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Resolution of Bad Loan Problem: Bank-level Evidence from a Low-income Country

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Abstract

How do banks resolve a severe bad loan problem in a capital-constrained, low income country 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 domestic banks in Bangladesh. On the aggregate level, the share of nonperforming loans in this market has dropped six fold, from above 41% in 1999 to below 7% in 2010. Notably, this dramatic improvement did not involve the creation of any centralized asset management facilities but relied on the bank management and governance reforms. We find that the gradual reduction of the bad loan ratio is primarily driven by bank-level management quality improvements and macro-level economic and financial development factors. Contrary to common belief, our results do not a support strong role of the corporate governance and the market monitoring channels in this process. Collectively, the evidence suggests the possibility of a gradual resolution of a severe bad debt problem at a bank level in a growing economy without direct government intervention.

Keywords: nonperforming loans, problem loans resolution, management quality, regulatory discipline, market discipline, banking sector reforms, emerging market banking, Bangladesh.

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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-crises recovery. This paper provides evidence on the resolution of bad loan problems when government bailout is not available for the banks.

There is now large 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[1] are found to be major determinants of non-performing loans. On the bank-level, the NPL accumulation is 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; Hu et al., 2004), 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.[2]

[1] See Barth et al. (2004) for a summary.

[2] Specially for an emerging market context, lax underwriting standards, unsophisticated credit risk management, poor regulatory discipline and regulatory forbearance (Barth, Caprio and Levine, 2004), poor incentives for the market

At the same time, the factors behind a successful *resolution* of a severe bad loan problem, especially at the bank level, remain largely unexplored. In the two companion regulatory papers, 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. [3] 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 with 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 ten-year experience of successful recovery from massive bad debts in Bangladesh. Indeed, as we show in Figure 1, there is a curious convergence trend between developed and developing economies in the last decade (2000 to 2011). While the ratio of bad loans has dropped significantly in low and lower middle economies, it has clearly been on the rise in high income countries since 2007. Figure 1 also shows that Bangladesh, a low income economy, has experienced a spectacular, six fold drop in the

monitoring, inefficient corporate governance, management entrenchment and connected lending (Khwaja, Mian and Qamar, 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.

[3] 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 Philippines.

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 commercial banks. 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 problemby using a new, hand-collected dataset for a panel of 26 banks over the 2000 – 2010 period. We trace the bank-level evolution of the bad loan ratios in response to the massive macroprudential regulation and corporate governance reforms. During the study period, the average bank in our sample reduced its gross NPL ratio from 18.5% to 4.7%. 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 largely due to the overlapping waves of regulatory shocks to the bank's internal and external governance structures which allow us to detect robust determinants of the NPL resolution process.

Our empirical results reveal that the primary bank-level driver of the bad loans resolution in a capital-constrained emerging market is the improvement in a bank management quality. We measure management quality with the net interest margin (NIM) and the inefficiency ratios 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 that macro-level development indicators - economic growth and financial development – are also strongly associated with the gradual bad loan problem resolution in an emerging banking sector. At the same time, although we document significant improvement in the governance standards and market discipline exposures for commercial banks in Bangladesh, we are unable to detect bank-level effects of these factors in speeding up bad loan recoveries.

This study provides the first and early evidence on severe bad loan problem resolution by using bank-level data in the previously unexplored low income country environment. Our results shed light on the evolution patterns of bad loans' recovery during decade-long internal and external governance reforms in a banking sector and also expand our understanding of the relative role of overlapping channels of the NPL problem solutions. 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 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 $680 in 2010. This emerging economy in South Asia is also characterized with a dense population, high vulnerability to natural disasters (floods) and long-standing political instability. In spite of all these challenges, however, the country's

banking system demonstrated significant improvements in the last decade, including a four-time increase in its total assets and twofold increases in the core capital and profitability 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 7% in 2010. This steep and successful trend in the NPL resolution makes Bangladesh a prominent outlier among its peer group of 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 active entry of the *de novo* private banks. As of the end of 2010, the country's banking sector consisted of 47 "scheduled" banks,[4] including 23 conventional private commercial banks, four state commercial banks, seven Islamic banks, [5] four specialized government development banks and nine branches of foreign banks.[6] 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 commercial banks. Although the banking system is dominated by the four state banks, their asset share reduced from 46.5% in 2001 to 28.5% in 2010 (Panel B of Table 1). As a result of these market structure changes, the private banks account for the majority of industry assets now, with a 58.8% combined asset share.

[4] The banks licensed under the 1991 Bank Company Act and operating under the Bangladesh Bank's (The Central Bank) supervision.

[5] Islami Shariah based private commercial banks operate under the Islami Shariah principles commonly denoted as the Profit-Loss Sharing model. These unconventional banking institutions are excluded from our empirical analysis.

Until recently, 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. In addition, weakly capitalized banks were reluctant to 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 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 commercial banks to write-off old bad loans. These reforms included such measures as a new loan classification system, write-off rules, 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.

Simultaneously, the government introduced and enforced a number of 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

[6] All foreign banks in Bangladesh are incorporate abroad and do not disclose separate financial statements.

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.

All the above 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. 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 11 years, from 2000 to 2010. Overall, we were able to find reports for 26 unique commercial banks, including four state banks and 22 private domestic 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 278 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 regression tables is 251.

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 a number of standard bank-level control variables that account for bank size, capitalization, lending activity and age. Below, we briefly describe the measures and the distribution of the dependent and explanatory study variables.

[Table 2]

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 the purpose of 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 remain 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.[7] For illustrative purposes, we also report the loan 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 16.8% of gross loans in 2000 to only 3.5% in 2010.

Following the BB conventions, we construct two 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 gross total 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 9.81% and it varies broadly from 0% to 44.59%, with a quartiles range from 1.97% to 15.04%.

[Table 4]

Our second and alternative 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 loan are gross loans minus loan loss reserves. We include *Net NPL ratio* in our analysis for the following two reasons. First, the *Net NPL ratio* brings additional information to the evaluation of a bank's bad loan position by accounting for the bank capacity to build up shield (reserves) against future write-offs. Second, the legal framework for bad debt recovery is cumbersome and delayed due to the weak protection of creditors' rights in Bangladesh; thus, some banks may have incentives to keep bad loans on their books for prolonged periods of time in hopes to recover them in the future from financially capable but strategically defaulting borrowers. As expected, the *Net NPL ratio* for an

[7] 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 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.

average bank is smaller than the *Gross NPL ratio* (6.72% versus 9.81%, correspondingly) 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).

3.2.2. Explanatory variables of interest.

Internal corporate governance. Bank governance variables include the bank's ownership, 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 43% 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 8.56% and a median of 5.37%. 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 3.11% and a zero at the 75th percentile of the pooled data distribution. Notably, in the Bangladesh regulatory framework, the board independence is heavily driven by a number of 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.[8]

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

[8] 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.

may fail to disclose any audit committee activity in its annual report. We classify all such cases as an indication of a low 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 4.5 per year (or 1.3 in the natural log-transformed representation).

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 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% (Table 4). We measure *Inefficiency*, the traditional measure for bank productivity, as the 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 20.76% to 175.42%, with a mean value of 47.24% and a median of 42.07%.

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 auditor. 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 2010, 88% 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 40% 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, 41% of bank-year observations in the sample are 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 6.63%. The financial development indicator demonstrates much higher variation, with an average of 34.78%, a minimum of 24.67% (in 2000) and a maximum of 47.05% (in 2010).

3.2.3. Bank-level control variables.

The core set of a bank-level financial variables that may potentially effect bad loans ratios includes asset size, 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 5.89% and it varies broadly, from -13.41% to 14.73% (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. The mean (median) Loan to Assets ratio is 64.37% (65.14%). The annual bank-level loan growth rate is high and volatile, with an average of 23.75% and a standard deviation of 19.74%. 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-controlled ones, are expected to grant such loans in accordance with 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 into direct 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 4.02%, the quartile range is from 0.62% to 5.78% and the maximum is at a high 30.43%. These statistics suggest 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.

Finally, 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 9% of the sample observations fall into the new bank category.

4. Results

4.1. Descriptive evidence

We start the exploration of bad loans' resolution patterns in a low income economy with the simple analysis of bank characteristics by years and by NPL ratio groups. Table 5 reports the evolution of mean values for all study variables across eleven sample years. In Table 6 we document the distribution of bank financial and governance characteristics by bad loan ratios. Below we highlight key findings from the descriptive statistics for each set of study variables.

[Tables 5 and 6]

4.1.1. Evolution of bank-level characteristics by year

Table 5 tracks the evolution of problem loans, corporate governance, management quality and market monitoring measures over the 2000 – 2010 period for an average sample bank. Overall, the numbers in Table 5 reveal gradual and substantial improvements in almost all components of

bank governance and financial performance. For the banks in our sanmple, the *Gross NPL ratio* drops from a high 18.5% in 2000 to only 4.65% in 2010; the *Net NPL ratio* follows a very similar pattern and decreases from 14.27% in 2000 to 2.43% 2010.

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 15% in 2010. Second, there is also a twofold increase in institutional ownership in an average bank, from 6.2% in 2000 to 11.46% in 2010. Third, board independence evolves from no independent directors on board in the first five years to a sharp increase from 0.38% to 9.72% in the last six 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 drops from 60.73% in 2000 to 38.67% in 2010. Simultaneously, the average NIM value increases almost twofold, from 1.48% to 2.70%. 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 to above 50% in 2006 and further to a high 92% 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 2010, all except three sample banks were publicly listed and traded at the Dhaka Stock Exchange.

On the macro-level, there is a pronounced upward financial development trend as the ratio of domestic private credit to GDP gradually increases twofold, from 24.67% in 2000 to 47.05% in

2010, indicating the growing role of banks in lending to the county's growing economy. The economic growth variable, however, does not change dramatically over time, averaging about 6% annual GDP growth.

The bottom part of Table 5 reports the evolution of bank-level control variables, such as bank size, capitalization and the loan portfolio composition and growth. We observe that, on average, banks in Bangladesh have substantially improved their capital buffers, from a low 4.89% in 2000 to a healthy 9.28% in 2010. Another notable pattern is the increase in average bank lending activity, which rises from well below 60% at the beginning of the period to almost 68% by the end of 2010. Annual loan growth rates, however, are volatile and do not follow any distinct pattern, ranging from 16.71% (in 2007) 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 with a number of visible and largely regulator-driven improvements in board independence, institutional ownership, market monitoring, management quality and bank capitalization.

4.1.2. Cross-tabs for NPL ratios and bank characteristics

In Table 6, we extend the prior time-series descriptive analysis by looking more closely at the distribution of bank characteristics by values of the bad loan ratios. For the purpose of this analysis, we categorize Gross NPL and Net NPL ratios into four discrete groups with the following arbitrary thresholds: 0 to 5% (banks with a moderate portfolio of bad loans), 5 to 10%, 10 to 20% and above 20% (banks with the most severe bad loans problems). We choose to explore cross-tabs instead of correlations to account for any potential non-linear patterns in data. Although more than half of the banks fall into the 0 to 5% NPL ratio category, the number of observations in the high

NPL groups is non-negligible. For instance, 17.9% of bank-years fall into the 20%+ by the Gross NPL ratio group.

[Table 6]

As reported in Table 6, higher institutional ownership, larger proportion of outside directors on board, audit committee activity, management quality and more intense market monitoring are all associated with less severe bad loan situations in a bank. As expected, there is also a strong association between bank capitalization and its ability to resolve and control bad loans portfolios. As unexpected, tight bank control by concentrated owners (as captured with the founders-controlled dummy variable) is not associated with a worse NPL situation. There is also some evidence that Directed loans contribute to bad loan problems.

Interestingly, descriptive statistics in Table 6 reveal that the issuance of new loans, as measured with the annual loan growth rate, can also improve NPL ratio indicators by simply reducing the relative weight of previously accumulated bad loans in the expanding loan portfolio. In new banks, the NPL ratios are relatively low as it usually takes time to accumulate bad loan. Finally, in regards to the macro-level factors, the cross-tabs reveal negative association between financial development and NPL ratios.

Evidently, all these trends reflect simple univariate comparisons and do not account for relationships among explanatory variables, for unobserved time-invariant, bank-specific effects and for miscellaneous system-wide, time-specific effects. In the next section, we offer multivariate regression analyses results that exploit the panel structure of our data.

4.2. Regression results

Our main regression results are presented in Tables 7 and 8. We construct a separate regression table for each of the two dependent variables, Gross NPL and Net NPL ratio. All major explanatory variables of interest, such as corporate governance, management quality and market

monitoring proxies (defined in Table 3), are one-period lagged to mitigate potential endogeneity issues. 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 is contemporaneous, as are macro-level (exogenous) variables.

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. The last model in each regression table (Model 5) exploits a cross-sectional variation among banks and uses only time fixed effects. To account for potential multicollinearity among internal governance, management quality and external market monitoring characteristics, we run separate regressions for each of these three sets of explanatory variables in Models 1 to 3; Models 4 and 5 incorporats all study variables.

[Tables 7 and 8]

Collectively, the fixed effect regressions' results in Tables 7 and 8 reveal that after accounting for bank and time fixed effects and the set of other time-varying control variables, the major driver of bad loan resolution at the bank level is 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 both dependent variables, Gross NPL and Net NPL ratios. The economic magnitude of the coefficients is also high. For example, a 1% increase in NIM is associated with an approximate 1.6% decrease in the gross NPL ratio and 1.5% decrease in the net NPL ratio in the following period. 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 0.04% decrease in each NPL ratio. Notably, management quality effects remain robust in the Model 2 and Model 4 specification and in the pooled regression framework with only time fixed effects (Model 5 in Tables 7 and 8). This result is consistent with

the idea that a bank's own performance and its ability to generate high NIM (and, to a lesser extent, control costs) plays an important 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. Therefore, we find management quality effects in the gross and net NPL ratio regressions.

Our second important result is the consistently strong role of macro-level development factors in the NPL ratios' decline: 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 4% decrease in the bank's gross NPL ratio and a 3% increase in the net NPL ratio. On a similar note, a 1% increase in the financial development indicator is associated with almost a 1% decrease in the NPL ratios. Although both effects appear to be smaller in the pooled sample specification (Model 5), they still remain statistically significant and with expected sign for the coefficients.

Our third and less expected result is that bank-level improvements in internal corporate governance and external market monitoring which exceed across-the-board improvements (and are absorbed in the time effects) play either a limited or mixed role in bad loan resolution in this emerging market context. An increase in audit monitoring activity seems to be associated with a decrease in the NPL ratio in the follow-up period; however, this result is not statistically significant across all model specifications. The effects of all other corporate governance variables included in the analysis - such as bank control type, board independence and institutional ownership - are not significantly different from zero. Moreover, in line with the prior descriptive results in Table 6, the coefficient on the founders-controlled bank dummy variables in Model 1 of Table 8 is negative and statistically significant, indicating that closely held banks may have better quality loan portfolios.

Similarly, for the external market monitoring set of variables, we do not find any significant effects on bad loan ratios across all model specifications. This result suggests that existing market

monitoring and market discipline channels in this low income economy are still insufficient to generate strong incentives to clean banks' balance sheets from problem loans. There is also a puzzling result in Models 3 and 4 of Table 7 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.

Finally, for bank-level control variables, 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 a lending activity, as measured with the loan to asset ratio, is positively associated with an increase in the bad loan ratio; however, this effect is statistically significant for the net NPL ratio only.

5. Summary and 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 and the macro-level economic development play the dominant role in bad loans resolution. At the same time, we document that at the bank level, corporate governance improvement and market monitoring in this low-income economy environment seem to play a solely cosmetic role and fail to make significant and visible contributions to the reduction of bad loan ratios. 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.

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, costs control, healthy loan portfolio growth and a generation of sizeable operating income helps to build up loan loss reserves and to write off previously accumulated bad loans.

References

Allen F., Chakrabarti R., De S., Qian J., Qian M. (2012). Financing Firms in India. *Journal of Financial Intermediation* 21, 409-445.

Barth J., Caprio G., Levine R. (2004). Bank regulation and supervision: what works best? *Journal of Financial Intermediation* 13, 205-248.

Berger A., DeYoung B. (1997). Problem loans and cost efficiency in commercial banks. *Journal of Banking and Finance* 21, 849 – 870.

Bonin J., Huang Y. (2001). Dealing with the bad loans of the Chinese banks. *Journal of Asian Economics* 12 (2), 197-214

Chalermchatvichien, P., Jumreornvong, S., Jiraporn, P., & Singh, M. (2013). The Effect of Bank Ownership Concentration on Capital Adequacy, Liquidity, and Capital Stability. *Journal of Financial Services Research*, 1-22.

Claessens, S., Djankov, S., & Klingebiel, D. (1999). Financial restructuring in East Asia: halfway there? *World Bank.*

Dado, Marinela and Daniela Klingebiel. 2000. Corporate Restructuring. Cross Country Experience with decentralized solutions. *The World Bank*, Mimeo.

Dell'Ariccia, Giovanni and Robert Marquez, 2006, "Lending Booms and Lending Standards", *Journal of Finance* 61(5), 2511-2546

Dinc S. (2005). Politicians and Banks: Political Influences on Government-Owned Banks in Emerging Markets. *Journal of Financial Economics* 77, 453–79.

Espinoza, R., Prasad A. (2010). Nonperforming Loans in the GCC Banking Systems and their Macroeconomic Effects. *IMF Working Paper* 10/224

Fofack, H. (2005). Nonperforming loans in Sub-Saharan Africa: causal analysis and macroeconomic implications. *World Bank Policy Research Working Paper* No. 3769

Foos D., Weber M., and Norden L.(2009) Loan Growth and Riskiness of Banks. *Journal of Banking and Finance* 34, 2929-2940

Fung, B., George, J., Hohl, S., & Ma, G. (2003). Public asset management companies in East Asia–case studies.Hu, J. L., Li, Y., & Chiu, Y. H. (2004). Ownership and nonperforming loans: evidence from Taiwan's banks. *The Developing Economies*, 42(3), 405-420.

Keeton, William R., and Charles S. Morris (1987). Why Do Banks' Loan Losses Differ? *Economic Review* May 1987, 3-21.

Khwaja A., Mian A., Qamar A. (2011). Bank Credit and Business Networks. *Working paper.*

Klingebiel, D. (2000). The use of asset management companies in the resolution of banking crises: cross-country experience (No. 2284). *World Bank*, Financial Sector Strategy and Policy Group.

Laeven L., Levine R. (2009). Bank Governance, Regulation and Risk Taking. *Journal of Financial Economics* 93, 259-275

Louzis D., Vouldis A., Metaxas V. (2012). Macroeconomic and bank-specific determinants of non-performing loans in Greece: A comparative study of mortgage, business and consumer loan portfolios. *Journal of Banking and Finance* 36, 1012-1027.

Salas, V. and Saurina, J. (2002), "Credit risk in two institutional regimes: Spanish commercial and savings banks", *Journal of Financial Services Research* 22, 203-24

Saunders A., Strock E., Travlos N. (1990). Ownership Structure, Deregulation, and Bank Risk Taking. *Journal of Finance* 45, 643-654.

Sinkey J., Greenawalt M. (1991). Loan-loss experience and risk-taking behavior at large commercial banks. *Journal of Financial Services Research* 5, 43–59.

Shehzad C., De Haan J., Scholtens B. (2010). The impact of bank ownership concentration on impaired loans and capital adequacy. *Journal of Banking and Finance* 34, 399–408.

Stiglitz, J. E., & Uy, M. (1996). Financial markets, public policy, and the East Asian miracle. *The World Bank Research Observer*, 11(2), 249-276.

Woo, D (2000). Two Approaches to Resolving Nonperforming Assets During Financial Crises. *IMF Working Paper*, WP/00/33, International Monetary Fund, Washington DC.

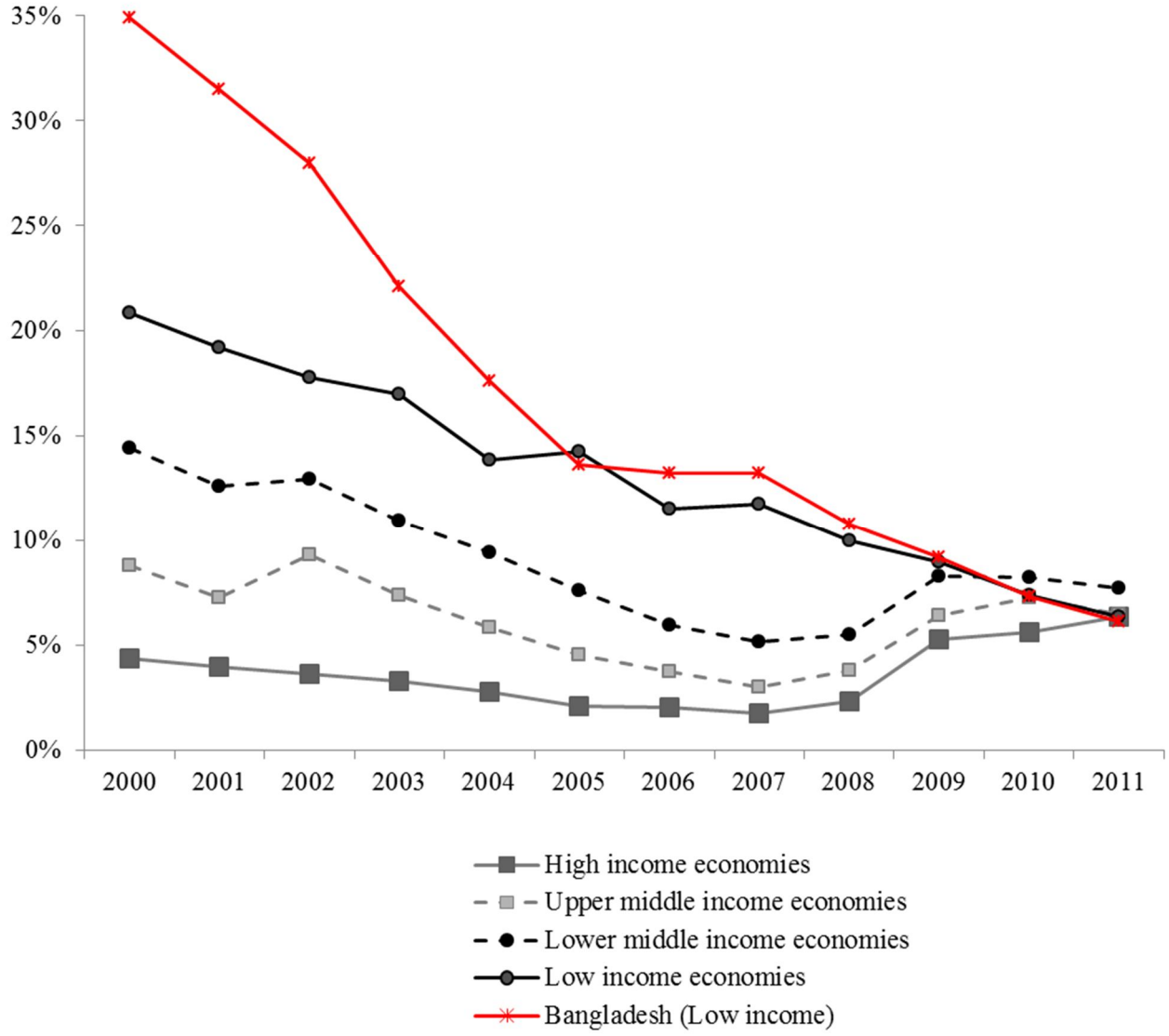

Figure 1. Evolution of non-performing loans by world bank income groups: Unbalanced panel of 98 countries, 2000 – 2011.

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 2010).
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 2010. 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	2010
Economic development:	Population (million)	129	148
	Nominal GDP (Tk. billion)	2,536	6,943
	Exchange rate (Tk. / $)	54	69
	GDP per capita ($)	393	680
Banking system development:	Banking system assets (Tk. billion)	1,280	4,855
	Banking system assets to GDP (%)	50.5	69.9
	Loans / Assets (%)	60.6	61.5
	Deposits / Assets (%)	74.7	76.7
	Capital and reserves / Assets (%)	4.2	8.6
	Regulaotry capital / RWA (%)	6.7	9.3
	NIM (%)	1.0	2.5
	ROA (%)	0.7	1.8
	ROE (%)	15.9	21.0
Problem loans indicators:	NPL (Tk. billion)	236.0	227.1
	Required to maintained provisions (%)	60.4	95.4
	Gross NPL / Total loans (%)	31.5	7.3
	Net NPL / Net loans (%)	25.6	1.3

Panel B. Banking system structure

	2001		2010	
Bank types	N of banks	% of system assets	N of banks	% of system assets
Private commercial banks	30	34.9	30	58.8
State commercial banks	4	46.5	4	28.5
Development financial institutions	5	11.7	4	6.1
Foreign commercial banks	11	6.9	9	6.6
Total	50	100.0	47	100.0

Table 2. Definition of the study variables

Variable	Definition
Nonperforming loans:	
Gross NPL ratio	= Classified loans / Total loans, in %.
Net NPL ratio	= (Classified loans – Specific loan loss reserves) / (Total loans – Specific loan loss reserves), in %.
Internal governance:	
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)
Management quality:	
Inefficiency	= Cost income ratio defined as Operating expense / Operating income, in %
NIM	= Net interest margin, in %
Market monitoring:	
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
Macro-level factors:	
Economic growth	= Annual growth rate of the country's GDP, in %
Financial development	= Domestic credit to private sector to GDP, in %
Bank-level control variables:	
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.

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
Unclassified loans:				
Standard				1%
Special Mention Account	Overdue 90 days or more; introduced since 2005.			5%
Classified loans:	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 = 278 bank-year obs.)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Unclassified loans:											
Standard	81.5	83.3	85.6	88.3	91.0	92.4	91.8	89.4	91.4	92.8	94.1
SMA	-	-	-	-	-	0.7	1.2	2.0	1.6	1.3	1.2
Classified loans:											
Substandard	0.6	0.7	1.1	0.9	0.6	0.5	0.8	0.8	0.7	0.7	0.7
Doubtful	1.1	0.8	0.8	1.3	0.4	0.4	0.5	1.1	0.8	0.5	0.5
Loss	16.8	15.2	12.5	9.5	8.0	6.0	5.7	6.7	5.6	4.7	3.5
Total loans	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 4. Summary statistics: 278 bank-year observations for 26 Bangladesh banks, 2000 – 2010.

The study sample is an unbalanced panel of 278 bank-year observations for 26 unique banks in Bangladesh over the 2000 – 2010 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 3. For dummy variables, this table reports proportion (mean values).

	Mean	SD	Min	25th percentile	Median	75th percentile	Max
Nonperforming loans:							
Gross NPL ratio	9.81	11.35	0.00	1.97	4.34	15.04	44.59
Net NPL ratio	6.72	9.07	-0.89	0.92	2.21	8.64	37.09
Internal governance:							
Founders-controlled bank (0; 1)	0.43						
Institutional ownership	8.56	9.57	0.00	0.00	5.37	16.40	39.35
Board independence	3.11	7.57	0.00	0.00	0.00	0.00	50.00
Audit committee activity	1.31	0.96	0.00	0.00	1.61	1.95	3.69
Management quality:							
Inefficiency	47.24	20.76	20.44	35.47	42.07	51.92	175.42
NIM	2.05	1.03	-1.29	1.58	2.12	2.65	4.79
Market monitoring:							
Big 4 auditor (0; 1)	0.41						
Credit rating (0; 1)	0.40						
Publicly listing (0; 1)	0.76						
Macro-level factors:							
Economic growth	5.84	0.61	4.42	5.27	5.96	6.27	6.63
Financial development	34.78	6.14	24.67	30.15	33.81	39.21	47.05
Bank-level control variables:							
Bank size	10.59	1.05	7.64	9.94	10.57	11.19	13.38
Capitalization	5.89	3.82	-13.41	4.25	6.00	7.67	14.73
Loans / Assets	64.37	8.86	24.64	59.63	65.14	70.75	80.77
Directed loans	4.02	5.05	0.00	0.62	2.26	5.78	30.43
Loan growth rate	23.75	19.74	-19.97	10.90	20.66	31.81	114.62
New bank (0; 1)	0.09						

Table 5. Descriptive statistics: Evolution of Bangladesh banks' characteristics by year (278 bank-year observation, 2000 – 2010).

This table documents mean values by year for all study variables. Definitions of the variables are provided in Table 3. The study sample is an unbalanced panel of 278 bank-year observations for 26 unique commercial banks in Bangladesh over the 2000 – 2010 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
N of observations	22	22	26	26	26	26	26	26	26	26	26
% of Bangladesh banking sector assets	70.2	72.8	71.8	70.8	70.7	68.4	67.6	71.8	70.9	71.6	72.5
Nonperforming loans:											
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
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
Internal governance:											
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	0.15
Institutional ownership	6.20	5.36	5.53	7.09	6.82	7.10	8.99	10.84	12.15	11.77	11.46
Board independence	0.00	0.00	0.00	0.00	0.00	0.38	1.00	3.92	8.63	9.60	9.72
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
Management quality:											
Inefficiency	60.73	50.29	59.88	50.25	49.40	43.49	46.10	41.29	41.00	41.10	38.67
NIM	1.48	1.82	1.68	1.73	1.90	2.10	2.20	2.21	2.41	2.26	2.70
Market monitoring:											
Big 4 auditor (0; 1)	0.41	0.32	0.38	0.46	0.62	0.46	0.38	0.27	0.35	0.35	0.54
Credit rating (0; 1)	0.00	0.00	0.04	0.04	0.04	0.12	0.54	0.81	0.88	0.92	0.92
Public listing (0; 1)	0.59	0.64	0.54	0.73	0.73	0.73	0.77	0.88	0.88	0.88	0.88
Macro-level factors:											
Economic growth	5.94	5.27	4.42	5.26	6.27	5.96	6.63	6.43	6.19	5.74	6.07
Financial development	24.67	27.78	30.15	30.17	32.13	33.81	36.16	37.29	39.21	41.51	47.05

(to be cont'd)

Table 5. ***(Cont'd)***

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Bank-level control variables:											
Capitalization	4.78	4.20	4.73	5.52	4.75	4.90	4.74	5.77	6.24	7.30	9.28
Loans / Assets	53.84	59.75	60.37	62.08	63.90	68.80	68.54	66.46	68.81	65.50	67.64
Directed loans	2.98	3.39	2.94	3.38	3.96	3.57	3.43	3.92	4.86	5.40	6.14
Loan growth rate	na	34.04	19.99	22.64	27.22	26.12	22.48	16.71	24.81	18.61	26.27
Bank size	9.69	10.02	9.88	10.07	10.31	10.49	10.72	10.93	11.14	11.37	11.60
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

Table 6. Bank-level characteristics by the gross and net NPL ratio groups.

This table reports the distribution of bank-level characteristics in the gross and net NPL ratio groups. All variables (except contemporaneous loan growth rate, new bank dummy and macro-level characteristics) are one-period lagged to the NPL ratios. The construction of lags reduces the number of usable bank-year observations from 278 to 251. The reported statistics are mean values for continuous variables and proportions for dummy variables. Definitions of all study variables are provided in Table 3.

	Gross NPL ratio $_t$				Net NPL ratio $_t$			
	0-5%	5-10%	10-20%	20%+	0-5%	5-10%	10-20%	20%+
N of bank-year obs.	145	34	27	45	175	21	33	22
% of sample	57.8	13.5	10.8	17.9	69.7	8.4	13.1	8.8
Internal governance:								
Founders-controlled bank $_{t-1}$	0.63	0.47	0.11	0.11	0.60	0.19	0.12	0.09
Institutional ownership $_{t-1}$	10.82	8.88	4.58	1.95	10.48	4.62	3.01	2.34
Board independence $_{t-1}$	3.01	3.76	0.77	0.60	3.14	1.90	0.69	0.00
Audit committee activity $_{t-1}$	1.40	1.59	1.16	0.53	1.45	1.13	0.90	0.24
Management quality:								
Inefficiency $_{t-1}$	42.09	46.05	53.51	65.60	42.59	52.03	59.10	71.36
NIM $_{t-1}$	2.34	2.42	1.66	0.74	2.34	2.00	1.15	0.45
Market monitoring:								
Big 4 auditor $_{t-1}$	0.48	0.38	0.30	0.24	0.45	0.38	0.27	0.23
Credit rating $_{t-1}$	0.42	0.47	0.22	0.11	0.43	0.33	0.12	0.05
Public listing $_{t-1}$	0.78	0.88	0.74	0.53	0.79	0.76	0.70	0.45
Macro-level factors:								
Economic growth $_t$	5.90	6.02	5.90	5.53	5.93	5.77	5.72	5.49
Financial development $_t$	35.98	36.57	33.68	30.79	36.15	34.53	32.91	28.81
Bank-level control variables:								
Bank size $_{t-1}$	10.16	10.48	10.91	11.34	10.24	10.68	11.06	11.48
Capitalization $_{t-1}$	6.81	6.20	3.33	0.97	6.70	3.77	1.48	1.41
Loans / Assets $_{t-1}$	65.90	66.05	59.19	60.23	65.99	59.37	60.37	60.11
Directed loans $_{t-1}$	3.15	2.83	3.64	6.79	3.18	4.47	3.80	8.27
Loan growth rate $_t$	33.15	17.82	9.25	6.63	30.39	12.81	7.12	6.31
New bank $_t$	0.15	0.00	0.00	0.00	0.13	0.00	0.00	0.00

Table 7. 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 – 2010 period. Definitions of variables are provided in Table 3. The robust standard errors are in parentheses, below the coefficient estimates. ***, **, and * signify 1%, 5% and 10% significance.

Independent variables	Dependent variable: Gross NPL ratio				
	Model 1	Model 2	Model 3	Model 4	Model 5
Internal governance:					
Founders-controlled bank $_{t-1}$	-1.570			-0.356	-1.849
	(1.203)			(1.264)	(1.427)
Institutional ownership $_{t-1}$	-0.077			-0.095*	-0.082
	(0.058)			(0.054)	(0.061)
Board independence $_{t-1}$	0.002			-0.020	0.023
	(0.054)			(0.051)	(0.050)
Audit committee activity $_{t-1}$	-0.763			-0.949*	-1.021**
	(0.577)			(0.542)	(0.498)
Management quality:					
Inefficiency $_{t-1}$		0.036**		0.031*	0.087***
		(0.018)		(0.019)	(0.027)
NIM $_{t-1}$		-1.591***		-1.558***	-0.816**
		(0.441)		(0.433)	(0.380)
Market monitoring:					
Big 4 auditor $_{t-1}$			0.642	0.708	-0.899
			(0.701)	(0.640)	(1.190)
Credit rating $_{t-1}$			-0.840	-1.024	-2.221
			(1.143)	(1.112)	(1.458)
Public listing $_{t-1}$			2.474**	2.763***	-0.119
			(1.074)	(1.060)	(1.825)
Macro-level factors:					
Economic growth $_{t}$	-3.706***	-4.000***	-4.057***	-3.729***	-3.243***
	(0.807)	(0.715)	(0.729)	(0.784)	(0.813)
Financial development $_{t}$	-0.763***	-0.753***	-0.767***	-0.554***	-0.385*
	(0.156)	(0.146)	(0.179)	(0.175)	(0.144)
Control variables:					
Capitalization $_{t-1}$	-0.466**	-0.400**	-0.464**	-0.440**	-0.334**
	(0.186)	(0.189)	(0.194)	(0.207)	(0.125)
Loans / Assets $_{t-1}$	0.032	0.039	0.032	0.042	0.006
	(0.054)	(0.053)	(0.052)	(0.053)	(0.066)
Directed loans $_{t-1}$	-0.117	-0.191*	-0.122	-0.126	-0.027
	(0.097)	(0.101)	(0.103)	(0.109)	(0.107)
Loan growth rate $_{t}$	-0.040	-0.042	-0.036	-0.039	-0.106***
	(0.027)	(0.028)	(0.028)	(0.028)	(0.035)
Bank size $_{t-1}$	6.731***	6.338***	6.507***	5.644***	4.188***
	(1.594)	(1.440)	(1.638)	(1.619)	(1.165)
New bank $_{t}$	-3.201	-4.300**	-1.004	-3.451*	-4.537*
	(2.274)	(2.095)	(2.036)	(2.002)	(2.424)
Bank fixed effects	Yes	Yes	Yes	Yes	No
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes	Yes
Number of obs.	251	251	251	251	251
Adjusted R^2	84.60%	85.89%	84.64%	85.99%	79.24%

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 – 2010 period. Definitions of variables are provided in Table 3. The robust standard errors are in parentheses. ***, **, and * signify 1%, 5% and 10% significance.

Independent variables	Dependent variable: Net NPL ratio				
	Model 1	Model 2	Model 3	Model 4	Model 5
Internal governance:					
Founders-controlled bank $_{t-1}$	-1.997***			-0.626	-1.138
	(0.728)			(0.783)	(0.945)
Institutional ownership $_{t-1}$	-0.044			-0.043	-0.039
	(0.043)			(0.039)	(0.051)
Board independence $_{t-1}$	0.001			-0.013	0.047
	(0.043)			(0.038)	(0.034)
Audit committee activity $_{t-1}$	-0.489			-0.574	-0.917*
	(0.500)			(0.467)	(0.545)
Management quality:					
Inefficiency $_{t-1}$		0.038**		0.036**	0.075***
		(0.015)		(0.016)	(0.025)
NIM $_{t-1}$		-1.496***		-1.463***	-1.135**
		(0.330)		(0.331)	(0.454)
Market monitoring:					
Big 4 auditor $_{t-1}$			0.489	0.541	-1.031
			(0.572)	(0.515)	(0.845)
Credit rating $_{t-1}$			-0.820	-0.867	-1.863**
			(0.882)	(0.818)	(0.779)
Public listing $_{t-1}$			0.899	0.737	0.164
			(0.869)	(0.757)	(1.418)
Macro-level factors: :					
Economic growth $_{t}$	-2.948***	-3.116***	-3.222***	-3.010***	-2.323***
	(0.692)	(0.536)	(0.597)	(0.646)	(0.681)
Financial development $_{t}$	-0.935***	-0.907***	-0.926***	-0.775***	-0.437***
	(0.126)	(0.114)	(0.149)	(0.134)	(0.112)
Control variables:					
Capitalization $_{t-1}$	-0.031	0.036	-0.004	0.025	-0.083
	(0.138)	(0.154)	(0.147)	(0.167)	(0.107)
Loans / Assets $_{t-1}$	0.103**	0.109**	0.106**	0.112**	0.035
	(0.048)	(0.044)	(0.047)	(0.045)	(0.057)
Directed loans $_{t-1}$	0.130*	0.060	0.116	0.101	-0.053
	(0.074)	(0.076)	(0.078)	(0.082)	(0.091)
Loan growth rate $_{t}$	0.014	0.014	0.018	0.012	-0.048*
	(0.018)	(0.018)	(0.019)	(0.018)	(0.027)
Bank size $_{t-1}$	7.620***	7.433***	7.849***	7.073***	4.178***
	(1.128)	(1.027)	(1.216)	(1.135)	(0.788)
New bank $_{t}$	-0.346	-1.526	1.054	-1.362	-3.024*
	(1.562)	(1.424)	(1.490)	(1.432)	(1.558)
Bank fixed effects	Yes	Yes	Yes	Yes	No
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes	Yes
Number of obs.	251	251	251	251	251
Adjusted R^2	85.56%	87.62%	85.38%	85.99%	79.24%