BANKS' OWNERSHIP STRUCTURE, RISK AND PERFORMANCE

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 423 banks around 39 countries, for the period from 2000 to 2006. Our analyses show that ownership concentration is more important to explain performance than risk taking. Our main finding is the first empirical evidence 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 loss of 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 dispersed ownership structure when legal protection of shareholders is low.

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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) 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 as 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 423 banks from 39 different countries for the period from 2000 to 2006. This databa 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 banking regulations on risk and performance of banks.

Concerning bank risk taking, we find evidence of a positive linear effect of ownership concentration on risk only for small banks. Unlike Laeven and Levine (2006), we did not find the same evidence for large banks. However, our results point that ownership concentration is more important to explain performance than risk. We find a first ever evidence in the literature of a cubic relationship between ownership concentration and bank performance. 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.

Regarding shareholders' protection laws, 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 banking regulations, our main finding is that ownership concentration is more important to increase the performance of banks with concentrated ownership structures when the supervisory authority is less independent from the government and the banking system.

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 respect 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 less risk. Therefore, a firm controlled or actively monitored by shareholders is expected to take more risk than a firm where personal managers' 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 banking 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 with concentrated ownership, 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. This can be translated in terms of less risk taking by managers if concentration of ownership is high. In addition, investor protection laws and banking regulations can also play a role in 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 behaviour[1], 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.

However, looking only at risk taking behaviour does not convey a clear picture in terms of bank efficiency. Therefore, 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 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. In other words, too much monitoring reduces managers' initiative to seek firm-specific investments, which is detrimental to firm value. 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).

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[1] Saunders *et al.* (1990); Anderson and Fraser (2000), Brewer and Saidenberg (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).

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. This makes it possible a cubic relationship between ownership concentration and performance, up to now unsupported by any empirical evidence, according to Miguel *et al.* (2004). 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. Third, the emergence of bank regulations aimed to reduce expropriation by insiders (Caprio and Levine, 2002) should enhance bank performance and valuations. Fourth, the presence of deposit insurance aimed to protect depositors through the reduction of excessive risk taking by banks may cause inefficiencies in terms of performance and valuation.

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 banking 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 39 countries out of the 49 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. Thus, the decision to include a heterogeneous set of banks is motivated by the fact that maybe small and not publicly listed banks are the ones which most need investor protection laws and regulations. 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. Third, 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 1997 to 2006. 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 in 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 2000 to 2006. 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 3.1), we excluded banks for which the ownership concentration variable has null variance and banks with less than 3 years of observations. A final panel of 423 banks with 1,537 bank-year observations around 39 countries[2] was then obtained for use in our regressions.

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[2] Colombia, Ecuador, Finland, Hong Kong, Indonesia, Norway, Pakistan, Uruguay and Zimbabwe ended up with no observations.

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. Using data from 1997 to 2006 resulted in earnings volatility computed for a 7-year period from 2000 to 2006. Source: calculations on data from *Bankscope*.

Z-Score: it is a ratio where the numerator is the sum of return over average assets before taxes and the capital to asset ratio, while the denominator is the standard deviation of return over average assets computed over a moving window of 4 years (e. g., see more of Z-Score in Boyd *et al.*, 1993). 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. Independent variables

3.2.1. Bank specific

Ownership Concentration: we use 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 *Bankscope* 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. Source: *Bankscope*.

Revenue Growth: bank's average growth in total revenues respect to the previous year. Source: calculations on data from *Bankscope*.

Size: log of bank's annual total assets in thousands of US dollars. Source: *Bankscope*.

Leverage: a bank's ratio of total debt to total assets. Source: *Bankscope*.

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). Source. *Bankscope*.

3.2.2. Country specific

<u>Shareholders Rights</u>: it is the measure of shareholders' legal protection of the country, represented by the anti-director rights index of Djankov *et al*. (2005), which is a revised version of the same index of La Porta *et al.* (1998). It is assumed constant all over the period from 1997 to 2006.

<u>Capital</u>: a measure of a country's regulatory restrictions on bank capital, represented by the index created by Barth *et al*. (2006). Higher values indicate greater stringency. Using data collected by those authors for years 1998 and 2003, the index is constructed for two periods: the first from 1997 to 2000 and the second from 2001 to 2006.

<u>Official</u>: the index of official supervisory power, created by Barth *et al*. (2006). This index is also constructed for the periods 1997-2000 and 2001-2006, using data collected by those authors.

<u>Independence</u>: the degree to which the country's supervisory authority is independent from the government and legally protected from the banking system. Source: Barth *et al*. (2006).

<u>Deposit Insurance</u>: a dummy variable indicating if the country has explicit deposit insurance or not (yes = 1, no = 0). Source: Demirguç-Kunt *et al*. (2005).

<u>Restrict</u>: index of a country's regulatory restrictions on banks ability to engage in securities market activities, the insurance business, conduct real estate activities, or own non-financial firms. It is argued to be a mechanism that limits the ability of insiders to expropriate bank resources (Boyd *et a.l*, 1998). Source: Barth *et al*. (2004)

<u>Diversification</u>: dummy for diversification guidelines imposed on banks. It takes a value of one if there are explicit, verifiable, quantifiable guidelines regarding asset diversification for banks, and zero otherwise. Source: Barth *et al*. (2004).

<u>GDP</u>: measure of a country's economic development, represented by the log of annual gross domestic product per capita (in terms of US dollars). Source: IMF.

<u>GDP Growth</u>: measure of a country's overall level of economic activity, expressed by the annual percentage growth in the gross domestic product. Source: IMF.

<u>Herfindahl-Hirschman Index</u>: measure of concentration of a country's bank industry, computed for each year of the period, as the sum of the squared market shares of banks, in terms of percentage of total assets. This variable is included to take into account the role of competition as a substitute for corporate governance mechanisms, for corporate efficiency (Allen and Gale, 2000b; Nickell *et al*., 1997). Source: calculations on data from *Bankscope*.

Country-Average ROA: return on assets averaged across all banks in the country. Source: calculations on data from *Bankscope*.

Table 1 reports the descriptive statistics of the variables in the selected panel (1,537 observations, 423 banks). Table 2 shows mean values of bank-level variables by country, whereas Table 3 shows means of country-specific variables. Table 4 contains the matrix of correlations between all variables, except Deposit Insurance.

Insert Tables 1, 2, 3 and 4 about here

3.3 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 characteristic of the database available, which consists of observations of bank accounting and ownership variables distributed along a period of 10 years (from 1997 to 2006). As described in the previous section, an unbalanced panel composed of 1,537 bank-year observations, comprising 423 banks, along 7 years (from 2000 to 2006) 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. Nevertheless, we excluded from our sample the banks for which Ownership Concentration has no variability.

The main justification for the use of panel data analyses in this study is that, by introducing the time dimension, panel data techniques are 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 and size. 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 are (almost) time-invariant. 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 produce coefficients less biased and lower standard errors. To avoid problems of low precision of estimated coefficients when the number of periods is small (2 or 3) we excluded from our sample banks with less than 2 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 (namely, the GMM instruments set) to the transformed equation. Eventually, Revenue Growth, Leverage and Size (bank specific variables), which are 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

According to the risk shifting hypothesis, a bank controlled or effectively monitored by shareholders is expected to take more risk than a bank without these characteristics. Therefore, we expect risk increases with the level of shareholdings of the ultimate owner. Also, theory tells that the monitoring effort exerted by the large shareholder increases as his shareholdings increases. Therefore, a firm controlled or effectively monitored by shareholders should take more risk than a firm where private interests of managers prevail. However, at the same time, managerial incentives to exert effort decreases as monitoring increases, because managers have less discretion to act (Burkart *et al*, 1997). In other words, too monitoring may lead to less discretion of managers, and as consequence, to less risk taking. Also, if shareholder participates in the management, his appetite for risk taking is likely to decrease, as managers' interests prevail over shareholders' ones. We do not have information if the largest shareholder is actively involved in management, but it is reasonable to expect that the degree of involvement increases with the level of shareholdings. Altogether, theoretical predictions regarding the effect of ownership concentration on bank risk taking neither are in the same direction, nor are for specific ranges of ownership concentration, which suggests that non-linear relationships are possible. Hence, our analysis starts by examining a linear relationship between ownership concentration and risk by running a regression of Earnings Volatility on Ownership Concentration, controlling by legal, bank regulations, and other bank and country specific variables. Regression results in column *R1* including only some bank and country specific independent variables do not provide evidence of ownership concentration linearly affecting bank risk. As shown in column *R2,* the inclusion of Leverage and State Owned variables does not change this result. Finally, the regression in column 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 do not support neither quadratic nor cubic relationships between ownership concentration and risk.

Insert Table 5 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. Columns *R1* and *R2* of Table 6 present the results of regressions considering respectively banks in countries with high shareholders rights (anti-director rights index greater than 3), and low shareholders rights (equal or lower than 3). In both cases, no evidence is found on the importance of ownership concentration to explain bank risk taking. In the case of countries with high shareholders protection, such evidence supports the theoretical argument that effective legal protection of shareholders work as a substitute for the existence of a large shareholder that monitors management, increasing bank risk taking. The case of countries with poor shareholders legal protection is interesting: although evidence found does not support a role of ownership concentration that would substitute for poor protection of shareholders, bank regulations do play a role in shaping risk taking, as coefficients for Capital, Official, Independence and Deposit Insurance variables are significant (column *R2* of Table 6). It suggests that bank regulations may substitute for shareholders protection laws as corporate governance mechanisms acting on those banks.

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 encourage bank risk taking depends on the presence of additional governance mechanisms to which often only large and publicly listed firms are subject. Columns *R3* and *R4* of Table 5 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 (54). Results are robust if only the 30 or 20 largest banks are included. Evidence for this subset is that ownership concentration does not help to explain

bank risk, which is not an unexpected result, 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 our expectations, result in column *R4* 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. It is an expected result for listed banks, for which risk taking may be influenced by alternative governance mechanisms, rather than relying on a concentrated ownership structure. On the contrary, we expected a role for ownership concentration for unlisted banks, which was not confirmed.

Insert Table 6 about here

4.1.4. The role of shareholders protection laws

Regression *R3* of Table 5 does not report a role for shareholders rights in explaining bank risk. When analyzing sub-samples regressions of Table 6, again there is no evidence for shareholders rights influencing bank risk for the large, small, and listed banks sub-samples. These are not unreasonable results, as each subset of banks may be exposed to alternative governance mechanisms. In fact, evidence points to a role of bank regulations for large banks' risk, and a positive effect of competition (Herfindahl-Hirschman Index's coefficient is negative and significant) on the risk of listed banks. Instead, what matters for small banks' risk are bank-specific ownership concentration and some bank regulations. Results for the unlisted banks sub-sample report a negative effect of shareholders protection laws on risk. We do not attempt to interpret this result, as the focus of La Porta *et al*, (1998) and Djankov *et al*. (2005), who defined the anti-director rights index, is on publicly traded firms. We also run regressions (not reported) considering the interaction between ownership concentration and shareholders rights, but no significance was achieved. Finally, we find weak evidence that increasing shareholders rights increases stability (Z-Score) of large banks, according to regression *R4*, in Table 7, which seems reasonable.

4.1.5. The role of bank regulations

Regression *R3* of Table 5 reports significant coefficients for some bank regulations in explaining risk. As a first result, we notice that capital regulatory restrictions increase bank risk taking, as the Capital variable entered positive and significantly in all regressions of Tables 5 and 6. Additional evidence on Capital is given by regression *R1* of Table 7, in which Capital is significant to reduce banks' stability (Z-Score). Such evidence does not support Basel II's policy recommendation on the stringency of capital requirements to reduce bank risk taking and strengthen financial stability. Variable Restrict (restrictions on activities of banks) also has a positive impact on risk, according to regression *R3* in Table 5. There is also a weak evidence of the same effect for small banks (regression *R4* in Table 6). This result suggests that increased risk taking is an additional effect of trying to avoid expropriation of bank resources by insiders, probably because managers have fewer opportunities to diversify banks' risk. Next, we find that increasing Official supervisory power reduces bank risk taking (regression *R3* of Table 5). Specifically, there is also evidence that this regulation reduces risk of banks in countries with low protection of shareholders, large banks and listed banks (regressions *R2*, *R3* and *R5* of Table 6). However, we cannot conclude that the regulator achieved its purposes, as there is no evidence that Official supervisory power enhances bank stability, according to regressions of Table 7. Finally, there is evidence that the higher the degree of Independence of the supervisory authority, the higher is bank risk taking (regression *R3* of Table 5). More specifically, it is also true for banks in countries with low protection of minority shareholders, and for large banks. However, there is no evidence of the influence of Independence variable on bank stability, as seen in Table 7. Still, if what is going on is an alignment of shareholders' and managers' interests, greater independence of the supervisor (from the government and the banking system) seems a desirable regulation. However, caution is recommended when using the independence index, as pointed by Barth *et al*. (2006), who suggest using it simultaneously with information on national political institutions.

4.1.6. Other controls

We find (weak) evidence that increasing competition favours bank risk taking, as the coefficient for the concentration of a country bank industry (Herfindahl-Hirschman Index) is negative and significant (regression *R3* of Table 5). Such evidence is also true for publicly listed banks (regression *R5* in Table 6). It supports the idea of substitutability between

competition and corporate governance, as for this subset of banks neither ownership concentration nor many regulations influence risk taking.

Next, a negative relationship between Leverage and risk is reported (regression *R3* of Table 5), which in principle sounds unexpected. However, the explanation may be the existence of endogeneity between Size, Leverage and Earnings Volatility. Looking at Table 4, we see a high negative correlation between Size and Earnings Volatility, which intuitively makes sense. Therefore, through the high positive correlation between Size and Leverage, the reported negative relationship between Leverage and risk also makes sense. In other words, if a bank is high levered, it is likely the case that it is also a large bank, which in turn is likely to experience less risk taking due to greater stability and diversification of portfolios and activities, respect to small banks.

As expected, higher degrees of economic development, measured by the logarithm of a country's GDP per capita, reduce bank risk taking. Finally, the State Owned variable is not significant, which means that a bank in which the government is the main shareholder does not differ from other banks with respect to their risk taking behaviour.

4.1.7. 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, the result is not changed, as shown in column *R2*. 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 very correlated with ownership concentration) and Z-Score. For such, we restricted the sample to the largest banks in each country (banks ranked bellow the median of country's ranking of bank total assets). Results in regression *R3* of Table 6 show a negative but not significant coefficient for ownership concentration. Again, including Leverage does not change the result (regression *R4*). These last results are robust if we consider only the 20 or the 30 largest banks in each country. Such finding contrasts with those of Laeven and Levine (2006).

Concerning the influence of shareholders protection laws and bank regulations on Z-Score, these are commented in sub-sections 4.1.4 and 4.1.5.

Insert Table 7 about here

4.2. Performance

4.2.1. The role of ownership concentration

We believe that conclusions and recommendations about efficiency of firms are enriched if we do not rely only on their risk taking behaviour. This is so because it is not clear if 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.

According to our theoretical review, there are arguments that support a cubic relationship between performance and ownership concentration. We attempt to conciliate those theoretical predictions, by proposing the following hypothesis to be tested on our sample:

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.

Results in Table 7 show the evidence that support the cubic hypothesis for the relationship between ownership concentration and bank performance. Significance of linear, quadratic and cubic coefficients is attained at the 5% level for different sets of regressors. This is the main finding of this paper, and to our knowledge it is the first evidence of such a relationship in the literature. For the estimation including all regressors (column *R4* of Table 8), the correspondent roots of the equation relating bank performance to ownership concentration support a positive effect of ownership concentration (probably due to effective monitoring by the main shareholder) on performance, when the largest shareholder's stake increases until 29.8% (e. g., Burkart *et al.,* 1997). For values of concentration of ownership from 29.8% to

82.2%, 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 82.2% 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 1 shows the cubic form obtained for the relationship between performance and ownership concentration.

Insert Table 8 about here

Insert Figure 1 about here

4.2.2. Interactions

It is argued in section 2 that the importance of agency problems is likely to differ respect to firms' ownership concentration structures. On the one hand, conflicts of interests between shareholders and managers are more important in dispersed ownership structure, respect to concentrated ownership structure. 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 lower than 50%), while the second includes banks with concentrated ownership structure (main owner's stake greater than 50%).

4.2.2.1. The role of shareholders protection laws

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 enters negative and significant (regressions *R1* and *R2* 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 good 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. When considering banks with concentrated ownership structures, we did not find any evidence for the role of shareholders rights (regressions *R3* and *R4* of Table 9).

Insert Table 9 about here

4.2.2.2. The role of bank regulations

Regressions *R3* and *R4* in Table 8 report a role for some bank regulations in explaining bank performance. First, banks in countries with explicit deposit insurance experience better performance. Caprio *et al.* (2007) argue that generous deposit insurance would be beneficial to bank valuations in banks where a controlling owner has high cash-flow rights, but find no such evidence on their data. Our results, however, support their argument, as for banks with concentrated ownership structures (main owner's stake greater than 50%), the existence of deposit insurance improves performance (regressions *R1* to *R4* of Table 10). Second, the independence of the supervisor also improves bank performance, as seen in regressions *R3* and *R4* of Table 8. Additional evidence is that Independence interacts with ownership concentration to influence the performance of banks with concentrated ownership structure. According to regression *R3* of Table 10, ownership concentration is more important to increase performance of (concentrated ownership) banks in countries with less independent

supervisors. Or, increasing ownership concentration is less important to improve performance of (concentrated ownership) banks when these are subject to a more independent supervisor. Finally, weak evidence is reported for the influence of Official and Restrict variables on bank performance. An increase in the official supervisory power reduces bank performance, whereas increasing the restrictions on banks' activities improve bank performance. Together with the evidence for Independence, Official and Restrict variables on bank risk (*R3*, Table 5), we conclude that risk taking driven by these regulations goes in the same direction as performance. It is not an obvious result, as correlation between risk (Earnings Volatility) and Performance (Risk-Adjusted ROA) is highly negative (Table 4). The message left for policy makers is that more independent and less powerful bank supervisors enhance bank performance. Regressions on the sub-sample of banks with dispersed ownership structures (unreported) did not produce any additional evidence for the interaction between ownership concentration and regulations. Also, results reported no role for competition of banking industry on performance.

Insert Table 10 about here
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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-specific characteristics. We derive our results performing dynamic panel data estimations on a database composed of 1,537 bank-year observations for 423 banks around 39 countries in the period 2000-2006. Our analysis departs from studying the effect of ownership concentration on bank risk (measured by earnings volatility), and concludes that small banks' risk increases with ownership concentration (measured by the largest shareholder's stake). Contrasting with previous evidence of Laeven and Levine (2006), the result does not hold for large banks. Our analysis do not provide any evidence of non-linear relationships between ownership concentration and bank risk. In addition, we report evidence of substitutability between different firm-level and broad corporate governance mechanisms, and competition, when influencing bank risk taking. Specifically, we first find that bank regulations are relevant to explain the risk of banks in countries with poor legal protection of shareholders. Second, bank regulations influence the risk of large banks more than the risk of small banks, which rely on ownership concentration to influence risk taking. Third, the risk of publicly listed banks increases with competition, which is not verified for unlisted banks.

In order to get a better picture in terms of bank efficiency, we then analyzed the relationship between bank ownership structure and performance (measured by the risk adjusted return on assets). Borrowing from the literature on non-financial firms (Morck *et al.* 1988) we proposed 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 shareholders and minority ones. This generates expropriation of controlling shareholders at the expense of minority shareholders (we can define it as agency problem two, APT). The role of corporate governance mechanisms, like ownership structure, is to mitigate both agency costs (Shleiffer and Vishny, 1997). In particular, when ownership concentration is low, 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 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, blockholders have a stake high enough to internalize a very significant proportion of the expropriation costs. In that case, the incentives to expropriate decrease. 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 is reflected in decreasing performance.

The results confirm our arguments and we find the first evidence in the literature 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 82%. This is remarkable given that for a significant proportion of banks (around 30%), 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 well have perverse effect on the overall financial system. To investigate these issues in a deeper level should be the subject of some future research.

Additional findings are, first, 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 an evidence similar to that obtained by Caprio *et al.* (2007). Second, that ownership concentration is more important to increase the performance of banks with concentrated ownership structures when the supervisory authority is less independent from the government and the banking system.

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 subject, when compared with non-financial firms.

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TABLES AND FIGURES

Table 1 – Descriptive Statistics
(Panel with 1,537 observations of 423 banks around 39 countries, for the 2000-2006 period)

Variable	Mean	Std. Deviation	Minimum	Maximum	Percentile 10%	Percentile 25%	Median	Percentile 75%	Percentile 90%
Earnings Volatility (x10²)	0.80	1.36	0.01	14.68	0.10	0.19	0.43	0.82	1.66
Z-Score	35.85	47.29	-1.23	709.65	5.56	10.99	22.20	43.78	76.12
Risk-Adjusted ROA	3.25	3.55	-7.76	22.40	0.07	0.80	2.60	4.55	7.61
Own. Concentration (%)	57.52	38.39	0.01	100.00	4.79	10.36	59.80	99.99	100.00
Revenue Growth	0.31	0.72	-1.32	3.98	-0.35	-0.14	0.13	0.56	1.23
Size	14.70	2.09	9.66	20.99	12.09	13.02	14.60	16.33	17.49
Leverage	0.89	0.09	0.33	0.98	0.77	0.88	0.93	0.95	0.96
State Owned	0.12	0.32	0.00	1.00	0.00	0.00	0.00	0.00	1.00
Capital	4.82	1.66	1.00	9.00	3.00	4.00	5.00	6.00	7.00
Official	10.68	2.52	6.00	15.50	7.00	8.00	11.00	13.00	14.00
Independence	1.44	0.93	0.00	3.00	0.00	1.00	1.00	2.00	3.00
Deposit Insurance	0.92	0.28	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Restrict	8.49	2.87	5.00	13.00	5.00	5.00	8.75	10.00	13.00
Diversification	0.50	0.50	0.00	1.00	0.00	0.00	1.00	1.00	1.00
Shareholders Rights	3.41	0.94	0.00	5.00	2.50	3.00	3.00	4.00	5.00
Log (GDP per capita)	9.54	1.36	5.83	10.87	7.15	8.47	10.28	10.48	10.71
GDP growth	2.78	2.62	-10.90	18.30	0.10	1.10	2.20	4.20	6.44
Herfindahl-Hirschman Index	1045	961	156	10000	259	404	665	1367	2247
Country-Average ROA	1.41	1.64	-12.32	21.32	-0.01	0.59	1.18	2.39	2.96

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

	Country	Obs	Banks	Earnings Volatility (10^2)	Risk-Adjusted ROA	Z-Score	Own. Conc. (%)	Revenue Growth	Size	Leverage	State Owned
1	ARGENTINA	41	11	4.31	5.93	0.11	67.22	- 0.04	13.40	0.83	0.00
2	AUSTRALIA	19	6	0.34	36.28	5.64	9.22	0.83	17.49	0.93	0.16
3	AUSTRIA	39	10	0.57	35.37	3.00	73.49	0.44	12.94	0.89	0.29
4	BELGIUM	34	9	0.51	22.07	3.28	86.39	0.22	14.72	0.93	0.16
5	BRAZIL	57	16	2.04	14.77	2.19	73.11	0.04	14.59	0.86	0.09
6	CANADA	8	2	0.35	29.69	1.09	75.96	0.35	12.25	0.92	0.00
7	CHILE	26	7	0.29	48.58	7.68	68.68	0.26	15.36	0.91	0.00
8	DENMARK	73	19	0.78	30.13	4.02	40.57	0.63	14.21	0.89	0.00
9	EGYPT	45	12	0.70	29.60	2.38	52.45	0.18	13.86	0.90	0.30
10	FRANCE	115	32	0.48	54.61	4.27	75.84	0.38	14.93	0.90	0.04
11	GERMANY	156	41	0.55	51.19	2.40	68.91	0.23	13.45	0.91	0.19
12	GREECE	7	2	0.46	20.78	2.12	43.90	1.23	16.55	0.93	0.00
13	INDIA	87	22	0.74	18.16	3.94	64.91	0.70	15.42	0.95	0.54
14	IRELAND	22	7	0.16	33.95	3.27	80.69	0.29	15.42	0.95	0.00
15	ISRAEL	21	6	0.27	16.24	1.30	53.07	0.10	16.51	0.94	0.76
16	ITALY	60	18	0.42	31.42	3.84	50.96	0.32	15.80	0.92	0.00
17	JAPAN	174	50	0.23	38.17	2.56	9.49	0.05	17.13	0.95	0.02
18	JORDAN	7	2	0.33	49.38	5.52	20.38	0.06	15.70	0.90	0.00
19	KENYA	13	4	0.97	52.93	4.36	43.23	0.30	11.39	0.87	0.00
20	KOREA	34	9	0.56	14.15	2.11	49.29	0.79	17.30	0.95	0.24
21	MALAYSIA	45	10	0.74	28.40	3.52	72.57	0.38	15.21	0.87	0.00
22	MEXICO	6	2	5.14	16.32	1.94	92.78	0.28	13.67	0.78	0.00
23	NETHERLANDS	7	2	0.35	38.37	3.74	68.69	0.28	14.52	0.91	0.00
24	NIGERIA	4	1	0.68	33.68	5.61	41.30	- 0.33	12.52	0.81	0.00
25	PERU	23	6	1.09	21.65	2.68	70.10	0.32	13.42	0.86	0.00
26	PHILIPPINES	20	6	0.68	48.74	3.62	47.17	0.30	13.04	0.83	0.00
27	PORTUGAL	13	4	0.32	28.63	2.54	44.03	0.42	16.44	0.93	0.00
28	SINGAPORE	10	3	0.30	53.36	4.40	67.67	0.19	17.00	0.90	0.00
29	SOUTH AFRICA	8	2	2.10	4.76	0.49	96.87	0.33	11.50	0.90	0.00
30	SPAIN	25	7	0.39	34.25	5.27	82.81	0.32	14.40	0.89	0.00
31	SRI LANKA	14	4	0.61	19.05	3.21	9.38	0.30	13.16	0.94	0.00
32	SWEDEN	4	1	0.15	31.59	3.08	41.90	- 0.07	18.59	0.97	0.00
33	SWITZERLAND	176	48	1.06	58.31	4.58	71.93	0.23	13.23	0.80	0.14
34	TAIWAN	27	8	0.33	9.94	- 0.36	28.00	0.29	16.13	0.95	0.19
35	THAILAND	31	8	0.80	16.70	2.04	52.87	0.63	15.77	0.91	0.26
36	TURKEY	19	6	2.99	8.48	1.64	58.13	0.96	15.87	0.82	0.00
37	UK	39	11	0.37	41.62	2.47	86.68	0.23	13.69	0.82	0.21
38	USA	25	8	0.39	44.87	6.20	51.30	0.13	14.12	0.91	0.12
39	VENEZUELA	3	1	2.12	11.27	3.20	65.97	- 0.10	15.24	0.88	0.00
	Whole Sample	1537	423	0.80	35.70	3.24	56.76	0.31	14.77	0.89	0.13

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

	Country	Capital	Official	Independence	Deposit Insurance	Restrict	Diversification	Sh Rights	Log (GDP per capita)	GDP growth	HH Index	Country ROA
1	ARGENTINA	4.0	8.0	1.0	1.0	8.75	1.0	3.0	8.36	4.87	731	- 1.10
2	AUSTRALIA	6.0	10.5	3.0	0.0	8.00	0.0	4.0	10.23	3.27	1,430	1.62
3	AUSTRIA	6.0	13.0	2.0	1.0	5.00	1.0	2.5	10.39	1.72	666	0.90
4	BELGIUM	4.0	10.0	2.0	1.0	9.00	1.0	2.0	10.30	1.63	2,246	1.36
5	BRAZIL	7.0	13.0	1.0	1.0	10.00	0.0	5.0	8.17	3.02	744	3.44
6	CANADA	4.0	11.0	2.0	1.0	7.00	1.0	4.0	10.25	2.73	2,381	1.48
7	CHILE	4.0	11.0	0.0	1.0	11.00	0.0	4.0	8.68	4.36	1,236	0.97
8	DENMARK	9.0	9.0	0.0	1.0	8.00	0.0	4.0	10.62	1.54	1,380	2.49
9	EGYPT	3.0	14.0	3.0	0.0	13.00	1.0	2.0	7.16	3.97	1,192	0.81
10	FRANCE	3.0	7.0	1.0	1.0	6.00	1.0	3.0	10.27	1.41	616	0.95
11	GERMANY	5.0	8.0	1.0	1.0	5.00	0.0	2.5	10.28	0.72	319	0.67
12	GREECE	4.0	12.0	2.0	1.0	9.00	0.0	2.0	10.04	4.25	1,891	0.61
13	INDIA	6.0	10.0	2.0	1.0	10.00	0.0	5.0	6.41	7.42	523	1.58
14	IRELAND	5.0	11.0	3.0	1.0	8.00	0.0	4.0	10.55	5.11	852	1.03
15	ISRAEL	4.0	7.0	1.0	0.0	13.00	0.0	4.0	9.81	1.78	2,577	0.44
16	ITALY	4.0	7.0	0.0	1.0	10.00	0.0	2.5	10.19	0.65	302	0.98
17	JAPAN	4.0	12.0	1.0	1.0	13.00	1.0	3.5	10.44	1.93	384	0.12
18	JORDAN	6.0	14.0	3.0	1.0	11.00	1.0	1.0	7.63	6.11	8,178	1.49
19	KENYA	7.0	13.5	2.0	1.0	10.00	0.0	4.0	6.22	3.35	1,054	1.97
20	KOREA	3.0	12.0	1.0	1.0	9.00	0.0	3.5	9.54	4.63	871	2.20
21	MALAYSIA	1.0	11.0	2.0	1.0	10.00	1.0	5.0	8.41	5.00	603	2.15
22	MEXICO	5.0	8.0	0.0	1.0	12.00	0.0	3.0	8.77	2.13	1,368	2.04
23	NETHERLANDS	4.0	6.0	2.0	1.0	6.00	0.0	3.0	10.43	1.07	1,914	1.89
24	NIGERIA	6.0	13.0	3.0	1.0	9.00	0.0	4.0	6.15	6.35	683	3.52
25	PERU	5.0	12.0	2.0	1.0	8.00	1.0	3.5	7.83	5.02	2,361	1.65
26	PHILIPPINES	4.0	11.0	1.0	1.0	7.00	1.0	3.0	6.95	5.24	811	1.24
27	PORTUGAL	4.0	14.0	3.0	1.0	9.00	1.0	2.5	9.61	0.47	1,831	0.98
28	SINGAPORE	7.0	13.0	1.0	0.0	8.00	0.0	5.0	10.03	4.14	2,808	2.27
29	SOUTH AFRICA	7.0	6.0	2.0	0.0	8.00	1.0	5.0	8.21	4.11	2,309	11.50
30	SPAIN	7.0	9.0	1.0	1.0	7.00	1.0	5.0	9.90	3.30	820	0.72
31	SRI LANKA	5.0	7.0	1.0	1.0	7.00	0.0	4.0	6.91	5.47	1,568	0.34
32	SWEDEN	3.0	8.0	2.0	1.0	9.00	0.0	3.5	10.45	2.68	1,228	1.91
33	SWITZERLAND	6.0	14.0	3.0	1.0	5.00	1.0	3.0	10.71	1.21	2,437	2.42
34	TAIWAN	6.0	14.0	1.0	0.0	12.00	0.0	3.0	9.53	4.28	473	1.41
35	THAILAND	2.0	9.0	0.0	1.0	9.00	0.0	4.0	7.76	5.35	917	2.13
36	TURKEY	3.0	15.5	1.0	1.0	12.00	0.0	2.0	8.28	7.37	1,256	3.25
37	UK	5.0	11.0	1.0	1.0	5.00	0.0	5.0	10.35	2.50	350	1.06
38	USA	4.0	13.0	2.0	1.0	12.00	0.0	3.0	10.58	2.90	212	2.32
39	VENEZUELA	3.0	11.0	1.0	1.0	10.00	1.0	0.0	8.36	6.93	857	6.03
	Whole Sample	4.82	10.63	1.4	0.9	8.59	0.5	3.4	9.50	2.79	1,023	1.40

Table 4 – Correlation Matrix
(Panel with 1,537 observations of 423 banks around 39 countries, for the 2000-2006 period)

	Earn. Volat.	Z-Score	Risk-Ad Roa	Own. Conc.	Reven. Growth	Size	Lever.	Shar. Rights	Capital	Official	Indep..	Restrict	Diversif	GDP / capita	HH Index	GDP Growth
Earnings Volatility	1															
Z-Score	-0.21*	1														
Risk-Adjusted ROA	-0.25*	0.52*	1													
Own. Concentration	0.15*	-0.04	-0.04	1												
Revenue Growth	-0.08*	-0.02	0.13*	0.02	1											
Size	-0.30*	-0.08*	0.04	-0.29*	0.08*	1										
Leverage	-0.41*	-0.08*	0.02	-0.20*	0.06*	0.53*	1									
Shareholder Rights	0.00	-0.07*	0.04	-0.12*	-0.01	0.22*	0.09*	1								
Capital	0.05*	0.01	0.07*	0.02	0.03	-0.24*	-0.10*	-0.07*	1							
Official	0.02	0.02	0.03	-0.11*	-0.03	-0.01	-0.16*	0.12*	0.15*	1						
Independence	0.01	0.08*	0.09*	0.13*	-0.01	-0.22*	-0.17*	0.03	0.05	0.58*	1					
Restrict	-0.02	-0.16*	-0.08*	-0.38*	-0.05*	0.49*	0.28*	0.39*	-0.27*	0.22*	-0.20*	1				
Diversification	0.03	0.09*	0.01	-0.01	-0.11*	-0.05	-0.14*	0.07*	-0.29*	0.28*	0.41*	-0.01	1			
GDP per capita	-0.18*	0.18*	0.06*	-0.04	-0.03	0.03	-0.05*	-0.30*	0.10*	-0.05	-0.06*	-0.33*	0.19*	1		
HH Index	0.19*	-0.14*	0.02	-0.03	0.15*	0.11*	0.05*	0.39*	-0.09*	0.12*	0.07*	0.28*	-0.14*	-0.58*	1	
GDP Growth	0.05	0.06*	0.12*	0.05*	0.06*	-0.15*	-0.20*	-0.22*	0.24*	0.33*	0.47*	-0.17*	0.25*	0.06*	0.05	1
Country-Av. ROA	0.10*	-0.02	0.09*	0.11*	0.12*	-0.13*	-0.12*	-0.04	0.25*	0.18*	0.16*	-0.11*	-0.11*	-0.07*	0.28*	0.27*

* 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 2000-2006. (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.

	Independent variables	(R1)	(R2)	(R3)	(R4)	(R5)
	Bank Specific					
1	Earnings Volatility (t-1)	87.639 ***	80.211 ***	76.754 ***	63.266 ***	71.650 ***
		(10.115)	(10.449)	(9.170)	(12.422)	(10.967)
2	Ownership Concentration	0.000	0.000	0.001	-0.003	-0.016
		(0.001)	(0.001)	(0.001)	(0.006)	(0.014)
3	Ownership Concentration^2				0.000	0.000
					(0.000)	(0.000)
4	Ownership Concentration^3					0.000
						(0.000)
5	Revenue Growth	0.000	0.000	0.000	0.000	0.000
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
6	Size	0.001	0.041	0.073	0.079 **	-0.005
		(0.016)	(0.026)	(0.051)	(0.038)	(0.012)
7	Leverage		-3.373 *	-5.431 **	-6.968 ***	-1.250
			(1.884)	(2.660)	(2.495)	(0.844)
8	State Owned		-0.006	-0.056	-0.081	-0.031
			(0.048)	(0.072)	(0.127)	(0.065)
	Country Bank Regulations					
9	Capital			0.062 **	0.059 ***	0.031 **
				(0.024)	(0.022)	(0.014)
10	Official			-0.046 *	-0.058 ***	-0.016
				(0.027)	(0.022)	(0.010)
11	Independence			0.069 *	0.075	0.021
				(0.042)	(0.046)	(0.027)
12	Deposit Insurance			0.042	0.026	-0.012
				(0.064)	(0.094)	(0.048)
13	Restrict			0.028 **	0.031 *	0.005
				(0.014)	(0.017)	(0.009)
14	Diversification			-0.004	0.034	0.029
				(0.061)	(0.087)	(0.057)
	Other Country Specific					
15	Shareholders Rights			-0.070	-0.074	-0.033
				(0.047)	(0.051)	(0.026)
16	Log (GDP per capita)	-0.032 **	-0.042 **	-0.052 **	-0.054	-0.055 **
		(0.015)	(0.017)	(0.024)	(0.033)	(0.025)
17	GDP growth	-0.008	0.004	0.017	0.037 *	0.015
		(0.015)	(0.010)	(0.015)	(0.019)	(0.019)
18	Herfindahl-Hirschman Index	0.000	0.000	-0.0001 *	-0.0001 *	0.000
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
19	Country-Average ROA	-0.012	-0.025	-0.017	-0.012	-0.015
		(0.018)	(0.022)	(0.019)	(0.020)	(0.023)
	Number of obs.	1426	1426	1426	1426	1426
	Number of groups (banks)	395	395	395	395	395
	Number of instruments	63	99	101	138	134
	GMM-style instruments	1, L2(2)	1, L2(2), L.7	1, L2(2), L.7	1, L2(2,3), L.7	1, L2(2, 3, 4)
	IV-style instruments	5, 6, 16-19, year dumms	5, 6, 8, 16-19, year d's	5, 6, 8-19, year dumms	5, 6, 8-19, year dumms	5-19, year dummies
	F (variables; groups - 1)	40.11 ***	32.02 ***	20.26 ***	24.63 ***	26.58 ***
	Arell.-Bond test for AR(2) in 1st differences (z; Pr > z)	0.43 0.665	0.31 0.757	0.20 0.838	0.18 0.855	0.52 0.603

[+] Significance levels: *** 1%, ** 5%; * 10%

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

Dependent variable: Earnings Volatility. GMM dynamic panel-data regressions[+] over the period 2000-2006. (Two-step system GMM, orthogonal deviations transform, Windmeijer's standard errors correction): (*R1*): High Shareholders Rights; (*R2*): Low Shareholders Rights; (*R3*): Large Banks; (*R4*) Small Banks; (*R5*): Listed Banks; (*R6*) Unlisted Banks. Constant and year dummies omitted. All coefficients and standard errors (in parentheses) are multiplied by 100.

	Independent variables	(R1)	(R2)	(R3)	(R4)	(R5)	(R6)
	Bank Specific						
1	Earnings Volatility (t-1)	79.745 ***	69.017 ***	74.178 ***	72.968 ***	87.290 ***	64.696 ***
		(7.302)	(7.751)	(11.249)	(11.291)	(6.948)	(12.114)
2	Ownership Concentration	0.000	0.001	-0.001	0.003 **	0.000	0.004
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.004)
3	Revenue Growth	-0.015	0.000	0.0001 ***	-0.051	0.000 **	-0.006
		(0.026)	(0.000)	(0.000)	(0.044)	(0.000)	(0.028)
4	Size	0.031	0.087	0.031	0.176	0.055	0.109
		(0.075)	(0.117)	(0.024)	(0.183)	(0.048)	(0.067)
5	Leverage	-1.403 *	-2.259	-6.578 *	-1.647	-0.405	-5.817 **
		(0.842)	(1.544)	(3.447)	(1.262)	(1.397)	(2.547)
6	State Owned	-0.037	-0.039	0.049	-0.060	-0.067	-0.045
		(0.112)	(0.078)	(0.073)	(0.091)	(0.050)	(0.147)
	Country Bank Regulations						
7	Capital	0.032 **	0.235 **	0.025 *	0.103 **	0.051 **	0.106 **
		(0.013)	(0.101)	(0.014)	(0.051)	(0.024)	(0.053)
8	Official	-0.018	-0.089 *	-0.042 **	-0.025	-0.024 *	-0.031
		(0.028)	(0.046)	(0.019)	(0.029)	(0.014)	(0.037)
9	Independence	0.057	0.245 *	0.103 **	-0.005	-0.034	-0.028
		(0.037)	(0.146)	(0.049)	(0.087)	(0.049)	(0.080)
10	Deposit Insurance	0.133	0.469 **	0.037	0.131	-0.128	-0.021
		(0.139)	(0.205)	(0.093)	(0.156)	(0.092)	(0.217)
11	Restrict	0.027	0.063	0.005	0.045 *	-0.010	0.026
		(0.028)	(0.040)	(0.018)	(0.023)	(0.017)	(0.027)
12	Diversification	-0.032	0.071	0.034	0.095	0.099	0.086
		(0.055)	(0.121)	(0.064)	(0.101)	(0.093)	(0.095)
	Other Country Specific						
13	Shareholders Rights	0.050	0.066	-0.027	-0.011	-0.051	-0.184 **
		(0.051)	(0.104)	(0.040)	(0.049)	(0.040)	(0.087)
14	Log (GDP per capita)	-0.040	-0.115	0.002	-0.045	-0.068	-0.132 **
		(0.057)	(0.079)	(0.021)	(0.046)	(0.046)	(0.053)
15	GDP growth	-0.019	0.074 *	0.029	0.021	0.014	0.044
		(0.017)	(0.045)	(0.019)	(0.036)	(0.015)	(0.029)
16	Herfindahl-Hirschman Index	0.000	0.000	0.000	0.000	-0.00003 **	0.000
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
17	Country-Average ROA	0.018 *	-0.103 **	-0.035 *	-0.018	-0.047 **	-0.002
		(0.011)	(0.048)	(0.019)	(0.032)	(0.019)	(0.025)
	Number of obs.	704	722	746	637	584	793
	Number of groups (banks)	191	204	204	179	163	218
	Number of instruments	107	107	107	107	142	107
	GMM-style instruments	1, L2(2), L.4	1, L2(2), L.4	1, L2(2), L.5	1, L2(2), L.4	1, L2(2), L.(4, 5)	1, L2(2), L.5
	IV-style instruments	3, 5-17, time dummies	3, 5-17, time dummies	3, 4, 6-17, time dumms	3, 5-17, time dummies	3, 6-17, time dummies	3, 4, 6-17, time dumms
	F (variables; groups - 1)	99.15 ***	21.56 ***	42.76 ***	19.33 ***	64.64 ***	20.11 ***
	Arell.-Bond test for AR(2) in 1st differences (z; Pr > z)	0.74	-0.20	0.41	0.55	-1.52	0.52
		0.461	0.841	0.683	0.584	0.128	0.606

[+] 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 2000-2006. (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.

	Independent variables	(R1)	(R2)	(R3)	(R4)
	Bank Specific				
1	Z-Score (t-1)	0.339 **	0.356 **	0.173 **	0.215 **
		(0.166)	(0.165)	(0.076)	(0.096)
2	Ownership Concentration	-0.016	-0.054	-0.044	-0.049
		(0.038)	(0.049)	(0.049)	(0.042)
3	Revenue Growth	-0.002	0.002	-0.004	-0.001
		(0.007)	(0.005)	(0.018)	(0.013)
4	Size	-4.869 **	0.300	-2.873	-0.665
		(2.161)	(0.601)	(3.844)	(1.520)
5	Leverage		-20.469		-37.686
			(14.955)		(82.375)
6	State Owned	5.714	-0.259		
		(4.666)	(3.724)		
	Country Bank Regulations				
7	Capital	-2.086 **	-0.650	-0.698	-0.125
		(0.961)	(0.553)	(1.283)	(0.720)
8	Official	-0.165	-0.293	0.832	0.698
		(0.656)	(0.487)	(0.746)	(0.712)
9	Independence	1.684	1.633	2.684	2.686
		(2.175)	(1.678)	(2.055)	(1.896)
10	Deposit Insurance	4.326	7.578	4.162	3.662
		(5.383)	(4.878)	(6.104)	(5.256)
11	Restrict	1.045	-0.459	-0.374	-0.523
		(0.968)	(0.603)	(1.262)	(0.891)
12	Diversification	-1.995	0.741	0.945	1.009
		(3.053)	(2.080)	(4.576)	(3.082)
	Other Country Specific				
13	Shareholders Rights	2.139	0.820	3.215	3.068 *
		(1.682)	(1.426)	(2.413)	(1.675)
14	Log (GDP per capita)	4.887 ***	2.800 **	3.974	2.956 **
		(1.770)	(1.328)	(2.556)	(1.255)
15	GDP growth	-0.401	-0.436		
		(0.508)	(0.426)		
16	Herfindahl-Hirschman Index	0.000	0.000		
		(0.002)	(0.001)		
17	Country-Average ROA	-0.608	-0.063	-0.771	-0.986
		(0.619)	(0.562)	(0.757)	(0.877)
	Number of obs.	1537	1537	773	773
	Number of groups (banks)	423	423	211	211
	Number of instruments	146	77	108	109
	GMM-style instruments	1, L(2, 3, 4)	1, L(2)	1, L(2, 4)	1, L(2, 5)
	IV-style instruments	6-17, year dummies	3-17, year dummies	3, 7-14, 17, year dumms	3, 4, 7-14, 17,, year dummies
	F (variables; groups - 1)	5.06 ***	11.50 ***	3.28 ***	3.28 ***
	Arellano-Bond test for AR(2) in 1st differences (z; Pr > z)	0.62 0.536	0.70 0.485	-0.16 0.874	0.04 0.0968

[+] 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 2000-2006 (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	(R1)	(R2)	(R3)	(R4)
	Bank Specific				
1	Risk-Adjusted ROA (t-1)	35.854 ***	35.559 ***	35.433 ***	34.928 ***
		(6.489)	(6.384)	(6.318)	(6.261)
2	Own. Concentration	21.047 ***	19.750 **	20.911 ***	19.858 **
		(7.749)	(7.980)	(7.653)	(8.007)
3	Own. Concentration ^2	-0.475 **	-0.449 **	-0.469 ***	-0.454 **
		(0.187)	(0.194)	(0.180)	(0.189)
4	Own. Concentration ^3	0.003 **	0.003 **	0.003 **	0.003 **
		(0.001)	(0.001)	(0.001)	(0.001)
5	Revenue Growth	0.127 ***	0.115 ***	0.127 ***	0.118 ***
		(0.024)	(0.023)	(0.023)	(0.023)
6	Size	14.377 **	15.230 **	19.335 ***	15.258 **
		(6.412)	(6.256)	(6.752)	(6.843)
7	Leverage	-125.859	-63.051	-108.735	-68.442
		(121.169)	(124.160)	(124.901)	(128.124)
8	State Owned	-46.154	-35.034	-53.738 *	-41.080
		(32.017)	(32.223)	(29.677)	(29.593)
	Country Bank Regulations				
9	Capital			18.330 **	10.088
				(7.370)	(8.093)
10	Official			-9.368	-11.174 *
				(5.835)	(5.958)
11	Independence			54.954 ***	60.759 ***
				(19.321)	(21.555)
12	Deposit Insurance			146.575 ***	162.877 ***
				(43.997)	(44.055)
13	Restrict			7.824	12.321 *
				(5.862)	(7.092)
14	Diversification			-5.541	-27.391
				(26.072)	(27.633)
	Other Country Specific				
15	Shareholders Rights				10.508
					(11.178)
16	Log (GDP per capita)		15.653 *		21.680 *
			(9.207)		(11.631)
17	GDP growth		0.140		-0.840
			(3.720)		(3.716)
18	Herfindahl-Hirschman Index		0.016		0.012
			(0.011)		(0.012)
19	Country-Average ROA		8.553		8.758
			(6.042)		(5.906)
	Number of obs.		1,537		
	Number of groups (banks)		423		
	Number of instruments	123	127	130	134
	GMM-style instruments	1, L2(2, 3, 4)	1, L2(2, 3, 4)	1, L2(2, 3, 4)	1, L2(2, 3, 4)
	IV-style instruments	5-8, year dummies	5-8, 15-19, year dummies	5-14, year dummies	5-19, year dummies
	F (variables; groups - 1)	22.38 ***	19.83 ***	17.39 ***	15.34 ***
	Arellano-Bond test for AR(2) in 1st differences (z; Pr > z)	0.75	0.77	0.74	0.76
		0.453	0.440	0.457	0.449

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

Table 9 – The effect of Shareholders Protection Laws on Bank Performance

Dependent variable: Risk-Adjusted ROA (Return over Average Assets). GMM dynamic panel-data regressions[+] over the period 2000-2006. (Two-step system GMM, orthogonal deviations transform, Windmeijer's standard errors correction): (*R1*) and (*R2*): Dispersed Ownership; (*R3*) and (*R4*): Concentrated Ownership. Constant and year dummies omitted. All coefficients and standard errors (in parentheses) are multiplied by 100.

	Independent variables	*(R1)*	*(R2)*	*(R3)*	*(R4)*
	Interaction				
1	Ownership Concentration	19.672 **	28.685 ***	7.165	6.668
		(7.791)	(10.053)	(6.818)	(6.939)
2	Shareholders Rights	127.696 **	154.624 **	190.560	185.047
		(60.707)	(64.606)	(169.397)	(179.390)
3	Own. Concentration * Shareholders Rights	-5.666 **	-8.023 ***	-1.990	-1.881
		(2.301)	(2.767)	(1.915)	(2.003)
	Other Bank Specific				
4	Risk-Adjusted ROA (t-1)	41.706 ***	39.699 ***	34.145 ***	34.129 ***
		(10.586)	(11.732)	(10.490)	(10.194)
5	Revenue Growth	17.920	10.562	32.460 **	33.070 **
		(27.806)	(28.550)	(13.876)	(13.774)
6	Size	8.168	17.784	8.503	8.210
		(9.683)	(12.447)	(8.320)	(11.117)
7	Leverage	-226.282	-121.061	107.499	141.718
		(378.398)	(391.162)	(128.052)	(147.790)
8	State Owned	19.226	5.966	-35.488	-33.152
		(59.450)	(49.643)	(31.615)	(32.347)
	Country Bank Regulations				
9	Capital		-4.544		-5.623
			(16.510)		(12.878)
10	Official		9.146		1.298
			(11.493)		(10.351)
11	Independence		40.252		5.760
			(42.896)		(35.350)
12	Deposit Insurance		170.571 **		71.763
			(78.836)		(68.859)
13	Restrict		1.473		2.795
			(12.521)		(10.154)
14	Diversification		-172.660 **		12.446
			(79.531)		(39.298)
	Other Country Specific				
15	Log (GDP per capita)	-5.560	2.317	28.596 **	30.466
		(20.815)	(18.210)	(12.536)	(21.455)
16	GDP growth	-18.407	-17.054	5.190	4.188
		(12.507)	(15.413)	(4.715)	(4.664)
17	Herfindahl-Hirschman Index	0.034	0.023	0.004	0.002
		(0.027)	(0.033)	(0.015)	(0.030)
18	Country-Average ROA	20.313	13.476	4.582	5.597
		(17.476)	(15.341)	(6.220)	(5.845)
	Number of obs.	461	461	749	749
	Number of groups (banks)	136	136	210	210
	Number of instruments	101	102	97	103
	GMM-style instruments	L2(1,3), 4	L2(1,3), 4	L2(1,3), 4	L2(1,3), 4
	IV-style instruments	2, 5-8, 15-18, year dummies	2, 5-18, year dummies	2, 5-8, 15-18, year dummies	2, 5-8, 15-18, year dummies
	F (variables; groups - 1)	11.77 ***	8.77 ***	6.35 ***	6.13 ***
	Arell.-Bond test for AR(2) in 1st differences (z; Pr > z)	0.81	0.46	0.10	0.13
		0.420	0.644	0.920	0.900

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

**Table 10 – The effect of Regulations and Competition on Bank Performance
(Concentrated Ownership Structures)**

Dependent variable: Risk-Adjusted ROA (Return over Average Assets). GMM dynamic panel-data regressions[+] over the period 2000-2006. (Two-step system GMM, orthogonal deviations transform, Windmeijer's standard errors correction): (*R1*): Capital; (*R2*): Official; (*R3*): Independence; (*R4*): Restrictions; (*R5*): Competition. Constant and year dummies omitted. All coefficients and standard errors (in parentheses) are multiplied by 100.

	Independent variables	*(R1)*	*(R2)*	*(R3)*	*(R4)*	*(R5)*
	Interaction					
1	Ownership Concentration	0.213	5.991	3.042 **	0.769	0.494
		(1.581)	(4.132)	(1.480)	(4.234)	(1.165)
2	**Own. Concentration * (Regulation)**	0.046	-0.542	-2.047 **	-0.130	0.000
		(0.317)	(0.406)	(1.005)	(0.544)	(0.001)
	Other Bank Specific					
3	Risk-Adjusted ROA (t-1)	39.284 ***	36.765 ***	35.498 ***	39.639 ***	36.666 ***
		(9.713)	(10.078)	(8.623)	(10.979)	(8.980)
4	Revenue Growth	25.674	26.095 **	22.577 *	25.595 *	19.031
		(15.587)	(12.037)	(12.087)	(13.562)	(12.560)
5	Size	14.249	12.287	16.402 *	15.203	13.399
		(10.554)	(9.660)	(9.765)	(9.323)	(13.210)
6	Leverage	15.511	85.118	75.613	43.154	48.705
		(141.427)	(122.635)	(135.293)	(130.965)	(164.271)
7	State Owned	-45.689	-33.492	-25.215	-41.557	-32.819
		(41.896)	(29.437)	(29.748)	(37.215)	(30.080)
	Country Bank Regulations					
8	**Capital**	**-4.401**	2.196	-3.216	-3.126	-2.416
		(27.960)	(10.352)	(9.436)	(11.141)	(11.993)
9	**Official**	-4.916	**43.890**	-2.896	-6.744	-5.187
		(7.645)	**(37.355)**	(6.872)	(7.818)	(8.326)
10	**Independence**	25.887	20.966	**199.743 ****	23.777	37.593
		(27.719)	(26.479)	**(97.715)**	(30.556)	(32.219)
11	Deposit Insurance	114.938 **	131.896 *	134.632 **	112.241 *	65.600
		(54.126)	(76.194)	(60.707)	(61.010)	(59.197)
12	**Restrict**	0.535	5.968	4.634	**10.262**	4.554
		(9.615)	(9.754)	(9.622)	**(49.278)**	(9.911)
13	Diversification	5.319	-8.506	-1.129	-8.022	14.774
		(35.357)	(36.708)	(35.882)	(37.801)	(41.458)
	Other Country Specific					
14	Shareholders Rights	14.536	9.766	19.301	10.838	16.260
		(17.122)	(16.369)	(15.343)	(19.244)	(16.595)
15	Log (GDP per capita)	18.277	23.565	31.887 **	20.574	29.054 *
		(15.061)	(16.750)	(15.256)	(16.135)	(17.527)
16	GDP growth	7.093 *	6.212	4.105	5.018	3.630
		(4.192)	(4.233)	(3.708)	(3.912)	(4.158)
17	**Herfindahl-Hirschman Index**	0.012	0.013	0.007	0.011	**0.003**
		(0.022)	(0.017)	(0.016)	(0.022)	**(0.075)**
18	Country-Average ROA	5.714	2.962	7.348	7.703	9.012 *
		(5.082)	(4.963)	(5.528)	(5.720)	(5.060)
	Number of obs.	749	749	749	749	749
	Number of groups (banks)	210	210	210	210	210
	Number of instruments	113	113	108	103	103
	GMM-style instruments	L(1, 2), 3	L(1, 2), 3	L.1, L2(2), 3	L2(1, 2), 3	L2(1, 2), 3
	IV-style instruments	4-18, time dummies	4-18, time dummies	4-18, time dummies	4-18, time dummies	4-18, time dummies
	F (variables; groups - 1)	9.98 ***	7.73 **	6.74	7.52 ***	5.72 ***
	Arell.-Bond test for AR(2) in 1st differences (z; Pr > z)	0.62 0.538	0.43 0.664	0.35 0.727	0.92 0.357	0.66 0.512

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

Figure 1 – Cubic Relationship between Bank Performance and Ownership Concentration

Risk-Adjusted ROA

Monitoring Effect

Expropriation of Minority and/or Excess Monitoring Effects

Cost Effect of Expropriation

29.81

82.24

Largest Shareholdings (%)