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## Regulations, Governance, and Resolution of Non-Performing Loan: Evidence from an Emerging Economy

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2019

# Regulations Governance and Resolution of Non-performing Loan

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# **Regulations, governance, and resolution of non-performing loan: Evidence from an emerging economy**

## **Abstract**

How do banks resolve a severe bad loan problem in a capital-constrained, low-income economy when a government bailout is not an option? We address this question by examining new evidence of a sharp decline in bad loan ratios in a panel of conventional commercial banks in Bangladesh. On the aggregate level, the bad loan ratio in this market has dropped from 41% in 1999 to only 10.0% in 2012. We find that at a micro-level this dramatic improvement is associated with bank management quality and internal governance that were substantially enhanced during a decade of large-scale regulatory reforms. The bank-level findings persist even after controlling for market monitoring, bank- and industry-level factors and macroeconomic variables. Both economic growth and financial development paved the way for the banks operating in this macroeconomic environment to reduce NPL over time.

**Keywords:** nonperforming loans; regulatory discipline; market discipline; banking sector reforms; Bangladesh.

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# Regulations, governance, and resolution of non-performing loan: Evidence from an emerging economy

## 1. Introduction

Dealing with sizable nonperforming loans (henceforth NPL) is an old and pervasive issue for many developing economies. As an aftermath of the financial crisis, however, the loan portfolio quality concerns became equally relevant to more advanced banking markets. The unresolved bad debts put pressure on the banks' balance sheets, earnings, and capital adequacy and, from a system-wide perspective, undermine banking sectors' stability, restrict credit supply and slow down overall economic growth and post-crisis recovery. This paper provides evidence on the resolution of bad loan problems when a government bailout was not available for the banks.

There is now vast literature documenting *causes and consequences* of the NPL problem. On the macro-level, the role of adverse economic conditions, lax underwriting standards during the preceding lending booms, weak banking regulation and supervision, inadequate corporate governance and poor incentives for the market monitoring<sup>1</sup> are found to be major determinants of non-performing loans. On the bank-level, the NPL accumulation can be explained by such factors as bank ownership structure (Shehzad et al., 2010; Saunders et al., 1990; Laeven and Levine, 2009; Chalermchatvichien et al., 2013), management quality (Berger and DeYoung, 1997; Espinoza and Prasad, 2010; Fofack, 2005); previous growth in the loan portfolios (Foos et al., 2009; Keeton and Morris, 1987) and bank capital position (Sinkey and Greenawalt, 1991). Salas and Saurina (2002) and Louzis et al. (2012) provide strong evidence of the interplay of macroeconomic and bank level variables in determining problem loans.<sup>2</sup>

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<sup>1</sup> See Barth et al. (2004) for a summary Aysan et al. (2015) for emerging markets.

<sup>2</sup> Specially for an emerging market context, lax underwriting standards, unsophisticated credit risk management, poor regulatory discipline and regulatory forbearance (Barth et al., 2004), poor incentives for the market monitoring,

At the same time, the factors behind a successful *resolution* of a severe bad loan problem, especially at the bank level, remain largely unexplored. Klingebiel (2000) and Dado and Klingebiel (2000) describe two alternative approaches to the NPL resolution in a distressed banking sector – a stock approach and a flow approach. In the stock approach, the responsibility for the bad debts resolution is assumed by a private or public asset management company (AMC) and/or a bank restructuring agency with a mandate to take over the nonperforming assets of distressed banks.<sup>3</sup> In the flow approach, the resolution of accumulated bad loans is left to banks - i.e., the regulators rely on the banks' self-sustained clean-up of their balance sheets. To enhance bank-level incentives for the write-down of bad losses, the flow resolution regime is usually accompanied by legal, accounting, and/or governance reforms. Although the flow-based NPL resolution offers a promising path towards reducing bad debts without direct government bailouts, there are yet no empirical studies which attempt to explore its pros and cons with bank-level evidence.

In this paper, we attempt to identify system-wide and bank-level factors behind the NPL resolution and to draw regulatory and bank management lessons by examining the thirteen-year experience of successful recovery from massive bad debts in Bangladesh. Indeed, as we show in Figure 1, there is a convergence trend between developed and developing economies in the last decade. While the ratio of bad loans has dropped significantly in low and lower middle economies, it has been on the rise in high-income countries since 2007. Figure 1 also shows that Bangladesh,

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inefficient corporate governance, management entrenchment and connected lending (Khwaja et al., 2011), weak creditor rights protection (Allen et al., 2012), government- and politically-directed lending (Dinc, 2005; Bonin and Huang, 2001), opaque borrowers and explosive and unregulated lending booms (Dell'Ariccia and Marquez, 2006) are found to be major drivers of non-performing loans.

<sup>3</sup>For details of cross-country experiences on the stock-based NPL resolution see Bonin and Huang (2001), Claessens et al. (1999), Stiglitz and Uy (1996), Fung et al. (2003), and Woo (2000). Most of these papers discuss mixed evidence on the AMCs effectiveness in East Asian countries following the Asian financial crisis. Klingebiel (2000) provides a set of case studies for a broader list of developed and developing countries, including Finland, Spain, Sweden, US, Ghana, Mexico, and the Philippines. Betz et al. (2016) discuss factors that drive time to resolution of defaulted loans in Germany, the UK, and the USA. Overall the resolution process is shorter in Germany than two other countries.

a low- income economy, has experienced a spectacular, four-fold drop in the banks' NPL ratio over the same period. Due to the constraints of the low-income economy, the government of Bangladesh could not spend the enormous funds on the clean-up of the NPLs and/or recapitalization of local private commercial banks.<sup>4</sup> Thus, its rescue measures relied heavily on the flow-based resolution strategy. Another feature that makes Bangladesh's banking sector an empirically interesting setting is the massive wave of regulatory reforms during our study period. These reforms attempted to enhance banks' incentives to write-off bad debts and included such measures as new minimum capital requirements, stricter loan classification and provisioning regimes, corporate governance reforms, promotion of the sound credit risk management practices, new disclosure rules, and new channels for market discipline effects.

We examine the recent Bangladesh experience in the aggressive, regulatory-driven resolution of the nonperforming loans problem by using a new, hand-collected dataset for a panel of 26 banks over the 2000 – 2012 period.<sup>5</sup> We trace the bank-level evolution of the bad loan ratios in response to the massive macro-prudential regulation and corporate governance reforms. During the study period, the average bank in our sample reduced its gross NPL ratio from 18.5% to 8.2%. To explain the evolution of the gross and net (adjusted for loan loss reserves) NPL ratios, we construct a panel that tracks the evolution of a broad set of explanatory variables, such as individual banks' financial performance, internal governance, market monitoring, and management quality. We also explore the role of macro-level economic development factors. Although the sample size is relatively small, the cross-sectional and time-series variation in this study sample is substantial

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<sup>4</sup>We thank the referee for suggesting that even a low-income country can possibly bailout state-owned banks through recapitalization. However, during our sample period, we see no anecdotal evidence of bailing out of state-owned banks by the government.

<sup>5</sup> Other studies on non-financial sectors in Bangladesh include Haque et al. (2011) on governance and capital structure, Razzaque et al. (2016) on real earnings management, Siddiqui et al. (2013) on audit fee premium, Muttakin et al. (2015) on effect of CSR disclosure on earnings quality just to name a few

mainly due to the overlapping waves of regulatory shocks to the bank's internal and external governance structures which allow us to detect a robust relationship between the NPL resolution process and bank-level and macro-level variables.

Our empirical results reveal a robust association between the bad loan resolutions in a capital-constrained emerging market and the improvement in a bank management quality. We measure management quality with the net interest margin (NIM) (Fofack, 2005) and the inefficiency ratios (Louzis, Vouldis, and Metaxas, 2012) and show that the improvements in these profit-generating indicators help to build up loan loss provisioning cushions and to write-off unrecoverable debts. We also find selected internal governance variable such as audit committee activity significantly explain the resolution of NPL. However, we find limited support for institutional ownership, another internal governance variable, for playing a role in the NPL resolution process, while board independence did not work out at all in explaining the resolution of bad loans as opposed to usual findings in the developed market. Further, we show under some condition, market monitoring proxied by credit rating variable can be significantly associated with net NPL (adjusted for loan loss reserves) resolution.

Finally, we find that the macro-level factors, including economic growth and financial development, are also strongly associated with the bad loans' gradual write-offs in an emerging banking sector. It is also important to note that all the observed improvements in the governance and asset quality bank characteristics observed in this explorative study occurred amid a cascade of the regulatory reforms that we carefully trace and document in the paper.

We contribute to the literature in several ways. First, using hand-collect data, this study provides *evidence* on severe bad loan problem resolution by using bank-level data in the previously unexplored low-income no-bailout country environment. Second, we are the first study to

document empirical evidence on flow-based approach to NPL resolution (Klingebiel, 2000; Dado and Klingebiel, 2000). Third, several studies, e.g., Shehzad et al., 2010; Saunders et al., 1990; Laeven and Levine, 2009; Chalermchatvichien et al., 2013; Berger and DeYoung, 1997; Espinoza and Prasad, 2010; document factors driving the evolution of *NPL accumulation*. We complement this literature by documenting factors that are associated with the evolution of *NPLs' recovery*. Fourth, our results show *the relative role of overlapping channels* of NPL resolution for a low-income economy in the presence of decade-long internal and external governance reforms in a banking sector. Our paper highlight that the regulatory reforms, economic growth, and financial development at the macro level enabled banks operating efficiently to write-off bad debts reduce NPL over time. As for other channels, improvements in internal governance proxied by audit committee activities, market monitoring proxied by credit rating is strongly associated with gross and net NPL resolution respectively. From a broader perspective, this study contributes to the rapidly growing literature on emerging banking markets and informs ongoing academic and regulatory debates on the efficient nonperforming loans resolution. The lessons from Bangladesh show that strong financial performance, cost control, healthy loan portfolio growth and a generation of sizeable operating income help banks to build up loan loss reserves and help them to write off previously accumulated bad loans. They also show that corporate governance reforms that enhance the role of the internal audit committees may also contribute to the bad loan problem resolution.

The rest of the paper is organized as follows. Section 2 outlines institutional and background details and provides a snapshot of the massive regulatory reforms that took place in the banking sector of Bangladesh; in Section 3 we describe our data, sample construction, and variables; and Section 4 presents our empirical results, while Section 5 offers concluding remarks.



## **2. Background: Bangladesh banking system development and regulatory reforms.**

As shown in the macroeconomic snapshot (Panel A of Table 1), Bangladesh is a low-income country with an annual per capita income of only \$840 in 2012. This emerging economy in South Asia is also characterized by a dense population, high vulnerability to natural disasters (floods) and long-standing political instability. Despite all these challenges, however, the country's banking system demonstrated significant improvements in the last decade, including a six-time increase in its total assets and about twofold increases in the core capital ratios. Most notably, the aggregate ratio of nonperforming loans for the whole banking system has dropped from its peak of 41% of total loans in 1999 to 31.5% in 2001 and then to 10% in 2012. This steep and successful trend in the NPL resolution makes Bangladesh an interesting case for its peer group low-income economies (Figure 1). In this section, we briefly discuss the milestones of the aggressive country-level reforms implemented in the last decade to provide an institutional framework for our subsequent bank-level analyses.

[Table 1 and Figure 1]

After Bangladesh achieved its independence in 1971, the country's banking system consisted of only eleven banks, including six nationalized commercial banks, two state-owned specialized banks, and three foreign banks. During the 1980s, the sector expanded due to the active entry of the *de novo* private banks. According to the annual report of Bangladesh Bank, as of the end of 2012, the country's banking sector consisted of 47 "scheduled" banks<sup>6</sup>, including 23 private

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<sup>6</sup> The banks licensed under the 1991 Bank Company Act and operating under the Bangladesh Bank's (The Central Bank) supervision.

commercial banks<sup>7</sup>, four state-owned commercial banks, seven Islamic banks<sup>8</sup>, four specialized government development banks and nine branches of foreign banks.<sup>9</sup>In this study, we focus our analysis on the stand-alone financial intermediaries that provide traditional banking services to firms and individuals by attracting deposits and issuing interest-based loans; therefore, our focus group includes conventional private and state-owned commercial banks. Although the four state banks dominate the banking system, their asset share reduced from 46.5% in 2001 to 26.0% in 2012 (Panel B of Table 1). Because of these market structure changes, the private commercial banks account for most of the industry assets now, with a 62.2% combined asset share.

During the early 1990s and 2000s, the Bangladesh banking system was one of the most heavily burdened with unrecoverable bad loans. The accumulation of these problem loans is commonly attributed to the poor credit underwriting standards, including the prevalence of government-directed and politically-driven lending on nonmarket terms. Also, weakly capitalized banks could not write-off bad debts because of the poor quality of underlying collateral, legal barriers to recovering and insufficient provisioning for loan losses. For example, as shown in Panel A of Table 1, as of the end of 2001, the combined capital and reserves ratio to total assets was only 4.2%, and the banking sector could only maintain 60.4% of the required provisions. Since the late 90s, cleaning up banks' balance sheets from NPLs was recognized by regulators in Bangladesh Bank (henceforth BB) as a priority for the banking sector development. With above

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<sup>7</sup> As our sample statistics will show, majority of these private commercial banks are not controlled by founders and they are listed in the stock exchange. Also the founder controlled banks are required by law to be listed in the stock exchange. In that regards, the commercial banks in our sample are not truly private commercial as it might appear by its name. We didn't include in our sample a private commercial bank since it is not listed in the stock exchange. Our final sample include 22 PCB and 4 state-owned banks.

<sup>8</sup>Islamic Shariah based private commercial banks operate under the Islamic Shariah principles commonly denoted as the Profit-Loss Sharing model. These unconventional banking institutions are excluded from our empirical analysis.

<sup>9</sup>All foreign banks in Bangladesh are incorporate abroad and do not disclose separate financial statements.

80% of all classified loans in the loss category, it was evident that major NPL resolution efforts should be associated with the write-offs rather than recoveries. Since 2000, the BB introduced a series of aggressive reforms that put continuous pressure on private commercial banks to reduce its exposure to non-performing loan. These reforms included such measures as a new loan classification system, guidelines for the management of core risks (credit risk, foreign exchange risk, asset and liability management, operational and technology risks, money laundering and terrorism financing risks), limits to the related parties transaction and single borrower exposures, increased transparency, strengthening of internal control, a requirement to introduce a risk management department in each bank, enforcement of supervisory monitoring and penalties for regulatory non-compliance. One of the key regulatory reforms initiated by the BB is the “policy on write-off of bad loan.” According to BB bank circular BRPD no. 3 dated January 13, 2003, banks are allowed to write-off five-year-old bad loans provided 100% provision maintained. It was further instructed to the banks to initiate the write-off process as soon as a bad loan meet the criteria. This was the first time the BB allowed write-off bad loans that’s why it had a significant impact on the non-performing loan of the banks. Also during 2003, BB issued another regulation through BRPD circular no. 1 dated January 13, 2003, instructing the banks to examine the reasons behind the default on loans when the borrower attempt to reschedule the loan. It further instructs the banks not to renegotiate with the borrower if the money is not invested in the business or habitual defaulted borrower. The circular also directed the banks with limits to reschedule in case of term loans and loans for working capital and prohibits defaulted borrows from applying for loans within one year of default. Over our sample period, there have been many changes to rescheduling requirements hence this regulation might have a weaker impact on the resolution of NPL ratio.

Simultaneously, the BB introduced and enforced many corporate governance reforms in the banking area including specification of the responsibilities, qualifications, and accountabilities of banks' board of directors and CEOs. Governance reforms also put a cap on the boards' size in an attempt to reduce excessive influence of controlling families on CEO and management decisions. The regulator also prohibited banks from extending or renewing credit to previously defaulted borrowers and, as an unconventional measure in the corrupt economy, banned influential and politically-connected defaulters from participation in parliamentary elections and directorships of financial intermediaries.

Under the new corporate governance standards, bank directors are required to have at least 15 years of relevant professional experience and spotless credit history. Board size is capped at 13 members, a significant reduction for banks that used to have more than 20 directors. The directors' tenure is limited to six years, and each family cannot have more than two members on board. The maximum CEO age is capped at 65 years.

In Appendix 1, we document a wave of the intense regulatory reforms in Bangladesh's banking sector during the study period. By browsing all regulatory circulars from 1998 to 2012, we were able to identify 28 key regulations, including 20 circulars that target the credit risk management practice, bad loan classifications and provisioning, and the NPL write-offs guidelines. The remaining eight documents introduce multiple bank governance reforms that we discussed in this section.

[Appendix 1]

Thus, as shown in Appendix 1, all major governance reforms were introduced during the study period and overlapped with aggressive credit risk management and NPL resolution reforms. In addition to the enforcement of the regulatory discipline and internal corporate governance

standards compliance, the private commercial banks were forced to get listed on the national stock exchange to promote better transparency and private monitoring incentives.<sup>10</sup> In this study, we exploit this unique period of aggressive regulatory and governance reforms in an emerging market context to provide evidence on the relative importance of the system-wide regulatory reforms and bank-level characteristics on the NPL resolution.

### **3. Data and summary statistics.**

#### *3.1. Sample construction*

The bank-level data for this study are hand-collected from the annual reports (hard copies) of banks in Bangladesh, obtained locally. Each report contains a full set of the audited financial statements and detailed disclosures of the banks' corporate governance arrangements and structures. The sample period covers 13 years, from 2000 to 2012. Overall, we were able to find reports for 26 unique commercial banks, including four state banks and 22 private domestic commercial banks. Collectively, the sample banks account for about 70% of Bangladesh's banking sector assets, with some variation across years. As explained in the background section, development banks, Islamic banks, and foreign banks' branches are excluded from the study sample due to their non-comparable business models, regulatory regimes and/or data availability limitations. Our total sample consists of 330 bank-year observations for domestic commercial (the so-called "scheduled") banks. At the regression analyses stage, we miss some observations due to one-period lags and loan growth rate construction; the final usable number of observations in

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<sup>10</sup>It is also worth mentioning that, despite a wave of regulatory reforms that we list Appendix 1, the regulatory forbearance in this banking sector remained relatively high and some banks delayed the introduction of the new requirements and standards. Although these delays in compliance obscure the timing of regime shifts, they also create a valuable cross-sectional variation in sample banks that we exploit in our empirical analyses.

regression tables is 301. In Appendix 2, we document the exact composition of our sample, by the bank and by year.

[Appendix 2]

### *3.2. Variables and summary statistics: Bangladesh context*

Table 2 defines six blocks of variables used in this study. These blocks include proxies for nonperforming loans, internal corporate governance, management quality, external market monitoring, macro-level development indicators, and several standard bank-level control variables that account for bank size, capitalization, lending activity, age, and market structure. Below, we briefly describe the measures and the distribution of the dependent and explanatory study variables.

[Table2]

#### *3.2.1. Dependent variables: Nonperforming loan ratios*

We start our construction of the NPL measures from an in-depth examination of the country-specific regulatory definitions of bad and problem loans. Panel A of Table 3 summarizes the currently adopted five-group loan classification schema and the loan loss provision requirements for each group. For this study, our focus is on the three categories of classified loans: substandard, doubtful and bad loans. The problem loan recognition thresholds in this table show that the regulatory loan classification in Bangladesh remains lax as it recognizes a loan as classified only after it was more than six months overdue. Thus, all three categories of classified loans on balance sheets are deeply overdue by all international standards, and we treat them as a cumulative bad loans category in the subsequent analysis.<sup>11</sup> For illustrative purposes, we also report the loan

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<sup>11</sup>In 2005, the BB introduced the Special Mention Account (SMA) to align loan groups with the best international standards and to recognize problem loans as early as 90 days overdue. Under the updated classification, SMA is

portfolios' composition by unclassified and classified loans' components for an average sample bank by years (Panel B of Table 3). These numbers show that major improvement in the loans' portfolio quality comes from the shrinking share of most seasoned overdue loans ("Bad or Loss" category) which drop from 17.6% of gross loans in 2000 to only 3.5% in 2010 although we observe a recent increasing trend in NPL ratio, at the end of 2012 the NPL ratio stood at 8.5% (also documented in Rafiq(2015)).

[Table 3]

Following the BB conventions, we construct three alternative NPL ratios. The first dependent variable, *Gross NPL ratio*, is the year-end sum of classified loans - including substandard, doubtful and bad - all divided by total gross loans. This is the standard credit risk measure in banking literature. As reported in Table 4, the average gross NPL ratio in the study sample is 9.24%, and it varies broadly from 0% to 44.59%, with a quartile range from 2.20% to 11.96%.

[Table 4]

Our second and supplementary dependent variable is the *Old NPL ratio*. It accounts exclusively for the oldest, at least one year overdue (or bad loss) loans on a bank's balance sheet, as a ratio of total loans. For the full sample, this ratio varies from 0% to 48.00%, with an average of 7.73% and the median at 2.85%. Finally, our third dependent variable, *Net NPL ratio*, is the sum of classified loans net of accumulated loan loss reserves as the proportion of net loans, where net loans are gross loans minus loan loss reserves. This is the measure of uncovered NPLs; it allows to account for bank capacity to build up a shield (reserves) against future write-offs and is widely

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formally a part of unclassified loans, with a low provisioning requirement of only 5%(Table 3). Due to its relatively recent introduction, bank-level SMA data are not available for the whole sample period and we cannot rely on this category in constructing NPL measures.

used in the BB disclosure statistics. As expected, the *Net NPL ratio* for an average bank is smaller than the *Gross NPL ratio* (with a mean of 6.22% and a median of 2.26%) and, at the left-side tail of the distribution, it can even take negative values if the loan loss reserves exceed classified loans level (Table 4).

The dynamics of NPL ratios vary considerably between two groups of banks in our sample. As shown in Table 3 Panel C, the state-owned banks have higher NPL ratios compared to private commercial banks and both types of banks managed to reduce a significant portion of bad loans over the sample period. The private commercial banks were able to contain their NPL ratios in single digit. However, in the recent years (2011 and 2012) NPL ratios for both types of banks are in the rise due to deterioration of credit quality in the overall banking system.

### 3.2.2. *Explanatory variables of interest.*

*Internal corporate governance.* Bank governance variables include the bank's ownership, the board of directors' and audit committee characteristics. All governance variables are constructed from the raw data reported in bank annual reports' narratives on bank ownership, management, and governance practices.

We capture a bank ownership type with two variables: the dummy variable for the *Founders-controlled* banks and with a continuous variable for the shareholdings of *Institutional owners*. As reported in Table 4, in 40% of bank-year observations, the banks are controlled by the founding members. The institutional ownership ranges from zero to 39.35% shares, with a mean value of 9.14% and a median of 6.98%. These numbers suggest that institutional owners in our sample are either non-existent or exclusively minority shareholders.

We use the proportion of independent directors as a standard proxy for *Board independence*. As we show in Table 4, the ratio of independent directors is extremely low in this



banking sector, with an average of 4.37% and 7.14% at the 75<sup>th</sup> percentile of the pooled data distribution. Notably, in the Bangladesh regulatory framework, the board independence is heavily driven by many concurrent regulatory initiatives, including the requirement to include independent directors on the board and to reduce the board size to a maximum of thirteen directors.<sup>12</sup>

Finally, as a crude observable measure for the *Audit Committee* monitoring activity, we use a natural log of the number of its meetings per year. One pitfall for using this measure is that a bank may fail to disclose any audit committee activity in its annual report. We classify all such cases as an indication of a weak or absent role of the audit committee and code them as zeroes. This way, from a broader perspective, the audit committee activity variable can be viewed as a combined measure of a bank's internal control practices' transparency and activity. The average raw number of audit committee meetings for the pooled sample is 6.92.

*Management quality.* Bank managers in Bangladesh are hired professionals that are typically not affiliated with founding members or other owners' groups. Although the BB has developed and introduced multiple circulars, guidelines, qualification requirements and educational brochures to improve the senior bank management skills and culture, the bank management quality is still difficult to observe directly. Thus, we opt to measure management quality with the two commonly used proxies, net interest margin (*NIM*) and Inefficiency *ratio*.

We measure *NIM*, an indicator of the core profitability of the bank financial intermediation model, as a difference between annual interest income and interest expense, divided by the bank's total assets. The mean and the median values of this bank management quality indicator are about 2.13% (Table 4). We measure *Inefficiency*, the traditional measure of bank productivity, as the

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<sup>12</sup>To reduce the founding directors and their family members' intrusion into the day-to-day bank operations, the BB imposed this board size threshold and gave banks several years to bring their board size in compliance with it. Our sample covers this transition period. We discuss BB governance reforms in more details in the background section of this paper.

ratio of annual operating expenses to operating income. Higher values of the inefficiency ratio indicate higher costs required to generate each dollar of bank revenue and, therefore, a lower quality of bank management. This inefficiency ratio varies dramatically, from 20.44% to 175.42%, with a mean value of 46.82% and a median of 42.26%.

Market monitoring. Bank's incentives for the NPL resolution in response to the market discipline pressure and higher financial disclosure standards are captured with a bank's public listing status, its availability of an external credit rating and its Big 4 external auditors. During the sample period, most of the commercial banks undergo public listing on the Dhaka Stock Exchange (the major stock exchange in Bangladesh). This major transformation in the Bangladesh banking system from closely held private banks towards more open, more transparent, publicly listed institutions was largely orchestrated by the regulators and occurred at different years for different banks. By the end of 2012, 85% of the sample banks were publicly listed.

To construct a *Credit rating* availability dummy, we use information from two local credit rating agencies officially recognized by the BB and detect the first year of the credit rating assignment for each bank. We further compare these data with the credit ratings reported in the banks' annual report to resolve any discrepancies. Notably, during the sample period, none of the banks in Bangladesh had an international credit rating. It is also worth mentioning that excluding the last sample year, credit ratings were not formally required for banks in Bangladesh. It ensures substantial variability in the frequency of rated and non-rated banks by years. For the whole sample period, there are 50% of bank-year observations with at least one officially assigned credit rating.

To construct the *Big 4 auditor* indicator variable, which we use as yet another proxy for bank transparency and market monitoring intensity, we obtain a list of all bank auditors in Bangladesh that are formally affiliated with the Big 4 global auditing firms and match them with

the sample banks' auditors' names. Overall, 46% of bank-year observations in the sample is associated with a Big 4 auditor presence (Table 4).

Macro-level development indicators. To explore the effects of across-the-board macroeconomic improvements and growth on the bad loans resolution in Bangladeshi banks, we employ two commonly used macro-level time series. The first macro-level variable, *Economic growth*, is the annual percentage growth rate of the country's GDP. The second macro-level variable, *Financial development*, is proxied with the ratio of domestic credit to the private sector divided by the country's GDP. Both data series come from the publicly available World Bank Development Indicators database. For the pooled sample, the mean and median annual GDP growth rate is about 6%, with a relatively narrow range - from 4.42% to 6.70%. The financial development indicator demonstrates much higher variation, with an average of 36.03%, a minimum of 24.67% and a maximum of 47.05%.

### 3.2.3. Bank-level control variables.

The core set of bank-level financial variables that may potentially effect bad loans ratios includes asset size, market structure,<sup>13</sup> capitalization and three measures of bank lending activity and loan portfolio composition – the loan to asset ratio, directed loans ratio and the loan portfolio growth rate.

The average capital ratio is only 6.23%, and it varies broadly, from -13.41% to 29.68% (Table 4). These numbers suggest an overall low capitalization in the country's banking sector and regulatory forbearance when it comes to severely undercapitalized banks.<sup>14</sup> The mean (median)

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<sup>13</sup> We would like to thank anonymous referee for suggesting us to include a proxy variable for market structure in our empirical analysis.

Loan to Assets ratio is 64.22% (65.14%). The annual bank-level loan growth rate is high and volatile, with an average of 22.19% and a standard deviation of 18.49%. Although these growth rates are extraordinary by the standards of a developed banking market, they are broadly comparable to growth rates in other emerging and developing banking markets.

One other country-specific control variable used in this study is the *Directed loans* ratio which accounts for the weight of micro-lending and agricultural loans in the total loan portfolio; these so-called “directed” loans represent a special class of loans in Bangladesh. All commercial banks, including private and state-owned banks, are expected to grant such loans per the regulator-assigned quotas that vary from year to year based on government social and economic recovery agendas. Although these loans can be very risky, their loan loss provisioning rules are set at artificially low levels and their overdue time thresholds are also inflated, at 60 months or above. In other words, these loans are accounted for separately, outside of the standard five-group classification of loans reported in Table 2. Therefore, banks’ involvement indirect lending can potentially bias both of our bad loans measures, gross and net NPL ratios, and the direction of this bias is difficult to detect *a priori* due to the nonconventional provisioning rules for these loans. To deal with this issue, we introduce the *Directed loans* measure that should absorb all potential effects of this government-directed lending activity on reported bad loans portfolios. Although the mean value for the directed loans ratio is relatively low at 4.58%, the quartile range is from 0.69% to 6.43% and the maximum is at a high 40.25%. These statistics suggest the skewed and uneven distribution of the directed lending burden among our sample banks and further justify the need to explicitly control for these loans in nonperforming loans regressions.

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<sup>14</sup> Overall, there are four unique banks and 14 (out of 277 total) bank-year observations with a negative capital level in our sample; these observations are approximately equally distributed by years. The mean capital ratio in this heavily undercapitalized subsample is -6.08%; the minimal capital ratio is -13.41% (as shown in Table 4).

To account for the fact that *de novo* banks are expected to have a lighter bad loans burden as it takes time to accumulate delinquent loans in a bank's assets portfolio, we include a *New bank* dummy to distinguish banks that are up to three years old. As reported in Table 4, only 7% of the sample observations fall into the new bank category.

Finally, we included concentration ratio as one of the control variables in our regression model to incorporate the effect of market structure on non-performing loan ratio. We constructed theCR3 (concentration ratio for top 3 banks) for the banks by adding the deposits of top three banks then dividing by total deposits in the market in a year. We expect a positive relationship between concentration and bad loans. Banks operating in a less competitive environment (i.e., market concentration is high) encourages more aggressive lending, the risk-taking by banks might lead to that might lead to poor credit disbursement increasing the proportion of bad loan which is consistent with structure-conduct-performance hypothesis.<sup>15</sup> On an average, top three banks (mainly large state-owned banks) control about 54.75% of the deposit market. The concentration ratio was high in the earlier part of the sample (e.g., 62.82% in 2000) and as more banks entered the market, the competition increased, and the concentration ratio dropped to 41.28%.

## **4. Results**

### *4.1. Descriptive evidence*

Table 5 tracks the evolution of bank-level characteristics by year, including problem loans, corporate governance, management quality and market monitoring measures over the 2000 – 2012 period for an average sample bank. With exceptions in few years, on aggregate, the numbers in

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<sup>15</sup> For more on structure-performance-conduct hypothesis see Gilbert (1984), Hannan(1991), Lloyed-Williams, Molyneux and Thornton (1994).

Table 5 reveal gradual and substantial improvements in almost all components of bank governance and financial performance during the study period. For the banks in our sample, the average *Gross NPL ratio* dropped from a high 18.50% in 2000 to only 8.20% in 2012.<sup>16</sup> During the same period, the average Old NPL ratio dropped from 17.31% to 5.74%. The average *Net NPL ratio* follows a very similar pattern and decreases from 14.27% in 2000 to 4.78% 2012.

[Table 5]

There are also notable changes across all corporate governance measures. First, the proportion of founders-controlled banks decreases from 55% of the sample banks in 2000 to 19% in 2012. Second, there is also a twofold increase in institutional ownership in an average bank, from 6.20% in 2000 to 12.61% in 2012. Third, board independence evolves from no independent directors on board in the first five years to a sharp increase from 0.38% to 13.38% in the last eight years. Finally, in response to the regulatory initiatives, the disclosure and frequency of audit committee meetings visibly jumps in 2003 and continues to increase during the subsequent sample years.

Bank-level management quality improvements are also pronounced. The inefficiency ratio steadily dropped from 60.73% in 2000 to 47.26% in 2012. Simultaneously, the average NIM value increases almost twofold, from 1.48% to 2.41%. Collectively, these patterns suggest dramatic improvements in the productivity and profitability of Bangladeshi banks.

In regards to external market monitoring, we detect a sharp increase in the number of banks with assigned credit rating. The proportion of such banks is negligible until 2005 and then jumps

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<sup>16</sup>The Gross NPL ratio slightly increase in 2007, which might be attributed to the conversion of considerable amount off-balance sheet exposures into funded facilities that part of it become overdue and classified. Consequently, BB issued a regulation through BRPD circular no. 8 and 10 dated August 8 and September 18, 2007, respectively, instructing commercial banks to maintain a 1% general provision against off-balance sheet exposures in addition to the existing provisioning requirements. Also, this general provision will be part of regulatory capital as supplementary (Tier II) capital.

to above 50% in 2006 and further to a high 100% in the last two sample years. This pattern reflects a regulatory regime shock as the BB started to require officially assigned and publicly disclosed credit rating for all commercial banks from at least one of the two local credit rating agencies. The Big 4 auditor dummy exhibits substantial variability suggesting frequent changes of external auditors. By the end of 2012, all except four sample banks were publicly listed and traded on the Dhaka Stock Exchange.

Descriptive statistics in Table 5 also reports the evolution of bank-level control variables, such as bank size, capitalization the loan portfolio composition, and growth. We observe that, on average, banks in Bangladesh have substantially improved their capital buffers, from a low 4.78% in 2000 to a healthy 8.85% in 2012. Another notable pattern is the increase in average bank lending activity, which increases to 61.38% by the end of 2012. Annual loan growth rates, however, are volatile and do not follow any distinct pattern, ranging from 12.71% (in 2012) to 34.04% (in 2001). Although these growth rates are high by the standards of any developed banking market, they are not exceptionally high for an emerging market.

Overall, the descriptive analysis of the corporate governance variables reveals substantial time-series differences. It also shows that bad loan resolution was accompanied by many visible and largely regulator-driven improvements in board independence, institutional ownership, market monitoring, management quality and bank capitalization.

The bottom part of Table 5 reports the evolution of the macro-level variables. These annual statistics show a pronounced upward financial development trend as the ratio of domestic private credit to GDP gradually increases twofold, from 24.67% in 2000 to 43.00% in 2012, indicating the growing role of banks in lending to the country's growing economy. The economic growth variable, however, does not change dramatically over time, averaging about 6% annual GDP

growth. Finally, the concentration ratio gradually declined over the period implying a steady improvement in the market structure within the banking sector.

#### *4.2. Regression results*

Our main regression results are presented in Tables 6, 7 and 8. We construct a separate regression table for each of the three dependent variables - Gross NPL (Table 6), Old NPL (Table 7) and Net NPL (Table 8) ratios. All the key explanatory variables of interest, such as corporate governance, management quality and market monitoring proxies (defined in Table 2), are one-period lagged. Other control variables that define bank financial position and may affect NPL ratios - such as bank size, capitalization, and lending activity - are also one year lagged. The new bank dummy variable, loan growth rate, and concentration ratio are contemporaneous, as are macro-level (exogenous) variables.

[Tables 6 to 8]

The first four models in each regression table exploit the panel structure of our data and include time and bank fixed effects that control for the unobserved heterogeneity. In Model 5, we attempt to utilize additional cross-sectional variation among banks and pool our data by omitting bank fixed effects. The last model in each regression table (Model 6) includes bank time fixed effects but substitutes time fixed effects with the macro-level variables. To account for potential multicollinearity among internal governance, management quality, and external market monitoring characteristics, we estimate separate regressions for each of the three sets of explanatory variables of interest in Models 1 to 3. In contrast, Models 4 to 6 incorporate all study variables.

Collectively, the fixed effect regressions' results in the three regression tables with alternative dependent variables reveal that after accounting for bank and time fixed effects and



other time-varying control variables, we find a robust association between bad loan resolution at the bank level and an improvement in management quality. The coefficients on lagged NIM and Inefficiency variables, our proxies for bank management quality, are highly significant across alternative model specifications for all three versions of the NPL ratio as a dependent variable. The economic magnitude of these coefficients is also high. For example, a 1% increase in NIM is associated with an approximately 0.84% (model 4, table 6) decrease in the gross NPL ratio in the following period. The magnitude of this coefficient is higher for Old NPL and about the same for Net NPL dependent variables. The improvement in the inefficiency ratio has a less economically pronounced but still statistically significant effect: a 1% decrease in the inefficiency ratio is associated with about 0.03% (model 4, table 6) decrease in the NPL ratio, with some variation in the exact size of this coefficient depending upon the model specification. Notably, management quality effects remain robust across all alternative models' specifications. This result is consistent with the idea that a bank's performance and its ability to generate high NIM (and, to a lesser extent, control costs) play a major role in recovery from a bad loans problem. Apparently, higher operational profitability allows to allocate larger provisions for bad loans and eventually write them off.

Our second notable result is that corporate governance variables may also play a role in the NPL resolution. However, their effects are more fragile and less straightforward. Based on the collective evidence from the estimation results in Tables 6 to 8, the audit committee activity seems to be the best candidates among internal governance factors to be associated with significant reduction in the NPL ratios. A level-log coefficient interpretation on the Audit committee activity variable suggests that as changes in the frequency of meetings in a year increase by 1% the NPL ratio drops from about 0.99% to 1.7% (depending on the model specification).

In the case of the founding families' control of the bank dummy, the direction of the relation is surprising but in line with our prior descriptive evidence: banks with concentrated ownership seem to have better quality loan portfolios. This effect is sizeable based on the point estimates of the coefficient. At the same time, it is not statistically significant across all models. Our results suggest that following an increase in institutional ownership is not strongly associated with a decrease in non-performing loan ratios. Finally, the increase in the board independence does not seem to have any effects on the next period's NPL ratios.

Our third result is that bank-level improvements in external market monitoring which exceed across-the-board improvements (that are absorbed in the time effects) play at best limited role in resolving bad loans in this emerging market context. As reported in table 8, we detect a statistically significant negative association between Credit rating dummies and the follow-up NPL ratio in models. The reason credit rating is significant in Net NPL model is that the credit rating varies for banks who don't provide sufficient provisions for bad loans or loan loss reserves and those banks which provided for sufficient provisions for bad loans carried out credit rating. There is also a puzzling result in Models 3 and 4 of Table 6 that suggests an increasing gross NPL ratio in the years following bank's public listing. All else being equal, it suggests relative disincentives for bad loans resolution in the post-IPO market. This result is highly sensitive to the model specification and requires further investigation. We expect a complex interplay and potential trade-offs between increased transparency, lower ownership concentration and less incentives for the pre-listing window-dressing following the bank listing on the local exchange. Taken together, these results suggest that existing market monitoring and market discipline channels in this low-income economy are not powerful enough to generate strong incentives to clean banks' balance sheets from problem loans. Another plausible explanation is that incentives alone may not be

sufficient in resolving the NPL problem. Banks may need the actual capacity in terms of higher earning and/or capitalization to be able to clean up their balance sheets from unrecoverable debts.

For bank-level control variables, reported as a separate block in regression tables, we find several significant effects in expected directions. Undercapitalized banks exhibit difficulty in reducing their gross NPL ratio as they simply do not have substantial capital cushions to create reserves and/or write off bad loans from their portfolios. For the net NPL ratio, this effect disappears as the net NPL ratio directly accounts for the buildup of loan loss reserves. Also, a bank's increase in lending activity, as measured by the loan to asset ratio, is positively associated with an increase in the bad loan ratio especially evident in case of net NPL ratio. We also find a significant association between loan growth with NPL ratios only for gross and net NPL ratio. We only find limited evidence of an association between *de novo* banks and directed loans with NPL ratio. In our sample, larger banks seems have higher non-performing loan ratio as expected. Finally, we predicted and find a stronger positive association between market structure (i.e., concentration ratio) and the non-performing loan.

Finally, our supplementary important result is the strong role of macro-level development factors in the NPL ratios' decline (Model 6): increase in the country's economic growth and financial development is robustly associated with the shrinking NPL ratios. For example, a 1% increase in the GDP growth is associated with about a 0.75% decrease in the bank's NPL ratios. On a similar note, a 1% increase in the financial development indicator is associated with almost a 2.95% reduction in the NPL ratios.

#### *4.3. Additional tests and robustness checks*

As a final round of robustness checks, we perform several additional tests. First, we checked the delayed (allowing two lags) association between of several governance variables and

resolution of the non-performing loan and find a robust relation between audit committee activities and NPL resolution, however, we did not find any statistical relationship at conventional level between founders-controlled banks, board independence and institutional ownership with NPL ratios. Table 9 shows the lagged results of our full model including bank and time fixed effects.

[Table 9]

Second, we control for the influence of extreme outliers by winsorizing all continuous variables at the 5<sup>th</sup> and 95<sup>th</sup> percentiles of the distribution. Third, we re-estimate Model 4 in Tables 6 to 8 using robust standard errors clustered at the bank level.<sup>17</sup> As expected, this estimation produces larger standard errors; however, the result for the NIM and bank capitalization in reducing the NPL burden remains robust. Fourth, we re-estimate all regressions in Tables 6 to 8 by excluding a few special case banks, such as state-owned banks (N = 4) and *de novo* banks (N=2) that entered the industry during the sample period. Fifth, we exclude observations from the initial two-year period to allow a balanced panel of banks and to isolate the effects of the lax disclosure regime in the early years of the banking sector reforms and potentially lower quality of governance data in the 2000 and 2001 annual reports. Sixth, we substitute year time effects with the linear trend variable for modeling the gradual, across-the-board evolution of the banking sector reforms in Bangladesh. As expected, the time trend variable is highly statistically significant and suggests a strong overall reduction in the Bangladesh's banks' NPL ratios by about 2.2% or more (depending on the model specification) in each subsequent year. Seventh, we re-estimate panel OLS regressions with bank and time fixed effects using log-levels of the gross, old and net nonperforming loans instead of ratios.

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<sup>17</sup> We avoid using bank-clustered standard errors in our main regression analyses due to small number of clusters in our sample. We do, however, use heteroskedasticity-robust standard errors in all estimated regression.

Overall, the results of these robustness checks do not alter our main conclusions concerning the impact of bank governance, management and monitoring variables on the NPL resolution that we summarize in Table 10. As before, we get fragile and/or marginally significant results for the internal governance variables' role and insignificant results for the Big 4 external auditors and the external credit rating availability. At the same time, the above robustness test produces a strong association between the operating efficiency and profitability (NIM) and resolution of bad loans. They also further support the role of bank capitalization and the macroeconomic development in reducing the NPL ratios.

[Table 10]

## **5. Conclusions**

This study explores successful bad loan resolution in a low-income economy during a decade of aggressive corporate governance and market monitoring reforms. Using unique bank-level data for a representative panel of commercial banks in Bangladesh, we show that management quality, selected corporate government improvements and the macro-level economic development play a significant role in bad loans resolution. We also show that most of these improvements occur amid large-scale bank governance and credit risk management regulatory reforms that we carefully document in this study.

At the same time, we find that at the bank level, market monitoring in this low-income economy environment seems to be related to the reduction of bad loan ratios under some specifications. The last result, however, should be interpreted with caution due to the relatively small sample size that may prevent us from detecting several significant relations.

In Table 10, we summarize our major empirical findings and relate them to the regulatory reforms in this low-income economy which, as of the end of our sample period in 2012, has gradually recovered from a severe NPL problem in its commercial banking sector by relying on the no-bailout policy.

Overall, the study results provide an optimistic assessment of recovery paths towards a bad loan resolution in a vulnerable but rapidly developing banking sector. Even when external capital injections are limited, lessons from Bangladesh show that a bank's strong financial performance, operational efficiency along with loan portfolio growth, and a generation of sizeable operating income help to build up loan loss reserves and to write off accumulated bad loans. They also show that corporate governance reforms that enhance the role of the internal audit committees may also contribute to the bad loan problem resolution, even though some of these factors' effects tend to be delayed rather than immediate.

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## Appendix 1.

### A wave of the regulatory reforms in the Bangladesh's banking sector (1998-2012)

This appendix reports the timing and the content of the key regulatory reforms introduced in the Bangladeshi banking industry during the 1998 to 2012 period, including 20 regulations related to credit risk management and NPL write-offs and 8 regulations on the corporate governance improvements. We identify these regulations by browsing the full set of the Bank of Bangladesh circulars around the sample period.

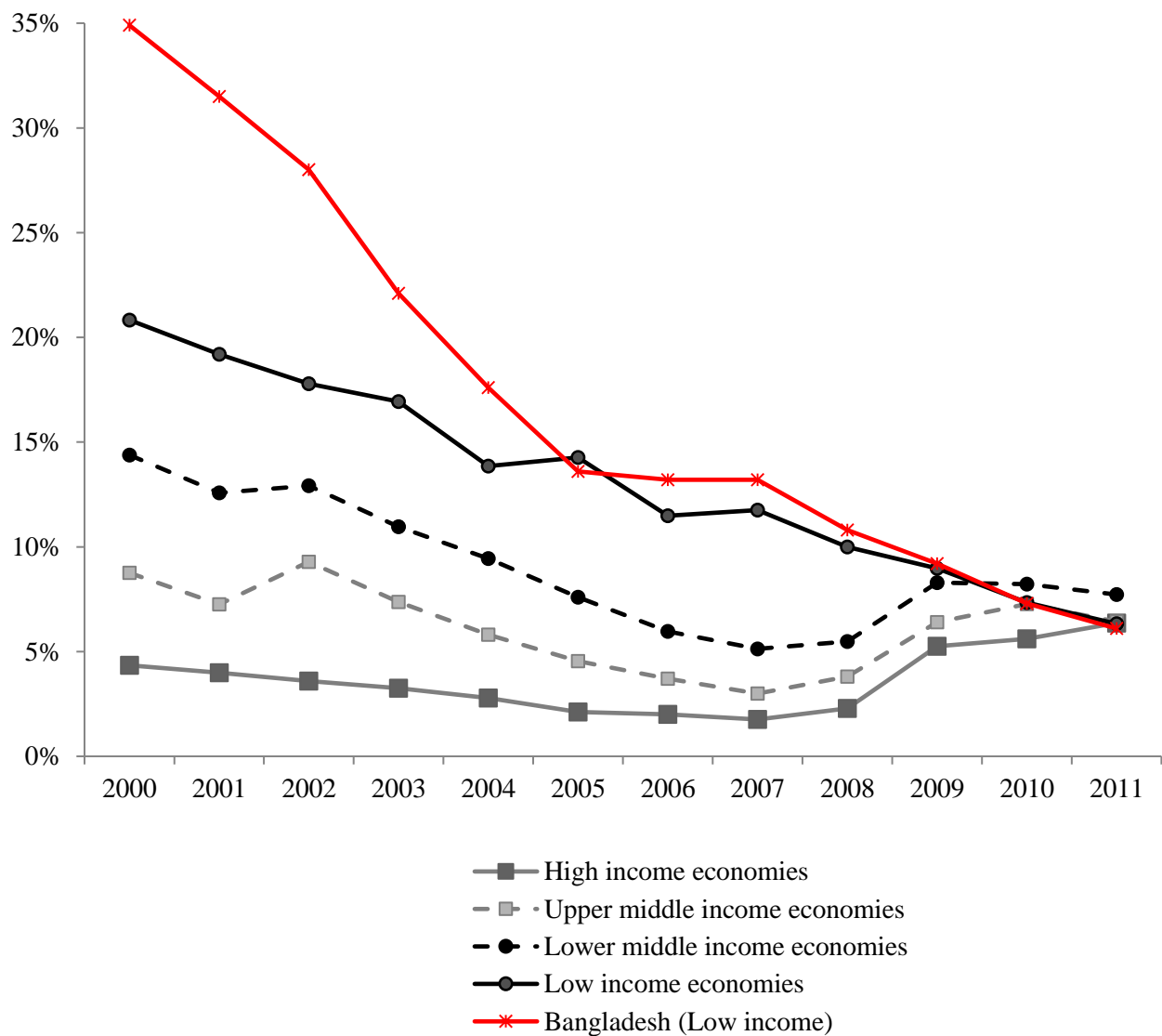
No.	Date	Regulation Title (Bank of Bangladesh Circular No.)	Primary focus
1	12/06/1998	Policy on loan classification and provision. (BRPD-16)	NPL resolution
2	05/14/2001	Policy on loan classification and provision- (Partial Modification of BRPD-16 of 1998.) (BRPD -09)	NPL resolution
3	11/24/2002	Master Circular on Capital Adequacy of Banks (BRPD - 10)	NPL resolution
4	12/23/2002	Policy of the formation of the Bank Audit Committee (BRPD - 12)	Bank governance
5	01/13/2003	Policies for rescheduling of loans (BRPD – 01)	NPL resolution
6	01/13/2003	Policy on write off of Loan (BRPD - 02)	NPL resolution
7	04/26/2003	Policy on the formation of Board of Directors and qualifications and eligibility for the appointment of Directors (BRPD - 12)	Bank governance
8	07/24/2003	Restrictions with respect to responsibilities and accountabilities of BOD and CEO of Banks (BRPD - 16)	Bank governance
9	10/07/2003	Managing Core Risks in Banking (BRPD - 17)	NPL resolution
10	01/20/2004	Reminder on provision on quarterly basis (BRPD-02)	NPL resolution
11	06/07/2004	Submission of statement of loans extended by the Bank Companies to the Directors of the Financial Institutions (BRPD - 06)	NPL resolution
12	02/15/2005	Policy on loan classification and provisioning- introduction of Special Mention Account (BRPD - 02)	NPL resolution
13	04/07/2005	Revised policy on loan classification and provision (BRPD – 04)	NPL resolution
14	08/20/2005	Policy on loan classification and provisioning- Provisioning of Special Mention Account (BRPD - 09)	NPL resolution
15	12/11/2005	Implementation of Credit Risk Grading Manual (BRPD - 16)	NPL resolution
16	02/14/2006	Other Terms and Conditions of Rescheduling (BRPD - 02)	NPL resolution
17	03/19/2006	Other Terms and Conditions of Rescheduling (BRPD - 03)	NPL resolution
18	06/05/2006	Master Circular on loan classification and provisioning (BRPD - 05)	NPL resolution
19	07/05/2006	Policies related to credit rating of banks (BRPD - 06)	Bank governance
20	08/07/2007	Master Circular on loan classification and provisioning (BPRD – 08)	NPL resolution
21	09/18/2007	General provisioning on loan against Off-Balance Sheet Exposure (BPRD – 10)	NPL resolution
22	10/09/2007	Capital adequacy and board size (BRPD – 09)	Bank governance
23	11/05/2007	Policy on the formation, tenure of Board of Directors and qualifications and eligibility for the appointment of Directors (BRPD - 11)	Bank governance
24	08/18/2008	Appointment of Depositor Directors (BRPD - 12)	Bank governance
25	04/19/2009	Rescheduling of Loans to Export Industries due to Global Recession without required down payment (BRPD-03)	NPL resolution
26	12/06/2009	Rescheduling of Loans to Export Industries due to Global Recession without required down payment (BRPD-17)	NPL resolution
27	12/21/2009	Rescheduling of Loans of affected/or Closed Industries during Care-taker Government (BRPD-18)	NPL resolution
28	02/04/2010	Restrictions with respect to responsibilities and accountabilities of BOD and CEO of Banks (BRPD - 06)	Bank governance

## Appendix 2.

### List of sample banks: Name, age, listing status, ownership type and sample years.

The study sample consists of 26 unique domestic banks in Bangladesh, including 22 private commercial banks (or PCB) and four state-owned commercial banks (or SOCB) for which we were able to hand-collect a series of hard copies of annual reports during the 2000 to 2012 period. Development banks, Islamic banks and foreign banks' branches are excluded from the study sample due to their non-comparable business models, regulatory regimes and/or data availability limitations. Collectively, the sample banks account for about 70% of Bangladesh's banking sector assets, with some variation across years.

Bank name	Founding year	Listing year	Sample years	Ownership type
AB Bank	1981	1983	2000-2012	PCB
Agrani Bank	1972	Not listed	2000-2012	SOCB
Bank Asia	1999	2003	2000-2012	PCB
BRAC Bank	2001	2007	2002-2012	PCB
City Bank	1983	1986	2000-2012	PCB
Dhaka Bank	1995	2000	2000-2012	PCB
Dutch Bangla	1995	2001	2001-2012	PCB
Eastern Bank	1992	1993	2000-2012	PCB
IFIC	1983	1986	2000-2012	PCB
Jamuna Bank	2001	2006	2002-2012	PCB
Janata Bank	1971	Not listed	2000-2012	SOCB
Mercantile Bank	1999	2003	2000-2012	PCB
Mutual Trust Bank	1999	2003	2002-2012	PCB
NBL	1983	1984	2000-2012	PCB
NCC Bank	1993	2000	2000-2012	PCB
One Bank	1999	2003	2000-2012	PCB
Premier Bank	1999	2007	2000-2012	PCB
Prime Bank	1995	1999	2000-2012	PCB
Pubali Bank Ltd	1983	1984	2000-2012	PCB
Rupali Bank	1986	Not listed	2000-2012	SOCB
Sonali Bank	1972	Not listed	2000-2012	SOCB
Southeast Bank	1995	2000	2000-2012	PCB
Standard Bank	1999	2003	2000-2012	PCB
Trust Bank	1999	2007	2002-2012	PCB
UCBL	1983	1986	2000-2012	PCB
Uttara Bank	1965	1984	2000-2012	PCB



**Figure 1. Evolution of non-performing loans by World Bank income groups: Unbalanced panel of 98 countries, 2000 – 2011.**

This graph reports the average values of the NPL/Loans ratio within each income group across time. The raw data are obtained from the World Bank Development Indicators database. During all years of reported observations, Bangladesh is classified as a low income economy.

**Table 1. Bangladesh: Economic and financial development indicators (2001 and 2012).**

Panel A presents the key macroeconomic and banking system development indicators for Bangladesh as of 2001 (the first year of available and comparable macro-level data) and 2012. Panel B describes the banking system structure for these periods. The raw macro-level data for these tables come from various issues of the Bangladesh Bank Reports and Bangladesh Bureau of Statistics economic reviews.

*Panel A. Economic development, banking system performance and problem loans*

		2001	2012
Economic development:	Population (million)	129	155
	Nominal GDP (Tk. billion)	2,536	9147.84
	Exchange rate (Tk. / \$)	54	81.82
	GDP per capita (\$)	393	839.51
Banking system development:	Banking system assets (Tk. billion)	1,280	7030.7
	Banking system assets to GDP (%)	50.5	76.86
	Loans / Assets (%)	60.6	60.6
	Deposits / Assets (%)	74.7	76.74
	Capital and reserves / Assets (%)	4.2	7.09
	Regulatory capital / RWA (%)	6.7	10.50
	NIM (%)	1.0	2.18
	ROA (%)	0.7	0.60
Problem loans indicators:	ROE (%)	15.9	8.2
	NPL (Tk. billion)	236.0	427.30
	Required to maintained provisions (%)	60.4	78.3
	Gross NPL / Total loans (%)	31.5	10.0
	Net NPL / Net loans (%)	25.6	4.4

*Panel B. Banking system structure*

Bank types	2001		2012	
	N of banks	% of system assets	N of banks	% of system assets
Private commercial banks	30	34.9	30	62.2
State commercial banks	4	46.5	4	26.0
Development financial institutions	5	11.7	4	5.5
Foreign commercial banks	11	6.9	9	6.3
Total	50	100.0	47	100.0

**Table 2. Definition of the study variables**

Variable	Definition
<b><i>Nonperforming loans:</i></b>	
Gross NPL ratio	= Classified loans / Total loans (in %), where the classified loans are defined as the sum of loss, doubtful and substandard loans.
Old NPL ratio	= Loss loans / Total loans, in %. By the Bangladesh's regulatory definition, these seasoned NPLs are overdue by at least one year.
Net NPL ratio	= (Classified loans – Specific loan loss reserves) / (Total loans – Specific loan loss reserves), in %.
<b><i>Internal governance:</i></b>	
Founders-controlled bank	= 1 if a bank is majority-controlled by “sponsors,” i.e. by a group of closely connected founding private owners.
Institutional ownership	= Percent of bank shares owned by institutional and foreign investors
Board independence	= Percent of independent and depositor directors on board
Audit committee activity	= Ln (N of disclosed audit committee meetings in a year + 1)
<b><i>Management quality:</i></b>	
Inefficiency	= Cost income ratio defined as Operating expense / Operating income, in %
NIM	= Net interest margin, in %
<b><i>Market monitoring:</i></b>	
Big 4 auditor	= 1 if a bank's external auditor is directly affiliated with one of the Big 4 global auditing firms and zero otherwise
Credit rating	= 1 if a bank has assigned and publicly disclosed credit rating issued by the licensed local agency and zero otherwise.
Public listing	= 1 if a bank is publicly listed on the stock exchange and zero otherwise
<b><i>Bank-level control variables:</i></b>	
Bank size	= Ln (Bank size in Taka thousands)
Capitalization	= Book equity to total assets, in %
Loans / Assets	= Gross loans to total assets, in %
Directed loans	= Micro and agricultural loans to total loans, in %.
Loan growth rate	= Annual logarithmic growth rate of a bank's gross loans, in %.
New bank	= 1 if a bank is three or less years old and zero otherwise.
CR3	= $\sum$ of deposits of top three banks divided by total deposits in the market in a year, in%
<b><i>Macro-level factors:</i></b>	
Economic growth	= Annual growth rate of the country's GDP, in %
Financial development	= Domestic credit to private sector to GDP, in %

**Table 3. Loan categories in the Bangladesh banking system: Regulatory definitions and distribution by years in a study sample.**

Panel A describes the Bangladesh Bank’s regulatory classification of loans by categories. In Panel B, we report the loan portfolio composition for an average sample bank during the study period.

*Panel A. Loans’ Regulatory Categories in Bangladesh Banking Sector (except Agricultural and Microcredit):*

Loan category	Regulatory definition			Provision requirements
<b>Unclassified loans:</b>				
Standard				1%
Special Mention Account	Overdue 90 days or more; introduced since 2005.			5%
<b>Classified loans:</b>				
	Months overdue by loan maturity type			
	Continuous or demand loans	Term loans, < 5 years	Term loans, > 5 years	
Sub-standard	6	6	12	20%
Doubtful	9	12	18	50%
Bad /Loss	12	18	24	100%

Panel B. Loan portfolio composition in a study sample: Mean, % of total loans (N = 330 bank-year obs.)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
<b>Unclassified loans:</b>													
Standard	80.6	83.3	85.6	88.3	91.0	92.4	91.8	89.4	91.4	92.8	94.1	92.5	85.6
SMA	-	-	-	-	-	0.7	1.2	2.0	1.6	1.3	1.2	1.50	2.5
<b>Classified loans:</b>													
Substandard	0.7	0.7	1.1	0.9	0.6	0.5	0.8	0.8	0.7	0.7	0.7	0.70	1.9
Doubtful	1.1	0.8	0.8	1.3	0.4	0.4	0.5	1.1	0.8	0.5	0.5	0.80	1.5
Loss	17.6	15.2	12.5	9.5	8.0	6.0	5.7	6.7	5.6	4.7	3.5	4.5	8.5
<b>Total loans</b>	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Panel C. Nonperforming loan ratios among State Owned and Commercial Banks in study sample: Mean, % of total loans

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Average
State-Owned Banks														
Gross NPL ratio	37.55	35.33	32.20	25.70	22.52	19.75	22.51	31.67	23.94	18.97	13.42	9.82	25.15	24.50
Old NPL ratio	37.04	31.77	29.54	22.60	21.10	18.23	19.95	25.62	21.52	16.90	11.97	8.38	18.99	21.82
Net NPL ratio	34.11	32.26	29.28	24.73	18.80	15.78	15.23	19.92	13.12	8.62	6.21	3.45	14.73	18.17
Private Commercial Banks														
Gross NPL ratio	14.27	12.44	11.06	9.24	6.56	4.60	4.15	4.36	3.99	3.53	3.06	3.45	5.99	6.67
Old NPL ratio	12.92	11.36	9.35	7.16	5.61	3.76	3.10	3.24	2.66	2.51	1.96	2.18	4.01	5.37
Net NPL ratio	9.86	7.75	6.83	5.95	4.05	2.96	2.52	2.57	2.31	2.00	1.74	2.13	3.49	4.17

**Table 4. Summary statistics: 330 bank-year observations for 26 Bangladesh banks, 2000 – 2012.**

The study sample is an unbalanced panel of 330 bank-year observations for 26 unique banks in Bangladesh over the 2000 – 2012 period. By construction, the study sample excludes Islamic banks and development financial institutions. We also exclude foreign banks branches as they do not disclose annual reports as separate entities. Raw bank-level data are hand-collected from the banks' annual reports. Macro-level data comes from the World Bank Development Indicators database. The definitions of all study variables are provided in Table 2. For dummy variables, this table reports proportion (mean values).

	Mean	SD	Min	25 <sup>th</sup> percentile	Median	75 <sup>th</sup> percentile	Max
<b><i>Nonperforming loans:</i></b>							
Gross NPL ratio	9.24	10.79	0.00	2.20	4.31	11.96	44.59
Old NPL ratio	7.73	10.01	0.00	1.28	2.85	10.18	48.00
Net NPL ratio	6.22	8.53	-0.89	1.06	2.26	6.63	37.09
<b><i>Internal governance:</i></b>							
Founders-controlled bank (0; 1)	0.40						
Institutional ownership	9.14	9.69	0.00	0.00	6.98	16.58	39.35
Board independence	4.37	9.13	0.00	0.00	0.00	7.14	50.00
Audit committee activity	1.38	0.97	0.00	0.00	1.61	2.08	3.74
<b><i>Management quality:</i></b>							
Inefficiency	46.82	19.68	20.44	35.29	42.26	51.70	175.42
NIM	2.13	1.13	-1.29	1.58	2.16	2.73	8.93
<b><i>Market monitoring:</i></b>							
Big 4 auditor (0; 1)	0.46						
Credit rating (0; 1)	0.50						
Public listing (0; 1)	0.85						
<b><i>Bank-level control variables:</i></b>							
Bank size	10.79	1.10	7.64	10.10	10.79	11.58	13.53
Capitalization	6.23	4.00	-13.41	4.56	6.43	8.29	29.68
Loans / Assets	64.22	8.50	24.64	59.67	65.14	70.46	80.77
Directed loans	4.58	5.80	0.00	0.69	2.83	6.43	40.25
Loan growth rate	22.19	18.49	-19.97	10.68	18.39	29.60	114.62
New bank (0; 1)	0.07	0.26	0.00	0.00	0.00	0.00	1.00
CR3	54.75	9.70	41.28	44.87	54.40	63.31	70.42
<b><i>Macro-level factors:</i></b>							
Economic growth	5.94	0.61	4.42	5.74	6.07	6.27	6.70
Financial development	36.03	6.34	24.67	30.17	36.16	41.51	47.05



**Table 5. Descriptive statistics: Evolution of Bangladesh banks' characteristics by year (330bank-year observation, 2000 – 2012).**

This table documents mean values by year for continuous bank-level variables and proportions for the indicator variables. It also reports the distribution of the macro-level variables by year. Definitions of all variables are provided in Table 2. The study sample is an unbalanced panel of 330 bank-year observations for 26 unique commercial banks in Bangladesh over the 2000 – 2012 period. Raw bank-level data are hand-collected from the banks' annual reports. Macro-level data come from the World Bank Development Indicators database. In the first two rows, we also report the number of bank-level observations per year and the cumulative asset market share of sample banks.

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
No of Observation	21	22	26	26	26	26	26	26	26	26	26	26	26
% of Bangladesh banking sector assets	70.0	72.8	71.8	70.8	70.7	68.4	67.6	71.8	70.9	71.6	72.5	71.80	70.85
Gross NPL ratio	18.50	16.60	14.31	11.77	9.01	6.93	6.97	8.56	7.06	5.91	4.65	4.19	8.20
Old NPL ratio	17.31	15.07	12.46	9.53	8.00	5.98	5.69	6.68	5.56	4.72	3.50	2.90	5.74
Net NPL ratio	14.27	12.20	10.28	8.84	6.32	4.93	4.48	5.24	3.97	3.02	2.43	2.29	4.78
Founders-controlled bank (0; 1)	0.55	0.50	0.58	0.54	0.50	0.46	0.46	0.38	0.35	0.31	0.23	0.23	0.19
Institutional ownership	6.20	5.36	5.53	7.09	6.82	7.10	8.99	10.84	12.15	11.77	11.46	11.90	12.61
Board independence	0.00	0.00	0.00	0.00	0.00	0.38	1.00	3.92	8.63	9.60	9.72	8.79	13.38
Audit committee activity	0.00	0.00	0.00	1.42	1.71	1.59	1.59	1.77	1.93	2.00	1.97	2.05	1.52
Inefficiency	60.73	50.29	59.88	50.25	49.40	43.49	46.10	41.29	41.00	41.10	38.67	41.93	47.26
NIM	1.48	1.82	1.68	1.73	1.90	2.10	2.20	2.21	2.41	2.26	2.70	2.67	2.41
Big 4 auditor (0; 1)	0.41	0.32	0.36	0.46	0.62	0.46	0.40	0.27	0.35	0.35	0.54	0.69	0.77
Credit rating (0; 1)	0.00	0.00	0.04	0.04	0.04	0.12	0.54	0.81	0.88	0.92	1.00	1.00	1.00
Public listing (0; 1)	0.82	0.82	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.88	0.88
Bank size	9.69	10.02	9.88	10.07	10.31	10.49	10.72	10.93	11.14	11.37	11.60	11.80	11.99
Capitalization	4.78	4.20	4.73	5.52	4.75	4.90	4.74	5.77	6.24	7.30	9.28	9.38	8.85
Loans / Assets	53.84	59.75	60.37	62.08	63.90	68.80	68.54	66.46	68.81	65.50	67.64	65.44	61.38
Directed loans	2.98	3.39	2.94	3.38	3.96	3.57	3.43	3.92	4.86	5.40	6.14	6.72	8.40
Loan growth rate		34.04	19.99	22.64	27.22	26.12	22.48	16.71	24.81	18.61	26.27	16.62	12.71
New bank (0; 1)	0.27	0.23	0.35	0.08	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Financial development	24.67	27.78	30.15	30.17	32.13	33.81	36.16	37.29	39.21	41.51	47.05	42.47	43.00
Economic growth	5.94	5.27	4.42	5.26	6.27	5.96	6.63	6.43	6.19	5.74	6.07	6.68	6.20
CR3	63.81	61.35	70.42	67.59	63.31	59.96	54.39	51.37	48.28	44.86	44.21	43.31	41.28

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**Table 6. Regression results: Determinants of the Gross NPL ratio in Bangladesh banks.**

The table reports estimation results for the determinants of the *Gross NPL ratio* in an unbalanced panel of 26 banks in Bangladesh over the 2000 – 2012 period. Definitions of variables are provided in Table 2. Robust standard errors are reported in parentheses. \*\*\*, \*\* and \* denote the significance levels at 1%, 5%, and 10% .

Independent variables	Dependent variable: Gross NPL ratio $t$					
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
<b>Internal governance:</b>						
Founders-controlled bank $t-1$	-1.733*			-1.097	-1.529	-0.744
	(0.964)			(0.974)	(1.191)	(1.693)
Institutional ownership $t-1$	-0.038			-0.068	-0.102*	-0.053
	(0.045)			(0.045)	(0.052)	(0.054)
Board independence $t-1$	0.021			0.024	-0.006	0.027
	(0.040)			(0.040)	(0.040)	(0.068)
Audit committee activity $t-1$	-0.746			-0.988*	-1.216**	-1.699***
	(0.522)			(0.516)	(0.557)	(0.495)
<b>Management quality:</b>						
Inefficiency $t-1$		0.038**		0.029*	0.087***	0.023
		(0.015)		(0.016)	(0.027)	(0.023)
NIM $t-1$		-0.750*		-0.835*	-0.682**	-1.000*
		(0.459)		(0.443)	(0.280)	(0.559)
<b>Market monitoring:</b>						
Big 4 auditor $t-1$			0.805	0.824	-0.531	0.834
			(0.628)	(0.611)	(1.003)	(0.850)
Credit rating $t-1$			-1.114	-1.231	-2.424	-1.621
			(1.001)	(0.998)	(1.434)	(1.215)
Public listing $t-1$			2.234**	2.513**	-0.316	3.649**
			(0.991)	(0.995)	(1.840)	(1.349)
<b>Macro-level factors:</b>						
Economic growth $t$						-0.749***
						(0.120)
Financial development $t$						-2.958***
						(0.737)
<b>Control variables:</b>						
Capitalization $t-1$	-0.394***	-0.310**	-0.376**	-0.339**	-0.288***	-0.374**
	(0.139)	(0.149)	(0.146)	(0.154)	(0.095)	(0.139)
Loans / Assets $t-1$	0.027	0.032	0.030	0.031	-0.026	-0.007
	(0.051)	(0.050)	(0.049)	(0.052)	(0.067)	(0.064)
Directed loans $t-1$	-0.107	-0.146*	-0.115	-0.073	-0.038	-0.055
	(0.070)	(0.080)	(0.077)	(0.083)	(0.063)	(0.110)
Loan growth rate $t$	-0.050*	-0.051*	-0.042	-0.050*	-0.110***	-0.048
	(0.025)	(0.026)	(0.026)	(0.026)	(0.033)	(0.038)
Bank size $t-1$	5.637***	5.826***	5.801***	4.756***	4.405***	4.480**
	(1.506)	(1.495)	(1.580)	(1.631)	(0.909)	(1.898)
New bank $t$	-3.696	-4.251**	-1.555	-3.669*	-4.817*	-2.246
	(2.276)	(2.139)	(2.117)	(2.053)	(2.436)	(2.034)
CR3 $t$	0.569***	0.598***	0.589***	0.454***	0.324**	0.160
	(0.109)	(0.108)	(0.116)	(0.122)	(0.133)	(0.132)
Bank fixed effects	Yes	Yes	Yes	Yes	No	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	No
Constant	Yes	Yes	Yes	Yes	Yes	Yes
Number of obs.	301	301	301	301	301	301
Adjusted R <sup>2</sup>	63.48%	65.37%	63.56%	67.05%	77.62%	61.40%

**Table 7. Regression results: Determinants of the Old NPL ratio in Bangladesh banks.**

The table reports estimation results for the determinants of the *Old NPL ratio* in an unbalanced panel of 26 banks in Bangladesh over the 2000 – 2012 period. Definitions of variables are provided in Table 2. Robust standard errors are reported in parentheses. \*\*\*, \*\* and \* denote the significance levels at 1%, 5%, and 10% .

Independent variables	Dependent variable: Old NPL ratio <sub>t</sub>					
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
<b>Internal governance:</b>						
Founders-controlled bank <sub>t-1</sub>	-1.246 (0.885)			-0.556 (0.887)	-1.487 (1.177)	-0.294 (1.495)
Institutional ownership <sub>t-1</sub>	-0.046 (0.042)			-0.075* (0.041)	-0.090* (0.051)	-0.063 (0.053)
Board independence <sub>t-1</sub>	0.033 (0.037)			0.045 (0.038)	-0.006 (0.037)	0.054 (0.068)
Audit committee activity <sub>t-1</sub>	-0.627 (0.484)			-0.864* (0.470)	-1.136** (0.516)	-1.414*** (0.446)
<b>Management quality:</b>						
Inefficiency <sub>t-1</sub>		0.035*** (0.013)		0.027* (0.014)	0.081*** (0.025)	0.016 (0.022)
NIM <sub>t-1</sub>		-0.994** (0.452)		-1.144*** (0.418)	-0.722*** (0.248)	-1.401*** (0.480)
<b>Market monitoring:</b>						
Big 4 auditor <sub>t-1</sub>			0.877 (0.547)	0.877* (0.514)	-0.573 (0.918)	0.861 (0.724)
Credit rating <sub>t-1</sub>			-0.679 (0.928)	-0.812 (0.896)	-2.158 (1.410)	-1.345 (1.113)
Public listing <sub>t-1</sub>			2.205** (0.941)	2.402** (0.952)	0.285 (1.770)	3.875*** (1.354)
<b>Macro-level factors:</b>						
Economic growth <sub>t</sub>						-0.676*** (0.123)
Financial development <sub>t</sub>						-2.641*** (0.684)
<b>Control variables:</b>						
Capitalization <sub>t-1</sub>	-0.316*** (0.114)	-0.236* (0.121)	-0.312*** (0.117)	-0.249** (0.117)	-0.293** (0.112)	-0.302*** (0.094)
Loans / Assets <sub>t-1</sub>	0.032 (0.045)	0.042 (0.043)	0.034 (0.043)	0.039 (0.044)	-0.022 (0.064)	0.013 (0.062)
Directed loans <sub>t-1</sub>	-0.040 (0.059)	-0.069 (0.073)	-0.044 (0.065)	0.001 (0.074)	-0.046 (0.062)	0.018 (0.095)
Loan growth rate <sub>t</sub>	-0.046** (0.023)	-0.047** (0.023)	-0.039 (0.024)	-0.046** (0.023)	-0.103*** (0.030)	-0.040 (0.033)
Bank size <sub>t-1</sub>	5.106*** (1.358)	4.974*** (1.331)	5.197*** (1.425)	3.944*** (1.446)	3.724*** (0.855)	3.210* (1.674)
New bank <sub>t</sub>	-2.870 (2.069)	-3.657* (1.903)	-0.847 (1.917)	-3.205* (1.860)	-4.028* (2.281)	-1.827 (1.805)
CR3 <sub>t</sub>	0.572*** (0.095)	0.573*** (0.091)	0.598*** (0.104)	0.453*** (0.111)	0.312** (0.129)	0.150 (0.119)
Bank fixed effects	Yes	Yes	Yes	Yes	No	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	No
Constant	Yes	Yes	Yes	Yes	Yes	Yes
Number of obs.	301	301	301	301	301	301
Adjusted R <sup>2</sup>	60.66%	62.33%	60.97%	64.67%	74.85%	58.49%

**Table 8. Regression results: Determinants of the Net NPL ratio in Bangladesh banks.**

The table reports estimation results for the determinants of the *Net NPL ratio* in an unbalanced panel of 26 banks in Bangladesh over the 2000 – 2012 period. Definitions of variables are provided in Table 2. Robust standard errors are reported in parentheses. \*\*\*, \*\* and \* denote the significance levels at 1%, 5%, and 10% .

Independent variables	Dependent variable: Net NPL ratio <sub>t</sub>					
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
<b>Internal governance:</b>						
Founders-controlled bank <sub>t-1</sub>	-1.966*** (0.610)			-1.108* (0.634)	-1.043 (0.831)	-0.824 (1.095)
Institutional ownership <sub>t-1</sub>	-0.012 (0.033)			-0.028 (0.031)	-0.050 (0.044)	-0.016 (0.039)
Board independence <sub>t-1</sub>	-0.007 (0.032)			0.006 (0.031)	0.024 (0.032)	0.018 (0.053)
Audit committee activity <sub>t-1</sub>	-0.510 (0.442)			-0.663 (0.438)	-0.914* (0.515)	-1.350*** (0.364)
<b>Management quality:</b>						
Inefficiency <sub>t-1</sub>		0.042*** (0.014)		0.037** (0.015)	0.078*** (0.024)	0.028 (0.023)
NIM <sub>t-1</sub>		-1.030*** (0.304)		-1.041*** (0.312)	-0.928*** (0.306)	-1.406*** (0.398)
<b>Market monitoring:</b>						
Big 4 auditor <sub>t-1</sub>			0.534 (0.491)	0.534 (0.452)	-0.860 (0.714)	0.399 (0.624)
Credit rating <sub>t-1</sub>			-0.867 (0.798)	-0.916 (0.762)	-1.868** (0.738)	-1.522** (0.676)
Public listing <sub>t-1</sub>			0.946 (0.832)	0.720 (0.710)	0.396 (1.416)	1.916** (0.849)
<b>Macro-level factors:</b>						
Economic growth <sub>t</sub>						-0.710*** (0.108)
Financial development <sub>t</sub>						-2.180*** (0.629)
<b>Control variables:</b>						
Capitalization <sub>t-1</sub>	-0.070 (0.122)	0.036 (0.136)	-0.037 (0.127)	0.019 (0.143)	-0.097 (0.080)	-0.072 (0.122)
Loans / Assets <sub>t-1</sub>	0.110** (0.045)	0.115*** (0.042)	0.110** (0.045)	0.115*** (0.043)	0.026 (0.057)	0.100** (0.048)
Directed loans <sub>t-1</sub>	0.100** (0.048)	0.075 (0.051)	0.095* (0.049)	0.117** (0.055)	-0.028 (0.052)	0.129** (0.050)
Loan growth rate <sub>t</sub>	0.015 (0.017)	0.012 (0.017)	0.020 (0.018)	0.010 (0.017)	-0.057** (0.026)	0.012 (0.017)
Bank size <sub>t-1</sub>	7.588*** (1.069)	7.467*** (1.027)	7.912*** (1.176)	6.921*** (1.102)	3.950*** (0.623)	5.370*** (0.834)
New bank <sub>t</sub>	-0.060 (1.612)	-1.191 (1.478)	1.198 (1.628)	-1.150 (1.481)	-3.008* (1.536)	-0.975 (1.409)
CR3 <sub>t</sub>	0.728*** (0.081)	0.720*** (0.075)	0.745*** (0.092)	0.632*** (0.084)	0.327*** (0.087)	0.011 (0.090)
Bank fixed effects	Yes	Yes	Yes	Yes	No	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	No
Constant	Yes	Yes	Yes	Yes	Yes	Yes
Number of obs.	301	301	301	301	301	301
Adjusted R <sup>2</sup>	67.74%	70.73%	67.07%	71.63%	77.34%	66.05%

**Table 9. Additional results: Allowing for delayed effect of the bank governance characteristics on the NPL resolution process.**

In this table we extend our regression results in Tables 7 and 8 by allowing a more slow adjustment of the three alternative NPL ratios to bank governance characteristics. Except deeper (two-year) lags for the Internal Governance proxies, all reported regressions replicate Model 4 in Tables 7 and 8, i.e. include bank and time fixed effects and the full set of the management quality, market monitoring and bank-level control variables. The number of usable bank-year observations is 275. Robust standard errors are reported in parentheses; \*\*\*, \*\* and \* denote the significance levels at 1%, 5%, and 10% levels.

Independent variables	Dependent variable:		
	Gross NPL ratio $t$	Old NPL ratio $t$	Net NPL ratio $t$
<b><i>Internal governance:</i></b>			
Founders-controlled bank $t-2$	-1.380* (0.580)	-1.159* (0.574)	-1.107* (0.587)
Institutional ownership $t-2$	-0.063 (0.048)	-0.053 (0.045)	-0.018 (0.032)
Board independence $t-2$	0.004 (0.041)	0.027 (0.035)	-0.013 (0.031)
Audit committee activity $t-2$	-1.203* (0.639)	-1.115** (0.561)	-1.001** (0.487)
Management quality variables	Yes	Yes	Yes
Market monitoring variables	Yes	Yes	Yes
Control variables	Yes	Yes	Yes
Bank fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Constant	Yes	Yes	Yes
Number of obs.	275	275	275
Adjusted R <sup>2</sup>	62.87%	64.53%	68.90%

**Table 10. Summary of results: Governance, management quality and private monitoring channels of the NPL resolution**

Factors and channels	Mandated by the regulation?	Empirical findings
<b><i>Internal governance:</i></b>		
Founders-controlled bank	Yes, directly, by enforcing banks to sell shares to the general public and by restricting the ownership stake to closely confined founding private owners.	Concentrated (founders-controlled) bank ownership is associated with lower levels of NPLs. However, this relationship is not robust and, based on the descriptive results, seems to dominate at the early stage of the banking sector reform, when other corporate governance mechanisms are not in place yet.
Institutional ownership	No; banks can have any proportion of institutional and/or foreign investors in their ownership structure.	Following the increase in the institutional and/or foreign ownership in a bank may not be strongly associated with the decrease in the ratio of NPL loans.
Board independence	Yes, directly by the capped number of directors (max 13), restrictions on the number of directors from a single family and introduction of depositor directors.	Although board independence has visibly improved during the study period in Bangladeshi banks, this advancement in bank governance characteristics are insignificantly associated with the NPL resolution.
Audit committee activity	Yes, directly by prescribing the committee's composition, responsibilities, and disclosure standards	Internal audit committee activity seems to have the most robust and consistent effect among all internal governance mechanisms in resolving NPLs. The strength of this factor also seems to increase with time, once we allow more delayed effects with a deeper lags structure.
<b><i>Management quality:</i></b>		
Inefficiency	Yes, indirectly by CEO qualification requirements	As a bank's operating inefficiency decreases by 10%, the NPL ratio in a follow-up period also drops by about 0.56% (on an average). This effect is robust across almost all model specifications.
NIM	Yes, indirectly by CEO qualifications requirements and enforcement to expedite NPL write-offs from the last period's net profit	As the bank's core operating profitability increases, all NPL ratios tend to drop. Across all model specifications, this result is economically and statistically strong and suggests about 1.01% (on an average) decrease in the NPL ratios following a 1% increase in the bank's NIM.

*(to be cont'd)*

**Table 10. (Cont'd)**

Factors and channels	Mandated by the regulation?	Findings
<b>Market monitoring:</b>		
Big 4 auditor	Yes, indirectly; the auditors are annually ranked by BB and banks should select an auditor from the approved list.	Although sample banks tend to flip their external auditors quite often during the sample period, the use of the reputable, Big4-affiliated, auditor is not significantly associated with the reduction of the NPL.
Credit rating	Yes, but only in the most recent period.	Following the assignment of a credit ratings, banks tend to reduce their NPL ratio by about 1.5% in the follow-up period.
Public listing	Yes; strong regulatory pressure and enforcement to convert private and government-owned banks to the publicly listed corporations.	Following the public listing, banks tend to increase their NPL ratios by a sizeable 2.5%. However, this result is highly sensitive to the model specification and requires further investigation. We expect a complex interplay and potential trade-offs between increased transparency, lower ownership concentration and less incentives for the pre-listing window-dressing following the bank listing on the local exchange.
<b>Other key factors:</b>		
Capitalization	Yes, through enforcing banks to maintain adequate capital ratios	Gradual increase in bank capital ratio is associated with the reduction of the total and old NPL in its portfolio. For uncovered NPLs' ratio, i.e. NPLs adjusted for accumulated loan loss reserves, we do not detect any significant relation with bank capital adequacy.
Economic growth and financial development	NA	Robust economic growth is associated with reduction of bad loan ratios in a developing banking sector.