

# Risk Governance, Incentives and Cognitive Bias<sup>1</sup>

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## **Overview**

The financial crisis of 2008-2009 underscores the importance of risk governance and incentive alignment for preserving the long-term viability of financial institutions. Widespread breakdowns in risk management of all types in the years leading up to the crisis are well-documented in Congressional panels, class action lawsuits and bankruptcy proceedings.<sup>3</sup> Despite significant advances in analytic capabilities that were supposed to improve the accuracy of risk assessment, fundamental breakdowns in risk management occurred driven by poor corporate governance coupled with senior management cognitive biases. These biases were manifest in poor executive compensation structures that failed to take risk management objectives into account, and marginalization of risk management functions both in terms of stature and financial support, leading to extremely poor identification, measurement and management of risks. Under a weak corporate governance model, management may have greater opportunity to influence their compensation structure with an eye toward maximizing their utility. Management cognitive biases may help shape performance objectives used in setting their compensation. In this process, risk management actions that reduce the chances of achieving target performance objectives may be resisted by management. Cognitive biases may then lead to management outcomes that marginalize the impact of risk managers to the business.

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<sup>3</sup> The Financial Crisis Inquiry Report: Final Report of the National Commission on the Causes of the Financial and Economic Crisis in the United States, Financial Crisis Inquiry Commission, 2011.

Enactment of the Dodd-Frank Act has in part attempted to regulate improvements in risk management by requiring risk committees of bank boards be established for firms over \$10 billion in assets, and requiring risk expertise on boards, among other changes to bolster risk management. Cognitive biases of senior management are difficult to regulate if even possible, and thus a set of complementary actions are required to attack deeply rooted cultural institutional attitudes toward excessive risk-taking. A well-established body of literature exists on executive compensation, incentives and risk-taking. Another important strand of research explaining risk decisions under uncertainty is found in behavioral economics. Building on the work from these two areas, this section of the paper establishes a model describing the relationship between incentives and the effectiveness of risk management functions within the corporate structure. This section shows how poorly designed executive compensation structures can lead management to marginalize risk management units and how limitations in data and analytics facilitate this process. Understanding these behavioral effects provides insight into what policies may be useful in driving toward effective risk management outcomes.

Strengthening financial incentives for management to instill a strong risk culture in an organization can be accomplished in several ways. For example, external groups critical to the firm's viability and ongoing operation such as rating agencies, regulators and directors and officers liability insurers could elevate the focus on risk management practices by reflecting this more in their ratings and premium structures, including risk-based deposit premiums. Adoption of risk-based performance metrics used directly in setting executive compensation is another mechanism that can address incentive alignment issues between management and shareholders. Strengthening the ties of risk management to the board is also essential as is raising the situational awareness of risk managers to assess and internalize both firm-specific and potential systemic risks facing the industry.

## **A Bank Risk Management Model**

Risk management at financial institutions differs in large measure from that of nonfinancial companies in that risk is a primary ingredient in the development of products and services of financial services companies. For purposes of exposition, a distinction is made up front between risk management and business management. The former group is responsible for identifying and measuring risk and proposing and/or taking actions to mitigate risk. Business management has responsibility for overall profitability and related objectives for a line of business. As a result, it is natural that business management will take an active interest in participating in risk discussions.

Complicating these discussions is the fact that risk management is largely an exercise in quantifying uncertainty and then working to find ways to mitigate risks outside the company's risk appetite. These two features of risk management; a deeply rooted connection between risk and product and uncertainty give rise to a set of behaviors that when present can lead to significant breakdowns in risk management, potentially jeopardizing the health of the firm. So while much of risk management over the last decade or more has witnessed a remarkable evolution into a highly analytic-focused discipline, the fundamental drivers shaping risk-taking are rooted in more subtle behavioral characteristics.

Following the demise of several well-known large financial institutions during the crisis, a number of Congressional inquiries and bankruptcy investigations identified a wide range of risk management breakdowns. These include evidence at Lehman that senior risk managers were marginalized during discussions of strategic business issues and a lengthy history at Washington Mutual (WaMu) of limiting the involvement of risk management in critical areas of the business.<sup>4</sup> In yet another

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<sup>4</sup> Valukas, Anton R., Lehman Brothers Holdings Inc. Chapter 11 Proceedings Examiner's Report, Volume 1, March 11, 2010, p. 46 and FDIC, Offices of Inspector General, Evaluation of Federal Regulatory Oversight of Washington Mutual Bank, Report No. EVAL-10-002, April 9, 2010, p. 12

example, affirmations by ex-risk managers at the subprime lender New Century echoed these themes at larger companies.<sup>5</sup> With so many anecdotal examples regarding poor risk governance apparent during the crisis, a natural question is what explains this behavior?

Research from areas investigating behavioral responses to financial risk-taking and agency costs related to incentive conflicts among corporate stakeholders serves as a useful theoretical backdrop for developing a working model explaining drivers of business management biases toward risk management. The academic literature tends to support the view that weak corporate governance structures open the door for managers to impose greater control over the design of their compensation packages.<sup>6</sup> If so, then these incentive structures provide the vehicle through which firm risk-taking is defined. Focus on short-term rewards and performance metrics that ignore or minimize risk views from risk managers then set the level of risk-taking for the firm. Bringing this concept together with work on cognitive biases from behavioral economics establishes the linkage between incentive compensation structures and risk governance.

In their work, Bebchuk et al. outline differences between optimal contracting and the managerial power model to designing incentive compensation packages for executives. In an optimal contracting framework, the objective is to minimize agency costs between management and shareholders. The authors further contend that boards do not always act in an arm's length fashion with respect to senior management and over time for various reasons may become captive or overly influenced by a powerful CEO. This allows management to maximize their own utility at the expense of shareholders by influencing the design of compensation contracts allowing them to extract rents. Management cognitive biases regarding

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<sup>5</sup> Lindsay, Patricia, Former Vice President, Corporate Risk, New Century Financial Corporation, Testimony to the Financial Crisis Inquiry Commission, April 7, 2010.

<sup>6</sup> Bebchuk, Lucien Ayre, Jesse M. Fried, and David I. Walker, "Managerial Power and Rent Extraction in the Design of Executive Compensation," *The University of Chicago Law Review*, Vol. 69, 2002, pp.751-846.

competitor behavior, risk-taking and their own priors regarding expected performance, operating in tandem with “managerial positional power” form the basis for suboptimal risk governance outcomes.

A critical contribution of the work to the expected utility-choice model is in describing asymmetries between gains and losses affecting an individual’s risk decision. Barberis, Huang, and Santos leverage this work as well as that of Thaler and Johnson to show how an individual’s risk-taking is dependent on prior financial outcomes.<sup>7</sup> Specifically, within the standard utility model, Barberis et al. append a term representing utility that comes about from changes in the value of an investor’s financial wealth. This is described formally as:

$$\text{MAX } E \left[ \sum_{t=0}^{\infty} \left( \rho^t \frac{C_t^{1-\gamma}}{1-\gamma} \right) + \beta_T \rho^{t+1} v(X_{t+1}, S_t, z_t) \right]$$

Where the first term on the right-hand of the expression represents the standard relationship between consumption, C, and utility,  $\rho$  is the discount rate, and  $\gamma$  is a parameter governing the shape of the utility function with respect to C. For our purposes, the second term of is of more interest. The function  $v(X_t, S_t, z_t)$  represents the amount of utility derived from changes in the investor’s financial position.  $X_t$  in this term reflects the gain or loss in investment over some time period,  $S_t$  represents the actual financial holdings at time t, and a state variable  $z_t$  relates investment gains or losses in a previous time period to  $S_t$ . The effect of prior financial performance is related to an historical benchmark in their model designated as  $Z_t$ , such that  $z_t = X_t/S_t$ . Should  $S_t > Z_t$ , the investor experiences gains sometime in the past. The significance of this outcome is that investors become less loss averse if prior financial performance has resulted in financial gains rather than losses. With this framework in place, it is possible to describe management risk-taking at financial institutions and how it relates to their risk management functions.

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<sup>7</sup> Barberis, Nicholas, Ming Huang, and Tano Santos, “Prospect Theory and Asset Prices,” *The Quarterly Journal of Economics*, Vol. 116, No. 1, Feb. 2001, pp. 1-53. Thaler, Richard H., and Eric J. Johnson, “Gambling with the House Money and Trying to Break Even: The Effects of Prior Outcomes on Risky Choice,” *Management Science*, XXXVI, 1990, pp. 643-660.

Business management at a financial institution faces a similar utility function as described by Barberis et al. for investors. In this example, the term  $v(\dots)$  is replaced with  $\theta(I_t)$  where  $\theta$  represents the contribution to management utility due to changes in firm financial performance and  $I_t$  represents management's incentive compensation structure through which financial performance is measured.

Business and risk management biases at banks can be described leveraging the seminal work by Kahneman and Tversky on prospect theory describing risk-taking behavior as well as their work on cognitive biases.<sup>8</sup> Management incentive contracts are later described to be a function of a set of cognitive biases driving their risk-taking behavior. Central to this model is the linkage of incentive compensation structure to changes in risk-taking. Incentive compensation as mentioned earlier is a function of the firm's corporate governance structure with weaker governance exemplified under the managerial power framework permitting incentive compensation structures that allow for greater risk-taking. In that regard, changes

in business management utility are related to  $\theta$  in the following way:  $\frac{\partial E[U]}{\partial \theta} > 0$ ,

implying that as a firm's financial performance improves, it raises management utility. Incentive contracts can lead to greater utility as a result of a set of performance measures poorly reflecting a longer-term view of performance adjusting for risk. Although the performance metrics of these contracts may lead to favorable compensation outcomes for management in the short-term, they are illusory. The primary transmission mechanism for this relationship then is the incentive compensation structure. We further describe  $I_t$  as a function of several factors driving management's "view" of firm performance. This view of performance is a reflection of the underlying performance metrics embedded in the incentive compensation arrangement. This might include for example, measures of firm profitability, stock performance (such as price-earnings ratios), market share, among other possible metrics. Performance metrics established in incentive

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<sup>8</sup> Kahneman, Daniel and Amos Tversky, "Prospect Theory: An Analysis of Decision Under Risk," *Econometrica*, XLVII, 1979, 263-291.

contracts designed under conditions explained by the managerial power model are related to a set of management cognitive biases well-established in the behavioral economics literature.

One of these behaviors relates to *confirmation biases* that assign greater weight to information supporting a particular view.<sup>9</sup> This bias may be associated with the “house money effect” described by Thaler et al. where prior financial performance influences an individual’s risk-taking. In this context, a prior period of sustained favorable financial performance would be a confirming event of future strong performance thus reducing management’s level of loss aversion. Kahneman also refers to an “illusion of validity” where overconfidence in a particular view or outcome is established merely by the coherence of a story and its conformance with a point of view.<sup>10</sup> Confirmation bias and the illusion of validity may be reinforcing biases for managers. Another bias introduced into this framework is *herd behavior*. Shiller, Banerjee and others describe a phenomenon where imperfect information regarding a group (e.g., a competitor) leads to decisions where management follow a competitor’s strategy at the expense of their own based on limited information.<sup>11</sup> An example of this would be large mortgage originators such as Countrywide and WaMu following each other’s product development movements, which were largely based on relaxed underwriting standards and increased risk layering of existing products. These firms viewed these newer products as having greater expected profitability than existing products based upon formal disclosures of financial performance by competitors of these new products as well as informal information from recently hired employees of competitor firms and other market intelligence. This herd effect could be reinforced by confirmation bias supported by a period of

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<sup>9</sup> Shefrin, Hersch, “Behavioral Corporate Finance,” *Journal of Applied Corporate Finance*, Vol. 14, 2001, pp. 113-118.

<sup>10</sup> Kahneman, Daniel, “Don’t Blink! The Hazards of Confidence,” *New York Times*, October 19, 2011.

<sup>11</sup> Shiller, Robert J., “Conversation, Information and Herd Behavior,” *American Economic Review*, Vol 85, No. 2, may 1995, pp. 181-185. Banerjee, Abhijit V., “A Simple Model of Herd Behavior,” *Quarterly Journal of Economics*, August 1992, Vol. 107, No. 3, pp. 797-817.

recent past performance reflecting strong house price appreciation, low interest rates and low defaults. The last bias introduced into this framework is related to the *ambiguity effect*.<sup>12</sup> This bias describes a phenomenon whereby individuals tend to favor decisions based on certain rather than uncertain outcomes. Frisch and Baron attribute this behavior to a general desire to avoid alternatives where information may be incomplete.<sup>13</sup> In the context of risk management, the ambiguity effect has a particular role in defining the effectiveness of risk management. First, since forward-looking estimates of firm risk are probabilistic in nature, this introduces uncertainty into management decisionmaking and performance benchmarks used in incentive contracts. Riskier views could reduce the attractiveness of certain products, and potentially lower the performance of the firm and management compensation in the process.

An example of this would be differences performance between prime and subprime mortgages. Define the firm's return on equity as net income divided by book, or regulatory capital where net income equals interest and noninterest revenues less interest and noninterest expenses of which credit losses are a component. On an ROE basis, applying a 4 percent regulatory capital charge to each loan, and assuming prime and subprime net income of .5% and 2%, respectively, the obvious choice would be to originate subprime loans carrying a 50% ROE over a prime loan with an ROE of 12.5%. However, if risk management offers a more appropriate performance metric adjusting for the risk of each product relying on risk capital rather than regulatory capital, a different result emerges. Assume that risk management finds that the amount of risk capital that should be deployed against prime loans is 2% and for subprime loans it is 10% based on the underlying risk

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<sup>12</sup> Ellsberg, Daniel, "Risk, Ambiguity and the Savage Axioms," *Quarterly Journal of Economics*, Vol. 75, 1961, pp. 643-699.

<sup>13</sup> Frisch, D., & Baron, J. (1988). Ambiguity and Rationality. *Journal of Behavioral Decision Making*, 1, 149-157.

characteristics of the borrower, loan, property and other factors. Using the net income figures from before, the decision would reverse with prime loans preferred (25% risk-adjusted return) over subprime (20% risk-adjusted return). Importantly, the overall profitability of the decision declines from before presumably reflected in bonus outcomes of management.

Compounding the ambiguity effect are data and analytical limitations that at times can reinforce management decisions to adopt riskier products. This can occur through data and modeling errors rendering risk estimates of limited value in the view of management. Furthermore, confirmation bias and herd effects can also reinforce the ambiguity effect. In the previous example, if risk management establishes that subprime loans have significantly higher risk than previous historical performance suggests and that other competitors continue to originate such products successfully in large volumes, weak governance leading to poor incentive structures augmented by these cognitive biases can neutralize the effectiveness of risk management.

To illustrate these concepts more concretely, consider a manager with a utility function as described earlier such that changes in utility are related to outcomes determined by the incentive compensation structure of that manager,  $\theta(I_t)$ . Extending the discussion by Barberis et al. that managers are more sensitive to reductions in compensation (as might be exemplified by low bonus payouts and option grants) than to increases, reflecting their degree of loss aversion, the relationship of interest is as follows:

$$\theta(I_t) = \begin{cases} \Pi_{t+1} & \text{for } \Pi_{t+1} \geq 0 \\ \delta \Pi_{t+1} & \text{for } \Pi_{t+1} < 0 \end{cases}$$

Where  $\Pi_{t+1}$  represents the gain or loss in firm profitability as described in the incentive compensation contract and  $\delta > 1$ , reflecting the manager's greater

sensitivity to losses than gains generally. For this example  $\delta$  is fixed across scenarios at 1.5, with no loss of generality to the model. In addition,  $\theta$  is set in three scenarios at .5, 1, and 1.5 which differentially impacts the manager's utility. In turn, the incentive structure is dependent upon the four cognitive biases; confirmation bias (denoted as X), herd behavior (H), ambiguity bias (A) and the house effect (HE) and the strength of the firm's governance structure (G) reflecting the relative positional power of management according to the managerial power concept. The complete relationship of these cognitive biases to incentive structures can be written formally as:

$$I_t = g(X_t, \overline{H}_t, A_t, \overline{HE}_t, G_t)$$

The ambiguity effect in this model focuses on the estimates of risk presented by the risk management team. Furthermore, management takes previous financial performance into account (the house effect) by referencing current performance (e.g., stock price)  $\Pi_t$  against an historical benchmark level  $\Pi^*$ . Thus, cases where  $\Pi^* > \Pi_t$  signify situations where past performance has been strong and vice versa.

We define this relationship as  $\frac{\Pi^*}{\Pi_t} = \overline{HE}_t$  in the model with  $\overline{HE}_t < 1$  signifying cases

where prior performance has been good, thus lowering the manager's loss aversion.

In a similar fashion, we can relate the firm's performance in a given period to a benchmark of performance of other competitors reflected by a composite

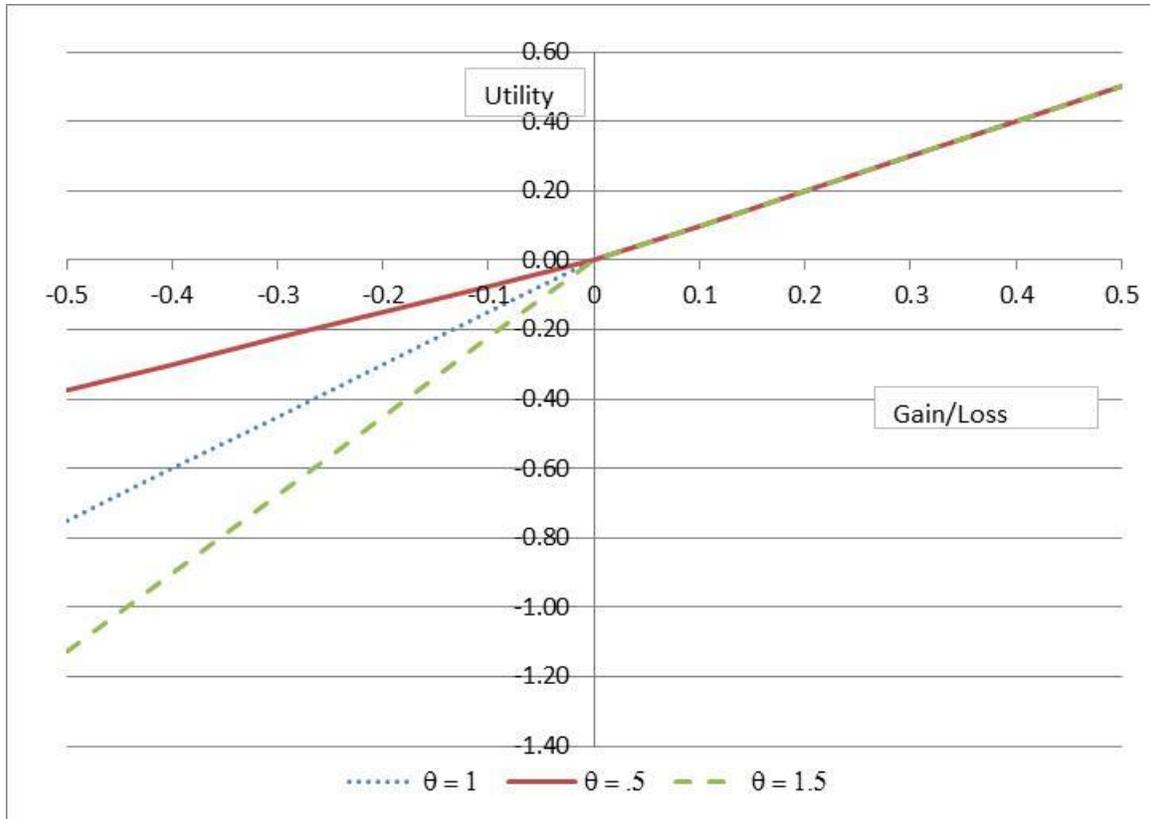
performance index of  $\Pi_t^C$  as follows:  $\overline{H}_t = \frac{\Pi_t^C}{\Pi_t}$ . In cases where  $\overline{H}_t > 1$ , the manager

engages in herd behavior. Finally we assume that firm profitability (ROE) ranges from +50% to -50% over the general period of interest. Figure 1 presents a summary depiction of the three scenarios across each ROE outcome and utility.

Figure 1 illustrates how negative return events differentially affect the manager's utility outcomes dependent upon management cognitive biases that affect the level of loss aversion. Consider the baseline scenario where  $\theta = 1$ . The line segment, as in all three scenarios is kinked at 0. This scenario illustrates that losses have a greater

effect on the manager than gains. In scenario 2, where  $\theta = .5$ , the manager exhibits less sensitivity to losses than in scenario 1 as cognitive biases and weak corporate

**Figure 1**



governance have lowered the manager’s loss aversion. By contrast, scenario 3 ( $\theta = 1.5$ ), the manager exhibits greater loss aversion than the other two scenarios. This outcome could be attributed to a combination of strong governance practices and controls that limit the manager’s ability to influence their incentive compensation arrangements and supported by cognitive abilities that limit the potential for herd behavior, the house money effect and ambiguity bias.

Having described the general relationships between governance, incentives and cognitive bias on risk-taking, it is possible to examine how these factors interact with the firm’s risk management function. Of particular interest is how data and analytics enter into the process; how the stature and structure of the risk

management organization can affect and be affected by management cognitive biases (particularly the case of confirmation bias in the presence of risk management views seemingly more conservative than historical performance); and how marginalization of risk management views can affect firm and management outcomes.

Data and analytics are used to construct forward-looking estimates of risk by the risk management team. In the model, these views enter via the ambiguity effect. Formally, this can be expressed as the following:

$$A_t = f(D_t|S_t, M_t|S_t, \frac{E_t}{E_{t+n}}|S_t)$$

Where  $D_t$  represents the quality of the firm's risk data warehouse,  $M_t$  is the quality (accuracy) of the models and analytics deployed to estimate risk, and  $E_t/E_{t+n}$  reflects the degree to which forward-looking estimates of risk ( $E_{t+n}$ ) deviate from actual historical risk outcomes ( $E_t$ ). This relationship is meant to capture the degree to which risk management estimates of future risk outcomes differ from previous experience. In situations where actual historical performance is significantly better than what the risk management team projects going forward, it raises the potential for ambiguity bias and, in the presence of confirmation bias and the house effect can be a reinforcing negative effect toward risk management. It is expected that both errors and deficiencies in data and models reduce the accuracy of risk estimates and thus management's confidence in those projections, further raising the ambiguity effect. Each of the variables affecting ambiguity bias is conditional on the level of stature in the risk organization,  $S_t$ . Stature is defined as the level of impact, value and perceived effectiveness of the risk team by management.

The metrics used to define performance play a critical role in shaping incentive contracts and firm and management performance outcomes. Going back to the earlier example of prime versus subprime loan originations, reliance on ROE versus a risk-adjusted metric can lead to demonstrably different outcomes. In the current

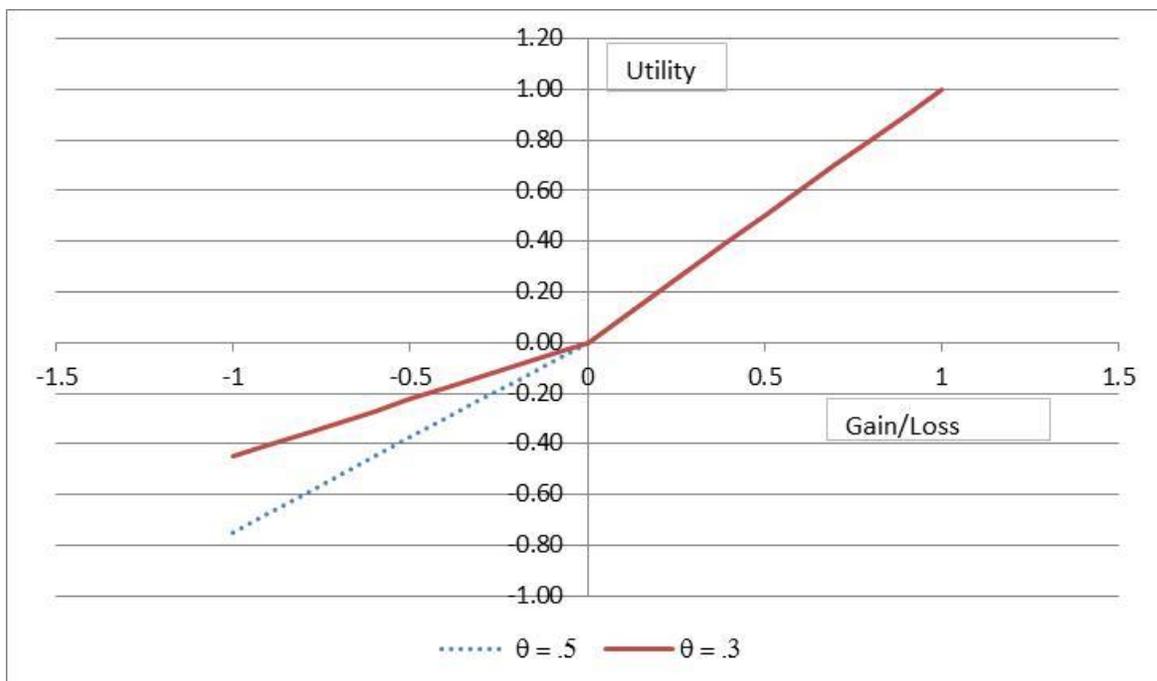
model then, we capture this effect in the house effect variable (HE) by expressing the general model under two alternative scenarios:

Scenario 1: Non-risk-adjusted  $HE_{t,NR} = \frac{\Pi_{t,NR}^*}{\Pi_{t,NR}}$  and,

Scenario 2: Risk-adjusted  $HE_{t,R} = \frac{\Pi_{t,R}^*}{\Pi_{t,R}}$

With these enhancements to the model in place, some general observations regarding the effect on risk management can be offered from some simple examples based upon scenario 2 ( $\theta = .5$ ) from before. Keeping the value of the parameter  $\delta$  as 1.5, we assume that the stature of the risk management team is high and that it has an endowment of data and models that are of relatively good quality such that  $D_t$  and  $M_t$  imply no change in  $\theta$  due to A. Recall that scenario 2 assumed a weak governance structure, and hence poor incentive structures leading to lower loss aversion, ceteris paribus. Compare that against a scenario in which the firm's data and models are poor and the stature of the group is low such that together these deficiencies further diminish  $\theta$  to the level .3. Figure 2 compares the outcomes of

**Figure 2**



these two scenarios illustrating the point that the ambiguity effect, reinforced by a lack of stature of risk management can amplify the manager's risk-taking posture. Stature might be able to limit the ambiguity effect attributed to poor data and modeling outcomes, particularly if such deficiencies have been rare. A similar outcome as depicted in Figure 2 could occur due to the actual-expected outcomes effect on A. That is, should  $E_t/E_{t+n} < 1$ , it raises A in the same relative manner as a deficiency in data and analytics and thus reinforcing and even amplifying the confirmation and house money effects.

Now consider the impact of applying different performance metrics in the manager's incentive compensation plan. We compare two scenarios; one where risk is not adjusted in the definition of performance (e.g., ROE) and the other scenario applies a risk-adjusted metric of performance (e.g., using risk capital instead of regulatory or book capital in the ROE calculation). Figure 3 applies the original scenario 2 ( $\theta = .5$ ) and assumes that the manager applies an ROE metric while the risk team applies a risk-adjusted metric which is closer to actual performance but still is measured with some error.

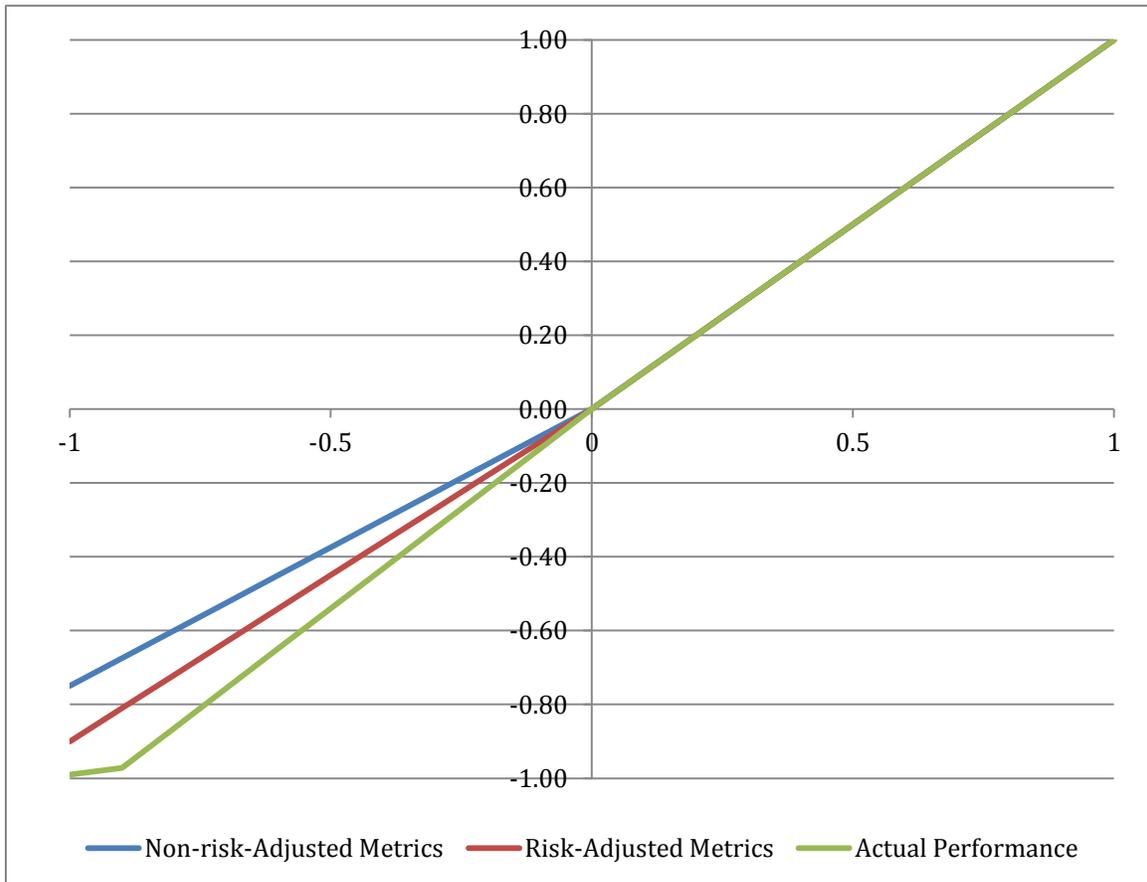
The results from this scenario suggest that when cognitive biases exist in the presence of weak governance, the tendency would be for management to underestimate risk which is compounded by application of metrics not adjusted for risk. Although risk-adjusted metrics are not fully accurate either, adjusting for risk results in expected outcomes that are closer to actual performance than management's views.

### **Implications and Policy Options**

The model presented above provides a framework for studying effects of banking risk governance from the perspective of managerial cognitive bias and incentives. In that framework we were able to illustrate the linkages between corporate

governance and its effect on incentive contracts for management and how that impacts the effectiveness of risk management within the company. The purpose of

**Figure 3**



this section is to draw attention to specific aspects of the model that can contribute to ineffective risk management and propose solutions that can mitigate this outcome. Areas of particular interest are solutions that financially reward institutions and management for maintaining strong risk management processes and controls, align incentives of business and risk managers to view performance on a risk-adjusted basis, and enhance the stature of risk management within the organization.

### Financial Incentives

Under the managerial power framework, weak oversight by a board can lead to executive compensation arrangements that are suboptimal for shareholders. Specifically, weak corporate governance creates an environment where management can influence the design of their compensation packages. An array of management cognitive biases can further shape performance objectives that maximize an executive's utility. Actions by risk management that lower the likelihood of achieving management performance objectives create conflicts between business and risk managers. Cognitive biases can negatively affect these tensions, leading to situations that marginalize the effectiveness of risk management units. Crafting a broad-based set of financial incentives promoting risk management best practices could improve management risk-taking behavior. Several organizations are well-suited to provide such incentives. These include companies offering directors and officers (D&O) liability insurance, rating agencies, and safety and soundness regulators.

Over the past several years, D&O insurance has been a target for a number of plaintiffs in civil suits lodged against major banks and financial institutions in the wake of the financial crisis. For example, in 2011 a consolidated class action lawsuit brought against a number of individual and other defendants associated with the collapse of WaMu, the largest bank failure in history was settled for \$208.5M, of which almost \$200M was from D&O insurance. Among the complaints levied in the lawsuit were that management "deliberately and secretly decreased the efficacy of WaMu's risk management policies; (2) corrupted WaMu's appraisal process; (3) abandoned appropriate underwriting standards; and (4) misrepresented both WaMus' financial results and internal controls."<sup>14</sup> Clearly, the financial crisis has illustrated the risks to D&O insurers and the need to strengthen their due diligence in underwriting their clients. D&O insurance policies are one area where financial incentives to induce management of financial institutions to take greater care in

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<sup>14</sup> Frankel, Allison, "Underwriters Pony Up Big in WaMu Securities Class Action," Thomson Reuters News and Insight, July 1, 2011.

building effective risk governance capabilities could occur. Going forward, such firms should as part of their underwriting review conduct a full bottoms-up assessment of the quality of the risk management structure of the client firm. This should entail a detailed 360 assessment from senior management, the board, and risk management personnel as to the culture, stature, organization and process and controls in place to manage risk across the enterprise. Policy endorsements and premiums would carry a larger weight on these aspects of risk management of prospective policyholders. An example of how such a process could work exists today by one provider that offers indemnification from repurchase liability on mortgages. The MOSA™ Score is developed from an extensive on-site review and survey instrument focusing on the level of quality of risk infrastructure.<sup>15</sup> This includes questions pertaining to organizational structure, and processes and controls in place to manage risk. Weights are assigned to individual risk factors, survey responses and due diligence outcomes. Lender premiums and approval are dependent on the lender's MOSA™ score which provides a composite view of a lender's risk management profile.

Risk assessments by safety and soundness regulators present another opportunity to incent management to adopt risk management best practices. The CAMELS rating process that has been in place for evaluating the quality of a depository institution across categories including capital, assets, management, earnings, liquidity, and sensitivity to market movements should be further strengthened to provide greater weight on risk management practices than they have in the past. For example, between, 2001-2007, the Office of Thrift Supervision (OTS) assigned a CAMELS rating to WaMu of 2, which is defined to be an institution that is “fundamentally sound.”<sup>16</sup> In addition, the FDIC determined that while OTS field examination staff identified weaknesses in WaMu's risk management processes to handle their high-

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<sup>15</sup> The Prieston Group, MOSA™ Score technical documents, 2010.

<sup>16</sup> FDIC, Offices of Inspector General, Evaluation of Federal Regulatory Oversight of Washington Mutual Bank, Report No. EVAL-10-002, April 9, 2010, p. 20.

risk strategy, they did little to address these deficiencies.<sup>17</sup> OTS has since been merged in with the Office of the Comptroller of the Currency (OCC), however, this example illustrates the oftentimes delicate balance between regulator and regulated entity. The Federal Reserve's revised Bank Holding Company rating system (BOPEC) that has been in place since 2004 features risk management controls and processes as a major component of the rating system.<sup>18</sup> This rating structure provides a useful guidepost for future enhancement of the CAMELs process. Another area where regulatory agencies have the tools to strengthen their oversight of depository risk governance practices is deposit insurance. Development of a robust risk management score that could be tied to risk-based deposit premiums could also promote good risk governance practices.

Another activity that could strengthen risk management is for regulators to have greater input into senior risk manager recruitment and termination outcomes. Although it is fairly standard practice to brief regulators on risk management changes, the regulatory community must have a greater voice in expressing concerns with turnover trends among risk managers, staffing cutbacks in risk functions, and reorganizations that reduce the stature and effectiveness of risk management teams to carry out their responsibilities, among other possible indicators of risk governance problems. Regulators need to translate those concerns directly into the ratings process and inform boards of needed course corrections surrounding deteriorating risk management personnel trends.

Ratings agencies and investor ratings are another leverage point to incent improvements in risk management. Private ratings providers have focused attention in the past on risk governance at the board and senior executive levels; however, these efforts are usually far too general in nature to provide sufficient

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<sup>17</sup> FDIC, Offices of Inspector General, Evaluation of Federal Regulatory Oversight of Washington Mutual Bank, Report No. EVAL-10-002, April 9, 2010, p. 28.

<sup>18</sup> Board of Governors of the Federal Reserve System, Supervisory Letter SR 04-18, Bank Holding Company Rating System, December 6, 2004.

detail on specific aspects of risk management within the institution. Greater detail must be provided on the organizational dynamics of risk management; how it maintains independence or not, what forums risk management has to present their recommendations and findings about risk, and compensation structures of managers, with emphasis on metrics that are adjusted for risk are just a few examples of the kind of details needed to properly assess risk management.

### Risk-Adjusted Metrics, Data and Analytics

The model illustrated circumstances under which management would be incented to pursue products and services that might not be in the best long-term interest of the company due to reliance on performance metrics not appropriately adjusted for risk. This is an area that has tremendous potential across the industry to improve decisionmaking. Deciding what measures to apply, how to weight them and measure them are key issues in development and deployment of risk-adjusted performance metrics into incentive compensations structures.

Although the use and reporting of ROE among firms is fairly widespread, as discussed earlier, such measures do not take into account the underlying risk between assets. In that regard, efforts to measure risk capital are critical to developing such measures as risk-adjusted return on capital (RaRoC) or shareholder value-added (SVA). Data and analytic requirements for these efforts can be daunting; however, the benefits can be considerable in terms of facilitating better capital allocation decisions within the company. As shown in the model scenarios, efforts to ensure data accuracy, consistency, and timeliness of availability are critical not just for modeling, but also for strengthening the credibility of risk management. Poor data and analytics in development of forward-looking views of risk can reinforce confirmation bias and the house effect bias of management. Investment therefore in robust risk data warehouses that integrate various risks across the firm should be taken as a priority for financial institutions. Care must also be taken to ensure that integration of data and systems hosting the data are possible. This includes factoring in such requirements when conducting due

diligence of acquisition targets. Not taking into account back-end integration costs can wind up limiting the value of the data for making enterprise-wide risk decisions.

Analytic capabilities, beyond the accuracy issues of model building exercises are crucial to providing a structure around strategic risk discussions at the firm. Measurement errors in addition to mispricing and misallocating capital can undermine the credibility of risk management leading to a reduction in stature of the risk organization if analytic capabilities are poorly designed and developed. Even when such capabilities are robust, risk managers can encounter stiff resistance when cognitive biases are present and corporate governance is weak to analytic views that do not comport with prior experience. The model accounted for such situations in the context of confirmation bias and the house money effect. This can be illustrated by the following example. During the period 2004-2006, home prices had accelerated rapidly in most areas of the country with low defaults experienced in those years. For companies where management cognitive biases were present, it would be difficult for risk management to convince management that alternative scenarios and simulation-based outcomes could lead to both lower home prices and high defaults in the future. Faced with such forecasts, under these conditions, risk managers have limited options other than to document and express their concern and allow their views to be overridden. Resolving risk governance deficiencies then is critical to maintaining a sound risk management capability.

### Institutional Risk Governance

Inculcating a strong risk culture within the firm is difficult for firms that have historically not enjoyed such an environment. However, risk culture is a prerequisite for ensuring prudent risks are taken. Development of best practice risk management capabilities is unlikely to overcome cognitive biases and weak corporate governance. In that regard, the financial incentives discussed earlier can reinforce other changes in risk governance within the firm.

The independence of the senior risk officer of a firm is among the most important characteristics of effective risk management. However, organizational independence does not always mean the risk officer is able to completely provide risk views unencumbered from implied pressure from senior management. The reporting structure of risk organizations varies from firm to firm with some Chief Risk Officers reporting directly to the CEO, Chairman of the Board and in some cases the CFO and/or business head, sometimes in a dual reporting framework. Ideally, the CRO or most senior risk officer should report into the chairman of the board of director's Risk Committee, not unlike the typical reporting structure of the general auditor to the Audit Committee of the board. This structure would provide the board with independent views and importantly provide air cover when required over risk views that are inconsistent with the business.

Among the most important tasks the Risk Committee and the board can do in facilitating strong risk governance is to establish a clear vision of the risk-taking posture of the firm. This roadmap would provide management and staff with the board's expectations regarding risk and how it should be evaluated in the context of strategic business decisions. Moreover, to be effective, the Risk Committee should be comprised of individuals either with some form of risk, audit, finance or accounting backgrounds given the complexity of risks across the firm.

As described in the model presented earlier, weak corporate governance practices can lead to poorly designed management incentive arrangements that are focused on short-term results and may not adequately take risk into consideration. Both business and risk management should share a balanced performance scorecard for compensation that reflects risk measures provided by risk management which would be established by the Compensation Committee of the board in consultation with the Risk Committee. Risk managers would not be compensated on production under this incentive scheme. Moreover, business managers should bear a portion of their compensation that is dependent upon certain risk outcomes. For example, losses on loans over time on particular vintages would be measured against

expected outcomes and benchmarks of performance established allowing payout of a portion of deferred compensation only when losses are within the indicator of performance. Some issues that come up in such arrangements include how to ensure fair accountability of management to risk performance standards and how to structure contracts with longer-term performance targets.

Another area to improve risk governance entails elevating the situational awareness of business and risk managers from a focus on firm-specific risk to that of the systemic risk to the industry. The temptation to follow a set of competitors is high when coupled with pressures from investors for greater earnings. However, imposing a certain degree of objectivity to understanding key drivers of a set of pervasive industry behaviors can at least limit the degree of herd behavior and myopic focus on individual firm outcomes. Following a course contrary to the industry is difficult, particularly if it leads to a decline in short- and intermediate-term profitability and market share. This is where a strong risk culture at the board level can support a direction by the firm that weights longer-term outcomes more heavily in assessing managerial performance.

### **Summary**

The financial crisis of 2008-2009 provides an opportunity to study the dynamics of risk governance at financial institutions. Specifically, the large number of failures across the industry, although anecdotal bear a number of similarities. Most failures could be traced back to deficiencies in risk governance and risk management. Lax corporate governance practices enabled management to set incentive compensation arrangements that did not appropriately take risk into consideration. Compounding these problems were a number of cognitive biases so prevalent at the time, that they promoted an explosion in exotic mortgage products and synthetic derivative products with limited historical experience to form sound risk views. Drawing from the extensive academic literature on corporate governance and executive compensation and behavioral economics work on cognitive biases, a model explaining how these factors can contribute to poor risk governance was presented.

Scenarios from this model illustrated how weak governance and incentive contracts can set in motion a series of behaviors predicated on certain strongly held views toward risk-taking. These include confirmation biases that cause management to weight specific outcomes more that align to a particular view; a house-money effect where previous performance factors prominently in management loss aversion, a herd effect where management follows competitor actions based on imperfect information and ambiguity bias that leads management toward outcomes having greater certainty. Scenarios showed that in the presence of cognitive biases and poor governance, risk management can be marginalized and suboptimal outcomes realized.

To better incent management toward implementing effective risk management practices based on the model's structural relationships, a number of important policy solutions are put forward. These include financial incentives such as more rigorous assessment of risk governance and management structures at financial institutions by D&O insurers, rating agencies, and regulatory agencies with assessments tied directly to supervisory outcomes, ratings and policy premiums. The introduction of risk-based metrics into incentive compensations schemes is recommended with particular emphasis on developing robust risk data warehouse capabilities that can support sophisticated risk capital measurement. Opportunities to strengthen risk governance within the company include formalizing the reporting of the senior risk officer to the Risk Committee of the board, establishing a balanced scorecard taking risk heavily into account in incentive compensation structures and raising the situational awareness of risk managers to build the stature of the risk management organization.