, 1999). Another profitability measure, NIM is the bank's net interest income (interest income minus interest expense) divided by total assets. Variation in NIM may reflect changes in net interest income or total assets and may depend on the quality of assets (i.e., loan default rate) or taxation (Demirguc-Kunt and Huizinga, 1999).

4.2 Determinants of profitability: independent variables

Following the literature discussed in Section 3, the major bank-specific characteristics influencing profitability measures are: the capital ratio, asset quality, bank size and corporate governance. The external determinants include both industry-related and macroeconomic factors. The industry-related factors are:

ownership structure, concentration and regulations related to financial reforms. The macroeconomic indicators considered are: GDP growth rate and CPI inflation.

Capital ratio (TC/TA): The capital ratio indicates the solvency of financial institutions. This reflects bank's capability to absorb losses incurred due to poor asset quality. The capital ratio is measured as the total capital divided by total assets (TC/TA). The literature suggests a higher capital ratio lowers the need for external funding and, therefore, raises profitability (Kosmidou, 2008).

Asset quality (TL/TA): The risk-related characteristic specific to each bank is the composition of assets (i.e., asset quality). Banks are intermediaries between depositors and borrowers. The more deposits are transformed into loans, the higher are net interest income and profits. A bank with a higher ratio of loans to assets (TL/TA) is expected to be more efficient in earning profits because interest income is the major source of bank revenue that impacts the profit positively (Maudos et al., 2002). However, non-performing loans (NPLs) incur loss to banks due to provisioning against the NPLs and result in decreased profits (Miller and Noulas, 1997). Therefore, the expected sign of the variable (TL/TA) depends on extent of non-performing loans in total assets.

Bank size (SIZE): Bank size (SIZE) is measured by total assets of a bank. There is no consensus in the banking literature regarding the direction of influence of bank size on profitability. Large size bank may reduce costs and thus increase profits due to economies of scale and/or scope. On the other hand, large banks may not be efficient in reducing operational cost and become less profitable (compared to small size banks) due to complex bureaucratic system, excess staff and weak supervision of their large volume of assets. The empirical literature discussed in Section 3 provides mixed evidence regarding the relationship between bank size and profitability.

Independent director (ID) and Political director (PD) in the bank board: Corporate governance research emphasizes the independence of the bank board (Berger et al., 2012). Independent board members may be more effective in monitoring the management of the bank (Hermalin and Weisbach, 1991, Andres and Vallelado, 2008). Pathan et al. (2007) find a statistically significant positive relationship between having an independent director on the bank board and profitability measures, such as ROA and ROE, employing a panel fixed-effect regression model

for Thai commercial banks. Skully (2002) recommends independent directors in the bank board for ensuring better bank governance.

Among other empirical studies, Shen and Lin (2012) provide the evidence that political interference deteriorates the financial performance of banks in terms of ROA, ROE and NIM in a cross-country study using bank-level data for 65 countries for the period 2003-2007. We include dummy variables for independent director and political director on the bank board as corporate governance variables in order to examine how these variables affect the profitability of banks. The dummy variables are defined as: PD=1 if any politically linked person is on the bank board and zero otherwise, and ID=1 if any independent director is on the bank board and zero otherwise.

Ownership structure (OWN): There is still disagreement in banking literature whether ownership structure has any effect on bank performance. Many empirical studies (e.g., Micco et al., 2007, Iannotta et al., 2007, Short, 1979) provide evidence that ownership structure does affect bank profitability. In contrast, Dietrich and Wanzenried (2011) and Athanasoglou et al. (2008) argue that bank ownership status (private or state-owned) is irrelevant for explaining profitability. In our model, a dummy variable for ownership structure is defined as: OWN=1, if the bank is state-owned and zero otherwise.

3-bank concentration ratio (CR3): The structure-conduct-performance (SCP) hypothesis argues for non-competitive pricing behaviour of banks/firms (i.e., earning monopoly profit) in highly concentrated markets (Short, 1979, Garcia-Herrero et al., 2009). According to the hypothesis, banks are expected to enjoy greater market power, and consequently, earn higher profits in more concentrated markets. However, banks may feel less pressure to control their costs, and therefore, become less efficient if there is a high degree of concentration. Thus, the effect of concentration on profitability may be either positive or negative. The three-bank deposit concentration ratio (CR3) is included in our model to capture the effect of market concentration.

Deregulation: Changes in regulatory conditions in financial/banking markets may impact on profitability. Many developing economies, including Bangladesh, have

liberalized their banking market through privatization and deregulations. One approach to measuring the impact of liberalization has been to use period dummy variables to distinguish between regulatory regimes in the sample period (Edirisuriya and O' Brien, 2001). We use dummy variables defined as: $DTr = 1$ for observations during the transition period (1991-1995) and zero otherwise; and $DPs = 1$ for observations during the post-reform period (1996-2012) and zero otherwise. The pre-reform period (1983-1990) dummy is treated as the base and is excluded from the regression, so the coefficient of DTr (DPs) can be interpreted as the change in profitability from the pre-reform period to the transition (post-reform) period.

GDP growth rate (GDPG): Higher economic growth may strengthen the debt servicing capacity of borrowers and, therefore, contribute to lowering the credit risk, while adverse macroeconomic conditions may increase non-performing loans (NPLs) and eventually reduce bank profit. We follow others, including Maudos et al. (2002) and Pasiouras and Kosmidou (2007), and use the GDP growth rate as a variable expected to positively affect profitability.

CPI inflation (INF): Following the literature in Section 3, the average CPI inflation is included in the regression analysis as a macroeconomic indicator. A higher level of inflation may increase bank revenue if income increases more than the cost. Perry (1992) suggests the effect of inflation on bank performance depends on whether the inflation is anticipated or unanticipated.

Detailed definitions of all variables are provided in Appendix II.

5. Data and methodology

Since the focus of the paper is to examine the impact of financial reform policies on profitability, the sample contains bank-level annual data from 12 major commercial banks that have pre- and post-reform banking operation history for the period 1983-2012. The names of the sample banks along with their respective data periods are provided in Appendix III. The bank-level data have been sourced from the balance sheets of individual banks in Bangladesh. The macro-level data have been collected from Bangladesh Bureau of Statistics (BBS), Bangladesh Bank (Central Bank),

Ministry of Finance, the Government of Bangladesh and World Development Indicator (WDI). The total number of observations is 360.

Three panel regressions are estimated, with each regression having one of the three measures of profitability, NIM, ROA and ROE as dependent variable along with the set of bank-specific, industry-related and macroeconomic indicators as independent variables. The correlation matrix, presented in Appendix IV, shows the degree of correlation between the dependent and the explanatory variables used in regression analyses. The matrix shows generally weak correlation among the independent variables.

5.1 Descriptive statistics of the variables

Table 1 presents the summary statistics of the variables considered for the empirical estimation. The mean and standard error for all the variables are for each of three periods: pre-reform, transition and post-reform period. The descriptive statistics show the return on equity (ROE) and return on asset (ROA) decrease while net interest margin (NIM) increases slightly in the post-reform period compared to the pre-reform period. An increasing trend in average asset quality (TL/TA) indicates positive growth in loans relative to total assets. The capital ratio (TC/TA) also increases in the post-reform period compared to the pre-reform period indicating higher strength of the banks in the post-reform period. This is useful for mitigating credit risks.

Table 1: Summary statistics of the variables

Variables	Pre-reform (1983-1990)		Transition (1991-1995)		Post-reform (1996-2012)	
	Mean	S.E	Mean	S.E	Mean	S.E
Dependent Variables						
NIM	0.011	0.081	0.006	0.014	0.018	0.040
ROE	0.271	0.589	0.001	0.539	0.139	0.352
ROA	0.005	0.006	0.001	0.014	0.006	0.019
Independent Variables						
Bank size in logarithm (SIZE)	8.067	0.513	8.321	0.375	8.696	0.382
Transition dummy (DTr)	0	0	1	0	0	0
Post-reform dummy (DPs)	0	0	0	0	1	0
Concentration Ratio (CR3)	0.712	0.085	0.613	0.011	0.425	0.129

Ownership dummy (OWN)	0.333	0.474	0.333	0.475	0.333	0.472
Independent director (ID)	0	0	0	0	0.123	0.329
Political director (PD)	0.417	0.496	0.417	0.497	0.480	0.501
Capital ratio (TC/TA)	0.041	0.047	0.040	0.030	0.047	0.041
Asset quality (TL/TA)	0.584	0.107	0.594	0.070	0.622	0.083
GDP growth rate (GDPG)	3.889	1.185	4.392	0.628	5.719	0.676
CPI Inflation (INF)	8.729	1.794	5.724	2.598	6.194	2.499

Source: Author's calculations based on the balance sheets and income statements of the sample banks.

The decreasing trend in 3-bank deposit concentration ratio reflects an increasingly competitive banking structure in Bangladesh after deregulation. The provision for independent directors in the bank board has been introduced in the post-reform period for careful overseeing of the banks' activities. However, the presence of politically linked directors in the bank board increases during the same period. The average GDP growth increases and CPI inflation decreases in the post-reform period compared to the pre-reform period, indicating favourable macroeconomic conditions in Bangladesh after deregulation.

5.2 Model specification and estimation

The panel regression model is expressed as:

$$Z_{it} = \beta_i + \gamma Y_{it} + \nu_{it} \quad (1)$$

where Z_{it} represents the measures of profitability for bank i in period t . Y_{it} indicates the selected explanatory variables, ν_{it} denotes the error term, β is the constant term and γ is the vector of regression coefficients.

The empirical model to be estimated is as follows:

$$z_{it} = \beta_0 + \gamma_1(TC/TA)_{it} + \gamma_2(TL/TA)_{it} + \gamma_3 SIZE_{it} + \gamma_4 OWN_{it} + \gamma_5 CR3_t + \gamma_6 PD_{it} + \gamma_7 ID_{it} + \gamma_8 DTr_t + \gamma_9 DPs_t + \gamma_{10} GDPG_t + \gamma_{11} INF_t + e_{it} \quad (2)$$

where, z is expressed as the measure of profitability in terms of one of ROA, ROE or NIM. The explanatory variables are capital ratio (TC/TA), asset quality (TL/TA), bank size (SIZE), dummy for bank ownership (OWN), three-bank deposit concentration ratio (CR3), dummy for political director in the bank board (PD),

dummy for independent director in the bank board (ID), dummy variable for the transition period of the financial reform program (DTr), dummy variable for the post-reform period (DPs), GDP growth rate (GDPG) and CPI inflation (INF).

Both random-effect (RE) and fixed-effect (FE) models are estimated for Equation (2). The Hausman specification test is performed to choose which of the models is appropriate for representing the sample data. The results indicate the RE model is the appropriate one (the probability for the λ^2 -statistic is given in Appendix V). The results for the RE model are presented in the text (Table 2). The full regression results for both the FE model and the RE model are presented in Appendix V.

6. Empirical results

Table 2 reports the results for the regressions for each of NIM, ROA and ROE on bank-specific, industry-related and macroeconomic variables. The model fits the panel data reasonably well as indicated by the significance levels for the Wald-test statistics for all three regressions in Table 2.

Table 2: Determinants of profitability: NIM, ROA & ROE

	NIM	ROA	ROE
Capital ratio (TC/TA)	0.098 (0.076)	0.171*** (0.021)	-0.967 (0.666)
Asset Quality (TL/TA)	0.010 (0.036)	0.024** (0.009)	0.858*** (0.315)
Bank size (SIZE)	0.015 (0.013)	0.007** (0.004)	0.115 (0.115)
Ownership dummy (OWN)	-0.025** (0.012)	-0.008** (0.003)	-0.004 (0.107)
Concentration ratio (CR3)	0.004 (0.034)	0.011 (0.009)	0.665** (0.299)
Political Director dummy (PD)	-0.001 (0.009)	-0.000 (0.002)	0.009 (0.078)
Independent Director dummy (ID)	-0.001 (0.012)	0.004 (0.003)	0.021 (0.107)
Transition Period dummy (DTr)	0.004 (0.010)	-0.006 (0.003)	-0.193** (0.089)
Post-reform period dummy (DPs)	0.025** (0.013)	0.000 (0.003)	-0.061 (0.110)
GDP growth rate (GDPG)	-0.011*** (0.004)	-0.001 (0.000)	0.044 (0.031)
CPI inflation (INF)	0.002* (0.001)	0.000 (0.000)	0.025** (0.011)
R-squared	0.076	0.272	0.108
Wald Chi-square	28.43	130.11	42.13

Probability (Chi-square)	0.003	0.000	0.000
Total Observations	360	360	360

Source: Authors' estimation using STATA. The pre-reform period is treated as the base period. Standard errors are in parentheses. ***, ** and * denote statistical significance level at 1%, 5% and 10%, respectively.

The results show a positive and statistically significant relationship between the capital ratio (TC/TA) and ROA, which implies well-capitalized banks earn more profits. One possible reason is that well-capitalized banks need less external funding and, therefore, cost of funding is low and profits high. This is consistent with other empirical studies, such as Berger (1995b), Kosmidou (2008), Pasiouras and Kosmidou (2007) and Garcia-Herrero et al. (2009).

The estimated coefficient for asset quality (total loans/total assets) enters all three regression models with a positive sign and is statistically significant at 5% and 1% level of significance, respectively, for ROA and ROE. However, no significance is found for NIM. Banks with higher loan-asset ratio tend to be more profitable. The finding is consistent with previous empirical studies, such as Molyneux and Thornton (1992) and Pasiouras and Kosmidou (2007).

The relationship between size and profitability ratios is found positive in all three estimated regressions. However, the coefficient is statistically significant only for ROA at 5% level. Other empirical studies, for example Hauner (2005) and Kosmidou (2008), find a similar positive relationship between bank size and profitability, which suggests cost advantages due to increasing returns to scale. However, Pasiouras and Kosmidou (2007) find a negative relationship between bank size and performance.

Negative coefficients for the ownership dummy variable in all three regressions indicate government ownership has a negative effect on profitability. Micco et al. (2007) finds similar lower profitability for state-owned banks compared to private sector banks in developing countries. The result is also consistent with some other empirical studies, e.g., Short (1979), Bourke (1989) and Lin and Zhang (2009). The objective of private banks is profit maximization, while state-owned banks do not necessarily pursue profit maximization. In many cases, the government uses public banks to support its political objectives at the expense of profits (La Porta et al., 2002). Moreover, public banks have a social role. They address market

imperfections and can be socially profitable but financially unprofitable (Stiglitz, 1993).

Bank concentration enters positively in all three regressions (NIM, ROA and ROE). However, the coefficient is statistically significant only for ROE. The result is consistent with Molyneux and Thornton (1992) and Smirlock (1985), among others, and supports the traditional structure-conduct-performance paradigm. The estimated coefficient suggests that greater market power leads to higher bank profit. However, several other studies find an inverse relationship between concentration and profitability (Berger, 1995a, Athanasoglou et al., 2008, Garcia-Herrero et al., 2009).

The negative coefficient for the financial reform period dummy variable for transition period indicates ROE has been adversely affected during the transition period compared to the pre-reform period. The coefficient is statistically significant at 5% level of significance. Increases in equity in order to maintain the required capital adequacy (in compliance with the Basel recommendation) may have lowered ROE. Consistent with this interpretation, the estimated coefficients for NIM and ROA are not statistically significant. Hsiu-I Ting (2017) also provides evidence that financial liberalization does not have any significant relation with ROA.

The estimated positive and statistically significant coefficient for the post-reform period dummy variable on NIM indicates an increased net interest margin in the post-reform period. Perhaps banks invest their surplus funds (after maintaining the capital requirement) in economically viable and profitable projects and, eventually, earn more interest income. This is consistent with Heffernan and Fu (2010) suggesting that reform policies have significant positive effects on NIM compared to ROA or ROE. The estimated coefficients for governance variables, political and independent director in the bank board, in all three regressions are not statistically significant.

Turning to the macroeconomic indicators, the regression results show that GDP growth rate has a significant negative impact on NIM. Although Kosmidou (2008) argues for positive relationship between GDP growth and profitability, this is not true for the sample banks in Bangladesh. Inflation enters the profitability regressions with a positive coefficient. The coefficients for NIM and ROE are statistically significant at 10% and 5% level of significance respectively, while the

coefficient is not significant for ROA. The regression results for NIM and ROE are consistent with the Perry's (1992) hypothesis regarding anticipated inflation, with interest rates adjusted in such a way that the bank revenues increase faster than the cost. Demirguc-Kunt and Huizinga (1999) find similar relationships in a cross-country study using bank-level data for 80 countries for the period 1988-95.

7. Robustness check

To check the robustness of the results in Section 6, a pooled ordinary least square (OLS) regression model is estimated using the sample data. Table 3 reports the results obtained from OLS regression. It is evident from the Table 3 that the sign, magnitude and the level of statistical significance of the estimated coefficients are mostly very much similar to the coefficients obtained from estimating the random-effect model in Table 2. As an exception, the relationship between capital ratio and NIM is significant in the OLS regression, unlike the random-effect model, but the magnitude of the estimated coefficient is similar across the regressions.

Table 3: Determinants of profitability: NIM, ROA & ROE

	NIM	ROA	ROE
Capital ratio (TC/TA)	0.098*** (0.029)	0.171*** (0.067)	-0.967 (0.797)
Asset Quality (TL/TA)	0.010 (0.012)	0.024** (0.008)	0.858** (0.387)
Bank size (SIZE)	0.014 (0.013)	0.007 (0.005)	0.115 (0.132)
Ownership dummy (OWN)	-0.025* (0.012)	-0.008* (0.004)	-0.004 (0.127)
Concentration ratio (CR3)	0.004 (0.029)	0.011 (0.012)	0.665* (0.365)
Political Director dummy (PD)	-0.001 (0.004)	-0.000 (0.002)	0.009 (0.064)
Independent Director dummy (ID)	-0.001 (0.003)	0.004 (0.003)	0.021 (0.067)
Transition Period dummy (DTr)	0.004 (0.017)	-0.006** (0.002)	-0.193* (0.099)
Post-reform period dummy (DPs)	0.025 (0.028)	0.000 (0.003)	-0.061 (0.113)
GDP growth rate (GDPG)	-0.011 (0.008)	-0.001* (0.001)	0.044 (0.035)
CPI inflation (INF)	0.002 (0.002)	0.000 (0.000)	0.025** (0.011)
R-squared	0.076	0.272	0.108
Probability (F)	0.000	0.000	0.020

Total Observations	360	360	360
--------------------	-----	-----	-----

Source: Authors' estimation using STATA. The pre-reform period is treated as the base period. Standard errors are in parentheses. ***, ** and * denote statistical significance level at 1%, 5% and 10%, respectively.

We also obtain a statistically significant coefficient for GDP growth rate on ROA in the pooled OLS regression but not in the random-effect regression, but the estimated coefficients are equal in both regressions. The significant inverse relationship between GDP growth and ROA indicates that higher GDP growth may enhance the banks' capacity to provide loans and advances at a lower interest rate and, therefore, less return or income earned. Unlike the random-effect model we find no significance for the variables, post-reform period dummy, GDP growth rate and CPI inflation, on NIM in the OLS regression, even though the estimated coefficients are similar.

8. Conclusions

This study evaluates the impact of financial reform policies on the financial performance of 12 major commercial banks in Bangladesh over the period 1983-2012. The study also explores how bank-specific characteristics, industry-related and macroeconomic indicators affect the profitability of the sample banks. The findings indicate that profitability of the sample banks has not improved after the financial reform except for NIM in the post-reform period. The results also show that large banks are more profitable. Small banks can merge and enhance asset size as suggested by Berger and Humphrey (1997). The results also demonstrate that greater market power (i.e., higher concentration) leads to higher bank profit. The robustness check of the empirical results shows only a few changes in statistical significance of the estimated coefficients.

The findings also reveal that GDP growth effect does not pass through to higher banking profitability, while CPI inflation increases the profitability of the sample banks. No significant impact is observed for corporate governance variables, political director and independent director in the bank board, on profitability measures, while greater capital strength and higher loan to assets ratio lead to higher profitability. Hence, regulators should insure that banks remain highly capitalized

and increase their loan portfolios (without increasing non-performing loans) to ensure a viable banking sector in Bangladesh.

ACCEPTED MANUSCRIPT

Appendices
Appendix I: Policy measures undertaken in the financial sector in Bangladesh during the period, 1972-2013

Period	Policy measures on financial Sector	Consequences due to policy measures
1972-1982: Command Economy/pre-reform period	<ul style="list-style-type: none"> • Strictly regulated • Administered interest rate • Directed sectoral lending • Strict control over foreign exchange transaction • Fixed exchange rate • All banks are nationalized • Lack of modern monetary tools 	<ul style="list-style-type: none"> • Inefficiency in resource allocation; credit disbursement politically motivated or directed by the Central Bank or the Government in state-owned commercial banks; • Poor credit delivery and recovery • Widespread loan defaults and delinquencies; therefore, growing capital shortfall in nationalized banks • Low level of financial intermediation; only about one percent of GDP in 1979 (BBS) • Weak management of foreign exchange system
1983-1988: First phase of the financial deregulation initiatives;	<ul style="list-style-type: none"> • Denationalization of state owned commercial banks • Licensing new private sector banks • Constitute a commission (Money, Banking and Credit) to recommend on remedial measures to make the banking sector more efficient and competitive 	<ul style="list-style-type: none"> • No expected outcome from the partial reform measures during the period, due to inherent structural rigidities • Recommendations from several committees/commissions during the period
1989-2000: Second phase of the financial deregulation initiatives;	<ul style="list-style-type: none"> • Financial sector reform programme (FSRP) started in 1989 with assistance from USAID and IDA • Introduction of market based interest rate policy • Abolition of directed sectoral lending • Revision of loan classification and provisioning criteria • Revision of legal provisions and procedures 	<ul style="list-style-type: none"> • Market determined interest rate with few exceptions for export-oriented sectors • Banks and financial institutions can decide on their sectoral disbursement of credit portfolio • Both on-site and off-site supervision by BB brings financial discipline in the banking sector • Exchange rate pegging system (flexible within a band) keep the foreign exchange market stable • Current account convertibility in 1994

	<p>enforcing loan recovery</p> <ul style="list-style-type: none"> • Shift of exchange rate regime: fixed to flexible (pegging) • Separate department established at BB to strengthen the bank supervision • Bank Company Act 1991 enacted to give BB more authority to regulate the banking sector • Credit information Bureau (CIB) set up in BB in 1992 to provide credit information for loan risk assessment 	<ul style="list-style-type: none"> •
<p>2001-2007: Third phase of the financial deregulation initiatives;</p>	<ul style="list-style-type: none"> • Introduction of modern monetary policy instruments Repo (Repurchase agreement) and reverse Repo • Amendment of Bank company Act 1991 and Bangladesh Bank Order 1972 • Introduction of free floating exchange rate • Introduction of risk-weighted asset based capital adequacy requirement as per the BASEL-1 recommendation • State-owned commercial banks corporatized • Enactment of Money Laundering and Prevention Act 2002 in order to prevent terrorist financing after the terrorist attack in USA 	<ul style="list-style-type: none"> • BB can manage day-to-day liquidity in response to temporary and unexpected shocks in the supply and demand for money through Repo and reverse Repo • Market determined exchange rate, though BB does intervene if necessary to keep the value of Taka stable. • Amendment of Bangladesh Bank Order and Bank Company Act empowered the central bank to pursue independent monetary policy and regulate and supervise the banking sector • Enactment of Financial Institution Act entrusted BB with the authority to supervise the financial institutions • As per the BASEL recommendation, banks obliged to keep 8 percent of risk-weighted assets as capital adequacy requirement • Three state-owned commercial banks made limited companies in 1997 with a view to ensuring good governance, less influence (from the Government side) on the Board of Directors
<p>2008-2013:Reform measures after the global financial crisis;</p>	<ul style="list-style-type: none"> • Corporate governance regulations • Risk management system development • Stress testing policies 	<ul style="list-style-type: none"> • Regulation of corporate governance limits the number of the commercial bank board members to 13 and several committees, e.g., audit committee, formed to oversee the day-to-day banking activities • Submission of compliance report to BB made mandatory on regular

	<p>Enhancement of capital adequacy requirement as per the BASEL II recommendations</p> <ul style="list-style-type: none"> • Foreign Exchange Regulations 1947 updated with inclusion of new provisions • On-line connectivity of Credit Information Bureau (CIB) • Introduction of net banking (e-banking), mobile banking, and automated clearing of payment instruments • An independent Risk Management Unit (RMU) established in all banks to conduct stress testing for examining the bank's capacity of handling future shocks. 	<p>basis</p> <ul style="list-style-type: none"> • Bank balance sheet and other financial statements disclosed in public media in every six months for stakeholders to be aware of the financial condition of the banks • Capital adequacy requirement increased to 10 percent of the total risk-weighted asset to ensure solvency of the bank • Online CIB report helps banks to make quick and accurate decision on prospective investment, and thus efficient resource allocation • Banks have to efficiently manage core risks: credit risk, market risk, liquidity risk, asset-liability risk, foreign exchange risk, internal audit and compliance risk, money laundering risk • Mobile banking helps banks to take banking services to the remote areas to unbanked people
--	---	---

Source: Authors' compilation of annual reports of the Central Bank of Bangladesh.

Appendix II: Definition of the variables

Variables	Definition
Dependent variables	
NIM	Net interest margin: interest income minus interest expense divided by total assets.
ROA	Return on Asset: net profit divided by total assets
ROE	Return on Equity: net profit divided by total equity
Explanatory variables	
Bank-specific characteristics	
TCTA	Capital ratio : total capital divided by total assets
TLTA	Asset quality: total loans divided by total assets
SIZE	Bank size: natural logarithm of the total assets, as deflated using GDP deflator, base: 1996=100 (World Bank, 2014)
Industry-related factors	
CR3	3-bank concentration ratio: an annual index measuring the deposit share of three major state-owned banks (Sonali, Janata and Agrani).
DPr	Pre-reform dummy variable for the period, 1983-1990, considered as base period and omitted from regressions
DTr	Transition dummy variable for the period, 1991-1995. DTr=1 if transition period and zero otherwise
DPs	Post-reform dummy variable for the period, 1996-2012. DPs=1 if post-reform period and zero otherwise
Corporate Governance variables	
ID	Independent director: dummy variable; ID=1 if independent directors are in the bank board and zero otherwise
PD	Political director: dummy variable; PD=1 if political directors are in the bank board and zero otherwise
Macroeconomic indicators	
GDPG	GDP growth rate: real GDP growth rate
INF	CPI inflation rate

Appendix III: List of sample banks

Sl no.	Name of the sample banks	Sample period
1.	Agrani Bank	1983-2012
2.	Janata Bank	1983-2012
3.	Rupali Bank	1983-2012
4.	Sonali Bank	1983-2012
5.	Arab Bangladesh Bank (AB Bank)	1983-2012
6.	National Bank	1983-2012
7.	The City Bank	1983-2012
8.	International Finance Investment and Commerce Bank (IFIC Bank)	1983-2012
9.	United Commercial Bank (UCB)	1983-2012
10.	Pubali Bank	1983-2012
11.	Uttara Bank	1983-2012
12.	Islami Bank Bangladesh	1983-2012

Source: Authors' compilation

Appendix IV: Correlation matrix

	NIM	ROE	ROA	DPs	OWN	DTr	PD	SIZE	ID	CR3	TCT	TLT	GDP	INF
											A	A	A	G
NIM	1.000													
ROE	0.189	1.000												
ROA	0.230	-0.023	1.000											
DPs	0.094	-0.029	0.103	1.000										
OWN	-0.169	0.084	-0.266	0.000	1.000									
DTr	-0.074	-0.146	-0.156	-0.511	0.000	1.000								
PD	-0.124	0.087	-0.198	0.063	0.777	-0.032	1.000							
SIZE	-0.031	0.059	-0.065	0.526	0.630	-0.129	0.598	1.000						
ID	0.061	-0.009	0.184	0.238	-0.147	-0.122	-0.051	0.177	1.000					
CR3	-0.074	0.071	-0.110	-0.744	-0.000	0.216	-0.085	-0.612	-0.424	1.000				
TCT	0.123	-0.131	0.441	0.069	-0.339	-0.041	-0.298	-0.208	0.197	-0.140	1.000			
A												1.000		
TLT	0.067	0.152	0.119	0.190	-0.156	-0.065	-0.070	0.244	0.139	-0.278	-0.164	1.000		
A													1.000	
GDP	-0.024	0.005	0.056	0.691	-0.000	-0.235	0.069	0.452	0.291	-0.711	0.132	-0.166	1.000	
G														1.000
INFL	0.049	0.162	0.111	-0.261	0.000	-0.182	0.027	-0.135	0.119	0.082	0.171	-0.057	-0.026	1.000

Source: Authors' estimation

Appendix V: Determinants of profitability measures: NIM, ROA & ROE

	NIM		ROA		ROE	
	FE	RE	FE	RE	FE	RE
Capital ratio (TCTA)	0.152* (0.079)	0.098 (0.076)	0.179*** (0.022)	0.171*** (0.021)	-0.718 (0.678)	-0.967 (0.666)
Asset Quality (TLTA)	0.055 (0.041)	0.010 (0.036)	0.023* (0.011)	0.024** (0.009)	0.511 (0.357)	0.858*** (0.315)
Bank size (SIZE)	-0.011 (0.019)	0.015 (0.013)	0.009* (0.005)	0.007** (0.004)	0.245 (0.167)	0.115 (0.115)
Ownership dummy (OWN)	-	-0.025** (0.012)	-	-0.008** (0.003)	-	-0.004 (0.107)
Concentration ratio (CR3)	-0.022 (0.038)	0.004 (0.034)	0.015 (0.010)	0.011 (0.009)	0.794** (0.329)	0.665** (0.299)
Political Director dummy (PD)	-0.003 (0.018)	-0.001 (0.009)	0.000 (0.005)	-0.000 (0.002)	0.022 (0.151)	0.009 (0.078)
Independent Director dummy (ID)	0.002 (0.013)	-0.001 (0.012)	0.004 (0.004)	0.004 (0.003)	0.015 (0.111)	0.021 (0.107)
Transition Period dummy (DTr)	0.007 (0.010)	0.004 (0.010)	-0.006** (0.003)	-0.006 (0.003)	-0.212** (0.089)	-0.193** (0.089)
Post-reform period dummy (DPs)	0.031** (0.013)	0.025** (0.013)	-0.000 (0.004)	0.000 (0.003)	-0.096 (0.112)	-0.061 (0.110)
GDP growth rate (GDPG)	-0.011*** (0.004)	-0.011*** (0.004)	-0.001 (0.001)	-0.001 (0.000)	0.043 (0.031)	0.044 (0.031)
CPI inflation (INFL)	0.002* (0.001)	0.002* (0.001)	0.000 (0.000)	0.000 (0.000)	0.024** (0.011)	0.025** (0.011)
R-squared	0.062	0.076	0.194	0.272	0.094	0.108
Hausman test	Prob $\chi^2 = 0.29$:RE		Prob $\chi^2 = 0.842$:RE		Prob $\chi^2 = 0.000$:RE	
Total observations	360		360		360	

Source: Authors' estimation using STATA. FE stands for fixed-effect model and RE is random-effect model. Pre-reform period is treated as base period. Standard errors are in parentheses.

*** denotes statistical significance level at 1%; ** denotes statistical significance at 5%; * denotes statistical significance level at 10%

References

- ANDRES, P. D. & VALLELADO, E. 2008. Corporate governance in banking: the role of the board of directors. *Journal of Banking & Finance*, 32, 2570-2580.
- ATHANASOGLU, P. P., BRISSIMIS, S. N. & DELIS, M. D. 2008. Bank-specific, industry-specific and macroeconomic determinants of bank profitability. *Journal of International Financial Markets, Institutions & Money*, 18, 121-136.
- BANGLADESH BUREAU OF STATISTICS 2013. *National Income Accounting*. Dhaka: Government of Bangladesh.
- BERGER, A. N. 1995a. The profit-structure relationship in Banking-tests of market-power and efficient-structure hypothesis. *Journal of Money, Credit and Banking*, 27, 404-431.
- BERGER, A. N. 1995b. The relationship between captial and earnings in Banking. *Journal of Money, Credit and Banking*, 27, 432-456.
- BERGER, A. N. & HUMPHREY, D. B. 1997. Efficiency of financial institutions: international survey and directions for future research. *European Journal of Operational Research*, 98, 175-212.
- BERGER, A. N., KICK, T. & SCHAECK, K. 2012. Executive board composition and bank risk taking. *Working Paper*, Bangor: Bangor Business School
- BOURKE, P. 1989. Concentration and other determinants of bank profitability in Europe, North America and Australia. *Journal of Banking & Finance*, 13, 65-79.
- COX, R. A. K. & WANG, G. W. Y. 2014. Predicting the US bank failure: A discriminant analysis, *Economic Analysis and Policy*, 44: 202-211.
- DEMIRGUC-KUNT, A. & HUIZINGA, H. 1999. Determinants of commercial bank interest margins and profitability: some international evidence. *World Bank Economic Review*, 13, 379-408.
- DIETRICH, A. & WANZENRIED, G. 2011. Determinants of bank profitability before and during the crisis : evidence from Switzerland. *Journal of International Financial Markets, Institutions & Money*, 21, 307-327.
- EDIRISURIYA, P. & O' BRIEN, G. C. 2001. Financial deregulation and economies of scale and scope: evidence from the major Australian banks. *Asia-Pacific Financial Markets*, 8, 197-214.
- FLAMINI, V., MCDONALD, C. & SCHUMACHER, L. 2009. The determinants of commercial bank profitability in Sub-Saharan Africa. *IMF Wroking Paper*. International Monetary Fund.
- GARCIA-HERRERO, A., GAVILA, S. & SANTABARBARA, D. 2009. What explains the low profitability of Chinese banks? *Journal of Banking & Finance*, 33, 2080-2092.
- GOB 1986. *Report of The National Commission on Money, Banking and Credit*. Dhaka: Government of Bangladesh.
- GODDARD, J., MOLYNEUX, P. & WILSON, J. O. S. 2004. Dynamics of growth and profitability in Banking. *Journal of Money, Credit and Banking*, 36, 1069-1090.
- HAUNER, D. 2005. Explaining efficiency differences among large German and Austrian banks. *Applied Economics*, 37, 969-980.

- HEFFERNAN, S. A. & FU, X. 2010. Determinants of financial performance in Chinese banking. *Applied Financial Economics*, 20, 1585-1600.
- HERMALIN, B. E. & WEISBACH, M. S. 1991. The effects of board composition and direct incentives on firm performance. *Financial Management*, 20, 101-112.
- HO, T. S. Y. & SAUNDERS, A. 1981. The determinants of bank interest margins: theory and empirical evidence. *Journal of Financial and Quantitative Analysis*, XVI, 581-600.
- IANNOTTA, G., NOCERA, G. & SIRONI, A. 2007. Ownership structure, risk and performance in the European banking industry. *Journal of Banking & Finance*, 31, 2127-2149.
- IFTIKHAR, S. F. 2016. The impact of financial reforms on bank's interest rate margins : a panel data analysis. *Journal of Financial Economic Policy*, 8, 120-138.
- KASMAN, A., TUNC, G., VARDAR, G. & OKAN, B. 2010. Consolidation and commercial bank net interest margins: evidence from the old and new European Union members and candidate countries. *Economic Modelling*, 27, 648-655.
- KAZEMI, M. A. M. 1998. Financial Sector Reforms: The Bangladesh Experience. *ESCAP Seminar on Improved Management of the Financial Sector*. Manila.
- KOSMIDOU, K. 2008. The determinants of banks' profits in Greece during the period of EU financial integration. *Managerial Finance*, 34, 146-159.
- LA PORTA, R., LOPEZ-DE-SILANES, F. & SHLEIFER, A. 2002. Government ownership of banks. *Journal of Finance*, 57, 265-301.
- LIN, X. & ZHANG, Y. 2009. Bank ownership reform and bank performance in China. *Journal of Banking & Finance*, 33, 20-29.
- MAUDOS, J., PASTOR, J. M., PEREZ, F. & QUESADA, J. 2002. Cost and profit efficiency in European banks. *Journal of International Financial Markets, Institutions & Money*, 12, 33-58.
- MIA, A. M. & BEN SOLTANE, B. I. 2016. Productivity and its determinants in microfinance institutions (MFIs): Evidence from South Asian countries, *Economic Analysis and Policy*, 51: 232-45.
- MICCO, A., PANIZZA, U. & YANEZ, M. 2007. Bank ownership and performance: does politics matter. *Journal of Banking & Finance*, 31, 2019-241.
- MILLER, S. M. & NOULAS, A. G. 1996. The technical efficiency of large bank production. *Journal of Banking & Finance*, 20, 495-509.
- MILLER, S. M. & NOULAS, A. G. 1997. Portfoli mix and large-bank profitability in the USA. *Applied Economics*, 29, 505-512.
- MOLYNEUX, P. & THORNTON, J. 1992. Determinants of European bank profitability : a note. *Journal of Banking & Finance*, 16, 1173-1178.
- NACEUR, S. B. & GOAIED, M. 2008. The determinants of commercial bank interest margin and profitability: evidence from Tunisia. *Frontiers in Finance and Economics* 5, 106-130.
- NACEUR, S. B. & OMRAN, M. 2011. The effects of bank regulations, competition, and financial reforms on banks' performance. *Emerging Markets Review*, 12, 1-20.
- OLSON, D. & ZOUBI, T. 2011. Efficiency and bank profitability in MENA countries. *Emerging Markets Review*, 12, 94-110.

- PASIOURAS, F. & KOSMIDOU, K. 2007. Factors influencing the profitability of domestic and foreign commercial banks in the European Union. *Research in International Business and Finance*, 21, 222-237.
- PATHAN, S., SKULLY, M. & WICKRAMANAYAKE, J. 2007. Board size, independence and performance: an analysis of Thai banks. *Asia-Pacific Financial Markets* 14, 211-227.
- PERRY, P. 1992. Do banks gain or lose from inflation? *Journal of Retail Banking*, 14, 25-30.
- RIVARD, R. J. & THOMAS, C. R. 1997. The effect of interstate banking on large bank holding company profitability and risk. *Journal of Economics and Business*, 49, 61-76.
- SALIM, R. 1998. An Assessment of Trade and Industrial Policy Reform in Bangladesh. *Asia-Pacific Development Journal*, 5, 71-101.
- SALIM, R. 1999. *Capacity Realization and Productivity Growth in a Developing Country: Has Economic Reform had Impact?*, Singapore, Ashgate.
- SALIM, R., HOQUE, M. & SUYANTO, 2010. The role of governance, ICT and bad loans in the Australian bank efficiency: an empirical study, *Asia Pacific Journal of Economics and Business*, 14, 18-36.
- SALIM, R. ARJOMANDI, A. & SEUFERT, J. H. 2016. Does corporate governance affect Australian banks' performance?, *Journal of International Financial Markets, Institutions & Money* 43: 113-125.
- SHEN, C.-H. & LIN, C.-Y. 2012. Why government banks underperform: A political interference view. *Journal of Financial Intermediation*, 21, 181-202.
- SHORT, B. K. 1979. The relation between commercial bank profit rates and banking concentration in Canada, Western Europe and Japan. *Journal of Banking and Finance*, 3, 209-219.
- SKULLY, M. T. 2002. Banking and corporate governance : some prudential issues. *Second International Conference on Banking and Finance*. Greece.
- SMIRLOCK, M. 1985. Evidence on the (non) relationship between concentration and profitability in banking. *Journal of Money, Credit and Banking*, 17, 69-83.
- STAIKOURAS, C. & WOOD, G. 2004. The determinants of European bank profitability *International Business and Economics Research Journal*, 3, 57-68.
- STIGLITZ, J. E. 1993. The role of the state in financial markets. *World Bank Economic Review*. Washington: World Bank.
- SUFIAN, F. & HABIBULLAH, M. S. 2009. Determinants of bank profitability in a developing economy : empirical evidence from Bangladesh. *Journal of Business and Economic Statistics*, 10, 207-217.
- TING, H.-I. 2017. Financial development, role of government, and bank profitability : evidence from the 2008 financial crisis. *Journal of Economics and Finance*, 41, 370-391.
- WILLIAMS, B. 2003. Domestic and international determinants of bank profits: foreign banks in Australia. *Journal of Banking & Finance*, 27, 1185-1210.
- WORLD BANK. 2014. World Development Indicators [Online]. The World Bank. Available: <http://data.worldbank.org/products/wdi> [Accessed]