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Corporate Governance and Banks: What Have We Learned from the Financial Crisis?

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Abstract

Recent academic work and policy analysis give insight into the governance problems exposed by the financial crisis and suggest possible solutions. We begin this paper by explaining why governance of banks differs from governance of nonfinancial firms. We then look at four areas of governance: executive compensation, boards, risk management, and market discipline. We discuss promising solutions and areas where further research is needed.

Keywords: governance, banks

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1. Introduction

The financial crisis exposed flaws throughout financial markets and prompted much investigation into the way banks work. This paper focuses on one line of investigation—the corporate governance of banks. It examines why governance of banks differs from governance of nonfinancial firms and where the governance of banks failed during the crisis; it also offers recommendations for improving the governance system. Bank governance has been the topic of much recent academic work (see table 1) and policy discussion (Senior Supervisors Group 2008, 2009; Walker Report 2009; Committee of European Banking Supervisors 2010). Because of their contemporaneous nature, there has been little connection between the academic approach and policy analysis. The purpose of this paper is to make such connections and ground the policy debate on scientific evidence**.**

The paper begins by providing a twist on the usual question of what is different about banks by asking what differences are important to governance. Two themes—the multitude of stakeholders in banks and the complexity of the business—run throughout the paper. Besides shareholders, the stakeholders in banks are both numerous (depositors, debtholders, and the government as both insurer of deposits and residual claimant on systemic externalities) and large (over 90 percent of the balance sheet of banks is debt**).**Yet shareholders control the firm, and evidence shows that both the boards and the compensation package for CEOs represent the shareholders' preference for increasing risks. That preference, however, is in conflict with the preference of other stakeholders. Shareholders respond to their incentives; Laeven and Levine (2009) and Ellul and Yerramilli (2010) show that the presence of institutional investors increases the riskiness of the bank. The goal of increasing risk was largely successful, even though the outcome of that increased risk during the crisis was not.[1]

The natural next question is, What was different about banking in the crisis period versus the period before? Here is where the issue of complexity becomes important. The business of banks has become more complex and more opaque. Moreover, banks have become much larger and expanded dramatically into other businesses since the passage of the Gramm-Leach-Bliley Act in 1999. The business of banks has also been taken up by nonbanks in the "shadow-banking" sector, creating unregulated and uninsured exposures. This added complexity has made the job of

[1] Cheng, Hong, and Scheinkman (2010) describe how the realization of this risk was successful in the late 1990s.

boards and managers difficult for many reasons. First, the simple number of activities to manage has multiplied. Second, the knowledge needed to understand these activities has also increased substantially. Third, techniques used to manage these activities (such as value at risk in the case of risk management and credit ratings for capital requirements) have not performed well under the greater degree of complexity and duress.

The paper examines in depth four topics in the corporate governance of banks: executive compensation, boards, risk management, and market discipline. Policy recommendations are provided where possible, although several issues have no clear answers. Throughout the paper are references to table 1, which surveys the very recent literature tying measures of governance to measures of risk and performance in the years just before and during the crisis. Ideally, the goal would be to gain a robust sense of the role governance plays in risk taking in order to suggest best practices or regulatory guidance. However, the notion of causation is a tricky one: does a given characteristic lead a bank to make risky choices, or does a culture of risk taking lead a bank to have certain characteristics? Due to this endogeneity problem, most of these relationships are interpreted here as correlations. Several papers cited in this paper use lags to improve this interpretation. A few papers, denoted with **, use further econometric techniques to push this interpretation further. Also, most of these papers focus on large financial institutions, not just banks. With that caveat, this analysis discusses the results as they apply to banks. Last, almost all the correlations display the expected sign (or at least the sign consistent across datasets).[2]

The discussion of governance failures begins with a look at executive compensation, including trends in compensation packages and recent evidence demonstrating how equity compensation promoted risk taking. The paper then cites recent research suggesting that linking executive pay to the price of debt can reduce excess risk. The next topic—board characteristics—includes the size of the board, the number of outside directors, the experience of the directors, and their other activities. Although most of the evidence does not point strongly toward immediate reforms,

[2] The main exceptions are when the measures of risk are (1) write-downs and (2) receiving TARP funds. Neither of these is surprising. The meaning of write-downs is debatable. While they signify the realization of losses, a bank has a certain degree of discretion is taking write-downs, implying they could be a sign of ex ante risk taking (realized in losses) or ex post prudent behavior (managing expectations of how a shock has affected the firm). Regarding TARP funds, it is not obvious that the worst-off banks were the ones receiving funds, as there is a survivorship bias and some recent evidence suggests initial mispricing of recipients (Ng, Vasvari, and Moerman 2010). Therefore, because of their ambiguity, we will not discuss these two measures.

reforms do imply trade-offs. The paper then addresses risk taking at the firm and the risk management function. Here, unambiguous evidence shows the need for reform and for strengthening the risk management roles within the firm. Last, the paper explores the role of market discipline, looking at two specific inputs that permit market discipline to function well (or not function well): capital requirements and the size and scope of banks. In recent years, banks have found ways to get around capital requirements, diminishing the effect of market discipline. At the same time, banks have increased their size, scope, and complexity, making both regulation and market discipline less effective. At the same time, not much evidence indicates that structurally changing the business of banks will improve matters because reduced banking also has its problems and current banks may innovate around regulation. The paper ends with a brief conclusion.

2. Why Is the Governance of Banks Different from That of Nonfinancial Firms?

Two key differences distinguish the governance of banks from that of nonfinancial firms. The first is that banks have many more stakeholders than nonfinancial firms. The second is that the business of banks is opaque and complex and can shift rather quickly. Thus, while this paper will obviously discuss the roles of the board and of executive compensation, it will also discuss the roles of risk, incentives, and regulation, which may not be critical for nonfinancial firms.[3]

Banks, which consist of more than 90 percent debt (as opposed to an average of 40 percent for nonfinancial firms), have more stakeholders than nonfinancial firms. Beyond the shareholders, the stakeholders in a bank include debtholders, the majority of which are the depositors and the holders of subordinated debt. The deposit insurance authority also has an interest in the bank's health, as its insurance will be called upon in the case of insolvency. Inasmuch as a bank's insolvency has negative consequences for the financial system as a whole (certainly more relevant for larger institutions) and these externalities need to be regulated, bailed out, or both at a sizable cost to taxpayers, the government is also a stakeholder in the bank. Furthermore, as depositors are generally small and subject to free-rider issues in monitoring, the importance of other nonequity stakeholders increases.

[3] See Adams and Mehran (2003) and Adams (2010) for a discussion of differences between governance of bank holding companies in the United States and nonfinancial firms.

Despite the multitude of stakeholders, the board represents solely the views of shareholders, subject to regulatory constraints. Shareholders' interests may diverge substantially from those of other stakeholders, especially on risk, where shareholders prefer volatility and may have short-term perspectives. Clearly, debtholders and regulators prefer low volatility and take longer-term views. In their model, Bolton, Mehran, and Shapiro (2011) demonstrate that shareholders may not have the incentive to reduce risk taking at a firm, even if it is in their own interest due to commitment problems.

The role of leverage differs across industries: in a nonfinancial firm, leverage is a source of financing, while in the banking sector it is a factor of production. Banks will deploy the cheapest factor in their production function. While debt and equity would be equally expensive in a Modigliani-Miller world, in banking firms that would not be the case for a number of reasons. In particular, because depositors have access to a state-funded safety net, they are less sensitive to bank risk than other investors and hence do not demand adequate compensation for risk taking when they invest. Ceteris paribus, this tendency renders debt a cheap source of funds and biases banks toward it. One could attempt to correct for this bias by charging banks an economic price for their deposit insurance protection. However, although a risk-based deposit insurance system was adopted in the United States in the mid-1990s, firms still pay a fixed protection rate on their deposits. The structural opacity of banking assets, moreover, makes it very hard to determine a fair price for deposit insurance.[4] As a result, for both practical and technological reasons deposit insurance seems to be underpriced, and banks are excessively willing to lever themselves. And, as a consequence of underpriced debt, many investment opportunities appear unrealistically attractive to bankers. Hence, one can argue that deposit insurance protection was an important force behind the recent rapid expansion in bank lending and in the size of deposit-taking institutions.

At the same time, banks are both opaque and complex. As Levine (2004) notes, "Banks can alter the risk composition of their assets more quickly than most non-financial industries, and banks can readily hide problems by extending loans to clients that cannot service previous debt obligations." Moreover, the business of securitization has in essence (1) speeded up the process of lending at the origination stage and in

[4] See also Freixas and Rochet (1995).

interbank markets (for example, repo) and (2) increased opacity by merging large amounts of information and relying on credit ratings.

Academics debate how opaque banks truly are. Morgan (2002) shows that rating agencies disagree substantially more over ratings on bonds issued by banks than over those issued by nonfinancial firms. Flannery, Kwan, and Nimalendran (2004) show that the trading properties of banks and the accuracy of analysts' earnings forecasts for banks are similar to those of nonfinancial firms. Nevertheless, Flannery, Kwan, and Nimalendran (2010) show that this similarity broke down right at the beginning of the financial crisis in mid-2007. While not a bank, Lehman Brothers and the case of Repo 105certainly highlighted the possibility that balance sheets might be manipulated.

Opacity and complexity play a role in governance in both the interaction between the board and management and the relationship between the bank and its regulators. The question of how well boards represent shareholders depends on whether boards understand the inner workings of the bank. While obvious, the notion that independent board members should have more financial market experience has become an important issue (this is discussed in the section on boards).

3. Corporate Governance Failures in the Crisis

A. Executive Compensation

Many view compensation practices as a contributing factor to the current financial crisis. Conventional wisdom holds that the executive pay structure was designed to enhance risk taking and create value for shareholders but not to protect debtholders. This dynamic was particularly strong in the banking industry because banks are highly levered and their leverage is subsidized. What has not been as widely discussed is the fact that government subsidies directly affect compensation.

The level of executive pay in a nonfinancial firm is generally related to the size of the firm's assets (market value of equity or book value),[5] its asset complexity, and the industry structure and competition. Leverage has an insignificant effect on pay, and, on average, firms judiciously choose their leverage for its effects on their credit ratings and potential costs of distress. An industrial firm on average has about 40 percent debt in its capital structure.

[5] For example, see Gabaix and Landier (2008). For more on the relation between the governance of nonfinancial and financial firms, see Adams (2010).

A bank's size and its level of executive pay are highly correlated. Since the deposit insurance system contributes to the size and growth of the firm, it thus contributes to the rate of executive pay in the banking industry. For this reason, bank regulators have an economic argument for controlling executive pay. In addition, bank boards should take into account the effect of compensation on solvency and capital adequacy, and banks should internalize the costs associated with risk taking.

Capital structure can exert a direct influence on the structure of executive compensation of the bank holding company (BHC). According to agency theory, stockholders want the board to compensate a CEO with stock options since they increase the CEO's pay-performance sensitivity. A higher level of stock options, in theory, motivates the CEO to pursue riskier investment strategies. If the firm has debt in its capital structure, riskier strategies benefit stockholders at the expense of debtholders (see, for example, Jensen and Meckling 1976). In efficient capital markets, however, the incentive for risk taking is anticipated by debtholders, and thus increased reliance on stock options gives rise to a debt premium or cost of raising debt (John and John 1993). The size of the premium is related to the leverage ratio. To reduce the cost of debt, leveraged firms may choose to scale back on their use of stock options. As BHCs are highly levered institutions, they may therefore want to limit their use of stock options since, for example, those options could affect the cost of issuing subordinated debt. John and Qian (2003) and John, Mehran, and Qian (forthcoming) provide support for this argument and document that the pay-performance sensitivity for CEOs of BHCs is lower the higher the ratio of the BHCs' debt to total assets.

1. Compensation Trends

Figure 1 presents mean and median salaries for top executives of banking firms in Standard & Poors' ExecuComp for the period 1992–2007. The figure shows an upward trend in nominal terms in the 1990s and relatively stable pay in 2000s. Figure 2 presents mean and median bonuses for the same period. While the median bonus is relatively unchanged, the mean bonus for the industry has generally increased since 1992. However, the sharp drop in bonuses in 2006–07 suggests that pay is related to performance or that market forces were at work. Figure 3 presents the dollar (Black-Scholes) value of stock option grants. The trend follows that of nonfinancials,

increasing rapidly through 2000, with a sharp drop thereafter. The cause of the drop is not fully clear. The increased scrutiny of pay following the dot-com bubble, particularly related to stock options, in the era of Sarbanes-Oxley beginning in 2002 is likely to be a contributing factor.

Figure 4 presents the vesting schedule of options granted in the period 1996–2007. Twenty percent of options granted to the five top executives at each bank had immediate vesting, and nearly 29 percent had vesting of one year. The short-option vesting may have provided incentives to focus on short-term return. Figure 5 documents 7,254 exercises for the top five executives and documents how soon the options were exercised following vesting. About 34 percent of options were exercised immediately when they were vested. Another 15.5 percent of options were exercised within one year after vesting. The evidence in the two charts together suggests that stock options were not designed to promote decisions compatible with safety and soundness and the protection of creditors and taxpayers.

2. The Link between Compensation, Performance, and Risk Taking during the Financial Crisis

One might ask why the trends in compensation have changed. In fact, the wave of deregulation occurring at the end of the 1990s created unprecedented opportunities for risk taking in the banking industry. Top executives wanted to exploit these risky opportunities, of course, but did not want to risk their own compensation. Consequently, the landscape of compensation changed, with further reliance on cash compensation and bonuses. Moreover, since 2006 CEOs in the banking sector have had the highest pay of all executives in the economy.

Fahlenbrach and Stulz (2010) find that banks with CEOs whose incentives were more closely aligned with the interests of shareholders performed worse and find no evidence that they performed better. Banks with higher-option compensation and a larger fraction of compensation in bonuses for their CEOs did not perform worse during the crisis. Suntheim (2010) shows that institutions whose CEOs had more incentives to take risks (higher vega) performed worse. Moreover, a whole host of papers (cited in table 1) find that higher risk-taking incentives did indeed lead to higher volatility. The only result that may be surprising at first glance is that of Fahlenbrach and Stulz (2010). Why would shareholders want give incentives to perform worse? The other papers

answer this question succinctly: shareholders gave CEOs the incentives to take on risk, which happened not to pay out in this realization. This notion that shareholders created an incentive system in their own interest is something that will be discussed throughout the paper.

3. How Should Compensation Be Designed?

As noted earlier, CEO incentives may be well aligned with shareholders' preferences but not aligned with those of other stakeholders.[6] To align a CEO's objective with social objectives related to risk choice, Bolton, Mehran, and Shapiro (2011) propose tying compensation at least in part to a measure of the default riskiness of the firm.[7] Specifically, excess risk taking may be controlled by tying CEO compensation to the bank's CDS spread over the performance evaluation period. A high, and increasing, CDS spread would result in a lower compensation and vice versa. They then demonstrate that shareholders would not choose to implement such a compensation scheme, instead preferring excess risk. Shareholders suffer from a commitment problem due to multiple factors: the ability to renegotiate the compensation contract and distortions in debt markets arising from deposit insurance and investors' misperceptions of risk. The benefit of the CDS spread is that it is a market price for the probability of default that is liquid for large institutions. Bebchuk and Spamann (2010) and Edmans and Liu (2010) suggest linking compensation directly to debt.

Bolton, Mehran, and Shapiro (2011) provide supporting evidence that increased CEO financial exposure to underlying bank risk is perceived by the market to reduce risk taking, reflected in lower CDS spreads. They use the greater disclosure requirements by the Securities and Exchange Commission for CEO pay in 2007 with respect to both deferred compensation and executive pension grants to compute the fraction of CEO pay at risk if the bank fails, that is, deferred compensation and pension payments. The higher this fraction is, the more the bank's CDS spread decreases. Thus, as expected, the market believes that CEOs that stand to lose more financially in the

[6] In section 3D, the use of options in compensation is proposed as backdoor equity financing to conserve capital. Here, the concern is the incentive effects on CEOs.

[7] There are, of course, other proposals for changing the composition of compensation, such as clawbacks. Clawbacks, however, may not be based on robust measures of risk taking, especially since the amount clawed back may be determined by bank examiners.

event of the bank's failure take lower risks.[8] Tung and Wang (2011) provide additional evidence of reduced risk taking by aligning CEO compensation with the value of the firm. Higher ratios of inside debt (deferred compensation and pension payments) to equity imply lower idiosyncratic risk and less risky loans.

B. Boards

1. The Evidence

A number of studies have argued that boards are shareholders' first line of defense in governance, focusing on factors that influence board effectiveness.[9] Among the crucial factors are board size and ratio of outside directors to inside directors. Some authors argue that large boards reduce the value of a firm because of free-rider problems. Others posit that an increase in the representation of outside directors should improve firm performance because they are more likely than firm insiders to be strong monitors. Although it has been documented that large boards are value reducing, Adams and Mehran (2010) do not find a negative correlation between board size and performance (as proxied by Tobin's Q) for bank holding companies when using data spanning nearly four decades. Board size also has an ambiguous relationship with risk, as seen in table 1. Consistent with studies of nonfinancial firms, Adams and Mehran (2010) also document that bank performance is unrelated to the outside director ratio. At the same time, several recent papers have found that the proportion of outside directors is negatively related to risk (see table 1). As shown in figure 6, the percentage of outside directors has trended upward since the mid-1990s, while the total number of directors has been declining over the past two decades.

Adams and Mehran (2010) show that the performance of BHCs deteriorates when busier directors serve on the bank board (that is, directors who serve on other boards). This finding within the banking industry is consistent with other studies on nonfinancials (see Fich and Shivdasani 2006). In addition, banks with busy bank executives serving as directors of other companies also do poorly. Finally, Adams and

[8] One side-benefit of this approach is that it creates a built-in stabilizer using compensation. When banks are performing well and their credit quality is strong, bonuses will be paid out. However, when their performance deteriorates and their credit quality weakens (which would be reflected in an increase in their CDS spread), the banks will be forced to conserve capital through the automatic adjustment of bonuses. This is in a sense analogous to cutting dividends to protect the bank and its creditors. While cutting dividends imposes a cost on equity holders, this approach imposes a cost on risk takers.

[9] For a review of the literature, see Hermalin and Weisbach (2003); Adams and Mehran (2003); Adams, Hermalin, and Weisbach (2010); and Adams (2010).

Mehran document that interlocks adversely affect bank performance.[10] Minton, Taillard, and Williamson (2010) find that a higher outside director ratio did not mean that a BHC fared better during the financial crisis.

While policy circles have discussed the impact of independent directors with little financial experience—holding that experience is crucial to understanding today's complex financial markets—a dark side to expertise may be further alignment with risk-taking incentives. As discussed in Guerrera and Larsen (2008), for example, Northern Rock's board included a former bank CEO, a top fund manager, and a previous member of the Bank of England's governing body, while Bear Stearns had a board on which seven of 13 members had a banking background.[11] Empirical evidence adds to this impression: Minton, Taillard, and Williamson (2010) show a positive relationship between the experience of independent directors and volatility.[12] These results do not imply causation. It may be that banks that want to take more risks hire board members with more expertise.

2. Governance from the Supervisory Point of View

The supervisory community has recognized that governance practices are often rather weak before a crisis, and a number of these groups have addressed these issues quite thoroughly.[13] However, while the supervisory community has made progress in the past several years in identifying stronger practices, many of the nuances of governance and incentive conflicts make the regulation and supervision of corporate governance difficult. Often, there are no hard and fast rules, and just when a practice

[10] An interlock is a situation where the chairman or the CEO of a BHC is a director in another company whose top management is on the board of the BHC.
[11] On average, 17.8 percent members of U.S. boards had previous banking experience in 2006, according to Ferreira, Kirchmaier, and Metzger (2010).
[12] Garicano and Cuñat (2009) find evidence for Spanish *cajas* that goes in the opposite direction, demonstrating that *cajas* that had chairmen without previous banking experience (or without postgraduate education) performed worse. The nonprofit nature of the *cajas* and their close link with political institutions make this striking result difficult to generalize to international banks. Similarly, Hau and Thum (2009) find evidence that lack of financial experience of board members in German banks was strongly positively related to losses by the banks. This lack of experience is correlated with being a political appointment and was much more present in public banks (*Landesbanken*).
[13] For instance, the Basel Committee's Corporate Governance Task Force updated its Principles for Enhancing Corporate Governance last year, and the Senior Supervisors Group has addressed governance weaknesses in three of its reports (March 2008, "Observations on Risk Management Practices during the Recent Market Turbulence"; October 2009, "Risk Management Lessons from the Global Banking Crisis of 2008"; December 2010, "Observations on Risk Appetite Frameworks and IT Infrastructures").

becomes widely accepted as best practice, exceptions to the rules emerge in precisely those firms most in need of good governance.

One of biggest challenges for supervisors is identifying and encouraging best practices while being mindful that one size cannot fit all: from a regulatory point of view, boards and management should focus more on safety and soundness issues. But what governance structure is most conducive to achieving that end, and is it the same at all firms? What is the ideal makeup of a board of directors at a large and complex firm? And how far should supervisors go in criticizing or endorsing firms' governance practices—particularly when it comes to the board of directors?

One of the most often cited components of effective governance is the ability and willingness of bank boards to challenge management and engage in good dialogue to ensure that the company's actions and decisions take into account the wide range of factors that could affect stakeholders. To gain comfort that a board is indeed capable of performing its duty to challenge and engage, one might ask, Is the board composition conducive to achieving strong governance outcomes? Does it include the right people, with appropriate levels of independence and sufficient expertise? Do board members insist on receiving the kinds of information they need to understand the firm's risks and vulnerabilities?

First is the question of expertise. Naturally, board members cannot be expected to know as much about the business as a member of management. However, if board members are to carry out their responsibility to challenge management, they must have the expertise necessary to grasp the complexity of the business and thus the associated risks. The question, however, is what constitutes appropriate expertise. Are additional expectations required to ensure that the board's "financial experts" are able to assess the risks posed by exposures to the more complex products at the larger securities firms? And how many "experts" does a board need? Is there a role for nonexperts? Some argue that the nonfinancial experts are the individuals that may ask the important, high-level strategic questions, while the more technical members are focused on the details.

Furthermore, expertise is not enough to ensure that the board will engage with and challenge management. Another important prerequisite is a board member's ability to voice independent or potentially unpopular views. The idea that independence is important to good board governance is obviously not new and has been reinforced through law and regulations. Personal or informal loyalties can be just as detrimental to strong, independent views as more formal ties can be. The challenge for supervisors is,

irrespective of *official* independence, How do we assess whether board members exercise *intellectual* independence in carrying out their duties?

The degree of board engagement is another component of real challenge. Arguably, board members must invest sufficient time and energy to understand the risks to which their firms are exposed. Many have argued that board members at large financial institutions have too many other commitments to be able to devote enough time to carrying out their board responsibilities. On the other side of the argument, banks hold that their firms benefit from the input of individuals that understand global business trends and that can speak to some of the geopolitical issues these multinational firms face. They acknowledge that the most desirable individuals are by definition overcommitted, but crucial nevertheless.

How should supervisors address this tension? Should they limit the number of other directorships that a member of a board of a large bank can hold? Are gaps in a board member's knowledge due to a lack of expertise, insufficient time invested, or some other shortfall? For instance, is management providing the board the background it needs? Regulators expect management to share the right amount of information, at the appropriate level of detail, to ensure that directors are getting what they need to do their jobs. At the same time, it is incumbent upon conscientious boards to demand the most useful information in the form that works best for them.

Supervisors can gain insight into the quality of board engagement, expertise, and independence through more intensive interaction with board members, but the question remains, Are engagement, expertise, and independence enough? An engaged, independent, and expert board member may consider that his or her sole responsibility is to the shareholder. Supervisors are interested in other stakeholders like creditors, depositors, and the public. How do they ensure that boards and senior management consider the interests of other stakeholders? How do they align their interests—at least to some extent—with the goal of containing downside risk? This is an open question that definitely needs consideration.

C. Risk and Risk Management

To address the crucial connection between governance and risk, the paper takes two approaches. First, it looks at the big picture and connects some of the strands in

previous parts of the paper to clarify how incentives have played a role in excess risk taking. Second, it discusses risk management as a specific role within the bank.

Although compensation was discussed earlier, the notion of "residual compensation" used by Cheng, Hong, and Scheinkman (2010), as it relates to the notion of a risk-taking culture at a bank, is worth attention. Residual compensation is constructed as the residuals of a regression of compensation on firm size (defined by market capitalization) and subindustry-level characteristics.[14] Hence, it is the compensation unexplained by firm size, which also takes into account talent differences, as suggested by Gabaix and Landier (2008). Interestingly, the firms with persistently high residual compensation include Bear Stearns, Lehman, Citicorp, Countrywide, and AIG. The authors find that residual compensation is strongly correlated with several measures of risk taking (summarized in table 1) and is also correlated with institutional ownership. They interpret this relationship as a culture of "short-termism" present at these firms, in part due to the preferences of institutional shareholders. Ellul and Yerramilli (2010) and Laeven and Levine (2009) also find a significant positive relationship between institutional ownership and multiple measures of riskiness. The notion of a risk-taking culture is an important one. Official reports such as the Walker Report (2009) and those of the Senior Supervisors Group (2008, 2009) discuss risk supervision failures, incentives to take on excess risk, and the need for a bank to define its risk appetite. However, little fault is placed on the firm for potentially having accurately represented the wishes of its shareholders (and ignoring other stakeholders, as discussed earlier).[15]

The importance of the chief risk officer (CRO) and the risk committee is examined in depth by Ellul and Yerramilli (2010). Using a sample of the 74 largest bank holding companies in the United States from 2000 to 2008, they offer some insights into the prioritization of risk: 51.9 percent of the firms have a CRO as an executive officer, 19.5 percent have a CRO among the top five compensated executives, and 23.2 percent of risk committees (they use audit committees in the absence of a risk committee) have at least one independent or "gray" director with banking experience. They construct a risk management index (RMI) using principal-component analysis of the variables that define whether a CRO is present, whether the CRO is an executive

[14] This is broken down into three groups: primary dealers, banks that are not primary dealers, and insurance companies.

[15] The point that risk taking was intentional and potentially supported by shareholders is also suggested by the evidence on the experience of independent board members in the section on boards.

officer, and whether the CRO is among the top five compensated and that give CRO compensation divided by CEO compensation. In table 1, a higher RMI index means that three measures of volatility will be lower. This relationship also holds if the explanatory variable is just CRO compensation divided by CEO compensation. Similarly, Keys, Mukherjee, Seru, and Vig (2009) find that larger relative power for the CRO (measured by CRO compensation divided by the amount of compensation given to the top five paid executives) implies lower default rates on loans (mortgages and home equity loans) originated by the bank. Moreover, Ellul and Yerramilli (2010) show that banks with a larger RMI had "lower exposure to private-label mortgage backed securities and risky trading assets, and were less active in trading off-balance sheet derivative securities." Finally, banks with higher "quality of oversight" (the average of dummies whether the risk committee is experienced[16] and whether the risk committee is active[17]) had lower volatility as well.

The Senior Supervisors Group (2009) interviewed managers and executives in large financial institutions about risk management practices. The governance issues they point out are the following:[18]

- Risk management is often separated along product and organizational lines.
- The board and senior managers often do not specify what risk level is acceptable to the firm.
- Compensation practices are more related to attracting and retaining staff than to sensitivity to risk. Moreover, risk takers are rewarded with "status and influence."
- The boards of directors do not correctly perceive the risks the firms are taking.

The second and fourth points emphasize the role of communication and prioritization of risk at the top levels. This finding is in line with the work of Ellul and Yerramilli (2010) in making the connection between the centrality of the role of risk management and less volatility. It also seems to point to a board's lack of understanding of risk practices. As discussed earlier, experience is certainly an issue, but it is unclear whether increased

[16] That is, the risk committee has at least one member with previous banking experience.
[17] That is, the risk committee meets more times during the year than the average risk committee in the sample.
[18] Of course, they point out many institutional arrangements and practices that led to excess risk taking. We focus only on the ones directly related to governance.

board experience with financial markets would improve matters. The risk culture of the firm, which the Senior Supervisors Group also emphasizes in the description of rewards for risk takers, is an important factor.

Other reports have made similar points. The Walker Report (2009) and papers by the Bank for International Settlements (2009) and the Committee of European Banking Supervisors (2010) all highlight other significant issues:

- Banks need to define their risk appetite at senior levels and to communicate it throughout the institution.
- The risk management function should be led by an experienced and independent CRO who is given appropriate status and compensation in line with the importance of the role.

These suggestions seem to be the minimum needed for risk to become a priority in the bank.

D. Market Discipline

Corporate governance can be defined as comprising the procedures by which ex ante agreements on corporate actions are created and enforced. These procedures exist in the context of markets for corporate control, for managerial talent, and for financial capital. In general, the effectiveness of corporate governance procedures is closely bound up in the effectiveness of the signals and incentives generated by these markets or, in short, in the quality of *market discipline*. Market discipline is the subject matter of this section, including the impact of the regulation of bank capital and of expansion in the scale and scope of financial institutions on market discipline.

1. Bank Capital

Bank capital, a particularly important source of market discipline in banks, is the focus of many regulations. A well-designed regime for capital adequacy may serve as a partial substitute for formal corporate governance rules in banking, because capital regulation can strengthen market incentives for bank shareholders and managers to resolve governance problems. This section investigates this possibility.

Bank capital serves at least three purposes.[19] First, it acts as a buffer against bankruptcy and the attendant social costs. Second, should bank failure occur, capital is a buffer against losses to the deposit insurance fund and, hence, to the taxpayer. And, third, bank capital exposes bank shareholders to losses and so should counter the excessive risk-taking incentives engendered by a deposit insurance fund with risk-insensitive premiums. The third of these roles makes the structure of bank capital a vehicle for governance.

Several authors argue that, because it exposes shareholders directly to the risk of failure, bank capital requirements encourage good risk management practices (see, for example, Rochet 1992; Kim and Santomero (1988); Morrison and White 2005).[20] Higher capital requirements should therefore work in favor of better bank governance. However, recent work appears to indicate that, over the years leading up to the financial crisis, the composition of bank capital altered in a way that undermined owner incentives. In their examination of the composition of bank capital and the effects of bank dividend policies in the period before the financial crisis, Acharya, Gujral, and Shin (forthcoming) find that the composition of bank capital has changed. Most of the new capital issues in response to the crisis are of debt or of hybrid securities such as preferred stock. Moreover, bankers continued to pay dividends throughout the crisis: Acharya et al. (2009) argue that this policy has broken the priority of debt over equity and has served as a form of risk shifting. Their conclusions are supported by Khorana and Perlman (2010), who argue that the 150 largest banks have engaged in procyclical distribution strategies that have jeopardized long-term value.

In replacing their share-based capital with arguably weaker forms of capital, banks leave themselves open to severe losses in future crisis situations. Indeed, in a multicountry study Demirguc-Kunt, Detragiache, and Morrouche (2010) find that better-capitalized banks fared better during the crisis and that higher-quality capital, such as tier 1 capital, was more relevant to their performance. Berger and Bouwman (2009) present evidence that bank capital is more important during financial crises, when it enables banks both to survive and to improve their market shares. Beltratti and

[19] See Furlong and Keeley (1989) and Morrison and White (2005) on the relationship between capital requirements and risk, and Gordy and Heitfield (2010) and references therein for an analysis of risk-based capital requirements. Calem and Rafael (1999) calibrate a model that demonstrates a U-shaped relationship between capital levels and risk-taking incentives.

[20] In addition, Boot and Marinč (2010) demonstrate that higher capital requirements can raise stability by inducing entry by higher-quality banks that believe themselves less likely to be undercut by poor bankers taking advantage of the deposit insurance fund, and so raise competition.

Stulz (2009) show that banks with more capital, and from countries with stricter capital supervision, fared better during the crisis. Chesney, Stromberg, and Wagner (2010) also find a negative relationship between tier 1 capital ratios and write-downs.

That banks failed to account for the effects identified in the previous paragraph suggests that capital requirements alone are not a sufficient mechanism for bank governance. Reducing the quality of the bank's capital raises the value of the government safety net, which, while it is socially suboptimal, increases shareholder wealth. Macey and O'Hara (2003) argue that the right response to this problem would be to extend the fiduciary duties of banks beyond the usual shareholder-maximization objective to include an obligation toward the safety and soundness of their institutions. Hence, they argue, bank directors should explicitly account for solvency risk and should be personally liable for failures to do so.

Macey and O'Hara's idea is an attractive one, but it may be subject to the same problems that hamper general governance arrangements in banks: namely, the opacity of banks and the noncontractibility of their activities. It may prove very difficult to prove in court that a bank's directors failed to fulfill their wider fiduciary duty: indeed, it is precisely this type of problem that makes bank capital an important governance tool. It may therefore prove simpler to address the problems that make equity capital an unattractive source of funds for banks. In the absence of tax advantages and government support for debt, there is no particular reason to believe that equity is a more costly bank liability than debt (see Admati, DeMarzo, Hellwig, and Pfleiderer 2010). Further, Mehran and Thakor (2011) provide a theoretical argument showing that bank value and capital are positively correlated. Their empirical work supports their theory.[21] Hence, one way to reduce the preference of banks for debt finance would be to reduce the value of the deposit insurance net. Although a simpler, and likely more effective, approach, would be to abolish the tax advantage of corporate debt, that seems unlikely to occur.[22] Three alternative proposals have been recently advanced: (1) to extend the tax advantage to certain types of equity capital, which has been the effect of the contingent convertible bond, or CoCo bond,[23] and a related instrument, “bail-inable” debt, as a

[21] See Allen, Carletti, and Marquez (2011) for another argument suggesting that banks with more capital are more valuable.

[22] For a brief recent discussion of the politics of reform, see James Surowiecki, “The Debt Economy,” *New Yorker*, November 23, 2010.

[23] See Flannery (2009) and Albul, Jaffee, and Tchistyi (2010), who argue respectively that CoCo bonds would reduce the incidence and the costs of financial distress in banking firms. Sundaresan and Wang (2001) discuss the difficulty of pricing contingent convertible bonds.

resolution mechanism (Ervin 2011); (2) to establish a special capital account as in Acharya, Mehan, and Thakor (2011); and (3) to use options in compensation as backdoor equity capital.[24]

2. Scale, Scope, and Corporate Governance

Recent years have seen a significant increase in the scale and scope of financial institutions. In several ways, this expansion has affected the formation of market prices and, as a result, the functioning of market discipline. Large banks are perceived as too-big-to-fail and are possibly too-complex-to-fail as well. They may also have succeeded in extending the reach of the deposit insurance net beyond its intended narrow use in retail deposit taking. Each of these effects has reduced the sensitivity of bank investors to bank risk taking, because investors anticipate a degree of state support even in failure conditions. The consequence is a severe attenuation of market discipline and of the ability of outside stakeholders to align the incentives of bank managers with their own. To the extent that this is the case, new governance arrangements are needed that either substitute for or restore market-based incentives. This section discusses the weakening of market discipline in large financial firms and possible policy responses. No clear solutions to these governance problems have emerged, although this paper identifies areas upon which future research and policy discussions could focus.

Bank scope has expanded in recent years in both the United States, where the November 1999 Gramm-Leach-Bliley Act dismantled the barriers to universal banking that were created by the Glass-Steagall Act, and in Europe, where conglomeration has been occurring for at least two decades.[25] The repeal of Glass-Steagall reflected industry pressure and also a realization that contemporary justifications for its passage had little empirical support.[26] But, as noted below, the repeal had some apparently unanticipated deleterious effects on market discipline in financial institutions.

The crisis reinforced the fact that some large financial institutions are too big and systemically important to fail. Ben Bernanke (2009) acknowledged that "in the present crisis, the too-big-to-fail issue has emerged as an enormous problem." The inevitable consequence of this observation is a decline in market discipline in financial

[24] See Mehran and Rosenberg (200**8**) and Babenko and Tserlukevich (2009) for related evidence.
[25] See Morrison (2010) for a survey of universal banking. Lown et al. (2000) discuss the pressures that led to financial conglomeration.
[26] See Morrison and Wilhelm (2007, 196–215), Krozner and Rajan (1994), and Ang and Richardson (1994).

conglomerates. This issue can be addressed partly through improved bankruptcy procedures for large banks, but it is unlikely that very large and complex financially fragile institutions will ever be treated precisely as smaller banks are.

Bank conglomeration has not only expanded the scale of banks but also the scope, potentially worsening a too-big-to-fail problem. By expanding the range of activities in which deposit-taking institutions participate, it may also have extended the reach of the deposit insurance safety net to securities businesses:[27] if a systemically important firm is engaged in a securities business, then the prudential authorities may believe that the business should be protected in the event of its failure to avoid damaging the deposit-taking business. In this way, conglomeration may weaken market discipline in businesses where it was formerly very effective. Moreover, it may prove a rationale for more conglomerate risk taking: absent enforceable fiduciary responsibilities of the type envisaged by Macey and O'Hara (2003), banks will take advantage of opportunities to extend the deposit insurance safety net, and, in particular, financial conglomerates might be expected to engage in more risk shifting.[28]

The apparent diminution of market discipline caused by financial conglomeration has undermined traditional governance arrangements in banks. Several possible responses present themselves. First, shareholders and regulators could demand that bankers report their activities in greater detail and so improve the ex ante contracting environment. Such reporting could be further strengthened by trusted third-party information providers. Second, regulators could attempt to alter the institutional structure within which banks operate and so resolve some of the incentive problems caused by a weakening of market discipline. These possibilities are examined in turn below. Neither appears to be a panacea.

If better reporting would improve contracting, and thus strengthen bank governance arrangements, one might ask why it has not already emerged through a process of market discovery. One explanation may be that, because shareholders and managers have a shared desire to extract a deposit insurance fund subsidy, neither has an incentive to produce reports that might make it harder to do so. If this is the case, then an argument could be made for state-mandated reporting, possibly by a neutral third-party information provider. But such a requirement would run up against

[27] For theoretical models of this effect, see Freixas, Lóránth, and Morrison (2007) and Dewatripont and Mitchell (2005).
[28] Stiroh (2004) and DeYoung and Roland (2001) provide evidence that diversified financial institutions take more risks.

problems: regulatory intervention in market-based information generation can undermine the incentives that ensure its veracity, and banks are increasingly too complex for outsiders to comprehend.

A greater investment in third-party information provision would certainly generate more information on which shareholder and supervisor governance arrangements could be predicated. But such information is valuable only insofar as it is accurate. The evidence from a strong reliance on credit ratings in financial regulations suggests that it may not be:[29] ratings for structured products had to be revised sharply downward after the crisis, and firms that had relied on them experienced significant losses.[30] If the credit rating agencies lowered their standards before the crisis, they may have done so in response to the hard-wiring of their data into regulatory standards. Partnoy (1999) argues that, when investors have a legally imposed mandate based on a credit rating, they become less concerned with the quality of the rating than with its existence. As a result, the rating agency may subordinate its concern for its reputation to its desire to attract business by selling regulatory certification, and the quality of ratings may diminish. Moreover, ratings shopping by issuers may exacerbate the conflicts of interest, as in Bolton, Freixas, and Shapiro (2010). Ratings accuracy is also likely to suffer most in booms, as in the recent crisis (see Bar-Isaac and Shapiro 2010). Issuers may design bonds to achieve the necessary rating by the lowest possible margin: consonant with this hypothesis, Benmelech and Dlugosz (**2009**) find a very high degree of uniformity in the design of loan-backed notes, and Coval, Jurek, and Stafford (2009a, 2009b) and Brennan, Hein, and Poon (2008) show that these notes were structured to maximize their market betas and hence their yield.

Quite apart from the difficulties associated with mandated third-party information provision, it may be technologically impossible to generate data that could support better governance in large financial firms. Plenty of evidence suggests that such firms are now almost too complex to manage. For example, Herring and Carmassi (2010) note that Citi has nearly 2,500 subsidiaries and that it operates in 84 countries. Bank officers faced with this sort of complexity naturally struggle to manage every

[29] U.S. banks were referred by the comptroller of the currency to the ratings agencies to identify the speculative-grade bonds that should not form a part of their portfolio as far back as 1936, and, more recently, ratings have played an increasing role in the determination of regulatory capital ratios. See the Basel Committee on Banking Supervision (2006).

[30] See, for example, Paul J. Davies, "CDO Downgrades Break New Records," *Financial Times*, December 13, 2007, reporting the downgrade of over 2,000 securities in November 2008, over 500 of which moved down over 10 notches on the standard ratings scale.

aspect of their business effectively, so that additional agency problems are introduced into complex financial firms. Generating a report that an outsider could understand and use as the basis for a governance contract may not be possible. Nevertheless, shareholders tolerate this situation, perhaps because it is unclear to the regulatory authorities what the consequences of firm failure in a complex organization would be, so that, when push comes to shove, complex firms may receive a bailout. In short, a "too-complex-to-fail" problem may exacerbate the governance problems caused by a too-big-to-fail problem.

Therefore, governance problems deriving from a failure of market discipline in large firms may not be susceptible to a formal, "box-ticking" solution, precisely because they reflect the inability of regulators and bankers to contract ex ante upon banker actions. The only effective governance responses to the expansion of scale and scope in financial firms may thus be *institutional*: that is, banker incentives to engage in risk shifting in large financial firms may best be countered by altering the structure of the firms and the regulatory landscape in which they operate.

Several authors have proposed that an effective institutional response to market discipline problems in large financial firms would be to separate commercial and investment banking completely;[31] some have even gone so far as to advocate narrow banking legislation.[32] The "Volcker Rule" proposed a partial separation in the form of a ban on proprietary trading for banks with a deposit insurance safety net (see G-30 2009); a watered-down version of this rule made its way into the Dodd-Franks Wall Street Reform and Consumer Protection Act of July 2010.

The argument for narrow banking is seductive, given that the evidence for scope economies in banking is mixed.[33] If such evidence is not compelling, then perhaps the incentive benefits from exposing risk takers to better and more focused market discipline may outweigh their cost. However, this argument requires regulators to make a credible commitment not to bail out nonnarrow institutions. Recent evidence, however, shows that such a commitment is unlikely to be enforceable. An example particularly germane to this discussion is the *shadow-banking sector*, comprising

[31] Herring and Carmassi (2010) report that some degree of separation between lending and securities activity is already commonplace in countries that permit banks to engage in both activities.
[32] See, for example, Kay (2009).
[33] Barth, Brumbaugh, and Wilcox (2000) make a technological case for economies of scope, and Berger, De Young, Genay, and Udell (2000) identify some potential economies in universal banks. However, Allen and Rai (1996) and Vennet (1999) find only limited evidence of scope economies in European universal banks, although Cyberto-Ottone and Murgia (2000) show that scope expansion can raise shareholder wealth.

vehicles financed with short-term funds and holding in longer-term assets, but without deposit insurance and, hence, not regulated as banks. Most of the assets held in the shadow-banking sector immediately before the crisis were bank-originated loans, transferred to the shadow banks through securitizations.

The shadow-banking sector grew very rapidly in the years before the financial crisis,[34] and, while shadow banks were not subject to financial regulation, some received state support during the crisis.[35] The growth of this sector has two related implications. First, it suggests that bankers will innovate their way around complex regulations. If so, such regulations cause a misallocation of human capital within the banking sector and hence an exacerbation of governance problems. Second, the crisis experience of money market mutual funds indicates moreover, that the lines have blurred between institutions supported by the state and those that are not. In light of this observation, one might expect regulated institutions to shift the regulated parts of their business outside the ambit of the supervisor, while retaining the assets that benefit most from government support.[36]

In summary, the case for legislation that restricts the activities of deposit-taking firms is mixed. Such legislation might be effective if it could be enforced. But the crisis experience of the shadow-banking sector suggests that such enforcement would be difficult and that scope-restricting legislation may serve to undermine market discipline even further.

An alternative institutional response to weakened market discipline in large banks might be simply to force them to shrink, so that they are once again small-enough-to-fail. In line with this suggestion, Čihák, Maechler, Schaeck, and Stolz (2009) find evidence that market discipline is effective for smaller-to-medium-sized banks that are unlikely to receive a government bailout: executives in such banks are more likely to be dismissed if they assume risks, incur losses, cut dividends, have a high charter value, and hold high levels of subordinated debt.

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[34] Adrian and Shin (2009) show that, immediately before the crisis, the shadow-banking sector had more assets than the banking sector. Gorton (2009) tracks the evolution of this sector.

[35] Kacperczyk and Schnabl (2010) document a run on the money market mutual fund sector. Despite the fact that money market mutual funds were not formally covered by the deposit insurance fund, the U.S. Department of the Treasury reacted to the run by announcing temporary insurance for investors in money market mutual funds.

[36] Acharya, Schnabl, and Suarez (2010) present evidence in line with this from the asset-backed commercial paper market, where securitizations before the crisis reduced capital requirements without reducing the riskiness of the originator's asset portfolio.

While smaller banks would be less able to take advantage of government support, they would also be more competitive. Every economics undergraduate understands that heightened competition is good for consumers. However, starting with Keeley (1990), a strand of banking literature identifies a confounding effect in banking, suggesting that competition could result in more financial fragility, because it would lower the value of the bank's franchise and so encourage risk taking.[37] This effect might outweigh the governance benefits that flow from reduced access to government funds. Recent theoretical work, however, suggests that this effect is not cut and dried,[38] and recent empirical work indicates that, while bank competition may be associated with heightened financial fragility, the causal link is not certain.[39]

This section has identified a serious governance problem in large financial institutions stemming from the weakening of market discipline and the difficulty of implementing formal regulations because of the extreme complexity of the institutions. The only effective approach to these governance problems may be institutional. The natural argument for narrower banks, however, is undermined by the ability of banks to innovate their way around scope regulation, and the case for smaller banks is still unproven. Market discipline problems in large banks therefore remain a serious challenge. The crisis has at least generated plenty of data that will facilitate future research and inform future policy debates.

4. Conclusion

Thanks to the deposit insurance subsidy, shareholders in banks have created incentives for taking risks and maximizing leverage, at a substantial cost to other stakeholders. This effect has been amplified in recent years as banks have been able to push into newer, more complex activities and have thus broadened their scope. The nature of these businesses has made it difficult for regulators to keep pace with the changes and analyze the implications of the expansion. This paper offers some suggestions based on the recent financial literature that may diminish governance

[37] See also Besanko and Thakor (1993) and Hellman, Murdoch, and Stiglitz (2000).
[38] See Boyd and De Nicolo (2005), who argue that heightened bank competition may reduce borrower risk shifting, although Martinez-Miera and Repullo (2010) argue that this effect is ambiguous.
[39] Berger, Klapper, and Turk-Ariss (2009) find from their analysis of 8,235 banks in 23 developed countries that banks with higher market power also have less overall risk exposure. However, Beck (2008) argues that although the positive association between increased bank competition and risk has been associated in the past with financial fragility, this has been the consequence of regulatory and supervisory failures, and Boyd, De Nicolo, and Jalal (2006) and De Nicolo and Loukoianova (**2007**) find an inverse relation between banking sector concentration and the risk of bank failure.

problems. The paper also presents challenges that have no easy answers. Further research will be needed to make headway on such issues.

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Appendix

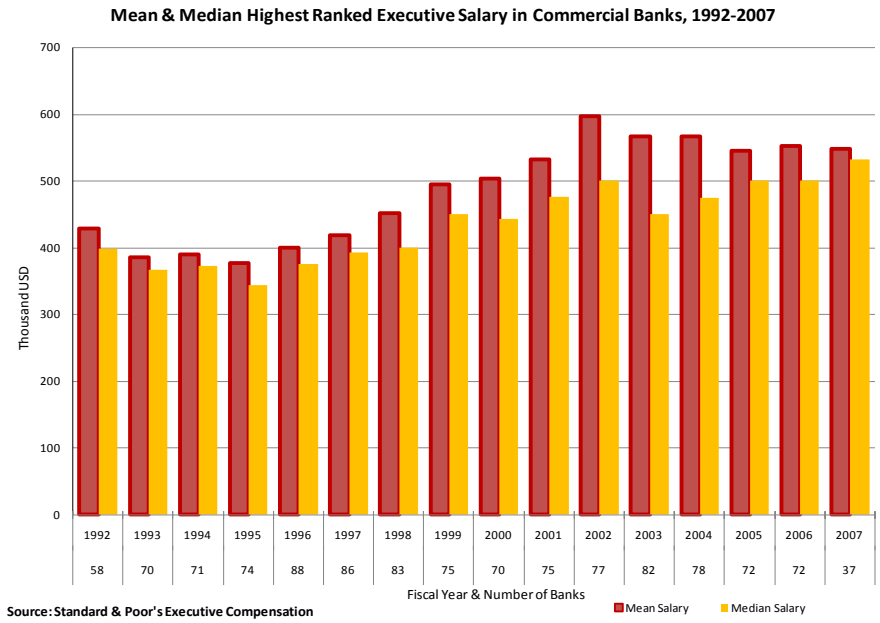
Table 1

THE RELATIONSHIP BETWEEN GOVERNANCE AND MEASURES OF RISK AND PERFORMANCE

			RISK MEASURES			PERFORMANCE MEASURES		
	Authors	Period	Measure	Period	Sign	Measure	Period	Sign
BOARD								
% Independent Directors	Erkens, Hung, and Matos (2009)[a]	Dec '06	Writedowns	Q1 '07 -Q3 '08	Positive	Stock returns	Q1 07 -Q3 08	Negative
	Pathan (2009) **	'97-'04	Std. Dev. Stock returns	'97-'04	Negative			
		'97-'04	Systematic (Beta)	'97-'04	Negative			
		'97-'04	Idiosyncratic (residuals)	'97-'04	Negative			
	Faleye and Krishnan (2010)	'94-'06	Non-investment grade rating by S&P	'94-'06	Negative			
			of borrowers (new loans)					
	Minton, Taillard, and Williamson (2010)	'01-'08	Std. Dev. Stock returns	'01-'08	Negative			
		'06	Received TARP funds		Positive			
	Adams (2009)	'07	Received TARP funds		Positive			
Board Size	Pathan (2009) **	'97-'04	Std. Dev. Stock returns	'97-'04	Negative			
		'97-'04	Systematic (Beta)	'97-'04	Negative			
		'97-'04	Idiosyncratic (residuals)	'97-'04	Negative			
	Faleye and Krishnan (2010)	'94-'06	Non-investment grade rating by S&P	'94-'06	Positive			
			of borrowers (new loans)					
	Minton, Taillard, and Williamson (2010)	'01-'08	Std. Dev. Stock returns	'01-'08	Negative			
		'06	Received TARP funds		Positive			
	Adams (2009)	'07	Received TARP funds		Positive			
Experience	Minton, Taillard, and Williamson (2010)	'01-'08	Std. Dev. Stock returns	'01-'08	Positive			
		'06	Received TARP funds		Positive			
	Fernandes and Fich (2009)	'06				Stock returns	'07-'08	Positive
CEO also chair	Faleye and Krishnan (2010)	'94-'06	Non-investment grade rating by S&P	'94-'06	Positive			
			of borrowers (new loans)					
RISK COMMITTEE								
Risk Management Index	Ellul and Yerramilli (2010) **	'00-'08	Mean Implied Volatility of Put Options	'00-'08	Negative	Sharpe Ratio	'00-'08	Positive
		'00-'08	Marginal Expected Shortfall	'00-'08	Negative			
		'00-'08	Std. Deviation Stock Returns	'00-'08	Negative			
CRO Pay/ CEO Pay	Ellul and Yerramilli (2010) **	'06	Mean Implied Volatility of Put Options	'07-'08	Negative			
		'06	Marginal Expected Shortfall	'07-'08	Negative			
		'06	Std. Deviation Stock Returns	'07-'08	Negative			
CRO Pay/ Top 5 Executives' Pay	Keys, Mukherjee, Seru, and Vig (2009) **	'01-'06	Loan Delinquency	'01-'06	Negative			
Quality of Oversight	Ellul and Yerramilli (2010) **	'00-'07	Mean Implied Volatility of Put Options	'01-'08	Negative			
		'00-'07	Std. Deviation Stock Returns	'01-'08	Negative			
EXECUTIVE COMPENSATION								
Residual Pay(taking out firm size)	Cheng, Hong, and Scheinkman (2010)	'92-'94, '98-'00	Beta	'95-'00, '01-'08	Positive	Excess returns	'95-'00	Positive
		'92-'94, '98-'00	Volatility of stock	'95-'00, '01-'08	Positive	Excess returns	'01-'08	Negative
		'92-'94, '98-'00	Correlation of stock returns with ABX	'95-'00, '01-'08	Positive			
Vega	Chesney, Stromberg, and Wagner (2010)	'02-'06	Writedowns	Q3 '07 - Q4 '08	Positive			
	Suntheim (2010)**[a]	'00 - '06	Std. Deviation Stock Returns	'00 - '06	Positive	Stock returns	Q3 '07-Q4 '08	Negative
		'00 - '06	Beta	'00 - '06	Positive			
	DeYoung, Peng, and Yen (2009)**	'94-'06	Beta	'94-'06	Positive			
		'94-'06	CAPM Residual	'94-'06	Positive			
		'94-'06	Private MBS holdings	'94-'06	Positive			
	Ellul and Yerramilli (2010) **	'00-'07	Std. Deviation Stock Returns	'01-'08	Positive			
	Mehran and Rosenberg (2008)**	'93-'01	Std. Deviation Stock Returns	'94-'02	Positive			
		'93-'01	Residual Volatility	'94-'02	Positive			
Delta	Chesney, Stromberg, and Wagner (2010)	'02-'06	Writedowns	Q3 '07 - Q4 '08	Positive			
	Suntheim (2010)**[a]	'00 - '06	CAPM residual (idiosyncratic risk)	'00 - '06	Negative			
		'00 - '06	Beta	'00 - '06	Negative			
	DeYoung, Peng, and Yen (2009)**	'94-'06	Beta	'94-'06	Positive			
	Mehran and Rosenberg (2008)**	'93-'01	Systematic volatility	'94-'02	Positive			
	Fahlenbrach and Stulz (2010)	'06				Stock Returns	Q3 '07-Q4 '08	Negative
		'06				ROE	Q3 '07-Q4 '08	Negative
		'06				ROA	Q3 '07-Q4 '08	Negative
% comp in deferred stock and options	Balachandran, Kogut, and Harnal (2010)**	'95-'07	Predicted default probability	'96-'08	Positive			
INSTITUTIONAL OWNERSHIP	Erkens, Hung, and Matos (2009)[a]	Dec '06	Writedowns	Q1 07 -Q3 08	Positive			
	Ellul and Yerramilli (2010) **	'00-'07	Mean Implied Volatility of Put Options	'01-'08	Positive			
		'00-'07	Std. Deviation Stock Returns	'01-'08	Positive			
	Cheng, Hong, and Scheinkman (2010)	'92-'94, '98-'00	Risk Score	'95-'00, '01-'08	Positive	Excess returns	'95-'00	Positive
						Excess returns	'01-'08	Negative
	Laeven and Levine (2009)[a]**	'01	z-score	(i) '01, (ii) '02-'04	Negative			
			Equity volatility	'01	Positive			
			Earnings volatility	'01	Positive			

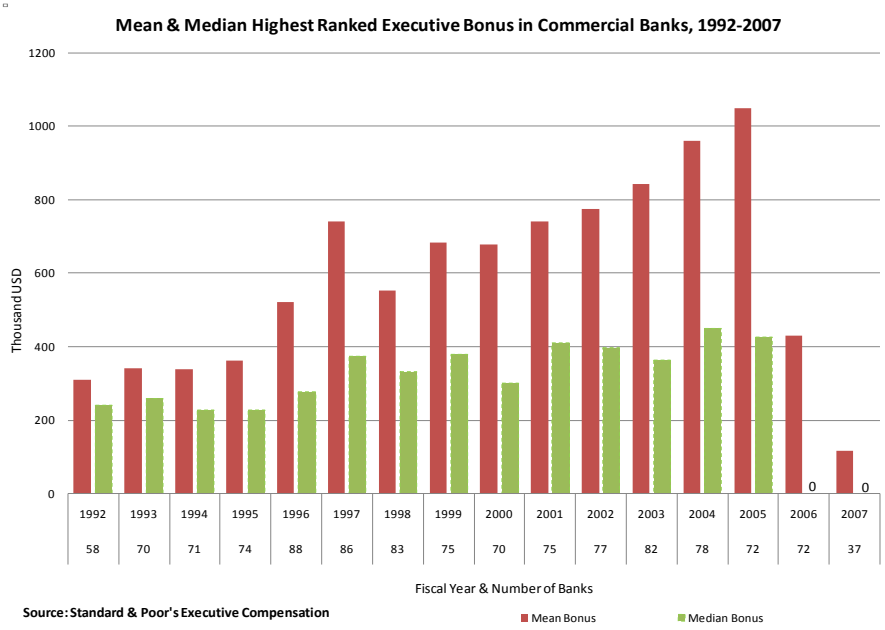
[a] indicates that authors use an international sample. Erkens, Hung, and Matos (2009) have a 42% U.S. sample, while Suntheim (2010) has a 31% U.S. sample
** indicates authors used econometric techniques other than lags to correct for endogeneity issue
Note that only coefficients that were significant are reported here. Lack of significance is also informative, but was not included for presentational purposes.

Figure 1



Source: Standard & Poor's Executive Compensation

Figure 2



Source: Standard & Poor's Executive Compensation

Figure 3

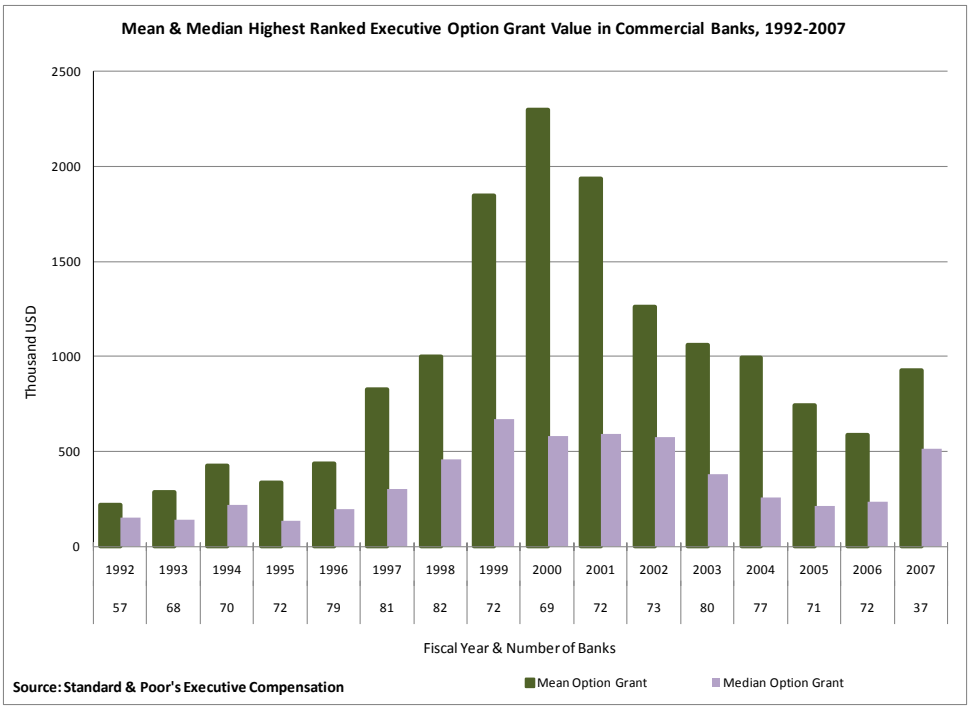

Mean & Median Highest Ranked Executive Option Grant Value in Commercial Banks, 1992-2007
Thousand USD
2500
2000
1500
1000
500
0
1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007
57 68 70 72 79 81 82 72 69 72 73 80 77 71 72 37
Fiscal Year & Number of Banks
Source: Standard & Poor's Executive Compensation
Mean Option Grant
Median Option Grant

Figure 4

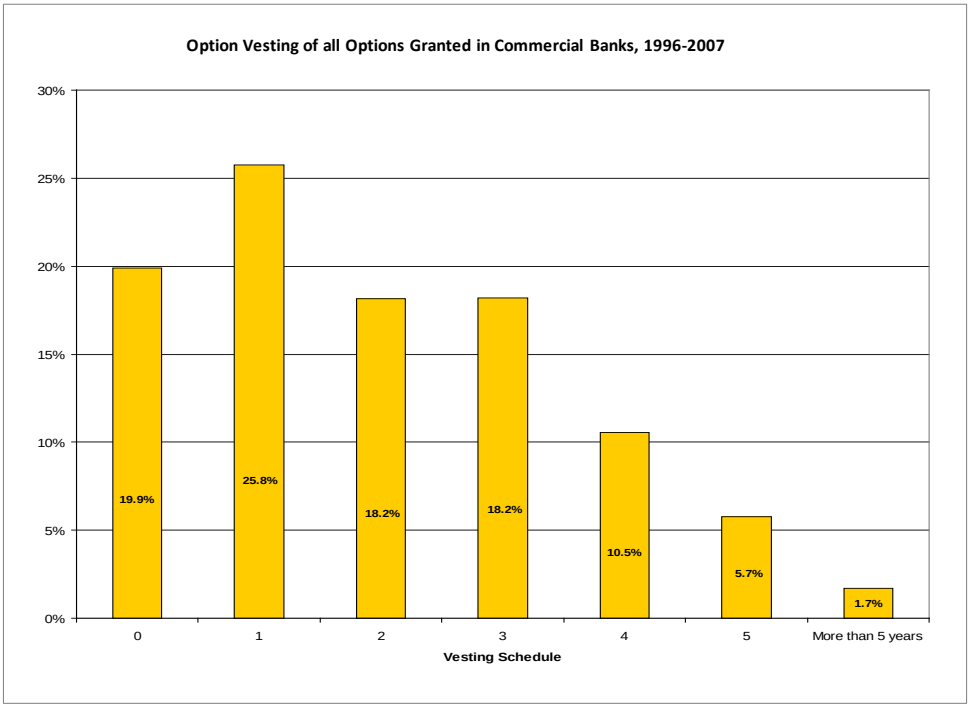

Option Vesting of all Options Granted in Commercial Banks, 1996-2007
30%
25%
20%
15%
10%
5%
0%
19.9%
25.8%
18.2%
18.2%
10.5%
5.7%
1.7%
0
1
2
3
4
5
More than 5 years
Vesting Schedule

Figure 5

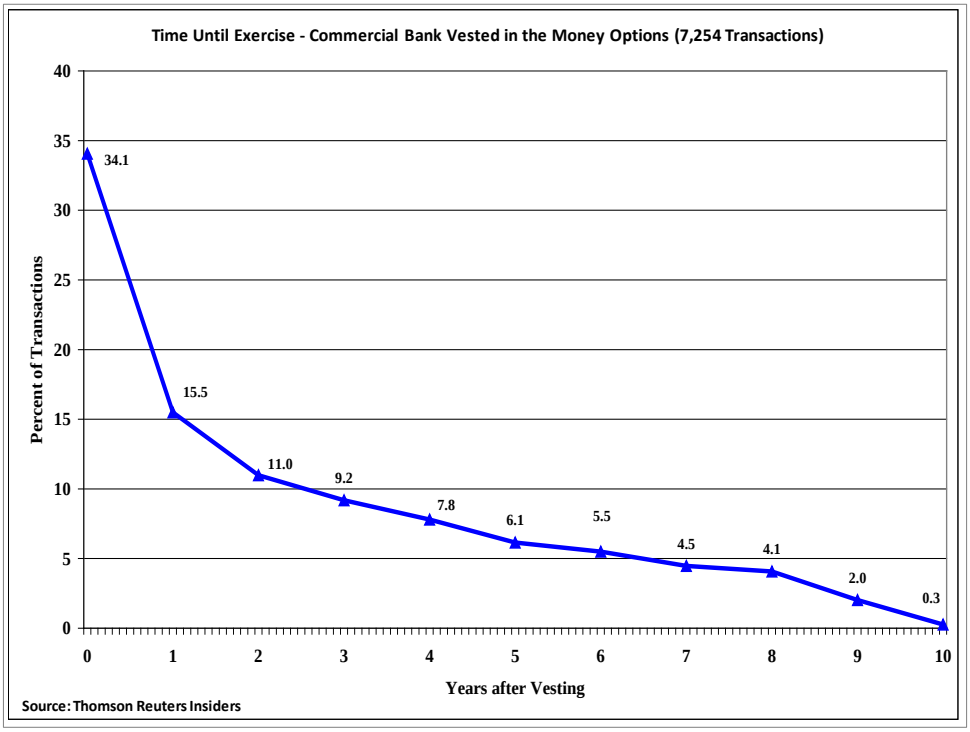
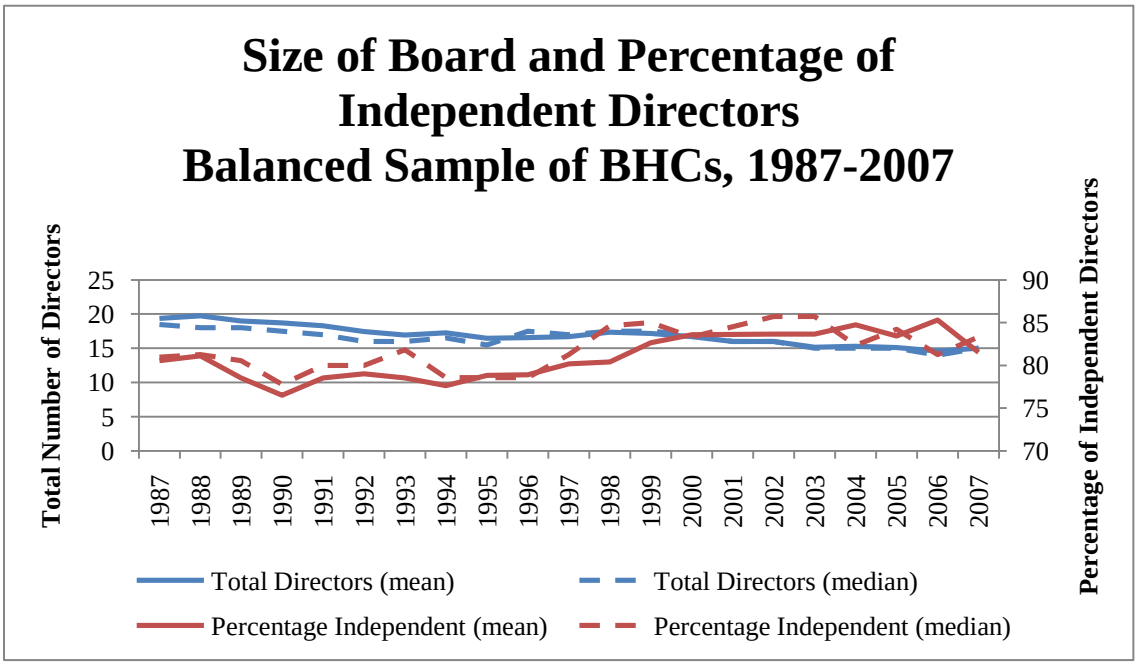

Time Until Exercise - Commercial Bank Vested in the Money Options (7,254 Transactions)
Percent of Transactions
Years after Vesting
34.1
15.5
11.0
9.2
7.8
6.1
5.5
4.5
4.1
2.0
0.3
Source: Thomson Reuters Insiders

Figure 6


Size of Board and Percentage of Independent Directors
Balanced Sample of BHCs, 1987-2007
Total Number of Directors
Percentage of Independent Directors
25
20
15
10
5
0
90
85
80
75
70
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
Total Directors (mean)
Total Directors (median)
Percentage Independent (mean)
Percentage Independent (median)