WHY DID SOME BANKS PERFORM BETTER DURING THE CREDIT CRISIS?
A CROSS-COUNTRY STUDY OF THE IMPACT OF GOVERNANCE AND REGULATION

Andrea Beltratti
René M. Stulz

Why Did Some Banks Perform Better During the Credit Crisis? A Cross-Country Study of the Impact of Governance and Regulation
Andrea Beltratti and René M. Stulz
NBER Working Paper No. 15180
July 2009
JEL No. G01,G15,G18,G21,G32,G34

ABSTRACT

Though overall bank performance from July 2007 to December 2008 was the worst since at least the Great Depression, there is significant variation in the cross-section of stock returns of large banks across the world during that period. We use this variation to evaluate the importance of factors that have been discussed as having contributed to the poor performance of banks during the credit crisis. More specifically, we investigate whether bank performance is related to bank-level governance, country-level governance, country-level regulation, and bank balance sheet and profitability characteristics before the crisis. Banks that the market favored in 2006 had especially poor returns during the crisis. Using conventional indicators of good governance, banks with more shareholder-friendly boards performed worse during the crisis. Banks in countries with stricter capital requirement regulations and with more independent supervisors performed better. Though banks in countries with more powerful supervisors had worse stock returns, we provide some evidence that this may be because these supervisors required banks to raise more capital during the crisis and that doing so was costly for shareholders. Large banks with more Tier 1 capital and more deposit financing at the end of 2006 had significantly higher returns during the crisis. After accounting for country fixed effects, banks with more loans and more liquid assets performed better during the month following the Lehman bankruptcy, and so did banks from countries with stronger capital supervision and more restrictions on bank activities.

Andrea Beltratti
Department of Finance
Bocconi University
Via Roentgen 1
20100 Milan
Italy
andrea.beltratti@unibocconi.it

René M. Stulz
The Ohio State University
Fisher College of Business
806A Fisher Hall
2100 Neil Avenue
Columbus, OH 43210-1144
and NBER
and also ECGI
stulz_1@cob.osu.edu

1. Introduction

Throughout the world, many large banks have seen most of their equity destroyed by the crisis that started in the U.S. subprime sector in 2007 and governments have had to infuse capital in banks in many countries to prevent outright failure. Was the poor performance of the banks the outcome of a financial Tsunami that hit them unexpectedly, or were some banks more predisposed to experience large losses? Many observers have argued that ineffective regulation contributed or even caused the collapse. If that is the case, we would expect differences in the regulation of financial institutions across countries to be helpful in explaining the performance of banks during the credit crisis. Other observers have criticized the governance of banks and suggested that better governance would have led to better performance during the crisis. Finally, it could be that banks were affected differentially simply because they had different balance sheets and profitability before the crisis for reasons unrelated to governance and regulation and that these characteristics affected their vulnerability to large adverse shocks. In this paper, we investigate these possible determinants of bank performance, measured by stock returns, during the crisis for a sample of large banks, i.e., banks with assets in excess of $50 billion at the end of 2006, across the world. Our sample includes 98 banks. Of these, 19 are U.S. banks.

One striking result is that banks with the highest returns in 2006 had the worst returns during the crisis. More specifically, the banks in the worst quartile of performance during the crisis had an average return of -87.44% during the crisis but an average return of 33.07% in 2006. In contrast, the best-performing banks during the crisis had an average return of -16.58% but they had an average return of 7.80% in 2006. This evidence is most consistent with the Tsunami explanation for the crisis: the attributes that the market valued in 2006, for instance, a successful securitization line of business, exposed banks to risks that led them to perform poorly when the crisis hit. The market did not expect these attributes to be a source of weakness for banks and did not expect the banks with these attributes to perform poorly as of 2006.

An OECD report argues that "the financial crisis can be to an important extent attributed to failures and weaknesses in corporate governance arrangements" (Kirkpatrick (2008)). We find no evidence

supportive of such a statement in our data. There is no evidence that banks with better governance, when governance is measured with data used in the well-known Corporate Governance Quotient (CGQ score) perform better during the crisis. Strikingly, banks with more pro-shareholder boards performed worse during the crisis. Such a result does not mean that good governance is bad. Rather, it is consistent with the view that banks that were pushed by their boards to maximize shareholder wealth before the crisis took risks that were understood to create shareholder wealth, but were costly ex post because of outcomes that were not expected when the risks were taken. Our result is consistent with the result of Adams (2009) that in the U.S. banks that received TARP funds had more independent boards. Bank balance sheets and bank profitability in 2006 are more important determinants of bank performance during the crisis than bank governance and bank regulation. Banks that had a higher Tier 1 capital ratio in 2006 and more deposits generally performed better during the crisis. As a result, the positioning of banks as of the end of 2006 is more important than governance and/or regulation in explaining the performance of banks during the next two years. Another way to explain our results is that banks were differentially exposed to various risks by the end of 2006. Some exposures that were rewarded by the markets in 2006 turned out to be unexpectedly costly for banks the following two years. Overall, the explanatory power of regulatory variables is small compared to the explanatory power of bank-level variables.

To test the bank-level governance hypothesis, we use data from the CGQ score and a proxy for the existence of a controlling shareholder. We require banks in our sample to have a CGQ index for 2006. We use the governance attributes of the CGQ score in the same way as Doidge, Karolyi, and Stulz (2007) and Aggarwal, Erel, Stulz, and Williamson (2009), namely we create subindices that capture key elements of governance rather than use the CGQ score directly. The subindices are for board attributes, audit function attributes, compensation policy attributes, and takeover restrictions. With all subindices, more pro-shareholder governance implies a higher value of the index. We find no consistent evidence that better governance led to better performance during the crisis, but we find strong evidence that banks with more shareholder-friendly boards performed worse. We also use a measure of insider ownership as a proxy for governance. This measure is never related to performance in our regressions. Country governance,

measured using the comprehensive index of Kaufman, Kray, and Mastruzzi (2008), is also not related to bank performance. Finally, shareholder protection as measured by the anti-director index first introduced in La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1998) is not consistently related to performance, but when it has a significant coefficient, the coefficient is positive. Though studies of corporate governance are generally plagued by concerns about endogeneity, such concerns do not seem to be relevant for our study. It does not seem plausible that banks' anticipation of how they would be affected by the events of 2007-2008 somehow influenced their choice of governance mechanisms before 2007.

We use the database on bank regulation developed in Barth, Caprio, and Levine (2001, 2004) to examine the hypothesis that stricter regulation prevented bank losses during the crisis. We use indicators for the power of the regulators, oversight of bank capital, restrictions on bank activities, and the independence of the supervisory authority. When we compare the banks in the top quartile of return performance to those in the bottom quartile, the better performing banks have more restrictions on their activities, stronger oversight of bank capital, and a more independent supervisory authority. In multiple regressions, we generally find that a stronger supervisory authority has a negative impact on performance during the crisis and stronger bank capital oversight is associated with better performance. We interpret the negative coefficient on the strength of the supervisory authority as follows. If stronger supervisory authorities would have been more effective at preventing banks from taking risks before the crisis, we would expect a positive coefficient on that variable. A possible explanation for this negative coefficient is that once the crisis was ongoing, stronger regulators took more measures that were costly to shareholders to assure the survival of banks.

When a financial crisis occurs, we would expect banks with more capital and more stable financing to perform better. We find that this is the case. Banks with more Tier I capital in 2006 had higher returns during the crisis. Further, banks that rely more on deposits in their financing also had higher returns. There is some evidence that larger banks performed worse. In contrast, however, the coefficients on measures of leverage other than Tier I, such as the ratios of equity to assets and tangible equity to liabilities, are not significant when we limit the sample to large banks. These latter ratios perform better in

terms of significance than the Tier 1 ratio in a sample that includes banks with assets in excess of $10 billion, in contrast to our main sample that includes only banks with assets in excess of $50 billion.

The results we have described so far concern the performance of banks from the middle of 2007 to the end of 2008. The month following the bankruptcy of Lehman is widely regarded as a month where contagion was dominant. Contagion is usually taken to mean comovement that cannot be explained by fundamentals. It is therefore important to investigate whether the bank characteristics we focus on can help understand the performance of banks during that month. With contagion, we would expect bank-level variables and regulatory variables to have no explanatory power for that period. In multiple regressions, banks with more shareholder friendly boards performed worse in the month after Lehman. There is some evidence that banks with more loans to assets and with more liquid assets performed better. Banks from jurisdictions with strong capital supervision and more restrictions on bank activities had higher returns during that month. Our evidence suggests that the market discriminated across banks to some extent during the month following Lehman. The explanatory power of our bank governance, balance sheet, performance, and regulatory variables drops in half during the month following Lehman compared to the period from July 2007 to the end of December 2008.

The paper proceeds as follows. In Section 2, we introduce the data we use. In Section 3, we examine how the performance of banks during the crisis relates to governance, regulation, balance sheet composition, and profitability before the crisis. In Section 4, we investigate whether the contagion that followed the collapse of Lehman affected banks differently depending on their attributes. In Section 5, we examine the robustness of our results. We conclude in Section 6.

2. Data

To select the sample, we start from the financial institutions in Bankscope with assets in excess of $10 billion in 2006. There are 1,245 institutions in Bankscope that satisfy this criterion. We then eliminate the financial institutions that are not included in the Riskmetrics database, which we use for bank-level governance data. We are left with 231 institutions. This sample includes a wide variety of

5

financial institutions: banks, holding companies, investment banks, brokers. Importantly, the sample includes all financial institutions that merged or went bankrupt during the financial crisis. We use Datastream for stock returns (including dividends). Eleven institutions are dropped for various reasons: data errors (one), delisting before July 2007 (six), avoid duplication between the banking group and the financial group when both are publicly traded (two), mergers (two).[1] We are therefore left with a slightly smaller sample of 220 institutions.

From the sample of 220 institutions, we form a sample of 98 institutions that includes only institutions that can be reasonably called *large* deposit-taking banks. Except for Section 5, we focus on large banks in this paper. A financial institution is included in the sample of 98 large banks if it has a loan/asset ratio above 10%, a deposit/asset ratio above 20%, total assets in excess of $50 billion at the end of 2006 and reports information on its Tier 1 capital ratio. These banks come from 20 countries. Univariate statistics for the data discussed in this section are reported in Table 1. We winsorize the explanatory variables at the 1% and 99% level. In this section, we describe the data as well as the performance measures we use.

2.a. Bank returns

Our bank performance measure is buy-and-hold dollar returns. Our main focus is on returns from the middle of 2007 to the end of 2008. We call this period the *crisis period*. The start of the period seems uncontroversial. The end of the period is partly dictated by data availability. Banks performed poorly during the first quarter of 2009 as well, but one could argue that the returns of banks during that period were heavily influenced by uncertainty about resolution mechanisms and the possibility of nationalization. Not surprisingly, the average buy-and-hold dollar return in our sample is extremely poor at -54.43%. However, the standard deviation of 28.55% is surprisingly high. The banks in the sample also performed

---

[1] Our sample includes banks that merged during the crisis. We excluded banks with mergers close to completion on July 1, 2007.

extremely poorly in the month that followed the bankruptcy of Lehman as they lost on average 28.81%, but again there is a surprisingly large standard deviation of 17.57%.

2.b. Bank balance sheet and income characteristics

We investigate the hypothesis that characteristics of bank balance sheets and income statements before the start of the crisis help explain the performance of banks during the crisis. We obtain these data from Bankscope for 2006. Our choice of variables is largely dictated by data availability. For instance, it would be useful to have measures of the exposure of banks to subprime loans, but such data is not available from Bankscope – or, for that matter, any public source. Similarly, banks' exposure to SIVs played an important role in the crisis (see Acharya and Schnabl (2009)), but we have no data for this exposure.

We use three different variables to capture the capital ratios of banks:

 a. Tier 1, defined as the ratio of tier 1 capital to total risk-weighted assets;

 b. Equity, defined as the ratio of total equity to total assets;

 c. Tangible equity, defined as the ratio of tangible equity to total liabilities. When we do not have data for intangible assets, we use total equity in the numerator.

The first is a regulatory capital ratio whereas the other two are ratios that capital markets focus on (see the arguments in Acharya, Gujral, and Shin (2009)). Everything else equal, we would expect banks' performance during the crisis to be positively related to capital ratios before the crisis since a bank with more capital would have more of a cushion to absorb adverse shocks and hence would experience less financial distress. To capture the composition of the liabilities we use Deposit, which is defined as the ratio of deposits to assets. Deposit financing is generally more sticky, so that a bank with more deposits will have more stable financing compared to one that relies more on money markets for its financing, especially when the money markets work poorly. We would therefore expect that banks with more deposit financing would have performed better. We also use Money Market defined as the ratio of money

market funding to assets as the withdrawal of short-term money market funding played an important role in the credit crisis (see, for instance, Brunnermeier (2009)).

We use two variables to characterize the asset side of the banks. First, we use Loans defined as the ratio of loans to total assets. Banks where Loans is higher would be banks with a smaller portfolio of securities. Presumably, these banks would also have fewer assets marked to market. We would expect such banks to have performed better because their regulatory capital would have been less endangered by the increase in credit spreads that reduced security values – though these banks would have had to increase their loss reserves on their loans. We also use Liquidity which we define as the ratio of liquid assets to total assets. Everything else equal, we would expect banks with more liquid assets to be in a better position to reduce their balance sheet and to cope with financing difficulties. We also report a measure of profitability, Profit, defined as pre-tax profits divided by assets, but do not use it in regressions as it is available for only a subset of firms for 2008 and as it is sensitive to differences in accounting standards on how securities and derivatives are marked to market. Not surprisingly, profitability falls sharply from 2006 to 2008.

2.c. Regulation

The regulation hypothesis for the performance of banks during the crisis is that lax regulation led banks to take risks that they would not have taken with tighter regulation. With this hypothesis, we would expect stricter regulation to be associated with better bank performance during the crisis. To test this hypothesis, we use the indices of Caprio, Laeven and Levine (2007).[2] These indices are as follows:

a)   Official, an index of the power of the commercial bank supervisory agency, includings elements like the rights of the supervisor to meet with and demand information from auditors, to force a bank to change the internal organizational structure, to supersede the rights of shareholders, and to intervene in a bank;

_____

[2] These indices are also discussed in Barth, Caprio, and Levine (2001, 2004).

b) Capital, an index of regulatory oversight of bank capital, Capital, including indicators for whether the sources of funds that count as regulatory capital can include assets other than cash and government securities, and whether authorities verify the source of capital;

c) Restrict, an index of regulatory restrictions on the activities of banks, consisting, for example, of limitations in the ability of banks to engage in securities market activities, insurance activities, real estate activities, and to own nonfinancial firms;

d) Independence, an index of the independence of the supervisory authority, measuring the degree to which the supervisory authority is independent from the rest of the government and the degree to which the supervisory authority is shielded from lawsuits by banks and other parties.

Perhaps not surprisingly given our data requirements, the banks in our sample have on average stronger regulation indices than the average bank in studies that cover more countries such as Caprio et al. (2007).

2.d. Country-level governance

There is now considerable evidence showing that country-level governance variables are important determinants of firm policies and valuations as well as of financial development. Empirical work shows that risk-taking is affected by shareholder rights as well as by a country's institutions, such as the institutions protecting property rights (see, for instance, John, Litov, and Yeung (2008)). At the level of a bank, we would expect that banks in countries with better institutions would be more likely to take decisions that maximize shareholder wealth. If bank executives took bad risks because they were not sufficiently focused on the interests of shareholders, we would expect banks to perform better during the crisis in countries with more protection of shareholder rights and stronger institutions. However, private benefits of control are higher in countries with poor shareholder rights and poor institutions. It could be that executives took fewer risks in such countries to protect their own interests. Hence, banks from these countries could perform better because executives paid less attention to maximizing shareholder wealth.

As proxies for country-level governance, we use the country-level indicators of Kaufman, Kray, and Mastruzzi (2008). These indicators are obtained from combining several hundred individual variables measuring political stability, government effectiveness, regulatory quality, enforcement of the rule of law, corruption, and the extent to which a country's citizens are able to participate in selecting their government. We follow Kaufman et al. (1999) and consider the mean of the six variables for each country. We call this index Institutions and a higher value of the index indicates better institutions. We measure shareholder protection using Anti-director, which is the anti-director index of La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1998) as revised in Djankov, La Porta, Lopez-de-Silanes, and Shleifer (2008). The anti-director index takes values from 0 to 5. A higher value means better shareholder rights. Our sample's lowest value is 2.

2.e. Bank-level governance

The bank governance hypothesis predicts that banks with better governance should have had higher returns during the crisis. Better governance could have acted through two channels. Many observers have argued that traders and executives of banks had incentives to take risks that were not in the best interests of shareholders. If these observers are right, we would expect banks with better governance to have set incentives and controls in such a way that in these banks traders and executives would have been more likely to avoid taking risks that did not benefit shareholders. Hence, these banks should have performed better during the crisis because their exposure to the risks that manifested themselves during the crisis would have been lower. Though this type of argument has been advanced by many observers, it is worthwhile to note that it does not follow from finance theory that poor governance necessarily leads to more risk-taking. Following Merton (1977), there is a considerable literature making the case that greater risk-taking can be in the interests of shareholders in the presence of deposit insurance. Further, there is empirical evidence showing that poor governance can lead executives to take fewer risks to protect their private benefits from control (see, for instance, John, Litov and Yeung (2008)). This paper would predict that banks with better governance would take more risks, which would have led to poor performance

during the crisis if the risks taken before the crisis had unexpected bad outcomes. The second channel through which governance could have affected performance is that once the crisis affected banks adversely, banks with better governance might have been better at coping with the crisis effectively because they made better decisions (see Graham and Narasimhan (2004) for a similar perspective on how firms weathered the Great Depression). With this channel, banks with better governance would have made wiser decisions during the crisis and hence they would have had better returns.

Recent cross-country research emphasizes the importance of the nature of ownership for bank performance and risk-taking. Most relevant for our study, Laeven and Levine (2008) consider the potential conflicts between managers and owners and analyze the relations between risk taking by banks, their ownership structures, and bank regulations. They find that bank risk is generally higher in banks that have controlling shareholders with large stakes. However, they show that this effect is mitigated by the presence of strong shareholder protection laws. They conclude further that the impact of regulation on bank risk depends on whether the bank has a large controlling shareholder. Specifically, stricter regulation decreases bank risk when a bank is widely held but increases it when it has a large controlling shareholder.

To proxy for the nature of ownership, we use an indicator variable from Bankscope which takes value one if there is no shareholder who controls directly or indirectly more than 25% of the shares. We call this indicator variable ownership. Admittedly, Bankscope's threshold of ownership is higher than is typically used to denote widely-held ownership.[3] The high threshold helps explain why the frequency of widely-held banks is a high 80% in our sample. Another contributing factor to the high frequency of widely-held banks may be that we are considering the largest banks and our data is more recent than the data used in other studies.[4]

We also use components of the CGQ score for 2006. ISS started providing the Corporate Governance Quotient (CGQ) for U.S. companies in 2002 and for international companies in 2003. The CGQ scores are now produced by Riskmetrics. The CGQ rankings are a relative measure of a firm's investment in

---

[3] For instance, La Porta, Lopez-de-Silanes, and Shleifer (1999) consider thresholds of 10% and 20%.
[4] See, for instance, Caprio, Laeven, and Levine (2007).

11

internal governance – that is, its adoption of governance attributes that increase the power of minority shareholders – and indicate the firm's investment in governance relative to firms in its industry or within an index in which the firm is included. To compute these indices, Riskmetrics collects information on governance attributes for a large number of U.S. and foreign companies. We use that information to construct governance subindices. How a firm fares for each attribute is determined by an examination of the firm's regulatory filings, annual reports, and its website. Firms do not pay to get rated but can access their ratings and check for accuracy. Firms can change their ratings only by making and publicly disclosing changes to their governance structure. For each attribute, Riskmetrics evaluates whether a firm meets a threshold level of implementation of the attribute and considers the firm to have that attribute if it meets the threshold. The advantages of using the Riskmetrics data are that it evaluates firms consistently across countries, that it is publicly available, and that it has been used in empirical work showing that the governance attributes it measures are related to firm value (see, for instance, Aggarwal, Erel, Stulz, and Williamson (2009)). Though governance indices are widely used in empirical research, such use has both strengths and weaknesses. In particular, theoretical work shows that a governance attribute can be valuable for one firm but also can destroy wealth in another firm, so that on theoretical grounds there is no necessary relation between governance indices and firm value.[5] The literature has also questioned whether governance indices measure the right governance attributes. A further difficulty is that, as noted by Adams and Mehran (2003) for the U.S., regulation typically affects governance more for financial institutions than it does for other firms. In this paper, our ambition in using the governance attributes of the CGQ rankings is limited. These rankings evaluate firms according to a number of criteria that are considered to be important by governance observers in the U.S. and we investigate whether these attributes are related to bank performance during the crisis.

Following Aggarwal, Erel, Stulz, and Williamson (2009), we select 44 attributes that are available for U.S. firms as well as for foreign firms. These attributes cover four broad subcategories: (1) Board (25 attributes), (2) Audit (three attributes), (3) Takeover (six attributes), and (4) Compensation (10 attributes).

---

[5] See, for instance, Coles, Naveen, and Naveen (2008).

Board attributes attempt to capture the aspects of the functioning of the board of directors that relate to board independence, composition of committees, size, transparency, and how work is conducted; Audit includes questions regarding the independence of the audit committee and the role of auditors; Takeover includes provisions from the firm's charter and bylaws concerning the existence of a dual-class structure, the role of shareholders, and the existence of a poison pill and blank check preferred; and Compensation deals with executive and director compensation issues related to options, stock ownership and loans, and how they are determined and monitored. We average the scores for each attribute within a group to obtain an index for that group for each firm. A higher value of an index means that the firm's governance is more favorable to the interests of shareholders for that index. As can be seen in Table 1, there is a wide range of values for each of the indices. The range is narrower within countries. However, it is interesting to note that there is substantial variation in the board index within the U.S. as well. The standard deviation of the index within the U.S. for the banks in our sample is roughly half its standard deviation across all banks.

Table 1 shows that the banks in our sample differ substantially with respect to the characteristics we measure. Interestingly, all the banks meet the Basel I Tier 1 requirement at the end of 2006 since the lowest Tier 1 ratio is 5.79%. However, the ratio of equity to total assets is quite low for some banks as its minimum is 1.85%. Similarly, the ratio of tangible equity to liabilities has low values as well since its minimum is 1.49%. All these capitalization variables have wide ranges. For instance, for Tier 1, the range is from 5.79% to 14.03%. Our other bank characteristics have wide ranges as well. For instance, the range of Deposits is from 28.49% to 90.99%. There is much variation in the governance and regulatory variables as well.

3. Determinants of bank performance during the crisis

In this section, we first compare the characteristics of the banks that had the worst return performance (bottom quartile) and had the best return performance (top quartile) during the crisis. We then estimate multiple regressions to investigate the determinants of performance.

3.a. Characteristics of worst and best performing banks

Table 2 divides the sample into the top and bottom quartiles of return performance from the middle of 2007 to the end of 2008. By construction, the difference in average returns between these two groups is extremely large. The bottom-performing quartile banks had an average return over that period of -87.44%; in contrast, the top-performing banks had an average return of -16.58%. Strikingly, however, the banks that performed poorly during the crisis had extremely high returns in 2006 as their average return was 33.07%. In contrast, the banks that performed better during the crisis had a much lower average return of 7.80% in 2006.

The worst-performing banks are larger banks. We see that the best-performing banks had significantly lower leverage at the end of 2006. Interestingly, the difference in capital ratios is higher for the equity capital ratio than for the Tier 1 capital ratio. The best-performing banks have a Tier 1 ratio that is 98 basis points higher than the worst-performing banks. However, they have a ratio of equity to assets that is higher by 176 basis points. A similar result holds for the ratio of tangible equity to liabilities. Consequently, the banks that performed better had more capital but also better capital – in the sense of more equity.

The better-performing banks are more traditional banks. There is an extremely large difference in the ratio of deposits to assets between the best-performing and the worst-performing banks. At the end of 2006, the average deposits to assets ratio was 72.65% for the best-performing banks and 52.69% for the worst-performing ones. Neither the ratio of loans to assets nor the ratio of liquid assets to total assets was significantly different between the two groups of banks. Money market funding was not more important for the banks that perform poorly. There was no difference in the profitability of banks in 2006. Obviously, there were large differences in 2007 and 2008.

We now consider the regulation and country-level governance variables. The first variable measures the power of the supervisors. There is no difference in that variable between best-performing and worst-performing banks. However, the banks that performed better come from countries with stronger oversight of bank capital, more restrictions on bank activities, and greater independence of regulators. Banks that

performed better also come from countries with worse governance. The anti-director index does not differ between the best-performing banks and the worst-performing banks.

Finally, we turn now to differences in governance. There is no difference in the proportion of banks with concentrated ownership between the best performing banks and the worst performing banks. With the indices we use, a higher value of an index means that, everything else equal, the bank has more shareholder-friendly governance as evaluated by Riskmetrics. The first index is the index of board attributes. Strikingly, the banks with the worst performance have an index with a much higher value than the banks with the best performance. The difference between the two means is statistically significant at the 1% level. Consequently, better-performing banks had a much less shareholder-friendly board than the worse-performing banks. There is no significant difference for the other indices.

3.b. Multiple regressions

The comparisons made in section 3.a. show that the banks that performed the worst during the crisis had on average, in 2006, better returns, more leverage, less deposits, more shareholder-oriented boards, and came from countries with better governance, weaker oversight of capital, fewer restrictions on bank activities and more independent supervisors. The problem with these comparisons is that many of these bank characteristics are correlated. Further, they might be correlated with unobserved country characteristics. In this section, we therefore estimate multiple regressions to evaluate the relation between bank characteristics and bank performance. In some of these regressions, we control for country fixed effects. We cannot control for country fixed effects in all regressions because of multicollinearity when we use our regulatory variables. We therefore estimate regressions without the regulatory variables but with country fixed effects and regressions with regulatory variables but not with country fixed effects. In estimating the significance of the regression coefficients, we allow for clustering at the country level.

Regression (1) of Table 3 estimates the relation between bank performance and bank-level governance variables and uses country fixed effects. The board index has a negative coefficient significant at the 1% level and the takeover index has a positive coefficient significant at the 10% level.

However, the latter index is never significant in the other regressions. The economic significance of the coefficient on the board index is substantial. The firms in the bottom quartile of performance have an average board index of 13.80 and the firms in the top quartile of performance have an average board index of 10.84. A one point increase in the board index is associated with a decrease in returns of 5.04 percentage points. We explained earlier that we would find such a result if banks with more pro-shareholder boards took more risks that unexpectedly performed poorly. A concern, however, is that banks with more pro-shareholder boards could have performed more poorly because these boards forced management to disclose bad news. However, such an explanation seems to make it difficult to understand why, as we show in the next section, the coefficient on the board index is negative in the month following Lehman's bankruptcy as well. We would expect that more transparent banks would have suffered less during that month for given risk exposures, so that the poor performance of banks with more pro-shareholder boards seems more likely to result from the risk exposures of those banks.

We now turn to balance sheet and income statement characteristics of banks. In Regression (2), we use bank characteristics and country fixed effects as independent variables. The regression uses the Tier 1 capital ratio as the proxy for regulatory capital. We find that there is a significant positive relation between bank performance and Tier 1 capital. A one standard deviation increase in the Tier 1 capital ratio controlling for country fixed-effects improves performance during the crisis by 14.71%. Banks with higher returns in 2006 performed worse during the crisis. No other variable has a significant coefficient.

In regression (3), we combine regressions (1) and (2). The board index, the Tier 1 capital ratio, and the 2006 return are still significant and their coefficients are similar to their coefficients in the previous regressions. The takeover index is not significant in regression (3). However, the ratio of deposits to assets has a significant positive coefficient at the 5% level and size has a negative coefficient significant at the 10% level.

Regressions (4) and (5) use the regulatory variables. In regression (4), we regress bank returns on the regulatory indices, the country-level governance index, the anti-director index, and GDP per capita. Bank

16

returns during the crisis were positively related to the index of capital supervision. Except for the anti-director index, which has a positive coefficient, no other variable is significant in regression (4).

Finally, in regression (5), we add to regression (4) the bank-level governance variables as well as the bank financial characteristics. In contrast to regression (3), neither bank size nor deposits are significant. However, the board index has a significant negative coefficient and the Tier 1 capital ratio has a positive significant coefficient. Further, as in regression (4), the index of capital oversight is positive and significant. In addition, the index of powers of supervisors has a negative significant coefficient. The country governance variables are not significant.

A striking result from Table 3 is the extent to which governance and bank characteristics are helpful in explaining the cross-sectional variation in bank returns during the crisis compared to regulatory characteristics. Though we do not report that regression, the adjusted R-squared of a regression with only country fixed-effects is 0.187. The adjusted R-squared of the regression using bank-level governance variables and bank balance-sheet and performance characteristics is 0.515, so that these bank-level characteristics increase the adjusted R-squared by 0.328. In contrast, the adjusted R-squared of the regression with only regulatory variables is 0.093. The adjusted R-squared of the regression with only regulatory variables surely overstates the impact of regulation since the regulatory variables are likely to be correlated with country characteristics not controlled for. This evidence suggests that bank-level variables are much more important in understanding the performance of large banks during the credit crisis than the regulation they were subjected to.

To better understand the role of the governance and regulatory variables, we estimated regressions using information available from Bloomberg on writedowns and capital raising for 41 banks in our sample from 11 countries. Because of the small sample, the information from these regressions is limited, but it is nevertheless interesting. We first regressed the ratio of writedowns to assets on the board index, Tier 1 capital ratio, the log of assets, the power of the supervisor, the index of capital supervision, the institution index, and the anti-director index. We find that the writedown ratio is positively related to the board index and to the powers of the supervisor, and negatively related to the Tier 1 capital ratio and the

strength of capital supervision. This regression supports our interpretation that banks with a more shareholder-friendly board took more risks. We then estimate the same regression for capital raising, but now we add the ratio of writedowns to assets as an explanatory variable. In that regression, the board index is not significant. However, the index of the power of the supervisor has a positive significant coefficient at the 5% level. This regression is consistent with the hypothesis that more powerful supervisors required banks to raise more funds for a given amount of writeoffs. Of course, these regressions have to be interpreted with caution because of the small sample, of selection problems, and of potential endogeneity issues.

4. The performance of banks following the Lehman bankruptcy

The Lehman bankruptcy was followed by what has generally been characterized as a period of panic and contagion in the markets. There is controversy about that period. For instance, Taylor (2009) argues that the dramatic events in the capital markets over the weeks after the Lehman bankruptcy filing were not triggered by the bankruptcy filing but instead by the actions of policymakers. More specifically, using an event study, he claims that the adverse movements in the markets followed the meeting of Fed Chairman Bernanke and Treasury Secretary Paulson with Congressional leaders and the announcement of TARP. During the month starting on the market close immediately before the bankruptcy filing (the Lehman bankruptcy month), the average return of the banks in our sample is -28.81%. If this dramatic destruction of shareholder wealth was the result of indiscriminate panic and contagion, the variables we have focused on so far should not be helpful in understanding the cross-sectional variation in bank returns during that month. In this section, we investigate whether the performance of banks during the Lehman bankruptcy month is related to the characteristics used in Section 3.

In Table 4, we divide banks in the Lehman bankruptcy month into return quartiles and compare bank characteristics between the worst and best performing banks, similarly to the analysis conducted in Table 2. We find that banks with the worst performance had lower Tier 1 capital and a lower deposit-to-asset ratio before the crisis. None of the other bank characteristics differ between the best-performing and

worst-performing banks at the 10% level. There are no significant differences in governance between the best and worst performing banks even though the board index is close to being significant at the 10% level. However, the best-performing banks come from countries with more powerful supervisors, more restrictions on bank activities, and stricter capital oversight.

We also estimate multiple regressions for the Lehman bankruptcy month as we did for the whole crisis period. These multiple regressions are presented in Table 5. The board index has a significant negative coefficient in all regressions. The takeover index has a positive significant coefficient in the first regression, but not in the other ones. In regression (2), banks that performed better have a higher ratio of loans to assets and a higher ratio of liquid assets to assets, but the Tier 1 ratio is not related to performance. In regression (3), we use both bank-level governance variables and balance sheet and performance characteristics. No bank balance sheet or performance characteristic is significant in that regression. In regression (4), we use only the regulatory variables. The index of capital supervision has a positive significant coefficient and no other regulatory variable has a significant coefficient. We also include the anti-director index which has a positive significant coefficient in that regression at the 1% level.

Regression (5) controls for all the bank-level and regulatory characteristics we are interested in, but it does not use country fixed-effects. In that regression, the board index has a significant negative coefficient. The loan to assets and the liquid assets to assets ratios have positive significant coefficients, but again the Tier 1 ratio is not significant. The indices of capital supervision and of restrictions of bank activities have significant positive coefficients. The coefficient on the anti-director index is significantly positive as well.

The evidence in regression (5) suggests that the market distinguished between banks following the bankruptcy of Lehman to some extent. However, regression (5) in Table 5 does not explain as much of the cross-sectional variation in returns as the comparable regression in Table 3. A concern with these regressions is that the regulatory variables could proxy for country characteristics. In general, fixed-effects could alleviate that concern, but in regression (5) such an approach cannot be used because of

multicollinearity. When we use country-fixed effects without the regulatory variables, none of the bank balance sheet and performance characteristics are significant.

5. Robustness checks

We now turn to an exploration of the robustness of our results. We focus on regression (5) in Table 3 since that regression includes all the variables we are interested in. We first estimate the same regression but with different capital ratios. The estimates are provided in Table 6. Regression (1) uses the ratio of equity to total assets. With that regression, the coefficient on the ratio of equity to assets is positive and close to being significant at 10%. The other coefficients are similar to those in regression (5) of Table 3. When we estimate regression (5) of Table 3 with the ratio of tangible equity to liabilities instead of the Tier 1 ratio, the coefficient on the ratio is positive and insignificant. The log of assets is significantly negative. As in all other regressions, the board index has a significant negative coefficient.

The last three regressions of Table 6 estimate regression (3) on a larger sample. The larger sample differs from the sample used so far because we allow banks to be included if they have assets in excess of $10 billion instead of in excess of $50 billion. As in all regressions, the board index has a significant negative coefficient. The ratio of equity to assets and the ratio of tangible assets to liabilities have positive significant coefficients, but the coefficient on the Tier 1 capital ratio is not significant. The coefficient on liquid assets is positive and significant in each regression, but the 2006 return is not significant in these regressions. The log of assets has a negative significant coefficient in all the regressions. The regulation variables are usually not significant in this sample. It seems from these regressions that the Tier 1 ratio is more relevant for the large banks, whereas the other ratios are more relevant for the smaller banks.

We performed additional robustness tests that we do not report in a table. First, we added a country's stock market index return net of the banking index return. The results are generally consistent with the results we report in the tables when we do not include fixed-effects, though in some regressions more regulatory variables have positive significant coefficients. The concern about these regressions is that the banks in our sample are generally in the bank index. Second, we re-estimated our regressions without

three countries that have each only one bank in the sample. Again, the results are generally consistent with the regressions we reproduce in the tables – though in one regression using the larger sample the board index is no longer significant. Finally, we estimate the regressions using robust standard errors instead of clustering. The only major change resulting from using these estimates is that Tier 1 has a positive significant coefficient in the regressions of Table 5.

6. Conclusion.

In this paper, we investigate the determinants of large bank stock return performance across the world during the period from the beginning of July 2007 to the end of December 2008. This period corresponds to the greatest destruction of bank wealth since the Great Depression. We find that banks with more shareholder-friendly boards performed worse during that period. In contrast, banks with more Tier 1 capital, more deposits, and more loans performed better. Banks from countries with stronger capital supervision had higher returns as well. Banks from countries with stronger regulators had worse performance, but this might result from greater intervention by these regulators during the crisis at the expense of shareholders. In particular, using a smaller sample, we find that banks in countries with more powerful regulators raised more capital for a given amount of writedowns. During the month following the bankruptcy of Lehman, banks' balance sheet characteristics are insignificant in regressions that allow for country fixed effects, but even during that month banks with more shareholder-friendly boards performed worse and banks from countries with stronger capital supervision and more restrictions on banking fared better.

Overall, our evidence shows that bank governance, regulation, and balance sheets before the crisis are all helpful in understanding bank performance during the crisis. However, banks with more shareholder-friendly boards, which are banks that conventional wisdom would have considered to be better governed, fared worse during the crisis. Either conventional wisdom is wrong, as suggested by Adams (2009), or this evidence is consistent with the view that banks that took more risks rewarded by the market –perhaps because the market did not assess them correctly ex ante – before the crisis suffered more during the crisis

when these risks led to unexpectedly large losses. Strong evidence supportive of the latter interpretation is that the performance of large banks during the crisis is negatively related to their performance in 2006. In other words, the banks that the market rewarded with largest stock increases in 2006 are the banks whose stock suffered the largest losses during the crisis.

References

Acharya, Viral V., Irvind Gujral, and Hyun Song Shin, Dividends and bank capital in the financial crisis of 2007-2009, unpublished working paper, New York University, New York, NY.

Acharya, Viral V., and Philipp Schnabl, 2009, Securitization without risk transfer, unpublished working paper, New York University, New York, NY.

Aggarwal, R., Isil Erel, René M. Stulz, and Rohan Williamson, 2009, Do U.S. firms have the best corporate governance? A cross-country examination of the relation between corporate governance and shareholder wealth, Review of Financial Studies, forthcoming.

Adams, Renée, 2009, Governance and the financial crisis, unpublished paper, University of Queensland, Brisbane, Australia.

Adams, Renée, and Hamid Mehran, 2003, Is corporate governance different for bank holding companies, Economic Policy Review 9, 123-142.

Barth, James R., Gerard Caprio, Jr., and Ross Levine, The regulation and supervision of banks around the world: A new database, World Bank Policy Research Working Paper No. 2588, World Bank, Washington, D.C.

Barth, James R., Gerard Caprio, Jr., and Ross Levine, 2004, Bank regulation and supervision: What works best?, Journal of Financial Intermediation 13, 205-248.

Brunnermeier, Markus K., 2009, Deciphering the liquidity and credit crunch 2007-2008, Journal of Economic Perspectives 23, 77-100.

Caprio, Gerard, Luc Laeven and Ross Levine, 2007, Governance and bank valuation, Journal of Financial Intermediation 16, 584-617.

Coles, Jeffrey L., Daniel D. Naveen, and Lalitah Naveen, 2008, Boards: Does one size fit all, Journal of Financial Economics 87, 329-356.

Djankov, S., R. La Porta, F. Lopez-de-Silanes, and A. Shleifer, 2008, The law and economics of self-dealing, Journal of Financial Economics 88, 430-465.

Doidge, Craig, C. Andrew Karolyi and René M. Stulz, 2007, Why do countries matter so much for corporate governance?, Journal of Financial Economics 86, 1-39.

Graham, John, and Krishnamoorthy, Narasimhan, 2004, Corporate survival and managerial experiences during the Great Depression, unpublished working paper, Duke University, Durham, North Carolina.

John, Kose, Lubomir Litov and Bernard Yeung, 2008, Corporate governance and risk-taking, Journal of Finance 63, 1679-1728.

Kaufman, Daniel, Kraay, Aart, and Massimo Mastruzzi, 2008, Governance matters VII: Aggregate and individual governance indicators, 1996-2007, unpublished working paper, World Bank, Washington, D.C.

Kirkpatrick, Grant, 2008, The corporate governance lessons from the financial crisis, report, OECD, Paris, France.

La Porta, Rafael, Florencio Lopez-De-Silanes and Andrei Shleifer, 1999, Corporate ownership around the world, Journal of Finance 54, 471-517.

La Porta, R., F. Lopez-de-Silanes, A. Shleifer, and R. Vishny, 1998, Law and finance, Journal of Political Economy 106, 1113-1155.

Laeven, Luc, and Ross Levine, 2008, Bank governance, regulation, and risk taking, Journal of Financial Economics, forthcoming.

Merton, Robert C., 1977, An analytic derivation of the cost of deposit insurance and loan guarantees: An application of modern option pricing theory, Journal of Banking and Finance 1, 3-11.

Taylor, 2009, The financial crisis and the policy responses: An analysis of what went wrong, unpublished working paper, Stanford University, Palo Alto, CA.

Table 1. Summary Statistics

The sample includes 98 banks in Bankscope with returns available from Datastream, with loan/assets larger than 10%, deposit/assets larger than 20%, total assets larger than $50bn as of 2006, and included in the Riskmetrics CGQ database. Firm characteristics are computed in 2006, prior to the beginning of the financial crisis. Tier 1 is the ratio of Tier 1 capital to risk-weighted assets, equity is the ratio of equity to total assets, ownership is a dummy variable equal to 1 when no shareholder holds more than 25% of the shares directly or indirectly; the other bank characteristics are deposits, tangible equity (equity minus intangible assets whenever available or equity when intangible assets is not available), loans, liquid assets (all these variables are normalized by total assets except for tangible equity which is normalized by liabilities). The bank balance sheet and income variables are winsorized at the 1% and 99% levels and are expressed in percentage terms. The regulation variables come from Caprio, Laeven and Levine (2007) using data in the 2007 database (revised in June 2008) downloaded from the World Bank (http://econ.worldbank.org). Official is an index of the power of the commercial bank supervisory agency, restrict is an index of regulatory restrictions on the activities of banks, capital is an index of regulatory oversight of bank capital, and independence is an index of the independence of the supervisory authority. The variable institution is the simple average of six indicators reported by Kaufmann, Kraay and Mastruzzi (2008) called voice, political stability, government effectiveness, regulatory quality, rule of law, corruption. ADRI is the anti-director index of LLSV (1998) as revised in Djankov, La Porta, Lopez-de-Silanes, and Shleifer (2008). For corporate governance, we follow Aggarwal, Erel, Stulz, and Williamson (2008) and select 44 attributes that are available for U.S. firms as well as for foreign firms from the Riskmetrics CGQ dataset and construct indices for these attributes for broad subcategories: (1) Board (board, 25 attributes), (2) Audit (audit three attributes), (3) Anti-takeover (takeover, six attributes), and (4) Compensation and Ownership (compensation, 10 attributes).

	Observations	Minimum	Maximum	Average	Median	Standard deviation
Stock returns						
- 2006	98	-31.92	74.04	25.22	26.22	22.23
- July 2007 - Dec. 2008	98	-98.75	29.14	-54.43	-55.50	28.55
- Sep. 12 - Oct. 10, 2008	97	-89.55	3.98	-28.81	-25.46	17.57
Bank characteristics						
- Tier 1	98	5.79	14.03	8.65	8.20	1.80
- Equity	98	1.85	11.62	6.20	5.89	2.54
- Tangible equity	98	1.49	13.07	6.06	5.55	2.90
- Deposits	98	28.49	90.99	62.21	63.32	15.40
- Money market debt	98	0.45	41.34	8.51	5.54	8.99
- Loans	98	19.31	82.91	55.74	59.21	15.45
- Liquid assets	98	2.88	61.94	20.30	18.75	12.19
- Log assets	98	17.77	21.40	19.25	19.14	1.13
- Profit rate 2006	98	-0.65	3.93	1.19	1.10	0.64
- Profit rate 2007	97	-1.50	3.20	1.17	1.22	0.75
- Profit rate 2008	68	-4.14	2.38	0.34	0.57	1.33
Regulation and institution						
- Official	98	3.00	13.00	10.25	11.00	2.69
- Capital	98	1.00	5.03	3.26	4.00	1.07
- Restrict	98	3.00	13.00	9.01	9.00	3.02
- Independence	98	1.00	4.00	3.36	4.00	0.83
- Institution	98	0.59	1.79	1.33	1.27	0.29
- ADRI	98	2.00	5.00	3.82	4.00	0.93
Corporate governance						
- Ownership	98	0.00	1.00	0.80	1.00	0.40
- Board	98	6.00	21.00	12.29	12.00	3.74
- Audit	98	0.97	3.00	1.80	2.00	0.79
- Takeover	98	1.97	6.00	3.81	4.00	0.70
- Compensation	98	1.00	9.00	4.48	4.00	2.42

Table 2. Summary Statistics for banks in the first and fourth quartiles of stock return performance from July 1, 2007 to December 31, 2008

This table compares the characteristics of banks in the bottom quartile of stock return performance relative to those in the top quartile of stock return performance. The sample includes 98 banks in Bankscope with returns available from Datastream, with loan/assets larger than 10%, deposit/assets larger than 20%, total assets larger than $50bn as of 2006, and included in the Riskmetrics CGQ database. Firm characteristics are computed in 2006. Tier 1 is the ratio of Tier 1 capital to risk-weighted assets, equity is the ratio of equity to total assets, ownership is a dummy variable equal to 1 when no shareholder holds more than 25% of the shares directly or indirectly; the other bank characteristics are deposits, tangible equity (equity minus intangible assets whenever available or equity when intangible assets is not available), loans, liquid assets (all these variables are normalized by total assets except for tangible equity which is normalized by liabilities). The bank balance sheet and income variables are winsorized at the 1% and 99% levels and are expressed in percentage terms. The regulation variables come from Caprio et al. (2007) using data in the 2007 database (revised in June 2008) downloaded from the World Bank (http://econ.worldbank.org). Official is an index of the power of the commercial bank supervisory agency, restrict is an index of regulatory restrictions on the activities of banks, capital is an index of regulatory oversight of bank capital, and independence is an index of the independence of the supervisory authority. The variable institution is the simple average of six indicators reported by Kaufmann et al. (2008) called voice, political stability, government effectiveness, regulatory quality, rule of law, corruption. ADRI is the anti-director index of LLSV (1998) as revised in Djankov et al. (2008). For corporate governance, we follow Aggarwal et al. (2008) and select 44 attributes that are available for U.S. firms as well as for foreign firms from the Riskmetrics CGQ dataset and construct indices for these attributes for broad subcategories: (1) Board (board, 25 attributes), (2) Audit (audit, 3 attributes), (3) Anti-takeover (takeover, 6 attributes), and (4) Compensation and Ownership (compensation, 10 attributes). *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Mean of banks in bottom quartile of distribution of returns	Mean of banks in top quartile of distribution of returns	Test for equality of means (p values)
Stock returns			
- 2006	33.07	7.80	0.000***
- July 2007-Dec. 2008	-87.44	-16.58	0.000***
- Sep. 12 - Oct. 10, 2008	-46.94	-15.43	0.000***
Bank characteristics			
- Tier 1	8.19	9.17	0.035**
- Equity	5.20	6.96	0.017**
- Tangible equity	5.23	7.00	0.036**
- Deposits	52.69	72.65	0.000***
- Money market debt	8.89	6.01	0.178
- Loans	56.12	58.18	0.613
- Liquid assets	17.52	19.17	0.608
- Log assets 2006	19.55	18.63	0.001***
- Profit rate 2006	1.03	1.28	0.239
- Profit rate 2007	0.63	1.28	0.003***
- Profit rate 2008	-0.68	1.07	0.001***
Regulation, institution			
- Official	10.80	11.32	0.407
- Capital	2.72	3.64	0.004***
- Restrict	8.12	10.92	0.002***
- Independence	3.64	3.28	0.095*
- Institution	1.44	1.31	0.011**
- ADRI	3.84	4.06	0.377
Corporate governance			
- Ownership	0.88	0.76	0.279
- Board	13.80	10.84	0.007***
- Audit	1.88	1.68	0.422
- Takeover	3.68	3.96	0.153
- Compensation	4.76	4.00	0.285

Table 3. Returns regressions for July 2007-December 2008

The regressions estimate the relation between buy-and-hold stock returns over the period July 2007-December 2008 and bank characteristics. The sample includes 98 banks in Bankscope with returns available from Datastream, with loan/assets larger than 10%, deposit/assets larger than 20%, total assets larger than $50bn as of 2006, and included in the Riskmetrics CGQ database. Firm characteristics are computed in 2006. Tier 1 is the ratio of Tier 1 capital to risk-weighted assets, ownership is a dummy variable equal to 1 when no shareholder holds more than 25% of the shares directly or indirectly; the other bank characteristics are deposits, tangible equity (equity minus intangible assets whenever available or equity when intangible assets is not available), loans, liquid assets (all these variables are normalized by total assets except for tangible equity which is normalized by liabilities). The bank balance sheet and income variables are winsorized at the 1% and 99% levels and are expressed in percentage terms. The regulation variables come from Caprio et al. (2007) using data in the 2007 database (revised in June 2008) downloaded from the World Bank (http://econ.worldbank.org). Official is an index of the power of the commercial bank supervisory agency, restrict is an index of regulatory restrictions on the activities of banks, capital is an index of regulatory oversight of bank capital, and independence is an index of the independence of the supervisory authority. The variable institution is the simple average of six indicators reported by Kaufmann et al.(2008) called voice, political stability, government effectiveness, regulatory quality, rule of law, corruption. ADRI is the anti-director index of LLSV (1998) as revised in Djankov et al. (2008). For corporate governance, we follow Aggarwal et al.(2008) and select 44 attributes that are available for U.S. firms as well as for foreign firms from the Riskmetrics CGQ dataset and construct indices for these attributes for broad subcategories: (1) Board (board, 25 attributes), (2) Audit (audit, 3attributes), (3) Anti-takeover (takeover, 6 attributes), and (4) Compensation and Ownership (compensation, 10 attributes). Regression 1 includes corporate governance attributes, regression 2 includes bank characteristics, regression 3 includes corporate governance attributes and bank characteristics, regression 4 includes regulation and country variables, regression 5 includes corporate governance attributes, bank characteristics, regulation, country variables. The *p*-values, in parentheses are adjusted for clustering at the country-level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Adj.-R^2 is adjusted R-squared.

Regression	1	2	3	4	5
Constant	-41.859	-94.767	-39.362	-114.751	-61.444
	(0.269)	(0.150)	(0.581)	(0.177)	(0.730)
Board	-5.038		-5.435		-2.976
	(0.008)***		(0.001)***		(0.031)**
Audit	13.972		9.724		8.052
	(0.117)		(0.197)		(0.269)
Takeover	12.271		11.668		6.837
	(0.053)*		(0.121)		(0.129)
Compensation	-0.257		0.039		-0.570
	(0.882)		(0.985)		(0.720)
Ownership	-7.369		-5.602		-11.327
	(0.317)		(0.344)		(0.139)
Tier 1		8.174	7.947		5.011
		(0.006)***	(0.004)***		(0.045)**
Deposits		0.398	0.557		0.200
		(0.197)	(0.020)**		(0.394)
Money market debt		-0.323	0.228		0.127
		(0.591)	(0.695)		(0.826)
Loans		0.062	-0.234		0.303
		(0.822)	(0.581)		(0.312)
2006 return		-0.712	-0.685		-0.326
		(0.024)**	(0.006)***		(0.092)*
Liquid assets		0.914	0.354		0.423
		(0.172)	(0.499)		(0.393)
Log assets		-3.098	-3.777		-1.733
		(0.117)	(0.064)*		(0.439)
Official				-0.705	-2.720
				(0.526)	(0.041)**
Capital				6.378	7.904
				(0.046)**	(0.068)*
Restrict				1.974	2.281
				(0.373)	(0.223)
Independence				-3.289	9.640
				(0.476)	(0.169)
Institution				3.462	11.667
				(0.799)	(0.501)
ADRI				7.329	1.148
				(0.033)**	(0.781)
Log GDP				0.728	-9.535
				(0.942)	(0.596)
Number of observations	98	98	98	98	98
Adj.-R^2	0.290	0.419	0.515	0.093	0.354

Table 4. Comparison of the best performing and worst performing banks during the month of the Lehman bankruptcy (from September 12 to October 10, 2007)

This table compares the characteristics of banks in the bottom quartile of stock return performance and in the top quartile of stock return performance from September 12 to October 10 2007. The sample includes 97 banks in Bankscope with returns available from Datastream, with loan/assets larger than 10%, deposit/assets larger than 20%, total assets larger than $50bn as of 2006, and included in the Riskmetrics CGQ database. Firm characteristics are computed in 2006. Tier 1 is the ratio of Tier 1 capital and risk-weighted assets, equity is the ratio of equity to total assets, ownership is a dummy variable equal to 1 when no shareholder holds more than 25% of the shares directly or indirectly; the other bank characteristics are deposits, tangible equity (equity minus intangible assets whenever available or equity when intangible assets is not available), loans, liquid assets (all these variables are normalized by total assets except for tangible equity which is normalized by liabilities). The bank balance sheet and income variables are winsorized at the 1% and 99% levels and are expressed in percentage terms. The regulation variables come from Caprio et al. (2007) using data in the 2007 database (revised in June 2008) downloaded from the World Bank (http://econ.worldbank.org). Official is an index of the power of the commercial bank supervisory agency, restrict is an index of regulatory restrictions on the activities of banks, capital is an index of regulatory oversight of bank capital, and independence is an index of the independence of the supervisory authority. The variable institution is the simple average of six indicators reported by Kaufmann et al. (2008) called voice, political stability, government effectiveness, regulatory quality, rule of law, corruption. ADRI is the anti-director index of LLSV (1998) as revised in Djankov et al. (2008). Following Aggarwal et al. (2008) we select 44 attributes that are available for U.S. firms as well as for foreign firms from the Riskmetrics CGQ dataset and construct indices for these attributes for broad subcategories: (1) Board (board, 25 attributes), (2) Audit (audit, 3 attributes), (3) Anti-takeover (takeover, 6 attributes), and (4) Compensation and Ownership (compensation, 10 attributes). *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Mean of banks in bottom quartile of distribution of returns	Mean of banks in top quartile of distribution of returns	Test for equality of means (p values)
Stock returns			
- 2006	32.80	17.41	0.023**
- July 2007-Dec. 2008	-82.37	-29.79	0.000***
- Sep. 12 - Oct. 10, 2008	-52.54	-8.64	0.000***
Bank characteristics			
- Tier 1	7.92	8.64	0.072*
- Equity	5.54	6.71	0.136
- Tangible equity	5.38	6.76	0.134
- Deposits	55.55	64.25	0.054*
- Money market debt	9.61	7.99	0.550
- Loans	54.06	58.97	0.260
- Liquid assets	18.60	19.18	0.862
- Log assets	19.69	19.15	0.117
- Profit rate 2006	0.99	1.25	0.258
- Profit rate 2007	0.87	1.20	0.103
- Profit rate 2008	-0.32	0.66	0.008***
Regulation, institution			
- Official	10.32	11.46	0.048**
- Capital	2.80	3.58	0.023**
- Restrict	8.36	10.00	0.069*
- Independence	3.40	3.37	0.918
- Institution	1.38	1.26	0.103
- ADRI	3.70	4.00	0.270
Corporate governance			
- Ownership	0.84	0.75	0.445
- Board	13.04	11.33	0.120
- Audit	1.80	1.83	0.885
- Takeover	3.72	3.92	0.226
- Compensation	4.36	4.42	0.964

Table 5. Returns regression for the Lehman bankruptcy month (September 12-October 10, 2008)

This table shows estimates of regressions bank returns during the Lehman bankruptcy months on bank characteristics. The sample includes 97 banks in Bankscope with returns available from Datastream, with loan/assets larger than 10%, deposit/assets larger than 20%, total assets larger than $50bn as of 2006, and included in the Riskmetrics CGQ database. Firm characteristics are computed in 2006, prior to the beginning of the financial crisis. Tier 1 is the ratio of Tier 1 capital to risk-weighted assets, ownership is a dummy variable equal to 1 when no shareholder holds more than 25% of the shares directly or indirectly; the other bank characteristics are deposits, tangible equity (equity minus intangible assets whenever available or equity when intangible assets is not available), loans, liquid assets (all these variables are normalized by total assets except for tangible equity which is normalized by liabilities). The bank balance sheet and income variables are winsorized at the 1% and 99% levels and are expressed in percentage terms. The regulation variables come from Caprio et al. (2007) using data in the 2007 database (revised in June 2008) downloaded from the World Bank (http://econ.worldbank.org). Official is an index of the power of the commercial bank supervisory agency, restrict is an index of regulatory restrictions on the activities of banks, capital is an index of regulatory oversight of bank capital, and independence is an index of the independence of the supervisory authority. The variable institution is the simple average of six indicators reported by Kaufmann et al. (2008) called voice, political stability, government effectiveness, regulatory quality, rule of law, corruption. ADRI is the anti-director index of LLSV (1998) as revised in Djankov et al. (2008). For corporate governance, we follow Aggarwal et al. (2008) and select 44 attributes that are available for U.S. firms as well as for foreign firms from the Riskmetrics CGQ dataset and construct indices for these attributes for broad subcategories: (1) Board (board, 25 attributes), (2) Audit (audit three attributes), (3) Anti-takeover (takeover, six attributes), and (4) Compensation and Ownership (compensation, 10 attributes). Regression 1 includes corporate governance attributes, regression 2 includes bank characteristics, regression 3 includes corporate governance attributes and bank characteristics, regression 4 includes regulation and country variables, regression 5 includes corporate governance attributes, bank characteristics, regulation, country variables. The p-values, in parentheses are adjusted for clustering at the country level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Adj.-R^2 is adjusted R-squared.

Regression	1	2	3	4	5
Constant	-34.366	-28.278	-14.162	51.533	85.508
	(0.293)	(0.570)	(0.865)	(0.284)	(0.197)
Board	-2.628		-2.715		-1.878
	(0.004)***		(0.045)**		(0.006)***
Audit	7.296		4.933		3.668
	(0.342)		(0.508)		(0.387)
Takeover	8.741		6.653		3.691
	(0.089)*		(0.134)		(0.327)
Compensation	0.678		0.503		1.566
	(0.475)		(0.623)		(0.192)
Ownership	-7.204		-9.267		-9.935
	(0.193)		(0.158)		(0.111)
Tier 1		2.962	2.978		2.642
		(0.236)	(0.269)		(0.176)
Deposits		-0.337	-0.238		-0.228
		(0.126)	(0.227)		(0.282)
Money market		-0.025	0.356		0.334
		(0.906)	(0.332)		(0.188)
Loans		0.422	0.325		0.356
		(0.041)**	(0.210)		(0.027)**
2006 return		-0.132	-0.089		-0.052
		(0.308)	(0.411)		(0.627)
Liquid assets		0.713	0.417		0.489
		(0.041)**	(0.226)		(0.018)**
Log assets		-1.955	-1.991		-1.454
		(0.546)	(0.580)		(0.574)
Official				-0.005	-0.413
				(0.994)	(0.569)
Capital				3.272	4.512
				(0.036)**	(0.097)*
Restrict				1.294	3.154
				(0.148)	(0.006)***
Independence				-1.900	2.179
				(0.418)	(0.506)
Institution				-2.207	8.806
				(0.803)	(0.303)
ADRI				4.610	5.297
				(0.006)***	(0.005)***
Log GDP				-10.928	-19.798
				(0.104)	(0.003)***
Number of observations	97	97	97	97	97
Adj.-R^2	0.192	0.141	0.225	0.068	0.217

Table 6. Returns regressions for the period of July 2007-December 2008 with different capitalization ratios and samples

This Table shows estimates of regression (5) of Table 3 for different capital ratios and different samples. The large bank sample includes 98 banks in Bankscope with returns available from Datastream, with loan/assets larger than 10%, deposit/assets larger than 20%, total assets larger than $50bn as of 2006, and included in the Riskmetrics CGQ database. The small bank sample includes banks satisfying the same criteria except that they have assets in excess of $10 billion. Firm characteristics are computed in 2006. Tier 1 is the ratio of Tier 1 capital to risk-weighted assets, equity is the ratio of equity to total assets, tangible equity is the ratio of tangible equity to total liabilities, ownership is a dummy variable equal to 1 when no shareholder holds more than 25% of the shares directly or indirectly; the other bank characteristics are deposits, tangible equity (equity minus intangible assets whenever available or equity when intangible assets is not available), loans, liquid assets (all these variables are normalized by total assets except for tangible equity which is normalized by liabilities). The bank balance sheet and income variables are winsorized at the 1% and 99% levels and are expressed in percentage terms. The regulation variables come from Caprio et al. (2007) using data in the 2007 database (revised in June 2008) downloaded from the World Bank (http://econ.worldbank.org). Official is an index of the power of the commercial bank supervisory agency, restrict is an index of regulatory restrictions on the activities of banks, capital is an index of regulatory oversight of bank capital, and independence is an index of the independence of the supervisory authority. The variable institution is the simple average of six indicators reported by Kaufmann et al. (2008) called voice, political stability, government effectiveness, regulatory quality, rule of law, corruption. ADRI is the anti-director index of LLSV (1998) as revised in Djankov et al. (2008). For corporate governance, we follow Aggarwal et al. (2008) and select 44 attributes that are available for U.S. firms as well as for foreign firms from the Riskmetrics CGQ dataset and construct indices for these attributes for broad subcategories: (1) Board (board, 25 attributes), (2) Audit (audit, 3attributes), (3) Anti-takeover (takeover, 6 attributes), and (4) Compensation and Ownership (compensation, 10 attributes). The p-values, in parentheses are adjusted for clustering at the country level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Adj.-R^2 is adjusted R-squared.

	Large banks		All banks		
	1	2	3	4	5
Constant	62.402	79.168	-77.157	-13.742	-10.756
	(0.670)	(0.582)	(0.466)	(0.886)	(0.910)
Board	-3.068	-2.809	-2.251	-2.785	-2.716
	(0.057)*	(0.083)*	(0.045)**	(0.016)**	(0.017)**
Audit	10.080	11.451	0.058	-0.535	0.052
	(0.192)	(0.106)	(0.990)	(0.919)	(0.992)
Takeover	6.744	6.952	4.053	4.219	4.081
	(0.186)	(0.193)	(0.041)**	(0.051)*	(0.057)*
Compensation	-0.319	-0.642	2.157	2.729	2.546
	(0.837)	(0.662)	(0.473)	(0.318)	(0.359)
Ownership	-8.318	-8.571	-9.613	-8.294	-8.053
	(0.285)	(0.278)	(0.104)	(0.150)	(0.156)
Tier 1			2.159		
			(0.306)		
Equity	1.749			2.733	
	(0.110)			(0.006)***	
Tangible equity		0.635			2.259
		(0.697)			(0.038)**
Deposits	0.205	0.280	0.185	0.136	0.120
	(0.280)	(0.139)	(0.364)	(0.495)	(0.549)
Loans	-0.010	-0.074	0.234	0.131	0.134
	(0.972)	(0.796)	(0.393)	(0.584)	(0.548)
2006 return	-0.389	-0.350	-0.166	-0.263	-0.251
	(0.027)**	(0.035)**	(0.356)	(0.185)	(0.226)
Liquid assets	0.556	0.474	0.903	0.981	0.955
	(0.123)	(0.134)	(0.004)***	(0.003)***	(0.003)***
Log assets	-4.124	-4.215	-5.243	-5.909	-6.099
	(0.034)**	(0.049)**	(0.063)*	(0.005)***	(0.009)***
Official	-2.384	-2.401	-1.564	-1.490	-1.617
	(0.055)*	(0.051)*	(0.193)	(0.194)	(0.151)
Capital	8.489	8.802	6.637	5.719	5.690
	(0.015)**	(0.011)**	(0.093)*	(0.164)	(0.149)
Restrict	1.315	1.775	2.684	2.064	2.004
	(0.537)	(0.449)	(0.047)**	(0.150)	(0.158)
Independence	6.218	5.908	4.404	3.522	3.516
	(0.317)	(0.341)	(0.451)	(0.528)	(0.536)
Institution	23.472	21.312	13.190	24.500	22.926
	(0.158)	(0.198)	(0.376)	(0.093)*	(0.117)
ADRI	2.275	2.571	5.861	5.536	5.485
	(0.526)	(0.427)	(0.089)*	(0.142)	(0.135)
Log GDP	-13.384	-14.899	-0.743	-4.539	-3.700
	(0.426)	(0.371)	(0.943)	(0.691)	(0.747)
Number of observations	98	98	175	175	175
Adj.-R^2	0.309	0.301	0.308	0.320	0.314