King's Research Portal

DOI:

[10.1016/j.intfin.2018.11.006](https://doi.org/10.1016/j.intfin.2018.11.006)

Document Version

Peer reviewed version

[Link to publication record in King's Research Portal](#)

Citation for published version (APA):

Wang, M., & Sun, X. (2018). Identity of Large Owner, Regulation and Bank Risk in Developing Countries. *Journal of International Financial Markets, Institutions and Money*. <https://doi.org/10.1016/j.intfin.2018.11.006>

Citing this paper

Please note that where the full-text provided on King's Research Portal is the Author Accepted Manuscript or Post-Print version this may differ from the final Published version. If citing, it is advised that you check and use the publisher's definitive version for pagination, volume/issue, and date of publication details. And where the final published version is provided on the Research Portal, if citing you are again advised to check the publisher's website for any subsequent corrections.

General rights

Copyright and moral rights for the publications made accessible in the Research Portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognize and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the Research Portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the Research Portal

Take down policy

If you believe that this document breaches copyright please contact librarypure@kcl.ac.uk providing details, and we will remove access to the work immediately and investigate your claim.

Accepted Manuscript

Identity of Large Owner, Regulation and Bank Risk in Developing Countries

Mingzhu Wang, Xiaojie Sun

PII: S1042-4431(18)30462-1
DOI: <https://doi.org/10.1016/j.intfin.2018.11.006>
Reference: INTFIN 1072

To appear in: *Journal of International Financial Markets, Institutions & Money*

Received Date: 18 November 2018
Accepted Date: 26 November 2018

Please cite this article as: M. Wang, X. Sun, Identity of Large Owner, Regulation and Bank Risk in Developing Countries, *Journal of International Financial Markets, Institutions & Money* (2018), doi: <https://doi.org/10.1016/j.intfin.2018.11.006>

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

Identity of Large Owner, Regulation and Bank Risk in Developing Countries

Mingzhu Wang ^a, Xiaojie Sun ^{b c}

^a *King's Business School, King's College London, WC2B 4BG London, United Kingdom*

^b *University of International Business and Economics, School of Banking & Finance, 100029 Beijing, China*

^c *Beijing Office of China Banking Regulatory Commission, 100033 Beijing, China*

Abstract

This paper examines the impacts of bank owners and national bank regulation on the risk-taking of unlisted and listed banks in developing countries. National bank regulations reduce bank risk in 43 developing countries after controlling the shareholding level of large owners, other bank-level characteristics and country-level factors. Banks with large owners (governments, industrial companies, and foreigners) take less risk than other banks in developing countries when national regulation is considered. However, the marginal effect of regulation on bank risk varies with the identity of the large owner. National regulation and certain large bank owners (industrial companies and financial companies) have positive joint effects on bank risk. Regulations on capital adequacy, activity restriction, external auditing requirement, depositor protection scheme, and information disclosure are efficient in reducing bank risk. National bank regulations improve bank asset quality, boost liquidity and decrease bank sensitivity to market risk whilst they also increase management costs and hamper profitability of banks.

Keywords: Large Owner; Regulation; Bank Risk; Developing Countries

JEL: G21, G38, G18

Acknowledgement: This paper was presented at the 2017 Cross Country Perspectives of Finance conferences held in Chengdu, China and Chiang Mai, Thailand. The authors are very grateful to the two anonymous referees and the conference participants for their insights into the paper.

1.Introduction

Prior studies by Saunders, Strock, and Travlos (1990) and Laeven and Levine (2009) show that bank risk varies positively with the presence and the shareholding of large owners. Agency theory suggests that ownership structure influences corporate risk-taking (Jensen and Meckling 1976; John, Litov, and Yeung 2008). Shareholders with larger voting and cash flow rights have correspondingly greater power and incentives to shape corporate behaviour than smaller owners (Shleifer and Vishny 1986). From this perspective, ownership structure influences the ability of owners to alter bank risk in response to standard risk shifting incentives and to those created by official regulations (Boyd and Hakenes 2008). Saunders et al. (1990) find that banks controlled by large owners exhibit higher risk-taking behaviour than those controlled by managers with diverse ownership in the U.S. They do not, however, test whether ownership structure and regulation jointly shape bank risk-taking, or whether their results can be generalized beyond the U.S. to developing countries. Consistent with the theory that greater cash flow rights by a large owner are associated with more risk, Laeven and Levine (2009) also find that the risk is generally higher in publicly listed banks that have large owners with substantial cash flow rights than those with no large owner. They do not, however, differentiate the identity of the large owner or test whether their results can be generalized to unlisted banks. We contribute to this line of research by analysing a sample of unlisted and listed banks with different large owners in developing countries.

Banks with different owners tend to have different risk-taking behaviours. For example, European banks controlled by families or governments have lower profitability, higher earnings volatility and higher default risk than those controlled by financial institutions or industrial companies that benefit from diversification (Saghi-Zedek 2016). In developing countries with weak institutional quality, ownership concentrations by families or governments take place more frequently and are associated with higher agency costs than in

developed countries (Haw and Ho 2010). Government-owned banks, often reflect government-dictated policies in their lending decisions (Firth et al. 2009; Chen et al. 2013), tend to lend less prudentially than banks owned by other type of large owners (Jia 2009), and undertake more risk-taking behaviour than foreign banks (Zhu and Yang 2016). Foreign banks have grown significantly in developing countries in the past decade. The penetration of foreign banks improves the banking competition in the developing countries and the effect is stronger when the host country has a low banking concentration (Jeon et al. 2011). Whether the largest owner of a bank has a diversified portfolio affects the risk-taking behaviour of the bank (García-Kuhnert, Marchica and Mura 2017). These prior studies lead us to wonder whether bank risk is affected by the identity of large bank owners. Some owners, like financial companies, may have more diversified portfolios than others, like families. More importantly, different large bank owners may have distinct resilience or responses to regulations. Extant literature offers little empirical evidence on whether banks with different large owners take risk similarly under regulation, particularly in developing countries.

Banking systems in developing countries are relatively underdeveloped and differ from those in developed countries.¹ Most developing countries have reformed their banking systems since the 1990s', through banking privatization, moving control of interest, opening market to foreign banks, etc. In addition to these reforms, banking systems of developing countries have also kept up with the development in global bank regulation. The global financial turmoil in 2008 exposed such problems in the banking sector as the use of high leverages, deficiency of liquidity buffers, low efficiency of corporate governance, defects of internal control, and incentive mechanism loopholes (Acharya et al. 2009; Simpson 2010; Vines et al. 2011). The importance of regulation to banking sector became prominent after the crisis and led to subsequent regulatory responses in a belief that effective banking

¹Developing countries are defined according to World Economic Outlook (IMF, 2016).

supervision could reduce bank risk and improve banking performance. Evidence from developed countries shows that regulatory strategy enhances the accuracy of information disclosure and reduces the degree of corruption in the banking sector (Beck et al. 2006; Klomp and Haan 2012). Strengthened capital controls and improved regulatory capacity of governments increase the operational efficiency of European banks (Chortareas et al. 2012). Most developing countries also strengthened bank regulation as a response to the global financial crisis in 2008. Limited evidence shows that bank regulation, especially capital regulation, also reduces bank risk in developing countries (Klomp and Haan 2014).

We contribute to the literature by conducting a comprehensive research on the association between national regulation, the identity of the large bank owner, and bank risk in 43 developing countries for the sample period of 2004-2012. Based on World Bank surveys conducted by Barth, Caprio, and Levine (2008, 2013), we self-construct the total national regulation scores as well as twelve subcategory regulation scores on entry to banking sector, ownership, capital requirement, activities restrictions, etc. We measure bank risk by three means: (1) a self-constructed total risk based on Capital adequacy, Asset qualities, Management costs, Earnings and profitability, Liquidity, and Sensitivity to market risk (CAMELS); (2) credit rating risk; and (3) inverted z score for insolvency risk.

When the identity of the large bank owner is excluded from the analyses, the total regulation significantly reduces bank risk, regardless the risk measurement, similar to Klomp and Hann (2012, 2014). Our empirical evidence that bank risk varies positively with ownership concentration is also consistent with Laeven and Levine (2009). However, contradictory to Saunders et al. (1990) and Laeven and Levine (2009), we find that large bank owner reduces bank risk in developing countries. Furthermore, national bank regulation and the identity of the large bank owner have significant joint effects on bank risk. Bank risk is significantly reduced in most developing countries where the national bank regulation

became more stringent in 2008 as a response to the crisis. However, in fourteen countries that experienced deregulation in the post-crisis period, banks take more risk, supporting the positive association between bank risk and deregulation evidenced in Saunders et al. (1990).

Our investigation to the impact of twelve sub-categories of regulation on bank risk shows that regulations on capital adequacy, activity restriction, external auditing requirement, depositor protection scheme, and information disclosure are negatively associated with bank risk in developing countries, regardless the risk measurements. Total regulation and relevant subcategory regulations are efficient in improving asset quality, boosting liquidity, and decreasing bank sensitivity to market risk in developing countries. However, regulations increase management costs and hamper bank profitability.

Overall, our findings suggest that bank regulation is efficient in reducing bank risk but the marginal effect of national bank regulation on bank risk varies with not only the controlling power but also the identity of the large owner of banks. In addition to academic contributions to the relevant literature, empirical evidence reported in our paper has political implications for bank regulators in developing countries. For example, our results imply that banks in developing countries can do better financially if they focus on banking business rather than expanding activities into securities, insurance, real estate or investment in non-financial firms. This provides an important rationale for regulatory restrictions on non-banking activities of banks in some developing countries like China.

The rest of this paper is organized as follows. Section 2 explains why and how national bank regulation and the identity of the large owner shape bank risk in developing countries. Section 3 details the measurements of bank risk, self-construction of regulation and the identity of the large bank owners. Section 4 describes the empirical models. Section 5 justifies the sample selection and reports descriptive statistics of regression variables. Section 6 reports the empirical analyses results. Section 7 concludes the paper.

2. Bank Risk Shaped by Regulation and Large Owners

2.1 How National Regulation Shapes Bank Risk?

Keeley (1990) develops a theoretical framework for the impact of regulation on bank risk and shows that deregulation of American banking sector increases bank incentives to take on extra risk, thus increasing the risk of failure. The prediction of this theoretical framework is supported by empirical evidence provided by Saunders et al. (1990). Prior studies cover selected aspects of regulations. For example, Agoraki et al. (2011) consider capital requirements, restriction on activities, and supervisory power. Laeven and Levine (2009) examine deposit insurance, capital regulations, and regulatory restrictions on bank activities. Extant literature offers a mixed view on how regulation in these aspects influence bank risk as detailed below.

Klomp and Haan (2012) find that market entry regulation reduces capital and asset risk of banks. Few other prior studies examine the impact of the entry regulation on bank risk. Based on the assumption that market entry regulation reduces the competition in a banking industry, prior studies on competition and bank risk concludes that banks take more risk when facing increased competition. Boyd and Nicolo (2005) confront this common perception and find that banks may also become riskier as the markets become more concentrated.

More stringent capital adequacy requirements lead banks to set stricter acceptance criteria for granting new loans, resulting in a more prudent, less-risky behaviour (Bolt and Tieman 2004). However, regulation on capital requirement harms franchise value, encourages gambling (Hellmann et al. 2000), and increases a bank's riskiness (Blum 1999). Hence, capital requirement may not be enough and additional regulation such as deposit rate controls, deposit premiums or asset restrictions could be useful in reducing risk within a competitive environment (Matutes and Vives 2000; Repullo 2004).

Deposit insurance is a corner stone of many banking systems worldwide because it helps protect small savers and prevents bank runs ([Lambert et al. 2017](#)). If the bank is a monopoly or banks are competing only in the loan market, deposit insurance has no influence on risk-taking of banks ([Niinimäki 2004](#)). Explicit deposit insurance reduces the risk of European banks in the 1990s ([Gropp and Vesala 2004](#)). Empirical evidence for a sample of banks worldwide shows that deposit insurance decreases bank risk during the crisis period 2007–2009 but increases bank risk during normal time ([Anginer et al. 2014](#)). Other empirical evidence also largely indicates that the existence of a deposit insurance scheme increases bank risk ([Wheelock and Wilson, 1995](#); [Hovakimian and Kane, 2000](#); [Demirgüç-Kunt and Detragiache, 2001](#); [Barth et al. 2004](#)). American banks affected by the 2008 *Emergency Economic Stabilization Act* increase their investments in risky commercial real estate loans and become riskier relative to unaffected banks ([Lambert et al. 2017](#)).

Extant literature offers mixed evidence on whether bank risk is affected by the regulatory restriction on bank activities. Lower restrictions on bank activities lead to more competition and encourage greater risk-taking ([Claessens and Laeven 2004](#)). However, low restrictions could also allow the creation of large financial conglomerates, reducing competition in the market ([Beck et al. 2004](#)). The activity and branching restriction enforced after the financial crises of the 1930s restricted competition and enhanced stability (Beck 2008). The financial liberalization in the 1970s and 1980s resulted in “unchecked” competition leading to banking fragility ([Keeley 1990](#)). High reliance on fee-based activities is associated with under-priced borrower default risk ([Lepetit et al. 2008a](#)) and expansion into non-interest income activities increases bank risk of insolvency ([Lepetit et al. 2008b](#)).

A powerful supervisor could improve the governance of banks, promote competition, and prevent bank managers to take excessive risk. However, such effects depend on the balance of power between banks and supervisors, especially in developing countries. Under

the political/regulatory capture view, powerful banks may confine politicians and induce supervisors to act in the interest of banks rather than the interest of the society (Stigler, 1971).

2.2 Risk-taking Behaviour of Banks with Different Large Owners Under National Regulation

Whether and how the identity of bank owner and bank regulation jointly affect bank risk are not yet examined in the literature. Hence, we review here prior studies investigating the risk-taking behaviour of banks with different large owners, including governments, industrial companies, financial companies, families and foreigners, respectively.

Extant literature offers mixed evidence on how government owners affect the risk-taking behaviour of banks or firms they invest. Banks owned by governments tend to take more risk and operate less efficiently than those owned by other large owners in both developed and developing countries (Cull and Xu 2003; Berger, Hasan and Zhou 2009; Jia 2009; Saghi-Zedek 2016; Zhu and Yang 2016). Government-owned banks in Europe have lower profitability, poorer loan quality and higher insolvency risk than their private counterparts (Iannotta, Giacomo, and Andrea 2007). Government-owned banks in developing countries have lower profitability and higher costs than their private counterparts (Micco, Panizza, and Yanez 2007). Government-owned banks operated less profitably, held less core capital, and had greater credit risk than privately-owned banks in southeast Asian countries prior to 2001, but the gap closed afterwards (Cornett, et al. 2010). Government-owned banks must shoulder political tasks of the government and hence exhibit risk-taking behaviours different from those owned by families or companies. Wishing to achieve their political goals, government-owned banks tend to bail out poorly-performing state-owned enterprises in China and largely ignore their non-performing loans, leading to a typical soft lending decision (Cull and Xu 2003). However, state ownership is negatively related to the risk-taking behaviour of newly privatized firms (Boubakri, Cosset, and Saffar 2013). National

regulation is omitted in afore-mentioned studies. We argue that national regulation may have more direct effect on government-owned banks than other banks as the regulatory influence could be facilitated by the voting power of the government owner. Hence, we conjecture a negative effect of the government owner on bank risk, i.e. government-owned banks may take less risk than other banks when national bank regulation is taken into consideration.

Industrial and financial companies with advanced techniques, expertise and knowledge may allow banks to manage diverse activities where banks potentially lack experience. Banks with a significant presence of such owners could diversify more promptly than widely-held banks and enjoy economies of activity diversification (Saghi-Zedek 2016). These suggest that banks owned by industrial companies and financial companies may take less risk than other banks because of their superior risk diversification.

Extant literature offers some limited evidence on how family owners shape bank risk in developed countries but not in developing countries. European banks controlled by families have higher earnings volatility and default risk than those controlled by financial institutions or industrial companies (Saghi-Zedek 2016). Family-owned banks limit executive management positions to family members, which may restrict their labour pool to obtain qualified talents (Saghi-Zedek 2016). Family owners could also see innovation and openness as potential threats to their control and might be reluctant to finance innovations (Morck et al. 1998). The limitation of executive management positions to family members and reluctance to finance innovations may be more prominent in developing countries, which will limit banks owned by families to manage and diversify risk efficiently. However, the long-term orientation of family goal may also impede the bank to pursue risky investment. In addition, banks owned by families may be more sensitive to national bank regulation due to their smaller size and weaker bargaining power than those owned by governments and companies.

Hence, family-owned banks may take less risk than other banks in developing countries with stringent regulation.

Prior evidence on the risk-taking behaviour of foreign banks can be best described as mixed. Foreign banks improve the competition in banking sector of developing countries, especially in host countries with low banking concentrations ([Jeon et al. 2011](#)). However, the pursuit of fee-based income by Indian banks, both domestic and foreign, increases risk as measured by the volatility of return on assets ([Pennathur et al. 2012](#)). Transition countries in eastern and central Europe with more foreign banks have reduced non-performing loans but high insolvency risk ([Agoraki, Delis, and Pasiouras, 2011](#)). Foreign banks tend to have higher profit and lower costs than domestic banks in developing countries ([Claessens et al. 2001](#); [Micco et al. 2007](#)) but lower profit and higher costs than domestic banks in developed countries ([Claessens et al. 2001](#)). Considering foreign banks in developing countries are likely from developed countries, they are expected to be more willing to comply to national bank regulation and more prudent in risk-taking than domestic banks. Hence, we predict foreign banks to take less risk in developing countries with stringent regulation.

In a nutshell, different from [Saunders et al. \(1990\)](#) and [Laeven and Levine \(2009\)](#), we expect large bank owners (governments, industrial companies, financial companies, families and foreigners) to reduce bank risk in developing countries. We also expect significant joint effects of bank regulation and the identity of large bank owner on bank risk. These conjectures form our below hypotheses for empirical examination:

H1: *Banks with large owners (governments, industrial/financial companies, families and foreigners) take less risk in developing countries when national regulation is considered.*

H2: *Large bank owners and national regulation have significant joint effects on bank risk in developing countries.*

3. Measurements of Bank Risk, Regulation and Identity of Large Owner

3.1 Bank Risk Measurements

The global financial crisis in 2008 has revived attention to risk in the banking sector and the ways in which it can be measured. In this paper, we measure bank risk using three sets of indicators – the CAMELS indicators, credit rating risk, and inverted z score.

Our first measurement of bank risk is developed based on the CAMELS indicators widely adopted in banking research (Bassett, Lee, and Spiller 2015), including thirteen indicators categorized into six aspects - capital adequacy, asset qualities, management costs, earnings and profitability, liquidity, and sensitivity to market risk. However, not all CAMELS indicators are positive indicators of bank risk. Indicators for capital adequacy, and earnings and profitability are expected to be negatively related to bank risk. For example, a low total equity to total assets ratio, an indicator for capital adequacy, means a high financial leverage, which makes the bank less resilient to shocks, *ceteris paribus*. An increase in a bank's profitability reduces the likelihood of a distress event. Some indicators of liquidity, such as the ratios of liquid assets to total assets or short-term funds, may also be negatively associated with bank risk because liquidity leads to risk reduction, lower probability of insolvency risk and enhanced bank stability². In constructing total bank risk based on the thirteen CAMELS indicators, we take the potential negative associations into account so that all thirteen indicators are positively associated with the constructed total risk. We collect the data from BankScope of Bureau van Dijk and use one-factor model to calculate an overall indicator based on the CAMELS indicators to reflect the total risk of a bank³.

²As shown in Table 2, EAR, TCR, ROA, ROE, LAA, and LASFR are negatively related to bank risk while the rest CAMELS indicators are positively associated with bank risk.

³Our one-factor model is based on factor analysis, a statistical method used to describe variability among observed, correlated variables in terms of a potentially lower number of unobserved variables called factors. Factor analysis helps to deal with data sets where there are a large number of observed variables reflecting a small number of underlying or latent variables. We calculate a comprehensive factor for each bank based on the thirteen CAMELS indicators. The factor analysis results are available upon request for each sample bank.

Our second measurement of bank risk is developed based on credit ratings, which are also used in prior studies (Bongini et al. 2002; Iannotta et al. 2013). Credit ratings include Fitch Long-Term Issuer Default Rating (FLT), Moody Long-term Rating (MLT) and Standard & Poor's Issuer Credit Rating Long-term (S&PLT). We collect all three credit ratings from BankScope and convert them into numerical risk scores (as shown in Table A.1) so that we can use the proxy for credit ratings of FLT, MLT and S&PLT in regressions. By measuring a bank's probability of default synthetically, the credit rating indicator reflects not only a bank's profitability, asset quality, risk, management quality, and macroeconomic conditions, but also the potential support from an external entity such as a parent company, a regulatory agency, and a local/national government (Iannotta et al. 2013).

Thirdly, we measure bank risk using the inverted z-score of each bank, which equals to the standard deviation of return on assets (ROA) over the full sample period of investigation divided by the sum of current ROA and current total equity to total assets ratio (EAR). The z-score measures the distance from insolvency (Roy 1952) and is used widely in prior studies on bank risk (Bassett et al. 2015; Bongini et al. 2002; Chortareas et al. 2012; Laeven and Levine 2009). It relates a bank's capital level to the variability in returns so that we know how much variability in returns can be absorbed by capital before the bank becomes insolvent, assuming that the capital level can be adjusted downwards in case of loss. However, z-score is defined in a way that a low value of z-score indicates a high level of bank risk. We use the inverted z-score to measure bank insolvency risk so that the interpretation of empirical results is consistent with those for self-constructed total risk and credit rating risk.

3.2 National Bank Regulation

Bank regulation has been measured based on two sources in prior literature. Demirgüç-Kunt et al. (2008) and Demirgüç-Kunt and Detragiache (2011) use an index

measuring the extent to which countries adhere to the *Core Principles for Effective Bank Supervision* issued by the *Basel Committee on Banking Supervision*. As compliance with the principles is mostly classified information, we use World Bank surveys to compute proxies for national bank regulation. In these surveys, Barth et al. (2001, 2003, 2008, 2013) collect detailed and comprehensive information on bank regulation and supervision for more than 107 countries between 1999 and 2012.

Regulation scores are self-calculated based on the relevant information collected manually from two *Bank Regulation and Supervision* surveys conducted around the recent financial crisis by Barth et al. (2008, 2013).⁴ The surveys cover more than 200 questions about bank regulation and receive responses from about 100 jurisdictions by the country's central bank or other related institutions. According to the nature of questions covered in World Bank's survey (2008, 2013), we classify the bank regulation indicators into twelve categories: (1) entry into banking; (2) ownership; (3) capital requirement; (4) activities restrictions; (5) external auditing requirements; (6) internal management/organizational requirements; (7) liquidity and risk diversification; (8) depositor (saving) protection schemes; (9) asset classification provisioning and write-offs; (10) accounting/ information disclosure; (11) discipline/problem institutions/exit; and (12) supervision⁵. Our construction of total regulation scores follows a three-step procedure.⁶ We firstly select 132 questions that can be numerically scored and unify the numerical answers so that higher scores correspond to stricter regulations. We then group the survey questions with numerical answers into the twelve categories as discussed above to generate the subcategory regulation scores. In the

⁴ <http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EXTRESEARCH/0,,contentMDK:20345037~pagePK:64214825~piPK:64214943~theSitePK:469382,00.html>

⁵ Pasiouras et al. (2006) and Klomp and Haan (2014) classify the bank regulation indicators into seven categories: (1) capital requirement; (2) private monitoring; (3) activities restrictions; (4) supervisory control; (5) deposit insurer's power; (6) liquidity; and (7) market entry regulations.

⁶ The detailed construction of regulation score for each of the sample country based on the World Bank questions is available from the authors upon request.

final step, total regulation scores are generated as the sum of all twelve subcategory regulation scores.⁷

3.3 Large Bank Owners

Following Caprio, Laeven, and Levine (2007) and Laeven and Levine (2009), we classify a bank as having a large owner if the largest shareholder has direct and indirect voting rights that sum to 10% or more. A widely-held bank is defined as one with no shareholder holding 10% of the voting rights or more. According to the identity of the large bank owner from BankScope database, we categorize banks into six groups - banks owned by governments, industrial companies, financial companies, families, foreign owners, and banks with no large owner, respectively.

4. Empirical Models

Our baseline regression model is shown in below Eq. (1).

$$Bank\ Risk_{ijt} = \alpha_0 + \alpha_1 Bank\ Risk_{ijt-1} + \alpha_2 Regulation_{ijt} + \sum_{k=1}^n \alpha_{2+k} C_k + \varepsilon_{ijt} \quad (1)$$

where, $Bank\ Risk_{ijt}$ is the risk of bank i in country j at time t , which is measured as the total risk based on the CAMELS indicators, credit rating score, and inverted z-score, respectively. $Regulation_{ijt}$ is measured as the total regulation or twelve subcategory regulations faced by bank i in country j at time t . C_k represents bank-level and country level control variables.⁸

In Eq.(1), we regress bank risk indicators on bank regulation (including total regulation and subcategory regulation scores) and other control variables. We then introduce the identity dummies and shareholding by the controlling owner into Eq.(2). Five dummy variables are created according to our categorization of large bank owners into governments, industrial companies, financial companies, families, and foreign owners. In addition to the

⁷ We have also tried to use the factor analysis to construct the total regulation scores but realized this approach unsuitable. The extraction and rotation sums of squared loadings in the post-crisis period of 2008-2012 are about 57% and much lower than the acceptable threshold of 70%.

⁸Please refer to [Table A.2](#) for the definitions and data sources of all variables.

identity dummies of large bank owners, we also consider in Eq.(2) the influence of the total shareholding by controlling shareholder as a measurement of ownership concentration.

$$Bank\ Risk_{ijt} = \beta_0 + \beta_1 Bank\ Risk_{ijt-1} + \beta_2 Regulaiton_{ijt} + \beta_3 Owner_{ijt} + \sum_{k=1}^n \beta_{3+k} C_k + \varepsilon_{ijt} \quad (2)$$

where $Owner_{ijt}$ represents the identity of bank i 's large owner in country j at time t ; and other variables are defined the same as those in Eq. (1).

We further include the interaction terms of national regulation scores and the dummy variables for different identity of large owner and the shareholding by the controlling owner into Eq. (3). The coefficient ϕ_3 captures the joint effects of national regulation and the identity of large owner on risk-taking behaviour of banks.

$$Bank\ Risk_{ijt} = \phi_0 + \phi_1 Bank\ Risk_{ijt-1} + \phi_2 Regulaiton_{ijt} + \phi_3 Regulaiton_{ijt} \times Owner_{ijt} + \phi_4 Owner_{ijt} + \sum_{k=1}^n \phi_{4+k} C_k + \varepsilon_{ijt} \quad (3)$$

where $Regulaiton_{ijt} \times Owner_{ijt}$ is the interaction term between the national regulation and the identity of the bank owner in country j at time t ; and other variables are defined the same as those in Eq. (2).

Prior studies on bank risk usually adopt the ordinary least square and panel regressions (Laeven and Levine 2009). Panel regression is beneficial in accounting for between-firm cross-sectional variations and within-firm temporal changes over time. However, this method can be inflicted with heteroskedasticity and autocorrelation problems. Therefore, we estimate our equations using Arellano-Bond dynamic panel regression. The general method of moments (GMM) estimator in the dynamic panel regression controls for heteroskedasticity and autoregression related to bank risk over time while the lagged dependent variable accounts for the impact of previous bank risk on current and future bank risk (Arellano and Bond 1991). In addition to addressing the heteroskedasticity and autocorrelation issues, the Arellano-Bond dynamic model also help reduce endogeneity

concerns as its fixed effects ameliorate concerns about firm-level omitted variable bias. We further include year dummies in the dynamic model to mitigate time-varying unobserved heterogeneity bias. In dynamic panel regression model, simultaneity in independent variables can be handled by lagging the instruments once, which allows for exogeneity tests using the J-statistics. The two stage least squared J-statistics, also called Sargan's statistics, are hence reported for all regressions reported in our paper.

5. Sample Selection and Summary Statistics

Country level regulation scores are only available until 2012 from World Bank's surveys by [Barth et al. \(2013\)](#). We collect data for 3,213 observations of 357 banks from 43 developing countries during the sample period of 2004-2012, which covers four years before the global financial crisis in 2008 and four years afterwards. We choose 43 sample countries based on the criteria of developing countries in World Economic Outlook ([Barth et al. 2013](#)), the consistency of the World Bank's questionnaires, and the availability of bank-level data from BankScope. We start with about 70 developing jurisdictions covered in the World Bank's surveys ([Barth et al. 2008, 2013](#)) but have to drop 27 sample countries due to the data availability from BankScope. After excluding duplicated bank records and inactive banks from BankScope database, 1,028 commercial banks remain for the 43 sample countries, which further reduces to 357 commercial banks due to data availability for bank-level variables. Our final sample, including 268 unlisted banks and 89 listed banks, provides a reasonable representation of banks in developing countries. Amongst the 357 sample banks, 197 banks have large owners and 113 banks have credit ratings as detailed in [Table 1](#).

[Insert [Table 1](#) Here]

[Table 2](#) shows the calculations of the thirteen CAMELS indicators, their predicted associations with bank risk, and means for all sample banks and banks with different large

owners, respectively. Banks owned by governments and industrial companies have more adequate capital than family-owned banks and foreign banks. Banks owned by financial companies have the least adequate capital. Government-owned banks have the best asset quality, followed by those owned by industrial companies. Family-owned banks are more efficient in curbing management costs and hence more profitable than other banks in developing countries. They also have the highest liquid assets to total assets ratios, but government-owned banks have the highest liquid assets to short-term funds ratios. Family-owned banks have the highest total interest expenses to total deposits ratios, but foreign banks have the highest government securities to total assets ratios.

[Insert Table 2 Here]

Table 3 reports descriptive statistics of bank risk measured by total risk measurement based on the CAMELS indicators, credit rating score and inverted z score. In addition to reporting descriptive statistics for all sample banks, Table 3 also categorises sample banks according to their controlling owners into five groups as discussed in the previous section. The risk level ranking amongst the five categories of large owners varies when risk is measured using different indicators. Mean comparison of total risk measurement based on the CAMELS indicators suggests that banks controlled by financial companies take the most risk. Foreign banks are riskier than those controlled by industrial companies followed by banks owned by families; banks controlled by governments take the least risk. Mean comparison of credit rating scores shows that family-owned banks have the highest credit risk. Banks owned by industrial companies have higher credit risk than those owned by governments, followed by foreign banks. Those owned by financial companies have the least credit risk, implying that such owners may reduce bank default risk through the synergetic benefit, information advantage or risk diversification. Mean comparison of inverted z score measured for

insolvency risk implies that banks owned by industrial companies and financial companies have lower insolvency risk than those owned by governments, families, and foreigners.

[Insert Table 3 Here]

Table 4 presents descriptive statistics for main variables used in our empirical analyses. Statistics for the bank-level CAMELS indicators, the identities of different large owners and other firm characteristics are summarized in Panel A. Those for national regulation scores and economic variables are reported in Panel B and Panel C, respectively. Most bank-level data are collected from BankScope and some data for Chinese banks are collected from CSMAR Solution. Other than the self-constructed regulation scores and the indicator for IMF Assistant Program (IMFassis) collected from IMF annual reports, all other country-level data are collected from worldwide governance indicators of World Bank.

[Insert Table 4 Here]

Table 5 reports correlation coefficients for main variables used in regression analyses. None of these variables are highly correlated. Hence, multicollinearity is not a concern in our empirical analyses of Eq. (1-3).

[Insert Table 5 Here]

6. Empirical Results

6.1 Bank Risk, National Regulation and Large Owners

Regression results for Eq. (1-3) are reported in Table 6. When the ownership level and the identity of the large owner are excluded from the regression, the total regulation reduces bank risk significantly, no matter how it is measured. The negative association between regulation and bank risk remains significant after including the identity dummies and the total shareholdings of large owners. However, the significance of the coefficient for regulation is

lost when interaction terms are included in regressions where bank risk is measured by credit ratings and inverted z score.

When bank risk is measured based on the CAMELS indicators, the coefficients for the five identity dummies of large bank owners are all significant. Banks owned by governments, industrial companies, families, and foreigners take less risk than widely-held banks, but those owned by financial companies take more risk than others. In their pursuit of profit maximization, financial companies may have incentives to encourage their owned banks to bypass the political regulation on banking business, leading to more risk-taking behaviours of banks in developing countries. Our finding that the family-owned banks have lower total risk is contradictory to the findings for European banks in Saghi-Zedek (2016). After considering the joint effects of the identity of the large owner and national regulation on bank risk in regression analyses, we find that the coefficients of the dummy variables for banks owned by industrial companies, families, and foreigners remain significantly negative, implying risk reduction in these banks. However, the significance of government owner in reducing total risk is lost after including the interaction terms between the identity of the large owner and total regulation. The coefficients for all these interaction terms, except for governments, are significantly positive, suggesting that national regulation is less efficient in reducing risk of banks owned by industrial companies, financial companies, families, and foreigners than banks owned by governments or those with no large owner.

When bank risk is proxied by credit ratings, the coefficients for the five identity dummies of large bank owners are mostly significant. Family-owned banks have higher credit rating risk whereas banks owned by foreigners, governments, and financial companies face lower credit rating risk than those with no large owner. Coefficients for the interaction terms between regulation and large owners suggest that the national bank regulation is less efficient in reducing credit risk of banks owned by governments, industrial companies, and

financial companies than other banks in developing countries. The significantly negative coefficient for the interaction between family-owned banks and regulation suggests that national bank regulation reduces bank credit risk more efficiently in these banks than others.

When bank risk is measured as the inverted z-score, all five types of large bank owners reduce bank insolvency risk as indicated by the significantly negative coefficients of bank owner identity dummies. The coefficients for the interaction terms between national bank regulation and most large bank owners are significantly positive, suggesting that the insolvency risk reduction effect of national bank regulation decreases in banks owned by governments, industrial companies, financial companies, and families. National bank regulation and family owner jointly reduce bank risk-taking behaviour. However, these empirical results for joint effects must be interpreted with cautions because the regression with the interaction terms of regulation and the identity of the large owner does not pass the Sagan test, as shown in the last column of [Table 6](#).

Overall, banks owned by governments, industrial companies and foreign banks take less risk than those with no large owner, which is consistently observed in regressions regardless of the bank risk measurement. Banks owned by financial companies have lower credit rating risk and insolvency risk than those widely held. Family-owned banks also have lower insolvency risk and total risk than those with no large owner. These findings support our prediction in *H1*. The results are fairly robust for banks owned by governments, industrial companies and foreign banks across different bank risk measurements. However, family-owned banks have a high credit rating risk. Bank owned by financial companies have a high total risk based on the CAMELS indicators, although such effect disappears after including the interaction term with bank regulation.

National regulation and the identity of the large owner also jointly shape bank risk in developing countries. In particular, industrial companies and financial companies as bank

owners have positive joint effects with regulation on bank risk. This empirical evidence is robust regardless of the bank risk measurement. Other identities of bank owners also have significant joint effects with regulation on bank risk, but the direction of the joint effect varies with the bank risk measurement. As such, our prediction in *H2* for significant joint effects between bank regulation and the identity of the large owner on bank risk is supported by empirical results reported in [Table 6](#).

The controlling power of large owners measured as their total shareholding is positively associated with bank credit rating risk but negatively associated with inverted z-score when the interaction with national regulation is taken into consideration. The coefficients of interaction terms between the total shareholding level of large owners and regulation suggest that national regulation reduces bank credit rating risk more efficiently when large bank owners possess more shareholding but the opposite for insolvency risk. The coefficients for other control variables are largely significant, suggesting that these bank-level and national-level factors shape bank risk as well. However, we notice that the sign of the coefficients changes when bank risk is measured differently.

[Insert [Table 6](#) Here]

Not all twelve subcategory regulations reduce bank risk in the same way. For the completeness of our research, we also analyse how each of the twelve subcategory regulations affects bank risk measured by the CAMELS indicators, credit rating risk and inverted z score, respectively. [Table 7](#) summarizes these regression results.⁹ Our finding that regulation on capital adequacy requirement reduces bank risk is consistent with [Bolt and Tieman \(2004\)](#) but opposite to [Blum \(1999\)](#) and [Hellmann et al. \(2000\)](#). In addition, national regulations on bank activities (ActivitiesR), external auditing requirement (ExAuditR), depositor protection scheme (DepositR), accounting information disclosure (DisclosureR),

⁹We only report the summarized results in [Table 7](#) due to the length of the paper. Please refer to appendices [Table A.4a-c](#) for detailed regression results for [Table 7](#).

and supervision also reduce bank risk significantly in developing countries, as suggested by the results reported in Table 7. However, regulation on discipline problem and institutions' exit (ExitR) increase bank risk. The regulatory restriction on entry into banking sector (EntryR) increases bank risk measured as total risk and credit rating risk, which is contradictory to the finding from developed countries in Klomp and Haan (2012). It is possible that the regulatory restriction on entry into the banking sector reduces competitions within the sector in developing countries. Large bank owners, after entering the market, have incentives to increase their expected profit, and in turn, banks with such large owners take more risk when the markets become more concentrated. However, regulatory restriction on entry into banking sector reduces insolvency risk measured by the inverted z score. Similarly, the effect of other sub-categories of regulations (OwnershipR, ManagmenetR, LiquidityR, ProvisionR and SupervisionR) on bank risk also vary with its measurement.

[Insert Table 7 Here]

We then try to link the sub-categories of regulations to the six aspects of the CAMELS indicators and regress the total regulation and the relevant subcategory regulation on each of the six aspects.

6.2 Bank Capital Adequacy, National Regulation and Large Owners

Firstly, we check the impact of total regulation and subcategory regulation (capital requirement) on capital adequacy of our sample banks as measured by the total equity to total assets ratio (EAR) and total capital ratio (TCR), respectively. According to Table 8, total regulation and capital regulation increase the former but decrease the latter. Since the TCR is internally calculated by banks, the negative relation between this ratio and total regulation may suggest that banks in countries with stringent regulations calculate their TCR more conservatively than those in countries with less stringent regulations.

Large owners like governments, industrial companies, financial companies, and families are positively associated with both proxies for bank capital adequacy, suggesting that banks with these types of large owners are more likely to have the adequate capital for bank runs. Foreign banks have higher EAR ratio but lower TCR ratio than other banks, possibly because they calculate the TCR ratio more conservatively than domestic banks in developing countries. The negative coefficients for the shareholding by the controlling owner imply that their controlling power reduces bank capital adequacy.

[Insert Table 8 Here]

6.3 Bank Asset Quality, National Regulation and Large Owners

Table 9 reports regression results for the impact of the total regulation and the subcategory regulation (asset classification provisioning and write-offs) on bank asset quality measured by the loan loss provision to total loans ratio (LLR) and impaired loan ratio (ILR). The regression results show that both ratios decrease with the total regulation score. However, the effect of subcategory regulation on asset classification provisioning and write-offs on asset quality is sensitive to the presence of large owners in banks. When the dummy variables for large owners are excluded in the regression, subcategory regulation on asset classification provisioning and write-offs seems to improve asset quality by reducing both the loan loss provision and the impaired loan. However, when we take large owners of banks into consideration, this subcategory of regulation is positively associated with the ratio of the loan loss provision to total loans only. Loan loss provisions and non-performing loans are reduced in banks owned by governments, industrial companies and foreign banks but increased in family banks. Mixed results are evidenced for banks owned by financial companies and shareholding of the controlling bank owner.

[Insert Table 9 Here]

6.4 Bank Management Costs, National Regulation and Large Owners

Table 10 reports the regression results for the total regulation and the subcategory regulation (internal management and organizational requirements) on bank management costs. We find that total regulation is positively associated with the total cost to total income ratio (CIR) and the overhead cost to total assets ratio (OCA). Management/organizational requirement increases both ratios when ownership variables are excluded from regressions. However, when we include the identity of the large bank owner in regressions, this subcategory of regulation has a negative association with the ratio of total cost to total income. Management cost is negatively associated with banks owned by governments, industrial companies, financial companies, and families but positively associated with foreign banks, suggesting they manage cost less efficiently than domestic banks. Management cost of banks also increase with the shareholding of the controlling bank owner.

[Insert Table 10 Here]

6.5 Bank Profitability, National Regulation and Large Owners

Out of the twelve subcategory regulations, the restriction on bank activities, such as securities, insurance, real estate and investment in non-financial firms, is likely to have a direct impact on bank profitability measured by return on assets (ROA) and return on equity (ROE). Hence, we analyse the impact of total regulation and regulatory restriction on bank activities on bank profitability with a further consideration of large owners. Empirical results for the regressions of total regulation and activities regulation on ROA and ROE, as reported in Table 11, show that total regulation reduces bank profitability but regulatory restriction on bank activities increases bank profitability in developing countries. The latter finding suggests that banks in developing countries can perform better financially by focusing on banking business rather than expanding into non-banking activities. This empirical evidence

provides further support to Li and Zhang's (2013) finding that activity diversification worsens the risk and return trade-off for the Chinese banking industry. Our finding that banks perform better financially by focusing on banking activities provides an important rationale for regulatory restrictions on non-banking activities of banks in developing countries¹⁰.

Banks owned by governments, industrial companies, financial companies and families are more profitable than those with no large owner. Foreign banks generate higher returns for shareholders but lower returns for their debtholders than widely-held banks. The shareholding by the controlling owner is also negatively associated with bank profitability.

[Insert Table 11 Here]

6.6 Bank Liquidity, National Regulation and Large Owners

Table 12 reports the regression results for the impacts of total regulation and subcategory regulation (liquidity and risk diversification) on bank liquidity proxied by the liquid assets to total assets ratio (LAA), the liquid assets to short-term funds ratio (LASFR), and the total loans to deposits ratio (TLD). Bank assets are more liquid when the former two ratios are high and the TLD ratio is low. Both total regulation and subcategory regulation on liquidity and risk diversification increase LAA and LASFR but decrease TLD, suggesting that they improve bank liquidity in developing countries. The identity of the large owner also matters for bank liquidity. Banks owned by government and financial companies have fewer liquid assets than other banks. However, the impact of other owners on bank liquidity varies across different liquidity ratios. The shareholding by the controlling owner is positively associated with bank liquidity, especially measured by the LASFR ratio.

[Insert Table 12 Here]

¹⁰ For instance, banks in China are prohibited from investing in the stock market.

6.7 Bank Sensitivity to Market Risk, National Regulation and Large Owners

We regress total regulation and subcategory regulation on supervision on bank sensitivity to market risk measured by the total interest expenses to total deposits (TIETD) ratio and the government securities to total assets (GSTA) ratio. Both ratios are positive indicators of bank sensitivity to market risk, especially interest rate risk. Regression results reported in Table 13 show that both total regulation and the subcategory regulation on supervision decrease the TIETD ratio and the GSTA ratio. Banks owned by governments and financial companies have lower TIETD ratios but higher GSTA ratios than other banks, suggesting a mixed impact of these large owners on bank sensitivity to market risk. Banks owned by industrial companies have lower TIETD ratios and GSTA ratios than other banks. Family-owned banks have higher TIETD and GSTA ratios than other banks and hence are more sensitive to market risk. On the contrary, foreign banks have lower TIETD ratios than domestic banks, implying their less sensitivity to market risk. Foreign banks have lower GSTA ratios when total regulation is used in the regression but higher GSTA ratios under subcategory regulation on supervision, implying that such owner's impact on the GSTA ratio of banks is sensitive to regulation. The shareholding by the controlling owner is positively associated with the TIETD ratio but negatively associated with the GSTA ratio, revealing a mixed impact on bank sensitivity to market risk.

[Insert Table 13 Here]

6.8 Changes in Bank Risk, Changes in National Regulation and Deregulation

Table A.3 presents the self-constructed bank regulation scores based on the World Bank Surveys by sample countries during our sample period of 2004-2012. As shown in Table A.3, our self-constructed bank regulation scores vary across different developing countries, which offers an ideal context to examine how national bank regulation influences

bank risk in developing countries. Furthermore, the total regulation score is persistent with limited variation over time for most countries, which alleviates the concern for a reverse causality, i.e. bank risk affects bank regulation (Klomp and Haan 2012).

According to Table A.3, almost all the sample developing countries experienced drastic changes in bank regulation between 2007 and 2008, attributed to the global financial crisis, while the regulation scores before and after it are almost constant over time. Therefore, we focus on changes in national regulation and bank risk from 2007 to 2008 and conduct further cross-sectional analyses by computing the changes of regulation and bank risk between 2007 and 2008. Based on previous findings that bank risk is reduced when national regulation becomes more stringent, we expect a negative association between changes in bank risk and changes in national regulation scores. Although most of our sample countries strengthened bank regulations in 2008, fourteen sample countries experienced deregulation, i.e. their regulation scores decreased after the crisis as shown in Table A.3. The banks in sample countries that experienced deregulation may take more risk than those in other countries that strengthened their national bank regulation.

Both conjectures are supported by the empirical results reported in Table 14. We conduct ordinary least squared regression to first difference transformation of our Eq.(1) for 2007 and 2008 only.¹¹ The regression results show that changes in total regulation are negatively associated with changes in all three measurements of bank risk in sample developing countries. The coefficient of the dummy variable “deregulation” is positive regardless how bank risk is measured, confirming banks indeed take more risk in sample developing countries that experienced deregulation.

[Insert Table 14 Here]

¹¹We could not analyse the first difference transformation of Eq. (2) and Eq.(3) of our paper as the owner's identity remains constant between 2007 and 2008.

7. Conclusions

We examine how different bank owners and national bank regulation shape bank risk by analysing 357 unlisted and listed banks across 43 developing countries during the sample period of 2004-2012. National bank regulation scores are self-constructed based on World Bank Surveys by [Barth et al. \(2008, 2013\)](#) and include twelve subcategories. Bank risk is measured by three means: (1) a self-constructed total risk based on thirteen CAMELS indicators; (2) credit rating risk; and (3) inverted z score for insolvency risk.

We provide new evidence that the presence of large owners and national bank regulation in general reduce bank risk but the marginal effect of regulation on bank risk varies with the identity of the large owner. Bank regulation and certain types of large owners like governments, industrial companies, and foreigners reduce bank risk in developing countries, regardless the measurement of bank risk, after controlling the shareholding level of large owners, bank-level characteristics and country-level factors. Financial companies and families as bank owners also have significant impacts on bank risk but the direction of their impacts varies with the measurement of bank risk. More importantly, national regulation and the identity of the large owner jointly shape bank risk in developing countries. The risk-reduction effect of national bank regulation is reduced in bank owned by government, industrial companies and financial companies. Other identities of bank owners, i.e. foreigners and families, also have significant joint effects with regulation on bank risk, but the direction of the joint effect varies with the measurement of bank risk.

We further investigate whether each of the twelve subcategories of regulation reduces bank risk. Regulations on capital adequacy, activity restriction, external auditing requirement, depositor protection scheme, and information disclosure are efficient in reducing bank risk in developing countries, regardless of the risk measurement. However, regulations on discipline

problem and institutions' exit increase bank risk in developing countries. The impact of other subcategory regulations on bank risk varies with the risk measurement.

We then examine the impact of total regulation and relevant subcategory regulations on the thirteen CAMELS indicators that capture bank capital adequacy, asset quality, management cost, profitability, liquidity, and sensitivity to market risk. Overall, national bank regulations improve asset quality, boost liquidity, and decrease bank sensitivity to market risk in developing countries. However, regulations increase management costs and hamper profitability of banks in developing countries. Large bank owners have significant impacts on the CAMELS indicators, but the direction of the impact varies between different owners, which echoes the necessity to consider the identity of large bank owners in analysing bank risk.

Although the dynamic panel regression method adopted in our empirical analyses alleviates concerns on endogeneity and simultaneity issues, we further conduct regression analyses on changes in bank regulation and bank risk during the financial crisis period to check the robustness of our findings for the impact of regulation on bank risk. Bank regulators of most developing countries made the national regulations more stringent in 2008, especially those on capital regulations, deposit insurer's power, and supervisory control, as a response to the outburst of financial crisis in 2007. We show that increases in national regulation scores lead to declines in bank risk between 2007 and 2008. Interestingly, banks in the fourteen sample countries that experienced deregulation in 2008 take more risk than those in other countries that strengthened regulations, confirming a positive association between bank risk and deregulation.

In addition to the academic contributions to literature, empirical evidence reported in our paper also has political implications for bank regulators in developing countries. For example, our findings imply that banks in developing countries can do better financially by

focusing on banking business rather than expanding activities into securities, insurance, real estate or investment in non-financial firms. This finding provides an important rationale for regulatory restrictions on non-banking activities of banks in developing countries. More importantly, bank regulators in developing countries should be aware the distinct effects on the risk of banks owned by different types of large owners and consider the incentives of large bank owners in regulating the banking sector.

References:

- Acharya,V., Philippon,T., Richardson, M., Roubini, N., 2009. The Financial Crisis of 2007–2009: Causes and Remedies. *Financial Markets, Institutions & Instruments*18(2), 89–137.
- Agoraki, M.E.K., Delis, M. D., Pasiouras, F., 2011. Regulations, competition and bank risk-taking in transition countries. *J. Finan. Stab.* 7(1),38–48.
- Anginer, D., Demirgüç-Kunt, A., Zhu, M., 2014. How does deposit insurance affect bank risk? Evidence from the recent crisis. *J. Bank. Finance* 48, 312–321.
- Arellano, M., Bond, S., 1991. Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *Rev. Economic Stud.* 58(2), 277–297.
- Barth, J.R., Caprio, G., Levine, R., 2001. The regulation and supervision of banks around the world :a new database (English). World Bank, Working Paper No.2588.
- Barth, J.R., Caprio, G., Levine, R., 2004. Bank regulation and supervision: what works best? *J. Financ. Intermediat.* 13, 205–248.
- Barth, J.R., Caprio, G., Levine, R., 2006. Rethinking Bank Regulation Till Angels Govern. Cambridge University Press.
- Barth, J.R., Caprio, G., Levine, R., 2008. Bank regulations are changing: for better or worse? *Comp. Econ. Stud.* 50, 537–563. Symposium paper.
- Barth, J.R., Caprio, G., Levine, R., 2013. Bank regulation and supervision in 180 countries form 1999-2011. NBER Working Paper No. 18733.
- Beck, T., 2008. Bank Competition and Financial Stability: Friends or Foes? World Bank Policy Research Working Paper, 4656.
- Beck,T., Demirgüç-Kunt, A., Levine,R., 2006. Bank Concentration, Competition, and Crises: First Results. *J.Bank. Finance*30(5),1581–1603.
- Beck, T., Demirgüç-Kunt, A., Maksimovic, V., 2004. Bank competition and access to finance: international evidence. *J. Money Cred. Bank.* 36, 627–648.
- Berger, A.N., Hasan, I., Zhou, M., 2009. Bank ownership and efficiency in China: What will happen in the world’s largest nation. *J. Bank. Finance*33,113–130.
- Blum,J., 1999. Do capital adequacy requirements reduce risks in banking. *J. Bank. Finance*23, 755–771.
- Bolt, W.,Tieman, A.F., 2004.Banking competition, risk and regulation. *Scandinavian Journal of Economics*106(4):,783–804.
- Bongini, P., Laeven, L., Majnoni, G., 2002. How good is the market at assessing bank fragility? A horse race between different indicators.*J. Bank. Finance* 26(5),57–80.
- Boubakri, N., Cosset, J.C., Saffar, W., 2013. The role of state and foreign owners in corporate risk-taking: Evidence from privatization. *J. Financ. Econ.* 108, 641–658.
- Boyd, J., Hakenes, H., 2008. Looting and gambling in banking crises. Mimeo, University of Minnesota, Minneapolis, MN.
- Boyd, J., De Nicolo, G., 2005. The theory of bank risk taking and competition revisited. *J. Finance* 60 (3),1329–1343.
- Caprio, G., Laeven, L., Levine, R., 2007. Governance and bank valuation. *J. Financ. Intermediat.* 16(4),584–617.
- Claessens, S., Demirgüç-Kunt, A., Huizinga,H.,2001. How does foreign entry affect domestic banking markets? *J. Bank. Finance* 25(5), 891–911.
- Claessens, S., Laeven, L., 2004. What drives bank competition? Some international evidence. *J. Money Cred. Bank.* 36 (2), 563–583.

- Chen, A. A., Cao, H., Zhang, D., Dickson, D. G., 2013. The impact of shareholding structure on firm investment: Evidence from Chinese listed Firm. *Pac.-Basin Finance J.* 25, 85–100.
- Chortareas, G. E., Girardone, C., Ventouri, A., 2012. Bank supervision, regulation, and efficiency: Evidence from the European Union. *J. Financ. Stab.* 8(4), 292–302.
- Cornett, M. M., Lin, G., Khaksari, S., Tehranian, H., 2010. The impact of state ownership on performance differences in privately-owned versus government-owned banks: An international comparison. *J. Financ. Intermediat.* 19, 74–94.
- Cull, R., Xu, L., 2003. Who gets credit? The behaviour of bureaucrats and state banks in allocating credit to Chinese government-owned enterprises. *Journal of Development Economics* 71(2), 533–559.
- Demirgüç-Kunt, A., Detragiache, E., 2001. Deposit insurance and moral hazard. *Microscopy & Microanalysis* 17 (3), 450–471.
- Demirgüç-Kunt, A., Detragiache, E., 2011. Basel core principles and bank soundness: Does compliance matter? *J. Financ. Stab.* 7, 179–190.
- Demirgüç-Kunt, A., Detragiache, E., Tressel, T., 2008. Banking on the principles: compliance with Basel Core Principles and Bank Soundness. *J. Financ. Intermediat.* 17(4), 511–542.
- Firth, M., Lin, C., Liu, P., Wong, S. M. L., 2009. Inside the black box: Bank credit allocation in China's private sector. *J. Bank. Finance* 33(6), 1144–1155.
- García-Kuhnert, Y., Marchica, Maria. T., Mura, R., 2015. Shareholder diversification and bank risk-taking. *J. Financ. Intermediat.* 24(4), 602–635.
- Gropp, R., Vesala, J., 2004. Deposit insurance, moral hazard and market monitoring. *Review of Finance* 8(4), 571–602.
- Haw, I. M., Ho, S. S. M., Hu, B., Wu, D., 2010. Concentrated control, institutions, and banking sector: an international study. *J. Bank. Finance* 34(3), 485–497.
- Hellmann, T. F., Murdock, K. C., Stiglitz, J. E., 2000. Liberalization, moral hazard in banking, and prudential regulation: are capital requirements, enough? *Am. Econ. Rev.* 90(1), 147–165.
- Hovakimian, A., Kane, E. J., 2000. Effectiveness of Capital Regulation at U.S. Commercial Banks, 1985 to 1994. *J. Finance* 55 (1), 451–468.
- Iannotta, G., Nocera G., Sironi A., 2007. Ownership structure, risk and performance in the European banking industry. *J. Bank. Finance* 31(7), 2127–2149.
- Iannotta, G., Nocera G., Sironi A., 2013. The impact of government ownership on bank risk. *J. Financ. Intermediat.* 22(2), 152–176.
- Jensen, M. C., Meckling, W. H., 1976. Theory of the firm: managerial behavior, agency costs, and ownership structure. *J. Financ. Econ.* 3(4), 305–360.
- Jeon, B. N., Olivero, M. P., Wu, J., 2011. Do foreign banks increase competition? Evidence from emerging Asian and Latin American banking markets. *J. Bank. Finance* 35(4), 856–875.
- Jia, C., 2009. The effect of ownership on the prudential behavior of banks-the case of China. *J. Bank. Finance* 33(1), 77–87.
- John, K., Litov, L., Yeung, B., 2008. Corporate governance and risk taking. *J. Finance* 63(4), 1679–1728.
- Klomp, J., Haan, J. D., 2012. Banking risk and regulation: Does one size fit all? *J. Bank. Finance* 36(12), 3197–3212.
- Klomp, J., Haan, J. D., 2014. Bank Regulation, the Quality of Institutions, and Banking Risk in Developing Countries: An Empirical Analysis. *Emerging Markets Finance and Trade* 50(4), 19–40.

- Keeley, M.C., 1990. Deposit insurance, risk, and market power in banking. *Am. Econ. Rev.* 80(5), 1183–1200.
- Laeven, L., Levine, R., 2009. Bank governance, regulation and risk taking. *J. Financ. Econ.* 93, 259–275.
- Lambert, C., Noth, F., Schüwer, U., 2017. How do insured deposits affect bank risk: Evidence from the 2008 Emergency Economic Stabilization Act. *J. Financ. Intermediat.* 29, 81–102.
- Lepetit, L., Nys, E., Rous, P., Tarazi, A., 2008a. The expansion of services in European banking: implications for loan pricing and interest margins. *J. Bank. Finance* 32(11), 2325–2335.
- Lepetit, L., Nys, E., Rous, P., Tarazi, A., 2008b. Bank income structure and risk: an empirical analysis of European banks. *J. Bank. Finance* 32(8), 1452–1467.
- Li L., Zhang, Y., 2013. Are there diversification benefits of increasing non-interest income in the Chinese banking industry? *J. Empirical Finance* 24, 151–165.
- Matutes, C., Vives, X., 2000. Imperfect competition, risk-taking, and regulation in banking. *Euro. Econ. Rev.* 44(1), 1–34.
- Micco, A., Panizza, U., Yañez, M., 2007. Bank ownership and performance. Does politics matter? *J. Bank. Finance* 31(1), 219–241.
- Morck, R.K., Stangeland, D.A., Yeung, B., 1998. Inherited wealth, corporate control, and economic growth: the Canadian disease? NBER Working Paper No. 6814.
- Niinimäki, J.-P., 2004. The effects of competition on banks' risk-taking. *J. Econ.* 81(3), 199–222.
- Pasiouras, F., Gaganis, C., Zopounidis, C., 2006. The Impact of Bank Regulations, Supervision, Market Structure, and Bank Characteristics on Individual Bank Ratings: A Cross-Country Analysis. *Review of Quantitative Finance and Accounting* 27(4), 403–438.
- Pennathur, A.K., Subrahmanyam, V., Vishwasrao, S., 2012. Income diversification and risk: Does ownership matter? An empirical examination of Indian banks. *J. Bank. Finance* 36(8), 2203–2215.
- Repullo, R., 2004. Capital requirements, market power, and risk-taking in banking. *J. Financ. Intermediat.* 13(2), 156–182.
- Roy, A.D., 1952. Safety first and the holding of assets. *Econometrica* 20(3), 431–449.
- Saunders, A., Strock, E., Travlos, N.G., 1990. Ownership structure, deregulation, and bank risk taking. *J. Finance* 45(2), 643–654.
- Saghi-Zedek, N., 2016. Product diversification and bank performance: Does ownership structure matter? *J. Bank. Finance* 71, 154–167.
- Shleifer, A., Vishny, R.W., 1986. Large shareholders and corporate control. *J. Political Econ.* 94(3), 461–488.
- Simpson, J.L., 2010. Were there warning signals from banking sectors for the 2008/2009 global financial crisis. *Applied Financial Economics* 20(1-2), 45–61.
- Stigler, G.J., 1971. The Theory of Economic Regulation. *The Bell Journal of Economics and Management Science*. 2 (1), 3–21.
- Webb, David. C., 2011. Balancing the Banks: Global Lessons from the Financial Crisis. *Economic Journal* 121(550), 104.
- Wheelock, D.C., Wilson, P.W., 1995. Explaining Bank Failures: Deposit Insurance, Regulation, and Efficiency. *Rev. Econ. Stat.* 77 (4), 689–700.
- Zhu, W., Yang J., 2016. State ownership, cross-border acquisition, and risk-taking: Evidence from China's banking industry. *J. Bank. Finance* 71, 133–153.

Table 1
Sample Banks by Countries.

Country	All Banks	Sample Banks	Banks with Large Owner	Banks with Credit Rating
Argentina	17	12	7	7
Armenia	7	3	2	2
Bahrain	11	4	1	2
Belarus	7	4	4	2
Botswana	13	5	5	0
Brazil	8	3	2	1
Bulgaria	15	5	4	5
Chile	27	2	2	2
China	153	16	16	9
Columbia	35	10	7	2
Croatia	6	4	3	1
Egypt	24	15	11	2
Guatemala	11	5	4	0
Guyana	5	2	2	0
Honduras	12	5	4	0
Hungary	7	6	3	1
India	119	5	5	3
Jordan	19	11	2	2
Kazakhstan	16	4	3	3
Kenya	24	22	10	1
Kuwait	30	17	4	12
Lebanon	16	5	4	0
Luxembourg	71	37	7	2
Malaysia	41	13	12	2
Mali	9	4	3	0
Mexico	74	35	6	5
Nicaragua	4	1	1	0
Niger	23	9	6	6
Nigeria	14	8	0	6
Oman	13	8	3	4
Pakistan	12	3	2	1
Panama	45	8	6	3
Peru	25	4	3	3
Philippines	18	7	3	4
Poland	3	2	2	0
Romania	20	7	7	1
Russia	39	5	5	4
Senegal	12	7	5	0
South Africa	12	6	4	3
Thailand	12	7	4	2
Togo	8	4	1	0
Uruguay	23	13	9	9
Venezuela	8	4	3	1
Total	1,068	357	197	113

Table 1 shows the numbers of all banks in sample developing countries, sample banks selected, banks with large owners and those with credit ratings. Out of 1,068 banks in our sample countries, we select 357 sample banks based on their data availability. Large owners with more than 10% ownership present in 197 out of the 357 sample banks. Information on credit rating is only available for 113 out of 357 sample banks.

Table 2

CAMELS Banking Soundness Indicators and Summary Statistics by Bank Owners.

CAMELS indicators	Calculations	Lags	Potential relation to bank risk	All Banks	Government	Industrial	Financial	Family	Foreign
Capital Adequacy									
EAR (Total equity/total assets)	$\frac{TotalEquity}{TotalAssets} \times 100\%$	1	negative	14.64	17.86	17.89	11.13	14.95	12.50
TCR (Total capital ratio)	$\frac{Tier1\&2\ Capital}{RiskWeightedAssets} \times 100\%$	1	negative	21.80	22.57	22.81	18.59	21.11	19.47
Asset Quality									
LLR (Loan loss provision/total loans)	$\frac{LoanLossProvision}{TotalLoans} \times 100\%$	-1	positive	5.82	8.72	5.53	3.98	5.52	4.27
ILR (Impaired loan ratio)	$\frac{ImpairedLoan}{TotalLoans} \times 100\%$	-1	positive	7.81	9.73	7.34	6.34	4.29	6.74
Management Cost									
CIR (Total cost/total income)	$\frac{TotalCost}{TotalIncome} \times 100\%$	-1	positive	61.55	56.46	56.03	58.61	46.11	59.44
OCA (Overhead cost/total assets)	$\frac{OverheadCost}{TotalAssets} \times 100\%$	-1	positive	3.68	3.21	4.12	3.63	2.78	3.82
Earnings and Profitability									
ROA (Return on assets)	$\frac{Income}{TotalAssets} \times 100\%$	0	negative	11.91	1.75	1.46	1.72	2.89	1.87
ROE (Return on equity)	$\frac{Income}{TotalEquity} \times 100\%$	0	negative	1.54	11.27	13.02	15.22	17.23	14.80
Liquidity									
LAA (Liquid assets/total assets)	$\frac{LiquidAssets}{TotalAssets} \times 100\%$	0	negative	30.92	28.17	28.57	29.35	33.71	28.89
LASFR (Liquid assets/short-term funds)	$\frac{LiquidAssets}{Short-termFunds} \times 100\%$	0	negative	52.94	73.96	62.23	42.53	45.94	44.08
TLD (Total loans/deposits)	$\frac{TotalLoans}{Deposits} \times 100\%$	0	positive	62.61	64.42	65.46	65.09	59.15	64.56
Sensitivity to Market Risk									
TIETD (Total interest expenses/total deposits)	$\frac{TotalInterestExpenses}{TotalDeposits} \times 100\%$	0	positive	4.07	4.91	5.18	3.63	6.15	3.91
GSTA (Government securities/total assets)	$\frac{GovernmentSecurities}{TotalAssets} \times 100\%$	0	positive	12.52	10.80	9.84	13.22	12.11	13.87

Table 2 explains the CAMELS banking soundness indicators and their calculation, lags and relation to bank risk/distress. Means of these indicators are reported for all sample banks and banks owned by government, industrial companies, financial companies, family and foreigners. Data source: BankScope data

Table 3

Descriptive Statistics of Bank Risk by Bank Owners.

Types of bank	Variable	No. of Obs	Mean	Std. Dev.	Min	Max
All Banks	Total risk	3213	-2.03	9.05	-91.09	29.76
	Credit rating	993	11.00	3.66	1.00	21.00
	Inverted z score	3213	0.11	0.85	-27.84	18.98
Banks Owned by: Government	Total risk	576	-3.42	11.99	-91.09	20.47
	Credit rating	286	11.08	3.88	1.00	18.00
	Inverted z score	576	0.12	0.35	-0.75	7.61
Industrial Company	Total risk	260	-2.90	8.81	-50.36	11.50
	Credit rating	100	12.19	3.74	5.00	21.00
	Inverted z score	260	0.10	0.22	0.01	3.17
Financial Company	Total risk	1000	-1.16	7.41	-88.14	18.26
	Credit rating	297	10.63	3.54	3.00	18.00
	Inverted z score	1000	0.10	0.61	-1.17	18.98
Family	Total risk	54	-3.37	4.45	-14.82	5.14
	Credit rating	18	13.19	0.50	12.50	14.00
	Inverted z score	54	0.12	0.08	0.04	0.37
Foreign	Total risk	964	-1.36	7.95	-88.14	18.26
	Credit rating	280	10.95	3.84	3.00	21.00
	Inverted z score	964	0.12	0.67	0.01	18.98

Table 3 reports descriptive statistics for three measurements of bank risk, i.e. total risk, credit rating and inverted z score, in all banks and banks with five different types of large owners – government, industrial company, financial company, family and foreign. Total risk is self-constructed variables based on the CAMELS indicator discussed in Table 2. Credit rating is self-constructed credit rating score based on S&PLT, MLTD, and FLT credit ratings. Inverted bank-level z score is calculated as $\sigma \text{ ROA}/(\text{ROA}+\text{EAR})$.

Table 4

Descriptive Statistics for Regression Variables.

Panel A: Bank-Level Variables						Panel B: Country-level Regulation Variables						Panel C: Other Country-level Variables					
	N	Mean	Std. Dev.	Min	Max		N	Mean	Std. Dev.	Min	Max		N	Mean	Std. Dev.	Min	Max
EAR	3213	14.64	14.20	0.15	99.58	EntryR	3213	10.75	2.04	8.00	16.00	NExport	3213	1.77	11.07	-25.55	45.45
TCR	3213	21.80	12.49	1.15	93.35	OwnershipR	3213	6.33	1.99	2.00	11.73	Inflation	3213	5.93	5.08	-3.10	59.22
LLR	3213	5.82	9.43	0.02	98.95	CapitalR	3213	5.55	2.29	-0.12	10.31	GDPG	3213	4.79	3.74	-7.82	14.20
ILR	3213	7.81	11.39	0.00	87.00	ActivitiesR	3213	10.13	2.51	4.00	15.00	TTS	3213	114.57	38.06	21.40	262.09
CIR	3213	61.55	34.58	5.73	378.14	ExAuditR	3213	8.28	1.23	4.00	10.00	RIR	3213	3.28	5.72	-9.87	44.64
OCA	3213	3.68	3.36	0.03	51.77	ManagementR	3213	0.87	0.34	0.00	1.00	IRD	3213	6.02	3.82	-2.81	39.51
ROE	3213	11.91	18.58	-120.33	156.08	LiquidityR	3213	3.73	1.15	0.00	6.00	GDPPC	3213	17095.20	29321.75	234.91	113240.00
ROA	3212	1.54	3.85	-49.27	44.00	DepositR	3213	3.43	2.47	0.00	8.00	M2R	3213	3.24	1.47	0.53	12.43
LAA	3213	30.92	21.71	1.01	98.92	ProvisionR	3213	3.14	1.97	0.00	18.86	Concentration	3213	59.28	18.86	22.53	100.00
LASFR	3213	52.94	75.92	0.17	825.89	DisclosureR	3213	5.75	1.16	2.90	8.00	SMC	3213	69.21	54.93	0.65	252.42
TLD	3205	62.61	18.59	16.33	98.22	ExitR	3213	6.97	1.82	3.00	11.00	FB	3213	45.43	27.78	0.00	96.00
TIETD	3205	4.07	3.61	0.09	31.91	SupervisionR	3213	7.74	2.23	0.00	13.00	Crisis	3213	0.1	0.3	0	1
GSTA	3213	12.52	11.50	0.01	83.60	TotalR	3213	72.67	7.84	39.55	90.01	IMFassis	3213	0.15	0.35	0	1
Government	3213	0.18	0.38	0	1												
Industrial	3213	0.08	0.27	0	1												
Financial	3213	0.31	0.46	0	1												
Family	3213	0.02	0.13	0	1												
Foreign	3213	0.30	0.46	0	1												
Shareholding	3213	45.29	44.55	0	100												
Lnta	3213	14.53	3.11	8.71	28.66												

Table 4 reports descriptive statistics for variables used in regression analyses. The thirteen CAMELS indicators include total equity/total assets (EAR), total capital ratio (TCR), loan loss provision/total loans (LLR), impaired loan ratio (ILR), total cost/total income (CIR), overhead cost/total assets (OCA), return on assets (ROA), return on equity (ROE), liquid assets/total assets (LAA), liquid assets/short-term funds (LASFR), total interest expenses/total deposits (TIETD), and government securities/total assets (GSTA). Bank-level ownership variables include five dummies (government, industrial, financial, family and foreign) and the shareholding by the large owner (shareholding). Lnta is bank size measured as the natural logarithm of total assets. National bank regulation is measured using the total regulation score (TotalR) self-constructed based on World Bank surveys and twelve subcategory regulations scores, including (1) entry into banking (EntryR); (2) ownership (OwnershipR); (3) capital requirement (CapitalR); (4) activities restrictions (ActivitiesR); (5) external auditing requirements (ExAuditR); (6) internal management/organizational requirements (ManagementR); (7) liquidity and risk diversification (LiquidityR); (8) depositor (saving) protection schemes (DepositR); (9) asset classification provisioning and write-offs (ProvisionR); (10) accounting/ information disclosure (DisclosureR); (11) discipline problem and institutions' exit (ExitR); and (12) supervision (SupervisionR). Other country-level variables include net export (NExport), the value of export minus import as a share of GDP; Inflation, Change in the national consumer price index; GDP Growth (GDPG), annual percentage growth rate of GDP per capita at market prices based on constant prices of 2000 U.S. dollars; GDP per capita (GDPPC), gross domestic product divided by midyear population; Term of Trade Shocks (TTS), Standard deviation of the value of import divided by the value of export in constant prices of 2000 U.S. dollars; Real Interest Rate (RIR), The deposit interest rate minus Inflation measured by the GDP deflator; Interest Rate Differential (IRD), Difference between the rate interest rate in a country and the average real interest of Germany, US and Japan; M2 to Foreign Exchange Reserves (M2R), The sum of currency outside banks, demand deposits other than those of the central government, and the time, savings, and foreign currency deposits of resident sectors other than the central government; Concentration, Herfindahl-Hirschmann index of bank assets within a country; Stock Market Capitalization to GDP (SMC), Value of listed shares to GDP; Foreign Banks to Total Banks (FB), Percentage of the number of foreign owned banks to the number of the total banks in an Economy; Currency or Debt Crises (Crisis), dummy variable that equals 1 if in a country-year there is a currency crisis, otherwise 0; and IMF Assistant Program (IMFassis) Dummy variable that equals to 1 if in a country-year there is an IMF program is running, otherwise 0.

Table 5
Correlation Analyses.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)
(1) Total Risk	1.00																						
(2) Credit Rating	0.07b	1.00																					
(3) Inverted z score	0.14c	-0.13c	1.00																				
(4) TotalR	0.10c	0.08b	-0.04a	1.00																			
(5) NExport	-0.09b	-0.36c	-0.03a	-0.06b	1.00																		
(6) Inflation	0.06b	0.34c	0.00a	0.07b	-0.04a	1.00																	
(7) GDPG	0.00a	0.10c	0.00a	-0.16c	0.01a	-0.03a	1.00																
(8) TTS	0.18c	0.00a	-0.04a	-0.03a	0.42c	0.16c	-0.08b	1.00															
(9) RIR	0.00a	0.11c	-0.01a	0.12c	-0.36c	-0.12c	-0.10c	-0.17c	1.00														
(10) IRD	-0.03a	0.17c	-0.01a	0.17c	-0.22c	-0.06b	-0.03a	0.03a	0.76c	1.00													
(11) GDPPC	-0.06b	-0.51c	-0.04a	0.02a	0.58c	-0.13c	-0.18c	0.25c	-0.26c	-0.16c	1.00												
(12) M2R	-0.05b	-0.29c	-0.08b	-0.09b	0.11c	-0.08b	-0.03a	-0.19c	-0.05b	-0.10c	0.13c	1.00											
(13) Concentration	0.12c	-0.17c	0.02a	-0.08b	0.27c	-0.23c	0.04a	0.21c	-0.10c	-0.06b	0.12c	0.04a	1.00										
(14) SMC	-0.13c	-0.37c	-0.07b	0.04a	0.19c	-0.13c	-0.06b	-0.03a	-0.11c	-0.15c	0.40c	0.41c	0.18c	1.00									
(15) FB	0.04a	0.19c	0.07b	0.11c	-0.57c	-0.04a	-0.15c	-0.22c	0.34c	0.31c	-0.01a	-0.24c	0.00a	-0.04	1.00								
(16) Crisis	0.12c	0.12c	0.07b	-0.21c	-0.02a	0.14c	-0.13c	0.17c	0.16c	0.13c	-0.16c	-0.20c	-0.06	0.08b	1.00								
(17) IMFassis	0.01a	0.13c	-0.01a	0.03a	-0.21c	-0.03a	-0.06b	-0.05b	0.12c	0.06b	-0.13c	-0.10c	0.00a	-0.14	0.21c	-0.08b	1.00						
(18) Government	-0.13c	0.01a	-0.05b	0.01a	-0.10c	0.16c	0.14c	-0.20c	0.04a	0.01a	-0.08b	0.22c	-0.27c	0.03	-0.09b	-0.04a	-0.06b	1.00					
(19) Industrial	-0.07b	0.11c	-0.01a	-0.08b	-0.06b	-0.04a	0.04a	-0.02a	0.04a	0.08b	-0.06b	0.02a	-0.03a	0.02	0.04a	0.06b	-0.06b	-0.15c	1.00				
(20) Financial	-0.01a	-0.07b	-0.03a	0.04a	-0.22c	-0.14c	-0.10c	-0.07b	0.07b	0.08b	-0.03a	-0.08b	0.04a	0.02	0.27c	-0.07b	0.14c	-0.42c	-0.22c	1.00			
(21) Family	-0.04a	0.08b	-0.00a	-0.01a	-0.06b	0.03a	-0.01a	-0.01a	-0.06b	-0.02a	-0.04a	-0.07b	-0.02a	0.14	-0.06b	0.09b	-0.04a	-0.09b	-0.05b	0.06b	1.00		
(22) Foreign	0.03a	-0.01a	0.03a	0.13c	-0.15c	-0.16c	-0.11c	-0.08b	0.08b	0.10c	0.05b	-0.13c	0.04a	-0.03	0.32c	-0.10c	0.09b	-0.31c	0.13c	0.61c	0.07b	1.00	
(23) Shareholding	-0.14c	0.05b	-0.06b	0.09b	-0.28c	0.09b	-0.06b	-0.18c	0.09b	0.12c	-0.04a	0.02a	-0.28c	0.07	0.29c	0.02a	0.07b	0.40c	0.11c	0.41c	0.08b	0.39c	1.00
(24) Lnta	0.07b	-0.35c	-0.05b	-0.37c	0.09b	-0.18c	0.26c	-0.23c	-0.06b	-0.19c	-0.02a	0.27c	0.13c	0.04	-0.28c	-0.06b	-0.09b	0.20c	0.04a	-0.07b	-0.03a	-0.18c	-0.11c

Notes: Table 5 reports correlation analyses for variables used in regression analyses. Total risk is a self-constructed variable based on the CAMELS indicators. Credit rating is self-constructed credit rating score based on S&PLT, MLTD, and FLT credit ratings. Insolvency risk is the inverted bank-level z score calculated as $\sigma\text{ROA}/(\text{ROA}+\text{EAR})$. Total regulation score (TotalR) is self-constructed based on World Bank surveys. Large owner dummies (government, industrial, financial, family and foreign) take the value of 1 if the large owner is a government, an industrial company, a financial company, family or foreigner, respectively, and 0 otherwise. Shareholding is the shareholding by the large owner. Lnta is the natural logarithm of total assets as a measure of bank size. Net export (NExport) is the value of export minus import as a share of GDP. Inflation is the change in the national consumer price index. GDP Growth (GDPG) is the annual percentage growth rate of GDP per capita at market prices based on constant prices of 2000 U.S. dollars. GDP per capital (GDPPC) is gross domestic product divided by midyear population. Term of Trade Shocks (TTS) is the standard deviation of the value of import divided by the value of export in constant prices of 2000 U.S. dollars. Real Interest Rate (RIR) is the deposit interest rate minus Inflation measured by the GDP deflator. Interest Rate Differential (IRD) is the difference between the rate interest rate in a country and the average real interest of Germany, US and Japan. M2 to Foreign Exchange Reserves (M2R) is the sum of currency outside banks, demand deposits other than those of the central government, and the time, savings, and foreign currency deposits of resident sectors other than the central government. Concentration is the Herfindahl-Hirschmann index of bank assets within a country. Stock Market Capitalization to GDP (SMC) is the value of listed shares to GDP. Foreign Banks to Total Banks (FB) is the percentage of the number of foreign owned banks to the number of the total banks in an Economy. Currency or Debt Crises (Crisis) is a dummy variable that equals 1 if in a country-year there is a currency crisis, otherwise 0. And IMF Assistant Program (IMFassis) is a dummy variable that equals to 1 if in a country-year there is an IMF program is running, otherwise 0. a, b, and c denote significant at 1%, 5%, and 10%, respectively.

Table 6
Regulation, Identity of Large Owner and Bank Risk.

VARIABLES	Total Risk			Credit Rating			Inverted z Score		
Constant	1.356*** (8.50)	-1.462*** (-3.18)	1.408** (2.08)	0.906*** (2.92)	1.736*** (3.33)	1.817** (2.35)	-0.073*** (-33.41)	-0.487*** (-59.48)	-0.949*** (-51.36)
Lagged DV	0.479*** (184.79)	0.461*** (109.76)	0.461*** (106.77)	0.974*** (114.11)	0.965*** (81.47)	0.960*** (62.11)	0.092*** (1,762.17)	0.092*** (1,111.43)	0.104*** (801.59)
TotalR	-0.030*** (-22.78)	-0.023*** (-8.10)	-0.020*** (-3.53)	-0.005** (-2.46)	-0.005** (-2.19)	-0.006 (-0.66)	-0.001*** (-82.81)	-0.002*** (-85.72)	-0.000 (-0.94)
Government		-2.430*** (-6.20)	0.069 (0.04)		-0.519* (-1.91)	-1.424 (-1.49)		-0.747*** (-42.51)	-2.516*** (-26.84)
TotalR×Government			-0.037 (-1.50)			0.025* (1.92)			0.023*** (20.92)
Industrial		-4.267*** (-13.25)	-12.050*** (-6.98)		-0.431 (-1.55)	-2.831** (-2.00)		-0.602*** (-59.87)	-2.012*** (-22.68)
TotalR×Industrial			0.116*** (5.00)			0.055*** (3.25)			0.022*** (21.31)
Financial		1.943*** (5.97)	-2.668 (-1.57)		-0.638** (-2.14)	-3.841*** (-3.17)		-0.408*** (-27.56)	-2.346*** (-32.84)
TotalR×Financial			0.065*** (2.67)			0.061*** (3.69)			0.025*** (28.28)
Family		-4.407*** (-4.33)	-14.377*** (-6.91)		1.552*** (5.67)	16.471*** (5.50)		-0.462*** (-13.01)	-5.439*** (-22.64)
TotalR×Family			0.153*** (7.44)			-0.195*** (-5.22)			0.052*** (22.34)
Foreign		-1.633*** (-5.28)	-0.074*** (-3.38)		-0.393** (-2.04)	-0.024** (-2.04)		-0.270*** (-45.19)	-0.022 (-0.35)
TotalR×Foreign			3.452** (2.31)			1.251 (1.48)			-0.003*** (-3.64)
Shareholding		0.005 (1.60)	0.026 (1.49)		0.001 (0.34)	0.020*** (2.68)		0.003*** (15.20)	0.028*** (31.95)
TotalR× Shareholding			-0.000 (-1.04)			-0.000*** (-4.74)			-0.000*** (-34.84)
Lnta	-0.238*** (-38.94)	0.003 (0.14)	0.028 (1.08)	-0.197*** (-6.56)	-0.306*** (-4.60)	-0.238** (-2.39)	0.003*** (12.95)	0.028*** (40.60)	0.030*** (24.35)
Inflation	0.043*** (31.85)	0.067*** (14.85)	0.068*** (13.74)	0.003** (2.18)	0.008* (1.91)	0.002 (0.51)	-0.003*** (-280.61)	-0.000*** (-11.84)	0.001*** (22.33)
RIR	0.046*** (12.81)	0.062*** (15.67)	0.061*** (14.29)	0.008*** (3.67)	0.030*** (5.44)	0.004 (0.92)	-0.004*** (-267.24)	-0.004*** (-136.31)	-0.005*** (-99.48)
IRD	-0.125*** (-26.91)	-0.099*** (-10.95)	-0.104*** (-10.95)	-0.032*** (-9.41)	-0.016 (-1.64)	-0.028*** (-3.32)	0.027*** (721.39)	0.027*** (335.26)	0.033*** (147.29)
Crisis	1.052*** (17.13)	0.847*** (5.66)	0.915*** (4.69)	0.255*** (5.77)	-0.052 (-0.46)	-0.003 (-0.03)	0.076*** (158.02)	0.035*** (52.06)	0.070*** (27.75)
M2R	0.049*** (5.08)	0.064*** (3.64)	0.063*** (3.48)	0.017 (1.37)	0.034* (1.91)	0.042** (2.17)	-0.017*** (-244.15)	-0.016*** (-129.91)	-0.003*** (-9.92)
Concentration	0.021*** (18.49)	0.029*** (12.75)	0.027*** (13.24)	0.004*** (7.20)	0.001 (0.85)	-0.001 (-0.52)	-0.001*** (-304.25)	-0.005*** (-259.29)	-0.005*** (-144.02)
SMC	-0.001** (-2.35)	-0.006*** (-4.41)	-0.005*** (-2.97)	-0.002*** (-6.83)	-0.004*** (-6.69)	-0.005*** (-8.27)	0.000*** (107.27)	0.001*** (66.51)	0.001*** (63.02)
FB	0.008*** (9.74)	-0.010** (-2.55)	-0.015*** (-3.12)	0.000 (0.60)	0.004** (2.30)	0.007** (2.43)	-0.001*** (-137.06)	0.001*** (36.12)	0.002*** (45.71)
NExport	0.006*** (3.74)	-0.012* (-1.82)	-0.006 (-0.90)	0.006*** (5.53)	0.010*** (3.50)	0.012*** (3.99)	-0.001*** (-99.34)	-0.001*** (-66.15)	-0.001*** (-18.94)
TTS	-0.001*** (-4.09)	0.002* (1.72)	0.002* (1.92)	-0.000 (-1.03)	0.000 (0.58)	-0.002*** (-3.22)	0.001*** (187.46)	0.000*** (52.19)	0.001*** (61.27)
GDPG	0.054*** (9.83)	0.058*** (10.33)	0.054*** (8.88)	-0.013*** (-4.44)	0.002 (0.32)	0.001 (0.22)	-0.014*** (-603.73)	-0.012*** (-243.57)	-0.008*** (-105.78)
GDPPC	-0.000*** (-21.86)	-0.000 (-0.55)	-0.000 (-0.69)	-0.000*** (-5.28)	-0.000*** (-5.72)	-0.000*** (-3.75)	-0.000*** (-41.10)	-0.000*** (-61.11)	-0.000*** (-46.31)
IMFassis	0.038 (1.26)	-0.204*** (-3.97)	-0.195*** (-3.96)	-0.064** (-2.55)	-0.114*** (-2.59)	-0.068* (-1.69)	0.017*** (212.11)	0.011*** (53.86)	0.005*** (16.32)

Observations	2,499	2,499	2,499	878	770	770	2,856	2,856	2,856
Number of id	357	357	357	113	113	113	357	357	357
AB test AR(1)	0.000	0.000	0.000	0.000	0.000	0.000	0.086	0.085	0.085
AB test AR(2)	0.470	0.454	0.469	0.769	0.717	0.841	0.435	0.422	0.379
Sargan test	0.985	0.534	0.982	1.000	1.000	1.000	0.133	0.293	0.002

Notes: Total risk is a self-constructed variable based on the CAMELS indicators. Credit rating is self-constructed credit rating score based on S&PLT, MLTD, and FLT credit ratings. Insolvency risk is the inverted bank-level z score calculated as $\sigma ROA/(ROA+EAR)$. Total regulation score (TotalR) is self-constructed based on World Bank surveys. Large owner dummies (government, industrial, financial, family and foreign) take the value of 1 if the large owner is a government, an industrial company, a financial company, family or foreigner, respectively, and 0 otherwise. Shareholding is the shareholding by the large owner. Lnta is the natural logarithm of total assets as a measure of bank size. Net export (NExport) is the value of export minus import as a share of GDP. Inflation is the change in the national consumer price index. GDP Growth (GDPG) is the annual percentage growth rate of GDP per capita at market prices based on constant prices of 2000 U.S. dollars. GDP per capital (GDPPC) is gross domestic product divided by midyear population. Term of Trade Shocks (TTS) is the standard deviation of the value of import divided by the value of export in constant prices of 2000 U.S. dollars. Real Interest Rate (RIR) is the deposit interest rate minus Inflation measured by the GDP deflator. Interest Rate Differential (IRD) is the difference between the rate interest rate in a country and the average real interest of Germany, US and Japan. M2 to Foreign Exchange Reserves (M2R) is the sum of currency outside banks, demand deposits other than those of the central government, and the time, savings, and foreign currency deposits of resident sectors other than the central government. Concentration is the Herfindahl-Hirschmann index of bank assets within a country. Stock Market Capitalization to GDP (SMC) is the value of listed shares to GDP. Foreign Banks to Total Banks (FB) is the percentage of the number of foreign owned banks to the number of the total banks in an Economy. Currency or Debt Crises (Crisis) is a dummy variable that equals 1 if in a country-year there is a currency crisis, otherwise 0. And IMF Assistant Program (IMFassis) is a dummy variable that equals to 1 if in a country-year there is an IMF program is running, otherwise 0. The z-statistics are reported in parentheses. ***, **, and * indicate significance levels at 1%, 5%, and 10%, respectively.

Table 7

A Summary of Findings for Subcategory Regulations on Bank Risk.

	Total Risk	Credit Rating Risk	Inverted z Score
EntryR	+***	+**	_-***
OwnershipR	_-***	+***	_-***
CapitalR	_-***	_-**	_-***
ActivitiesR	_-***	_-***	_-***
ExAuditR	_-***	_-**	_-***
ManagementR	+***	_-***	_-***
LiquidityR	_-***		+***
DepositR	_-***	_-*	_-***
ProvisionR	+***	_-**	+***
DisclosureR		_-***	_-***
ExitR	+***	+***	+***
SupervisionR	_-***	_-***	+***

Notes: Total risk is a self-constructed variable based on the CAMELS indicators. Credit rating is self-constructed credit rating score based on S&PLT, MLTD, and FLT credit ratings. Insolvency risk is the inverted bank-level z score calculated as $\sigma ROA/(ROA+EAR)$. The twelve subcategory regulations scores include (1) entry into banking (EntryR); (2) ownership (OwnershipR); (3) capital requirement (CapitalR); (4) activities restrictions (ActivitiesR); (5) external auditing requirements (ExAuditR); (6) internal management/organizational requirements (ManagementR); (7) liquidity and risk diversification (LiquidityR); (8) depositor (saving) protection schemes (DepositR); (9) asset classification provisioning and write-offs (ProvisionR); (10) accounting/ information disclosure (DisclosureR); (11) discipline problem and institutions' exit (ExitR); and (12) supervision (SupervisionR). Details for the regression results reported in Table 7 can be found in [Table A.4a-c](#).

Table 8

Regulation, Large Owner and Capital Adequacy of Banks.

VARIABLES	Total Equity/Total Assets				Total Capital Ratio			
Constant	11.333*** (31.89)	11.249*** (34.93)	16.324*** (50.04)	15.028*** (36.31)	21.627*** (126.68)	20.562*** (120.97)	25.782*** (43.98)	27.639*** (50.09)
Lagged DV	0.657*** (203.53)	0.650*** (276.62)	0.604*** (429.71)	0.624*** (178.73)	0.544*** (298.13)	0.533*** (315.65)	0.487*** (205.47)	0.458*** (162.11)
TotalR	0.017*** (7.88)		0.018*** (9.86)		-0.039*** (-32.05)		-0.025*** (-14.46)	
CapitalR		0.232*** (25.53)		0.219*** (15.50)		-0.297*** (-37.71)		-0.240*** (-25.71)
Government			11.803*** (38.84)	9.185*** (24.32)			14.309*** (19.40)	15.715*** (24.07)
Industrial			5.038*** (16.55)	8.457*** (31.52)			24.315*** (31.20)	24.033*** (33.69)
Financial			5.544*** (22.04)	4.501*** (10.52)			12.975*** (14.08)	14.432*** (16.98)
Family			15.557*** (28.88)	7.057*** (8.59)			4.972*** (4.47)	1.686 (1.50)
Foreign			1.586*** (11.52)	3.019*** (8.43)			0.069 (0.16)	-1.048** (-2.39)
Shareholding			-0.062*** (-25.23)	-0.067*** (-20.77)			-0.147*** (-20.14)	-0.168*** (-27.67)
Lnta	2.858*** (37.68)	2.714*** (42.26)	-0.927*** (-41.27)	2.492*** (34.17)	1.509*** (39.25)	1.642*** (39.18)	0.907*** (19.25)	1.161*** (20.75)
Inflation	-0.021*** (-11.08)	-0.022*** (-18.17)	-0.069*** (-28.98)	-0.024*** (-5.85)	-0.017*** (-13.91)	-0.014*** (-10.99)	0.014*** (7.02)	0.008** (2.49)
RIR	-0.015*** (-4.00)	-0.027*** (-7.82)	-0.063*** (-31.54)	-0.018*** (-3.77)	0.031*** (13.28)	0.020*** (9.67)	-0.022*** (-7.75)	-0.006* (-1.93)
IRD	-0.080*** (-17.56)	-0.041*** (-8.54)	0.035*** (6.95)	-0.049*** (-5.89)	-0.094*** (-23.02)	-0.064*** (-16.30)	-0.020*** (-4.40)	0.017*** (2.75)
Crisis	1.044*** (14.51)	0.875*** (15.52)	0.124*** (2.85)	1.229*** (14.04)	-0.685*** (-19.64)	-0.757*** (-22.61)	0.155*** (3.49)	0.359*** (6.60)
M2R	0.007 (0.76)	-0.002 (-0.16)	-0.306*** (-30.01)	-0.086*** (-6.02)	-0.013 (-0.94)	0.031*** (2.87)	-0.100*** (-6.68)	0.022 (1.59)
Concentration	0.004*** (3.70)	-0.001 (-0.79)	0.006*** (6.51)	0.008*** (5.83)	-0.034*** (-47.47)	-0.033*** (-66.56)	-0.011*** (-13.97)	-0.010*** (-11.57)
SMC	-0.001 (-1.09)	-0.004*** (-5.39)	-0.005*** (-7.94)	-0.004*** (-4.35)	-0.002*** (-6.28)	0.001** (2.17)	0.001 (0.79)	0.002*** (2.89)
FB	-0.014*** (-8.43)	-0.012*** (-8.21)	-0.024*** (-15.87)	-0.015*** (-7.09)	-0.048*** (-84.71)	-0.046*** (-60.60)	-0.025*** (-16.11)	-0.034*** (-18.12)
NExport	0.062*** (22.76)	0.055*** (18.50)	0.082*** (46.86)	0.055*** (14.74)	0.047*** (20.16)	0.060*** (27.55)	0.034*** (16.00)	0.077*** (26.78)
TTS	0.012*** (16.22)	0.011*** (12.78)	0.012*** (30.47)	0.017*** (14.69)	0.020*** (44.60)	0.022*** (54.89)	0.023*** (31.95)	0.025*** (42.77)
GDPG	0.067*** (18.02)	0.063*** (14.22)	0.026*** (6.68)	0.043*** (10.65)	0.021*** (5.86)	-0.001 (-0.25)	-0.044*** (-13.38)	-0.060*** (-15.37)
GDPPC	-0.000 (-1.13)	0.000 (0.96)	0.000*** (4.75)	0.000** (2.50)	-0.000*** (-6.16)	-0.000*** (-10.99)	0.000** (2.09)	-0.000** (-1.99)
IMFassis	0.175*** (5.51)	0.169*** (4.97)	0.294*** (11.82)	0.237*** (5.30)	0.400*** (20.78)	0.381*** (21.66)	0.766*** (53.43)	0.523*** (24.10)
Observations	2,856	2,856	2,816	2,816	2,856	2,856	2,856	2,856
Number of id	357	357	352	352	357	357	357	357
AB test AR(1)	0.001	0.001	0.001	0.001	0.029	0.030	0.033	0.035
AB test AR(2)	0.593	0.581	0.606	0.577	0.447	0.451	0.451	0.464
Sargan test	0.216	0.217	0.988	0.233	0.228	0.200	0.660	0.207

Notes: Table 8 presents the effect of total regulation and subcategory regulation (CapitalR) on capital adequacy of banks. The subcategory regulation score (CapitalR) measures national regulation on capital requirement. The first proxy for capital adequacy of banks is total equity to total assets ratio. The second proxy is total capital ratio calculated as the ratio of tier 1&2 capital to total weighted assets. Other variables are defined the same as those in Table 6. The z-statistics are reported in parentheses. ***, **, and * indicate significance levels at 1%, 5%, and 10%, respectively.

Table 9

Regulation, Large Owner and Asset Quality of Banks.

VARIABLES	Loan Loss Provision/Total Loans				Impaired Loan Ratio			
Constant	-0.055 (-0.37)	-1.657*** (-17.13)	-2.965*** (-10.56)	-3.905*** (-17.48)	4.102*** (17.03)	1.708*** (10.57)	-0.060 (-0.28)	0.680 (1.55)
Lagged DV	0.915*** (722.43)	0.909*** (658.04)	0.876*** (497.39)	0.867*** (414.11)	0.783*** (336.76)	0.779*** (355.71)	0.781*** (623.69)	0.778*** (282.73)
TotalR	-0.014*** (-10.33)		-0.008*** (-5.66)		-0.025*** (-11.26)		-0.018*** (-15.06)	
ProvisionR		-0.027*** (-6.04)		0.084*** (21.92)		-0.058*** (-10.48)		0.004 (0.58)
Government			-2.601*** (-12.68)	-3.175*** (-14.14)			-2.796*** (-10.60)	1.826*** (3.78)
Industrial			-8.049*** (-34.95)	-8.229*** (-25.35)			-11.566*** (-38.40)	-5.643*** (-7.02)
Financial			1.499*** (10.35)	1.373*** (8.20)			-1.468*** (-7.24)	3.395*** (6.60)
Family			6.298*** (6.27)	5.281*** (4.67)			12.793*** (10.23)	5.502* (1.95)
Foreign			-3.656*** (-32.48)	-3.916*** (-41.17)			-0.201 (-1.52)	-0.742** (-2.36)
Shareholding			0.007*** (3.29)	0.008*** (3.15)			0.021*** (7.23)	-0.020*** (-4.88)
Lnta	0.634*** (15.55)	0.656*** (13.32)	0.434*** (15.09)	0.387*** (12.38)	1.040*** (12.79)	1.045*** (15.33)	0.218*** (5.10)	0.819*** (6.91)
Inflation	-0.014*** (-11.86)	-0.011*** (-12.13)	-0.013*** (-17.32)	-0.017*** (-25.77)	-0.019*** (-20.70)	-0.013*** (-12.19)	-0.017*** (-17.89)	-0.013*** (-7.23)
RIR	0.101*** (47.28)	0.100*** (40.40)	0.107*** (64.24)	0.102*** (59.04)	0.045*** (10.49)	0.049*** (11.33)	0.085*** (38.95)	0.055*** (12.85)
IRD	-0.133*** (-35.85)	-0.106*** (-25.32)	-0.124*** (-41.42)	-0.144*** (-44.15)	-0.150*** (-25.53)	-0.102*** (-16.61)	-0.169*** (-54.00)	-0.121*** (-16.65)
Crisis	-1.415*** (-25.18)	-1.459*** (-25.31)	-1.277*** (-30.18)	-1.113*** (-24.29)	-0.353*** (-3.98)	-0.582*** (-6.28)	0.549*** (17.51)	-0.879*** (-7.76)
M2R	-0.067*** (-12.51)	-0.081*** (-12.65)	-0.051*** (-9.44)	-0.052*** (-8.12)	-0.213*** (-14.96)	-0.236*** (-18.81)	-0.177*** (-20.37)	-0.250*** (-10.38)
Concentration	-0.012*** (-22.74)	-0.013*** (-25.29)	-0.020*** (-36.45)	-0.023*** (-39.56)	-0.034*** (-30.24)	-0.037*** (-31.03)	-0.048*** (-63.09)	-0.048*** (-25.72)
SMC	-0.006*** (-28.82)	-0.007*** (-25.98)	-0.005*** (-17.42)	-0.005*** (-14.01)	-0.003*** (-5.75)	-0.004*** (-6.83)	-0.003*** (-9.43)	-0.007*** (-6.18)
FB	0.022*** (33.34)	0.024*** (39.37)	0.032*** (35.66)	0.035*** (36.73)	0.027*** (33.45)	0.029*** (29.20)	0.037*** (52.28)	0.037*** (21.07)
NExport	0.079*** (34.27)	0.084*** (38.88)	0.070*** (56.39)	0.067*** (35.64)	0.126*** (43.12)	0.131*** (37.70)	0.109*** (41.94)	0.143*** (26.99)
TTS	0.005*** (9.60)	0.005*** (9.53)	0.006*** (15.10)	0.007*** (13.61)	0.001 (0.80)	0.001 (1.43)	0.006*** (13.78)	-0.001 (-0.78)
GDPG	-0.064*** (-23.54)	-0.063*** (-23.17)	-0.015*** (-8.73)	-0.016*** (-9.12)	-0.132*** (-35.80)	-0.126*** (-29.77)	-0.058*** (-31.33)	-0.101*** (-19.57)
GDPPC	-0.000*** (-19.06)	-0.000*** (-13.18)	-0.000*** (-47.06)	-0.000*** (-47.68)	-0.000*** (-10.22)	-0.000*** (-10.76)	-0.000*** (-59.23)	-0.000*** (-10.68)
IMFassis	0.266*** (15.71)	0.176*** (10.14)	0.109*** (5.93)	0.138*** (9.30)	0.504*** (13.82)	0.358*** (13.06)	0.427*** (24.73)	0.363*** (10.85)
Observations	2,499	2,499	2,816	2,816	2,499	2,499	2,816	2,816
Number of id	357	357	352	352	357	357	352	352
AB test AR(1)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
AB test AR(2)	0.312	0.314	0.286	0.188	0.372	0.370	0.448	0.533
Sargan test	0.437	0.359	0.404	0.138	0.447	0.367	0.880	0.260

Notes: Table 9 presents the effect of total regulation and subcategory regulation (ProvisionR) on asset quality of banks. The subcategory regulation score (ProvisionR) measures national regulation on asset classification provisioning and write-offs. The first proxy for asset quality of banks is loan loss provision to total loans ratio. The second proxy is impaired loan ratio calculated as the ratio of impaired loans to total loans. Other variables are defined the same as those in Table 6. The z-statistics are reported in parentheses. ***, **, and * indicate significance levels at 1%, 5%, and 10%, respectively.

Table 10
Regulation, Large Owner and Management Cost of Banks.

VARIABLES	Total Cost/Total Income				Overhead Cost/Total Assets			
Constant	59.526*** (35.62)	64.211*** (51.51)	37.296*** (13.62)	63.120*** (19.17)	1.965*** (19.55)	2.646*** (46.07)	2.993*** (12.97)	1.424*** (7.58)
Lagged DV	0.215*** (116.34)	0.214*** (113.42)	0.195*** (78.28)	0.161*** (54.86)	0.603*** (292.06)	0.553*** (261.07)	0.543*** (159.67)	0.587*** (217.00)
TotalR	0.037** (2.20)		0.156*** (8.30)		0.005*** (6.80)		-0.001 (-0.60)	
ManagementR		1.474*** (2.86)		-2.576*** (-4.77)		0.061*** (3.45)		0.207*** (7.76)
Government			-42.034*** (-15.35)	-44.097*** (-11.81)			-2.238*** (-6.14)	-3.439*** (-17.51)
Industrial			-23.270*** (-11.71)	-35.553*** (-15.26)			-0.986*** (-5.11)	-2.075*** (-14.62)
Financial			-33.408*** (-11.94)	-68.207*** (-19.03)			-5.635*** (-13.66)	-5.458*** (-22.94)
Family			-123.435*** (-8.00)	-220.937*** (-12.18)			-5.870*** (-6.42)	-5.832*** (-9.66)
Foreign			-3.533* (-1.73)	14.631*** (5.63)			1.942*** (9.38)	1.243*** (9.44)
Shareholding			0.128*** (5.37)	0.248*** (6.87)			0.022*** (5.68)	0.030*** (15.78)
Lnta	-5.708*** (-15.05)	-5.498*** (-12.56)	-5.115*** (-14.30)	-4.078*** (-10.26)	0.978*** (47.73)	0.738*** (39.66)	0.604*** (22.89)	1.076*** (50.74)
Inflation	0.155*** (10.18)	0.110*** (7.41)	0.235*** (15.08)	0.209*** (9.62)	-0.006*** (-11.66)	-0.017*** (-27.74)	-0.018*** (-10.37)	-0.018*** (-20.37)
RIR	0.062*** (4.25)	0.070*** (4.75)	0.005 (0.30)	0.127*** (6.96)	0.013*** (17.24)	-0.000 (-0.24)	-0.009*** (-6.16)	0.004*** (3.57)
IRD	0.271*** (11.52)	0.219*** (10.81)	0.643*** (19.01)	0.445*** (12.11)	0.033*** (24.20)	0.064*** (36.99)	0.077*** (19.78)	0.032*** (10.96)
Crisis	7.577*** (11.94)	5.753*** (10.95)	14.105*** (16.47)	11.733*** (12.07)	-0.411*** (-14.29)	-0.671*** (-21.15)	-0.448*** (-9.45)	-0.586*** (-19.20)
M2R	-1.852*** (-37.47)	-1.696*** (-23.14)	-0.533*** (-6.72)	-1.212*** (-13.55)	-0.024*** (-5.83)	-0.040*** (-10.37)	0.041*** (7.78)	-0.025*** (-5.38)
Concentration	-0.012*** (-2.80)	-0.014*** (-3.17)	-0.019*** (-4.66)	-0.065*** (-10.80)	-0.008*** (-35.25)	-0.002*** (-12.72)	-0.007*** (-17.40)	-0.005*** (-15.99)
SMC	-0.046*** (-12.88)	-0.042*** (-12.52)	0.058*** (12.88)	0.023*** (3.98)	-0.008*** (-31.38)	-0.005*** (-31.35)	-0.008*** (-26.13)	-0.003*** (-13.71)
FB	0.051*** (8.04)	0.019*** (3.03)	-0.159*** (-11.24)	0.120*** (9.32)	-0.003*** (-4.74)	-0.001** (-2.50)	-0.006*** (-3.87)	0.001*** (2.92)
NExport	-0.557*** (-42.94)	-0.581*** (-42.62)	-0.422*** (-39.00)	-0.203*** (-14.36)	-0.018*** (-20.33)	-0.016*** (-22.79)	-0.031*** (-22.05)	-0.036*** (-37.27)
TTS	0.063*** (20.39)	0.061*** (18.63)	0.061*** (16.40)	0.023*** (5.06)	0.001*** (3.52)	0.003*** (16.76)	0.002*** (7.12)	0.002*** (6.79)
GDPG	-0.157*** (-10.35)	-0.172*** (-10.32)	0.090*** (4.32)	0.184*** (9.86)	0.021*** (18.56)	0.012*** (12.00)	-0.002 (-1.14)	0.017*** (19.33)
GDPPC	0.000*** (9.59)	0.000*** (8.38)	-0.000*** (-5.03)	-0.000*** (-4.37)	-0.000*** (-18.98)	-0.000*** (-22.73)	-0.000 (-0.68)	-0.000*** (-20.01)
IMFassis	1.739*** (18.88)	1.609*** (15.25)	1.013*** (4.91)	-0.602*** (-3.34)	0.142*** (19.52)	0.119*** (9.91)	0.201*** (12.68)	0.081*** (6.61)
Observations	2,499	2,499	2,856	2,499	2,856	2,499	2,499	2,856
Number of id	357	357	357	357	357	357	357	357
AB test AR(1)	0.001	0.001	0.001	0.001	0.008	0.011	0.010	0.008
AB test AR(2)	0.171	0.172	0.166	0.214	0.066	0.083	0.090	0.063
Sargan test	0.664	0.680	0.679	0.304	0.208	0.260	0.129	0.218

Notes: Table 10 presents the effect of total regulation and subcategory regulation (ManagementR) on management cost of banks. The subcategory regulation score (ManagementR) measures national regulation on internal management/organizational requirements. The first proxy for management cost of banks is total cost to total income ratio. The second proxy is overhead cost to total assets ratio. Other variables are defined the same as those in Table 6. The z-statistics are reported in parentheses. ***, **, and * indicate significance levels at 1%, 5%, and 10%, respectively.

Table 11
Regulation, Large Owner and Profitability of Banks.

VARIABLES	ROA				ROE			
Constant	4.602*** (34.32)	2.195*** (17.20)	3.855*** (18.69)	2.118*** (13.51)	7.516*** (10.13)	-6.626*** (-11.62)	-4.974*** (-3.06)	2.930*** (3.01)
Lagged DV	0.073*** (46.16)	0.066*** (34.44)	0.097*** (65.65)	0.095*** (71.81)	0.309*** (96.44)	0.311*** (88.04)	0.295*** (54.94)	0.283*** (70.06)
TotalR	-0.016*** (-10.92)		-0.005*** (-3.55)		-0.085*** (-13.38)		-0.006 (-0.49)	
ActivitiesR		0.132*** (26.81)		0.068*** (12.58)		0.141*** (5.47)		0.073** (2.28)
Government			3.291*** (15.56)	2.109*** (9.37)			3.185** (2.32)	7.516*** (7.46)
Industrial			0.771*** (5.93)	-0.157 (-1.21)			0.961 (0.84)	6.323*** (7.72)
Financial			3.350*** (19.43)	2.323*** (14.31)			17.842*** (11.94)	19.354*** (20.77)
Family			7.740*** (19.47)	6.768*** (16.50)			59.061*** (7.55)	72.201*** (14.37)
Foreign			1.369*** (12.42)	1.168*** (15.30)			-9.973*** (-8.48)	-7.879*** (-11.40)
Shareholding			-0.041*** (-24.38)	-0.028*** (-15.53)			-0.011 (-0.90)	-0.099*** (-8.47)
Lnta	2.600*** (72.19)	2.504*** (75.37)	1.949*** (47.84)	1.976*** (48.49)	6.004*** (19.36)	5.922*** (21.46)	4.305*** (11.04)	6.290*** (21.36)
Inflation	-0.001 (-0.94)	0.000 (0.46)	0.004*** (4.11)	0.001 (0.88)	0.010 (1.55)	0.019*** (2.74)	0.089*** (6.79)	0.041*** (4.96)
RIR	0.062*** (30.88)	0.070*** (36.20)	0.084*** (49.30)	0.089*** (56.45)	0.131*** (15.21)	0.144*** (16.77)	0.086*** (5.82)	0.106*** (12.20)
IRD	0.020*** (6.43)	-0.000 (-0.08)	0.054*** (16.68)	0.049*** (19.92)	0.084*** (6.07)	0.063*** (4.44)	-0.043* (-1.87)	0.073*** (5.24)
Crisis	0.508*** (13.79)	0.597*** (15.79)	0.006 (0.14)	-0.040 (-0.83)	-2.644*** (-8.73)	-0.967*** (-3.66)	-5.795*** (-14.58)	-3.007*** (-11.54)
M2R	0.175*** (25.16)	0.153*** (23.61)	0.187*** (27.60)	0.186*** (22.08)	0.407*** (10.79)	0.268*** (6.21)	0.546*** (7.39)	0.346*** (6.61)
Concentration	-0.012*** (-25.53)	-0.014*** (-30.01)	-0.009*** (-28.01)	-0.011*** (-39.86)	-0.032*** (-14.66)	-0.035*** (-21.03)	-0.104*** (-20.52)	-0.048*** (-12.48)
SMC	-0.001*** (-2.06)	-0.002*** (-5.03)	0.001* (1.78)	-0.000 (-0.46)	-0.015*** (-7.77)	-0.020*** (-9.88)	-0.017*** (-4.27)	-0.028*** (-14.12)
FB	0.003*** (6.23)	0.006*** (10.30)	0.008*** (9.10)	0.007*** (9.84)	-0.017*** (-5.63)	0.002 (0.47)	0.059*** (4.98)	0.029*** (5.86)
NExport	0.068*** (47.65)	0.079*** (42.78)	0.088*** (44.01)	0.095*** (63.48)	0.061*** (7.98)	0.079*** (8.43)	-0.163*** (-12.84)	-0.045*** (-4.04)
TTS	-0.003*** (-9.72)	-0.002*** (-7.39)	0.014*** (45.86)	0.013*** (40.77)	-0.000 (-0.23)	0.001 (0.52)	0.047*** (19.82)	0.025*** (14.12)
GDPG	0.056*** (27.25)	0.054*** (27.29)	0.078*** (42.87)	0.072*** (41.98)	0.178*** (14.50)	0.173*** (13.48)	0.013 (0.63)	0.132*** (11.06)
GDPPC	-0.000*** (-16.46)	-0.000*** (-16.23)	-0.000*** (-32.47)	-0.000*** (-32.92)	-0.000*** (-4.44)	-0.000 (-1.59)	-0.000* (-1.79)	-0.000*** (-2.16)
IMFassis	-0.035*** (-2.42)	-0.065*** (-4.62)	-0.124*** (-10.21)	-0.170*** (-11.51)	1.133*** (10.82)	1.347*** (14.01)	1.272*** (9.74)	1.465*** (18.10)
Observations	2,499	2,499	2,856	2,856	2,499	2,499	2,499	2,856
Number of id	357	357	357	357	357	357	357	357
AB test AR(1)	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000
AB test AR(2)	0.608	0.554	0.762	0.770	0.981	0.993	0.921	0.809
Sargan test	0.446	0.306	0.206	0.103	0.855	0.737	0.347	0.438

Notes: Table 11 presents the effect of total regulation and subcategory regulation (ActivitiesR) on profitability of banks. Total regulation score (TotalR) is self-constructed based on World Bank surveys. The subcategory regulation score (ActivitiesR) measures national regulation on activities restrictions. Profitability of banks is proxied by ROA and ROE, respectively. Other variables are defined the same as those in Table 6. The z-statistics are reported in parentheses. ***, **, and * indicate significance levels at 1%, 5%, and 10%, respectively.

Table 12

Regulation, Large Owner and Liquidity of Banks.

VARIABLES	Liquid Assets/Total Assets				Liquid Assets/Short-term Funds				Total Loans/Deposits			
Constant	-8.572*** (-2.73)	-0.621 (-0.66)	3.827*** (2.61)	4.620*** (3.58)	39.025*** (25.58)	35.164*** (30.81)	45.273*** (11.96)	50.837*** (14.23)	24.536*** (24.33)	14.853*** (21.30)	30.686*** (21.67)	15.818*** (10.41)
Lagged DV	0.593*** (28.21)	0.617*** (80.98)	0.594*** (64.29)	0.604*** (60.01)	0.377*** (322.30)	0.380*** (322.14)	0.343*** (165.53)	0.346*** (175.04)	0.711*** (227.01)	0.710*** (222.28)	0.681*** (151.40)	0.676*** (116.20)
TotalR	0.043 (1.15)		0.037*** (3.09)		0.065*** (4.86)		0.091*** (5.65)		-0.078*** (-9.04)		-0.101*** (-10.91)	
LiquidityR		0.414*** (4.90)		0.258*** (2.59)		0.532*** (7.73)		0.323*** (2.92)		-0.224*** (-5.98)		-0.426*** (-6.22)
Government			0.246 (0.16)	-1.481 (-0.97)			-54.961*** (-18.68)	-56.463*** (-18.92)			11.494*** (9.95)	9.625*** (6.67)
Industrial			7.817*** (5.80)	6.830*** (7.17)			-41.318*** (-18.66)	-35.011*** (-18.92)			-1.551 (-1.63)	1.266 (0.99)
Financial			-8.929*** (-5.97)	-9.192*** (-6.24)			-65.558*** (-20.22)	-66.400*** (-23.47)			9.262*** (9.97)	11.130*** (7.86)
Family			7.104* (1.66)	3.194 (0.80)			-72.406*** (-10.40)	-140.958*** (-18.65)			21.644*** (5.51)	18.030*** (6.10)
Foreign			5.117*** (4.80)	3.322*** (3.44)			-30.996*** (-14.44)	-27.554*** (-14.08)			0.515 (0.95)	1.202* (1.93)
Shareholding			0.016 (1.17)	0.024* (1.83)			0.898*** (33.99)	0.915*** (33.87)			0.013 (1.17)	0.005 (0.35)
Lnta	4.722*** (4.38)	5.894*** (18.73)	5.441*** (14.85)	5.816*** (14.69)	7.646*** (21.63)	9.659*** (50.52)	7.103*** (16.90)	7.271*** (19.26)	-3.901*** (-14.91)	-3.848*** (-19.43)	-4.572*** (-22.17)	-3.973*** (-16.30)
Inflation	0.004 (0.08)	-0.025** (-2.51)	-0.050** (-2.22)	-0.066*** (-3.32)	-0.147*** (-13.63)	-0.223*** (-28.24)	-0.813*** (-24.59)	-0.772*** (-24.51)	0.107*** (10.56)	0.146*** (22.76)	0.034*** (3.30)	0.053*** (4.36)
RIR	0.066 (1.36)	-0.059*** (-4.19)	-0.036 (-1.50)	-0.060*** (-2.66)	-0.235*** (-15.24)	-0.344*** (-20.95)	-0.311*** (-12.32)	-0.324*** (-13.53)	0.082*** (8.86)	0.140*** (16.12)	0.123*** (10.00)	-0.004 (-0.30)
IRD	-0.240 (-1.45)	0.549*** (20.55)	0.411*** (12.40)	0.459*** (11.18)	-0.736*** (-16.71)	0.536*** (32.42)	-0.078** (-2.09)	-0.081* (-1.94)	-0.256*** (-10.91)	-0.220*** (-12.19)	-0.296*** (-13.91)	-0.276*** (-9.10)
Crisis	1.505 (1.20)	-0.348 (-1.48)	0.513 (0.86)	0.436 (0.84)	-2.846*** (-5.61)	-1.974*** (-6.41)	-4.513*** (-10.54)	-5.674*** (-12.55)	-2.383*** (-9.62)	-0.818*** (-6.76)	-2.903*** (-11.68)	-1.609*** (-5.87)
M2R	-0.269 (-1.14)	-1.306*** (-21.61)	-0.817*** (-8.90)	-0.986*** (-10.60)	-2.808*** (-41.71)	-2.183*** (-64.63)	-1.642*** (-20.66)	-1.215*** (-13.72)	-0.551*** (-11.17)	0.005 (0.17)	-0.193*** (-4.40)	-0.659*** (-10.46)
Concentration	0.013 (0.79)	-0.045*** (-12.09)	0.001 (0.11)	0.002 (0.25)	-0.195*** (-37.28)	-0.203*** (-62.91)	-0.029*** (-3.80)	-0.009 (-1.11)	0.008*** (3.57)	0.015*** (7.15)	0.015*** (4.46)	0.025*** (6.25)
SMC	0.034** (2.25)	0.020*** (10.38)	0.031*** (4.59)	0.021*** (2.90)	0.053*** (19.67)	0.082*** (44.64)	0.027*** (4.72)	0.026*** (3.98)	-0.010*** (-7.20)	-0.011*** (-6.32)	-0.021*** (-8.05)	-0.020*** (-5.90)

FB	-0.119*** (-2.73)	0.008* (1.74)	-0.005 (-0.30)	-0.003 (-0.19)	-0.096*** (-10.86)	-0.080*** (-13.23)	-0.437*** (-24.35)	-0.477*** (-21.60)	-0.026*** (-9.18)	-0.002 (-0.58)	-0.063*** (-11.16)	-0.136*** (-13.61)
NExport	-0.004 (-0.09)	-0.059*** (-7.66)	0.025 (1.26)	0.013 (0.63)	-0.135*** (-12.16)	-0.073*** (-8.82)	-0.356*** (-26.53)	-0.391*** (-23.69)	-0.030*** (-4.89)	-0.043*** (-8.31)	-0.061*** (-4.76)	-0.103*** (-8.94)
TTS	-0.025*** (-2.63)	-0.001 (-0.60)	-0.018*** (-3.76)	-0.023*** (-5.08)	0.079*** (23.71)	0.082*** (26.93)	0.055*** (7.91)	0.072*** (14.79)	0.009*** (4.70)	0.012*** (12.06)	0.004 (1.42)	0.002 (0.81)
GDPG	0.093 (1.47)	-0.092*** (-5.40)	-0.184*** (-5.95)	-0.186*** (-6.75)	-0.758*** (-40.41)	-0.825*** (-39.79)	-0.786*** (-28.77)	-0.727*** (-29.86)	0.090*** (7.11)	0.062*** (4.72)	0.037** (2.18)	0.010 (0.57)
GDPPC	0.000 (0.52)	0.000 (0.79)	0.000 (0.06)	0.000 (0.83)	0.000* (1.81)	-0.000*** (-3.67)	0.000*** (9.22)	0.000*** (10.52)	-0.000*** (-4.97)	-0.000 (-1.45)	0.000 (0.82)	0.000*** (4.10)
IMFassis	0.969** (2.55)	0.960*** (7.79)	0.914*** (5.16)	0.752*** (4.70)	2.205*** (14.59)	1.377*** (10.66)	-0.307 (-1.62)	-0.620*** (-3.18)	-0.119 (-0.83)	0.042 (0.39)	0.454*** (4.01)	0.977*** (6.49)
Observations	1,785	2,499	2,499	2,499	2,856	2,856	2,816	2,816	2,856	2,856	2,816	2,816
Number of id	357	357	357	357	357	357	357	357	357	357	357	357
AB test AR(1)	0.000	0.000	0.000	0.000	0.002	0.002	0.002	0.002	0.000	0.000	0.000	0.000
AB test AR(2)	0.101	0.050	0.059	0.054	0.127	0.128	0.141	0.142	0.540	0.495	0.539	0.531
Sargan test	0.277	0.945	0.405	0.376	0.185	0.313	0.185	0.118	0.508	0.619	0.635	0.797

Notes: Table 12 presents the effect of total regulation and subcategory regulation (LiquidityR) on asset liquidity of banks. The subcategory regulation score (LiquidityR) measures national regulation on liquidity and risk diversification. The first proxy for asset liquidity of banks is liquid assets to total assets ratio. The second proxy is liquid assets to short-term funds ratio. The last proxy is total loans to deposits ratio. The former two proxies are positive indicators for asset liquidity, but the last proxy is a negative indicator. Other variables are defined the same as those in Table 6. The z-statistics are reported in parentheses. ***, **, and * indicate significance levels at 1%, 5%, and 10%, respectively.

Table 13
Regulation, Large Owner and Bank Sensitivity to Market Risk.

VARIABLES	Total Interest Expenses/Total Deposits				Government Securities/Total Assets			
Constant	2.177*** (19.55)	1.198*** (13.33)	3.254*** (21.41)	1.811*** (11.47)	9.417*** (13.62)	10.980*** (22.79)	15.285*** (24.05)	12.305*** (15.89)
Lagged DV	0.584*** (238.21)	0.579*** (196.80)	0.503*** (185.12)	0.496*** (162.08)	0.562*** (124.74)	0.567*** (121.72)	0.553*** (142.83)	0.546*** (120.46)
TotalR	-0.022*** (-19.17)		-0.023*** (-22.57)		-0.013*** (-2.63)		-0.018*** (-4.87)	
SupervisionR		-0.106*** (-31.25)		-0.107*** (-29.73)		-0.024 (-1.59)		-0.053** (-2.17)
Government			-0.925*** (-8.05)	-2.148*** (-12.45)			7.513*** (13.84)	4.945*** (9.05)
Industrial			-0.769*** (-8.18)	-1.204*** (-9.54)			0.419 (1.14)	-4.799*** (-13.34)
Financial			-2.509*** (-23.89)	-3.880*** (-21.68)			8.303*** (14.65)	-0.302 (-0.40)
Family			4.069*** (11.07)	3.534*** (8.07)			12.071*** (11.34)	7.460*** (5.19)
Foreign			-1.219*** (-12.41)	-1.283*** (-10.54)			-2.067*** (-5.50)	4.650*** (6.48)
Shareholding			0.040*** (34.96)	0.049*** (28.03)			-0.099*** (-21.09)	-0.072*** (-19.35)
Lnta	-1.358*** (-36.97)	-1.463*** (-40.75)	-1.582*** (-49.31)	-1.626*** (-54.25)	-2.371*** (-25.00)	-2.384*** (-24.10)	-2.292*** (-22.15)	-1.906*** (-13.78)
Inflation	0.068*** (34.32)	0.066*** (43.08)	0.039*** (31.54)	0.038*** (26.37)	-0.064*** (-17.26)	-0.067*** (-19.71)	-0.061*** (-13.68)	-0.053*** (-9.94)
RIR	0.057*** (38.24)	0.059*** (48.39)	0.066*** (42.74)	0.064*** (36.90)	0.068*** (11.95)	0.075*** (12.37)	0.021*** (4.83)	0.066*** (8.97)
IRD	0.033*** (13.59)	0.015*** (5.49)	0.040*** (20.02)	0.021*** (10.25)	0.100*** (12.22)	0.095*** (14.09)	0.181*** (21.09)	0.198*** (17.27)
Crisis	-0.877*** (-20.77)	-0.886*** (-22.92)	-1.349*** (-30.19)	-1.257*** (-24.68)	-0.315** (-2.43)	-0.447*** (-3.88)	-0.502*** (-3.97)	-0.284 (-1.60)
M2R	0.090*** (12.94)	0.098*** (18.07)	0.028*** (4.25)	0.023*** (4.49)	0.456*** (26.03)	0.433*** (20.18)	0.217*** (7.24)	0.433*** (12.59)
Concentration	0.003*** (8.47)	0.005*** (11.54)	0.000 (0.62)	0.000 (0.91)	0.009*** (6.21)	0.005*** (3.59)	-0.001 (-0.80)	-0.021*** (-7.03)
SMC	0.004*** (16.38)	0.004*** (16.81)	0.002*** (7.74)	0.002*** (6.59)	-0.008*** (-9.38)	-0.007*** (-7.38)	-0.008*** (-7.45)	-0.015*** (-9.66)
FB	-0.006*** (-19.36)	-0.006*** (-17.09)	-0.015*** (-25.81)	-0.015*** (-22.68)	-0.021*** (-10.79)	-0.019*** (-10.32)	-0.001 (-0.65)	-0.008* (-1.77)
NExport	-0.015*** (-15.98)	-0.016*** (-12.25)	0.008*** (5.72)	0.005*** (3.48)	0.004 (1.07)	0.012*** (3.21)	0.049*** (10.16)	0.096*** (13.81)
TTS	0.005*** (18.38)	0.005*** (24.46)	-0.003*** (-6.75)	-0.002*** (-5.17)	-0.007*** (-8.92)	-0.006*** (-9.21)	0.005*** (6.16)	-0.006*** (-5.25)
GDPG	-0.016*** (-13.13)	-0.020*** (-13.40)	-0.034*** (-17.28)	-0.033*** (-19.14)	-0.046*** (-6.78)	-0.049*** (-9.43)	-0.045*** (-9.40)	-0.055*** (-5.75)
GDPPC	0.000*** (26.96)	0.000*** (26.99)	0.000*** (23.32)	0.000*** (25.32)	0.000*** (3.16)	0.000** (2.31)	-0.000** (-2.43)	-0.000*** (-3.70)
IMFassis	0.086*** (6.70)	0.174*** (12.32)	-0.007 (-0.57)	0.066*** (4.97)	-0.054* (-1.75)	-0.107*** (-3.04)	-0.123*** (-2.76)	-0.297*** (-4.07)
Observations	2,499	2,499	2,856	2,856	2,499	2,499	2,856	2,856
Number of id	357	357	357	357	357	357	357	357
AB test AR(1)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
AB test AR(2)	0.529	0.521	0.486	0.475	0.698	0.693	0.882	0.909
Sargan test	0.246	0.284	0.141	0.141	0.721	0.781	0.648	0.219

Notes: Table 13 presents the effect of total regulation and subcategory regulation (SupervisionR) on bank sensitivity to market risk. The subcategory regulation score (SupervisionR) measures national regulation on supervision. Bank sensitivity to market risk is proxied by either the ratio of total interest expenses to total deposits or the ratio of government securities to total assets. Other variables are defined the same as those in Table 6. The z-statistics are reported in parentheses. ***, **, and * indicate significance levels at 1%, 5%, and 10%, respectively.

Table 14

Changes in Regulations between 2007 and 2008, Deregulation and Bank Risk.

VARIABLES	Δ Total Risk		Δ Credit Rating		Δ Inverted z Score	
Constant	3.387*** (69.30)	-0.281** (-2.26)	-0.057*** (-3.80)	-5.278*** (-14.38)	0.629*** (51.41)	0.485*** (16.85)
Δ TotalR	-0.291*** (-48.62)		-0.051*** (-17.26)		-0.013*** (-7.45)	
Deregulation		27.212*** (48.62)		0.898*** (11.45)		0.576*** (6.32)
Δ Lnta	-4.599*** (-4.34)	-4.599*** (-4.34)	-0.256 (-0.68)	-0.256 (-0.68)	0.324 (1.30)	0.324 (1.30)
Δ Inflation	-0.544*** (-7.57)	-4.588*** (-404.87)	0.163*** (7.93)	0.560*** (9.46)		0.037*** (4.22)
Δ RIR	-0.595*** (-9.21)	-1.869*** (-48.74)	0.092*** (36.89)	0.298*** (19.26)	0.174*** (103.04)	0.238*** (16.15)
Δ IRD	0.442*** (3.00)	-3.399*** (-15.04)	-0.101** (-2.31)	0.497*** (4.36)	-0.758*** (-28.16)	-0.822*** (-18.43)
Crisis	-1.742*** (-20.18)	-1.936*** (-23.53)	0.084 (0.92)	-2.326*** (-17.37)	0.389*** (5.75)	1.109*** (20.44)
Δ M2R	0.272* (1.87)	2.637*** (27.16)	-0.243*** (-4.43)	-1.120*** (-10.75)	-0.229*** (-12.26)	-0.400*** (-10.19)
Δ Concentration	1.567*** (13.74)	6.859*** (1,318.62)	-0.048*** (-3.01)		-0.436*** (-41.31)	-0.413*** (-33.80)
Δ SMC	-0.165*** (-8.14)	-0.846*** (-134.74)	0.016*** (7.24)	-0.072*** (-10.10)	0.065*** (53.51)	0.073*** (21.44)
Δ FB	-0.925*** (-60.95)	-1.934*** (-346.12)	-0.021** (-2.20)	-0.010* (-1.99)	0.359*** (124.90)	0.373*** (259.73)
Δ NExport	-0.652*** (-25.94)	-3.250*** (-114.75)	0.027** (2.61)			
Δ TTS	-0.153*** (-13.78)	-0.508*** (-133.86)	-0.010*** (-134.61)	-0.181*** (-16.67)	0.080*** (42.17)	0.065*** (90.73)
Δ GDPG	0.333*** (5.10)	0.312*** (4.75)	-0.015 (-0.44)	-0.375*** (-35.19)	-0.128*** (-10.96)	-0.169*** (-9.58)
Δ GDPPC	0.003*** (19.11)	0.013*** (399.59)	0.000*** (23.96)	0.003*** (20.01)	-0.001*** (-85.75)	-0.001*** (-62.72)
Imfassis	7.630*** (10.60)	46.909*** (533.79)	-0.425 (-0.58)	-5.000*** (-7.92)	-1.512*** (-94.44)	-1.645*** (-21.50)
Observations	357	357	110	110	357	357
R-squared	0.239	0.239	0.345	0.345	0.130	0.130

Notes: Table 14 presents the effect of changes in regulation, deregulation on changes in bank risk between 2007 and 2008. Total regulation score (TotalR) is self-constructed based on World Bank surveys. Changes in the total regulation score (Δ TotalR) are calculated for each sample country using TotalR in 2008 minus TotalR in 2007. Deregulation is a dummy variable that equals 1 if a country experiences a negative change in regulation score from 2007 to 2008. Changes for other time-variant variables are also controlled in regressions. The z-statistics are reported in parentheses. ***, **, and * indicate significance levels at 1%, 5%, and 10%, respectively.

Table A.1
Banking Credit Rating Indicators.

S&PLT (Standard & Poor's Issuer Credit Rating Long- term)	MLTD (Moody Long-term Rating)	FLT (Fitch Long-Term Issuer Default Rating)	Risk Score
AAA	Aaa	AAA	1
AA+	Aa1	AA+	2
AA	Aa2	AA	3
AA-	Aa3	AA-	4
A+	A1	A+	5
A	A2	A	6
A-	A3	A-	7
BBB+	Baa1	BBB+	8
BBB	Baa2	BBB	9
BBB-	Baa3	BBB-	10
BB+	Ba1	BB+	11
BB	Ba2	BB	12
BB-	Ba3	BB-	13
B+	B1	B+	14
B	B2	B	15
B-	B3	B-	16
CCC+	Caa1		17
CCC	Caa2	CCC	18
CCC-	Caa3		19
CC	Ca	CC	20
C	C	C	21
SD		SD	22
D		D	23

Notes:

1. Table A.1 shows the conversion of credit ratings in to numerical credit rating scores.
2. Data source: BankScope.

Table A.2

Definition and Data Sources of Main Variables.

Variable	Definition	Calculation
TotalR	Total Regulation	Self-constructed regulation score based on World Bank Survey (2008, 2012)
Credit Rating	Credit Rating	Self-constructed credit rating score based on S&PLT, MLTD, and FLT
Inverted Z Score	Insolvency Risk	$\sigma ROA / (ROA + EAR)$
Government	Bank controlled by government	Dummy variable that equals to 1 if the sample bank is controlled by the government, 0 otherwise.
Industrial	Bank controlled by industrial company	Dummy variable that equals to 1 if the sample bank is controlled by an industrial company, 0 otherwise.
Financial	Bank controlled by financial company	Dummy variable that equals to 1 if the sample bank is controlled by a financial company, 0 otherwise.
Family	Bank controlled by family	Dummy variable that equals to 1 if the sample bank is controlled by a family, 0 otherwise.
Foreign	Bank controlled by foreign company	Dummy variable that equals to 1 if the sample bank is controlled by a foreign company, 0 otherwise.
Shareholding	Shareholding by the controlling owner	The percentage of shareholdings by the controlling owner of the bank
Lnta	Bank Size	The natural logarithm of bank's total asset
Inflation	Inflation	Change in the national consumer price index
RIR	Real Interest Rate	The deposit interest rate minus Inflation scaled by GDP
IRD	Interest Rate Differential	Difference between the rate interest rate in a country and the average real interest of Germany, United States and Japan.
Crisis	Currency or Debt Crises	Dummy variable if in a country-year there is a currency crisis, otherwise 0
M2R	M2 to Foreign Exchange Reserves	The sum of currency outside banks, demand deposits other than those of the central government, and the time, savings, and foreign currency deposits of resident sectors other than the central government.
Concentration	Concentration	Herfindahl-Hirschmann index of bank assets within a country
SMC	StockMarket Capitalization to GDP	Value of listed shares to GDP
FB	Foreign Banks to Total Banks	Percentage of the number of foreign banks to the number of the total banks in an Economy
NExport	Net Export	Value of export minus import scaled by GDP
TTS	Term of Trade Shocks	Standard deviation of the value of import divided by the value of export in constant prices of 2000 U.S. dollars
GDPG	GDP Growth	Annual percentage growth rate of GDP per capita at market prices based on constant prices of 2000 U.S. dollars
GDPPC	GDP per capita	GDP per capita is gross domestic product divided by midyear population
IMFassis	IMF Assistant Program	Dummy variable if in a country-year there is an IMF program is running, otherwise 0.

Notes:

1. Bank size is collected from BankScope,
2. IMF assistant program is collected from IMF,
3. All other variables are collected from the World Bank Databank.

Table A. 3
Yearly Regulation Scores for All Sample Countries.

Country	2004	2005	2006	2007	2008	2009	2010	2011	2012
Argentina	79.240	79.240	79.240	79.240	72.494	72.501	72.486	72.494	72.494
Armenia	73.613	73.613	73.613	73.613	74.069	74.066	74.002	74.046	74.046
Bahrain	72.098	72.098	72.098	72.098	81.498	81.498	81.378	81.458	81.458
Belarus	63.264	63.264	63.264	63.264	69.851	69.826	69.831	69.836	69.836
Botswana	71.909	71.909	71.909	71.909	71.450	71.480	71.500	71.477	71.477
Brazil	65.909	65.909	65.909	65.909	90.002	90.013	89.997	90.004	90.004
Bulgaria	69.925	69.925	69.925	69.925	72.032	72.059	72.069	72.053	72.053
Chile	68.791	68.791	68.791	68.791	78.219	78.231	78.223	78.224	78.224
China	65.718	65.718	65.718	65.718	56.080	56.080	56.080	56.080	56.080
Columbia	79.477	79.477	79.477	79.477	83.140	83.143	83.103	83.129	83.129
Croatia	65.238	65.238	65.238	65.238	73.983	73.987	74.001	73.990	73.990
Egypt	76.336	76.336	76.336	76.336	78.216	78.220	78.000	78.145	78.145
Guatemala	76.528	76.528	76.528	76.528	70.498	70.504	70.503	70.501	70.501
Guyana	69.730	69.730	69.730	69.730	69.612	69.640	69.650	69.634	69.634
Honduras	74.558	74.558	74.558	74.558	71.055	71.068	71.080	71.068	71.068
Hungary	79.654	79.654	79.654	79.654	72.428	72.449	72.454	72.444	72.444
India	74.083	74.083	74.083	74.083	81.877	81.973	81.978	81.943	81.943
Jordan	70.742	70.742	70.742	70.742	80.593	80.599	80.291	80.494	80.494
Kazakhstan	66.806	66.806	66.806	66.806	39.791	39.551	39.783	39.708	39.708
Kenya	81.054	81.054	81.054	81.054	76.860	76.870	76.880	76.870	76.870
Kuwait	68.695	68.695	68.695	68.695	71.860	71.870	71.890	71.873	71.873
Lebanon	77.023	77.023	77.023	77.023	65.693	65.694	65.500	65.629	65.629
Luxembourg	65.480	65.480	65.480	65.480	78.201	78.233	78.235	78.223	78.223
Malaysia	80.387	80.387	80.387	80.387	71.689	71.714	71.713	71.705	71.705
Mali	59.580	59.580	59.580	59.580	72.458	72.458	72.458	72.458	72.458
Mexico	59.159	59.159	59.159	59.159	78.713	78.726	78.723	78.721	78.721
Nicaragua	80.580	80.580	80.580	80.580	89.215	89.235	89.235	89.228	89.228
Niger	59.580	59.580	59.580	59.580	72.458	72.458	72.458	72.458	72.458
Nigeria	75.246	75.246	75.246	75.246	73.515	73.349	73.412	73.425	73.425
Oman	67.070	67.070	67.070	67.070	79.409	79.411	79.300	79.373	79.373
Pakistan	78.776	78.776	78.776	78.776	74.352	74.376	74.378	74.369	74.369
Panama	65.665	65.665	65.665	65.665	63.579	63.585	63.584	63.583	63.583
Peru	75.539	75.539	75.539	75.539	77.847	77.956	77.962	77.922	77.922
Philippines	76.375	76.375	76.375	76.375	83.309	83.309	83.322	83.313	83.313
Poland	65.941	65.941	65.941	65.941	79.440	79.458	79.462	79.453	79.453
Romania	68.646	68.646	68.646	68.646	74.239	74.255	74.263	74.252	74.252
Russia	66.643	66.643	66.643	66.643	67.221	67.252	67.237	67.237	67.237
Senegal	59.580	59.580	59.580	59.580	71.458	71.458	71.458	71.458	71.458
South Africa	67.445	67.445	67.445	67.445	71.670	71.677	71.686	71.678	71.678
Thailand	78.715	78.715	78.715	78.715	79.809	79.820	79.820	79.816	79.816
Togo	59.580	59.580	59.580	59.580	72.458	72.458	72.458	72.458	72.458
Uruguay	70.102	70.102	70.102	70.102	89.207	89.221	89.205	89.211	89.211
Venezuela	55.753	55.753	55.753	55.753	75.620	75.620	75.620	75.620	75.620

Notes: Table A.3 shows the self-constructed national bank regulation scores for the 43 sample countries during the sample period of 2004-2012. The regulation scores increase over time in most sample countries but decrease in 14 out of 43 sample countries.

Table A.4a
Subcategory Regulations on Bank Total Risk based the CAMELS Indicators.

VARIABLES	Total Risk										
Constant	-1.592*** (-3.43)	2.329*** (6.87)	0.566** (2.07)	1.585*** (5.27)	0.780** (2.11)	-0.704** (-2.39)	1.210*** (4.41)	-1.305*** (-2.69)	-1.492*** (-3.03)	-0.282 (-1.03)	-0.467 (-0.99)
Lagged DV	0.457*** (94.63)	0.457*** (116.63)	0.456*** (121.91)	0.449*** (133.52)	0.457*** (133.73)	0.453*** (125.82)	0.448*** (112.86)	0.460*** (131.44)	0.444*** (88.55)	0.460*** (93.42)	0.446*** (137.21)
EntryR	0.104*** (6.32)										
OwnershipR		-0.213*** (-18.16)									
CapitalR			-0.088*** (-7.89)								
ActivitiesR				-0.163*** (-15.10)							
ExAuditR					-0.162*** (-7.45)						
ManagementR						0.852*** (16.80)					
LiquidityR							-0.217*** (-10.12)				
DepositR								-0.082*** (-6.38)			
ProvisionR									0.226*** (28.84)		
DisclosureR										0.043 (1.08)	
ExitR											0.037*** (2.74)
SupervisionR											-0.034*** (-2.81)
Government	-3.633*** (-9.26)	-2.940*** (-7.33)	-2.336*** (-6.19)	-0.676* (-1.70)	-3.155*** (-8.89)	-2.220*** (-6.67)	-2.726*** (-7.79)	-3.024*** (-8.77)	-1.067** (-2.10)	-1.012** (-2.55)	-2.408*** (-5.91)
Industrial	-3.947*** (-11.15)	-4.799*** (-14.17)	-4.796*** (-15.77)	-2.864*** (-8.42)	-5.407*** (-17.53)	-3.453*** (-11.94)	-1.510*** (-5.36)	-4.388*** (-13.66)	-1.305*** (-3.49)	-1.225*** (-3.80)	-4.329*** (-13.49)
Financial	2.665*** (5.80)	2.789*** (7.44)	2.083*** (5.35)	3.672*** (10.15)	1.703*** (4.20)	2.549*** (8.69)	1.659*** (5.93)	1.743*** (4.24)	4.303*** (10.05)	3.260*** (8.95)	2.451*** (6.46)
Family	-5.965*** (-4.99)	-5.696*** (-6.14)	-2.591*** (-3.46)	-2.264*** (-2.79)	-4.323*** (-4.58)	-3.723*** (-4.41)	-4.986*** (-5.88)	-4.581*** (-4.75)	-5.032*** (-3.77)	-3.192*** (-2.63)	-4.334*** (-4.55)
Foreign	-3.247*** (-7.98)	-3.015*** (-10.33)	-2.549*** (-8.88)	-2.329*** (-9.62)	-2.621*** (-8.34)	-2.875*** (-12.38)	-1.008*** (-4.51)	-2.766*** (-9.45)	-2.537*** (-7.68)	-1.763*** (-4.96)	-2.703*** (-10.12)
Shareholding	0.011*** (3.28)	0.004 (1.21)	0.003 (1.00)	-0.015*** (-4.92)	0.006** (2.08)	0.002 (0.70)	0.004* (1.75)	0.007** (2.34)	-0.013*** (-3.28)	-0.009** (-2.43)	0.002 (0.68)
Lnta	0.090*** (4.24)	-0.042* (-1.91)	-0.026 (-1.42)	-0.038** (-2.07)	0.033 (1.47)	0.002 (0.09)	-0.031* (-1.69)	-0.026 (-1.27)	-2.938*** (-33.96)	-2.879*** (-32.45)	-0.017 (-0.78)
Inflation	0.078*** (17.50)	0.060*** (19.58)	0.056*** (20.04)	0.062*** (18.47)	0.063*** (16.95)	0.054*** (17.32)	0.081*** (22.92)	0.060*** (15.27)	0.049*** (8.60)	0.069*** (11.73)	0.055*** (15.42)
RIR	0.060*** (12.78)	0.037*** (10.76)	0.042*** (12.07)	0.032*** (6.77)	0.049*** (13.22)	0.044*** (12.55)	0.058*** (14.27)	0.044*** (10.06)	0.030*** (6.00)	0.042*** (9.61)	0.046*** (11.25)
IRD	-0.102*** (-9.29)	-0.121*** (-18.57)	-0.123*** (-20.75)	-0.108*** (-13.65)	-0.125*** (-17.69)	-0.135*** (-16.02)	-0.134*** (-17.72)	-0.131*** (-14.50)	-0.137*** (-15.29)	-0.081*** (-9.06)	-0.134*** (-16.02)
Crisis	0.761*** (4.60)	1.074*** (10.74)	1.056*** (11.34)	1.106*** (11.68)	1.083*** (10.03)	1.029*** (11.07)	0.927*** (10.60)	1.173*** (11.83)	1.056*** (8.08)	0.596*** (3.73)	1.067*** (11.35)
M2R	0.084*** (4.37)	0.069*** (3.76)	0.073*** (4.27)	0.056*** (3.09)	0.105*** (6.68)	0.065*** (3.71)	0.169*** (10.08)	0.059*** (2.86)	0.079*** (3.18)	0.109*** (4.78)	0.077*** (4.00)
Concentration	0.023*** (11.09)	0.007*** (4.93)	0.012*** (9.21)	0.012*** (9.08)	0.009*** (5.57)	0.009*** (7.20)	0.016*** (12.10)	0.006*** (3.58)	0.010*** (5.83)	0.016*** (8.53)	0.010*** (8.50)
SMC	-0.007*** (-5.29)	-0.004*** (-4.75)	-0.004*** (-5.17)	-0.004*** (-5.93)	-0.004*** (-5.26)	-0.005*** (-6.98)	-0.007*** (-10.11)	-0.005*** (-6.75)	-0.009*** (-8.97)	-0.008*** (-8.44)	-0.004*** (-5.01)
FB	-0.010*** (-2.48)	0.010*** (6.75)	0.013*** (8.56)	0.016*** (8.99)	0.016*** (10.51)	0.013*** (8.73)	0.013*** (9.52)	0.014*** (10.70)	0.016*** (7.23)	0.012*** (4.83)	0.015*** (8.61)
NExport	-0.008 (-1.19)	0.013*** (4.38)	0.015*** (5.69)	0.009*** (4.41)	0.015*** (5.69)	0.010*** (4.98)	-0.003 (-1.43)	0.013*** (4.77)	0.001 (0.26)	-0.006* (-1.70)	0.014*** (6.84)
TTS	0.002 (1.53)	-0.003*** (-4.08)	-0.002** (-2.45)	-0.000 (-0.25)	-0.001* (-1.90)	-0.001 (-0.76)	0.001 (0.90)	-0.002*** (-3.55)	0.000 (0.00)	0.001 (0.74)	0.001 (1.10)
GDPG	0.056*** (8.55)	0.059*** (11.67)	0.053*** (11.03)	0.066*** (13.60)	0.071*** (12.15)	0.055*** (12.17)	0.080*** (17.91)	0.064*** (10.56)	0.049*** (6.66)	0.060*** (7.78)	0.054*** (10.84)
GDPPC	0.000 (0.06)	-0.000*** (-14.74)	-0.000*** (-19.28)	-0.000*** (-20.76)	-0.000*** (-20.99)	-0.000*** (-20.19)	-0.000*** (-14.41)	-0.000*** (-19.12)	0.000 (0.96)	0.000 (1.64)	-0.000*** (-18.76)
IMFassiss	-0.230*** (-4.18)	-0.031 (-0.81)	-0.207*** (-7.11)	-0.116*** (-3.39)	-0.261*** (-7.94)	-0.231*** (-6.74)	-0.233*** (-7.28)	-0.175*** (-3.83)	-0.097** (-2.21)	-0.197*** (-4.09)	-0.193*** (-5.31)
Observations	2,499	2,499	2,499	2,499	2,499	2,499	2,499	2,499	2,499	2,499	2,499
Number of id	357	357	357	357	357	357	357	357	357	357	357
AB test AR(1)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
AB test AR(2)	0.450	0.416	0.422	0.440	0.405	0.441	0.395	0.423	0.442	0.432	0.420
Sargan test	0.947	0.989	0.820	0.990	0.990	0.991	0.874	0.989	0.648	0.591	0.615

Note: Table A.4a presents the effects of the twelve subcategory regulations on bank risk measured as total risk constructed based on CAMELS indicators.

Table A.4b
Subcategory Regulations on Bank Credit Risk (Credit Rating Score).

VARIABLES	Credit Rating Risk											
Constant	0.427 (1.42)	0.201 (0.49)	2.122*** (5.81)	0.508 (1.39)	1.734*** (6.45)	0.232 (0.65)	1.367*** (5.31)	0.789** (2.34)	0.142 (0.44)	0.749* (1.94)	-0.359 (-0.85)	1.305** (2.11)
Lagged DV	0.975*** (98.31)	0.980*** (91.69)	0.950*** (106.48)	0.986*** (81.14)	0.959*** (72.48)	1.000*** (80.90)	0.967*** (89.87)	0.969*** (80.97)	0.988*** (88.87)	0.997*** (98.38)	0.992*** (84.55)	0.984*** (72.05)
EntryR	0.022** (2.02)											
OwnershipR		0.041*** (2.81)										
CapitalR			-0.025** (-2.08)									
ActivitiesR				-0.024*** (-2.62)								
ExAuditR					-0.038** (-2.23)							
ManagementR						-0.239*** (-4.46)						
LiquidityR							-0.002 (-0.12)					
DepositR								-0.017* (-1.86)				
ProvisionR									-0.023** (-2.00)			
DisclosureR										-0.062*** (-3.48)		
ExitR											0.053*** (3.38)	
SupervisionR												-0.030*** (-2.86)
Government	0.059 (0.27)	-0.029 (-0.11)	0.266 (1.12)	-0.026 (-0.10)	-0.330 (-1.10)	-0.544** (-2.12)	-0.033 (-0.13)	-0.054 (-0.19)	-0.186 (-0.84)	-0.116 (-0.42)	-0.491* (-1.93)	-0.646* (-1.72)
Industrial	-0.110 (-0.36)	-0.133 (-0.50)	0.646 (1.35)	-0.466 (-1.52)	0.089 (0.20)	-0.360 (-1.48)	-0.115 (-0.34)	0.088 (0.31)	-0.278 (-1.03)	0.101 (0.45)	-0.173 (-0.72)	-0.460 (-1.29)
Financial	-0.179 (-0.78)	0.095 (0.42)	0.262 (1.37)	-0.132 (-0.58)	0.385 (1.19)	-0.191 (-0.86)	0.281 (1.31)	0.614** (2.47)	0.112 (0.50)	0.179 (0.82)	-0.001 (-0.00)	-0.107 (-0.30)
Family	1.557*** (6.00)	1.749*** (9.23)	0.499* (1.68)	2.510*** (6.87)	-0.057 (-0.18)	0.980*** (4.04)	-0.258 (-1.07)	1.425*** (5.88)	1.270*** (5.30)	0.682*** (2.93)	1.348*** (4.90)	-0.486* (-1.79)
Foreign	0.138 (0.65)	-0.364*** (-2.87)	0.282 (1.28)	-0.203 (-0.96)	-0.756** (-2.56)	-0.422*** (-2.69)	-0.300* (-1.65)	-0.323*** (-2.66)	-0.249** (-1.96)	-0.336** (-2.50)	-0.357* (-2.19)	-0.231 (-0.60)
Shareholding	-0.004 (-1.38)	-0.004 (-1.19)	-0.007*** (-2.73)	-0.004 (-1.14)	-0.002 (-0.47)	0.002 (0.77)	-0.004 (-1.49)	-0.004 (-1.54)	-0.002 (-0.82)	-0.003 (-1.19)	0.000 (0.16)	0.002 (0.71)
Lnta	-0.164*** (-2.95)	-0.155*** (-3.06)	-0.052 (-1.21)	-0.083 (-1.43)	-0.059 (-1.30)	-0.226*** (-6.15)	-0.145*** (-2.82)	-0.139*** (-2.97)	-0.117** (-2.49)	-0.196*** (-4.29)	-0.080 (-1.54)	-0.124** (-2.38)
Inflation	0.006** (2.11)	0.005** (2.30)	0.002 (0.56)	0.003 (1.00)	0.010*** (2.99)	0.001 (0.35)	0.002 (0.81)	0.007*** (3.06)	0.005** (1.96)	0.003 (1.26)	0.006** (2.32)	0.008** (2.20)
RIR	0.015*** (2.98)	0.011*** (2.76)	0.017*** (4.47)	0.015*** (3.76)	0.018*** (4.73)	0.003 (0.78)	0.010** (2.37)	0.005 (1.38)	0.006 (1.64)	0.005* (1.79)	0.006** (1.99)	0.018*** (5.11)
IRD	-0.028*** (-4.27)	-0.032*** (-5.05)	-0.038*** (-4.43)	-0.021*** (-2.94)	-0.033*** (-3.99)	-0.022*** (-3.09)	-0.043*** (-6.40)	-0.021*** (-3.62)	-0.017** (-2.09)	-0.036*** (-5.17)	-0.023*** (-2.77)	-0.036*** (-4.64)
Crisis	0.459*** (4.00)	0.247*** (4.29)	0.172* (1.90)	0.315*** (4.07)	0.079 (0.80)	0.223*** (4.38)	0.333*** (5.06)	0.137** (2.33)	0.100 (1.37)	0.245*** (5.83)	0.090 (1.39)	0.243*** (4.46)
M2R	0.061*** (3.41)	0.067*** (4.13)	0.009 (0.35)	0.058*** (5.03)	-0.004 (-0.16)	0.054*** (4.43)	-0.013 (-0.48)	0.028 (1.56)	0.043** (2.26)	0.038*** (2.78)	0.077*** (5.93)	-0.028 (-0.89)
Concentration	0.003*** (2.90)	0.002** (2.42)	-0.001* (-1.66)	-0.000 (-0.11)	-0.002* (-1.90)	0.004*** (4.81)	0.000 (0.10)	0.002*** (2.66)	0.003*** (3.74)	0.003*** (3.12)	0.002*** (3.06)	-0.001 (-1.08)
SMC	-0.002*** (-2.86)	-0.003*** (-5.42)	-0.002*** (-2.85)	-0.002*** (-3.56)	-0.001 (-1.11)	-0.002*** (-4.06)	-0.001 (-1.41)	-0.004*** (-7.49)	-0.002*** (-4.24)	-0.001*** (-3.52)	-0.002*** (-5.09)	0.001 (0.96)
FB	0.006*** (3.46)	0.007*** (4.85)	0.003 (0.81)	0.009*** (6.82)	0.003 (0.79)	0.003** (1.96)	0.006* (1.82)	0.002* (1.68)	0.003* (1.94)	0.002 (1.07)	0.003* (1.88)	0.004 (1.30)
NExport	0.010*** (3.82)	0.009*** (4.64)	0.007*** (3.00)	0.009*** (2.92)	0.000 (0.11)	0.005* (1.91)	0.001 (0.49)	0.007*** (2.93)	0.008*** (2.91)	0.003 (1.21)	0.005* (1.86)	0.007*** (2.60)
TTS	-0.000 (-0.26)	-0.000 (-1.03)	-0.003*** (-6.71)	0.001* (1.80)	-0.002*** (-3.91)	-0.001 (-1.33)	-0.003*** (-4.73)	-0.001* (-1.72)	-0.001 (-1.23)	-0.001*** (-3.66)	-0.000 (-0.27)	-0.003*** (-5.73)
GDPG	-0.007** (-2.21)	-0.008** (-2.16)	-0.004 (-0.76)	-0.004 (-1.28)	-0.002 (-0.53)	-0.005 (-1.15)	-0.002 (-0.54)	-0.003 (-0.78)	-0.005 (-0.97)	-0.012*** (-3.69)	-0.005 (-1.27)	0.000 (0.06)
GDPCC	-0.000*** (-8.03)	-0.000*** (-5.41)	-0.000 (-1.34)	-0.000*** (-7.02)	0.000 (0.67)	-0.000*** (-4.29)	-0.000 (-0.09)	-0.000*** (-4.84)	-0.000*** (-4.60)	-0.000*** (-2.67)	-0.000*** (-4.03)	-0.000 (-0.82)
IMFassiss	-0.078** (-1.96)	0.007 (0.26)	-0.008 (-0.24)	-0.016 (-0.42)	0.033 (0.97)	-0.036 (-1.20)	-0.051 (-1.41)	-0.065* (-1.95)	-0.010 (-0.29)	-0.021 (-0.72)	0.014 (0.55)	-0.015 (-0.45)
Observations	878	878	878	878	878	878	878	878	878	878	878	878
Number of id	113	113	113	113	113	113	113	113	113	113	113	113
AB test AR(1)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
AB test AR(2)	0.693	0.662	0.599	0.675	0.594	0.707	0.606	0.680	0.704	0.575	0.812	
Sargan test	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Note: Table A.4b presents the effects of the twelve subcategory regulations on bank risk measured as credit rating score.

Table A. 4c
Subcategory Regulations on Bank Insolvency Risk (Inverted z score).

VARIABLES	Insolvency Risk (inverted z score)											
Constant	-0.665*** (-80.77)	-0.288*** (-49.00)	-0.474*** (-96.08)	-0.928*** (-105.98)	0.120*** (11.76)	-0.486*** (-100.54)	-0.700*** (-82.61)	-0.283*** (-30.55)	-0.269*** (-53.47)	-0.401*** (-75.93)	-0.400*** (-98.95)	-0.491*** (-106.83)
Lagged DV	0.091*** (1,134.73)	0.091*** (1,717.40)	0.092*** (2,016.45)	0.091*** (827.99)	0.091*** (1,247.99)	0.092*** (2,102.79)	0.095*** (1,122.22)	0.092*** (1,741.73)	0.090*** (2,205.13)	0.092*** (2,043.46)	0.090*** (2,115.58)	0.090*** (2,242.00)
EntryR	-0.007*** (-63.01)											
OwnershipR		-0.022*** (-196.58)										
CapitalR			-0.006*** (-60.00)									
ActivitiesR				-0.001*** (-10.96)								
ExAuditR					-0.064*** (-266.95)							
ManagementR						-0.029*** (-42.29)						
LiquidityR							0.034*** (141.70)					
DepositR								-0.005*** (-28.99)				
ProvisionR									0.004*** (90.75)			
DisclosureR										-0.013*** (-76.33)		
ExitR											0.001*** (15.34)	
SupervisionR												0.008*** (115.11)
Government	-0.853*** (-50.09)	-0.749*** (-66.34)	-0.588*** (-73.32)	-0.880*** (-46.68)	-0.994*** (-50.34)	-0.638*** (-58.90)	-0.820*** (-24.74)	-1.028*** (-51.50)	-0.804*** (-59.82)	-0.585*** (-62.40)	-0.774*** (-75.77)	-0.627*** (-65.81)
Industrial	-0.649*** (-58.46)	-0.643*** (-92.64)	-0.618*** (-116.33)	-0.528*** (-47.18)	-0.966*** (-64.12)	-0.595*** (-92.65)	-0.537*** (-34.69)	-0.670*** (-54.55)	-0.701*** (-85.25)	-0.584*** (-99.65)	-0.760*** (-107.45)	-0.642*** (-107.86)
Financial	-0.439*** (-34.42)	-0.427*** (-60.63)	-0.429*** (-63.50)	-0.281*** (-18.50)	-0.536*** (-39.48)	-0.415*** (-61.85)	-0.309*** (-15.36)	-0.564*** (-56.74)	-0.421*** (-56.13)	-0.393*** (-52.42)	-0.447*** (-56.36)	-0.326*** (-45.85)
Family	-0.773*** (-18.95)	-0.240*** (-8.80)	0.039* (1.69)	-1.161*** (-26.27)	-0.734*** (-14.95)	-0.041 (-1.47)	-0.987*** (-13.50)	-0.036 (-0.74)	-0.623*** (-20.44)	-0.124*** (-5.04)	-0.583*** (-25.25)	-0.382*** (-17.05)
Foreign	-0.192*** (-24.03)	-0.220*** (-42.44)	-0.045*** (-9.44)	-0.466*** (-61.68)	-0.434*** (-38.77)	-0.149*** (-26.55)	-0.549*** (-48.75)	-0.489*** (-49.83)	-0.373*** (-59.12)	-0.152*** (-31.15)	-0.356*** (-65.44)	-0.326*** (-77.35)
Shareholding	0.003*** (13.51)	0.002*** (21.80)	0.001*** (13.81)	0.002*** (11.08)	0.004*** (17.27)	0.002*** (12.31)	0.003*** (8.40)	0.005*** (24.38)	0.003*** (19.51)	0.002*** (14.20)	0.003*** (27.11)	0.002*** (18.00)
Lnta	0.035*** (49.53)	0.054*** (131.79)	0.051*** (169.17)	0.041*** (59.15)	0.059*** (72.30)	0.055*** (179.83)	0.054*** (80.08)	0.044*** (57.30)	0.050*** (174.56)	0.053*** (162.23)	0.051*** (165.33)	0.057*** (198.71)
Inflation	0.001*** (37.53)	0.003*** (72.35)	0.003*** (84.81)	0.002*** (69.31)	0.000* (1.86)	0.003*** (87.53)	0.002*** (51.09)	-0.001*** (-29.55)	-0.001*** (-28.80)	0.002*** (71.62)	-0.001*** (-31.87)	-0.001*** (-48.60)
RIR	-0.005*** (-173.07)	-0.005*** (-256.61)	-0.005*** (-239.33)	-0.005*** (-171.99)	-0.003*** (-85.57)	-0.004*** (-213.12)	0.001*** (37.76)	-0.004*** (-158.13)	-0.003*** (-162.32)	-0.004*** (-187.55)	-0.003*** (-158.25)	-0.003*** (-165.35)
IRD	0.032*** (523.08)	0.026*** (344.42)	0.025*** (344.33)	0.032*** (374.06)	0.026*** (277.26)	0.025*** (346.39)	0.021*** (242.73)	0.026*** (392.97)	0.018*** (329.70)	0.023*** (328.68)	0.025*** (428.93)	0.026*** (444.29)
Crisis	0.054*** (89.15)	0.039*** (55.51)	0.002*** (3.31)	0.058*** (61.26)	0.063*** (82.07)	0.040*** (43.11)	0.008*** (9.63)	0.087*** (119.47)	0.064*** (115.36)	0.048*** (55.37)	0.044*** (115.96)	0.035*** (66.43)
M2R	-0.016*** (-85.27)	-0.016*** (-109.39)	-0.015*** (-141.42)	-0.014*** (-71.69)	-0.008*** (-52.58)	-0.016*** (-126.64)	0.009*** (50.13)	-0.015*** (-77.56)	-0.010*** (-90.52)	-0.018*** (-190.84)	-0.010*** (-109.81)	-0.013*** (-103.43)
Concentration	-0.006*** (-348.56)	-0.006*** (-283.08)	-0.006*** (-336.56)	-0.006*** (-244.67)	-0.003*** (-214.80)	-0.006*** (-280.54)	-0.002*** (-136.70)	-0.003*** (-267.07)	-0.003*** (-444.90)	-0.006*** (-278.92)	-0.003*** (-295.04)	-0.003*** (-309.38)
SMC	0.000*** (27.77)	0.001*** (58.52)	0.001*** (62.63)	0.000*** (21.03)	0.001*** (103.11)	0.001*** (63.06)	0.001*** (88.11)	0.000*** (37.29)	0.000*** (120.08)	0.001*** (78.62)	0.001*** (97.76)	0.001*** (75.99)
FB	0.002*** (82.55)	0.006*** (158.81)	0.006*** (192.94)	0.001*** (52.72)	0.003*** (130.11)	0.006*** (176.52)	0.004*** (134.36)	0.002*** (71.58)	0.003*** (181.85)	0.005*** (180.02)	0.002*** (136.42)	0.002*** (104.80)
NExport	0.000 (0.61)	-0.000* (-1.74)	-0.000*** (-26.24)	-0.002*** (-43.27)	-0.000*** (-5.31)	-0.000 (-0.69)	0.001*** (32.29)	-0.001*** (-39.81)	0.000*** (7.08)	0.000*** (11.01)	-0.000 (-1.21)	-0.000*** (-30.35)
TTS	0.001*** (93.37)	0.000*** (62.75)	0.001*** (111.67)	0.001*** (111.42)	0.001*** (95.34)	0.001*** (104.33)	0.001*** (198.32)	0.000*** (46.03)	0.001*** (276.73)	0.001*** (103.88)	0.001*** (145.29)	0.001*** (250.01)
GDPG	-0.010*** (-192.45)	-0.012*** (-221.81)	-0.014*** (-298.71)	-0.010*** (-184.56)	-0.010*** (-182.90)	-0.012*** (-223.30)	-0.005*** (-158.52)	-0.010*** (-229.15)	-0.011*** (-300.30)	-0.013*** (-258.37)	-0.011*** (-317.10)	-0.009*** (-267.91)
GDPG	-0.000*** (-60.92)	-0.000*** (-65.01)	-0.000*** (-69.08)	-0.000*** (-54.24)	-0.000*** (-69.75)	-0.000*** (-74.63)	-0.000*** (-84.03)	-0.000*** (-67.40)	-0.000*** (-153.80)	-0.000*** (-79.81)	-0.000*** (-172.63)	-0.000*** (-114.84)
IMFassis	0.019*** (76.47)	0.029*** (127.71)	0.019*** (83.52)	0.016*** (57.93)	-0.009*** (-38.11)	0.018*** (66.48)	-0.032*** (-122.83)	-0.006*** (-25.22)	-0.002*** (-14.42)	0.012*** (65.25)	-0.010*** (-66.62)	-0.021*** (-162.68)
Observations	2,856	2,856	2,856	2,856	2,856	2,856	2,856	2,856	2,856	2,856	2,856	2,856
Number of id	357	357	357	357	357	357	357	357	357	357	357	357
AB test AR(1)	0.083	0.084	0.084	0.084	0.086	0.084	0.086	0.085	0.086	0.084	0.085	0.085
AB test AR(2)	0.424	0.427	0.427	0.420	0.431	0.424	0.438	0.426	0.423	0.422	0.430	0.429
Sargan test	0.086	0.461	0.575	0.017	0.098	0.542	0.259	0.099	0.725	0.532	0.727	0.734

Note: Table A.4c presents the effects of the twelve subcategory regulations on bank risk measured as inverted z score, respectively.