The Role of Risk Management in Corporate Governance

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Abstract

Failures of banks' governance and risk management functions have been identified as key causes of the 2007-2008 financial crisis. This article reviews the empirical literature that investigates the relationship between governance structures and risk management functions as well as their impact on banks' risk-taking and performance. I first discuss risk management's responsibilities and relevance for a value-maximizing bank. The business nature of financial institutions and their funding structure, together with explicit and implicit government guarantees, set them apart from nonfinancial firms. I argue that conventional governance structures alone may be unable to restrain risk-taking in banks and thus the presence of a strong and independent risk management function becomes necessary to monitor and control enterprise-wide risk exposures. Recent evidence shows that a strong risk management function, compatible with the appropriate business model and culture, can restrain tail risk exposures at financial institutions and promote long-term value maximization.

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Introduction

Weaknesses in bank governance structures[1] and failures in risk management[2] have been identified by policy makers, regulators and academics as key causes of the financial crisis that started in 2007. Financial instability is not a random event, but rather the result of risk buildup within the system which affects financial and economic fragility, business cycle fluctuations, and economic growth (Bernanke (1983), and Calomiris & Mason (1997, 2003a, b)). This is an issue of first-order importance from a policy perspective and one that has attracted significant interest in an attempt to understand what led to the magnitude of risk taking experienced before the crisis. The objective of this paper is to review and discuss the growing empirical literature that examines the relationship between the governance structures and the risk management function within a bank's organization, their impact on risk taking and, ultimately, bank performance before and during the financial crisis.[3]

The empirical literature on governance in banks[4] has developed in different directions but there is a common thread running through it: conflicting incentives of managers, shareholders and creditors, which may be more severe in banks because of the nature of their business and the high leverage in their capital structure. While financial firms share some common governance and risk management problems with non-financial ones, they suffer from specific governance problems that make it harder for traditional governance structures to restrain executives' risk taking (Becht, Bolton & Röell (2011), and Mehran et al. (2011)). Importantly, regulation and

[1] 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)). Similarly the Commission on the Causes of the Financial and Economic Crisis in the U. S. concluded its work by stating that the "dramatic failures of corporate governance…at many systematically important financial institutions were a key cause of this crisis."

[2] For example, the then Chairman of the Federal Reserve, Ben Bernanke, argued that "The failure to appreciate risk exposures at a firm-wide level can be costly. For example, during the recent episode, the senior managers of some firms did not fully appreciate the extent of their firm's exposure to U.S. subprime mortgages" (May 2008).

[3] It is not the goal of this paper to review the literature on corporate governance in financial firms. For competently written reviews of this subject, see Adams (2010), Adams & Mehran (2003), and Mehran et al. (2011, 2012).

[4] In this paper I use the words "banks" to refer to both bank holding companies and investment banks.

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explicit and implicit government guarantees add a completely different dimension to the governance of banks. One of the goals of this paper is to review how these specific issues faced by banks relate to their risk taking activities. It will be argued that governance structures alone may be unable to restrain bank executives' risk taking, and a strong risk management function may become necessary.

While the literature on corporate governance is large and rich, significant gaps exist in our understanding of the risk management function and how it relates to governance structures. There is a burgeoning literature on risk management in corporations, specifically on their hedging practices and impact on performance. Rather than focusing on that literature, which mostly pertains to non-financial firms, here I will deal with the role of the risk management function within financial institutions. As Tufano (1996) argues, our knowledge of corporate risk management is very limited because firms' disclosure is limited. While Tufano (1996) refers to firms' hedging practices, the same applies to the organization side of risk management and how it relates to governance (for example, whether they are substitutes or complements). However, the earthquake suffered by the financial system due to the crisis has led researchers to investigate further the (organizational) risk management functions with the limited data available.

To profitably place risk management within the firm's governance structure, we start with a brief taxonomy of the risk management function. The first task is to understand enterprise-wide risk management's objectives, in order to gain perspective on the failures that arguably took place in the pre-crisis years. Most of the literature argues that risk management ought to curtail excessive risk taking, implying that each institution chooses an optimal risk profile (unobserved to empiricists) that maximizes shareholders' value.

Two questions arise: first, who determines optimal risk taking, and, second, who measures and monitors risk exposures so as to curtail excessive risk taking? Broadly speaking, the literature views governance structures playing a major role in choosing the optimal level of risk, while the risk management function is responsible for measuring and monitoring risk exposures. Due to the decentralized nature of risk taking within banks, and the high-powered incentives of executives, the literature views favorably a strong and independent risk management function (Ellul & Yerramilli (2013), Kashyap et al.(2008), Landier et al. (2009), and Stulz (2008 and 2014)).[5] It is unclear however what determines the strength of the risk management function within a firm. The limited evidence on this subject suggests that the risk management function is itself determined by the bank's overall governance structures.

The problem of identifying causality running from governance and risk management structures to risk taking and, ultimately, bank performance needs to be recognized from the outset. The challenge is very similar to the one faced by the corporate governance literature in non-financial firms when testing for the causal link between governance and performance.[6] There are different reasons that explain the difficulties in addressing appropriately this challenge for risk management in banks, the biggest limitation being data availability due to scarce bank disclosure. Finding that risk taking correlates with specific governance and risk management structures is an important first step in our understanding because it shows, for example, that risk management is neither redundant nor merely put in place to please supervisors but lacking real

[5] Risk managers may be unable to restrain bank executives, even if they have a formal role in an organization, if they do not have real power in the organization. The example of David Andrukonis, a risk manager at Freddie Mac, who tried to alert the organization's senior management to the risks in subprime and Alt-A loans, but was ultimately unable to restrain them, makes this point (Calomiris (2008)).

[6] Due to the endogeneity problem, an empiricist needs a natural experiment to test for and establish causality (Bertrand & Mullainathan (2003)).

power to restrain executives. Hopefully, in the future the literature will refine its identification strategies and come closer to establishing causal links.

This paper is organized as follows. Section 2 presents a framework for the responsibilities and relevance of the risk management function and its potential failures. Section 3 reviews the literature on corporate governance structures in banks - ownership structures, executive compensation, and board of directors - stressing how they impact risk taking activities. Section 4 discusses the literature on risk management and how it is linked to corporate governance. Section 5 concludes.

2. Risk Management: Responsibilities, Relevance and Failures

The first task is defining risk management, to set from the outset the responsibilities of this function and determine if, and when, failures occur. A valid starting point is the definition used by the Bank for International Settlements (2010): "The risk management function is responsible for identifying, measuring, monitoring, controlling or mitigating, and reporting on risk exposures. This should encompass all risks to the bank, on- and off-balance sheet and a group-wide, portfolio and business-line level, and should take into account the extent to which risks overlap…This should include a reconciliation of the aggregate level of risk in the bank to the board-established risk tolerance/appetite" (page 18).

Three main concepts need highlighting. First, the risk management function should have an enterprise-wide remit rather than confined to specific business lines: risk management function's effectiveness is measured by its ability to maximize enterprise value rather than the profitability of a single business unit. This dimension turns out to be very important in the case of large and financial institutions because risk is not centralized and sometimes is opaque. In the

pre-crisis years commercial banks set up off-balance sheet special purpose vehicles as part of their securitization business worth $1.3 trillion and at the same time providing explicit guarantees to these conduits (Acharya et al. (2013)). Indeed, one lesson from the financial crisis is that risks cannot be evaluated in isolation. That said, there are many practical obstacles confronting enterprise-wide risk management. The first obstacle, and one to which I repeatedly refer below, is the difficulty of correctly measuring risk at the enterprise level rather than at the single business unit level and of setting the appropriate risk limits thereafter. Value at risk (VaR) is a measure widely used by financial institutions, but its correct application is notoriously difficult. An important challenge is mapping the VaR of different single business units into an enterprise-wide measure that is consistent with firm-wide risk appetite. This particular challenge may not owe exclusively to limited data to feed into statistical models but also to intrafirm politics concerning its implementation. For example, if firm-wide risk appetite does not change, but a bank finds that a specific business unit ought to have higher risk taking because of profitable opportunities, it follows that some other areas within the bank should take lower risks. Risk management may be tasked with making such decisions, but this process will be fraught with major obstacles because of the intrafirm politics that emerge when such reallocation takes place, especially when incentives are linked to performance.

Second, the crucial question is who should set the institution's (optimal) risk level. Senior management is one candidate, but this group may have incentives that the literature (e.g. Bebchuk & Spamann (2010), and Cheng et al. (2010)) shows may lead the institution to take high risks without necessarily putting in place proper risk management. It is perhaps because of these severe conflicts affecting senior management that the Bank for International Settlements (2010) argues that this ought to be decided by the board of directors. The fiduciary role of the

board is to maximize shareholders' value, subject to the regulatory constraints. The magnitude of risk taking should be consistent with that overarching goal. Making the board as the pivotal force raises various questions; perhaps the most relevant one to this paper relates to its competence to set the optimal risk profile. This may be a troubling area given that financial expertise of independent directors was notoriously limited in the pre-crisis years (Minton et al. (2014)). In fact the Bank for International Settlements (2010) also argues that the board should be "… supported by competent, robust and independent risk and control functions, for which the board provides effective oversight" (page 2). But there is a clear demarcation between the board and the risk management function: it is not the risk management function that ought to determine optimal risk taking. Stulz (2014, 2008), in the case of financial firms, and Froot et al. (1993, and 1994)[7], in the case of industrial firms, make a similar argument.

Third, it follows that the responsibility of risk management is that of reconciling the targeted risk taking (risk tolerance) and the actual risk at an enterprise-wide level. This role is multi-faceted, ranging from risk measurement, reporting of risk exposures (presumably to an enterprise-wide body), to the monitoring and controlling/mitigating of risk exposures. The risk management function is not simply an internal control or policing system. Existing literature (Rosenberg & Schuermann (2006), Landier et al. (2009), Kashyap (2010), Ellul & Yerramilli (2013), and Stulz (2014)) perceives its remit to be broader than just compliance. For a successful outcome, the function has to manage both asset and liability risks simultaneously. Achieving this goal is difficult because objective obstacles exist when it comes to implementing enterprise-wide risk management in this way. For example, most of the risk measurement effort in the precrisis

[7] Froot et al. (1994) state that "Nor can risk management simply be handed off to the financial staff. That approach can lead to poor coordination with overall corporate strategy and a patchwork of derivatives trades that may, when taken together, reduce overall corporate value. Instead, it's critical for a company to devise a risk management strategy that is based on good investments and is aligned with its broader corporate objectives" (page 102).

period was concentrated on the asset side of banks' balance sheets and the risks associated with the funding dimension were largely ignored. The bankruptcies of Bear Stearns and Lehman Brothers show that financial institutions can disappear because of risk mismatch between the asset and liability sides of a balance sheet.

2.1 Relevance of Risk Management

To better understand why risk management is relevant, one has to start from first principles and ask when risk management is irrelevant? In a Modigliani-Miller world firm valuation does not depend on its leverage and risk management is irrelevant. In this world, no reason exists to justify investing resources in managing risk and reducing default risk (Stulz (2003)).

Once we depart from the Modigliani-Miler theorem of leverage irrelevance, and specifically allow for tail risk that can produce costly financial distress, risk management becomes very relevant. It is one channel through which the goal of maximizing shareholder wealth can be reached because it reduces the direct and indirect cost of financial distress. Indeed, value-maximizing banks have a well-grounded concern with the risk management process.[8] This argument is especially important for banks: first, in the case of a systemically important bank, financial distress generates contagion and systemic risk, and, second, banks' ability to issue short term claims for funding purposes depends on its financial health. When these frictions exist, it becomes immediately clear that a strong risk management function is very relevant to the banks' business model (DeAngelo & Stulz (2014)).

The literature suffers from lack of clarity about the risk management's objectives. In the aftermath of the recent financial crisis and also after the collapse of Long Term Capital

[8] See Bartram (2000), Nocco & Stulz (2006), Gordon et al. (2009), Hoyt & Liebenberg (2010), amongst many others.

Management in 1998 it was argued that it ought to avoid financial institutions from taking "excessive risks". This view is, at best, very vague because it implies that an optimal risk level is known by the bank's board and can be measured by the empiricist, and, at worst, can be very misleading if it is not adequately qualified. It does not follow that risk management ought to stop a bank from taking risks as long as they are value-enhancing. Risk management's role is to reduce the deadweight costs and prevent distortions in investment policy. In other words, risk management is tasked with the avoidance of value destroying risk taking, such as taking on tail risk without knowing the risk ramifications of such positions.

When will risk taking destroy value? Theoretically, this occurs when a bank's actual risk profile departs from its optimal level. A centralized and strong risk management function should be able to avoid embarking on a project that would alter the bank's risk profile, beyond what was determined as optimal in the first place. Practically, the bank's optimal risk profile is unobserved and the empiricist wanting to identify it is faced with a very hard task. Risk management faces a similar predicament that can lead to costly failures.

2.2 Risk Management Failures

Broadly speaking, risk management failures can be of three types: first, when the measurement of risks is not done properly, second, when the level of enterprise-wide risks are not communicated or communicated inappropriately to the institution's senior management, and third, when risks are not monitored and managed appropriately. If these failures occur, enterprise-wide risk taking can move away from the optimal risk profile.

It is not the scope of this paper to delve into the details of risk management failures[9] but rather to understand to what extent these failures, causing widespread problems not only to a single institution but potentially to the entire system, are due to poor governance structures. To do so, one has to recognize the objective limitations of any risk management system and disentangle these from failures that are due to a weak corporate governance system.

As an example, consider the identification and measurement of risk. Statistical methodologies to assess the distribution of (known) risks are the primary tools used by risk managers. These tools perform well when risk managers have sufficient historical data that can be used to assess risks under the working assumption that the return generating process in the future is not too different from the one that generated historical data. But how is the institution to behave when such historical data is not available, introducing significant subjectivity in the assessment of potential risks? In these cases there is a fine line between objective failures due to model limitations and organizational failures that occur when model limitations are used as reasons to underweight the opinion of risk managers.

Tail risk, defined as a rare outcome that can have devastating effects on the institution's balance sheet when it materializes, is a good example. Consider the risks involved in the underwriting and buying of mortgage-backed securities in the pre-crisis period. Being new financial products, statistical analysis had severe limitations due to historical data. A risk manager would have needed not only an analysis of the behavior of real estate prices across different states and its effect on the balance sheet, but crucially also the likelihood of a sharp downturn of real estate prices correlated across several geographical states. In such cases, exercises aimed at assessing the potential risk outcomes suffer from high levels of subjectivity.

[9] For a discussion of the taxonomy risk management failures see Stulz (2008).

The decision on whether a new project is consistent with the optimal level of risk taking becomes a lot harder and may become entangled in corporate politics.

It is in these circumstances that strong corporate governance is required in the sense of avoiding or mediating any intra-firm conflicts between different business units and taking an enterprise-wide view of any new project. The relevance of a strong and independent risk management function kicks in precisely in these instances, because the risk manager's views should be part of the decision making process. It is when the risk management function is not given its adequate weight in the enterprise-wide decisions that one can speak of the failure of the governance system within an institution. The same governance failures emerge if the risk management function is not in a position to communicate the enterprise-wide risks to senior management (and the board) or unable to fully monitor and manage those risks. Anecdotally there have been examples that suggest that this was one of the biggest failures, at least in some large institutions.[10]

3. Corporate Governance Structures

We next address the role of corporate governance structures in banks, a key aspect because it affects directly who and how the institution's (optimal) risk profile is determined and how much weight is given to the risk management function. We focus on three dimensions of governance that have been identified in the literature as the most important - ownership structures, board of directors, and compensation of top management - and discuss how they relate to risk taking.

[10] For example, UBS has clearly identified risk management failures within its organization and how these caused the large losses on its subprime investment. The UBS Shareholder Report on Write Downs (2008) states that "UBS's analysis identified a number of factors within the Risk Control functions, specifically within Market Risk, that suggest that the overall Risk Control framework was insufficiently robust."

3.1 Corporate Governance in Banks

Agency conflicts of different nature (between shareholders and the management, between shareholders and debtholders, etc.) are present in banks as much as they are in non-financial firms. The board of directors of banks may malfunction in ways not different than what happens in non-financial firms and misaligned incentives may fester in similar ways. But it is equally important to recognize that banks' business models set them apart from non-financial firms with important implications regarding the governance issues and their impact on risk taking in banks.

Becht et al. (2011) and Mehran et al. (2011) explain clearly why bank governance is different from that of non-financial firms because of three salient features. First, banks are in the business of taking on risks, with the function of commercial bank being that of maturity transformation, i.e. using short term (and liquid) demand deposits and wholesale funding and investing in risky (and illiquid) long term projects. Maximizing shareholder value means that risks have to be taken by management and technically complex trading strategies will have to be entered into. Such activities are opaque even to directors, let alone to shareholders and debtholders, and they need to be monitored by financial experts who are in short supply (Becht et al. (2011)). This salient feature highlights the importance of a board that is (a) composed of directors who have financial expertise and are knowledgeable of the financial industry (to understand risk positions and their long term implications), and (b) not captured by the Chief Executive Officer (CEO) to monitor effectively the risk positions.

Second, financial institutions face regulations that may alter their behavior and, as a consequence, the meaning of optimal risk taking. An important, yet unresolved question, is whether regulation is a complement or a substitute for bank governance structures.

Third, banks have high leverage, a key driver of executives' risk taking. This type of funding makes banks multi-constituency organizations where the decisions of executives and boards have first order implications for the funding providers without them being consulted. The importance of this last issue is blunted because of the protection given by deposit insurance and government guarantees, reducing the incentives of funding providers to monitor the actions of management.

3.2 Ownership Structures

Standard agency theory suggests that bank's ownership structure influences risk taking in corporations (Jensen & Meckling (1976), John et al. (2008)). Potential conflicts regarding risk taking are bound to emerge if the incentives of managers and owners are not aligned, impinging on the optimal risk profile. The presence of regulation, and how it interacts with ownership structures, makes this issue more complicated in banks. Our understanding on how ownership structures influence risk taking is limited, and further compounded by the drawback that ownership is a somewhat loose term that has been used some times to refer to the presence of a large blockholder/institutional investor with a large shareholding, and other times to refer to senior management control.

The additional layers of deposit insurance, too big to fail bailouts (Acharya et al. (2009) and legal restrictions on controlling ownership interest, in place for a long time in many countries, make it even harder to investigate how governance structures emerge in banks and how, in turn, they influence risk taking. Ideally one would want to see how ownership structures influence risk taking behavior without the presence of regulations, an impossible task for any study in the last few decades. One exception is Calomiris & Carlson (2014) who investigate how

bank ownership affects corporate governance, and how ownership and governance structures affect banks' risk management using a sample of 206 U.S. banks from 37 large cities during the National Banking Period (1863-1914) when no regulatory safety net existed for banks.

Calomiris & Carlson (2014) find significant cross-sectional differences across national banks in terms of the type of ownership, corporate governance structures, portfolio composition and their management of risks. Three key results emerge. First, there is a negative correlation between formal corporate governance[11] and the degree of managerial ownership, implying that concentrated managerial ownership is a substitute for governance structures. Second, managers' ability to extract rents (measured by their salaries relative to assets) are higher when they own a greater amount of stock. Third, managers with larger equity stakes engaged in less risk-taking activities compared to managers with smaller ownership (and with more formal governance structures).[12] The preference for lower risk was beneficial during panic events: during the panic of 1893, banks with larger management ownership were less likely to fail. These results show, on one hand, the importance of "skin in the game" leading to an alignment of the interests of managers and finance providers in risk-taking activities, and, on the other hand, the fact that the activity of powerful managers may exacerbate agency conflicts.

Saunders et al. (1990) were among the first to investigate the ownership channel (in the presence of regulations) and found that owner-controlled banks exhibited larger risk taking behavior relative to manager-controlled banks. These results are in stark contrast with those of Calomiris & Carlson (2014), highlighting the importance of regulations and bank guarantees

[11] The authors use five different measures of governance: (a) whether the board meets at least monthly, (b) high presence of outsiders on the board, (c) an active discount committee, (d) whether the president is bonded, and (e) whether the cashier is bonded.

[12] This result is consistent with Milgrom & Roberts (1992) who posit that CEOs with high human capital tied to the survival of the firm, and thus with a vested interest in the continuation of their employment, will tend to make financing and investment decisions that minimize risk.

which may change the behavior of bank owners. Laeven & Levin (2009) explore the interactions between ownership, regulations and risk taking using a sample of almost 300 banks from 48 countries in the pre-crisis period. Their work is centered around three theoretical concepts. First, (portfolio) diversification of owners and managers: diversified (large) owners want the bank to take more risk relative to managers who have bank-specific human capital and have no significant equity stake. Second, regulation should alter the risk taking incentives of owners and managers. Deposit insurance is a good example: it increases the ability and incentives of powerful owners to increase risk but not necessarily those of managers even with small equity stakes. One unintended consequence of capital regulation is powerful owners putting pressure on management to take riskier investments to compensate for utility losses imposed by rules (Koehn & Santomero (1980), and Buser et al. (1981)). Third, incentives versus ability of risk taking: powerful owners have incentives to increase risk relative to non-shareholder managers, but their ability to do so is curtailed by shareholder protection laws.

Laeven & Levin (2009) find two important results. First, larger bank owners (defined as investors with at least 10 percent of the cash flow rights) are associated with greater risk taking, but their ability to do so is reduced in countries with strong shareholder protection.[13] Second, and most importantly, ownership structures determine crucially the way risk taking and regulation interact with each other. For example, deposit insurance is associated with higher risk taking only for banks with powerful large owners. Moreover, stricter capital regulations are associated with greater risk taking in banks with powerful owners (shareholders want to compensate for loss of utility imposed by regulations), but lower risk taking in widely-held banks.

[13] Beltratti & Stulz (2011) also find that banks with larger controlling shareholder ownership are riskier in the pre-crisis period, i.e. they had greater idiosyncratic risk and a lower distance to default before the crisis.

3.3 Board of Directors

The corporate governance literature perceives boards as a crucial first line of defense in protecting shareholders from incompetent management (Hermalin & Weisbach (2003), Adams & Mehran (2003), Adams et al. (2010)). The role of directors, however, is not limited to monitoring: one of their functions is to assist the CEO and senior management with their decisions (Song & Thakor (2006), and Harris & Raviv (2008)). To achieve that goal, the financial expertise of independent directors is an essential characteristic of bank boards.

In the case of banks, there are two additional pressures on the board: first, regulatory bodies and supervisors, and, second, the multi-constituencies' interests of debt funders that make up over 90% of the banks' funding. Focusing on the former, banks' boards have to reconcile their fiduciary role on behalf of shareholders (taking risk to its optimal level), and regulatory requirements (interested exclusively on the safety and soundness of the bank).

Reconciling these two disparate objectives is not easy, especially in the presence of explicit and implicit government guarantees and pressures coming from competition[14] leading short-term oriented shareholders to put pressure on management. These pressures may have led executives to take myopic risk decisions when the true nature of the risk distribution was not known. If this is true, one ought to question the role of the board in determining optimal risk taking when directors have fiduciary duties towards short-term oriented shareholders.

The financial crisis has provided renewed impetus to empiricists to investigate the boards' role in the building of risk before the crisis and performance of banks during the financial crisis. The two dimensions that have attracted most attention are directors'

[14] These market pressures are perhaps best explained by the now infamous quote of Chuck Prince, then CEO of Citigroup, when he explained the bank's exposure to subprime mortgage assets. Mr. Prince, explaining why Citigroup would not be walking away from the subprime mortgage market at the beginning of the subprime crisis, remarked that "When the music stops, in terms of liquidity, things will be complicated. But as long as the music is playing, you've got to get up and dance. We're still dancing" (Financial Times, July 2007).

independence and the financial expertise of independent directors. Some argue that insufficiency on these two dimensions were among the major causes of governance failures (see, for example, Kirkpatrick (2009), Walker (2009), and European Commission (2010)). Note that regulation impinges heavily on board independence while it is completely silent on directors' expertise, making the latter more of a choice variable.

Beltratti & Stulz (2011), and Ferreira et al. (2013) investigate board composition and financial expertise in an international context. International studies are important not simply because of the impact of different regulatory arrangements but also because the interconnectedness of financial institutions across geographical borders. Ferreira et al. (2013) investigate banks from 41 countries over the pre-crisis period (2000-2008) and find two major results. Board independence and board financial expertise are determined in significantly different ways across countries. The cross-sectional variation in bank board independence is largely explained by country-level, rather than bank-level, characteristics, thus providing evidence for the role of regulations in setting board independence. Neither country-level nor bank-level characteristics explain the cross-sectional heterogeneity in board financial expertise, complicating our understanding of how banks decide this dimension. Changes in board experience are positively related to changes in size and negatively related to changes in performance. This result is important for two reasons: First, banks recognize that greater complexity (directly related to bank size) calls for more knowledgeable independent directors; second, banks appear to recognize that improvement in bank performance may be achieved through greater risk taking, prompting a need for more board expertise.

Beltratti & Stulz (2011) use data on board attributes collected by the Institutional Shareholder Services regarding board independence, composition of committees, size,

transparency, and conduct of work. They form an index to measure the level of shareholder-friendliness of the board before the onset of the crisis. The authors find a strong relation between the level of the board's shareholder-friendliness in the pre-crisis period and the subsequent bank performance, measured by stock returns, during the crisis: banks with more shareholder-friendly boards performed worse during the crisis. Furthermore, the banks with better governance were not less risky entering into the crisis and reduced loans more during the crisis. The authors argue that the results are not consistent with the hypothesis that excessive risk taking was facilitated by poor governance structures. One possible interpretation of these results is that in carrying out their fiduciary duty, shareholder-friendly boards allowed senior management to take on higher risk levels in the pre-crisis period to achieve value maximization. It is not clear what role the explicit and implicit government guarantees played in these decisions. However, the value-increasing risk taking activities in the pre-crisis left those banks exposed when the financial crisis hit the financial markets.

While this interpretation is plausible, it rests crucially on two assumptions. First, the argument that the financial crisis could not be forecasted and banks could not prepare themselves against such an eventuality. Some papers have suggested that the crisis itself was a large unexpected negative event (a "hundred year flood"), and that differences in crisis-period performance were the result of pure luck. Second, shareholder-friendly boards either promoted a strong risk management function inside the bank or did not hinder this function from monitoring effectively the risk taking activity and taking actions when such activity departed from optimality. That is, the actual risk taking in the pre-crisis period was consistent with the optimal risk profile decided by the board. It is hard to assert the latter without investigating the relationship between the governance structures and risk management functions. For example,

inefficient communication about risk exposures between the risk management function and the board, even a shareholder-friendly one, is one such failure. The report by the Senior Supervisors Group (2008) argue in this direction: "In some cases, hierarchical structures tended to serve as filters when information was sent up the management chain, leading to delays or distortions in sharing important data with senior management"[15] (page 9). The question that needs to be asked is whether the board got the right information at the appropriate time from risk managers, and whether it monitored the information flow from the risk management function to senior management.

The level of board expertise is a key characteristic in this sense. If financial expertise of independent directors reduces their costs of acquiring and processing information about the risk environment they should be able to set more precisely the bank's optimal risk profile, assist management in taking risk and monitor it efficiently (Harris & Raviv (2008)).

Minton, Taillard, and Williamson (2014) focus on the financial expertise of independent directors of U.S. commercial bank holding companies. It is only by understanding risk that a board can make an informed decision between value-increasing and value-destroying risk activities and assisting senior management. Minton et al. (2014) find that at the end of 2006, a quarter of the publicly traded BHCs with over $1 billion in assets did not have a single independent director who could be classified as a financial expert and in the pre-crisis period the presence of financial experts as a proportion of independent directors oscillates between 20% and 26%. Interestingly, Minton et al. (2014) find that the fraction of independent directors with financial expertise positively correlates with several measures of risk taking in the pre-crisis period. At the same time the authors find that, during the pre-crisis period, banks with more

[15] A further example is given by Stulz (2008) citing a UBS shareholder report about the subprime-related write-downs in the bank and showing that communication of risk exposure to senior management was highly inefficient.

financial expertise in their boards outperformed banks with less expertise but such over-performance is reversed during the financial crisis. It is worth noticing that the results run counter to the popular claim that financially knowledgeable directors will unambiguously reduce risk taking. One potential explanation for these results is that powerful CEOs, wanting to increase risk taking, will favor the election of financial experts to serve as a rubber stamping mechanism for decisions that have already been taken. The authors find no evidence of such behavior, suggesting that high expertise boards may have chosen activities with higher risks because, with the available information, they were beneficial to shareholders (at least, in normal times). The question that needs to be asked is why those same risks left banks vulnerable to tail risk during the crisis. An important question to ask is what kind of incentives financially knowledgeable directors have to perform their role? Relatedly, the issue of how dissent in the board room is treated by the CEO is key to better understand the role of financial experts. Landier et al. (2009) find that a certain level of disagreement in the chain of command may be useful in preventing bad decisions but whether or not dissent is accepted depends on different factors, especially the dynamics between the CEO and directors.

The evidence found in Europe about board competence, risk taking and performance is largely in contradiction with that found for the U.S. Hau and Thum (2009) investigate board competence in state-controlled Landesbanken in Germany, while Cuñat and Garicano (2010) investigate state- or church-dominated Cajas in Spain. In both cases, lack of board financial competence correlates strongly with losses incurred during the financial crisis, rendering the issue of financial expertise and risk taking more nuanced when individual countries are investigated.

3.4 Executive Compensation

Former Secretary Geithner, testifying in front of Congress in June 2009, argued that "…although many things caused this crisis, what happened to compensation and the incentives in creative risk taking did contribute in some institutions to the vulnerability that we saw…" Bebchuk and Spamann (2010) argue along the same lines: compensation packages given to bank's executives are tied to highly levered bets on banks' (short term) valuation, with negative consequences on preferred shareholders, bondholders, depositors, and, ultimately, taxpayers. The many reforms aimed at aligning executive compensation with the interests of banks' shareholders have come short of fully addressing the multi-constituency problem faced by banks.[16]

Standard theoretical literature (for example, Holmström & Tirole (1993)) and many empirical papers show that incentives given to the CEO matter for firm decisions, but there are important differences in the way standard theory applies to the financial industry. Three caveats should be kept in mind when interpreting evidence (Becht et al. (2011)). First, the firm in the standard executive compensation theory has no leverage while banks are heavily leveraged institutions. Second, endogenous risk taking choices do not feature in traditional theories while banks' business model is predicated on risk taking. Third, asset bubbles are not considered either. The theoretical framework of Bolton et al. (2006) is useful in this regard. In the case banks are held by optimistic investors, hoping they will sell to other investors who are even more optimistic, management (even an otherwise long-run value maximizing type) will face pressures to go for short-run earnings growth implying higher risk taking. This line of reasoning is closely related to ownership structures, and the balance of power between owners and managers, discussed above. If we allow for endogenous risk taking, and introduce the formation of asset

[16] Bolton et al. (2014) propose a different approach to the problem: linking executive compensation to the spread of bank's credit default swaps (CDS). Assuming that the CDS market reflects the inherent risk taking of executives in a timely manner, such a proposal will align better executives' incentives with those of the various constituencies.

price bubbles, we have a recipe for excessive risk taking even in the case of all-equity firm. By implication, the high leverage in the financial industry will induce even higher risk taking, potentially departing from the optimal risk profile.

The excessive amount of tail risk may enhance performance in the short run, but create severe damages when it materializes. The career concerns of executives in the finance industry may add more pressure. Acharya, Pagano and Volpin (2012) argue that when there is a competition for talent and perfect mobility across banks, risk-averse executives with performance-related incentives will take greater tail risks: by doing so, they will enhance short-term performance at the expense of an accumulation of long-term risks, which however will leave their compensation unaffected if, in the meanwhile, they move to a different bank.

Two main papers investigate how compensation incentives given to senior management, especially the CEO, correlate with risk taking: Cheng et al. (2010), and Fahlenbrach & Stulz (2011). Using 95 BHCs and investment banks, and using a period that starts in the pre-crisis and goes into the crisis period, Fahlenbrach & Stulz (2011) find that banks whose CEO's incentives were more aligned with those of shareholders (higher CEO's dollar ownership) were those that suffered the most during the crisis.[17] This evidence appears to be inconsistent with the view that CEOs focused knowingly and suboptimally on the short term. The evidence on insider sales show that three quarters of the CEO in the sample did not sell any of their ownership going in the crisis period, suggesting that they were either unable to forecast the financial crisis, or that CEOs believed they were taking the optimal amount of risk.

Cheng et al. (2010) investigate the link between compensation and risk-taking during the period of 1992-2008 using a residual pay measure, rather than more traditional measures, and

[17] The authors use five different measures of CEO incentives: salary and cash bonus, dollar ownership, dollar equity risk sensitivity, percentage of equity ownership, and percentage risk sensitivity.

reach different conclusions. The measure they use is the residual of total annual payouts to the top five executives controlling for bank size and finance sub-industry classifications and is intended to capture management's short-termism induced by market pressures to out-perform competitors. The authors also make the case that the residual pay measure captures the firm culture for high powered incentives that should influence not just the behavior of the top executives but also the rank-and-file employees who, while not having high ownership stakes, matter significantly for risk taking. There is significant cross-sectional heterogeneity in the residual pay,[18] found to be strongly correlated with price-based risk-taking measures, such as return volatility, sensitivity to the ABX subprime index, and, importantly, tail cumulative return performance. These risk-taking measures were also found to be correlated with executives' short-term pay such as bonuses and options.[19] Finally, compensation and risk-taking are related to institutional investors' ownership who tend to have short-term preferences, reinforcing the view that management was under pressure to produce short term performance rather than long term value maximization.

The tendency of executives and traders to take such tail risks cannot be entirely contained either through regulatory supervision or through traditional external market discipline from debtholders. It is precisely for these reasons that a strong and independent risk management is necessary to monitor closely the risk exposures. As argued by Kashyap et al. (2008): "…high powered pay-for-performance schemes create an incentive to exploit deficiencies in internal measurement systems…traders have an incentive to take risks that are not recognized by the system, so they can generate income that appears to stem from their superior abilities, even

[18] Cheng et al. (2010) find that firms that have high residual compensation included Bear Stearns, Lehman Brothers, Citicorp, Countrywide, and AIG, all of which faced significant problems during the crisis.

[19] Chesney et al. (2010), and Tung & Wang (2011) find overall similar results. The former find a relationship between risk-taking incentives, board composition and write-downs suffered by banks during the financial crisis, while the latter find that higher deferred compensation to executives correlated with lower risk taking activities.

though it is in fact only a market risk premium. This is not to say that risk managers in a bank are unaware of such incentives. However, they may be unable to fully control them" (page 9).

4. Risk Management Functions

The previous section discussed how traditional governance structures face severe limitations when applied to financial firms[20] and traditional governance structures may fail to reach their objective. It is for these reasons that an enterprise-wide and strong risk management function may become necessary.

For risks to be managed effectively, they must first be identified and measured, and then communicated to senior management. The issue of communication of risk, in a complex and decentralized organization, is central if senior management is to abide with optimal risk taking. Stein (2002) investigates how different types of organizational structures – decentralized structures with small business units, and large hierarchies - generate information regarding investment projects and the allocation of capital. A decentralized structure is mostly useful when the information about investment projects is of the "soft" type (e.g. small business lending) and cannot be credibly transmitted across the organization. However, large and complex hierarchies will function better when information can be "hardened" and transmitted across the different levels of the organization and senior management is made fully aware of it. While public data do not provide precise details about the flow of information on risk exposures within banks, recent papers have attempted to use the limited data to discern the structure and importance of risk management across banks.

[20] Diamond and Rajan (2009), and Bebchuk and Spamann (2010) argue that these serious flaws in bank governance, allowing for excessive risk taking, was a key factor contributing to the poor performance in the crisis.

4.1 Choice of Risk Management

The strength of the risk management function is closely related to the choices made by banks on their optimal risk taking. Banks may optimally decide simultaneously the amount of risks they take and the type and strength of their risk management function. In other words, risk management can be endogenous (Ellul & Yerramilli (2013)).

There are two competing hypotheses that frame well the choice of the risk management system. In the first hypothesis, the banks' business model, or risk culture, determines both the risks taken by the bank and also the strength of the risk management function. Banks with a conservative risk culture will, simultaneously, take lower risks and decide to have stronger risk management structures. Similarly, banks with a more aggressive risk culture will elect to take higher risks and put in place weaker risk management structures. Evidence of the presence of the risk culture/business model channel for overall bank behavior was found by Fahlenbrach et al. (2011). They investigate banks' performance over two different crisis: the one in 1998 caused by the Long Term Capital Management failure and the other being the financial that occurred a decade later. If banks that performed poorly in the 1998 crisis learned from their mistakes, because their risk models might have been found to be flawed or they understood that their risk management systems were poorly designed, would not have repeated their mistakes. In that case, these banks should have performed relatively well during the subsequent crisis. On the other hand, if the 1998 performance was driven by the inherent bank business model/corporate culture, which tend to be persistent, then past behavior may be repeated. The authors find that banks that performed badly during the 1998 crisis had a similarly negative performance during the financial crisis, consistent with the business model channel.

The second hypothesis has a flavor of the motivation for hedging theories (Froot et al. (1993), and Froot & Stein (1998)) because it uses the same concept as to why firms more likely to experience financial distress will also adopt a more aggressive stance in managing their risks. For example, Purnanandam (2007) finds that banks with a higher probability of financial distress tend to manage more aggressively interest rate risk, both by using more extensively derivative instruments and also adopting a more conservative asset-liability management. Similarly, but using a sample composed mainly of non-financial firms, Pagach & Warr (2011) find that firms that face greater risk of financial distress are more likely to hire a Chief Risk Officer (CRO) to strengthen their risk management structure. In the case of banks, we should expect that banks with high risk taking behavior, or those that intend to increase their risk behavior, will also adopt simultaneously a more aggressive risk management system.

Investigating the channel through which risk management influence risk taking is challenging. However, given our limited understanding and the importance of this question, establishing that risk management structures do matter for risk taking is a very useful first step. A robust correlation addresses effectively the cynical view that risk management systems have no real impact on bank's tail risk. We should not expect to find any relationship between risk management and risk taking if banks' risk management functions are mostly used to satisfy regulators and supervisors but carry no real power within an organization. This can happen because the compensation of traders taking risks may be highly convex, rendering ineffective any restrain made by risk managers (Landier et al. (2009)).

4.2 Empirical Evidence on Risk Management Functions

Data limitations, due to scarce disclosure by firms about their organizational risk management, mean that empirical evidence on how banks organize their risk management function, its real power and ability to restrain excessive risk taking, is hard to establish. This said, some recent papers investigate the impact of risk management on risk taking and bank performance, both during the pre-crisis and the crisis periods. The importance of the CRO within the bank hierarchy, proxied by such measures as the compensation package of the CRO compared to that of the CEO or whether the CRO reports to the board or the CEO, is the variable of interest.

Ellul & Yerramilli (2013) examine if a strong and independent risk management can explain the cross-sectional differences in risk taking behavior among banks in the U.S.[21] The null hypothesis is based on Rajan (2005), Kashyap et al. (2008), and Hoenig (2008): a breakdown of risk controls within a bank will make it difficult to restrain executives from taking excessive risk (or assuming significant amount of tail risk) that will cause large damage to the financial health of the institution when it is realized. To this end, the authors construct a risk management index that measures the strength and independence of the risk management function in U.S. banks.[22]

The first set of results relate to the determinants of the risk management function, specifically how it is related to other governance mechanisms. Banks exposed to greater risk (those with lower Tier-1 capital ratio, larger derivatives trading operations, and a larger fraction of income from non-banking activities)[23] put in place stronger risk management functions. Importantly, banks with CEO compensation contracts that induce greater risk taking also have stronger risk management, as do those with better corporate governance, more independent

[21] The Senior Supervisors Group (2008) notes that there were significant risk taking differences among banks in the period leading up to the crisis.

[22] The index is made up of the following six variables: the presence of a CRO, whether the CRO is an executive of the bank, whether the CRO is among the five highest paid executives, the ratio of the CRO's total compensation (excluding stock and option awards) to the CEO's total compensation, the board's risk committee experience, and how active is the board's risk committee.

[23] Using a sample composed mainly of non-financial firms, Liebenberg & Hoyt (2003) find that firm size and leverage are associated with the firm's decision to implement enterprise risk management.

boards, and less entrenched management have stronger risk management. These results are more consistent with the view that corporate governance structures and risk management functions are complements rather than substitutes.[24]

The second set of results relates pre-crisis risk management to banks' performance during the crisis period. The authors find that banks with stronger risk management have lower tail risk, lower non-performing loans, and better operating and stock return performance during the financial crisis years. These cross-sectional differences are not consistent with the narrative that the most recent financial crisis was a "hundred year flood" that damaged banks in the same way (Shleifer (2011)). The third set of results relate risk management to performance measured by stock returns over the 1995-2010 period. While banks with stronger risk management have higher annual stock returns during the financial crisis years, no association between risk management and stock returns during non-crisis years exist. Such evidence suggests that investors undertake a flight to quality during crisis periods (Gennaioli et al. (2012)), but they may not otherwise attach value to risk management in non-crisis periods.

Several other papers show that the CRO importance in the bank's hierarchy has a real impact on risk taking because of its ability to restrain executives from taking excessive risk. In a different context than the one considered above, Keys et al. (2009) investigate whether securitization had adverse implications on the ex-ante screening efforts made by loan originators. They find that lenders with powerful risk managers, measured by the risk manager's share of total compensation of the bank's five highest-paid executives, had lower default rates on the mortgages they originated.

[24] Pagach & Warr (2011) also find that firms that give high-powered incentives to their CEOs, in the form of larger option awards, are more likely to hire a CRO.

Other variables used by the literature to capture the risk management standing are the presence of the CRO in the bank's board and the reporting chain followed by the CRO, specifically whether the CRO reports to the board rather than the CEO. If the board has an enterprise-wide view of risk exposures, is not captured by the CEO, and acting in the long term interests of shareholders, then one expects that such reporting structure is likely to empower the risk management function. Aebi et al. (2012) find that banks where the CRO reports to the board rather than the CEO performed better (i.e. had higher buy-and-hold stock returns and higher Return on Equity) during the crisis. This result suggests that in the presence of conflicting risk taking interests between the CEO and CRO, reporting to the board is a more effective channel to restrain excessive risk taking.

A similar idea is examined by Lingel & Sheedy (2012) who construct a measure of the quality of the board risk oversight through the activity of the board's risk committee. The authors use a sample of 60 major international banks from 17 countries in the 2004 to 2010 period and find four risk management variables important for risk-taking behavior: CRO's presence in the senior executive team, CRO's compensation, activity of the board's risk committee, and the proportion of experienced bankers in the board's risk committee. The authors find that stronger board oversight in a given year is associated with lower risk the following year. The authors find no evidence that international financial institutions with better risk management performed better during the crisis.

Overall, recent literature has found evidence, both when looking at the U.S. and internationally, that measures of risk management strength correlate with lower risk-taking in the pre-crisis years and better bank performance during a crisis period. One important measure that appears to matter is the compensation of the CRO, especially when it is benchmarked with that

of the CEO. Figure 1 examines how a sample of U.S. bank holding companies' tail risk[25] during the crisis period varied with a measure of CRO's centrality[26] in the pre-crisis period. There is a negative relationship suggesting that U.S. bank where the risk management function is stronger (higher CRO centrality measure) had lower risk during the crisis.

[Insert Figure 1]

While finding a relationship between risk management's strength and risk taking is very interesting, the interpretation of this result is clouded by issues of endogeneity. One needs to be careful lest a mechanical interpretation is suggested. It does not follow that giving a larger compensation to the CRO, and ignoring the bank's business model/risk culture, will automatically make the risk management function more powerful and risk-taking less likely.

Perhaps a way to address such concerns is to investigate the channel through which risk management may influence risk-taking, a dimension that has not received adequate attention by the literature. Above we identified two potential channels: (a) hedging channel, and (b) business model channel. One potential way to disentangle between these two channels is to examine if and how banks change their risk management in response to unexpected large losses. Ellul & Yerramilli (2013) use the 1998 Russian crisis to explore the banks' responses in the years following that event. They test whether banks have rigid business models that do not respond appropriately after a crisis (business model channel), or whether they learn from the crisis and readjust their risk levels and risk management functions (hedging channel). The authors find evidence that is more consistent with the business model channel: banks with high tail risk in 1998 had lower risk management in the years following the Russian crisis, and they did not

[25] This measure is based on the expected shortfall that is widely used within banks to capture expected loss conditional on returns being less than a threshold (see Acharya et al. (2010)).
[26] This measure is the ratio of CRO's total compensation, excluding stock and option awards, to the CEO's total compensation.

improve this function as much as other banks that suffered less during the 1998 crisis did.[27] From a normative perspective, this result resonates with the conjecture that there are no simple prescriptions on how a bank can improve its risk management because this function could be part of the business model which may be persistent through time.

5. Conclusions

The Group of Thirty (2012) explains succinctly the challenges faced by governance structures in banks, due to the specific problems encountered in the financial industry, and revealed by the financial crisis: "…governance was too often revealed as a set of arrangements that approved risky strategies (which often produced unprecedented short-term profits and remuneration), was blind to the looming dangers on the balance sheet and in the global economy, and therefore failed to safeguard the financial institution, its customers and shareholders, and society at large" (page 5). This paper reviewed the literature on banks' governance structures and risk taking, and argued that governance failures make the case for a strong risk management function that may become necessary to monitor and control enterprise-wide risk exposures.

This review explains why value-maximizing banks have a well-grounded concern with the risk management process to restrain executives from taking higher risks than is optimal. However, risk management cannot be seen in isolation: it is closely related to the type of governance structures the bank adopts and its business model. Evidence shows that for risk management to successfully achieve its goals it has to be strong and independent of single business units. An important role of governance structures is to give the risk management

[27] This result may explain the evidence in Fahlenbrach et al. (2011) that banks that experienced the worst performance in the 1998 crisis were also those with the worst performance in the 2007-2008 financial crisis.

function its adequate weight in the enterprise-wide decisions and avoid failures that may lead to excessive tail risk without appropriate risk management systems being adopted.

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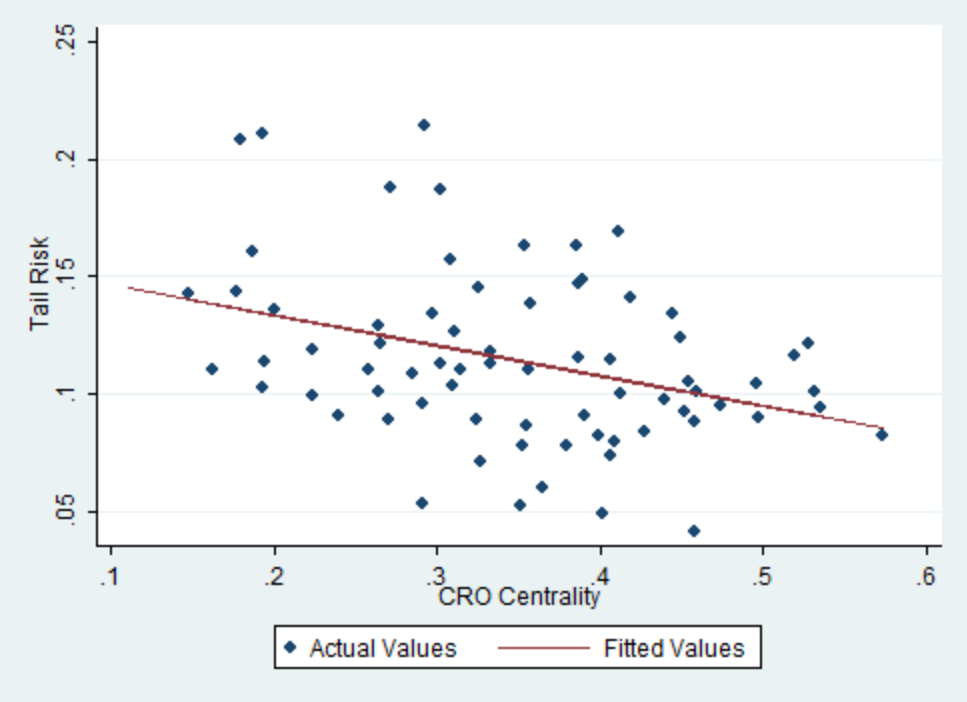
Figure 1. Tail Risk during Crisis Years vs. Pre-Crisis CRO Centrality

This figure plots the average Tail Risk of each BHC over the crisis years (2007 and 2008) versus its corresponding pre-crisis CRO Centrality, which is defined as the average CRO Centrality of the BHC over the period 2002-2006. The CRO Centrality is the ratio of CRO's total compensation, excluding stock and option awards, to the CEO's total compensation. The solid straight line in the figure is a plot of predicted values obtained from a regression of Tail Risk versus a constant and the pre-crisis CRO Centrality.



Source: Ellul & Yerramilli (2013)