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The Role of Risk Management in Corporate Governance

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banking, risk management, risk taking, corporate governance, ownership structure, board expertise, executive compensation

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.

1. INTRODUCTION

Policy makers, regulators, and academics have identified weaknesses in bank[1] governance structures and failures in risk management as key causes of the financial crisis that started in 2007. In a recent report, the Organization for Economic Cooperation and Development argues "the financial crisis can be to an important extent attributed to failures and weaknesses in corporate governance arrangements" (cited in Kirkpatrick 2009, p. 1). Similarly in the United States, the Commission on the Causes of the Financial and Economic Crisis (2011) concludes that the "dramatic failures of corporate governance and risk management at many systematically important financial institutions were a key cause of this crisis" (p. xviii). Ben Bernanke (2008), the then Chairman of the US Federal Reserve, also argues, "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 US subprime mortgages."

Financial instability is not a random event, but rather the result of risk buildup within the system that affects financial and economic fragility, business-cycle fluctuations, and economic growth (Bernanke 1983; 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 focus of this article is the role that governance structures and risk management play in the risk-taking behavior of individual financial institutions that can, if unchecked, engender systemic risk in financial markets. The conflicting incentives of managers, shareholders, and creditors are more severe in banks because of the nature of their business and the high leverage on their balance sheets. Although financial firms share some common governance and risk management problems with nonfinancial ones, they suffer from specific governance problems that make it harder for traditional governance structures on their own to restrain executives' risk-taking behavior (Becht, Bolton & Röell 2011; Mehran, Morrison & Shapiro 2011). Furthermore, regulation and government guarantees (explicit and implicit) add an additional layer of complexity to the governance of banks. The objective of this article is to argue that, given these challenges, a strong and independent risk management function at financial institutions becomes necessary to restrain excessive risk-taking during non-crisis periods. Importantly, for risk management to be effective it cannot operate in isolation but rather must be an integral part of a business model and risk culture that promote long-term value. I discuss the growing empirical literature that examines the relationship between the governance structures and the risk management function within a bank's organization as well as their impact on risk taking and, ultimately, bank performance before and during the financial crisis.

Significant gaps exist in our understanding of the risk management function and how it relates to traditional governance structures. For example, there is a burgeoning literature on risk management in corporations, specifically on their hedging practices and impact on performance. However, as Tufano (1996) argues, our knowledge of corporate risk management is very limited because firms' disclosure is limited. Though 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 such practices and structures are substitutes or complements). Progress on this dimension has been achieved recently because the earthquake suffered by the financial system due to the recent crisis has led researchers to use the limited data available to investigate further (organizational) risk management functions.

To profitably place risk management within a firm's governance structure, I start with a brief taxonomy of the risk management function. The first task is to understand enterprise-wide risk

[1] In this article I use the word bank to refer to both bank holding companies and investment banks.

management's objectives to gain perspective on the failures that arguably took place in the precrisis 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 any excessive risk-taking behavior? Broadly speaking, the literature views governance structures as playing a major role in choosing an optimal level of risk, whereas the risk management function is seen as responsible for measuring and monitoring risk exposures. These two dimensions are important to frame the limitations that conventional governance structures on their own have in restraining risk-taking behavior. For example, board structures and executive compensation have been identified by the corporate governance literature as effective mechanisms in nonfinancial institutions, but they have limited power in the case of banks. Consider board structures first. Directors are tasked with choosing the best business strategy that maximizes shareholders' value in line with the protection afforded to them by the business judgment rule. This objective may lead to excessive risk-taking in the individual bank if such a decision is perceived to be compatible with maximizing shareholders' value even if this may lead to a buildup of systemic risk in the system (Armour & Gordon 2014). The damage that was caused to the financial system by the excessive risk-taking of a single bank was seldom internalized by boards in the precrisis period. Likewise, high-powered incentives awarded to executives are meant to align the interests of banks' management with those of shareholders, but it is precisely such incentives that were identified as one important factor that led to tail risk exposure and eventually to widespread damage to the financial system (Dudley 2014; Geithner 2009). High-powered performance incentives are sometimes rewarded to traders that end up damaging the individual banks as well: Examples of rogue trading have emerged, sometimes generating devastating impacts on the reputation of banks. Rather than seeing cases of rogue trading as sporadic events (the proverbial bad apple scenario), Dudley (2014) makes the case that the problem lies with banks' leadership in setting and promoting a business model that enhances long-term value rather than short-term gains. In other words, these events show that there may be structural fault lines in the risk culture of a financial institution as set by the senior management. The prevailing risk culture, defined as the set of unwritten rules that guide risk-taking behavior (Dudley 2014), is a fundamental dimension that shapes the risk management function and its effectiveness.

Owing to the decentralized nature of risk taking within banks, and the high-powered incentives of executives, recent evidence points to the importance of the risk management function (Kashyap, Rajan & Stein 2008; Stulz 2008, 2014; Landier, Sraer & Thesmar 2009a; Ellul & Yerramilli 2013).[2] There is mounting evidence that in the cross-section of banks, there is at the very least a strong association between the quality of risk management, risk-taking in the precrisis years, and performance during the crisis period. That said, it is still unclear what determines the strength of the risk management function and how it interacts with the business model, or risk culture, chosen by a bank. Furthermore, risk management cannot be seen in isolation: It is not simply a highly paid group of risk managers that matter but how central they are in the banks' internal decision making structures. This is especially true because of numerous objective limitations and obstacles that enterprise-wide risk management faces in a complex and ever-changing marketplace. In other words, without the appropriate norms that should guide executives' behavior when no

[2]Even if risk managers have a formal role in an organization, without real power in the organization they may be unable to restrain bank executives. 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).

clear compliance rules exist, risk management is unlikely to reach its goal and enhance long-term value.

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 and is crucial for the correct interpretation of the results. The challenge is very similar to the one faced by the corporate governance literature in nonfinancial firms when testing for the causal link between governance and performance. It is problematic to fully address the endogeneity problem that exists in the choice of risk management and the impact of that choice on risk taking and performance (Bertrand & Mullainathan 2003). In other words, caution must be used when interpreting results found by the literature because a relationship between risk management on one hand and risk-taking behavior and performance on the other could be spurious. The biggest limitation is data availability due to scarce bank disclosures on their risk management practices. Thus, finding that risk taking correlates with specific governance and risk management structures is an important first step in our understanding because it shows that risk management is neither redundant nor merely put in place to please supervisors but is ultimately without any real power to restrain executives. The challenge for future research is to find ways to refine the identification strategies used and to come closer to establishing causal links and not simply robust correlations.

This article 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 establish 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 Basel Committee on Banking Supervision (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" (p. 18).

Three main concepts need highlighting. First, the risk management function should have an enterprise-wide remit rather than be confined to specific business lines: The effectiveness of the risk management function 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 for large financial institutions because risk is not centralized and sometimes is opaque. For example, in the precrisis years, commercial banks set up off-balance-sheet special-purpose vehicles worth $1.3 trillion as part of their securitization business while providing explicit guarantees to these conduits (Acharya, Schnabl & Suarez 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 be due 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 and especially when incentives are linked to performance.

Second, the crucial question is who should set an institution's (optimal) risk level. In theory and in practice, senior management is one of the most plausible candidates, but this group may have incentives that the literature (e.g., Bebchuk & Spamann 2010; Cheng, Hong & Scheinkman 2015) shows may lead an institution to take high risks without necessarily establishing proper risk management. Perhaps because of these severe conflicts affecting senior management, the Basel Committee on Banking Supervision (2010) argues that setting the optimal risk level ought to be decided by the board of directors. The fiduciary role of a board is to maximize shareholders' value, subject to regulatory constraints. The magnitude of risk taking should be consistent with that overarching goal. Making a board the pivotal force raises various questions; perhaps the most relevant one to this article relates to a board's competence to set an optimal risk profile. This may be a troubling area given that financial expertise of independent directors was notoriously limited in the precrisis years (Minton, Taillard & Williamson 2014). In fact, the Basel Committee on Banking Supervision (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" (p. 2). But there is a clear demarcation between the board and the risk management function: The risk management function ought not to determine optimal risk taking. Stulz (2014, 2008) makes similar arguments for financial firms and Froot, Scharfstein & Stein (1993, 1994) do so for industrial firms.

Third, it follows that the responsibility of risk management is to reconcile targeted risk taking (risk tolerance) and actual risk at an enterprise-wide level. This role is multifaceted, ranging from risk measurement and reporting of risk exposures (presumably to an enterprise-wide body) to 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, Sraer & Thesmar 2009a; Kashyap 2010; Ellul & Yerramilli 2013; 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 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 a risk mismatch between the asset and liability sides of the 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–Miller 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 costs of financial distress. Indeed, value-maximizing banks have a well-grounded concern with the risk management process (see, among others, Bartram 2000; Nocco & Stulz 2006; Gordon, Loeb & Tseng 2009; Hoyt & Liebenberg 2010). This argument is especially important for banks: First, financial distress generates contagion and systemic risk. Second, banks' ability to issue short-term claims for funding purposes depends on their financial health. When these frictions exist, a strong risk management function becomes central to banks' business models (DeAngelo & Stulz 2014).

The literature suffers from lack of clarity about risk management's objectives. In the aftermath of the recent financial crisis and also after the collapse of Long-Term Capital Management in 1998, researchers argued that risk management ought to prevent financial institutions from taking excessive risks. This view is, at best, very vague because it implies that an optimal risk level is known by a bank's board and can be measured by an empiricist. At worst, it can be very misleading if not adequately qualified. It is very hard to argue that risk management ought to stop a bank from taking risks if such activities enhance value. Risk management's role is to reduce 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 exposure to 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 a bank's risk profile, beyond what was determined as optimal in the first place. Practically, a bank's optimal risk profile is unobserved and an 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: Obstacles and Failures

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

The scope of this article is not to delve into the details of risk management failures (for a discussion of the taxonomy of risk management failures, see Stulz 2008), but rather to understand the extent to which these failures (causing widespread problems not only to a single institution, but potentially also to the entire system) are due to poor governance structures. To do so, the objective limitations of any risk management system must be recognized and disentangled from failures 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 and the basic inputs in VaR models. These tools perform well when risk managers have sufficient historical data that can be used to assess risks under the working assumption that a future return-generating process is not too different from the one that generated the historical data. But how should an institution behave when such historical data are not available, thereby 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 an institution's balance sheet when it materializes, is a good example. Consider the risks involved in underwriting and

buying mortgage-backed securities in the precrisis period. Because these were new financial products, statistical analyses based on historical data faced severe limitations. 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 about the likelihood of a sharp downturn of real estate prices correlated across several geographical states. In such cases, exercises aimed at assessing potential risk outcomes suffer from high levels of subjectivity. The decision whether a new project is consistent with an optimal level of risk taking becomes significantly harder to make and can easily become entangled in corporate politics.

In these circumstances, strong corporate governance is required to avoid or mediate any intrafirm conflicts between different business units and to take an enterprise-wide view of any new project. The relevance of the risk management function kicks in precisely in these instances, because a risk manager's views should be part of the decision-making process. When the risk management function is not given its adequate weight in enterprise-wide decisions, 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 positioned to communicate enterprise-wide risks to senior management (and the board) or unable to fully monitor and manage those risks. Anecdotally, some reports have suggested that this scenario presented one of the biggest failures, at least in some large institutions. For example, UBS (2008) has clearly identified risk management failures within its organization and how these caused the large losses on its subprime investment, stating "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" (p. 38).

3. CORPORATE GOVERNANCE STRUCTURES

I next address the role of corporate governance structures in banks, a key aspect because it affects directly the who and how of an institution's (optimal) risk profile as well as how much weight is given to the risk management function. I 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 I discuss how they relate to risk taking.

3.1. Corporate Governance in Banks

Agency conflicts (between shareholders and management, between shareholders and debtholders, etc.) in financial institutions may differ in nature from those in nonfinancial firms. It is true that a bank's board of directors may malfunction in ways similar to what happens in nonfinancial firms, and misaligned incentives may fester in similar ways. But it is equally important to recognize that the governance mechanisms that promote shareholders' value maximization may lead to exposure to tail risk in individual banks, generating systemic risks for the whole financial system. It is against this background that I review the main results reached by the literature on the effectiveness of governance structures in banks.

Becht, Bolton & Roell (2011) and Mehran, Morrison & Shapiro (2011) note three salient features that explain clearly why bank governance is different from that of nonfinancial firms. First, banks are in the business of taking on risks: The function of a commercial bank is 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 management has to take risks and technically complex trading strategies 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, Bolton & Roell 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 executive risk taking. This type of funding makes banks multiconstituency organizations where the decisions of executives and boards have first-order implications for funding providers without their being consulted. The protection given by deposit insurance and government guarantees increases the complexity of this third issue, thus reducing the incentives of funding providers to monitor the actions of management.

3.2. Ownership Structures

Standard agency theory suggests that banks' ownership structure influences risk taking in corporations (Jensen & Meckling 1976; John, Litov & Yeung 2008). Potential conflicts regarding risk taking are bound to emerge if the incentives of managers and owners are not aligned, thus 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 of how ownership structures influence risk taking is limited, with the limitation compounded by the somewhat loose definition of ownership in the literature: At times, ownership refers to the presence of a large blockholder/institutional investor, but at other times, it refers 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 (which have been 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, we would want to see how ownership structures influence risk-taking behavior without the presence of regulations, an impossible task for any study in the past few decades. One exception is Calomiris & Carlson (2014). Using a sample of 206 US banks from 37 large cities during the National Banking Period (1863–1914) when no regulatory safety net existed for banks, they investigate how bank ownership affects corporate governance and how ownership and governance structures affect banks' risk management.

Calomiris & Carlson (2014) find significant cross-sectional differences across national banks in terms of ownership types, corporate governance structures, portfolio composition, and risk management. Three key results emerge. First, there is a negative correlation between formal corporate governance and the degree of managerial ownership, implying that concentrated managerial ownership is a substitute for governance structures. Second, managers are able to extract higher rents (measured by their salaries relative to assets) when they own a greater amount of stock. Third, compared with managers with smaller ownership (and with more formal governance structures), those with larger equity stakes engaged in fewer risk-taking activities. This result is consistent with Milgrom & Roberts (1992), who posit that CEOs with high human capital tied to the survival of their firm, and thus with a vested interest in the continuation of their employment, tend to make financing and investment decisions that minimize risk. The preference for lower risk has also been beneficial during panic events: During the panic of 1893, banks with larger management ownership were less likely to fail. These results show, on the one hand, the importance of having "skin in the game" leading to an alignment of the interests of managers and finance providers in risk-taking activities and, on the other, how the activity of powerful managers may exacerbate agency conflicts.

Saunders, Strock & Travlos (1990) are among the first to investigate the ownership channel (in the presence of regulations) and find that owner-controlled banks exhibit greater 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 that may change the behavior of bank owners. Using a sample of almost 300 banks from 48 countries during the precrisis period, Laeven & Levine (2009) explore the interactions among ownership, regulations, and risk taking. Their work is centered around three theoretical concepts. First, given (portfolio) diversification of owners and managers, diversified (large) owners want their banks 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; Buser, Chen & Kane 1981). Third, powerful owners have incentives to increase risk relative to nonshareholder managers, but shareholder protection laws curtail their ability to do so, highlighting the importance of regulations and laws influencing risk-taking behavior.

Laeven & Levine (2009) find two important results. First, larger bank owners (defined as investors with at least 10% 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. Beltratti & Stulz (2012) also find that banks with larger controlling shareholder ownership were riskier in the precrisis period, i.e., they had greater idiosyncratic risk and a lower distance to default. 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 greater 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 with lower risk taking in widely held banks.

3.3. Board of Directors

The corporate governance literature perceives boards as a crucial first line of defense in protecting shareholders from incompetent management (Adams & Mehran 2003, Hermalin & Weisbach 2003, Adams 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, Harris & Raviv 2008). To achieve that goal, the financial expertise of independent directors is an essential characteristic of banks' boards.

For banks, there are two additional pressures on the board: (*a*) regulatory bodies and supervisors and (*b*) multiconstituencies' interests concerning debt funders that make up more than 90% of a banks' funding. Regarding the former, banks' boards have to reconcile their fiduciary role on behalf of shareholders (taking risk to its optimal level) and the various 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 leading short-term-oriented shareholders to put pressure on management. The infamous quote of Chuck Prince, then CEO of Citigroup, perhaps best explains these market pressures: When explaining the bank's exposure to subprime mortgage assets and why Citigroup would not be walking away from the subprime mortgage market at the beginning of the subprime crisis, Prince remarked, "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" (Nakamoto & Wighton 2007). These pressures may have led executives to make myopic risk decisions when the true nature of a risk distribution was not known. If this is true, we ought to question the role of the board in determining optimal risk taking when directors have fiduciary duties toward short-term-oriented shareholders.

The recent financial crisis has provided renewed impetus to empiricists to investigate boards' role in the building of risk before the crisis and banks' performance during the crisis. The two dimensions that have attracted most attention are board independence and the financial expertise of independent directors. Some argue that insufficiency on these two dimensions was among the major causes of governance failures (see, for example, Kirkpatrick 2009, Walker 2009, European Commission 2010). Note that regulation impinges heavily on board independence, although it is completely silent on directors' expertise, making the latter more of a choice variable.

Beltratti & Stulz (2012) and Ferreira, Kirchmaier & Metzger (2010) 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 of the interconnectedness of financial institutions across geographical borders. Ferreira, Kirchmaier & Metzger (2010) investigate banks from 41 countries during the precrisis 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 (2012) find a strong relation between the level of a board's shareholder friendliness in the precrisis period and subsequent bank performance (measured by stock returns) during the crisis: Banks with more shareholder-friendly boards performed worse during the crisis. Furthermore, banks with better governance were not less risky entering into the crisis and reduced loans more during the crisis. These results are not consistent with the hypothesis that poor governance structures facilitated excessive risk taking. One possible interpretation of these findings is that, in carrying out their fiduciary duty, shareholder-friendly boards allowed senior management to take on higher risk levels in the precrisis period as a way to achieve value maximization. It is not clear what role the explicit and implicit government guarantees played in these decisions. That said, these risk-taking activities in the precrisis period left those banks exposed when the crisis hit the financial markets.

Though this interpretation is plausible, it rests crucially on two assumptions. First, the recent financial crisis could not be forecasted and banks could not prepare themselves against such an eventuality. Some have suggested that the crisis was a large unexpected negative event (a 100-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 their bank or did not hinder this function from effectively monitoring risk-taking activities and taking actions when such activities departed from optimality. That is, actual risk taking in the precrisis period was consistent with the optimal risk profile decided by the board. But in this case the focus shifts to the relationship between the banks' governance structures and risk management functions as one of the most likely area where failures occurred. Inefficient communication about risk exposures

between the risk management function and the board, even a shareholder-friendly one, could be an example of such a failure. Stulz (2008) cites a UBS shareholder report on the subprime-related write-downs in the bank that shows that communication of risk exposure to senior management was highly inefficient. The report by the Senior Supervisors Group (2008) argues further 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" (p. 9). The questions that need to be asked are 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 respect. If the financial expertise of independent directors reduces their costs of acquiring and processing information about the risk environment, then they should be able to set more precisely their bank's optimal risk profile, assist management in taking risk, and monitor it efficiently (Harris & Raviv 2008). Minton, Taillard & Williamson (2014) focus on the financial expertise of independent directors of US commercial bank holding companies. Only by understanding risk can a board make informed decisions between taking on value-increasing risk activities and deciding against value-destroying ones, together with assisting senior management on how best to execute decisions. Minton, Taillard & Williamson (2014) find that one-quarter of publicly traded bank holding companies with more than $1 billion in assets at the end of 2006 did not have a single independent director who could be classified as a financial expert and that the presence of financial experts as a proportion of independent directors in the precrisis period oscillated between 20% and 26%. Interestingly, the fraction of independent directors with financial expertise positively correlates with several measures of risk taking in the precrisis period. During the same period, banks with more financial expertise in their boards outperformed banks with less expertise but such overperformance was reversed during the financial crisis. It is worth noticing that these 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 outside of the board. The authors find no evidence of such behavior, suggesting that high-expertise boards may have chosen activities with greater risks because, given the available information, they were beneficial to shareholders (at least, in noncrisis times). The question that arises is why those same risks left banks vulnerable to tail risk during the crisis. To answer that question one needs to consider two further dimensions. First, the types of incentives that financially knowledgeable directors are awarded to properly perform their roles should be explored. The literature has made very little progress on this front. Second, the issue of how dissent in the boardroom is treated by a CEO is key to better understanding the role of financial experts. Landier, Sraer & Thesmar (2009b) find that a certain level of disagreement in the chain of command may be useful in preventing bad decisions, but whether dissent is accepted depends on different factors, especially the dynamics between the CEO and directors.

Evidence on European board competence, risk taking, and performance is largely in contradiction with that of the United States. Hau & Thum (2009) investigate board competence in state-controlled *Landesbanken* in Germany and Cuñat & 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 recent financial crisis, rendering the issue of financial expertise and risk taking more nuanced when individual countries are investigated. Overall, the evidence reviewed here is consistent with the view that boards of directors may have been instrumental in banks' risk-taking activity because it was judged to promote value maximization in the short term. Armour and Gordon (2014) argue that this behavior was consistent with the business

judgment rule protection afforded by law to directors. Yet boards did not internalize the potentially negative implications that risk taking in an individual bank had on the buildup of systemic risk in the system. It is precisely because of this failure in the private law mechanism when it comes to boards of financial institutions, coupled with limitations of regulations, that led Armour and Gordon (2014) to propose a new set of officer and director liability rules that are aimed at inducing more risk-averse behavior on the part of directors.

3.4. Executive Compensation

Former US Treasury Secretary Timothy Geithner (2009), testifying in front of a Senate Appropriations subcommittee, 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 & Spamann (2010) argue along the same lines: Compensation packages given to bank executives are tied to highly leveraged bets on banks' (short-term) valuation, with negative consequences impacting preferred shareholders, bondholders, depositors, and, ultimately, taxpayers (see also Diamond & Rajan 2009). There is an emerging consensus that tackling the executive compensation dimension is crucial for financial stability and to rebuild the public trust in financial markets and institutions (Dudley 2014). The many reforms aimed at aligning executive compensation with the interests of banks' shareholders have fallen short of fully addressing the multiconstituency problem faced by banks. To address this problem, Bolton, Mehran & Shapiro (2015) propose a different approach—linking executive compensation to the spread of banks' credit default swaps. Assuming that the credit default swap market reflects in a timely manner the inherent risk taking of executives, this proposal would better align executives' incentives with those of the various constituencies. Another potential approach can be to defer compensation and link it more with long-term outcomes. If too much emphasis has been placed on short-term value maximization at the cost of long-term value, then deferring compensation will have the benefit that the time horizon of executives and traders is extended, forcing them to internalize the consequences of their risk-taking behavior.

Standard theoretical literature (for example, Holmström & Tirole 1993) and many empirical papers show that incentives given to a CEO matter for the firm's 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, Bolton & Roell 2011). First, a firm in the standard executive compensation theory has no leverage, whereas banks are heavily leveraged institutions. Second, endogenous risk-taking choices do not feature in traditional theories, whereas banks' business model is predicated on risk taking. Third, asset bubbles are not considered. The theoretical framework of Bolton, Scheinkman & Xiong (2006) is useful in this regard. When 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 greater risk taking. Note that this line of reasoning is closely related to ownership structures and to the balance of power between owners and managers discussed above. If we allow for endogenous risk taking and introduce the formation of asset price bubbles, we have a recipe for excessive risk taking, even within an all-equity firm. By implication, the high leverage in the financial industry will induce even greater 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 & Volpin (2012) argue that risk-averse executives with performance-related incentives will take greater tail risks when there is competition for talent and

perfect mobility across banks: By doing so, executives will enhance short-term performance at the expense of accumulating long-term risks, which leaves their compensation unaffected if, in the meanwhile, they move to a different bank.

Two main empirical papers (Cheng, Hong & Scheinkman 2015; Fahlenbrach & Stulz 2011) investigate how compensation incentives given to senior management, especially CEOs, correlate with risk taking and reach different conclusions. Fahlenbrach & Stulz (2011) use five different measures of CEO incentives: salary and cash bonus, dollar ownership, dollar equity risk sensitivity, percentage of equity ownership, and percentage of risk sensitivity. Analyzing 95 bank holding companies and investment banks in a period spanning from precrisis to crisis, they find that banks whose CEOs' incentives were more aligned with those of shareholders (greater CEO dollar ownership) suffered more during the crisis. This evidence appears to be inconsistent with the view that CEOs focused knowingly and suboptimally on the short term. The evidence on insider sales shows that three-quarters of the CEOs in the sample did not sell any of their ownership going into the crisis period, suggesting that they either were unable to forecast the financial crisis or believed they were taking the optimal amount of risk.

Using a residual-pay measure, rather than more traditional measures, Cheng, Hong & Scheinkman (2015) investigate the link between compensation and risk taking during the period 1992–2008 and reach different conclusions from those of Fahlenbrach & Stulz (2011). Controlling for bank size and finance subindustry classifications, they use the residual of total annual payouts to the top five executives as their measure, which is intended to capture management's short-termism induced by market pressures to outperform competitors. The authors also argue that the residual-pay measure captures the firm culture of high-powered incentives that influences the behavior of not just top executives, but also rank-and-file employees, who do not have high ownership stakes but matter significantly for risk taking. Banks with high residual compensation included Bear Stearns, Lehman Brothers, Citicorp, Countrywide, and AIG, all of which faced significant problems during the recent financial crisis. Significant cross-sectional heterogeneity in residual pay is 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 also correlated with executives' short-term pay such as bonuses and options (for similar overall results, see also Chesney, Stromberg & Wagner 2010; Tung & Wang 2011). Overall, these results are consistent with the view that high-powered incentives led to higher risk-taking behavior that was not controlled by the presence of institutional investors, thus 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 through either regulatory supervision or traditional external market discipline from debtholders. Precisely for these reasons, strong and independent risk management is necessary to closely monitor risk exposures. As argued by Kashyap, Rajan & Stein (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 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" (p. 9).

4. RISK MANAGEMENT FUNCTIONS

The previous section discusses how traditional governance structures and risk cultures face severe limitations when applied to financial firms and how they may fail to reach their objective. For

these reasons, an enterprise-wide risk management function may become necessary. For risks to be managed effectively, they must be first identified and measured and then communicated to senior management. The issue of communication of risk, in a complex and decentralized organization, is key if senior management is to abide with optimal risk taking. The importance of communication across different business units for a firm to make the right decisions is shown theoretically by Stein (2002), who investigates how different types of organizational structures generate information regarding investment projects and the allocation of capital. Large and complex hierarchies will function better when information can be hardened and transmitted across the different levels of an organization and when senior management is made fully aware of it. This argument can also be applied to the case of risk taking and risk management in large and complex banks where risk limits, and their allocations across units, have to be communicated in a timely and accurate manner. Although 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.

4.1. Choice of Risk Management

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

Two competing hypotheses frame well the choice of the risk management system. In the first hypothesis, banks' business models, or risk culture, determine 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. Fahlenbrach, Prilmeier & Stulz (2012) find evidence for the presence of the risk culture/business model channel for overall bank behavior. They investigate banks' performance during two different crises: one in 1998 caused by the failure of Long-Term Capital Management and another that occurred a decade later. If banks that performed poorly in the 1998 crisis had learned from their mistakes, either because their risk models were flawed or because they understood that their risk management systems were poorly designed, they would not have repeated their mistakes. In that case, these banks should have performed relatively well during the subsequent crisis. By contrast, if banks' 1998 performance was driven by the inherent bank business model/corporate culture, which tends to be persistent, then past risk-taking behavior may be repeated. The authors find that banks that performed badly during the 1998 crisis had a similarly negative performance during the subsequent financial crisis, consistent with the business model channel.

The second hypothesis shares the same spirit of the economics behind the hedging theories (Froot, Scharfstein & Stein 1993; Froot & Stein 1998), because the same concept is used to explain 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 experiencing financial distress tend to manage interest rate risk more aggressively, both by using derivative instruments more extensively and by adopting more conservative asset-liability management. Similarly, but using a sample composed mainly of nonfinancial 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. As such, we should expect

that banks with higher risk-taking behavior, or those that intend to increase their risk behavior, will also adopt a stronger risk management system.

Given our limited understanding and the importance of this issue, establishing that risk management structures do matter for risk taking is a very useful first step. A robust correlation effectively addresses the cynical view that risk management systems have no real impact on banks' 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 but carry no real power within an organization. Such an outcome can take place because the compensation of traders taking risks may be highly convex, rendering ineffective any restraints made by risk managers (Landier, Sraer & Thesmar 2009a).

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 as well as its real power and ability to restrain excessive risk taking is hard to establish. That said, some recent papers investigate the impact of risk management on risk taking and bank performance, during both the precrisis and crisis periods. The variable of interest is the importance of a CRO within a bank's hierarchy, proxied by such measures as the compensation package of the CRO compared with that of the CEO or whether the CRO reports to the board or the CEO.

Ellul & Yerramilli (2013) examine if strong and independent risk management can explain the cross-sectional differences in risk-taking behavior among banks in the United States (for a discussion of significant risk-taking differences among banks in the period leading up to the recent financial crisis, see Senior Supervisors Group 2008). The null hypothesis is based on work by Rajan (2005), Hoenig (2008), and Kashyap, Rajan & Stein (2008): A breakdown of risk controls within a bank makes it difficult to restrain executives from taking excessive risk that will cause much 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 US banks based on 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 to the CEO's total compensation, the board's risk committee experience, and how active the board's risk committee is.

The first set of results from Ellul & Yerramilli (2013) pertains to the determinants of the risk management function, and 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 nonbanking activities) put in place stronger risk management functions. Importantly, banks with CEO compensation contracts that induce greater risk taking have stronger risk management, as do those with better corporate governance, more independent boards, and less entrenched management. These results are more consistent with the view that corporate governance structures and risk management functions are complements rather than substitutes. These results are reminiscent of those found in the case of nonfinancial firms. For example, Liebenberg & Hoyt (2003) also find that firm size and leverage are associated with a firm's decision to implement enterprise-wide risk management. 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.

Establishing the relationship between risk management and performance is crucial to address the question about the relevance of risk management. In this regard Ellul & Yerramilli (2013)

relate precrisis risk management to banks' performance during the crisis period and find that banks with stronger risk management have lower tail risk, lower nonperforming 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 100-year flood that damaged all banks in the same way (Shleifer 2011). Even though banks with stronger risk management have higher annual stock returns during the financial crisis years, no association between risk management and stock returns during noncrisis years exists. This evidence suggests that investors undertake a flight to quality during crisis periods (Gennaioli, Shleifer & Vishny 2012), but they may not otherwise attach value to risk management in noncrisis periods.

Several other papers show that the importance of a CRO within a bank's hierarchy has real impacts on risk taking because of the CRO's 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.

Other variables used in the literature to capture risk management standing are the presence of a CRO on a bank's board and the reporting chain followed by a CRO, specifically whether the CRO reports to the board rather than the CEO. If a board has an enterprise-wide view of risk exposures, is not captured by a CEO, and acts in the long-term interests of shareholders, then such a reporting structure is expected to empower the risk management function. Aebi, Sabato & Schmid (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 a 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 board risk oversight through the activity of a board's risk committee. The authors use a sample of 60 major international banks from 17 countries in the 2004–2010 period and find four risk management variables important for risk-taking behavior: a CRO's presence in the senior executive team, CRO 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 do not find evidence that international financial institutions with better risk management performed better during the crisis.

Overall, recent literature has found evidence that measures of risk management strength correlate with lower risk taking in precrisis years and better bank performance during a crisis period. One important measure that appears to matter is CRO compensation, especially when it is benchmarked with that of the CEO. **Figure 1** examines how the tail risk (based on an expected shortfall measure widely used within banks to capture expected loss conditional on returns being less than a threshold) (see Acharya et al. 2010) of a sample of US bank holding companies during the crisis period varied with a measure of CRO centrality (the ratio of CRO's total compensation, excluding stock and option awards, to CEO's total compensation) in the precrisis period. There is a negative relationship suggesting that US banks where the risk management function was stronger (higher CRO centrality measure) had lower risk during the crisis.

Although finding a relationship between risk management's strength and risk taking is interesting, issues of endogeneity cloud interpretation of this result. We need to be careful lest a mechanical interpretation be suggested. It does not follow that giving a higher compensation to a CRO and ignoring a bank's business model/risk culture will automatically make the risk management function more powerful and risk taking less likely.

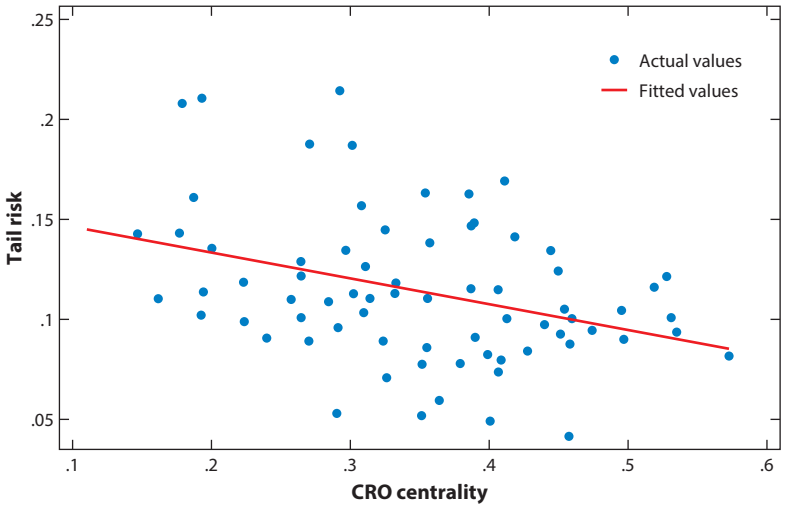

Figure 1

Tail risk during crisis years versus precrisis measure of chief risk officer (CRO) centrality. Average tail risk of each bank holding company over crisis years 2007 and 2008 is plotted versus its corresponding precrisis (2002–2006) CRO centrality. The solid straight line plots the predicted values obtained from a regression of tail risk on a constant and the precrisis CRO centrality. CRO centrality is the ratio of CRO's total compensation, excluding stock and option awards, to the total compensation of the chief executive officer. Figure generated from data of Ellul and Yerramilli (2013) with permission.

Perhaps a way to address such concerns is to investigate the channel through which risk management may influence risk taking, a dimension to which the literature has not given adequate attention. Above, I identify two potential channels: (*a*) the hedging channel and (*b*) the 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 banks' responses in the years following that event. They test whether banks had rigid business models that did not respond appropriately after the crisis (business model channel) or whether banks learned from the crisis and readjusted their risk levels and risk management functions (hedging channel). The authors find evidence 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 improve this function as much as did other banks that suffered less during the 1998 crisis. This result may also explain why banks that experienced the worst performance in the 1998 crisis were also those with the worst performance in the 2007–2008 financial crisis (Fahlenbrach, Prilmeier & Stulz 2012). From a normative perspective, these results resonate with the conjecture that there are no simple prescriptions for how a bank can improve its risk management because this function could be part of a business model that may persist through time.

CONCLUSIONS

The Group of Thirty Corporate Governance Working Group (2012) explains succinctly the challenges faced by governance structures in banks that result from the specific problems encountered in the financial industry and that the current financial crisis has brought to light: "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" (p. 5). In this article, I argue that governance failures make the case for a strong risk management function as a necessary structure to monitor and effectively 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 banks adopt and their business models. Evidence shows that for risk management to successfully achieve its goals it has to be independent of the single business units. An important role of governance structures is to give the risk management function its adequate weight in enterprise-wide decisions and avoid failures that may lead to excessive tail risk without the adoption of appropriate risk management systems.

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