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The influence of managerial ownership on bank market value, performance and risk:

Evidence from banks listed on the STOXX Global Index ^{*}

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Abstract

We follow agency theory to assess the influence of managerial ownership on the market value, performance and risk of 123 listed banks in 23 countries included in the STOXX Global Index in 2007 and 2010. After controlling for bank characteristics, regulatory restrictions and macroeconomic conditions, our findings show a positive relation between managerial ownership and both market value (Tobin's Q) and performance (ROA and ROE). Moreover, we find a negative relation between managerial ownership and risk (EDF, NPL/L and Z-SCORE). Bank market value and performance is a non-linear, inverse U-shaped function of managerial ownership. The negative relation between managerial ownership and bank risk is also non-linear and U-shaped. Our results remain robust to reverse causality. In their effort to immunize the global financial system from systemic risks, central banks and practitioners should find our results relevant for regulation purposes.

JEL Classification: G20; G32; G34

Keywords: Banks; Ownership; Corporate Governance

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The influence of managerial ownership on bank market value, performance and risk:

Evidence from banks listed on the STOXX Global Index

1. Introduction

Banks and their managers have been in the public eye since the onset of the current financial crisis. The main criticisms relate to governance failures, which are now the source of increasing attention from both academics and regulators. We focus on a specific governance mechanism, namely the role of managerial ownership in banking, which agency theory identifies as one of the devices at the disposal of firms to co-align the conflicting interests of shareholders and managers (Jensen and Meckling, 1976). In their seminal paper, the authors contend that equity owned by managers, which we define as managerial ownership, should decrease agency costs arising from conflicting interests and consequently have a positive influence on market value and performance, and a negative influence on risk-taking. However, the positive (negative) influence should spiral to a point beyond which managers will start appropriating perquisites and entrenching themselves, leading to nonmonotonic relations between managerial ownership and market value and performance (risk-taking).¹

The failure of an exceptionally large number of banks around the world that resulted in intervention by several governments using unprecedented forms of bailout during the financial crisis reinstated banks as a critical component of modern economies. Banks not only provide basic deposit-taking and lending services to consumers, but also essential services such as payments systems and liquidity. Liquidity and solvency problems can have a direct impact on the

¹ Managerial ownership is also identified as a governance mechanism in accounting (Horngrén et al., 2005) and economics (Tirole, 2006). Our paper is related to corporate governance theory. Corporate governance theory predicts that effective governance mechanisms enhance firm value and ensure accountability by insiders, the managers; this in turn motivates managers to act in the interest of shareholders, an issue that is at the crux of agency theory (Kroszner, 2004). Corporate governance theory also predicts that firm ownership influences risk-taking (see, among others, Bhimani (2009) and Kroszner (2004)).

smooth functioning of financial systems and the economy as a whole (Staikouras et al., 2007). The risks banks pose for financial systems justify the safety nets - deposit insurance, lender-of-last-resort mechanisms and bailout schemes - that were activated when prudential supervision and regulation failed. It is believed that safety nets encouraged managers to take more risks, which ultimately led to the collapse of an unprecedented number of banks around the world.

A review of the literature shows that, unlike manufacturing firms, it is only recently that academics have turned their attention to the agency relation (and corporate governance in general) in banking. Most studies pertain to ownership (block-holdings, family and managerial ownership), board structure (external and internal directors, diversity, size and turnover), and executive compensation (fixed and variable pay modes) and their relation to market value and performance.

The specific interest in the influence of managerial ownership on market value and performance in banking firms is also relatively recent, but, like non-banking firms, the results do not always coincide. In manufacturing firms for example, Agarwal and Knoeber (1996 – U.S.), Mehran (1995 – various countries), Yermack (1996 – U.S.) and Short and Keasey (1999 – U.K.) find a positive relation between managerial ownership (percentage of equity held by managers) and market value (Tobin's Q) and accounting performance (ROA) but Himmelberg et al. (1999 – various countries) and Demsetz and Villalonga (2001 – U.S.) find a positive but non-significant relation.²

Related studies in banking also address similar issues. Belkhir (2004), in a study of U.S. bank and savings-and-loan holding companies, finds a statistically significant (negative) relation between managerial ownership (percentage of equity owned by the company directors and top

² A topical strand of empirical studies also addresses the influence of family ownership on the market value of firms (see for example Kaserer and Modenhauer (2008) for a review of recent studies on the effects of family-control on the market value of firms). Family ownership is associated with large shareholdings, which is not the focus of our study.

executive officers, including the CEO) and market value (Tobin's Q). In a subsequent study, also on U.S. bank and savings-and-loan holding companies over the 1995 to 2002 period, Belkhir (2009) finds a statistically significant (positive) relation between managerial ownership (now measured as the percentage of outstanding common stock held by all directors and executive officers, except the CEO) at the beginning of the fiscal year, and market value (Tobin's Q) and accounting performance (ROA).³ Departing from the U.S. context, a study by Westman (2011), covers European financial companies (commercial and investment banks, and bank holding companies) over 2003-2006, and finds a statistically significant (positive) relation between managerial ownership and accounting performance (ROA and ROE).

The implication of banking activity for the smooth functioning of financial systems and the economy justifies the interest in the risk-taking behavior of banks. In an early study, Saunders et al. (1990) assessed the link between ownership structures, stockholder *versus* managerially (equity held by management, a measure similar to the one we use in this study) controlled banks, and risk-taking in U.S. banks over the 1978 to 1985 period. Their findings show that stockholder controlled banks exhibit significantly higher risk taking (capital market indicators) behavior compared to managerially controlled banks from 1979 to 1982, a period of relative deregulation. The on-going financial crisis revived the interest in risk-taking but the findings remain mixed. Laeven and Levine (2009) assessed the link between ownership structure (a measure of cash flow rights as a proxy for managerial ownership) and risk-taking (backward-looking risk measure, Z-SCORE) in banking with a global data set. They find a positive relation between their proxy for

³ Belkhir (2004) deploys four measures of ownership structure, namely insider ownership (which we designate managerial ownership in this paper), block holder ownership (stakes not less than 5%), share of outside directors, and board size. He finds that Q is a negative function of managerial ownership when the measures of ownership structure are separately regressed on Q. Belkhir (2009) analyzes the influence of other corporate governance measures on market value and performance but he finds positive relations (with Q and ROA) only for managerial ownership and board size. The mixed findings observed in these studies may stem from distinct definitions: whereas Belkhir (2004) includes the CEO, Belkhir (2009) does not. Another possible explanation is the specificity of bank holding companies which may have quite different motivations from pure commercial banks.

managerial ownership and risk-taking but the relationship is not significant in statistical terms. Barry et al. (2010) also assessed risk-taking (Z-SCORE) behavior across a small set of European countries. They find a negative and statistically significant relationship (although at 10% level of confidence) between managerial ownership and risk-taking by European banks.⁴

Several reasons may be fuelling these mixed findings on the influence of managerial ownership on market value, performance and risk-taking. First, the U.S. context is quite different from that of Europe and, more significantly, the rest of the world. Second, the definition of data and variables differs from one study to another inhibiting direct comparisons and the generalization of findings. Finally, heterogeneity in the activity of banks, country and coverage may be producing inefficient estimators.

We assess the theoretical predictions and qualify the influence of managerial ownership on bank market value (Tobin's Q), accounting performance (ROA, ROE) and risk-taking (EDF, NPL/L, Z-SCORE) across several countries controlling for bank specific characteristics, regulatory restrictions and macroeconomic factors.

Our study is relevant, although not exclusively, in the context of the on-going financial crisis for several reasons. First, despite the fact that the most important decisions in firms tend to be infrequent, agency issues are most often studied in a non-crisis context. We contribute to the literature by extending agency theory (and the broader corporate governance literature, Tirole (2006)) to a global financial crisis context. Previous studies in the context of the 1997-1998 Asian financial crisis, for example, show that non-management shareholdings resulted in better performance for firms and rent expropriation by managers (see, among others, Johnson et al., 2000; Mitton, 2002). Our study should shed further light on the role of agency theory in

⁴ In a related line of inquiry Forssbaeck (2011) investigates the influence of closely-held shareholdings (stakes above 5%) on the risk-taking behavior of banks during the pre-crisis period (1995-2005). Closely-held shareholdings are associated with large shareholdings, which are not the focus of our study.

precipitating financial crises. Second, most studies focus on the regulatory and macroeconomic conditions that triggered the recent financial crisis (see, among others, Taylor, 2009). We study why some banks were more affected than others. Specifically, we contribute to a new body of literature that attempts to identify a key agency factor that paved the way for some banks to perform better and take fewer risks than others before and during the crisis. In contrast to findings from the Asian financial crisis, for example, our findings indicate that improved performance and risk-taking is a function of the vested interest of managers in banks, both before and during the financial crisis. Third, the general perception of the media and the public is that agency relations are at the root of the on-going financial crisis. Our study sheds light on the extent to which managers can be held responsible for the on-going crisis. Fourth, we contribute to the regulatory reforms under scrutiny in that our study furthers knowledge on the extent to which an internal governance mechanism will be effective in immunizing financial systems and the economy as a whole in a future crisis.

The rest of the paper is organized as follows. In Section 2 we describe the data, variables and the method used to test our hypotheses. In Section 3 we present and interpret the empirical results. Section 4 contains a summary and conclusions of the study.

2. Data, variable definition and the method

2.1. Sample

In order to assemble reliable, consistent and coherent information, we followed previous studies by sampling our data from listed banks that are part of a stock index (see for example, Belkhir (2004, 2009 – S&P), Short and Keasey (1999 – LSE), Kaserer and Moldenhauer (2008 – CDAX)). We opted for the STOXX Global Index. This index provides a broad representation of the world's developed markets of Europe, the Americas and Asia/Pacific region. It is divided into three regional indexes: Europe, the Americas and Asia/Pacific, each of which comprises 600

stocks, summing 1,800 stocks (across several sectors). Our sample of 145 banks in 23 countries contains a homogeneous set of banks dedicated to the provision of a set of financial services consisting of retail banking, loans and money transmissions.⁵ Thus, we not only avoid confounding effects that would amplify the sample variance and most probably hinder the efficiency of the regression coefficient estimates, but also contribute to a more focused analysis of the influence of managerial ownership on the market value, performance and risk of listed banks included in a market index.

Bloomberg World would be an alternative candidate index. It includes 800 financial firms in 51 countries, 15% of which (120) are banks. Similarly, the tracker replicating the MSCI World Financials lists 328 banks in 23 countries, 37.36% of which are diversified banks and 3.48% are regional banks, summing 134 banks. Thus, if we chose another index, we would end up with a similar number of sampled of banks and country coverage. In addition, STOXX and MSCI behave similarly and perform well as benchmarks and representative market indices (Puttonen and Seppa, 2007). The MSCI World Index includes Israel and New Zealand and excludes Iceland unlike the STOXX Global Index; it thus covers 24 countries, one more than the STOXX Global Index.

As Bankscope has limited information on ownership, data on managerial ownership were collected from Bloomberg; the other financial data were collected mainly from Bankscope and Bloomberg. The latter does not provide historical data on managerial ownership. We analyze the influence of managerial ownership on the market value, performance and risk-taking in 2007 and 2010, as these are the two moments for which we have data on managerial ownership.⁶ All

⁵ STOXX Global Index fact-sheet (http://www.stoxx.com/download/indices/factsheets/sx150p_fs.pdf).

⁶ Holderness et al. (1996) provides evidence of a stable ownership-performance relation for a period of 60 years analyzing 1935 and 1995 cross-sectional data, where performance is proxied by Q. Zhou (2001) contends that managerial ownership changes very slowly. Kaserer and Moldenhauer (2008) also posit that family ownership tends

financial data were collected in Euros irrespective of the bank's reporting currency. The incorporation date was taken from the Internet, largely from each bank's website.

Missing variables reduced the sample size from 145 to a usable set of 123 banks. This usable sample includes banks from 23 countries pertaining to the above-mentioned regions (Europe, the Americas and Asia/Pacific). The U.S. and Japan represent 19.51% and 18.70% of the total sample, corresponding to 23 and 24 banks respectively.

Table 1 displays country averages for the dependent and independent variables. The dependent variable, Tobin's Q, ranges from 2.08 in Japan to 4.40 in Hong Kong, in 2007; and 1.44 in Italy to 2.98 in Hong Kong, in 2010. ROA ranges from near 0.00 in Switzerland, Germany, France and Netherlands to 0.03 in Belgium, in 2007; and from near 0.00 in Ireland to 0.09 in Norway, in 2010. ROE ranges from 0.06 in Japan to 0.26 in Ireland in 2007; and -4.83 in Ireland and 0.13 in Canada, in 2010. Non-performing loans to total loans (NPL/L) ranges from 0.18 in Spain and 4.68 in Singapore, in 2007; and 0.00 in Hong Kong and Singapore and 0.61 in Ireland, in 2010. The expected default frequency ranges from 0.12 in Sweden and Singapore and 0.66 in Japan, in 2007; the number of observations for 2010 data is insufficient. Z-SCORE ranges from -1.72 in Finland 0.40 in Germany, in 2007; and -3.10 in Greece, Ireland and Iceland and 6.88 in Austria, in 2010. This evidence sharply adheres to the anecdotal evidence on the financial crisis. The banking sector in Greece and Ireland, for example, reported significant losses in the wake of the financial crisis, ultimately triggering the need for IMF intervention.

2.2. Variable definition

We use market value, performance and risk-taking as the dependent variables and managerial ownership and control variables as the independent variables. We examine the

to be very sticky. It is not surprising that managerial ownership tends to be inert, since there are internal governance devices such as incentive-based compensation acting as substitutes that can be deployed more rapidly.

relation between managerial ownership and Tobin's Q (Q), (Demstev and Villalonga, 2001),⁷ return on assets (ROA) (Mehran, 1995), and return on equity (ROE) (Short and Keasey, 1999). All data to compute Q for each bank were collected from Bloomberg, as follows: market value: historical market capitalization; book value: total shareholder equity; debt: total liabilities; and assets: total assets. ROA and ROE, the second and third performance variables, were also collected directly from Bloomberg and Bankscope. Joh (2003) contends that accounting profitability indicators are better performance measures than stock market-based indicators because, unlike the latter, the former relate directly to firm survival.

We also assess the relationship between managerial ownership and three alternative bank risk measures (Bhimani, 2009).⁸ Non-performing loans in total loans (NPL/L) proxies loan portfolio risk, and we collect these accounting data from Bankscope. Moody's KMV EDFTM, Expected Default Frequency (EDF) is our market measure of bank risk. EDF is considered a powerful forward-looking measure and gauges actual probabilities of default. EDF data were collected from Moody's KMV (see for example Berndt et al. (2005); Garlappi et al. (2008) for both the aforementioned measures). As in Laeven and Levine (2009), amongst others, we use the logarithm of the Z-SCORE which estimates the distance to default because it represents the number of standard deviations that ROA has to drop to completely erode equity (banks with a higher Z-SCORE are less likely to default). Data to compute Z-SCORE were collected from Bankscope.

Managerial ownership (MO) is the ownership variable considered in this study. Data for this variable of interest were collected from Bloomberg using the 'MGHL' function, which

⁷ A forward-looking measure of performance: $Q = [(MV/BV) + (Debt/Assets)]$ where MV is the market value and BV stands for the book value.

⁸ The author contends that there are interdependencies between corporate governance and the risk management function of firms. For example, Berkman and Bradbury (1998) show that ownership structure can influence risk management practices in nonbanking firms and Teshima and Shuto (2008) show that ownership structure can influence management earnings.

stands for management holdings to the equity of each bank included in the sample.⁹ Additionally, we use the following bank controls sourced from Bankscope and Bloomberg: size (SIZE), age (AGE), revenue growth (GO), debt intensity (DI), capital intensity (CI), net operating income to total operating income (NII_OI). Restrictiveness (RES), private credit to GDP (PC_GDP), and stock market capitalization to GDP (SMC_GDP) pertain to the characteristics of the country in which the banks originated; RES is collected from Barth et al. (2000, 2001) and PC_GDP and SMC_GDP are sourced from the World Bank (<http://www.worldbank.org/wbsite/external>).

For SIZE, we compute the natural logarithm of each bank's gross operating revenue. Larger banks are likely to obtain scale and scope economies, thus exhibiting higher market values (Demsetz and Lehn, 1985). We computed the AGE of each bank by counting the number of years from the date of birth of the institution to each year under analysis (Laeven and Levine, 2007). Revenue growth (GO) is measured as the growth in revenues of each bank. Banks with higher revenue growth are likely to have larger market values (Xu and Wang, 1997). Debt intensity (DI) is the ratio of total liabilities over total assets (Demstev and Villalonga, 2001). Capital intensity (CI) was measured as the ratio of the total shareholders' equity divided by the revenues; firms operating with higher capital-to-sales ratio impose entry barriers and enjoy better control over the market. Following Laeven and Levine (2007) in their study on whether the diversity of activities conducted by financial institutions influences their market valuations, we use net operating income to total operating income (NII_OI) as one of our control variables. NII_OI gauges each bank's mix of income-generating activities, while total operating income is the sum of investment income, foreign exchange income, gain (or loss) on sale of securities, trading account income,

⁹ Bloomberg's 'MGHL' function leads to the management holdings screen. The information shown on this screen includes management holdings in terms of the percentage of shares held by management to total share outstanding for all classes of the shares ('Management's Holdings %Outst' in Bloomberg) for all of the holdings of the bank's management. For MO, we picked their holdings in the bank they manage. Other studies, for example Mehran (1995) and Himmelberg et al. (1999), also measure MO as the percentage of shares held by management.

and commissions and fees.

Levine (2004) considers that banks are often very heavily regulated. As banks in our sample are from 23 different countries, we included a variable that reflects the regulatory restrictiveness applicable in each country. We used the variable Restrict (RES) originally computed by Barth et al. (2000) for this purpose. Several studies use control variables that reflect the company's expenditures on R&D (Mehran, 1995). We argue that R&D is not a visible variable in the case of banks as it is not usually a specific function or activity and is therefore a consequence of the quality of each bank's human capital. To control for other country specific characteristics, following Barth et al. (2000), we use private credit to GDP (PC_GDP), value of claims on the private sector by deposit money banks and other financial institutions as a share of GDP, and stock market capitalization to GDP (SMC_GDP), value of domestic equities traded on domestic exchanges divided by GDP, which are proxies for the size and development of financial markets. These data were gathered from the World Bank (<http://worldbank.org/website/external>).

Table 2 displays the summary statistics for each variable. The dependent variable, Tobin's Q, ranges from 1.33 to 6.37 (2007), and 1.23 to 4.48 (2010) indicative of the expected value depletion during the financial crisis; while ROA ranges from 0.02 to 0.08 (2007), and from -0.02 to 0.09 (2010); and ROE from -0.18 to 0.35 (2007), and -0.48 to 0.63 (2010). The wider ranges of ROA and ROE, accompanied by higher standard deviations in 2010, are a consequence of the financial crisis. The risk measures also exhibit substantial variability - NPL/L: 0.00 to 27.24 (2007), and 0.00 to 61.00 (2010); EDF: -1.69 to -0.29 (2007), and 0.54 to 10.99 (2010); Z-SCORE: 0.01 to 0.85 (2007), and -0.10 to 0.09 (2010); again a consequence of the financial crisis. Our independent variable of interest also exhibits substantial variability. For example, managerial ownership (MO) ranges from 0.00 to 0.12 (2007), and 0.00 to 0.09 (2010). This narrower range, lower mean (0.01 (2007); 0.00 (2010)) and standard deviation (0.02 (2007); 0.01 (2010)) of this

variable in 2010, compared to 2007, suggest that managers slightly reduced their equity stakes in banks after the onset of the financial crisis. Whether this reduction influenced the market value, performance and risk-taking is ultimately an empirical issue that we address in the next section.

Table 3 shows the correlations between pairs of variables in years: 2007 (data below the diagonal line) and 2010 (data above the diagonal line). We observe that the independent variables are not so significantly correlated so as to cause linear dependence problems in multivariate regressions analyses.

2.3. Method

We use the linear regression model (OLS) for our cross-sectional analyses, deploying alternative measures of the dependent variable both for market value and risk in the baseline specification. Agrawal and Knoeber (1996), Holderness et al. (1996), Belkhir (2004), Kaserer and Moldenhauer (2008) and Yermack (1996) also use similar OLS regressions. For example, the closed form for Q , one of the alternative dependent variables, is:

$$Q_j = \alpha + \beta \text{ managerial ownership}_j + \gamma \text{ controls}_j + \varepsilon_j \quad (1)$$

where α is a constant; β and γ are coefficient estimates; controls pertain to bank and country characteristics; j refers to a specific bank; and ε_j is the error term. We hold the right hand side of equation (1) in the closed forms for the other alternative dependent variables pertaining to performance and risk-taking.

As we are interested in comparing the two cross-sectional analyses, we test differences of conditional means of 2007 and 2010 estimates using a χ^2 test after running seemingly unrelated estimations of the coefficients of both 2007 and 2010 cross-sections.¹⁰ In the robustness tests, we

¹⁰ Seemingly unrelated regression equations were proposed by Zellner (1962) and in our case consist of two regression equations. Each equation corresponds to a cross-section and can be estimated separately using standard OLS. Thus, we use *suest* to obtain more efficient estimators and to statistically compare the coefficient estimates as a post estimation test for cross-model hypotheses (Zellner, 1962; 2006). We also use *suest* to adjust for standard errors

also use quantile regression techniques to assess whether the link between our dependent variables and MO is linear or nonlinear.

3. Findings

We present the results for linear regressions (OLS) in the left hand column of Table 4 for the dependent variable Q and MO as the variable of interest, controlling for bank and country-specific traits deployed in the extant literature. The results reveal an economically and statistically significant relation between managerial ownership (MO) and bank market value (Q). MO is significantly different from zero (4.05 in 2007 and 10.98 in 2010) at the 1% significance level. These results suggest that managerial ownership lowers agency costs, which means that managers are more aligned with shareholders in creating value for the bank in which they hold a stake (Jensen and Meckling, 1976; Morck et al. 1988). This finding is consistent with the finding of Belkhir (2009) in the context of U.S. bank and savings-and-loan holding companies (1995-2002). We also find no statistical difference between the coefficient estimates of MO in 2007 as compared to 2010 ($\chi^2=1.90$), which is reassuring. Among bank controls, SIZE (-0.09 in 2007, and 0.45 in 2010) is significant at the 1% level. This finding is consistent with Laeven and Levine (2009). Net operating income to total operating income (NII_OI) is negatively linked to Q (-0.13 at the 1% level, in 2007). Private credit to GDP (PC_GDP) is negative and statistically different from zero in 2007 although with a minor effect on Q (-0.01 in 2007).

The χ^2 tests for differences between 2007 and 2010 do not yield significant results except for size (16.37 at the 1% significance level). Whereas size is negatively related to Q in 2007, it is positively related to Q in 2010. Studies in the context of the financial crisis show that large banks,

clustered at the country level since we are faced with intragroup correlation within country (Cameron and Trivedi, 2009). A seemingly unrelated estimation is perhaps the most used econometric model after the linear regression model (Geweke, 2003) and avoids misleading results that individually estimated OLS cross-sectional regressions could yield (see for example Belkhir, 2004 for a similar conclusion). We present the information criteria (Akaike, AIC and Bayesian, BIC) at the bottom of the regression tables since the coefficient of determination of individual OLS regression lacks applicability in this setup.

also candidates for bail-out plans, exhibit positive and abnormal returns (see, among others, Pop and Pop, 2009; Brewer and Klingenhagen, 2010). In the case of managerial ownership, the financial crisis did not alter its positive influence on bank market value.

In order to analyze the impact of managerial ownership (MO) on accounting performance, we re-estimate our specification using ROA and ROE, alternately, as the dependent variables proxying for bank profitability as previously. The two right hand columns of Table 4 present the findings. The coefficients of MO are positive in 2007 for both ROA and ROE and positive in 2010 for ROE. These findings are in line with the findings of Belkhir (2009) in the context of U.S. bank and savings-and-loan holding companies (1995-2002) and Westman (2011) in the context of European commercial and investment banks, and bank holding companies (2003-2006).

Finally, as depicted in Table 5, we analyze the link between managerial ownership (MO) and bank risk using the expected default frequency (EDF); the percentage of non-performing loans in total loans (NPL/L); and the Z-SCORE. The results suggest that higher managerial ownership (MO) is associated with lower bank risk (EDF (2007), NPL/L (2007) and Z-SCORE), except for NPL/L (2010). The specifications with EDF (2007) and NPL/L as the dependent variables yield a statistically significant value at the 1% confidence level. This finding is consistent with the findings of Barry et al. (2011) who find a negative and statistically significant relation (although at the 10% level of confidence) between managerial ownership and the Z-SCORE. There are several control variables that are significantly related to our dependent variables. Size, age, growth, debt and capital intensity are negatively related to our risk variables and are statistically significant at the 1% or 5% levels of confidence. The variable capturing restrictions on banking activity (RES) is negatively related to NPL/L (2007) and the Z-SCORE (2010) at the 10% and 5% levels of significance, respectively. Stock market capitalization to

GDP is negatively related to Z-SCORE in 2007 (statistically significant at the 5% confidence level) and positively related to Z-SCORE in 2010 (nonsignificant).

The χ^2 tests for differences in the coefficients for 2007 and 2010 show statistically significant results for MO (13.11 at the 1% significance level) in NPL/L regressions. This is understandable since banks altered their balance sheets significantly, shoring up large amounts of impaired loans or hiving them off to asset management companies, and in most cases reducing the credit to the economy during the financial crisis; consequently, this has an impact on NPL/L, changing loan patterns from 2007 to 2010. But the impact of managerial ownership (MO) on the other two measures of bank risk (EDF, Z-SCORE) persists during the financial crisis.

Robustness tests

Since regular regressions merely provide a grand summary of the averages of the distributions of the explanatory variables yielding an incomplete picture of the actual relations, we start by assessing whether the link between market value (Q) and MO is linear or nonlinear and, in the latter case, whether it varies with the level of ownership. We use five different points to describe the whole distribution in order to accommodate a sizeable number of observations in each bin.¹¹ In doing so, we are testing whether each bank, or at least a group of banks lying at the same quantile, has a different impact on market value (Mosteller and Tukey, 1977). Table 6 presents the results, splitting our measure of managerial ownership (MO) into five quantiles of MO (MOn1-MOn5). The first quantile (MOn1) is dropped to avoid linear dependence. The previous results are confirmed in that bank market value is a function of managerial ownership. In 2007 the coefficient estimates are mostly significant and decline as MO increases. Figure 1

¹¹ There is a trade-off between having (on one hand) a large number of bins, e.g. 10, in order to know the distribution of the estimates in more detail, and (on the other hand) forming bins with a significant number of observations to capture variability and comply with the Gauss-Markov assumptions for multiple linear regression (see, for example, Aiken, 1935; Wooldridge, 2003).

displays Tobin's Q across the spectrum of managerial ownership (MO ranges from near 0.00 to 0.12; the maximum is - MO: 0.07 and Q: 3.40) for the year 2007 and corroborates the aforementioned findings (see Table 6). Figure 1 depicts an inverse U-shaped relation between MO and Q. The non-linear relation is evident, suggesting that the effect of MO across the spectrum of Q is not constant, and the non-linear relation found in non-financial firms may be a good approximation, as Table 6 also depicts, with coefficients varying along the quantiles. Figure 1 also reveals that the coefficient estimates are more efficient for lower quantiles (lower values of managerial ownership) as the shadowed area of the graph is thinner for the lower bounds.¹² Morck et al. (1988) also find a nonmonotonic relation between managerial ownership and firm value; recent studies, for example, Fahlenbrach and Stulz (2009) also acknowledge this.

We rerun the regressions for ROA, ROE, and EDF, NPL/L, and Z-SCORE as the dependent variables sorting MO in the same five quantiles as above and the results also indicate a non-linear relation as in the baseline specification. Figure 2 corroborates these findings. Figure 2 displays NPL/L across the spectrum of managerial ownership (MO ranges from near 0.00 to 0.12; the minimum is - MO: 0.07 and NPL/L: 0.24) for the year 2007. In other words, it uses NPL/L as the dependent variable and the relation between MO and NPL/L is mostly U-shaped. These results suggest that there is an optimal level for managerial ownership beyond which the countervailing forces of the entrenchment of managers who hold larger stakes in the firm are stronger than the initial benefit of aligning managerial incentives with shareholders' interests. This is consistent with agency theory. Our results provide indirect evidence of the offsetting

¹² Morck et al. (1988) find a positive relation between inside ownership and market value in the range of 0.0-5% and above 25%; the relation is negative in the 5.0%-25% range. McConnell and Servaes (1990) also find a similar relation where maximum market value is attained in the 40-50% range beyond which the costs outweigh the benefits. Kaserer and Moldenhauer (2008) do not reject the positive relation between insider ownership and market value but could not replicate the curvilinear relation in German companies. Cho (1998) finds a positive relation between insider ownership and investment, measured by both capital and R&D expenditures: the first is lower than 7% and higher than 38%; otherwise, the relation is negative.

effects of agency as analyzed earlier by Jensen and Ruback (1983) and more recently by Fahlenbrach and Stulz (2009), in that managers with low stakes of the firm have more incentives to maximize firm value. For larger stakes, the incentives to appropriate perquisites and to entrench seem to prevail, although the effect of managerial ownership on bank market value is still positive.

Secondly, we also use the instrumental variables (IV) method to control for endogeneity and present the results in Table 7. We use the instrumental variables (IV) to control for endogeneity, since the factors underpinning managerial ownership (MO) can be the same as those causing change in the market value of banks. In other words, ownership can be endogenous and precede market valuation. In fact, Demsetz (1983) and Demsetz and Lehn (1985) argue that markets force firms to choose an optimal ownership structure. They posit that managerial ownership is thus an endogenous choice and therefore the correlation between managerial ownership and firm value can be spurious. To address this potential endogeneity issue, we re-estimate our baseline specification in Panel 1 of Table 7 using economic freedom as the instrument. Economic freedom is based on 10 measures of economic openness, regulatory efficiency, the rule of law, and competitiveness. The Heritage Foundation (<http://www.heritage.org/Index/>) is our source and we take the average value from 2002 to 2006. Panel 2 of Table 7 uses the openness of the economy and log of bank total assets as instruments. As expected, economic freedom (Panel 1) and openness of the economy (Panel 2) are positively and significantly linked with managerial ownership in the unreported first stage regressions. MO

appears positive in all panels of Table 7 and is significantly different from zero at the 1% confidence level, reinforcing our findings.¹³

In unreported regressions, we also estimated our models with a dummy for civil law (1) versus common law (0), and a composite index on the rule of law.¹⁴ These two controls proved nonsignificantly related to our dependent variables and our results remained qualitatively unaltered.

Finally we test whether the relation between managerial ownership and risk is moderated by national regulations (Laeven and Levine, 2009). We interact managerial ownership (MO) and regulatory restrictiveness (RES) to capture this effect, which is a step further in the analysis of the partial effect of MO and RES taken alone. Our findings hold, with MO appearing negatively and significantly related to NPL/L in both 2007 and 2010.¹⁵

4. Conclusions

Banks and their managers have been in the spotlight since the onset of the financial crisis. Governance failures across several countries are the butt of heavy criticism. The agency costs arising from misalignment of shareholder and managerial interests have long been considered important and empirically relevant in the context of manufacturing enterprises. The on-going financial crisis has reinstated the critical importance of the costs of misalignment of interests of shareholders and managers in the banking industry, particularly due to the perverse incentives arising from the different types of safety net. Agency theory is most often applied to a non-crisis

¹³ We intended to assess the robustness of our findings for large, medium and small banks. However, the sample split left us with very few banks in each category. We follow previous literature (see, for example, Laeven and Levine, 2009) by controlling our findings for bank size with a variable denoted SIZE in all regressions.

¹⁴ The dummy for common law ('0') and civil law ('1') is collected from La Porta et al. (1999). We collected data on rule of law, a composite governance index in Kaufman et al. (2009) for the two years previous to our cross-sections (2005 and 2008). The results are available from the corresponding author.

¹⁵ The results are available from the corresponding author.

context. The on-going financial crisis provides an interesting setting to further extend the expanding scope of applicability of agency and corporate governance theories.

The literature shows that most studies address this issue in the context of manufacturing enterprises and the results on the influence of managerial ownership on market value and performance are mixed. The non-linear relation between managerial ownership and market value varies across the studies. The few studies that focus on the influence of managerial ownership on market value concentrate mainly on U.S. bank and savings and loan holding companies and the findings are mixed (Belkhir, 2004, 2009). There is also mixed evidence from the few studies focusing on the influence of managerial ownership on the risk-taking behavior of banks in the U.S. (Saunders et al., 1990) and across several countries (Laeven and Levine, 2009; Barry et al., 2010). However, the findings on the positive influence of managerial ownership on accounting performance in U.S. bank holding companies (Belkhir, 2009) and European financial companies that include commercial and investment banks, and bank holding companies (Westman, 2011) are more consistent. These studies do not cover a period of financial crisis.

Building on previous studies, we assess the influence of managerial ownership on the market value, performance and risk-taking behavior of banks in the context of the on-going financial crisis. We do so for a homogenous set of banks listed on the STOXX Global Index. The use of banks listed on the stock index guarantees comparability in terms of stock market capitalization, free float, transparency, and reporting standards that usefully reduce sample variance in a cross-country analysis. The narrow definition of managerial ownership, a homogenous set of banks operating across several countries and an analysis over a period before and during the on-going financial crisis with an appropriate econometric method should shed further light on the mixed findings observed in previous studies and enable the generalization of findings.

First, compared to manufacturing firms, our data show very low levels of managerial ownership in several countries. Second, we find robust evidence of the positive and significant influence of managerial ownership on market value, and a negative and significant relation between managerial ownership and risk-taking controlling for bank characteristics, regulatory restrictions and macroeconomic conditions. Third, we find robust evidence of the positive (negative) influence of managerial ownership on the market value and performance (risk-taking) up to a point beyond which the negative agency forces more than offset the positive agency forces. In other words, for low ownership levels, managers have incentives to co-align their interest with that of shareholders, whereas in the case of higher ownership levels, the incentives to consume perquisites and entrench exceed the benefits, thus yielding an inverted U-shaped (U-shaped) relation between managerial ownership and bank value (risk-taking). Our findings are consistent for the periods before and during the financial crisis, strictly conforming to agency theory predictions.

The recent financial crisis has brought managerial self-interest in banking firms into the limelight. Our study indicates that a simple governance mechanism prescribed in the 1970s by management theorists and now widely accepted by accounting and economic theorists could limit the much queried self-interested managerial behavior during the financial crisis. Our findings also suggest that this simple governance mechanism has been used effectively by banks in a large number of countries in Europe, the Americas and Asia/Pacific to increase market value and reduce risk-taking before and during the financial crisis, a novel setting in which the agency relation is studied. Findings from previous financial crises (for example, the 1997-1998 crisis in Asia) showed that non-management shareholding resulted in better performance for firms and rent expropriation by managers. Our findings suggest that management shareholdings resulted in

better market value, performance and risk-taking for banks and these findings do not weaken during the on-going financial crisis.

In their effort to intertwine governance and regulation to immunize the global financial system from a future financial crisis, central banks may find the role of managerial ownership of relevance. Future research efforts can be directed towards drawing on banks undertaking a diverse set of activities and from more countries, at the expense of introducing additional bank and country-level heterogeneity and fuelling biases in the efficiency of regression coefficients. In this context, narrowly focused studies on banking should bring fresh and important insights for practice and regulation. More interestingly though, in addition to other external and internal governance mechanisms that we do not pretend to cover comprehensively in this paper due to lack of consistent and comparable data, the analysis of other forms of insider ownership – family, institutional, public – and their changes over time constitute promising avenues for future research.

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Table 1: *Variables - Average per country, pertaining to 2007 and 2010 cross-sections*

Q is the ratio of market to book value plus debt divided by total assets. ROA is the ratio of trailing 12 month net income (losses) minus trailing 12 month total distribution of dividends to preferred stock holders divided by average assets. ROE is the ratio of net income (losses) divided by shareholders' equity. Expected default frequency (EDF) is a credit risk measure sourced by Moody's KMV. Non-performing loans to total loans (NPL/L) is the percentage of problem loans in total loans. Z-SCORE represents the distance to default and corresponds to the number of standard deviations ROA has to decrease for equity to be depleted. Variable of interest: (i) managerial ownership (MO) is the ratio of shares held by management divided by total shares. Bank controls: (i) SIZE is the logarithm of gross operating revenue; (ii) AGE represents the number of years since incorporation; (iii) revenue growth (GO) is the contemporaneous total revenue scaled by the total revenue for the previous period; (iv) debt intensity (DI) is the ratio of debt divided by total assets; (v) capital intensity (CI) is the ratio of total shareholders' equity divided by revenues; (vi) net interest income divided by total operating income (NII_OI) is a proxy for income diversity. Country controls: (i) restrictiveness (RES) pertains to restrictions imposed on banks, namely the degree to which national regulatory authorities allow commercial banks to engage in 'nontraditional' activities; (ii) the development of the financial markets is proxied by private credit (value of claims on the private sector by deposit money banks and other financial institutions) (PC_GDP) and stock market capitalization (the total value of shares traded on a country's stock exchanges) (SMC_GDP), both scaled by GDP.

2007																
Country	Q	ROA	ROE	EDF	NPL/L	Z-SCORE	MO	SIZE	AGE	GO	DI	CI	NII_OI	RES	PC_GDP	SMC_GDP
Austria	2.20	0.01	0.14				0.00	9.43	188.00	0.32	0.94	0.91	2.00	1.25	65.30	0.22
Australia	3.42	0.01	0.18		1.62	-1.16	0.01	8.78	116.50	0.20	0.94	0.80	1.47	2.00	54.82	1.04
Belgium	2.36	0.03	0.15	0.31	0.83	-0.74	0.00	9.04	46.00	0.30	0.66	4.49	0.98	2.50	25.65	1.07
Canada	3.26	0.01	0.21	0.17	0.83	-1.45	0.00	9.57	158.00	0.14	0.95	0.79	1.44	2.25	60.86	1.01
Switzerland	2.72	0.00	0.06	0.19	1.57		0.00	9.44	140.33	0.10	0.95	1.12	0.75	1.50	141.30	2.14
Germany	2.13	0.00	0.16	0.53	3.97	0.40	0.00	10.82	137.00	0.13	0.98	0.50	1.30	1.75	76.46	0.41
Denmark	2.82	0.01	0.20	0.15	0.24	-0.72	0.00	8.05	110.00	0.21	0.96	0.82	0.85	1.75	42.45	0.55
Spain	3.20	0.01	0.19	0.19	0.18		0.03	8.72	126.71	0.38	0.93	0.94	1.42	1.75	65.05	0.81
Finland	2.35	0.01	0.11		0.25	-1.72	0.00	7.95	116.00	0.55	0.93	0.66	0.50	1.75	51.78	0.96
France	2.07	0.00	0.10	0.22	0.68	-1.38	0.00	11.09	147.67	0.12	0.97	0.68	1.55	2.00	75.47	0.77
Great Britain	2.37	0.01	0.17	0.36	2.30	-0.91	0.00	10.26	219.75	0.21	0.96	0.77	1.86	1.25	46.31	1.23
Greece	3.42	0.02	0.22	0.51	2.04	-1.29	0.00	8.55	100.50	0.42	0.92	0.99	1.72	2.25	36.72	0.56
Hong Kong	4.40	0.02	0.22	0.15	1.02	-1.01	0.03	7.90	59.75	0.24	0.92	1.20	1.11	2.00		4.56
Ireland	2.84	0.01	0.26				0.01	9.03	112.50	0.53	0.95	0.81	1.41	1.25	49.14	0.53
Iceland	2.88	0.01	0.21				0.00	8.11	83.00	0.41	0.94	0.74	1.22	2.75	34.79	0.99
Italy	2.22	0.01	0.12	0.13	4.04	-0.72	0.00	9.05	340.00	0.18	0.91	1.45	1.97	2.25	59.03	0.41
Japan	2.08	0.01	0.06	0.66	2.93	-0.82	0.00	6.58	87.17	0.05	0.83	5.08	2.87	3.25	128.38	0.70
Netherlands	2.12	0.00	0.15				0.00	11.56	287.00	0.29	0.96	0.33	0.00	1.50	86.69	0.95
Norway	2.40	0.01	0.21				0.00	9.18	185.00	0.35	0.95	0.99	1.20	2.00	81.62	0.44
Portugal	2.83	0.01	0.17	0.43	1.79	-1.26	0.00	8.04	62.00	0.00	0.94	1.22	1.62	2.00	55.01	0.38
Sweden	2.54	0.01	0.20	0.12	1.18	-1.32	0.00	9.33	165.25	0.30	0.96	0.85	1.14	3.00	89.11	0.91
Singapore	2.51	0.01	0.14	0.12	4.68	-1.26	0.01	8.63	83.50	0.06	0.90	1.51	1.03	2.25		1.46
U.S.	2.29	0.01	0.09	0.20	1.42	-1.19	0.01	9.00	151.17	0.11	0.90	1.26	2.18	3.00	113.07	1.28

Table 1: Continued (2010)

2010																
Country	Q	ROA	ROE	EDF	NPL/L	Z-SCORE	MO	SIZE	AGE	GO	DI	CI	NII_OI	RES	PC_GDP	SMC_GDP
Austria	1.78	0.01	0.08			6.88	0.00	6.15	191.00	0.20	0.04	0.13	0.65	1.25	74.82	0.60
Australia	2.44	0.01	0.12		0.01	3.87	0.00	6.27	134.29	0.21	0.11	0.13	0.68	2.00	33.61	3.90
Belgium	1.49	0.01	0.11		0.07	0.65	0.00	6.14	67.50	0.18	0.10	0.21	0.44	2.50	21.52	0.39
Canada	2.57	0.01	0.13		0.01	4.42	0.01	6.44	140.29	0.17	0.16	0.07	0.48	2.25	6.94	0.84
Switzerland	2.15	0.04	0.11			3.68	0.00	6.03	143.33	0.19	0.08	0.13	0.26	1.50	13.59	0.81
Germany	1.47	0.00	-0.02			0.11	0.00	5.90	140.00	0.03	0.35	0.19	0.40	1.75	19.45	1.28
Denmark	2.13	0.00	0.05		0.02	0.62	0.00	5.42	113.00	0.20	0.17	0.16	0.57	1.75	50.46	1.07
Spain	1.90	0.01	0.09			4.08	0.01	5.91	127.00	0.33	0.09	0.21	0.69	1.75	16.44	1.11
Finland	1.95	0.01	0.12			4.08	0.00	5.63	119.00	0.20	0.20	0.05	0.73	1.75	9.82	1.29
France	1.56	0.00	0.03		0.01	0.42	0.00	6.34	150.67	0.06	0.24	0.02	0.86	2.00	36.85	4.77
Great Britain	1.73	0.00	0.12			0.00	0.00	5.86	222.75	0.39	0.07	0.32	0.00	1.25	18.72	2.18
Greece	1.43	0.00	-0.02		0.08	0.00	0.00	5.09	103.50	0.07	0.11	1.63	0.75	2.25	9.21	1.08
Hong Kong	2.98	0.01	0.11		0.00	5.91	0.04	6.04	58.00	0.14	0.11	0.23	0.71	2.00	8.68	0.65
Ireland		-0.20	-4.83		0.61	0.00	0.01	5.86	115.50	0.28	0.13	0.32	0.37	1.25	13.82	1.36
Iceland		-0.12	0.05			0.00	0.00	5.86	44.67	0.30	0.02	0.32	0.91	2.75	41.43	0.76
Italy	1.44	0.00	0.04		0.03	0.65	0.00	5.83	349.25	0.43	0.09	0.35	0.51	2.25	16.87	0.81
Japan	1.83	0.00	0.05		0.03	2.79	0.00	5.48	87.13	0.17	0.15	0.21	0.00	3.25	29.60	2.06
Netherlands							0.00	5.86	290.00	0.43	0.04	0.32	0.57	1.50	33.29	0.14
Norway	2.20	0.09	0.12				0.00	6.20	188.00	0.22	0.00	0.06	0.65	2.00	3.37	0.39
Portugal	1.54	0.00	0.05		0.03		0.00	5.30	65.00	0.09	0.22	0.25	0.70	2.00	12.49	1.34
Sweden	2.25	0.01	0.10		0.01	2.53	0.00	6.15	168.25	-0.15	0.18	0.09	0.65	3.00	60.09	0.43
Singapore	2.35	0.01	0.12		0.00	4.10	0.01	6.22	86.50	0.15	0.08	0.08	0.65	2.25	4.91	0.69
U.S.	2.02	0.00	0.03		0.04	2.39	0.01	5.99	156.17	0.19	0.07	0.59	0.68	3.00	17.31	1.22

Table 2: *Descriptive Statistics per Variable*

Q is the ratio of market to book value plus debt divided by total assets. ROA is the ratio of trailing 12 month net income (losses) minus trailing 12 month total distribution of dividends to preferred stock holders divided by average assets. ROE is the ratio of net income (losses) divided by shareholders' equity. In robustness tests, expected default frequency (EDF), non-performing loans to total assets (NPL/L), and the logarithm of Z-SCORE are proxies for bank risk. Non-performing loans to total loans is the percentage of problem loans in total loans. Expected default frequency is a credit risk measure sourced by Moody's KMV. Z-SCORE represents the distance to default and corresponds to the number of standard deviations ROA has to decrease for equity to be depleted. Variable of interest: (i) managerial ownership (MO) is the ratio of shares held by management divided by total shares. Bank controls: (i) size is the logarithm of gross operating revenue; (ii) age represents the number of years since incorporation; (iii) revenue growth (GO) is the contemporaneous total revenue scaled by the total revenue for the previous period; (iv) debt (DI) is the ratio of debt divided by total assets; (v) capital intensity (CI) is the ratio of total shareholders' equity divided by revenues; (vi) net interest income divided by total operating income is a proxy for income diversity. Country controls: (i) restrictiveness (RES) pertains to restrictions imposed on banks, namely the degree to which national regulatory authorities allow commercial banks to engage in 'nontraditional' activities; (ii) the development of the financial markets is proxied by private credit (PC_GDP, the value of claims on the private sector by deposit money banks and other financial institutions) and stock market capitalization (SMC_GDP, the total value of shares traded on a country's stock exchanges), both scaled by GDP.

Variables	Unit	2007					2010				
		Number Obs.	Min.	Max.	Mean	St. Dev.	Number Obs.	Min.	Max.	Mean	St. Dev.
Q	Ratio	123	1.33	6.37	2.59	0.77	95	1.23	4.68	1.98	0.56
ROA	Ratio	123	-0.02	0.08	0.01	0.01	101	-0.02	0.09	0.00	0.03
ROE	Ratio	123	-0.18	0.35	0.14	0.08	101	-4.83	0.63	0.02	0.49
EDF	Number	30	-1.69	-0.29	-1.03	0.29					
NPL/L	Percent	78	0.00	27.24	2.41	3.62	123	0.00	61.06	3.66	4.94
Z-SCORE	Number	64	-2.03	1.85	-1.02	0.29	72	-10.86	0.23	0.23	0.04
MO	Ratio	123	0.00	0.12	0.01	0.02	123	0.00	0.09	0.00	0.01
SIZE	Thousands EUR	123	4.11	11.66	8.62	1.64	123	3.86	7.41	5.86	0.55
AGE	Years	123	5.00	535.00	138.61	92.36	123	8.00	538.00	141.61	100.57
GO	Ratio	123	-0.51	0.67	0.18	0.17	123	-9.02	3.05	0.43	2.76
DI	Ratio	123	0.00	0.98	0.91	0.15	123	0.00	0.44	1.18	0.83
CI	Ratio	123	0.16	29.00	1.86	3.43	123	0.00	11.01	0.32	1.10
NII_OI	Ratio	123	0.00	11.86	1.83	1.46	103	0.00	1.34	0.65	0.27
RES	Number	123	1.25	3.25	2.42	0.66	123	1.25	3.25	2.42	0.66
PC_GDP	Ratio	117	25.65	141.30	84.39	35.00	123	15.00	101.37	22.90	26.36
SMC_GDP	Ratio	123	0.22	4.56	1.05	0.74	123	0.09	10.88	1.52	2.54

Table 3: *Pearson Correlation Factors – 2007(below the diagonal) and 2010 (above the diagonal)*

Q is the ratio of market to book value plus debt divided by total assets. ROA is the ratio of trailing 12 month net income (losses) minus trailing 12 month total distribution of dividends to preferred stock holders divided by average assets. ROE is the ratio of net income (losses) divided by shareholders' equity. In robustness tests, expected default frequency (EDF from Moody's KMV), non-performing loans to total assets (NPL/L), and the logarithm of Z-SCORE are proxies for bank risk. Expected default frequency (EDF) is a credit risk measure sourced by Moody's KMV. Non-performing loans to total loans (NPL/L) is the percentage of problem loans in total loans. Z-SCORE represents the distance to default and corresponds to the number of standard deviations ROA has to decrease for equity to be depleted. Variable of interest: (i) managerial ownership (MO) is the ratio of shares held by management divided by total shares. Bank controls: (i) SIZE is the logarithm of gross operating revenue; (ii) AGE represents the number of years since incorporation; (iii) revenue growth (GO) is the contemporaneous total revenue scaled by the total revenue for the previous period; (iv) debt intensity (DI) is the ratio of debt divided by total assets; (v) capital intensity (CI) is the ratio of total shareholders' equity divided by revenues; (vi) net interest income divided by total operating income (NII_OI) is a proxy for income diversity. Country controls: (i) restrictiveness (RES) pertains to restrictions imposed on banks, namely the degree to which national regulatory authorities allow commercial banks to engage in 'nontraditional' activities; (ii) the development of the financial markets is proxied by private credit (value of claims on the private sector by deposit money banks and other financial institutions) (PC_GDP) and stock market capitalization (the total value of shares traded on a country's stock exchanges) (SMC_GDP), both scaled by GDP.

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
		2010														
2007	1 Q	1	0.30	0.70	-0.09	-0.61	0.49	0.22	0.37	-0.22	0.03	0.00	-0.12	-0.11	-0.03	-0.16
	2 ROA	0.22	1	0.76	-0.17	-0.65	0.38	-0.04	0.09	0.07	0.03	-0.12	-0.03	-0.13	0.00	-0.13
	3 ROE	0.63	0.29	1	-0.10	-0.69	0.59	-0.09	0.06	0.09	0.13	-0.05	-0.02	-0.03	0.05	-0.01
	4 EDF	-0.44	-0.23	-0.52	1	0.79	-0.45	0.48	-0.20	-0.19	-0.18	0.41	-0.10	0.09	0.24	-0.05
	5 NPL/L	-0.29	-0.14	-0.29	0.34	1	-0.22	0.16	-0.14	0.31	-0.28	-0.44	0.14	-0.03	0.59	0.17
	6 Z-SCORE	0.00	-0.08	0.21	0.10	0.06	1	0.27	0.13	-0.09	0.20	-0.23	-0.05	-0.11	-0.37	-0.10
	7 MO	0.19	0.01	0.04	-0.19	-0.15	-0.48	1	0.02	-0.11	-0.02	-0.06	-0.03	-0.03	-0.09	-0.12
	8 SIZE	0.05	-0.17	0.30	-0.39	-0.25	0.18	-0.16	1.00	0.23	0.00	-0.03	-0.42	-0.27	-0.05	-0.14
	9 AGE	-0.17	-0.21	0.01	-0.19	0.18	0.18	-0.08	0.44	1	0.02	-0.10	0.05	-0.31	-0.03	-0.03
	10 GO	0.30	0.01	0.39	-0.39	-0.16	0.26	0.10	0.12	0.04	1	0.25	0.00	-0.02	-0.04	-0.09
	11 DI	0.16	-0.76	0.19	-0.21	-0.01	0.00	0.04	0.37	0.21	0.19	1	-0.07	0.04	0.14	0.01
	12 CI	-0.22	0.50	-0.26	0.43	0.16	-0.01	-0.07	-0.48	-0.23	-0.22	-0.91	1	-0.05	0.09	0.14
	13 NII_OI	-0.35	-0.32	-0.37	0.48	0.28	-0.06	-0.03	-0.24	0.03	-0.30	0.15	-0.07	1	0.11	0.17
	14 RES	-0.33	0.01	-0.48	0.32	0.20	-0.20	-0.02	-0.45	-0.20	-0.39	-0.23	0.31	0.31	1	0.06
	15 PC_GDP	-0.42	-0.18	-0.64	0.44	0.22	-0.27	0.04	-0.35	-0.15	-0.52	-0.13	0.27	0.29	0.70	1
	16 SMC_GDP	0.39	0.12	0.11	-0.20	-0.15	-0.35	0.23	-0.04	-0.15	0.01	0.03	-0.09	-0.12	-0.11	0.26

Notes: Values in bold denote significance at the 1% level.

Table 4: OLS regression results for the impact of managerial ownership on Q, ROA and ROE and test for differences between 2007 and 2010 cross-sections

Dependent variables: Q is the ratio of market to book value plus debt divided by the total assets. ROA is the ratio of trailing 12 month net income (losses) minus trailing 12 month total distribution of dividends to preferred stock holders divided by average assets. Variable of interest: managerial ownership (MO) is the ratio of shares held by management divided by total shares. Bank controls: (i) SIZE is the logarithm of gross operating revenue; (ii) AGE represents the number of years since incorporation; (iii) revenue growth (GO) is the contemporaneous total revenue scaled by the total revenue for the previous period; (iv) debt intensity (DI) is the ratio of debt divided by total assets; (v) capital intensity (CI) is the ratio of total shareholders' equity divided by revenues; (vi) net interest income divided by total operating income (NII_OI) is a proxy for income diversity. Country controls: (i) restrictiveness (RES) pertains to restrictions imposed on banks, namely the degree to which national regulatory authorities allow commercial banks to engage in 'nontraditional' activities; (ii) the development of the financial markets is proxied by private credit (value of claims on the private sector by deposit money banks and other financial institutions) (PC_GDP) and stock market capitalization (the total value of shares traded on a country's stock exchanges) (SMC_GDP), both scaled by GDP.

Dependent	Q				ROA				ROE			
			Test for differences				Test for differences				Test for differences	
	2007	2010	χ^2	Sig.	2007	2010	χ^2	Sig.	2007	2010	χ^2	Sig.
MO	4.05 *** (1.11)	10.98 *** (4.48)	1.90	0.168	0.00 (0.01)	-10.17 (11.16)	0.83	0.362	0.20 * (0.12)	39.65 (26.78)	2.17	0.141
SIZE	-0.09 *** (0.04)	0.45 *** (0.13)	16.37	0.000	0.00 (0.00)	0.35 ** (0.17)	4.18	0.041	0.01 (0.00)	5.96 *** (0.90)	44.29	0.000
AGE	0.00 ** (0.00)	0.00 *** (0.00)	0.48	0.486	0.00 (0.00)	0.00 ** (0.00)	4.01	0.045	0.00 ** (0.00)	-0.01 (0.00)	6.54	0.011
GO	0.08 (0.40)	0.02 (0.01)	0.02	0.882	0.00 (0.00)	0.02 (0.04)	0.25	0.619	0.01 (0.04)	0.16 (0.17)	0.68	0.409
DI	-0.78 (0.98)	0.00 (0.01)	0.64	0.425	-0.10 *** (0.01)	-0.06 * (0.03)	1.55	0.213	0.03 (0.09)	0.13 (0.14)	0.44	0.507
CI	-0.07 * (0.04)	0.00 ** (0.00)	3.48	0.062	0.00 *** (0.00)	0.00 (0.00)	18.39	0.000	0.00 (0.00)	0.01 (0.00)	6.88	0.009
NII_OI	-0.13 *** (0.02)	-0.03 (0.19)	0.23	0.628	0.00 *** (0.00)	-1.12 (0.91)	1.50	0.221	-0.01 ** (0.00)	-1.08 (2.22)	0.23	0.631
RES	0.04 (0.13)	-0.05 (0.06)	0.47	0.495	0.00 (0.00)	-0.27 * (0.14)	3.83	0.050	0.00 (0.01)	-1.10 (0.76)	2.09	0.148
PC_GDP	-0.01 *** (0.00)	-0.21 (0.14)	0.04	0.843	0.00 ** (0.00)	-0.32 (0.39)	0.64	0.424	0.00 *** (0.00)	-0.40 (0.38)	1.12	0.290
SMC_GDP	0.16 (0.18)	-0.01 (0.02)	0.99	0.321	0.00 (0.00)	0.02 (0.03)	0.31	0.580	0.00 (0.02)	0.07 (0.31)	0.04	0.844
(Constant)	5.07 *** (1.05)	-0.41 (0.82)			0.11 *** (0.01)	1.15 (1.63)			0.18 (0.11)	-25.67 (5.46)		
Number of observations	113	87	200		113	88			113	88	201	
AIC	197.25	91.88			-913.49	293.33			-322.98	566.78		
BIC	227.25	116.54			-883.49	320.58			-292.98	594.03		

Notes: Significance at the 1%, 5%, and 10% level is denoted by ***, ** and *, respectively. Values in bold denote significance at the 1% level. Standard errors are in parentheses.

Table 5: OLS regression results for the impact of managerial ownership on EDF, NPL/L, and Z-SCORE and test for differences between 2007 and 2010 cross-sections

Dependent variables: expected default frequency (EDF), non-performing loans to total loans (NPL/L) and the logarithm of Z-SCORE. Variable of interest: managerial ownership (MO) is the ratio of shares held by management divided by total shares. Bank controls: (i) SIZE is the logarithm of gross operating revenue; (ii) AGE represents the number of years since incorporation; (iii) revenue growth (GO) is the contemporaneous total revenue scaled by the total revenue for the previous period; (iv) debt intensity (DI) is the ratio of debt divided by total assets; (v) capital intensity (CI) is the ratio of total shareholders' equity divided by revenues; (vi) net interest income divided by total operating income (NIL_OI) is a proxy for income diversity. Country controls: (i) restrictiveness (RES) pertains to restrictions imposed on banks, namely the degree to which national regulatory authorities allow commercial banks to engage in 'nontraditional' activities; (ii) the development of the financial markets is proxied by private credit (value of claims on the private sector by deposit money banks and other financial institutions) (PC_GDP) and stock market capitalization (the total value of shares traded on a country's stock exchanges) (SMC_GDP), both scaled by GDP.

Dependent	EDF		NPL/L				Z-SCORE			
	2007	2010	2007	2010	Test for differences		2007	2010	Test for differences	
					χ^2	Sig.			χ^2	Sig.
MO	-3.32 *** (1.15)		-54.07 *** (15.63)	2.10 *** (0.79)	13.11	0.000	-7.53 (14.37)	-97.77 (91.13)	0.78	0.376
SIZE	-0.00 (0.05)		-0.22 (0.23)	-0.01 ** (0.00)	0.91	0.34	0.02 (0.06)	0.00 (1.31)	0.00	0.990
AGE	-0.00 *** (0.00)		0.00 (0.01)	0.00 (0.00)	0.00	1.00	0.00 ** (0.00)	0.03 (0.02)	2.11	0.146
GO	0.09 (0.08)		2.64 (1.71)	-0.00 *** (0.00)	2.40	0.12	0.09 (0.19)	0.15 (0.10)	0.05	0.824
DI	0.70 * (0.42)		10.17 * (5.98)	-0.00 *** (0.00)	2.90	0.09	2.49 (1.57)	-0.09 *** (0.03)	2.37	0.124
CI	0.04 (0.02) **		0.50 ** (0.24)	-0.00 *** (0.00)	4.24	0.04	-0.07 (0.06)	-0.00 (0.00)	1.36	0.243
NIL_OI	0.08 (0.03)		1.72 ** (0.80)	-0.02 (0.01)	4.69	0.03	-0.01 (0.11)	-5.03 ** (2.41)	4.48	0.034
RES	-0.14 (0.06)		-1.95 * (1.18)	0.01 * (0.00)	2.74	0.10	-0.36 (0.50)	-1.36 ** (0.55)	1.48	0.224
PC_GDP	0.00 ** (0.00)		0.00 (0.02)	-0.40 (0.54)	0.01	0.94	0.01 (0.01)	1.41 (0.97)	2.10	0.148
SMC_GDP			2.76 (1.83)	0.00 (0.00)	2.28	0.13	-0.79 ** (0.36)	0.26 (0.12)	6.67	0.010
(Constant)	-0.43 (0.52)		-6.92 (7.09)	0.06 * (0.03)			1.98 (2.32)	4.94 (7.38)		
Number of observations	58		70	16	86		27	24	51	
AIC	-34.76		383.87	-89.46			9.77	134.52		
BIC	-12.09		408.60	-80.96			24.03	147.48		

Notes Significance at the 1%, 5% and 10% level is denoted by ***, ** and *, respectively. Values in bold denote significance at the 1% level. Standard errors are in parentheses.

Table 6: OLS regression results for the impact of managerial ownership on Q (aggregated per quantile)

We use Tobin's Q (Q) as the dependent variable. Q is the ratio of market to book value plus debt divided by total assets. Variable of interest: managerial ownership (MO) is the ratio of shares held by management divided by total shares. Bank controls: (i) SIZE is the logarithm of gross operating revenue; (ii) AGE represents the number of years since incorporation; (iii) revenue growth (GO) is the contemporaneous total revenue scaled by the total revenue for the previous period; (iv) debt intensity (DI) is the ratio of debt divided by total assets; (v) capital intensity (CI) is the ratio of total shareholders' equity divided by revenues; (vi) net interest income divided by total operating income (NII_OI) is a proxy for income diversity. Country controls: (i) restrictiveness (RES) pertains to restrictions imposed on banks, namely the degree to which national regulatory authorities allow commercial banks to engage in 'nontraditional' activities; (ii) the development of the financial markets is proxied by private credit (value of claims on the private sector by deposit money banks and other financial institutions) (PC_GDP) and stock market capitalization (the total value of shares traded on a country's stock exchanges) (SMC_GDP), both scaled by GDP.

Dependent Variable	Q			
	2007		2010	
Independent Variables				
MO (Mon1)				
MO (Mon2)	0.20 (0.09)	**	0.00 (0.11)	
MO (Mon3)	0.10 (0.05)	*	0.02 (0.08)	
MO (Mon4)	0.02 (0.04)		0.04 (0.05)	
MO (Mon5)	0.07 (0.03)	**	0.05 (0.04)	
SIZE	0.10 (0.04)	***	0.45 (0.12)	***
AGE	-0.00 (0.00)	*	-0.00 (0.00)	**
GO	0.03 (0.35)		0.02 (0.01)	*
DI	0.03 (0.35)		0.00 (0.01)	
CI	-0.05 (0.04)		0.00 (0.00)	*
NII_OI	-0.13 (0.06)	***	-0.02 (0.18)	
RES	-0.00 (0.11)		-0.06 (0.07)	
PC_GDP	-0.01 (0.00)	***	-0.25 (0.17)	
SMC_GDP	0.22 (0.16)		-0.01 (0.02)	
(Constant)	3.99 (1.04)	***	-0.47 (0.64)	
Number of Observations	117		87	
AIC	206.33		99.46	
BIC	245.00		133.98	

Notes: Significance at the 1%, 5% and 10% level is denoted by ***, ** and *, respectively. Values in bold denote significance at the 1% level. Standard errors are in parentheses.

Table 7: *Instrumental variables regression results for managerial ownership*

We run instrumental variables regressions to control for the endogeneity of ownership. We use Tobin's Q (Q) as the dependent variable. Q is the ratio of market to book value plus debt divided by total assets. Managerial ownership (MO) is the ratio of shares held by management divided by total shares. SIZE is the logarithm of gross operating revenue. We use economic freedom sourced from The Heritage Foundation (<http://www.heritage.org/Index/>) as the instrument in Panel 1. Economic freedom is an average of the scores of ten country indicators: Business Freedom, Trade Freedom, Fiscal Freedom, Government Spending, Monetary Freedom, Investment Freedom, Financial Freedom, Property rights, Freedom from Corruption, and Labor Freedom. They are scaled from 0 to 100, where 100 represents the maximum freedom. In Panel 2 we use openness of the economy as an instrument, maintaining log of bank total assets as another instrument.

Dependent Variable	Q			
	2007		2010	
Independent Variables	Instrument: economic freedom	Instrument: openness	Instrument: economic freedom	Instrument: openness
MO	80.23	25.92	58.28	58.82
SIZE	0.24	0.24	0.28	0.28

Note: Values in bold denote significance at the 1% level.

Figure 1. *Graphical display of Tobin's Q across the spectrum of managerial ownership (MO) for the year 2007*
The dependent variable is Tobin's Q (Q). The solid line represents estimation using quantile regression techniques and the shadowed area the corresponding 95% confidence interval for the quantile regression estimation – we use standard errors computed after quantile estimation. MO ranges from near 0.00 to 0.12. The maximum point is – MO: 0.07 and Q: 3.40.

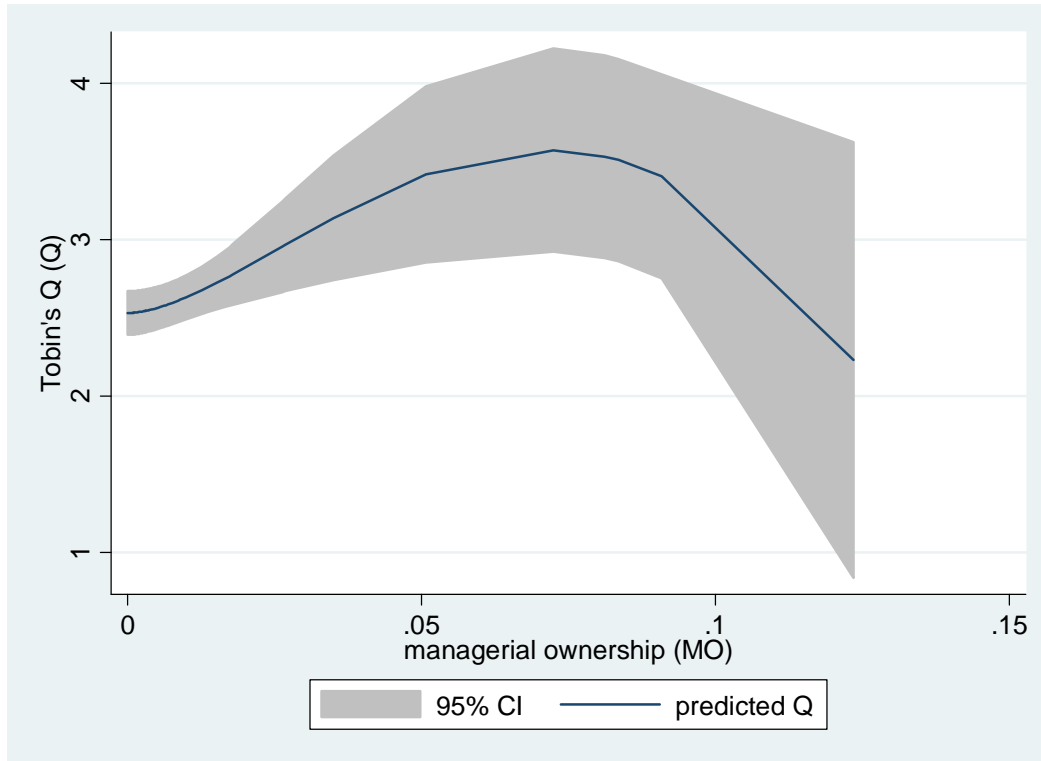


Figure 2. Graphical display of non-performing loans in total loans (NPL/L) across the spectrum of managerial ownership (MO) for the year 2007

The dependent variable is non-performing loans in total loans (NPL/L). The solid line represents estimation using quantile regression techniques and the shadowed area the corresponding 95% confidence interval for the quantile regression estimation – we use standard errors computed after quantile estimation. MO ranges from near 0.00 to 0.12. The minimum point is – MO: 0.07 and NPL/L: 0.24.

