

BANKS' OWNERSHIP STRUCTURE, RISK AND PERFORMANCE [†]

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Abstract

This paper studies empirically the effect of ownership concentration on the risk and performance of commercial banks, controlling for shareholders protection laws, bank regulations, and other country and bank specific traits. The sample used comprises 795 banks of 47 countries, in the period from 1997 to 2007. Our main finding is the existence of a cubic relationship between ownership concentration and bank performance. Such evidence is supportive of theoretical hypotheses of effective monitoring at low levels of ownership concentration, expropriation or losses connected to managerial discretion at moderate ownership concentration, and high costs of expropriation at high levels of ownership concentration. We also find that ownership concentration is more important to increase the performance of banks with low concentrated ownership structures, when legal protection of shareholders is low, and that capital regulations stringency is effective in simultaneously reducing risk and improving performance of banks. Regarding bank risk, we find a U-shape relationship between ownership concentration and earnings volatility, supporting that shareholder's incentive to take risk prevails when her equity stake is above a threshold.

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1. Introduction

The study of risk and performance of banks is of great relevance, since banks' investment decisions are argued to influence economic growth and stability (Allen and Gale, 2000a; Levine, 2006). Too little bank risk taking may hinder economic growth, whereas too much bank risk threatens economic stability. Hence, it makes sense for governments and institutions to regulate banks with the purpose of shaping and influencing bank risk taking and performance and attain economic growth and stability.

Remarkably, the existence of regulations constraining the action of banks may make the governance of these institutions different from non-financial firms' corporate governance. However, the debate whether banks are different from non-financial firms is far from conclusive and goes back to Fama (1985)'s famous question whether "*are banks different?*". On the one hand, some authors (Macey and O'Hara, 2003; John and Qian, 2003; Levine, 2003) argue that banks are different because they are heavily regulated, highly levered and more opaque than non-financial firms. On the other hand, authors like Caprio *et al* (2007) find that "*the same core corporate control mechanisms that influence the governance of non-financial firms also influence bank operations.*".

This paper tries to shed new light to this debate by analyzing the connection between banks' ownership structure and risk as well as performance using a rich database of 795 banks from 47 different countries for the period from 1997 to 2007. This database allows the use of dynamic panel data estimation techniques to control for endogeneity problems that emerge naturally in the ownership-performance analysis (Coles *et al.*, 2006, 2007). Specifically, we first search for empirical evidence of linear and/or non-linear effects of ownership concentration – measured through the main shareholder's equity holdings - on risk and performance of banks. Second, we examine the influence of country-specific shareholders protection laws and bank regulations on risk and performance of banks.

Concerning bank performance, we do find evidence of a cubic relationship between ownership concentration and bank performance (positive, negative and positive). Such evidence is supportive of theoretical hypotheses of monitoring effect at low ownership concentration, expropriation or loss of managerial discretion effects from moderate to high ownership concentration, and high costs (and absence) of expropriation at very high concentrated ownership. A similar cubic relationship between performance and insider ownership was found by Morck *et al.* (1988) for non-financial firms.

Concerning bank risk taking, we find evidence of a U-shaped relationship between earnings volatility and ownership concentration. For main shareholder's equity stakes of 25% and above, bank risk taking increases with ownership concentration. This finding supports the argument that shareholder's incentive to take risk prevails when her equity stake in the bank is above a threshold. Also, we found a positive linear effect of ownership concentration on risk for small banks. Unlike Laeven and Levine (2006), we did not find the same evidence for large banks. Still regarding bank risk taking, we find that ownership concentration increases the risk of banks located in countries where legal protection of shareholders is more developed.

Regarding shareholders' protection laws affecting bank performance, we find that they interact with ownership concentration to influence the performance of banks with dispersed ownership structure. For this sub-sample of banks, our evidence is that increasing ownership concentration is more important to increase bank performance when protection of shareholders is low. Such evidence is very similar to the one Caprio et al. (2007) find for large banks. Turning to bank regulations, we find that ownership concentration is more important to increase the performance of banks with dispersed ownership structures when either capital regulations are stricter or competition in the bank industry is stronger.

The rest of the article is structured as follows. Section 2 summarizes the most relevant literature akin to the objectives of this work. Section 3 is methodological and describes the sample, variables and empirical models to be tested. The empirical results obtained are presented in Section 4. In the final section of the article, we lay out the main conclusions of this research and discuss the significance of our results.

2. Theoretical context

To examine banks' risk taking behaviour, we first rely on the traditional risk shifting theoretical hypothesis, by which shareholders in a limited liability firm have incentives to increase risk (Galai and Masulis, 1976; Esty, 1998), as they can experience unlimited gains, but no losses. Therefore, if managers act in the interests of shareholders, in principle they should seek to maximize shareholders' wealth, by choosing to undertake the riskier projects available. Of course, such risk shifting behaviour is detrimental to creditors' interests, unless these are able to effectively monitor managers. In the case of banks, the study of risk shifting is of special relevance, as banks are in general higher levered when compared to non financial firms, which means banks' shareholders may experience incentives to shift high levels of risk.

According to agency theory, risk taking behaviour is influenced by conflicts between managers and shareholders (Jensen and Meckling, 1976). Instead of maximizing shareholders' wealth, managers can pursue their own interests, by enjoying private benefits of control or preserving specific acquired human capital (Demsetz and Lehn, 1985; Kane, 1985). In addition, managers bear the specific risk of the firms they manage, and for such they are expected to be more risk averse than shareholders with a diversified investment portfolio. Thus, if no mechanisms to align the interests of managers to the ones of shareholders are present, such as executive compensation contracts or effectively monitoring of managerial actions, managers would have incentives to take low levels of risk. Therefore, a firm controlled or actively monitored by shareholders is expected to take more risk than a firm where managers' individual interests prevail. By these same arguments, a shareholder that participates in the management of the firm would experience opposite risk incentives, suggesting that such shareholder would have an attitude to take less risk than a shareholder not involved in management. Another mechanism to solve the conflict of interests between shareholders and managers is the equity ownership by managers (Jensen and Meckling, 1976; Fama and Jensen, 1983). By such mechanism, interests of shareholders and managers converge as managers' shareholdings increases, resulting in more risk taking. However, increasing levels of managers' equity ownership may provide them with voting power sufficient to pursue personal objectives, resulting in less risk taking, expropriation of shareholders, and entrenchment.

Incentives to risk taking are also influenced by ownership structure, investor protection laws and bank regulations. Conflicts of interests between managers and shareholders are argued to be more important in firms with dispersed ownership structures, as coordination problem hinders effectively monitoring of managerial actions by small shareholders, who have to rely on external monitoring through the market for corporate control (Fama and Jensen, 1983; Jensen, 1988). By contrast, conflicts between managers and shareholders are expected to be less important in firms with concentrated ownership structure, as controlling shareholders have strong incentives to monitor managers, and even replace them in the case of poor performance (Franks *et al.*, 2001). Because shareholders' interests are likely to prevail in firms in which the ownership concentration is high enough, we expect these firms take more risk than ones with a dispersed ownership structure. The considerations made by Burkart *et al.* (1997), however, point that as the monitoring effort exerted by a large shareholder increases, managerial initiative to pursue new investment opportunities decreases. In other words, too much monitoring reduces managers' initiative to seek firm-specific

investments, which is detrimental to firm value. This can be translated in terms of less risk taking by managers at least when ownership concentration is not too high. These arguments lead to the first hypothesis to be tested in this study:

Hypothesis 1: Bank risk taking is reduced at low to moderate levels of ownership concentration, when managers' interests prevail and/or there is loss of managerial discretion, and increases with levels of ownership concentration above the threshold where shareholders' interests prevail.

In addition, investor protection laws and banking regulations can also play a role in shaping the risk taking attitude of banks. Some studies point that a legal system that protect small shareholders can substitute for the existence of a large shareholder that monitors management (Shleifer and Wolfenzon, 2002; John *et al.*, 2000; Caprio *et al.*, 2007). Therefore, the role of a large shareholder in increasing risk taking by managers is expected to be more important in countries without effective legal protection of shareholders. Finally, banking regulations aimed to avoid financial instability can affect banks' risk taking behaviour. Despite the considerable empirical research on how ownership structure and other corporate governance factors affect financial institutions' risk taking behaviour¹, evidence on the relationship between ownership structure and bank risk in the presence of other country-level governance mechanisms is scarce. Only the study of Laeven and Levine (2006) analyzes the relationship between bank risk taking and ownership structure, legal protection of investors and banking regulations across a large set of countries. Thus, our second hypothesis to be tested is as follows:

Hypothesis 2: The relationship between ownership concentration and risk is reinforced if the country's levels of shareholder legal protection, banking regulations promoting financial stability, or other country governance mechanisms are underdeveloped.

The second element for evaluating bank's efficiency is its performance. Then, it is also of interest to understand how banks' performance is related with ownership structure, legal investor protection and bank regulations. Such issue, although linked to the previous risk

¹ Saunders *et al.* (1990); Anderson and Fraser (2000), Brewer and Saldenberg (1996), Chen *et al.* (1998), Demsetz *et al.* (1996) Demsetz and Strahan, 1997; Knopf and Teall, 1996; Cebenoyan *et al.* (1999), Gorton and Rosen (1995), Sullivan and Spong (1998, 2007).

taking discussion, deserves a separate investigation, as it may provide conclusions regarding bank corporate finance efficiency. There is little empirical evidence on the issue, contrasting with the extensive research available on the relationship between corporate performance and ownership structure of non financial firms (for a review, see Miguel *et al.*, 2004). As previously argued, monitoring of managerial actions is difficult in a firm with dispersed ownership structure. On the contrary, a concentrated ownership structure providing effective monitoring in principle is expected to enhance firm performance. However, another potential conflict of interests arises in firms with concentrated ownership, as the controlling shareholders may engage in activities that expropriate minority shareholders (Shleifer and Vishny, 1986; Faccio and Stolin, 2006). Therefore, concentration of ownership may also have a negative impact on corporate performance, due to expropriation of minority shareholders by controlling shareholders. Thus, these theoretical hypotheses of monitoring and expropriation have opposite predictions regarding the relationship between ownership concentration and performance. In their model for the role of large shareholders, Burkart *et al.* (1997) challenge the view that monitoring is purely beneficial, by describing a trade-off between the benefits of monitoring and the ones of managerial discretion. As previously stated, the excess of monitoring may be detrimental to firm value, as it reduces managers' initiative to seek firm-specific investments. . They propose the ownership structure as a commitment device to delegate a certain degree of control to management. The mentioned theories suggest that a non linear relationship between ownership concentration and firm performance is possible. In fact, Miguel *et al* (2004) predict and find empirical evidence of a quadratic relationship, in which performance (firm value) increases at low levels of ownership concentration (due to the monitoring effect), and decreases at high levels (as a result of the expropriation effect). However, relying also on the theoretical argument that expropriation in general is costly (Burkart *et al.*, 1998), we should expect less severe expropriation in a high concentrated ownership structure. Therefore, a cubic relationship between ownership concentration and performance is possible. We propose the following hypothesis to be tested:

Hypothesis 3: Bank performance increases with ownership concentration at low levels of concentration due to effective monitoring by shareholders, decreases at intermediate levels of concentration due to expropriation of minority shareholders and/or less managerial discretion, and increases at high levels of concentration due to disincentives to internalize high costs of expropriation.

According to Miguel *et al.* (2004), there is no previous empirical evidence of the proposed hypothesis. Performance or firm value is also argued to increase in the presence of strong shareholder protection laws aimed to avoid expropriation by controlling owners (Claessens *et al.*, 2000; La Porta *et al.*, 2002). Therefore, the effectiveness of shareholder protection laws affects the relationship between ownership structure and performance. The unique characteristics of banks, however, may interfere in such relationship, as argued by Caprio *et al.* (2007). First, due to the higher opacity and complexity of banks (Morgan, 2002), investor protection laws alone may not provide effective protection to small shareholders. Second, heavy regulations imposed on banks may substitute for, or interfere with investor protection laws, or make these latter superfluous. As a consequence, it is not clear that we should expect a positive impact of investor protection laws on banks' performance and valuation, as it is the case for non financial firms. In addition, given the uniqueness of banks, regulations themselves may interfere in the relationship between ownership concentration and performance, rendering banks different from non-financial firms. In principle, the focus of bank regulations is to attain financial stability, but the issue of whether bank efficiency is also improved as a consequence of bank regulations is important. Finally, we can expect that other country level mechanisms such as competition in the banking industry may interact with, complement or substitute ownership concentration in inducing banks' managers to attain performance. In order to investigate the influence of banks' peculiarities on performance, we propose a last hypothesis to be tested:

Hypothesis 4: The country's levels of implementation of legal protection of shareholders, bank regulations and other governance mechanisms, strengthens the relationship between banks' ownership structure and performance.

With the purpose of providing a broader picture of how risk taking and expropriation incentives are shaping banks' performance, this paper analyses how both risk and performance are affected by ownership concentration, investor protection laws and bank regulations. It has similarities with the studies of Laeven and Levine (2006) and Caprio *et al.* (2007), both in purposes and in the cross country coverage of the databases used. However, it differs from those in three aspects. First, our database comprises not only large and often publicly listed banks, but also medium, small and not listed commercial banks around 47 countries out of the 49 ones for which La Porta *et al.* (1998) report data on legal protection of shareholders. As noticed by La Porta *et al.* (2002) and recognized by Caprio *et al.* (2007),

focusing on largest firms makes it harder to find a relationship between investor protection and firm value because large corporations have alternative governance mechanisms for limiting expropriation of minority shareholders, such as public scrutiny, reputation-building, foreign shareholdings, and listing on international exchanges. Second, our risk analysis relies on the volatility of earnings as the relevant measure of risk, instead of Z-Score as in Laeven and Levine (2006). Our belief is that Z-Score is rather a measure of stability, which may not convey a correct picture of bank risk taking behaviour. Last, the methodology used for both risk taking and performance analyses is based on panel data. More specifically, we perform dynamic panel data estimations through the Generalized Method of Moments. We believe that panel data analysis is able to control for omitted variables and endogeneity, an important issue when jointly analyzing ownership structure and performance (Coles *et al.*, 2007).

3. Data description

A sample of banks around the world is drawn from the *Bankscope* database. The countries selected to conduct the cross country panel data studies are the ones for which La Porta *et al.* (1998) report data on legal protection of shareholders (except New Zealand, as most banks there are owned by Australian banks). Such selection of countries also allows comparability with the studies of Laeven and Levine (2006) and Caprio *et al.* (2007). Departing from an initial database of all commercial banks from the 48 selected countries, we collected available annual data on largest owner's shareholdings and on accounting numbers for the period from 1994 to 2007. To avoid duplicity of data, while keeping as many observations as possible, only unconsolidated statements were considered when collecting accounting data. To avoid redundant data, banks which the largest owner is another bank in the same country with at least 10% of shareholdings were excluded from the sample. Risk and performance variables were generated using standard deviations over a moving window of four years, which reduced the time dimension of the panel to the period from 1997 to 2007. Then, the sample was again reduced after generating other bank-specific variables and deleting multivariate outliers using the Hadi and Simonoff (1993) method. Finally, due to methodological issues (explained in Section 3.3), we excluded banks for which the ownership concentration variable has null variance and banks with less than 3 years of observations. We ended up with an unbalanced panel of 795 banks located in 47 different countries that correspond to 4,681 bank-year

observations distributed in the 1997-2007 period². All regressions in this study were performed on such panel, or on sub-samples of it.

3.1 Dependent variables

3.1.1. Risk

Earnings Volatility: it is the risk measure from which the main results concerning bank risk taking are derived and it consists of the standard deviation of the ratio of total earnings before taxes and loan loss provisions to average total assets, computed over a moving window of 4 years. By using data from years 1994 to 2007, we were able to compute earnings volatility for the 11-year period from 1997 to 2007. Source: calculations on data from *Bankscope*.

Z-Score: it is a ratio where the numerator is the sum of return on assets and the capital to asset ratio, while the denominator is the standard deviation of return on assets computed over a moving window of 4 years (e. g., see more of Z-Score in Boyd *et al.*, 1993). Return on assets is the ratio of pre-tax profits to total assets. It is often referred as a measure of firm stability (or distance to default). Source: calculations on data from *Bankscope*.

3.1.2. Performance

Risk-Adjusted ROA: the bank's ratio of return on average assets before taxes to the standard deviation of this same return. The standard deviation is computed over a moving window of 4 years. Source: calculations on data from *Bankscope*.

3.2. Explanatory variables

Explanatory variables used to explain bank risk and performance are grouped in two sets: bank specific and country specific variables. First set includes a measure of ownership concentration, given by the equity participation of the largest shareholder, and other controls at the bank level. Second set includes bank regulations and measures of legal and economic development of the countries where banks are established. Bank regulations variables are indices representing three broad regulations: capital requirements stringency, official supervisory power, and regulations promoting the private monitoring of banks. The rationale behind choosing these indices is to represent the concepts underlying the approach of three reinforcing pillars adopted by Basel II (Basel, 2001), although such indices do not measure adherence to Basel II. They were constructed following Barth *et al.* (2006) for three periods

² Canada ended up with no observations, mainly because banks there experience no volatility in largest shareholder's equity participation.

(1997-2000, 2001-2003 and 2004-2007), using data from three surveys on bank regulation and supervision conducted by the *World Bank* (Barth *et al.*, 2001, 2006, 2008). Additional country specific variables are the level of legal protection of shareholders, as well as the enforcement of law, and measures of the country's financial and economic development. Finally, two proxies of competition in each country's banking industry are included. A detailed description of each explanatory variable used in this study is provided in Appendix 1. As required by the regression techniques used in this study, year dummies are also included as explanatory variables in all regressions.

3.3. Descriptive statistics

Table 1 reports the descriptive statistics of the variables in the selected panel (4,681 observations, 795 banks). We notice that ownership concentration variable has a mean of 58.72%, which is relatively high. Mean leverage is at 89.36%, a value that supports the view that banks are highly levered (Macey and O'Hara, 2003; John and Qian, 2003; Levine, 2003).

Table 2 shows mean values of bank-level variables by country, whereas Table 3 shows means of country-specific variables. Given the diversity of countries included in the sample, Tables 1, 2 and 3 shows that heterogeneity observed on both dependent and explanatory variables across observations and countries is appropriate for conducting an econometric analysis.

 Insert Tables 1, 2, 3 and 4 about here

Table 4 contains the matrix of correlations between the variables. Regarding dependent variables, we first observe that risk variables of *Earnings Volatility* and *Z-Score* have a negative correlation of 9%. Although a negative correlation between these variables was expected, its value is not as high as one could expect, which highlights the difference in approaches of measuring bank risk through earnings volatility or distance to default (*Z-Score*). It is remarkable the important negative correlations of *Earnings Volatility* with both *Size* and *Leverage*. It suggests that lower risk is associated with larger banks, which seems reasonable. Table 4 also shows that higher levered banks are associated with lower risk, which in principle is unexpected. However, from a reverse causality perspective, it is reasonable that sound banks can afford more leveraged financial structure. On the other hand, leverage does

not appear significantly correlated with bank performance. Also remarkable are the important negative correlations of *Earnings Volatility* with *Rule of Law*, *Financial Development* and *Log(GDP per capita)*, together with the positive correlations of these latter with performance measured by *Risk-Adjusted ROA*, suggesting that banks in more legally and economically developed countries experience lower risk and better performance. Concerning competition in the banking industry, negative correlations of *Earnings Volatility*, and positive correlations of *Risk-Adjusted ROA* with both *Bank Concentration* and *Log(Number of Banks)* in principle are ambiguous. However, these proxies for competition reveal a very small and positive correlation of 3%, indicating that a regression analysis is necessary to clearly identify the relationship between these variables. Finally, *Shareholders Rights* correlates negatively with *Earnings Volatility* but has no correlation with performance.

 Insert Table 4 about here

3.4. Methodology

The methodology chosen to derive the results in this paper is based on panel data analysis. More specifically, we perform dynamic panel estimations using the so-called system Generalized Method of Moments (GMM), a combination of the estimation techniques proposed by Arellano and Bond (1991), Arellano and Bover (1995), and Blundell and Bond (1998).

Our choice is first justified by the nature of the database available, which consists of observations of bank accounting and ownership variables distributed throughout a period of 14 years (from 1994 to 2007). As described in the previous section, an unbalanced panel composed of 4,681 bank-year observations, comprising 795 banks, along 11 years (from 1997 to 2007) was obtained after generating variables for bank risk and performance, and eliminating multivariate outliers.

A key variable on the analyses performed is the *Ownership Concentration*, defined as the sum of the direct and indirect fractions of bank's voting rights held by its largest shareholder. A concern would arise in using panel data techniques, if this variable were stable over time. However, for the panel used, there is variability in the *Ownership Concentration* variable for almost 80% of the banks. Yet we excluded from our sample the banks for which *Ownership Concentration* has no variability.

The main justification for the use of panel data analyses is that this technique is able to mitigate the influence of spurious characteristics in the relation between managers and shareholders. Similarly to Coles *et al.* (2006, 2007), we assume that risk, performance and ownership structure are jointly determined. It means that applying OLS techniques to our data would produce biased coefficients, provided that regressors are endogenous to the dependent variables. Following Roodman (2006), additional features of our data have driven our choice to system GMM, instead of traditional random or fixed effects panel data estimation. First, our dependent variables (risk and performance) are dynamic, in the sense that they depend on past realizations. This is intuitively true, as risk and performance are likely to experience time clustering. Also, our risk and performance measures depend on their past value by construction, as they consist or include a standard deviation calculated in a moving window of four periods. The problem is that, unlike GMM estimation, OLS or the so-called Within Groups estimator of a fixed effects panel estimation cannot eliminate the dynamic panel bias that arises when pre-determined variables are included as regressors. Second, other bank specific variables are suspected to be endogenous or not strictly exogenous, such as *Leverage*, *Size* and *Revenue Growth*. Third, the panel used has few time periods and a large number of observations. Fourth, our specification is overidentified, as there are more instruments than parameters, which generates a system of moment conditions with more equations than variables, a condition to use GMM estimation. Fifth, system GMM estimation allows for the inclusion of time-invariant regressors, without (asymptotically) affecting the coefficients estimates for other regressors. Such a feature is suitable for our database, as variables for bank regulations and investor protection laws experience low variation over time. Finally, heteroskedasticity and autocorrelation within banks, but not across them, are assumed.

All panel regressions performed in this study use system GMM, which means that a system of two equations is used for each model – the original equation and a transformed one. Pre-determined and not strictly exogenous transformed variables of the transformed equation are instrumented with their available lags in levels, whereas the variables in levels of the original equation are instrumented with suitable lags of their own first differences. The use of system GMM is argued to dramatically improve efficiency, respect to the so-called difference GMM, which consists only of the transformed equation. In this study, the transformation used in the second equation is the forward orthogonal deviations, which preserves the sample size of our unbalanced panel. We adopt the two-step estimation procedure with the finite-sample correction of standard errors proposed by Windmeijer (2005), which produces less biased coefficients and lower standard errors. To avoid problems of low precision of estimated

coefficients when the number of periods is small we excluded from our sample banks with less than 3 years of observations (Arellano and Bond, 1991).

For all regressions, one lag of the dependent variable was included as a regressor (pre-determined variable). The choice of the two different sets of instruments respective to their equations, adopted the following procedure. Lags of pre-determined variables and *Ownership Concentration* were always considered as instruments to the transformed equation (i.e., they are in the so-called GMM instruments set). In general, *Revenue Growth*, *Leverage* and *Size*, which are bank specific variables suspected to be not strictly exogenous, are also included as GMM instruments. The remaining variables are considered strictly exogenous and are instrumented by the so-called IV-styled instruments. This set of instruments includes the transformed and the level of each strictly exogenous variable.

Regressions were run using the “xtabond2” program implemented by Roodman (2006). All regressions specifications are overidentified according to the Hansen test of overidentification restrictions (Hansen, 1982). Also, all the GMM and IV-styled instruments sets chosen are valid, as confirmed by the “difference in Hansen” test performed for each set of each regression (Hansen, 1982). Finally, the Arellano-Bond test for autocorrelation in the idiosyncratic disturbance term (aside from the fixed effect) is reported for each regression.

4. Results

This section presents and comments the results of our separate analyses of bank risk and performance and their relationships with ownership concentration, shareholders protections laws and banking regulations.

4.1. Bank risk taking

4.1.1. The role of ownership concentration

In order to test Hypothesis 1, in Table 5 we examine the relationship between ownership concentration and risk controlling by legal, bank regulations, and other bank and country specific variables. Column 1 shows the results of running a regression of *Earnings Volatility* on *Ownership Concentration* which includes only some bank and country specific explanatory variables. The results found do not provide evidence of ownership concentration linearly affecting bank risk. As shown in regression *R2*, the inclusion of *Leverage* and *State Owned* variables does not change this result. Finally, regression *R3*, which includes also bank

regulations and shareholders rights variables, does not report a role for ownership concentration in explaining risk. Then, we expanded our model by including quadratic and cubic terms of *Ownership Concentration* to test for possible non-linear relationships with risk. Results in columns *R4* and *R5* of Table 5 support a quadratic relationship between ownership concentration and risk. Specifically, the relationship is U-shaped, with minimum *Earnings Volatility* occurring at the main owner's participation of 25%, according to regression *R5*. Figure 1 shows the effect of *Ownership Concentration* on *Earnings Volatility*. The evidence favours the risk-shifting hypothesis, given that bank risk taking increases as *Ownership Concentration* grows from values of 25% and above, suggesting that largest shareholder experience increasing incentives to control or effectively monitor bank's managers according to her interests. On the other hand, bank risk is lower for values of *Ownership Concentration* below 50%, which favours the argument that private interests of managers prevail when ownership is dispersed. Also, it supports Burkart *et al.*, (1997)'s argument of less risk taking due to loss of managerial discretion under intense monitoring. We conclude that these results confirm Hypothesis 1.

 Insert Table 5 about here

 Insert Figure 1 about here

4.1.2. Sub-samples

We proceed our analysis of bank risk by performing regressions on sub-samples of our working panel. First we check if ownership concentration differently affects bank risk taking across country legal protection of shareholders. The first two columns of Table 6 present the results of regressions considering respectively banks in countries with high shareholders rights (anti-self dealing index greater than its median of 0.41), and low shareholders rights (index equal or lower than 0.41). Results show that *Ownership Concentration* increases *Earnings Volatility* when protection of shareholders is high. Such evidence does not support Hypothesis 2, that rely on the theoretical argument that effective legal protection of shareholders works as a substitute for the existence of a large shareholder that monitors management. Instead, these mechanisms seem to complement each other to increase bank risk taking. In fact, shareholders are in a better position to monitor managers if they are legally

protected from self dealing on the part of managers. Interestingly, both capital regulations and official supervisory power are able to contain bank risk when shareholders' legal protection is high.

The next four regressions assess the importance of ownership concentration to bank risk taking when considering subsets of large/small banks and publicly listed/unlisted banks. This is to recognize that the importance of a large shareholder that monitors managers and encourages bank risk taking depends on the presence of additional governance mechanisms to which often only large and publicly listed firms are subject. Third and fourth columns of Table 6 contain the results of regressions on large and small banks subsets, respectively. Sub-sample of large banks includes the ones which total assets are ranked below the median of the country total assets ranking distribution. Evidence for this subset is that ownership concentration does not help to explain bank risk, which conforms to Hypothesis 2, considering that probably other governance mechanisms work to shape risk taking behaviour of large banks. The sample of small banks is composed by banks which *Size* variable (logarithm of total assets) is lower than the median of this variable. Confirming Hypothesis 2, result in fourth column shows that ownership concentration helps to increase risk of small banks. Turning to the publicly listed/unlisted banks, the evidence points that ownership concentration is not important to explain risk in any of these sub-samples. This last result does not conform to Hypothesis 2.

 Insert Table 6 about here

4.1.3. The role of laws

Regressions in Table 5 do not report a role for shareholders rights in explaining bank risk. However, when analyzing sub-samples regressions of Table 6, we first find that increasing shareholders rights reduces the risk of small banks. Considering that in average ownership is more concentrated in the subset of small banks (mean largest shareholder's stake of 67% versus 50% in large banks), this result may suggest that legal protection of shareholders is able to contain excessive risk taking by managers or controlling shareholders of small banks. Recall that for very high levels of ownership concentration the relationship between it and risk is increasing. However, this interpretation must be taken with caution, as the anti self-

dealing index of Djankov *et al.* (2007) focus on publicly traded firms, while in our sample only 20% of small banks are listed.

Concerning the degree of enforcement of laws, it is remarkable that *Rule of Law* reduces the risk of banks in the sub-samples of high legal protection of shareholders, large banks, as well as publicly listed banks, according to Table 6. The evidence supports a role for the effectiveness of legal systems in containing bank risk, that is complementary to shareholders protection laws and other governance mechanisms to which large and publicly listed banks are subjected.

4.1.4. The role of bank regulations

From regressions *R3* to *R5* in Table 5, we notice that capital regulatory restrictions reduce bank risk. Even though the *Capital* variable does not represent a perfect adherence to Basel II's first pillar, we believe the evidence supports Basel II's policy recommendation on the stringency of capital requirements to reduce bank risk taking and strengthen financial stability. Evidence from Table 6 tells that capital regulations stringency reduces the risk of banks in countries with high legal protection of shareholders, and of large banks. As previously mentioned, it suggests that capital regulations complement shareholders' legal protection in reducing bank risk taking. In addition, it seems that capital regulations are more effective in reducing the risk of large banks. Regarding official supervisory power, there is evidence that it also behaves as a complement to shareholders protection laws in reducing bank risk. Regression *R3* in Table 5 shows that the level of external private monitoring on banks has a positive effect on their *Earnings Volatility*. According to Table 6, this is especially true if shareholders' protection laws are high and banks are small, even though the significance of coefficients is not high. The evidence suggests that regulations promoting transparency and market discipline of banks induce them to take more risk. Such result does not support the role of private monitoring as a reinforcing mechanism to capital regulations and official supervisory power in reducing risk. Despite the evidence is not desirable from the perspective of regulatory authorities, the effectiveness of private monitoring to induce not only bank risk, but also performance is assessed in Section 4.2.2.

4.1.5. Z-Score analysis

Regressions are also run on *Z-Score* as a dependent variable. For the complete sample, column *R1* of Table 7 shows no evidence that ownership concentration influences *Z-Score*. We then decided to include *Leverage* as a regressor, as by construction, *Z-Score* is correlated

with *Leverage*. Doing so, ownership concentration still does not have any impact on *Z-Score*, as shown in column *R2*, even though *Leverage* appears negatively influencing *Z-Score*. After, we search for a similar evidence of Laeven and Levine (2006), who find a negative relationship between main owner's cash flow rights (which is supposed to be highly correlated with ownership concentration) and *Z-Score*, in a sample composed by large banks. For such, we restricted the sample to the largest banks in each country (banks ranked below the median of country's ranking of bank total assets). Confirming Laeven and Levine (2006), regression *R3* of Table 6 shows a negative and significant coefficient for ownership concentration. However, including *Leverage* renders *Ownership Concentration* not significant (regression *R4*). Such finding may suggest that the results of Laeven and Levine (2006) should be interpreted taking into account that they do not consider leverage as an explanatory factor of bank stability through *Z-Score*.

All regressions in Table 7 show a significant positive impact of *Rule of Law* on *Z-Score*. Together with the previously mentioned evidence of a decreasing impact of *Rule of Law* on *Earnings Volatility*, we conclude that, from a prudential point of view, *Rule of Law* has a beneficial role in terms of promoting bank soundness.

 Insert Table 7 about here

4.2. Bank Performance

4.2.1. The role of ownership concentration

In this section, we analyze the effect of ownership concentration on performance in order to contrast Hypotheses 3 and 4. Such analysis will also help us clarifying whether riskier taking decisions are always aimed at improving firm value. Instead, they may be the result of misbehaviour or inefficiencies resulting from the conflicts of interests between shareholders and managers, such as asset substitution, expropriation and entrenchment. In the case of banks, these problems might be worse due to higher opacity and leverage. Therefore, we extend our analysis by looking at how bank performance is affected by ownership concentration and other governance mechanisms.

Table 8 shows the results of contrasting Hypothesis 3. The evidence found conforms to the previous hypothesis and supports a cubic relationship between ownership concentration and bank performance. Significance of linear, quadratic and cubic coefficients is attained at

least at the 5% level considering different sets of regressors. For the estimation including all regressors (column *R4* of Table 8), the correspondent equation relating bank performance to ownership concentration support a positive effect of ownership concentration on performance, when the largest shareholder's stake increases until around 30%. This effect occurs probably due to effective monitoring by the main shareholder (e. g., Burkart *et al.*, 1997). For values of ownership concentration from around 30% to around 85%, bank performance decreases, supporting the hypotheses of expropriation of minority shareholders by the main shareholder (Shleifer and Vishny, 1986; Faccio and Stolin, 2004), or alternatively, of increasing costs of managerial loss of discretion (Burkart *et al.*, 1997). From values of ownership concentration from 85% to 100%, bank performance increases, giving support to the prediction that expropriation is reduced as a consequence of its increasing costs imposed to the main shareholder (Burkart *et al.*, 1998). Figure 2 illustrates the cubic shape obtained for the relationship between performance and ownership concentration.

 Insert Table 8 about here

 Insert Figure 2 about here

4.2.2. Interactions

It is argued in section 2 that the importance of agency problems is likely to differ contingent on firms' ownership concentration structures. On the one hand, conflicts of interests between shareholders and managers are more important in dispersed ownership structures, respect to concentrated ownership structures. This is so because in the latter shareholders' interests are likely to prevail. On the other hand, conflicts between controlling and minority shareholders are likely to be worse in firms with concentrated ownership structures. Therefore, in order to help deriving conclusions regarding the role of shareholders protection laws, bank regulations and competition on performance, we run regressions including the interaction of ownership concentration with variables for shareholders rights, bank regulations, and competition on two separate sub-samples of banks. The first sub-sample includes banks with dispersed ownership structures (main owner with an equity stake up to 50%), while the second includes banks with concentrated ownership structures (main owner's stake greater than 50%).

For the whole sample, we did not find evidence that the level of protection of shareholders influence bank performance (regression *R4* of Table 8). However, there is evidence that shareholders rights and its interaction with ownership concentration matter for performance of banks with dispersed ownership structure. Coefficients for ownership concentration and shareholders rights enter positively and significant when explaining performance, whereas the coefficient for the interaction term is negative and significant (first regression of Table 9). These results tell, first, that an increase in ownership concentration improves performance of banks with dispersed ownership, supporting again the effectiveness of monitoring in aligning shareholders' and managers' interests. Second, increasing the protection of shareholders also improves performance. And third, the negative interaction term tells us that the positive effect of ownership concentration on performance is more important when shareholders rights are low.. Alternatively, increasing ownership concentration is less important to performance of banks in countries with strong legal protection of shareholders. Such evidence is very similar to the one of Caprio *et al.* (2007), except that they consider large banks with any ownership structure (not only dispersed ownership), and firm value instead of performance. The magnitude of the coefficients are such that at levels of ownership concentration below 26%, it is necessary a level of shareholders rights above its median to keep an increasing relationship between the net effect of these variables and performance. On the other hand, for levels of ownership concentration above 26%, the net effect of shareholders rights and ownership concentration on performance is increasing only if shareholders rights is below its median. This result suggests substitutive roles of ownership concentration and shareholders rights to increase bank performance, which does not support Hypothesis 4. We did not find any evidence for the role of shareholders rights in banks with concentrated ownership structures (regressions are not reported).

 Insert Table 9 about here

Regressions *R3* and *R4* in Table 8 report a role for some bank regulations in explaining bank performance. First, the stringency of capital regulations has a positive impact on *Risk-Adjusted ROA*. Such evidence supports a beneficial role of capital regulations in attaining bank efficiency. Recall that we previously found that capital regulations stringency reduces bank risk (see Section 4.1.4). Considering that Basel II's policy recommendations focus on

limiting bank risk taking to promote financial stability, our results go beyond and offer a strong argument to strengthen capital regulations: to improve bank efficiency, in addition to attain financial stability. In other words, capital regulations stringency is beneficial either from the systemic viewpoint of the regulator, as from the individual bank's viewpoint of performance improving. Again, we clarify that capital regulations stringency in this study is represented by the index proposed by Barth *et al.* (2006), which does not represent a perfect adherence to Basel II's first pillar. Table 9 provides additional evidence on the influence of capital regulations stringency on the performance of banks with dispersed ownership structures (largest shareholder's stake lower than or equal to 50%). The interaction of *Capital* with *Ownership Concentration* is positive when influencing *Risk-Adjusted ROA*. It means that increasing both capital regulations stringency and ownership concentration helps to increase performance. For the selected sub-sample, ownership concentration linearly decreases performance, even though from Figure 2 we observe that there are ranges of increasing and decreasing performance with respect to ownership concentration. The positive interaction term tells that the decreasing effect of ownership concentration on performance is less important if capital regulations are more stringent. Irrespective of the relationship between ownership concentration and performance for levels of ownership concentration below 50%, we conclude that capital regulations and ownership concentration complement each other to increase the performance of banks y , which provides support to Hypothesis 4.

Second evidence is the negative influence of *Private Monitoring* on bank performance, according to regressions *R3* and *R4* in Table 8. Together with the previous evidence of the positive influence of private monitoring on bank risk (see Section 4.1.4), we conclude for a detrimental role of private monitoring from the perspectives of both the regulatory authorities and the banks. It may be the case that the excess of transparency hinders competitive advantages of banks in seeking investments opportunities, in the sense that a certain level of information opaqueness is necessary for banks to provide added-value services (Bruni and Paterno, 1995).

Finally, bank competition measured by the number of banks in a country has a positive impact on bank performance, according to regressions *R2* and *R4* in Table 8. Furthermore, last column of Table 9 shows that *Log(Number of Banks)* interacts positively with *Ownership Concentration* to increase the performance of banks with dispersed ownership structure. It means that the decreasing effect of ownership concentration in bank performance is less important if the bank industry is more competitive. Again, even though performance is initially increasing and then decreasing with respect to levels of ownership concentration

below 50% (see Figure 2), the complementary relation given by the positive interaction between competition and ownership concentration **conforms** to Hypothesis 4.

4.2.3. Robustness check for cubic relationship

The inclusion of quadratic and cubic terms of the *Ownership Concentration* variable in regressions of Table 8 may be a concern if collinearity between these variables is high enough to invalidate the cubic relationship obtained. Therefore, in order to check the robustness of the cubic relationship between ownership concentration and bank performance obtained in regression *R4* of Table 8, we perform piece-wise regressions to assess the linear relationship between these variables in each of the three different ranges of ownership concentration characterized in Figure 2. In the first range, where *Ownership Concentration* is between 0 and 30%, *Risk-Adjusted ROA* increases with *Ownership Concentration*. The second range has *Ownership Concentration* varying between 30% and 85% and is characterized by a negative relationship between *Risk-Adjusted ROA* and *Ownership Concentration*. In the third range, that includes values of *Ownership Concentration* from 85% to 100%, the linear relationship between the variables is positive. Table 10 report the results of the three separate piece-wise linear regressions for checking the sign of the linear relationship between *Ownership Concentration* and *Risk-Adjusted ROA*. The signs of the coefficients of *Ownership Concentration* for each range coincide with the signs of the net effect of this variable on bank performance, in each range of the cubic relationship represented in Figure 2. Moreover, the coefficients are significant for second and third ranges. Therefore, results in Table 10 assure the robustness of the cubic relationship between ownership concentration and bank performance previously obtained.

 Insert Table 10 about here

5. Conclusions

This paper examines the relationships between banks' ownership concentration, risk and performance, controlling for legal protection of shareholders, bank regulations and other bank and country specific characteristics. We derive our results performing dynamic panel data estimations on a database composed of 4,681 bank-year observations, generated by 795 banks

located in 47 countries in the period from 1997 to 2007. Our analysis departs from studying the effect of ownership concentration (measured by the equity stake of the bank's largest shareholder) on bank risk (measured by earnings volatility), and concludes that these variables have a non-linear U-shaped relationship. Bank risk increases at values of ownership concentration above 25%. This finding supports a role for ownership concentration as a mechanism of aligning the interests of managers to those of shareholders, who have intrinsic incentives to risk-shifting. Results also show that ownership concentration increases bank risk when legal protection of shareholders is high, suggesting that these mechanisms complement each other to increase bank risk taking, through effective monitoring of managers by shareholders if these are legally better protected from self dealing on the part of managers. In addition, evidence tells that the risk of small banks increases with ownership concentration. Contrasting with previous evidence of Laeven and Levine (2006), the result does not hold for large banks, which suggests that these are probably subjected to other governance mechanisms that shape their risk taking behaviour.

Regarding the relationship between bank ownership structure and performance (measured by the risk-adjusted return on assets), we borrow from Morck *et al.* (1988) to propose a cubic relationship between both variables. We explain this S-shape relationship relying on the two main agency problems that appear within an organization, independently whether it is financial or non-financial. The first problem appears between managers and shareholders in the absence of appropriate incentives or sufficient monitoring to align manager's interest with that of shareholders (we can define it as agency problem one, APO). The second agency problem appears between controlling and minority shareholders, when expropriation by controlling shareholders at the expense of minority shareholders takes place (we can define it as agency problem two, APT). The role of corporate governance mechanisms, like ownership structure, is to mitigate both agency costs (Shleifer and Vishny, 1997). In particular, when ownership structure is dispersed, the APO is particularly harmful. In this situation, an increase in ownership concentration reduces the free-riding in monitoring that appears in dispersed ownership structures. As a consequence, APO is alleviated, and performance should improve. This logic applies until the point where the ownership concentration is high enough such that shareholders with a significant stake (blockholders) emerge. These blockholders have power high enough to force the firm to follow practices that only favour blockholders' interests (APT). In this situation, the APT is more important than the APO and becomes particularly important as the ownership concentration increases. The result is a decrease in performance. Finally, when ownership concentration is quite large, the large stake of blockholders hinders

their incentives to internalize a very significant proportion of the expropriation costs. This should lead to an improvement in performance. An alternative explanation for a decrease in performance for moderate levels of ownership concentration is the trade-off between the benefits of monitoring and those of managerial discretion, proposed by Burkart *et al.* (1997). In other words, as monitoring by shareholders increases, managers have less discretion and initiative to seek new investment opportunities, which reflects in performance deterioration.

The results confirm our arguments and we find evidence of a cubic relationship between ownership concentration and bank performance. Our findings indicate that the expropriation (and/or loss of managerial discretion) region is between 30% and 85%. This is remarkable given that for a significant proportion of banks (around 40%), the total stake of the three largest shareholders falls in that region. Such evidence gives us a warning signal of the seriousness of the problem in financial institutions, particularly in countries with a weak corporate governance system. This kind of situation introduces inefficiencies in the functioning of banks that may have perverse effect on the overall financial system. To investigate these issues in a deeper level should be the subject of some future research.

Regarding the influence of country factors and its interactions with ownership concentration on bank performance, we first find that ownership concentration is more important to increase the performance of banks with dispersed ownership structures when the legal protection of minority shareholders is low, which is evidence similar to that obtained by Caprio *et al.* (2007).

Second, the stringency of capital regulations has a positive impact on bank performance, which supports a beneficial role of capital regulations in attaining bank efficiency. Together with the evidence that capital regulations stringency reduces bank risk, the results offer a strong argument for strengthening capital regulations, provided that it is beneficial either from the systemic perspective of regulatory authorities, who seek to attain financial stability, as from the individual bank's perspective of performance improving. Moreover, capital regulations stringency interacts positively with ownership concentration to increase performance of banks with dispersed ownership structure.

Third, we report a negative influence of external private monitoring of banks on their performance. Together with the evidence of the positive influence of private monitoring on bank risk, we conclude for a detrimental role of private monitoring from the perspectives of both the regulatory authorities and the banks. It seems that the excess of transparency hinders banks' competitive advantages that otherwise would derive from a certain level of information opaqueness.

Lastly, bank competition measured by the number of banks in a country has a positive impact on bank performance. In addition, competition interacts positively with ownership concentration to increase the performance of banks with dispersed ownership structure.

A final comment is that our results help to shed a light on the issue of whether banks are different from non-financial firms. We obtained a non-linear (cubic) relationship between ownership concentration and bank performance that do not importantly diverge from the empirical evidence available for firms in general (see a survey by Miguel *et al.* 2004). Therefore, even presenting unique characteristics that make them differ from non-financial firms (e. g., higher leverage, greater opacity and heavy regulations), our evidence indicates that banks behave in the same way as firms in general, in response to the same agency problems and similar corporate governance mechanisms they are subjected, when compared with non-financial firms.

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Appendix 1 – Description of Explanatory Variables

Variable	Description	Source
<i>Bank specific</i>		
Ownership Concentration	The equity percentage participation of the largest shareholder of the bank. More specifically, it is the total participation of the largest shareholder taken from the <i>Bankscope</i> database, i.e., the sum of direct and indirect fractions of the bank's voting rights held by the largest shareholder, whenever this information is available. Often, only the direct participation is available, and this value is used instead. Quadratic and cubic variables for ownership concentration are also generated for the examination of a cubic relationship between performance and ownership.	<i>Bankscope</i> .
Revenue Growth	The bank's average growth in total revenues respect to the previous year.	Calculations on data from <i>Bankscope</i> .
Size	Natural logarithm of bank's annual total assets in thousands of US dollars.	<i>Bankscope</i> .
Leverage	The bank's ratio of total debt to total assets.	<i>Bankscope</i> .
State Owned	A dummy indicating if the largest shareholder of the bank is the government of a country or State. It is included to control for government ownership, which is argued to affect principal-agent relationships (Levine, 2003), and to be associated with poorly developed banks (Barth et al., 1999).	<i>Bankscope</i> .
<i>Bank regulations</i>		
Capital Stringency	It is the Capital Requirements Stringency Index of Barth <i>et al.</i> (2006). It measures the level of stringency of capital restrictions imposed to banks, such as eligible funds for entering in the banking industry, and the use of risk based approaches by central banks when defining capital ratio requirements. Constructed for three periods (1997-2000, 2001-2003 and 2004-2007), using data from the surveys on bank regulation and supervision conducted by the <i>World Bank</i> . In our data, it ranges from 2 to its maximum possible value of 10, with higher values representing stricter capital regulations.	Barth <i>et al.</i> (2001, 2006, 2008).

Variable	Description	Source
Official Supervisory Power	It is the Official Supervisory Power Index of Barth <i>et al.</i> (2006). It represents the degree of the power that the supervisor authority has to oversee and intervene in banks functioning. Also constructed for three periods (1997-2000, 2001-2003 and 2004-2007), using data from the surveys on bank regulation and supervision conducted by the <i>World Bank</i> . In our data, the index ranges from 4 to 14.	Barth <i>et al.</i> (2001, 2006, 2008).
Private Monitoring	It is the Private Monitoring Index of Barth <i>et al.</i> (2006). It gives a measure of the degree to which banks are exposed to external monitoring, apart from official regulatory and supervisory oversight. It comprises regulatory requirements of information and accounting disclosure, external auditing, depositor protection, use of subordinated debt, and discipline. The index was constructed for three periods (1997-2000, 2001-2003 and 2004-2007), using data from the surveys on bank regulation and supervision conducted by the <i>World Bank</i> . Higher values of the index represent more regulations promoting the private monitoring of banks.	Barth <i>et al.</i> (2001, 2006, 2008).
<i>Other country specific</i>		
Shareholders Rights	It is the measure of a country's degree of legal protection of minority shareholders against expropriation by corporate insiders, represented by the anti-self-dealing index of Djankov <i>et al.</i> (2007). These authors argue that such index is better than their previous La Porta <i>et al.</i> (1998)'s anti-director rights index to explain a variety of stock market outcomes. It is assumed constant all over the period from 1997 to 2007.	Djankov <i>et al.</i> (2008).
Financial Development	A proxy of a country's financial development, constructed by Beck <i>et al.</i> (2000), using raw data from the IMF's International Financial Statistics, October 2008. This variable is given by the total credit to the private sector by deposit money banks, as a share of GDP. It is available for each year of the period. Higher values of this variable should correspond to more developed financial systems. If it is originally missing, zero is assigned to this variable, and a separate indicator for missing value is included.	Beck <i>et al.</i> (2000).
Rule of Law	It is a country governance indicator constructed by Kaufmann <i>et al.</i> (2008) measuring perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. The authors rely on multiple sources to construct a weighted aggregate indicator.	Kaufmann <i>et al.</i> (2008).

Variable	Description	Source
Bank Concentration	Total assets of country's three largest banks as a share of assets of all commercial banks, constructed by Beck et al. (2000) using data from the <i>Fitch's Bankscope</i> database. It reflects the level of concentration in the banking industry.	Beck <i>et al.</i> (2000).
Log (Number of Banks)	It is the logarithm of the number of commercial banks in the country, made available by Barth <i>et al.</i> (2001, 2006, 2008), based on the surveys on bank regulation and supervision conducted by the <i>World Bank</i> .	Barth <i>et al.</i> (2001, 2006, 2008).
Log (GDP)	The logarithm of the annual country's Gross Domestic Product (GDP), where GDP is given in billions of US Dollars. This variable is supposed to measure the size of a country's economy.	<i>IMF, International Financial Statistics</i>
Log (GDP per capita)	The logarithm of the annual country's GDP per capita. This variable is relied as a measure of a country's economic development.	<i>IMF, International Financial Statistics</i>
GDP growth	The percent growth in a country's GDP from the previous year to the current year. This variable reflects a country's business cycle.	<i>IMF, International Financial Statistics</i>
Country-Average ROA	Annual return on assets averaged across all banks in the country.	Calculations on data from <i>Bankscope</i> .

TABLES AND FIGURES

Table 1 – Descriptive Statistics
(Panel with 4,681 observations of 795 banks around 47 countries, in the 1997-2007 period)

<i>Variable</i>	<i>Mean</i>	<i>Std. Deviation</i>	<i>Minimum</i>	<i>Maximum</i>	<i>Percentile 10%</i>	<i>Percentile 25%</i>	<i>Median</i>	<i>Percentile 75%</i>	<i>Percentile 90%</i>
Earnings Volatility (x10 ²)	0.98	1.83	0.00	40.88	0.12	0.22	0.44	1.02	2.29
Z-Score	38.99	118.83	-5.02	5583.42	3.88	9.21	20.40	41.40	75.55
Risk-Adjusted ROA	3.16	3.83	-7.76	25.59	-0.13	0.56	2.40	4.47	7.60
Own. Concentration (%)	58.72	35.56	0.01	100.00	5.01	27.30	57.76	99.21	100.00
Revenue Growth	0.13	0.41	-2.01	2.46	-0.23	-0.06	0.09	0.27	0.56
Total Assets (bn USD)	15.50	68.20	0.01	1680	0.13	0.35	1.35	6.87	29.00
Leverage (%)	89.36	8.51	43.02	118.72	78.75	87.50	92.06	94.59	96.12
State Owned	0.06	0.24	0.00	1.00	0.00	0.00	0.00	0.00	0.00
Capital	6.42	1.67	2.00	10.00	5.00	5.00	6.00	7.00	9.00
Official	10.80	2.35	4.00	14.00	8.00	8.00	11.00	13.00	14.00
Private Monitoring	7.98	1.22	5.00	11.00	6.00	7.00	8.00	9.00	9.00
Shareholders Rights	0.43	0.18	0.08	1.00	0.27	0.28	0.41	0.52	0.68
Rule of Law	0.83	1.00	-1.67	2.04	-0.78	-0.04	1.30	1.68	1.86
Log (GDP)	6.16	1.47	0.62	9.55	4.44	5.16	5.97	7.55	8.27
Log (GDP per capita)	9.25	1.48	5.06	11.19	6.77	8.15	10.02	10.41	10.55
GDP growth	3.06	3.04	-13.13	21.18	0.25	1.31	2.86	4.56	6.27
Bank Concentration	0.59	0.19	0.21	1.00	0.35	0.42	0.59	0.71	0.86
Number of Banks	542	1319	8	10,500	26	52	190	342	907
Country-Average ROA	1.15	2.35	-26.76	23.39	-0.09	0.62	1.23	1.91	2.72

Table 2 – Country Descriptive Statistics (Mean of bank-specific variables)

	<i>Country</i>	<i>Obs</i>	<i>Banks</i>	<i>Earnings Volatility (10²)</i>	<i>Risk- Adjusted ROA</i>	<i>Z- Score</i>	<i>Own. Conc. (%)</i>	<i>Revenue Growth</i>	<i>Total Assets (bn USD)</i>	<i>Lever (%).</i>	<i>State Owned</i>
1	ARGENTINA	168	35	3.58	0.95	11.23	72.89	0.17	1.13	83.62	0.20
2	AUSTRALIA	80	10	0.27	5.66	36.30	20.66	0.13	54.60	93.51	0.00
3	AUSTRIA	141	21	0.75	5.24	47.40	65.37	0.20	2.70	89.83	0.00
4	BELGIUM	88	13	0.54	3.10	24.79	92.03	0.16	10.80	92.76	0.00
5	BRAZIL	256	48	2.57	2.14	14.25	75.26	0.14	6.95	85.30	0.16
6	CHILE	64	10	0.33	6.17	40.90	66.67	0.13	5.52	90.87	0.00
7	COLOMBIA	74	12	1.48	1.57	15.31	73.35	0.09	2.13	86.96	0.07
8	DENMARK	141	23	0.34	4.81	36.42	34.23	0.11	11.90	89.28	0.00
9	ECUADOR	38	6	2.05	2.57	18.20	55.48	0.19	0.51	88.51	0.00
10	EGYPT	113	17	0.53	3.48	38.80	54.49	0.11	1.72	91.16	0.00
11	FINLAND	12	2	0.41	5.38	31.06	15.48	0.08	1.60	94.13	0.00
12	FRANCE	414	75	0.81	3.15	47.24	77.91	0.12	25.30	87.74	0.00
13	GERMANY	548	75	0.54	2.93	89.68	70.40	0.09	30.70	91.23	0.07
14	GREECE	63	10	0.83	2.17	18.34	44.69	0.22	14.50	92.02	0.00
15	HONG KONG	20	3	0.50	5.02	46.70	69.53	0.02	4.89	82.93	0.00
16	INDIA	175	32	0.58	3.31	17.10	61.45	0.19	7.35	94.80	0.42
17	INDONESIA	195	34	2.06	3.42	23.97	61.96	0.18	1.33	86.22	0.02
18	IRELAND	34	5	0.13	4.41	53.60	94.60	0.17	6.23	91.52	0.00
19	ISRAEL	56	8	0.22	3.14	36.91	46.85	0.10	19.50	92.71	0.14
20	ITALY	29	8	0.39	2.69	39.06	72.75	0.17	12.30	87.00	0.00
21	JAPAN	391	77	0.34	1.36	29.42	7.11	0.01	33.90	95.29	0.00
22	JORDAN	20	4	0.43	6.16	42.99	20.95	0.16	6.09	91.03	0.00
23	KENYA	44	8	0.97	4.38	37.60	41.16	0.04	0.14	84.30	0.07
24	SOUTH KOREA	62	12	1.00	1.48	12.16	38.51	0.24	44.80	94.64	0.15
25	MALAYSIA	44	7	0.47	4.59	30.63	50.72	0.19	10.90	90.73	0.00
26	MEXICO	6	2	2.17	2.26	14.88	100.00	0.37	15.30	78.31	0.00
27	NETHERLANDS	22	5	0.24	4.68	49.78	77.59	0.28	1.95	91.56	0.00
28	NIGERIA	81	15	1.21	3.49	15.01	51.68	0.20	0.59	88.06	0.00
29	NORWAY	31	5	0.33	2.31	18.69	49.68	0.11	10.20	92.47	0.00
30	PAKISTAN	97	17	0.74	3.80	20.53	58.28	0.20	1.29	93.35	0.12
31	PERU	28	6	0.70	3.14	27.46	77.66	0.17	3.13	89.94	0.00
32	PHILIPPINES	57	10	0.76	2.90	35.39	42.86	0.08	1.36	85.69	0.00
33	PORTUGAL	70	11	0.50	3.12	42.35	68.18	0.16	13.20	91.48	0.07
34	SINGAPORE	14	2	0.32	5.39	41.87	14.05	0.07	38.80	88.78	0.00
35	SOUTH AFRICA	10	1	1.53	-0.25	6.83	88.45	0.04	0.08	91.33	0.00
36	SPAIN	202	33	0.65	3.82	54.91	69.67	0.11	13.20	88.75	0.00
37	SRI LANKA	33	5	0.65	4.11	25.30	18.29	0.16	0.67	91.72	0.09
38	SWEDEN	23	4	0.54	2.38	12.70	33.51	0.03	76.20	95.68	0.17
39	SWITZERLAND	342	51	1.09	4.72	54.42	77.12	0.14	11.80	79.87	0.04
40	TAIWAN	104	19	0.34	2.09	31.31	23.94	0.10	12.00	92.84	0.05
41	THAILAND	75	12	1.21	0.30	6.50	51.73	0.24	11.90	93.51	0.21
42	TURKEY	37	8	2.92	1.53	7.42	56.40	0.34	10.40	84.65	0.00
43	UNITED KINGDOM	21	4	0.36	2.71	32.10	55.46	0.07	0.24	86.07	0.00
44	URUGUAY	39	7	2.96	0.65	9.92	85.23	0.16	0.45	92.37	0.08
45	USA	81	16	0.37	5.94	43.49	66.85	0.18	12.40	89.95	0.00
46	VENEZUELA	28	5	2.12	3.20	12.32	42.94	0.24	2.57	86.92	0.00
47	ZIMBABWE	10	2	2.73	4.61	10.72	40.52	0.63	0.67	91.41	0.00
	Whole Sample	4,681	795	0.98	3.16	38.99	58.72	0.13	15.50	89.36	0.06

Table 3 – Country Descriptive Statistics (Mean of country-specific variables)

	<i>Country</i>	<i>Capital</i>	<i>Official</i>	<i>Private Monit.</i>	<i>Sh Rights</i>	<i>Rule of Law</i>	<i>Fin. Develop</i>	<i>GDP per capita</i>	<i>Bank Conc. (%)</i>	<i>Number of Banks</i>
1	ARGENTINA	6.7	9.5	8.3	0.44	-0.49	8.31	5,340	41.6	80
2	AUSTRALIA	6.4	11.2	9.7	0.79	1.76	9.70	24,989	77.5	52
3	AUSTRIA	7.2	11.7	6.0	0.21	1.83	6.00	31,720	66.5	911
4	BELGIUM	5.8	10.9	7.0	0.54	1.44	7.00	30,245	83.6	110
5	BRAZIL	6.6	13.7	8.7	0.29	-0.34	8.68	4,074	44.3	180
6	CHILE	5.8	10.8	7.4	0.63	1.17	7.39	5,822	52.4	27
7	COLOMBIA	5.4	13.0	9.0	0.58	-0.80	9.00	2,571	38.7	27
8	DENMARK	7.0	9.0	8.3	0.47	1.87	8.32	37,573	77.7	181
9	ECUADOR	10.0	14.0	9.0	0.08	-0.73	9.00	2,028	60.1	23
10	EGYPT	5.0	13.3	8.7	0.49	-0.06	8.70	1,402	57.0	41
11	FINLAND	4.5	8.0	8.8	0.46	1.89	8.75	32,478	97.3	10
12	FRANCE	6.0	7.4	6.5	0.38	1.34	6.50	29,237	55.7	365
13	GERMANY	6.4	8.6	7.8	0.28	1.71	7.75	29,280	67.3	1,887
14	GREECE	5.1	10.7	7.5	0.23	0.73	7.54	17,393	88.5	28
15	HONGKONG	6.4	11.0	8.7	0.96	1.17	8.70	24,953	63.1	163
16	INDIA	7.6	9.1	6.8	0.55	0.12	6.80	495	34.5	97
17	INDONESIA	6.2	12.6	8.6	0.68	-0.86	8.60	1,091	54.6	145
18	IRELAND	3.9	11.2	8.9	0.79	1.63	8.85	41,807	55.0	52
19	ISRAEL	5.5	8.0	9.6	0.71	0.90	9.57	19,153	73.9	23
20	ITALY	5.0	7.0	8.0	0.39	0.57	8.00	29,828	40.6	797
21	JAPAN	6.1	12.0	9.0	0.48	1.35	9.00	33,739	37.6	234
22	JORDAN	7.7	10.4	7.0	0.16	0.36	7.00	1,933	87.5	20
23	KENYA	7.2	13.3	7.6	0.22	-1.02	7.61	463	56.9	46
24	SOUTH KOREA	4.2	10.8	9.9	0.46	0.73	9.90	13,054	44.4	20
25	MALAYSIA	4.2	11.8	9.0	0.95	0.47	9.00	4,645	42.7	29
26	MEXICO	8.0	9.0	7.0	0.18	-0.47	7.00	5,530	61.1	52
27	NETHERLANDS	5.3	6.5	8.6	0.21	1.75	8.64	34,717	70.5	447
28	NIGERIA	7.9	12.0	7.4	0.52	-1.38	7.36	450	39.8	75
29	NORWAY	6.9	8.7	7.3	0.44	1.93	7.29	46,621	91.9	15
30	PAKISTAN	7.6	13.2	8.2	0.41	-0.82	8.21	572	56.4	38
31	PERU	4.3	12.0	7.0	0.41	-0.66	7.00	2,716	73.8	13
32	PHILIPPINES	5.8	11.4	8.1	0.24	-0.50	8.14	1,053	72.4	44
33	PORTUGAL	7.0	13.7	6.9	0.49	1.16	6.89	14,071	79.8	59
34	SINGAPORE	7.1	8.7	8.9	1.00	1.60	8.86	23,163	91.6	127
35	SOUTHAFRICA	8.5	7.0	9.1	0.81	0.15	9.10	3,901	86.4	49
36	SPAIN	9.6	9.6	8.3	0.37	1.26	8.29	19,316	74.1	287
37	SRILANKA	6.3	8.2	8.3	0.41	0.02	8.30	1,017	66.8	24
38	SWEDEN	3.0	6.4	6.7	0.34	1.82	6.65	32,585	95.5	25
39	SWITZERLAND	6.4	13.7	7.6	0.27	1.98	7.64	43,711	85.8	369
40	TAIWAN	5.5	11.0	8.2	0.56	0.85	8.23	13,830	27.7	39
41	THAILAND	5.6	9.6	8.0	0.85	0.22	7.96	2,256	48.6	27
42	TURKEY	5.8	13.7	7.8	0.43	0.01	7.78	5,870	71.5	53
43	UNITED KINGDOM	6.6	9.9	9.8	0.93	1.73	9.76	31,769	58.4	386
44	URUGUAY	6.0	12.4	9.0	0.17	0.50	9.00	5,817	50.8	19
45	USA	6.7	13.0	9.3	0.65	1.60	9.31	37,503	24.5	8,740
46	VENEZUELA	3.7	12.3	5.3	0.09	-1.05	5.25	4,701	41.5	19
47	ZIMBABWE	5.3	13.8	9.0	0.44	-1.22	9.00	354	69.7	16
	WholeSample	6.2	10.7	8.1	0.48	0.58	8.11	16,103	62.5	350

Table 4 – Correlation Matrix
(Panel with 4,681 observations of 795 banks located in 47 countries, for the 1997-2007 period)

	Earn. Volat.	Z-Score	Risk-Adj. ROA	Own. Conc.	Reven. Growth	Size	Lever.	Shar. Rights	Capital	Official	Private Monit.	Rule of Law	Fin. Devel.	GDP per capita	Bank Conc.	Log Number Banks	GDP Growth
Earnings Volatility	1																
Z-Score	-0.09*	1															
Risk-Adjusted ROA	-0.22*	0.22*	1														
Own. Concentration	0.13*	0.03*	-0.02	1													
Revenue Growth	0.03	-0.04*	0.04*	0.05*	1												
Size	-0.24*	-0.03	0.01	-0.31*	0.02	1											
Leverage	-0.23*	-0.03*	-0.01	-0.2*	0.01	0.53*	1										
Shareholder Rights	-0.07*	-0.07*	0.00	-0.17*	0.01	0.23*	0.14*	1									
Capital	-0.02	0.02	0.05*	0.07*	-0.03	-0.11*	-0.04*	-0.13*	1								
Official	0.12*	-0.07*	0.02	-0.07*	0.02	-0.03	-0.12*	0.00	0.07*	1							
Private Monitoring	0.03*	-0.03	-0.08*	-0.21*	-0.03	0.18*	0.03*	0.31*	0.09*	0.25*	1						
Rule of Law	-0.28*	0.13*	0.11*	-0.01	-0.06*	0.16*	0.06*	-0.16*	-0.01	-0.31*	-0.13*	1					
Financial Develop.	-0.23*	0.11*	0.06*	-0.01	-0.05*	0.12*	-0.02	-0.13*	0.00	-0.09*	-0.02	0.8*	1				
Log GDP per capita	-0.19*	0.11*	0.05*	0.01	-0.05*	0.19*	-0.01	-0.21*	-0.06*	-0.24*	-0.01	0.89*	0.73*	1			
Bank Concentration	-0.07*	0.08*	0.14*	0.16*	0.02	-0.15*	-0.15*	-0.28*	0.08*	-0.08*	-0.15*	0.42*	0.44*	0.34*	1		
Log Number Banks	-0.09*	0.12*	0.08*	0.16*	-0.05*	-0.11*	-0.07*	-0.3*	0.11*	-0.16*	-0.24*	0.53*	0.45*	0.51*	0.03*	1	
GDP Growth	0.04*	-0.04*	0.07*	0.01	0.14*	0.01	0.03*	0.18*	0.02	0.08*	-0.02	-0.32*	-0.35*	-0.32*	-0.1*	-0.27*	1
Country-Av. ROA	-0.02	0.01	0.12*	0.09*	0.1*	-0.04*	-0.07*	0.02	-0.08*	0.11*	-0.09*	0.00	-0.02	0.00	0.11*	0.11*	0.26*

* Significant at the 5% level.

Table 5 – Relationship between Bank Risk Taking, Ownership Structure, Laws, and Banking Regulations.

Dependent variable: Earnings Volatility. GMM dynamic panel-data regressions⁺ over the period 1997-2007. (Two-step system GMM, orthogonal deviations transform, Windmeijer's std errors correction). Constant and year dummies omitted. All coefficients and standard errors (in parentheses) are multiplied by 100.

<i>Independent variables</i>		<i>(R1)</i>	<i>(R2)</i>	<i>(R3)</i>	<i>(R4)</i>	<i>(R5)</i>
<i>Bank Specific</i>						
1	Earnings Volatility (t-1)	87.33 *** (15.77)	87.67 *** (15.39)	77.83 *** (18.00)	64.33 *** (17.80)	64.09 *** (16.94)
2	Ownership Concentration	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	-0.02 * (0.01)	-0.06 ** (0.03)
3	Ownership Concentration ²				0.0002 * (0.0001)	0.001 * (0.001)
4	Ownership Concentration ³					0.00 (0.00)
5	Revenue Growth	0.08 (0.19)	0.09 (0.20)	-0.02 (0.09)	-0.01 ** (0.00)	-0.01 ** (0.00)
6	Size	-0.02 (0.03)	-0.02 (0.03)	-0.01 (0.12)	-0.03 * (0.02)	-0.03 (0.02)
7	Leverage		0.00 (0.01)	0.00 (0.03)	-0.01 (0.01)	-0.01 (0.01)
8	State Owned		-0.05 (0.10)	-0.33 (0.25)	0.14 (0.13)	0.10 (0.13)
<i>Country Bank Regulations</i>						
9	Capital			-0.04 ** (0.02)	-0.02 ** (0.01)	-0.02 * (0.01)
10	Official			0.02 (0.02)	-0.01 (0.02)	-0.01 (0.01)
11	Private Monitoring			0.04 * (0.03)	0.02 (0.02)	0.03 (0.02)
<i>Other Country Specific</i>						
12	Shareholders Rights			-0.40 (0.33)	-0.17 (0.19)	-0.15 (0.18)
13	Rule of Law	-0.09 (0.16)	-0.08 (0.16)	0.47 (0.40)	-0.18 * (0.10)	-0.20 * (0.11)
14	Financial Development	0.26 (0.24)	0.26 (0.25)	0.09 (0.08)	0.00 (0.08)	-0.01 (0.08)
15	Log (GDP)	0.19 (0.19)	0.18 (0.20)	0.14 (0.10)	-0.02 (0.04)	-0.03 (0.03)
16	Log (GDP per capita)	0.01 (0.03)	0.02 (0.03)	-0.52 (0.33)	-0.01 (0.09)	-0.01 (0.09)
17	GDP growth	-0.06 (0.06)	-0.07 (0.06)	-0.04 *** (0.01)	-0.02 * (0.01)	-0.02 * (0.01)
18	Bank Concentration	-0.04 *** (0.01)	-0.04 *** (0.01)	0.26 (0.22)	0.15 (0.28)	0.28 (0.24)
19	Log (Number of Banks)	0.06 (0.19)	0.06 (0.20)	-0.04 (0.07)	0.02 (0.04)	0.03 (0.04)
20	Country-Average ROA	0.00 (0.02)	0.00 (0.03)	-0.03 *** (0.01)	-0.04 *** (0.01)	-0.04 *** (0.01)
Number of obs.		4,323	4,323	4,323	4,323	4,323
Number of groups (banks)		752	752	752	752	752
Number of instruments		60	62	90	169	213
GMM-style instruments		1, L2(2), L.(5, 14, 16)	1, L2(2), L.(5, 14, 16)	1, L2(2), L.(5, 6, 7, 16)	1, L2(2, 3)	1, L2(2, 3, 4)
IV-style instruments		6-8, 13, 15-20, year dum.	6-8, 13, 15-20, year dum.	8-15, 17-20, year dummies	4-20, year dummies	5-20, year dummies
F (variables; groups - 1)		43.05***	36.42***	11.42***	17.91***	18.37***
Arell.-Bond test for AR(2) in 1st differences (z; Pr > z)		0.58 0.561	0.59 0.555	0.07 0.947	0.17 0.865	0.15 0.878

⁺ Significance levels: *** 1%, ** 5%, * 10%

Table 6 – Relationship between Bank Risk, Ownership Structure, Laws, and Bank Regulations (Sub-Samples)

Dependent variable: Earnings Volatility. GMM dynamic panel-data regressions⁺ over the period 1997-2007. (Two-step system GMM, orthogonal deviations transform, Windmeijer's standard errors correction): Constant and year dummies omitted. All coefficients and standard errors (in parentheses) are multiplied by 100.

Independent variables		<i>Shareholder Rights</i>		<i>Size</i>		<i>Public listing</i>	
		<i>High</i>	<i>Low</i>	<i>Large</i>	<i>Small</i>	<i>Listed</i>	<i>Unlisted</i>
<i>Bank Specific</i>							
1	Earnings Volatility (t-1)	45.24 *** (14.17)	73.01 *** (12.30)	37.45 *** (9.00)	73.55 *** (8.00)	47.56 ** (19.43)	88.65 *** (4.87)
2	Ownership Concentration	0.01 ** (0.00)	0.01 (0.01)	0.01 (0.01)	0.02 ** (0.01)	0.00 (0.01)	0.01 (0.01)
3	Revenue Growth	0.01 (0.02)	-0.10 * (0.06)	0.00 (0.02)	0.00 (0.07)	-0.01 (0.03)	-0.04 (0.03)
4	Size	-0.26 (0.19)	0.07 (0.06)	-0.16 (0.13)	0.01 (0.14)	-0.24 (0.16)	-0.03 (0.03)
5	Leverage	0.04 * (0.02)	-0.01 (0.01)	0.02 (0.02)	-0.01 (0.01)	0.05 (0.04)	0.00 (0.01)
6	State Owned	-0.12 (0.18)	0.07 (0.21)	0.11 (0.25)	0.09 (0.16)	0.37 (0.27)	0.09 (0.26)
<i>Country Bank Regulations</i>							
7	Capital	-0.05 * (0.03)	-0.03 (0.02)	-0.05 ** (0.02)	-0.03 (0.02)	0.00 (0.02)	-0.03 (0.03)
8	Official	-0.05 * (0.03)	0.01 (0.01)	0.00 (0.02)	-0.04 (0.02)	-0.01 (0.03)	0.02 (0.02)
9	Private Monitoring	0.09 * (0.05)	-0.02 (0.03)	0.03 (0.04)	0.08 ** (0.03)	-0.05 (0.04)	0.03 (0.04)
<i>Other Country Specific</i>							
10	Shareholders Rights	-0.67 (0.45)	-0.66 (0.52)	-0.11 (0.24)	-0.46 * (0.26)	0.34 (0.32)	-0.27 (0.38)
11	Rule of Law	-0.48 ** (0.19)	-0.09 (0.12)	-0.35 *** (0.10)	-0.19 (0.13)	-0.50 ** (0.22)	0.12 (0.16)
12	Financial Development	0.18 (0.18)	0.11 (0.30)	-0.01 (0.10)	0.19 (0.17)	-0.06 (0.13)	0.40 (0.42)
13	Log (GDP)	0.13 (0.18)	0.09 (0.06)	0.09 (0.13)	-0.04 (0.05)	0.04 (0.10)	0.11 (0.13)
14	Log (GDP per capita)	0.13 (0.10)	-0.12 (0.14)	0.15 * (0.08)	-0.07 (0.07)	0.30 * (0.17)	-0.28 (0.22)
15	GDP growth	0.00 (0.02)	-0.04 ** (0.02)	-0.02 *** (0.01)	-0.06 *** (0.02)	-0.03 ** (0.01)	-0.02 (0.02)
16	Bank Concentration	0.42 (0.42)	0.19 (0.33)	0.01 (0.22)	-0.11 (0.36)	0.12 (0.31)	-0.31 (0.44)
17	Log (Number of Banks)	-0.05 (0.18)	-0.06 (0.05)	-0.02 (0.05)	0.03 (0.05)	0.00 (0.09)	-0.04 (0.08)
18	Country-Average ROA	-0.15 *** (0.04)	-0.01 (0.02)	-0.03 ** (0.02)	-0.03 ** (0.02)	0.01 (0.01)	-0.09 ** (0.04)
Number of obs.		2,139	2,184	2,192	2,118	1,679	2,644
Number of groups (banks)		377	375	366	431	324	497
Number of instruments		359	358	359	359	321	125
GMM-style instruments		1, L2(2), L.(3, 4, 5)	1, L2(2), L.(3, 4, 5)	1, L2(2), L.(3, 4, 5)	1, L2(2), L.(3, 4, 5)	1, L2(2), L.(3, 4, 5)	1, L2(2)
IV-style instruments		6-18, time dummies	6-18, time dummies	6-18, time dummies	6-18, time dummies	6-18, time dummies	3-18, time dummies
F (variables; groups - 1)		14.75***	43.34***	11.75***	50.72***	12.77***	29.21***
Arell.-Bond test for AR(2) in 1st differences (z; Pr > z)		-0.24 0.813	0.93 0.354	0.16 0.870	0.85 0.398	-0.91 0.362	0.75 0.456

⁺ Significance levels: *** 1%, ** 5%, * 10%

Table 7 – Relationship between Z-Score, Own. Concentration, Laws, and Regulations.

Dependent variable: Z-Score. GMM dynamic panel-data regressions⁺ over the period 1997-2007. (Two-step system GMM, orthogonal deviations transform, Windmeijer's standard errors correction): (R1): All the sample; (R2): All the sample, including Leverage; (R3): Large Banks; (R4) Large Banks, including Leverage. Constant and year dummies omitted.

<i>Independent variables</i>		<i>(R1)</i>	<i>(R2)</i>	<i>(R3)</i>	<i>(R4)</i>
<i>Bank Specific</i>					
1	Z-Score (t-1)	0.29 ** (0.13)	0.29 ** (0.13)	0.55 *** (0.04)	0.57 *** (0.06)
2	Ownership Concentration	0.02 (0.25)	0.03 (0.25)	-0.13 * (0.08)	-0.08 (0.07)
3	Revenue Growth	-2.80 (7.21)	-2.05 (7.10)	0.30 (0.47)	-0.41 (0.80)
4	Size	-0.63 (1.36)	0.53 (1.34)	-1.10 ** (0.49)	-0.42 (0.67)
5	Leverage		-0.49 *** (0.15)		-0.29 (0.27)
6	State Owned	4.21 (7.72)	3.21 (7.68)		
<i>Country Bank Regulations</i>					
7	Capital	0.11 (0.59)	0.14 (0.59)	0.45 (0.31)	0.40 (0.31)
8	Official	-0.55 (0.57)	-0.67 (0.59)	-0.24 (0.35)	-0.29 (0.38)
9	Private Monitoring	0.62 (1.08)	0.58 (1.08)	-0.45 (0.68)	-0.17 (0.85)
<i>Other Country Specific</i>					
10	Shareholders Rights	-2.73 (5.84)	-3.32 (5.83)	-2.19 (3.99)	-4.81 (4.11)
11	Rule of Law	6.70 ** (2.83)	8.06 *** (2.89)	4.90 *** (1.44)	5.91 *** (1.56)
12	Financial Development	1.06 (4.75)	0.83 (4.84)		
13	Log (GDP)	-0.71 (1.91)	-0.65 (1.92)		
14	Log (GDP per capita)	-1.12 (2.19)	-2.27 (2.22)	-1.01 (0.92)	-1.40 (1.05)
15	GDP growth	-0.08 (0.44)	-0.11 (0.43)		
16	Bank Concentration	6.81 (7.84)	5.45 (7.73)		
17	Log (Number of Banks)	2.14 (1.73)	2.13 (1.72)		
18	Country-Average ROA	0.21 (0.51)	0.08 (0.51)	0.22 (0.16)	0.27 (0.22)
Number of obs.		4,681	4,681	2,314	2,314
Number of groups (banks)		795	795	382	382
Number of instruments		56	57	180	262
GMM-style instruments		1, L2(2), L(3, 4)	1, L2(2), L(3, 4)	L(1, 3), L2(2)	L(1, 3, 5), L2(2)
IV-style instruments		6-18, year dummies	5-18, year dummies	4, 7-11, 14, 18, year dum.	4, 7-11, 14, 18, year dum.
F (variables; groups - 1)		6.32***	6.83***	25.67***	23.85***
Arellano-Bond test for AR(2) in 1st differences (z; Pr > z)		0.51 0.613	0.50 0.615	1.65 0.101	1.64 0.102

⁺ Standard errors in parentheses. Significance levels: *** 1%, ** 5%; * 10%

Table 8 – Cubic Relationship between Bank Performance and Ownership Concentration, controlled for Laws, Banking Regulations, and Bank specific factors

Dependent variable: Risk-Adjusted ROA (Return over Average Assets). GMM dynamic panel-data regressions⁺ over the period 1997-2007 (Two-step system GMM, orthogonal deviations transform, Windmeijer's standard errors correction). Constant and year dummies omitted. All coefficients and standard errors (in parentheses) are multiplied by 100.

<i>Independent variables</i>		<i>(R1)</i>	<i>(R2)</i>	<i>(R3)</i>	<i>(R4)</i>
<i>Bank Specific</i>					
1	Risk-Adjusted ROA (t-1)	33.73 *** (9.51)	31.40 *** (8.81)	33.87 *** (9.23)	31.40 *** (8.95)
2	Own. Concentration	38.87 *** (11.47)	35.64 ** (16.67)	39.60 *** (13.80)	36.92 ** (17.30)
3	Own. Concentration ^2	-0.87 *** (0.27)	-0.83 ** (0.38)	-0.90 *** (0.33)	-0.84 ** (0.39)
4	Own. Concentration ^3	0.005 *** (0.002)	0.005 ** (0.002)	0.005 *** (0.002)	0.005 ** (0.002)
5	Revenue Growth	0.94 *** (0.33)	0.15 (5.39)	2.93 (4.36)	-0.02 (5.40)
6	Size	43.30 (29.16)	58.06 * (30.41)	52.79 * (30.66)	56.17 * (31.02)
7	Leverage	-7.10 (5.02)	-8.07 ** (3.74)	-7.40 (4.70)	-8.13 ** (3.62)
8	State Owned	-41.60 (45.89)	-63.86 (44.91)	-66.05 (45.95)	-66.51 (47.44)
<i>Country Bank Regulations</i>					
9	Capital			14.66 *** (4.72)	10.32 ** (4.12)
10	Official			2.31 (3.77)	4.39 (5.06)
11	Private Monitoring			-32.59 *** (12.58)	-17.01 ** (8.22)
<i>Other Country Specific</i>					
12	Shareholders Rights				56.04 (67.13)
13	Rule of Law		94.56 *** (25.18)		88.69 *** (25.60)
14	Financial Development		-94.92 *** (32.46)		-91.43 *** (31.25)
15	Log (GDP)		-63.18 *** (20.06)		-53.90 *** (20.83)
16	Log (GDP per capita)		-24.04 (18.43)		-14.82 (17.46)
17	GDP growth		2.06 (2.67)		1.80 (2.63)
18	Bank Concentration		-29.00 (76.69)		-48.74 (75.19)
19	Log (Number of Banks)		60.41 ** (24.51)		50.16 ** (23.45)
20	Country-Average ROA		6.42 * (3.35)		6.30 * (3.30)
Number of obs.		4,681			
Number of groups (banks)		795			
Number of instruments		363	443	438	447
GMM-style instruments		1, L2(2, 3, 4), L(6, 7)	1, L2(2, 3, 4), L(5, 6, 7)	1, L2(2, 3, 4), L(5, 6, 7)	1, L2(2, 3, 4), L(5, 6, 7)
IV-style instruments		5, year dummies	8, 13-20, year dummies	8-11, year dummies	8-20, year dummies
F (variables; groups - 1)		14.96 ***	14.85 ***	14.82 ***	13.07 ***
Arellano-Bond test for AR(2) in 1st differences (z; Pr > z)		0.97 0.332	0.97 0.333	0.95 0.343	0.97 0.332

⁺ Significance levels: *** 1%, ** 5%; * 10%.

Table 9 – Banks with Dispersed Ownership Structures: The Effect of Shareholders Protection Laws, Capital Regulations and Competition on Bank Performance

Dependent variable: Risk-Adjusted ROA (Return over Average Assets). GMM dynamic panel-data regressions⁺ over the period 1997-2007. (Two-step system GMM, orthogonal deviations transform, Windmeijer's standard errors correction). Constant and year dummies omitted. All coefficients and standard errors (in parentheses) are multiplied by 100.

	<i>Independent variables</i>	<i>Shareholders Rights</i>	<i>Capital</i>	<i>Log (Number Banks)</i>
1	Risk-Adjusted ROA (t-1)	47.85 *** (4.26)	50.55 *** (4.03)	48.50 *** (4.45)
	<i>Interaction</i>			
2	Ownership Concentration	19.05 ** (7.77)	-8.72 *** (3.22)	-6.61 * (4.05)
3	Shareholders Rights	1,033 ** (437.16)	97.88 (67.81)	-19.14 (94.18)
4	Capital	1.99 (5.50)	-25.87 * (14.95)	6.85 (5.54)
5	Log (Number of Banks)	52.33 * (28.89)	59.28 *** (17.51)	37.27 (37.96)
6	Own. Concentration * Shareholders Rights	-39.39 ** (16.68)		
7	Own. Concentration * Capital		1.26 *** (0.47)	
8	Own. Concentration * Log (Number of Banks)			1.46 * (0.79)
	<i>Other Bank and Country Specific</i>			
4				
9	Revenue Growth	-19.44 (41.08)	29.73 (22.47)	-11.53 (40.41)
10	Size	35.90 (33.92)	19.70 (19.25)	59.00 * (35.39)
11	Leverage	-0.16 (4.31)	3.22 (3.36)	-0.61 (5.32)
12	State Owned	-71.85 (86.88)	29.09 (70.14)	-74.76 (90.70)
13	Official	-4.47 (6.09)	3.20 (5.09)	-2.73 (6.36)
14	Private Monitoring	-10.24 (11.47)	-9.28 (9.06)	6.24 (10.66)
15	Rule of Law	-13.22 (44.16)	20.81 (33.51)	9.13 (40.14)
16	Financial Development	-57.73 (39.57)	-82.33 *** (29.18)	-108.05 *** (40.69)
17	Log (GDP)	-80.12 *** (27.06)	-61.50 *** (18.99)	-95.47 *** (28.02)
18	Log (GDP per capita)	32.74 (22.89)	16.67 (22.46)	25.10 (21.77)
19	GDP growth	3.55 (2.41)	2.90 (2.10)	2.83 (2.49)
20	Bank Concentration	-83.12 (82.59)	94.40 (75.47)	-86.54 (89.58)
21	Country-Average ROA	15.12 *** (4.48)	8.58 ** (3.62)	8.46 * (4.40)
	Number of obs.	1,844	1,844	1,844
	Number of groups (banks)	353	353	353
	Number of instruments	81	340	82
	GMM-style instruments	L2(1), 4 L(5, 6, 7)	L2(1), 9, L(10, 11, 12)	L2(1), 9, L(10, 11, 12)
	IV-style instruments	2, 3, 8-19, year dummies	2, 4-8, 12-20, year dummies	2, 4-8, 12-20, year dummies
	F (variables; groups - 1)	14.74***	19.64***	14.19***
	Arell.-Bond test for AR(2) in 1st differences (z; Pr > z)	1.28 0.201	1.27 0.203	1.26 0.209

⁺ Significance levels: *** 1%, ** 5%; * 10%.

Table 10 – Robustness Check for Cubic Relationship between Bank Performance and Ownership Concentration.

Dependent variable: Risk-Adjusted ROA (Return over Average Assets). GMM dynamic panel-data regressions⁺ over the period 1997-2007 (Two-step system GMM, orthogonal deviations transform, Windmeijer's standard errors correction). Constant and year dummies omitted. All coefficients and standard errors (in parentheses) are multiplied by 100.

<i>Independent variables</i>		<i>Own. Conc ≤30</i>	<i>30 < Own. Conc < 85</i>	<i>Own. Conc ≥85</i>
<i>Bank Specific</i>				
1	Risk-Adjusted ROA (t-1)	48.73 *** (4.75)	22.96 ** (9.95)	34.58 *** (6.45)
2	Own. Concentration	0.05 (1.15)	-3.62 ** (1.84)	2.78 * (1.91)
3	Revenue Growth	-13.16 (74.45)	7.57 * (4.15)	9.53 (11.46)
4	Size	7.12 (8.10)	56.54 (45.07)	23.43 *** (7.23)
5	Leverage	-2.45 (2.06)	-6.52 (7.24)	-2.12 ** (1.05)
6	State Owned	48.73 *** (4.75)	-86.92 (89.72)	-8.15 (30.72)
<i>Country Bank Regulations</i>				
7	Capital	148.88 (132.66)	4.46 (7.01)	7.20 (5.52)
8	Official	14.55 ** (7.02)	-4.41 (11.10)	11.36 ** (5.01)
9	Private Monitoring	3.72 (6.20)	-15.68 (13.41)	-3.44 (10.55)
<i>Other Country Specific</i>				
10	Shareholders Rights	73.43 (78.77)	-39.30 (125.21)	107.69 (78.06)
11	Rule of Law	40.78 (46.65)	100.33 * (52.44)	75.00 ** (31.24)
12	Financial Development	-75.96 *** (28.27)	-61.20 (72.44)	-10.76 (50.94)
13	Log (GDP)	-31.71 (23.18)	-84.24 ** (33.67)	-19.25 (18.54)
14	Log (GDP per capita)	11.54 (29.87)	-37.29 (35.87)	-13.22 (18.31)
15	GDP growth	4.54 (4.05)	1.03 (4.13)	3.57 (3.62)
16	Bank Concentration	-1.38 (130.24)	18.62 (86.55)	-121.19 (80.05)
17	Log (Number of Banks)	16.16 (15.83)	80.47 ** (37.58)	14.46 (14.63)
18	Country-Average ROA	21.35 ** (9.94)	1.67 (4.47)	6.43 (4.20)
Number of obs.		1,167	1,540	1,553
Number of groups (banks)		231	305	301
Number of instruments		156	287	197
GMM-style instruments		1, L2(2), L(3)	1, L2(2), L(4, 5)	1, L2(2), L(3)
IV-style instruments		4-18, year dummies	3, 6-18, year dummies	4-18, year dummies
F (variables; groups - 1)		25.65***	7.13***	8.72***
Arellano-Bond test for AR(2) in 1st differences (z; Pr > z)		0.99 0.323	0.68 0.497	1.12 0.261

⁺ Significance levels: *** 1%, ** 5%; * 10%.

Figure 1 – U-Shaped Relationship between Bank Risk and Ownership Concentration

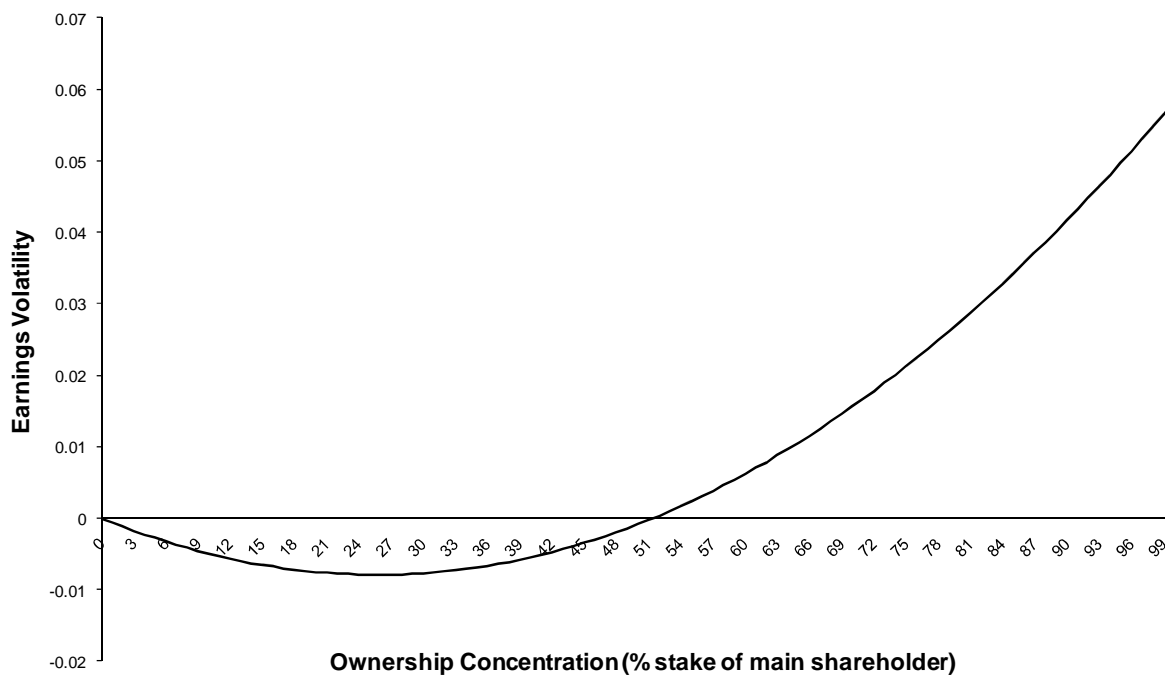


Figure 2 – Cubic Relationship between Bank Performance and Ownership Concentration

