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BANK SPECIFIC, BUSINESS AND INSTITUTIONAL
ENVIRONMENT DETERMINANTS OF BANKS
NONPERFORMING LOANS:
EVIDENCE FROM MENA COUNTRIES

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Abstract

The paper empirically analyzes the determinants of nonperforming loans (NPL) and the potential impact of both business and institutional environment on credit risk exposure of banks in the MENA region. Looking at a sample of 46 banks in 12 countries over the period 2002–2006, we find that, among bank specific factors, foreign participation coming from developed countries, high credit growth and loan loss provisions reduce the NPL level. However, highly capitalized banks experience high level of credit exposure. Credit quality of banks is also positively affected by the relevance of the information published by public and private bureaus. Finally, our findings highlight the importance of institutional environment in enhancing banks credit quality. Specifically, a better control of corruption, a sound regulatory quality, a better enforcement of rule of law, and a free voice and accountability play an important role in reducing NPL in the MENA countries.

ملخص

تتناول هذه الورقة، بالتحليل التجريبي، العوامل المحددة للقروض المصرفية غير العاملة و الأثر المحتمل لكل من العمل و البيئة المؤسسية علي التعرف علي مخاطر الائتمان لدى البنوك في منطقة الشرق الأوسط و شمال أفريقيا. بإلقاء نظرة فاحصة علي عينة من 46 بنك في 12 دولة خلال الفترة من 2002 إلي 2006، يتبين لنا انه من بين العوامل المحددة للصناعة المصرفية أن المشاركة الأجنبية التي تأتي من الدول المتقدمة و النمو الائتماني المرتفع الي جانب مخصصات خسائر القروض تقلل من مستوي القروض غير العاملة. و علي أي حال، فان البنوك ذات رؤوس الأموال العالية تكون أكثر عرضة للمخاطر الائتمانية. نجد أيضا أن الجودة الائتمانية للبنوك قد تأثرت إيجابا بصلة المعلومات التي نشرتها المكاتب الخاصة و العامة بالموضوع . و أخيرا، أظهرت هذه النتائج أهمية البيئة المؤسسية في تعزيز جودة الائتمان لدى المصارف. و بصورة أدق، فان الحد من الفساد و الجودة المنظمة و التطبيق الأفضل للقوانين و قابلية محاسبة المسئولين تلعب كلها دورا مهما في تقليل نسبة القروض المصرفية غير العاملة في بلاد الشرق الأوسط و شمال أفريقيا .

1. Introduction

The banking sector is the main source of financing in the MENA countries. Stock markets are relatively new and are a secondary method of raising funds for firms and economic agents. Despite several reforms and developments, financial systems still perform modestly. This may be due to governments' interference in the banking sector, the lack of competitiveness as well as the weaknesses of the legal systems. However, financial soundness indicators as well as financial development exhibit severe disparities between MENA countries.

More specifically, Financial Sector Assessment Programs (FSAP) conducted in several countries from the MENA region[1] by the World Bank jointly with the IMF, report high levels of unproductive debts in these countries. Tunisia and Egypt exhibit the highest levels of NPL, with 21% and 24% of gross loans over the period 2002–2006 respectively. Problem loans are also problematic in United Arab Emirates (12% of gross loans) despite recent financial system reforms. At the opposite end, other countries such as Kuwait and Saudi Arabia do not seem to suffer from problem loans (4% and 5% respectively). Examining the drivers of these NPL at the bank level and the possible impact of the legal and the business environment on credit risk is thus a key issue for both regulators (local and international) and bankers.

Following recommendations of international regulators, several MENA countries have adopted the minimum capital requirements for their banks as imposed by the first Basel Accord. The date of implementation of these regulations varied across countries: Jordan was the first country to impose the Cooke ratio (1992) and Tunisia (1999) was the last country to catch up. Besides, the level of the minimum capital requirement varies from country to country. It ranges from 8% (Malta, Saudi Arabia, Tunisia, Yemen and Morocco), 10% (Qatar, United Arab Emirates and Egypt) and 12% (Kuwait, Jordan, Bahrain, Oman and Lebanon). Few other countries have started implementing the new Basel Accord.

A limited number of empirical studies have examined the impact of the capital regulation on bank credit risk. Murinde and Yaseen (2004) examining a panel of 11 MENA region countries over the 1995–2003 period find that regulatory pressure positively impacts risk taking behavior of banks. Ben Naceur and Kandil (2009) report that imposing a higher capital adequacy ratio following the implementation of the Basel Accord by five MENA countries led to the expansion of credit activities among banks. These studies did not, however, examine the direct relationship between credit risk and capital adequacy regulation.

The aim of this research is twofold. First, it seeks to explain differences in NPL levels amongst MENA banks. Second, it addresses the possible impact of business and institutional environment on the rate of banks' problem loans. Besides, this research extends the relatively scarce literature on the determinants of NPL as only a limited number of studies have investigated the determinants of problem loans on a cross-country basis (Sinkey and Greenawalt, 1991; Kwan and Eisenbeis, 1997 and Salas and Saurina, 2002). Moreover, this issue has not yet been examined for countries from the MENA region.

Based on existing literature, we model NPL disparities between banks and over time as a function of both bank specific and environmental factors. The former serves to capture differences between banks in terms of ownership structure, credit and provisions policies and level of regulatory capital. The latter category allows us to control differences in business and institutional environment both between countries and over time to assess the link between their effectiveness and a well-functioning financial system (Barth et al., 2006, Kaufmann et al., 2008). The impact of business environment is captured through information on getting credit including measures of credit sharing, depth of credit information and legal rights

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[1] Tunisia, Algeria, Morocco, Egypt and United Arab Emirates.

variables. Finally, the institutional category considers the six governance indicators compiled by Kaufmann et al. (2008).

Our empirical analysis is based on a sample composed of 46 commercial banks from 12 MENA countries over the period 2002–2006. We use a random-effects panel regression model that controls for cluster effects at the country level. Our results show that (i) foreign participation from developed countries reduces the NPL level, (ii) highly capitalized banks experience high levels of NPL, (iii) high credit growth is associated with a reduced level of problem loans and finally (iv) loan loss provisions are regarded as a controlling mechanism over expected loan losses. Regarding business environment factors, it appears that only the relevance of information published by credit bureaus favorably impacts the credit exposure of banks. Finally, our results highlight the importance of institutional environment in enhancing banks credit quality. Specifically, a better control of corruption, a sound regulatory quality (effective implementation of regulation and promotion of the private sector), an increased enforcement of the rule of law, and a free and effective participation in political issues (voice and accountability) play an important role in reducing NPL in MENA countries.

The remainder of the paper is organized as follows. The second section reviews the literature on the determinants of bank NPL. The third section describes data and the methodology used. The fourth section analysis the results. The last section concludes the paper.

2. Literature Review and Hypotheses Development

2.1 Bank specific determinants

The credit policy of the bank plays an essential role in determining the subsequent levels of NPL. To maximize the short run benefits, managers seek to rapidly expand credit activities and may hence take inadequate credit exposures. Keeton (1999) suggests that rapid growth of loans can be triggered by return maximization strategies. In fact, interest revenues are the main source of return creation in banks. Particularly, during periods of economic growth, the financial institutions engage in market share conquest campaigns discarding the necessary assessment of credit quality of borrowers (Fernandez De Lis et al., 2000). The search for rapid growth of loans is achieved by either reducing interest rate charged to borrowers or by lending to lower credit quality borrowers. This will lead, through adverse selection reasoning, to an increase in problem loans. Fries et al. (2002) support the same conclusion relating NPL to credit growth rates. They suggest that managers engaging in Gambling Resurrection. Policies prefer more speculative aspects to maximize short term gains. This schema is further aggravated by the conduct of income smoothing activities, which delays the discovering by shareholders of the dangers and impacts of such strategies.

Empirically, Kwan and Eisenbeis (1997) find a U-shaped relationship between bad loans and loans growth. At a low growth rate, loans growth has a negative effect on the number of bad loans. As loans growth rate exceeds a certain point, further loans growth increase bad loans. In the same vein, Boudriga and Jellouli (2008) examining a sample of 10 major Tunisian banks report a negative relationship between credit to total assets ratio and NPL. They argue that the more the bank is concentrated in credit activities the better it controls borrowers' solvency.

The capital adequacy ratio is used, theoretically, as a tool to control excessive risk taking by banks and to prevent them from being insolvent through recapitalization (Basel Accord). Banks with level of capital adequacy ratio (CAR) less than the regulatory minimum are forced to adjust their balance sheet to comply with the regulatory requirement either by raising more capital (holding assets constant) or reducing risk-weighted assets (holding capital constant) (Dewatripont and Tirole, 1994). In fact, raising the level of capital relative to risky assets by either means could have a beneficial impact on the bank performance (Fries

et al., 2002). Empirically, there is no consensus on the benefits of more stringent capital regulations. On one hand, Sinkey and Greenawalt (1991), based on 154 American banks over 1984–1987, show that banks with adequate capital ratio during the three years preceding the year of study experience lower rates of NPL. On the other hand, banks with high levels of CAR may be encouraged to embark on riskier activities leading to riskier credit portfolios. Rime (2001) corroborates this argument using data for Swiss banks over the period 1989–1995. He puts forward that Swiss banks tend to increase their capital adequacy ratio, as it approaches the minimum regulatory level.

Loan loss provisions are regarded as a controlling mechanism over expected loan losses. Theoretically, higher levels of NPL should be associated with high rates of lagged provisioning (Hasan and Wall, 2004). Banks anticipating high levels of capital losses should create higher provisions to decrease earnings volatility and to reinforce medium-term bank solvency. Managers can also use loan loss provisions to signal the financial strength of their banks and therefore the overall bank attitude toward risk control. The willingness of a bank to provision for loan losses is regarded as a strong belief in the future performance of the bank (Ahmed et al., 1999). This may be done through raising general provisions which are set without regard to the occurrence of a default event. General provisions are made as a percentage of the total credit offered in a given year. Specifically, in countries with static provisioning (as in the MENA countries), the use of general provisioning is the only way to reduce future loan losses.

Bank performance may determine the risk taking behavior of managers. Banks with high profitability are less pressured with regards to revenue creation and thus less constrained to engage in risky credit offerings. However, inefficient banks are tempted to grant and to engage in more uncertain credit to defend their profitability and meet the prudential rules imposed by the monetary authorities. Godlewski (2004) using the return on assets (ROA) as a proxy for performance[2], shows that banks profitability negatively impacts the level of NPL ratio.

Theoretically, diversification reduces risk taking as it makes possible the compensation for losses in some products by gains in others (Winton, 1999). Banks are usually exposed to revenue creation pressure and thus constrained to engage in risky credit offerings. The potential losses on the loan activity may be overcome by looking for non-interest sources of revenues (financial revenues and capital gains). For well diversified banks, where non-interest revenues are important, NPL should be lower than for less (poorly) diversified financial institutions. Hu et al. (2004), using the "entropy index"[3] do not find a significant relationship between NPL and revenue diversification for a panel of 40 Taiwanese banks during 1996–1999. They argue that diversification could not be used as an efficient mean to reduce the proportion of problem loans, especially when the main source of revenue is from loans. Thus, only an effective revenue diversification will lead to a decrease in the rate of problem loans. Micco et al. (2004) using a panel of developing countries over the period 1995–2002 find that non-operating revenues are positively correlated to problem loans.

Size is also hypothesized to be negatively linked to credit risk exposure. As noted by Hu et al. (2004), this could indicate that larger banks have more resources, and are more experienced in dealing better with bad borrowers. Small banks, on the contrary, may be exposed to the adverse selection problems due to the lack of sufficient competencies and experience to effectively assess the credit quality of borrowers. Income creation pressure is also higher for small banks leading them to lend to 'bad' customers.

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[2] The ROA is the indicator widely used in empirical studies as a proxy of profitability.

[3] Entropy index $= -\sum_{j=1}^{n} S_j \ln S_j$; where S_j is the share of jth revenue and n is the number of revenue sources.

Foreign ownership seems to have a positive impact on banks' performance. Levine (1996) suggests that foreign shareholding improves the supply and the quality of financial services, enhances the overall supervisory environment and eases the access to international financial markets. In the same vein, Lensink and Hermes (2004) find that foreign ownership contributes to improve human capital through better management bringing, better skills and technologies, in particular in developing countries. This international expertise will also contribute to improve local competencies through training and knowledge transfer. Brealey and Kaplanis (1996) report that the presence of foreign banks may enhance foreign direct investment in the non-financial sector. Empirically, Barth et al. (2002) find a negative effect of foreign ownership on NPL leading to improve domestic banks credit quality. Micco et al. (2004), examining a panel of emerging countries, find that foreign controlled banks are better performing than domestic ones. At the same time, Boubakri et al. (2005) show that foreign participation reduces the level of risk taking among banks from developing countries.

However, it is essential to highlight that the impact of foreign participation depends on its origin (from developing vs. developed countries). Particularly, foreign participation in the MENA region, which has only developed recently due to barriers to entry, originates from both Arab and western countries. This foreign presence also exhibits some disparities between countries. These differences are related to the share of bank assets owned by foreign countries which varies between 0 for Yemen to 68 percent for Jordan (the most widely open banking sector in the region).

State ownership may play a role in shaping the behavior of bankers' risk taking and consequently the level of NPL. Salas and Saurina (2002) argue that to enhance the economic development of the country, state-owned banks have more incentives to fund riskier projects and to allocate more favorable credit to small and medium SMEs. This inadequate risk taking behavior (compared to the return profile) would lead to a higher level of NPL. Micco et al. (2004) report that state-owned banks tend to have higher levels of NPL, due to their weak credit recovery capacity compared to privately owned banks. Examining financial institutions with different ownership types covering 119 countries, they conclude that NPL tend to be higher for banks with state ownership than for other groups. This result is explained by the development mandate given to state-owned banks in developing economies. Also, Hu et al. (2004) find a positive correlation between capital share owned by the state and the level of NPL for a panel of Taiwanese banks. In the context of developed countries, Garciýa-Marco and Robles-Fernàndez (2007) find that Spanish commercial banks (private) are more exposed to risk than deposit banks (mainly state owned).

2.2 Business environment and NPL

It is commonly accepted in the literature and empirical works that business environment defines the conditions under which firms and individuals operate and impact the opportunities of growth in a country. It encompasses features of the legal, regulatory, financial, and institutional system of a country. In this study, we focus on aspects of the business environment related to getting credit provided by the Doing Business database[4]. The items provided by this database are supposed to have a direct impact on bank credit risk. It includes measures of credit information sharing and legal rights of borrowers and lenders. The level of information sharing among creditors and legal rights are likely to have an important influence on bank risk taking. Specifically, these indicators reflect the coverage, the scope, the quality and the accessibility of credit information available through public and private credit registries. Second, they indicate the extent to which collateral and bankruptcy laws facilitate lending.

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[4] www.doingbusiness.org.

Information sharing quality between borrowers and lenders leads, through improved credit risk assessment and reduced information asymmetry, to a more efficient allocation of credit (Galindo and Miller, 2001 and Jappelli and Pagano, 2002). In economies where information asymmetry is high, lenders are not able to observe the true credit quality of borrowers, which induces adverse selection problems (Jappelli and Pagano, 2002). Pagano and Jappelli (1993) suggest that enhanced information sharing contributes to reduce defaults among borrowers, as adverse selection problems are mitigated. The market response to information failures takes the form of institutional innovations, particularly the creation of either public or private credit bureaus. The existence of credit registries implies higher transparency, better market discipline and therefore less defaults on loans. Godlewski (2004) argues that the existence of such registries induces higher transparency and better market discipline forces. Besides, as noted by Padilla and Pagano (2000), credit bureaus may act as a borrower discipline device. If borrowers know that lenders will share their information on defaulting customers, they will be more cautious about their repayment records. This will create an incentive to borrowers to better perform. However, in countries where the information provided by credit bureaus is either incomplete, inadequate or is inappropriately used due to lack of competencies, credit registries do not play a disciplining role on credit risk taking. Indeed, while some agencies collect and distribute extensive information on total credit exposure by a borrower, ratings, late payments and defaults, court records of the company and its owners, others disseminate only limited and consolidated information (Miller, 2003). Due to differences on the nature and depth of credit information, it is worthwhile to explore whether public credit registries and private bureaus have different impacts on bank risk taking.

Legal rights are hypothesized to impact credit risk taking and to be correlated with financial and economic outcomes (La Porta et al., 1998). Conflicting results are reported with regards to the impact of legal rights protection on financial outcomes. On one hand, Japelli and Pagano (2002) and Qian and Starhan (2007) show that poor rule of law predicts higher credit risk. Djankov et al. (2007) expanding their measure of legal formalism, report improved lending activities for legal systems with better legal rights and enforcement efficiency. On the other hand, in less developed countries, informational efficiency seems to play a more important role in driving financial outcomes, in particular lending activities.

2.3 Institutional environment and NPL

The institutional environment within which the banking system operates is a very important determinant of credit quality. In the last decade, most of the MENA countries undertook several institutional reforms intended primarily to improve the international openness and economic stability. Widespread research has since been conducted in order to examine the role of institutions in economic growth. These studies concluded that higher growth rates are associated, generally, with an effective enforcement of civil property rights and sound regulatory systems. In contrast, the relationship between institutions and NPL has not been sufficiently examined by the literature (Godlewski, 2004 and Breuer, 2006). This analysis contributes to fill this gap.

The institutional environment includes the legal and judicial framework, the political stability, and the degree of corruption control. Although a well functioning government system is known to influence the performance of the financial system, there is little evidence linking well-functioning institutions and good governance to banks' financial outcomes such as NPL (Kaufmann et al., 2008). These factors appear to be important in determining cross-country differences in credit quality. For instance, in many developing countries, banks suffer from the significance of NPL. These countries are most characterized by inefficient judicial systems, corrupt bureaucracy or political institutions. These features hinder either the process

of extending credit or the process of control and recovery once the loan is granted (Creane et al., 2004).

More specifically, the existence of corruption negatively impacts the degree of market competitiveness and thus leads to inefficient loans offering. Johnson and Wilson (2000) suggest that in societies with little democratic traditions and civil discipline, decision makers are exposed to informal connections and other pressures from groups seeking unjustified or illegal economic rents. In this context, loan decisions are affected by the intensity of pressures from political lobbying by various interest groups. Loans will thus be gained by enterprises with solid political connections, but could be of lower quality (even in severe distress). Furthermore, internal control tends to decrease for countries with corrupt civil society.

In much of the MENA region, the quality of institutions, including the judicial system, bureaucracy, law and order and property rights, is poor albeit with some disparities between the different countries (Creane et al., 2004). It seems worthwhile to investigate whether the differences in banks' credit exposure is linked to the quality of institutions in each country.

3. Data and Methodology

3.1 Data

In this study, we investigate how bank specific factors, country's institutions and business environment affect NPL in the MENA region. We consider a sample of 46 banks from 12 countries for the years 2002–2006. The data used in this study is drawn from three main sources:

i. Bank-level financial statements and ownership information are obtained from the Bankscope database. The original sample covered the 21 MENA countries as defined by the World Bank, and a total of 584 banks. The sample selection procedure was as follows. First, to ensure the homogeneity of data used, only commercial banks were selected. Other special financial institutions such as Islamic and Investment banks were excluded for international comparison purposes. This led to a sample of 351 banks. Second, we considered only unconsolidated financial statements to better capture the effect of individual NPL leading to a sample of 238 banks. Third, 182 banks, for which data on NPL and capital adequacy ratio were not available were excluded from the sample. Finally, 10 banks were eliminated due to lack of information on ownership structure. This reduced the sample to a balanced panel of 46 banks from 12 countries[5] consisting of a total of 230 observations over the period 2002–2006.

ii. Country level data on information sharing measures and legal rights is taken from the Djankov, McLiesh, and Schleifer (DMS) (2007) and "Doing Business" database.

iii. Country level data on institutional environment is provided by the World Governance Indicators compiled by Kaufmann et al. (2008). This database is based on 276 individual variables taken from 37 data sources produced by 31 different organizations. This database is particularly used in the literature to analyze the role of institutions in shaping economic outcomes.

Finally we use the Financial Structure dataset as developed by Beck, Demirguc-Kunt and Levine (2008) to control for financial structure, and the World Economic Outlook (WEO) database to obtain other macroeconomic factors. Table (1) presents the data sources and provides a brief descriptions of the variables used in this study.

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[5] These countries are: Bahrain, Egypt, Jordan, Kuwait, Lebanon, Morocco, Oman, Saudi Arabia, Tunisia, Qatar, United Arab of Emirates and Yemen.

3.2 Variables used

Three sets of factors might explain the NPL level in a cross-country framework: namely bank industry factors, business environment and institutional variables. A set of control variables that captures macro-economic differences between countries are also used.

3.2.1 Bank specific variables

The bank industry factors include the rate of credit growth (*Cred_gr*) which reflects banks credit policy. The one year lagged bank regulatory capital to risk-weighted assets minus the required minimum capital (*Difcar*) as a proxy for capital requirements. This measure is more appropriate than using the absolute level of the regulatory capital because it controls the differences in the regulatory minimum solvency ratio between countries. Bank specific factors also include the one year lagged loan loss reserves to total loans ratio (*Prov*), the return on assets ratio (ROA), the *Herfindahl* index (*Herfind*) as a measure of diversification and the natural logarithm of total assets (*Size*) as a proxy of bank size. We further include three dummy proxies of ownership structure. Particularly, (State) is a dummy variable that equals one if the government holds a majority stake in the bank, (*Forgnodev*) is a dummy variable that equals one in the case of foreign participation from developing countries and (*Forgdev*) is a dummy variable that equals one for foreign participation from developed countries.

3.2.2 Business environment variables

The level of information sharing among creditors is also likely to have an important influence on bank risk taking. Based on the data available from DMS (2007) and the Doing Business dataset, we include two dummy variables to measure information sharing among lenders: the first variable (*Pubregist*) equals one if public credit registries exist in the country by the end of 2003, and zero otherwise. Public registries are created by public authorities and aim at collecting information on the credit quality of borrowers and disseminating it to financial institutions (DMS, 2007). The second variable (*Pivbur*) equals one if a private bureau is operating in the country by the end of 2003, and zero otherwise. Private bureaus are private commercial firms which maintain database facilitating the exchange of information among banks and other financial institutions (DMS, 2007). We also use another variable that captures the depth of Credit Information (*Infor*) to measure rules affecting the scope, accessibility and quality of credit information available through either public registries or private credit bureaus. This variable captures the difference in information contents across countries and is composed of six indicators. The credit information index ranges from 0 to 6, with higher values indicating higher availability of credit information. Finally, we introduce the legal rights index (*Right*) which measures the degree to which collateral and bankruptcy laws protect the rights of borrowers and lenders. This index ranges from 0 to 10, with higher scores indicating that collateral and bankruptcy laws are better designed to expand access to credit. Appendix (A) provides further details on variables construction.

3.2.3 Institutional environment variables

World Governance Indicators compiled by Kaufmann et al. (2008) are commonly adopted in the related literature to analyze the institutional quality in a country. The six dimensions of governance provided by this database are included in this study to test the effect of each of them on problem loans. They include : 1) voice and accountability (*V A*) which measures the extant of political and civil rights; 2) political instability and violence (*PS*) which indicates the likelihood of violent threats or changes in government; 3) government effectiveness (*GE*) as an indicator of the competence and the quality of public service delivery; 4) regulatory burden (*RQ*) which encompasses the incidence of market-unfriendly policies; 5) rule of law (*RL*) as a proxy for the quality of contract enforcement, the police and the courts, as well as the likelihood of crime and violence; and 6) control of corruption (*CC*) which indicates the

exercise of public power for private gain, including both soft and grand corruption and state capture. The six governance indicators are measured on a scale ranging from -2.5 to 2.5, with higher values corresponding to better governance. Appendix (B) provides further details on variables calculations and sources of information.

3.2.4 Control variables

We use four proxies for the macroeconomic environment. To control economic expansion we introduce the lagged GDP growth (*GDP_gr*). We expect lagged growth rate of GDP to account for omitted variables related to the level of development. For example, Breuer (2006) shows that the one year lagged growth rate in real GDP negatively and significantly impacts the NPL rate. The second variable consists of the unemployment rate (*Unemploy*) as defined by the percent of the labor force that is without jobs. We suppose a positive relation between unemployment rate and NPL. We also include a dummy variable (*High_inc*), which equals one for high income MENA countries and 0 otherwise, as a control variable that proxies for the wealth differences between countries. This variable also coincides with Gulf/ non-Gulf classification. Finally, to account for the weight of bank financing relative to market financing, we use the ratio of private credit by deposit money bank to stock market capitalization (*Market*).

3.3 Methodology

We use a pooled regression approach. Panel data combines both time series and cross-section data. First, it has the advantage of increasing the number of observations and degrees of freedom and reducing collinearity among explanatory variables especially when the number of years is low. Second, pooling enables controlling for exogenous shocks common to all banks (time effects) and reducing the omitted variable bias (unit effects). However, simple pooled regression may not be well designed to capture relationships between dependant and explanatory variables[6]. This is due to the fact that pooled regression assumes the homogenous behavior of the endogenous variable for all individuals in the sample (same intercept and same slopes). This is obviously not the case for the variable NPL, as it varies considerably between countries and years. Several alternative estimation methods are more suitable for panel data (fixed and random effects). When using the Hausman test, the fixed effect specification is preferred. However, the use of fixed effects specification raises two concerns. First, as noted by Haas and Lelyveld (2006), unit dummies are known to eliminate too much cross-sectional variance. Second, the inclusion of unit dummies eliminates *de facto* time invariant exogenous variables and does not properly capture the impact of quasi time invariant variables (Beck, 2005). Concerning the error structure, the fixed effects specification assumes that the error terms have a constant variance over time and are serially uncorrelated. Another possible solution would have been to include country-specific and year dummy variables to capture the fixed effects. So, we use a random-effects regression model that controls for both observed and unobserved cross-country heterogeneity. In all cases the standard errors of the estimated coefficients are adjusted for cluster effects at the country level as suggested by Peterson (2009)[7].

3.4 Descriptive statistics

The summary of descriptive statistics for the variables used in the empirical analysis are presented in Table (2)[8]. We note particularly that NPL rate presents a high disparity between banks with a minimum of 0.38% and a maximum of 72%. A similar pattern is observed for loan loss provisions ranging between 0.45% and 276.9%. Regarding bank profitability, we

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[6] Hsiao test rejects the homogeneity of data structure.

[7] We performed the bootstrap estimation as a robustness check; the significance of the main results is confirmed.

[8] Descriptive statistics by country are presented in Appendix (C).

remark that some banks have a negative return on assets with minimum values of -11.88%. Table (2) shows also that the Herfindahl ratio is on average very high (75%) indicating that banks in the sample seem to concentrate on credit activities. With respect to the ownership structure, foreign participation appears to be higher than state ownership with a high proportion of participation coming from developed countries. Concerning business environment variables, the average legal right index across countries and years is 3.457. The country scores range from 2 to 4. In our sample, the credit information index ranges from 2 to 5 with an average of 2.66. This shows furthermore the disparities between MENA countries with regard to institutional quality. In our sample, there is at least one private bureau in 13% of the countries and one public registry in 71% of the countries. This might be explained by the recent trends in the banking industry in the region with a widespread movement of privatization and upgrading of the infrastructure of the financial systems. Finally, it is worthwhile to note that the institutional quality indicators remain weak (on average) with values around the zero for almost all the dimensions.

4. Empirical Results

We first run a basic model including only bank specific factors and variables that control for economic conditions. We then estimate other specifications including business and institutional environment variables. To examine the impact of business variables on NPL, we introduce in four different specifications the four proxies defined above. The last specification considers all the four variables together. The final regressions consider the six indicators of institutional quality. Considering that institutional indicators are highly correlated with each other, we introduce them individually in the basic model. In all regressions, we include both years and country dummy variables to control for differences between countries and over the years.

We present in Table (3) the results related to the baseline model which examines the effects of bank specific variables on NPL. Tables (4) and (5) report results after controlling for business and institutional environment.

4.1 Bank specific determinants and NPL

To explore the impact of bank specific variables on NPL, we consider the following model:

$$NPL = f(Bank\_specific\_variables, Macro\_control, country\_dummies, year\_dummies)$$

Where the vector of bank specific variables is composed of the variables defined in the previous section. Control variables consist of the four macroeconomic indicators introduced individually. Regression results are reported in Table (3).

The coefficients estimates indicate that credit growth rate is negatively related to problem loans. This result is contrary to previous findings, which report a negative impact of rapid growth of loans on credit quality (Keeton, 1999 and Fries et al., 2002). It shows that credit exposure is not driven by aggressive commercial strategies. On the other hand, our result also suggests that banks concentrating on credit activities experience low levels of NPL. This might indicate that focusing on lending activities allows banks to better assess credit risk.

However, the diversification measured by the *Herfindahl* index and the natural logarithm of total assets does not seem to be linked to banks' credit quality. We explain this result by the fact that banks in the MENA region mainly concentrate on their credit activity, and hence the diversification has no significant effect and does not reduce credit risk.

The coefficient of *DifCar* is statistically significant at 5% across model specifications. This result is contrary to our prediction considering the capital adequacy ratio as a tool to reduce bank credit risk as suggested by the Basel Accord. Our result, however, supports the findings of Godlewski (2004) who suggests that the regulatory pressure may not be the most

appropriate regulatory device to mitigate banks' excessive risk taking in emerging market economies. We try to give an alternative explanation. Generally, banks in the MENA region are highly capitalized (an average rate of 20%). Hence, they are not under regulatory pressures to reduce their credit risk to comply with regulatory capital requirements and hence tend to take more risk. This finding adds to the conflicting results on the relation between capital and risk in banks (e.g. Shrieves and Dahl, 1992; De Nicoló, 2000; Fries et al., 2002).

With regard to provision policy, lagged loan loss provisions ($Pr\ ov_{t-1}$) are positively linked to the level of NPL. Loan loss provisions are regarded as a controlling mechanism over expected loan losses (Hasan and Wall, 2004). This confirms that banks use provisions as a tool to anticipate risks of potential loan default risk. Banks with high provisions are those engaged in riskier activities which lead to a high level of NPL. This behavior may also reflect the use of general provisions as a mean to prevent the bank from credit risk. This result differs from that found by Boudriga and Jellouli (2008) who observed a negative relationship between lagged provisions and NPL for a panel of Tunisian banks.

Also consistent with our hypothesized prediction, the coefficient of *ROA* is negative and statistically significant in all model specifications. This result provides support to our hypothesis that greater performance reduces NPL. Risk taking is reduced in banks exhibiting high levels of performance. The bad management hypothesis may be another plausible explanation to this negative relationship, as bad management leads both to riskier activities and weak performance. This finding is also consistent with the majority of previous studies (Kwan and Eisenbeis, 1995; Berger and DeYoung, 1997; Barth et al. 2002) which show, in different contexts, that the deteriorating quality of assets is the main source of banks failures.

Concerning ownership structure, results indicate that foreign participation from developed countries improves credit quality in all model specifications. This confirms our theoretical prediction which supposes that foreign ownership contributes to improving human capital through foreign managers who bring better skills and technologies, particularly in developing countries (Lensink and Hermes, 2004). In contrast, the coefficient of foreign participation from developing countries is not statistically significant. This is probably due to similarities in human skills and techniques between the country of origin and the host country. The empirical results also show that state ownership does not affect credit risk in the MENA countries.

4.2 Business environment and NPL

In Table (4), we rerun the baseline model and include business environment variables related to information sharing (public registries, private bureaus and depth of information) and to legal rights[9]. For all the regressions, we use the one year lagged GDP growth rate to control for the macroeconomic conditions.

$NPL_{it} = f\ (Bank\_specific\_variables,\ Business\_variables,\ Macro\_control,\ year\_dummies)$

The empirical results are presented in Table (4) with robust standard errors clustered by country. The coefficients estimates on the variables of the baseline model are similar in sign and magnitude to the results of the previous regressions. In the remaining of this section, we focus only on the interpretation of the estimated coefficients of the business environment factors.

The results show that the existence of public registries and private bureaus does not reduce NPL. This non significant coefficient of public registries could be due to the quality and

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[9] We do not consider country dummy variables. We think that the business environment variables capture the specific effects related to the banking environment in the country. We also run the regressions with country dummies; the main results are unchanged.

reliability of the information provided by these bureaus. Generally, credit data is above a certain threshold and disclosed in aggregated form. On the other hand, the presence of private credit bureaus in the MENA region is relatively recent (only 28% of countries included in the sample have private bureaus). Then, their potential positive effect on credit quality suggested by the literature is not likely to be observed over the examined period. It is also documented that the effective impact of such bureaus varies across countries and depends especially on their legal and regulatory framework (Miller, 2003).

To further investigate the impact of sharing information on credit exposure, we use the credit information index to capture the depth and quality of credit information across countries. This indicator compiled and published by Doing Business measures the rules affecting the scope, the accessibility and the quality of credit information available through either public or private credit registries. We find a negative relationship between NPL and the depth of credit information. This emphasizes the beneficial role of information quality in reducing moral hazard and adverse selection problems. It appears then that it is not only the existence of credit bureaus that improves the quality of banks' credit portfolios but it is mainly the relevance of the information published by these offices. In fact, while some bureaus collect and disseminate extensive information on credit (total credit exposure by borrower, ratings, late payments and defaults, court records of the company and its owners), other agencies only gather limited or consolidated information (Miller, 2003).

Finally, as can be seen from Table (4), the coefficient of legal rights is negative and statistically significant, suggesting the positive effect of legal rights on bank risk-taking. This result indicates that when collateral and bankruptcy laws provide higher protection borrowers and lenders, credit quality improves. Indeed, banks are more likely to seize collateral and to force repayment.

4.3 Institutional environment determinants and NPL

Finally, to test the impact of institutional variables on NPL, we adopt the same methodology as for the business environment variables. Therefore, we add to the baseline model the vector of institutional variables composed of the six indicators derived from World Governance Indicators compiled by Kaufmann et al. (2008). These are namely voice and accountability (*VA*), political instability and violence (*PS*), government effectiveness (*GE*), regulatory burden (*RQ*), rule of law (*RL*) and control of corruption (*CC*). Considering that the institutional indicators are highly correlated with each other, we introduce them separately in the following specification.

NPL = *f* (*Bank_specific_variables*, *institutional_variables*, *Macro_control*, *year_dummies*)

The empirical results are reported in Table (5)[10].

Examining the coefficients on the various institutional variables leads to a number of additional interesting results. The signs of all institutional variables are negative, but only two variables (government effectiveness and political stability) do not reportedly affect problem loans. Our results highlight the importance of institutional environment in enhancing governance mechanisms and therefore in reducing excessive risk taking incentives (Godlewski, 2004). Indeed, operating in a sound environment where rules are well implemented and enforced and where corruption is controlled may improve credit process and hence banking outcomes. In other words, it effectively facilities both granting and recovery of credits. Overall, our analysis shows that institutions play an important role in reducing NPL in MENA countries.

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[10] Table (5) does not include the year dummy variables.

5. Conclusion

The purpose of this paper is to examine the relationship between bank-specific business and institutional environment and NPL in banks operating in the MENA region over $2002 - 2006$. NPL in banks can be affected not only by specific factors but also by the business and institutional environment. Experiencing high level of NPL may threaten the stability of the banking industry and the financial system as a whole. Using a random-effects panel regression model that controls for cluster effects at the country level, our results report that among bank specific factors, foreign participation from developed countries reduces NPL. However, there is no evidence that state-owned banks experience more NPL. In contrast with the disciplining role assigned to regulatory capital, our results show that highly capitalized banks have a high level of NPL. Results also show that high credit growth is associated with a reduced level of problem loans. Banks that concentrate on their credit activity are more likely to effectively evaluate the true credit quality of borrowers. Finally, loan loss provisions are regarded as a controlling mechanism over expected loan losses.

With respect to the impact of environmental variables on NPL, we do not report evidence for the beneficial effect of the presence of private and public bureaus in MENA countries. Credit quality of banks is affected rather by the relevance of the information published by public and private bureaus, especially rules affecting the scope, accessibility and quality of credit information. Authority bodies have hence to strengthen the culture of information dissemination, which helps credit bureaus to provide appropriate information and operate effectively. However, we find a negative relationship between the depth of credit information and NPL.

Finally, our findings highlight the importance of institutional environment in enhancing banks' credit quality. Specifically, a better control of corruption, a sound regulatory quality, a better enforcement of the rule of law, and free voice and accountability play an important role in reducing NPL in the MENA countries. Therefore, MENA countries need to take effective measures to strengthen their legal framework, improve the functioning of governmental bodies and reduce corruption to contribute to reducing banks' credit risk and to insure the stability of the financial system.

Further investigations are needed to better understand the interactions and relationships between the different business and institutional factors and their respective impact on NPL. For instance, it is worthy to focus on the roles of banks' governance mechanisms and the potential impact of culture factors on banking outcomes.

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Table 1: Variables Definition

Variables	Definition	Predicted sign	Sources
NPL	Nonperforming loans to total loans ratio		Bank data from Bankscope
Cred_gr	Credit growth rate on annual basis	+	Bank data from Bankscope
Difcar	Capital adequacy ratio minus the minimum required capital	-	Bank data from Bankscope and Barth, Caprio,and Levine (2006)
ROA	Return on asset ratio	-	Bank data from Bankscope
Prov	Loan loss provision to total loans ratio	+	Bank data from Bankscope
Herfind	Herfindahl index equals to the sum of the squares of each income category in total bank income[11]	-	Authors' calculations using Bank data from Bankscope
Size	Natural logarithm of total assets	-	Bank data from Bankscope
Forgnodev	Dummy variable equals to 1 for banks with foreign participation from developing countries and 0 otherwise	- /+	Bank data from Bankscope
Forgdev	Dummy variable equals to 1 for banks with foreign participation from developed countries and 0 otherwise	-	Bank data from Bankscope
State	Dummy variable equals to 1 for State controlled banks and 0 otherwise	-	Bank data from Bankscope
GDP_gr	Growth rate of gross domestic product on annual basis	-	World Economic Outlook database (2008)
High_inc	Dummy variable equals to 1 for high income countries and 0 otherwise		Financial structure data set (2007)
Market	Ratio of private credit by deposit money bank to stock market capitalization		Financial structure data set (2007)
Unemploy	Unemployment rate	-	Central Intelligence Agency, World Factbook
Pubregist	Dummy variable equals 1 if a public credit registry exists in the country by the end of 2003, zero otherwise.	-	Djankov, McLiesh and Shleifer (2007)
Privbur	Dummy variable equals 1 if a private credit bureau operates in the country by the end of 2003, zero otherwise.	-	Djankov, McLiesh ,and Shleifer (2007)
Infor	Credit information index which measures rules affecting the scope, access, and , quality of credit information		Doing business (2008)
Right	Legal rights which measures the degree to which collateral and bankruptcy laws facilitate lending		Doing business (2008)
VA	Voice and accountability measuring political and civil rights		World Governance Indicators compiled by Kaufmann, Kraay and Mastruzziet (2008)
PS	Political instability and violence measuring the likelihood of violent threats or changes in government		World Governance Indicators compiled by Kaufmann, Kraay and Mastruzziet (2008)
GE	Government effectiveness measuring the competence of the bureaucracy and the quality of public service delivery		World Governance Indicators compiled by Kaufmann, Kraay and Mastruzziet (2008)
RQ	Regulatory burden measuring the incidence of market unfriendly policies		World Governance Indicators compiled by Kaufmann, Kraay and Mastruzziet (2008)
RL	Rule of law measuring the quality of contract enforcement, the police and the courts, as well as the likelihood of crime and violence		World Governance Indicators compiled by Kaufmann, Kraay and Mastruzziet (2008)
CC	Control of corruption measuring the exercise of public power for private gain, including both petty and grand corruption and state capture		World Governance Indicators compiled by Kaufmann, Kraay and Mastruzziet (2008)

[11] We consider five sources of income: interest income, commission income, fee income, trading income and other operating income.

Table 2: Descriptive Statistics

Variables	Mean	Median	Min	Max	SD
Dependant variable					
NPL	13.126	7.915	0.380	72.030	14.453
Bank specific variables					
Cred_gr	0.195	0.148	-0.391	2.569	0.295
Difcar	12.205	8.850	-2.127	74.000	11.677
Prov	2.062	1.108	-2.262	29.481	3.255
Roa	1.987	2.055	-11.880	13.150	1.773
Herfind	0.754	0.756	0.416	1.826	0.147
Size	14.351	14.344	10.268	17.543	1.527
Forgnodev	0.391	0.000	0.000	1.000	0.489
Forgdev	0.217	0.000	0.000	1.000	0.413
State	0.152	0.000	0.000	1.000	0.360
Business environment variables					
Pubregist	0.717	1.000	0.000	1.000	0.451
Privbur	0.130	0.000	0.000	1.000	0.338
Infor	2.661	2.000	0.000	5.000	1.417
Right	3.457	4.000	2.000	4.000	0.651
Institutional environment variables					
VA	-0.794	-0.730	-1.660	-0.280	0.348
PS	-0.246	-0.325	-1.890	1.000	0.800
GE	0.073	0.150	-1.010	0.840	0.503
RQ	0.134	0.090	-0.910	1.070	0.508
RL	0.223	0.280	-1.270	0.950	0.584
CC	0.237	0.300	-0.870	1.180	0.637
Control variables					
GDP_gr	5.667	5.268	0.128	17.723	3.651
High_inc	0.522	1.000	0.000	1.000	0.501
Market	0.649	0.445	0.000	2.420	0.583
Unemploy	0.142	0.150	0.018	0.350	0.092

Where NPL is nonperforming loans to total loans ratio, Cred_gr is credit growth rate on annual basis, Difcar is capital adequacy ratio minus the minimum required capital, Prov is loan loss provision to total loans ratio, ROA is return on asset ratio, Herfind is Herfindahl index, Size is natural logarithm of total assets, Forgnodev is a dummy variable equals to 1 for banks with foreign participation from developing countries and 0 otherwise, Forgdev is a dummy variable equals to 1 for banks with foreign participation from developed countries and 0 otherwise, State is dummy variable equals to 1 for state-controlled banks and 0 otherwise, Pubregist is dummy variable equals 1 if a public credit registry exists in the country, Privbur is a dummy variable equals 1 if a private credit bureau operates in the country, Infor is the credit indicator information index, Right is the legal right index, VA is voice and accountability, PS is political stability indicator, GE is government effectiveness indicator, RQ is the regulatory quality indicator, RL is the rule of law indicator, CC is control of corruption indicator, GDP_gr is growth rate of gross domestic product on annual basis, High_inc is dummy variable equals to 1 for high income countries and 0 otherwise, Market is the ratio of private credit by deposit money bank to stock market capitalization and Unemploy is the country unemployment rate.

Table 3: Bank-Specific Variables Regression on NPL

	Panel.1	Panel.2	Panel.3	Panel.4
Cred_gr	-4.282**	-4.420**	-4.429**	-4.407**
	(-3.09)	(-3.18)	(-2.99)	(-3.24)
Difcar	0.168*	0.174*	0.174*	0.174*
	(2.06)	(2.1)	(2.09)	(2.1)
Prov$_{t-1}$	0.541***	0.551***	0.551***	0.551***
	(4.26)	(4.3)	(4.42)	(4.3)
ROA	-0.786*	-0.781*	-0.782*	-0.781*
	(-1.83)	(-1.77)	(-1.77)	(-1.78)
Herfind	0.172	0.593	0.606	0.637
	(0.05)	(0.17)	(0.17)	(0.18)
Size	-0.974	-1.075	-1.077	-1.061
	(-0.68)	(-0.79)	(-0.81)	(-0.78)
Forgnodev	-3.677	-3.772	-3.771	-3.762
	(-0.63)	(-0.65)	(-0.64)	(-0.64)
Forgdev	-12.01*	-12.12*	-12.12*	-12.11*
	(-1.79)	(-1.79)	(-1.78)	(-1.79)
State	-11.68	-11.73	-11.73	-11.74
	(-1.17)	(-1.17)	(-1.17)	(-1.17)
GDP_gr$_{t-1}$	-0.104			
	(-1.00)			
High_inc		5.147		
		(0.71)		
Market			0.0502	
			(0.03)	
Unemploy				-2.284
				(-0.32)
Intercept	40.55*	41.41*	32.29*	41.54*
	(2.04)	(2.15)	(2.01)	(2.16)
Nbr groups (Obs)	46 (230)	46 (230)	46 (230)	46 (230)
R2	0.5873	0.5873	0.5874	0.5874

Where NPL is nonperforming loans to total loans ratio, Cred_gr is credit growth rate on annual basis, Difcar is capital adequacy ratio minus the minimum required capital, Prov is loan loss provision to total loans ratio, ROA is return on asset ratio, Herfind is Herfindahl index, Size is Neperian logarithm of total assets, Forgnodev is a dummy variable equals to 1 for banks with foreign participation from developing countries and 0 otherwise, Forgdev is a dummy variable equals to 1 for banks with foreign participation from developed countries and 0 otherwise, State is dummy variable equals to 1 for state-controlled banks and 0 otherwise, GDP_gr is growth rate of gross domestic product on annual basis, High_inc is dummy variable equals to 1 for high income countries and 0 otherwise, Market is the ratio of private credit by deposit money bank to stock market capitalization and Unemploy is the country unemployment rate.

 ***, **and * indicate significance at 1%, 5%, and 10% levels. t-Student are between parentheses. Method estimation is panel corrected standard errors.

Table 4: Bank-Specific and Business Environment Variables Regression on NPL

	Panel.1	Panel.2	Panel.3	Panel.4	Panel 5
Cred_gr	-3.814**	-3.810**	-3.997***	-4.221***	-4.239***
	(-2.49)	(-2.51)	(-2.75)	(-2.73)	(-2.88)
Difcar	0.15	0.148	0.172	0.158	0.166**
	(1.52)	(1.55)	(1.9)	(1.68)	(1.97)
Prov$_{t-1}$	0.626***	0.631***	0.606***	0.576***	0.557***
	(4.89)	(4.79)	(4.86)	(5.04)	(4.59)
ROA	-0.967**	-0.974**	-1.000***	-0.838**	-0.841**
	(-2.56)	(-2.50)	(-2.58)	(-2.16)	(-2.03)
Herfind	-1.408	-1.499	-1.547	-0.432	-0.898
	(-0.56)	(-0.59)	(-0.60)	(-0.17)	(-0.36)
Size	-2.529***	-2.561***	-1.946***	-1.098	-1.017
	(-2.69)	(-2.61)	(-2.88)	(-1.39)	(-1.17)
Forgnodev	-3.121	-2.885	-3.075	-1.361	0.273
	(-0.45)	(-0.37)	(-0.51)	(-0.27)	(-0.04)
Forgdev	-5.796	-5.58	-6.169	-5.959	-3.759
	(-0.84)	(-0.85)	(-1.30)	(-1.45)	(-0.68)
State	-0.426	-0.349	-2.258	-1.015	-0.876
	(-0.05)	(-0.05)	(-0.30)	(-0.17)	(-0.13)
GDP_gr$_{t-1}$	-0.117	-0.12	-0.145	-0.108	-0.138
	(-1.16)	(-1.16)	(-1.17)	(-1.10)	(-1.17)
Pubregist	-0.345				-0.233
	(-0.08)				(-0.07)
Privbur		1.173			6.333
		(0.17)			-0.85
Infor			-1.791*		-1.075*
			(-1.67)		(-1.69)
Right				-7.309***	-7.671***
				(-2.66)	(-4.62)
Intercept	54.638***	52.82***	51.34***	58.00***	59.63***
	(3.56)	-2.82	(4.19)	(4.60)	(7.97)
Nbr groups (Obs)	46 (230)	46 (230)	46 (230)	46 (230)	46 (230)
R2	0.3927	0.3949	0.4410	0.4518	0.4864

Where NPL is nonperforming loans to total loans ratio, Cred_gr is credit growth rate on annual basis, Difcar is capital adequacy ratio minus the minimum required capital, Prov is Loan loss provision to total loans ratio, ROA is return on asset ratio, Herfind is Herfindahl index, Size is Neperian logarithm of total assets, Forgnodev is a dummy variable equals to 1 for banks with foreign participation from developing countries and 0 otherwise, Forgdev is a dummy variable equals to 1 for banks with foreign participation from developed countries and 0 otherwise, State is dummy variable equals to 1 for state-controlled banks and 0 otherwise, GDP_gr is growth rate of gross domestic product on annual basis, Pubregist is dummy variable equals 1 if a public credit registry exists in the country, Privbur is a dummy variable equals 1 if a private credit bureau operates in the country, Infor is the credit information index, Right is the legal right index.

***, **and * indicate significance at 1%, 5%, and 10% levels. t-Student are between parentheses. Method estimation is panel corrected standard errors.

Table 5: Bank-Specific and Institutional Environment Variables Regression on NPL

	Panel.1	Panel.2	Panel.3	Panel.4	Panel 5	Panel 6
Cred_gr	-3.790***	-3.989***	-4.006***	-3.991***	-4.027***	-3.753***
	(-2.59)	(-2.66)	(-2.62)	(-2.94)	(-3.22)	(-2.90)
Difcar	0.134	0.143	0.148	0.149	0.143	0.129
	(1.31)	(1.52)	(1.52)	(1.57)	(1.47)	(1.31)
Prov$_{t-1}$	0.637***	0.628***	0.589***	0.564***	0.578***	0.594***
	(4.84)	(4.95)	(4.82)	(5.25)	(5.11)	(5.05)
ROA	-0.995***	-0.848**	-0.919**	-0.964***	-0.862**	-0.800**
	(-2.68)	(-2.18)	(-2.35)	(-2.84)	(-2.27)	(-2.24)
Herfind	-1.348	-0.138	-0.64	0.327	-0.256	0.0282
	(-0.51)	(-0.05)	(-0.25)	(-0.11)	(-0.10)	(0.01)
Size	-2.741***	-2.121**	-2.389***	-2.188***	-1.512**	-1.785**
	(-2.69)	(-2.29)	(-2.71)	(-2.85)	(-2.06)	(-2.40)
Forgnodev	-3.666	-2.327	-2.325	-2.16	-1.645	-2.645
	(-0.59)	(-0.39)	(-0.41)	(-0.41)	(-0.31)	(-0.46)
Forgdev	-7.854	-5.93	-5.622	-6.843	-6.158	-6.889
	(-1.45)	(-1.21)	(-1.23)	(-1.54)	(-1.42)	(-1.41)
State	-1.614	-0.338	0.153	-0.199	-0.283	-0.397
	(-0.22)	(-0.05)	(-0.02)	(-0.03)	(-0.04)	(-0.07)
GDP_gr$_{t-1}$	-0.124	-0.062	-0.0611	-0.0952	-0.103	-0.0787
	(-1.15)	(-0.69)	(-0.63)	(-0.90)	(-1.17)	(-0.83)
VA	-5.373*					
	(-1.88)					
PS		-2.811				
		(-1.51)				
GE			-5.068			
			(-1.56)			
RQ				-7.746***		
				(-3.31)		
RL					-6.702**	
					(-2.45)	
CC						-6.044**
						(-2.19)
Intercept	53.00***	46.60***	51.66***	49.14***	40.15***	44.86***
	(2.96)	(3.03)	(3.47)	(3.82)	(3.64)	(3.41)
Nbr groups (Obs)	46 (230)	46 (230)	46 (230)	46 (230)	46 (230)	46 (230)
R2	0.4233	0.4072	0.4118	0.4250	0.4210	0.4038

Where NPL is nonperforming loans to total loans ratio, Cred_gr is credit growth rate on annual basis, Difcar is capital adequacy ratio minus the minimum required capital, Prov is loan loss provision to total loans ratio, ROA is Return on asset ratio, Herfind is Herfindahl index, Size is Neperian logarithm of total assets, Forgnodev is a dummy variable equals to 1 for banks with foreign participation from developing countries and 0 otherwise, Forgdev is a dummy variable equals to 1 for banks with foreign participation from developed countries and 0 otherwise, State is dummy variable equals to 1 for state-controlled banks and 0 otherwise, GDP_gr is growth rate of gross domestic product on annual basis, Pubregist is dummy variable equals 1 if a public credit registry exists in the country, VA is voice and accountability, PS is political stability indicator, GE is government effectiveness indicator, RQ is the regulatory quality indicator, RL is the rule of law indicator, CC is control of corruption indicator.

***, **and * indicate significance at 1%, 5%, and 10% levels. t-Student are between parentheses. Method estimation is panel corrected standard errors.

Appendix A: Getting credit Doing Business and Djankov, McLiesh and Shleifer Database (2007)

Public Credit Registry Coverage (DMS)

The public credit registry coverage indicator reports the number of individuals and firms listed in a public credit registry with information on repayment history, unpaid debts or credit outstanding from the past 5 years. The number is expressed as a percentage of the adult population (the population aged 15 and above according to the World Bank's World Development Indicators 2008). A public credit registry is defined as a database managed by the public sector, usually by the central bank or the superintendent of banks that collects information on the creditworthiness of borrowers (persons or businesses) in the financial system and makes it available to financial institutions. If no public registry operates, the coverage value is 0.

Private Credit Bureau Coverage (DMS)

The private credit bureau coverage indicator reports the number of individuals and firms listed by a private credit bureau with information on repayment history, unpaid debts or credit outstanding from the past 5 years. The number is expressed as a percentage of the adult population (the population aged 15 and above according to the World Bank's World Development Indicators 2008). A private credit bureau is defined as a private firm or nonprofit organization that maintains a database on the creditworthiness of borrowers (persons or businesses) in the financial system and facilitates the exchange of credit information among banks and financial institutions. Credit investigative bureaus and credit reporting firms that do not directly facilitate information exchange among banks and other financial institutions are not considered. If no private bureau operates, the coverage value is 0.

Credit Information Index

The six characteristics measured by the index include: (1) both positive credit information (for example, loan amounts and pattern of on-time repayments) and negative information (for example, late payments, number and amount of defaults and bankruptcies) are distributed; (2) data on both firms and individual borrowers are distributed; (3) data from retailers, trade creditors, or utilities, as well as from financial institutions are distributed; (4) more than 2 years of historical data are distributed; (5) data are collected on all loans of value above 1% of income per capita; and (6) laws provided for borrowers' rights to inspect their own data. A value of one is added to the index when a country's information agencies have each of these characteristics.

The index ranges from 0 to 6, with higher values indicating the availability of more credit information, from either a public registry or a private bureau, to facilitate lending decisions.

Legal Rights

The strength of legal rights index includes eight aspects related to legal rights in collateral law and two aspects in bankruptcy law. A score of 1 is assigned for each of the following features of the laws:

1. Any business may use movable assets as collateral while keeping possession of the assets, and any financial institution may accept such assets as collateral.
2. The law allows a business to grant a non possessory security right in a single category of revolving movable assets (such as accounts receivable or inventory), without requiring a specific description of the secured assets.
3. The law allows a business to grant a non possessory security right in substantially all of its assets, without requiring a specific description of the secured assets.
4. A security right may extend to future or after-acquired assets and may extend automatically to the products, proceeds or replacements of the original assets.
5. General description of debts and obligations is permitted in collateral agreements and in registration documents, so that all types of obligations and debts can be secured by stating a maximum rather than a specific amount between the parties.
6. A collateral registry is in operation that is unified geographically and by asset type and that is indexed by the name of the grantor of a security right.
7. Secured creditors are paid first (for example, before general tax claims and employee claims) when a debtor defaults outside an insolvency procedure.
8. Secured creditors are paid first (for example, before general tax claims and employee claims) when a business is liquidated.
9. Secured creditors are not subject to an automatic stay or moratorium on enforcement procedures when a debtor enters a court supervised reorganization procedure.
10. The law allows parties to agree in a collateral agreement that the lender may enforce its security right out of court.

The index ranges from 0 to 10, with higher scores indicating that collateral and bankruptcy laws are better designed to expand access to credit.

Appendix B: Worldwide Governance Indicators (WGI) Developed by Kaufmann, Kraay and Mastruzziet (2008)

The six dimensions of governance that we measure are:

1. Voice and Accountability (VA) − capturing perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media.

2. Political Stability and Absence of Violence (PS) − capturing perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism.

3. Government Effectiveness (GE) − capturing perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.

4. Regulatory Quality (RQ) − capturing perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.

5. Rule of Law (RL) − capturing perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.

6. Control of Corruption (CC) − capturing perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests.

Appendix C: Descriptive Statistics by Country

Country	NPL	Cred_gr	Difcar	Prov	ROA	Herfind	Size	Infor	Right
Bahrain	28.56	0.02	26.54	3.20	0.42	0.92	14.03	4.00	4.00
Egypt	19.34	0.01	3.30	2.95	0.96	0.70	15.83	2.00	3.00
Jordan	7.94	0.26	9.49	0.76	1.71	0.69	14.05	2.00	4.00
Kuwait	6.12	0.18	5.26	0.97	2.44	0.86	15.77	3.00	4.00
Lebanon	13.89	0.11	21.85	2.19	1.28	0.79	13.11	4.20	3.00
Morocco	11.74	0.17	3.52	1.73	1.28	0.72	14.98	1.00	3.00
Oman	12.44	0.07	6.88	2.28	1.96	0.79	14.28	2.00	4.00
Qatar	11.82	0.47	13.46	0.97	3.03	0.78	14.14	2.00	3.00
Saudi Arabia	3.12	0.22	10.87	0.74	2.80	0.62	16.47	5.00	4.00
Tunisia	12.10	0.10	6.35	1.45	1.35	0.66	14.42	3.00	3.00
UAE	6.04	0.24	14.82	0.79	3.75	0.79	14.14	2.00	4.00
Yemen	37.62	0.39	13.88	7.62	0.85	0.72	12.00	0.00	2.00

	VA	PS	GE	RQ	RL	CC	GDP_gr	Market	Unemploy
Bahrain	-0.70	-0.06	0.50	0.83	0.73	0.66	8.21	0.93	0.15
Egypt	-1.05	-0.88	-0.39	-0.48	-0.03	-0.44	3.69	0.50	0.11
Jordan	-0.63	-0.38	0.17	0.26	0.37	0.24	6.43	1.51	0.15
Kuwait	-0.35	0.07	0.28	0.47	0.71	0.89	8.53	1.05	0.03
Lebanon	-0.52	-1.07	-0.34	-0.21	-0.35	-0.53	4.67	0.14	0.18
Morocco	-0.57	-0.38	-0.11	-0.20	-0.05	-0.13	4.92	0.36	0.17
Oman	-0.78	0.79	0.51	0.70	0.76	0.75	4.69	0.28	0.15
Qatar	-0.56	0.83	0.57	0.32	0.76	0.78	8.56	1.42	0.03
Saudi Arabia	-1.53	-0.67	-0.30	-0.06	0.23	0.18	3.93	0.95	0.23
Tunisia	-0.99	0.15	0.53	0.04	0.19	0.23	4.46	0.10	0.15
UAE	-0.78	0.71	0.74	0.77	0.79	1.08	6.82	0.71	0.02
Yemen	-1.04	-1.49	-0.87	-0.83	-1.11	-0.73	4.21	0.00	0.33

Where NPL is nonperforming loans to total loans ratio, Cred_gr is annual Credit growth rate, Difcar is capital adequacy ratio minus the minimum required capital, Prov is loan loss provision to total loans ratio, ROA is return on asset ratio, Herfind is Herfindahl index, Size is natural logarithm of total assets, Infor is the credit information index, Right is the legal right index, VA is voice and accountability, PS is political stability indicator, GE is government effectiveness indicator, RQ is the regulatory quality indicator, RL is the rule of law indicator, CC is control of corruption indicator, GDP_gr is growth rate of gross domestic product on annual basis, Market is the ratio of private credit by deposit money bank to stock market capitalization and Unemploy is the country unemployment rate.