Asymmetric Information, Moral Hazard, and Agency Problems in Bank Lending

Peter Alonzi, Robert Irons and Khalid Razaki
Dominican University
River Forest, Illinois

Abstract

The failure to recognize the full risks of lending contributed to the financial markets crisis. Fueling the crisis was asymmetrical information with its attendant moral hazard. We show that basing bank managers’ compensation on short-term profits incentivizes managers to downplay increased default risk. By lowering expected defaults, lenders minimized the need for reserves for defaults, which led to increased lending and also lowered costs, leading to higher short run profits. In doing so, managers maximized their financial compensation. We suggest that an appropriate regulation would base compensation on longer run profits related to loan cohorts reaching maturity.
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1. Introduction

Unprecedented bank losses and the abysmal management failures placed bank operations at the center of explanations of the financial markets crisis. One component of bank operations of particular interest is the compensation plan for senior management. This plan sets the incentives for senior management. Whether these incentives are effective depends crucially upon asymmetric information, agency problems, and moral hazard.

2. Literature Review

The banking literature has investigated at least four types of problems arising from asymmetric information that lead to increased risk in banking. The first problem [Huang et al 2006] is found in the relationship between bank and the bank’s loan customer. The loan customer knows, better than bank management, her/his situation, ability, and intention to meet the loan repayment obligations. The 5 C’s of credit exist to assist banks in dealing with this imbalance of information. A second problem is the moral hazard attendant to FDIC deposit insurance [Kose et al. 2000 and Prescott 2002] and is found in the relationship between the bank as agent and its depositors or more precisely the insurer of the depositors as principal. By relieving the bank of the risk of depositor runs, the existence of credible deposit insurance gives the bank the incentive to change lending standards and make riskier loans. This moral hazard is rooted in information asymmetry because the bank knows better than the insurer the quality of the loans it makes. Hence the insurance premium set by the insurer ex ante is inadequate after the bank changes its lending standards. Unlike the first two problems, a third problem is the split between the interests of bank management and bank owners. Kose et al [2000] point out that depending on the structure of the management compensation plan, bank management (as the agent of the bank owner) might choose a lending strategy different from the owner. Essentially to protect a bonus dependent upon sufficient profitability, management could make loans that raise the likelihood of achieving the threshold profit but that entail less risk than those that allow the owner to extract the full value provided by the deposit insurance moral hazard. Dowd [2009] presents an agency conflict between bank management and bank owners that differs from that of Kose et al. This agency conflict has arisen recently with the innovation of securitizing bank loans. Here the bank knows the quality of the loans the bank has underwritten better than the buyer of these securitized bank loans. This also raises a problem of moral hazard. The bank, knowing that it originated the loans with no intention of warehousing them in its own portfolio, but merely for sale in the market for securitized bank loans (mortgage backed securities MBS, collateralized debt obligations CDOs, asset backed securities ABS), cares less about credit worthiness (the long term quality) of the loan and more about the near term salability. Related to this is the further
problem of asymmetric information attending the quality of the rating of these MBS, CDO, and ABS by ratings agencies [DeMuth, 2008].

Setting effective incentives for bank management can provide a solution to the problem of increased risks they encourage banks to take. Kose et al [2000] study the effect of building the structure of management compensation set by bank owners into the deposit insurance premium. They find by setting the deposit insurance premium in this way that managerial compensation becomes a direct regulatory mechanism by giving owners the incentive to pick managerial compensation contracts that yield optimal investment risk choice from the standpoint of the regulator [Kose et al pg. 122]. Essentially such a deposit insurance premium confronts both bank owners and bank management with the costs of the loan decisions encouraged by bank management compensation plans. Dowd underscores the importance of incentives set by the structure of management compensation, stating “If senior managers are themselves working on packages that encourage excessive risk-taking—as most real-world remuneration packages do—then that is what will result.” [Dowd 2009, pg. 149]

The work of Bebchuk and Fried [2003] points out that compensation packages might not resolve the different interests of bank management and bank owners. In particular, if there is managerial power influencing the design of the compensation plan, the interests of management can be built into the compensation and make the compensation plan the source of, rather than the solution to, the agency problem. Essentially, the compensation plan codifies the agency problem by building the management’s interests into the plan, to the detriment of owners.

Empirical evidence supports the notion that bank management compensation does not provide incentives that result in better corporate performance and may lead to increased risk. Bicksler provides accounts of three high profile cases (Countrywide Financial, Citigroup, and Merrill Lynch) to demonstrate that CEO compensation was not “remotely linked to either corporate performance or actual realized returns of the equity shareholders” [Bicksler 2008, pg. 295]. Crumley [2008] finds only a very weak link between bank management compensation and corporate performance measured by the percentage change of either return on equity or stock market price return. Bebchuk and Fried state that “compensation provided executives is linked only weakly to managerial performance” [Bebchuk and Fried 2003, pg. 82]. They further note that during the 1990s, there was no significant correlation between a CEO’s salary and bonus and her firm’s industry-adjusted performance: “This pay-performance disconnect is puzzling from an optimal contracting view” [Bebchuk and Fried 2003, pg. 82]. Palia and Porter [2007] (as suggested by Kose et al’s conceptual analysis) find that compensation is positively and statistically significantly related to risk. Here, risk is measured in two ways: (1) by the standard deviation of the bank’s daily total return and (2) the standard deviation of the residuals. Notably, Palia and Porter’s findings must be interpreted carefully because their measure for bank compensation is the degree of alignment between bank owners and bank management. They are consistent with the second problem noted in the previous paragraph (moral hazard attendant to
FDIC insurance) in which bank management and bank owner interests are aligned. They are not evidence of the third problem noted by Dowd [2009].

In this paper we offer a model of bank decision-making that reveals the impact of asymmetrical information, a new agency issue, and moral hazard on bank management lending. Following the discussion of Kose et al [2009], the management compensation package is considered explicitly. The compensation package is set to align bank management interests with that of owners. A key difference between banking and other industries such as manufacturing reveals that information asymmetry creates an agency problem not found in the bank literature cited above. This new agency problem circumvents the intended alignment of management and ownership interests and reduces the effectiveness of the profit-based incentives. Essentially, bank management uses its better information (asymmetrical information) about the quality of loans originated to promote its interests by downplaying the default risk of its loan decisions, and consequently increasing short-term, recorded profits at the expense of owners’ interest (agency problem) in long-term actual profits. We also show that this leads to increased loan volume. The model also develops more formally the moral hazard problem emphasized by Dowd [2009] by allowing bank management to securitize and thus sell its loans. Coupling the innovation of securitization of bank loan paper with the aforementioned information asymmetry leads to a potent moral hazard, resulting in bank management originating riskier loans in the pursuit of higher recorded short-term profits to the detriment of long-term profits. Essentially, when bank loans can be securitized and sold, bank management no longer earns its compensation solely by warehousing loans to earn an interest spread between loan rates and deposit rates. It can also earn fees for selling the loans it originates. Since bank management removes loans from the bank’s portfolio by securitizing and selling the loans, bank management sheds default risk. The shedding of default risk provides management the incentive to lower credit standards in order to increase loan volume, leading to increased total fees that are directly related to securitized loan volume.

In light of the implications of our bank model we offer two different types of recommendations to address these issues. First are recommendations for the effective structuring of the compensation package for management. Second are recommendations for financial accounting and auditing practices. The proper modification of accounting and auditing practices responsible for adequate disclosure of financial information and risk can lessen or eliminate the impact of asymmetry of information.

The remainder of this paper consists of seven sections. Section 3 develops the key difference between banking and other industries that serves as motivation for the formal model of bank profit maximization through lending decisions. Section 4 presents the formal model of bank decision-making and its solution. In Section 5 the discussion of the closed form solutions for the bank lending decisions reveals the extent of the perverse incentives caused or enabled by the asymmetric information. Section 6 discusses the implications of the agency and moral hazard issues identified in Section 5. Section 7 considers the potential role of financial accounting and
auditing for solving the problems confronting banking. Section 8 presents recommendations to address the problems associated with the asymmetric information, agency problem, and moral hazard by improving bank incentive structures and the accounting information provided by banks. Section 9 concludes.

3. Motivation for the Economic Model

A profitable firm is one that can finance all assets or resources needed for its operations and capital investments, and still have funds available for its shareholders. An effective management compensation system is essential to the company’s effort to hire and retain competent managers. A well-constructed compensation system provides effective incentives encouraging improved productivity, and leading to enhanced profits. It is logical to provide increased rewards to those generating greater profits by basing their compensation on profitability. Though logical, basing compensation on profitability might be ineffective or even perverse.

Consider the case of a furniture manufacturer. Many of the major costs (materials, labor, energy, advertising, and other resources) of making furniture are incurred and known before revenues are received. This circumstance leads to a fairly reliable estimate of profit/loss by year-end. A profit signals a job well done and the payout of a bonus based on this profit provides the incentive to be even more productive in the future. This is a case of basing compensation on profitability that is positively motivating increased shareholder wealth.

Contrast a manufacturing firm with a financial firm, which for simplicity’s sake, we will call a “bank”. A bank differs from a manufacturer in one crucial respect: while the furniture manufacturer incurs and knows most of its expenses before receiving revenues, such need not be the case for a bank. The bank’s largest potential cost of making loans is default that results in a 100% loss of principal. Notably, this loss is uncertain and occurs in the future. However, significant portions of banking revenues (loan origination fees, document fees, etc) occur in the present. This comparison stresses that, unlike manufacturing where costs are incurred before revenues are received, in banking it is the reverse.¹ The bank’s major cost of loan default looms

¹ The difference in timing of cost incurrence and revenue generation stressed in the text may seem to be a chimera, but we do not think so for three reasons. First, the difference between manufacturing and banking is time. Defective products are likely to be discovered more quickly than defective loans. So even though there are future costs confronting manufacturing firms such as cost of recalling shoddy goods and honoring warranties, these costs are discovered much more quickly by their users than are shoddily made mortgages with their delayed terms such as rate resets after three years which lead to a longer elapsed time before default costs come to the fore. This difference in time to discover defects gives rise to the agency problem at the heart of the difference between the suitability of profit-based compensation for manufacturing but not banking. Second, manufacturing controls the quality of inanimate objects it manufactures while banks try to estimate the credit worthiness of humans. A chair remains a chair but a human can change—skip town, get sick, injured on the job, or hit by a bus. Furthermore, a human’s ability to repay is affected by recession and job loss -- a systemic risk -- that do not make chairs defective. Third, there is a difference in kind. The lender depends on its loan customer for future performance while the
in the future while revenues are received up front. Crucially, this suggests that the reported
profits of a bank are a less reliable indication of a job well done than the reported profits of a
manufacturer. In the banking case, with the major cost of default uncertain and occurring in the
future (i.e. after revenue is received), it is unclear whether the revenues from its loans truly
exceed the costs of its loans. It is unclear what the recorded profit signals about the quality of the
job done. Essentially, the signal that current period bank profits gives is unclear in the absence
of proprietary information possessed by bank management (asymmetric information) about the
quality of the loans it has originated/underwritten. Consequently, paying a bonus based on
current period profits, or more generally basing compensation primarily on current period
profitability, provides an ineffective incentive to do the job well or, more significantly, even
perverse incentives.

When a bank bases its management’s compensation upon profitability, a feedback loop is created
that introduces a perverse incentive. It is bank management that determines how much to set
aside for loan losses. Given that the bank management knows better than others the quality of the
loans they originated (asymmetry of information), its estimate of expected loan default and hence
the provision for loan defaults should be superior. But the amount set aside for reserves against
loan defaults is one of the costs entering the bank’s calculation of its profits. If management
compensation is based on profitability, bank management is exposed to temptation (agency
problem). By lowering the provision for loan losses, management raises measured short-run
profits, raises management compensation, and places owner capital at risk by failing to provide
sufficient reserves.

This is not to say that bankers willfully underestimate loan defaults in order to line their own
pockets. There are statistical metrics utilized by auditors and analysts to cross-check the
reasonableness of the bank’s stated expectation of loan losses. However, the statistical metrics
depend on historical data and trends that lag behind the timely, contemporaneous knowledge

2 Essentially, the process of originating loans (underwriting credit worthiness of borrowers) produces an asymmetry
of information dividing bank management and bank owners that leads to perverse incentives. In the lending process,
the bank management assesses the credit worthiness of its loan customers. This assessment puts bank management
in the best position to know the quality of the loans it generates and to formulate expectations about loan defaults.
This expectation of loan defaults is vital to the bank owners since it enters the computation of recorded profits and
thus affects the effectiveness of the signal provided by recorded profits. The choice of how much to set aside for
adequate loan loss reserves is bank management’s judgment call. Since the provision for loan loss reserves enters
the income statement as an expense, bank management’s proprietary information enters the profit calculation. As
the cost to the bank imposed by loan default is captured by the amount set aside for loan losses, accurate
expectations of defaults are needed to provide effective short run profit signals. But it is at this very juncture that
management’s superior private information (asymmetric information) gives rise to an agency problem.

manufacturer does not. The bank depends on the borrower to honor their promise to repay, which can be affected by
recession, war, flood, fire, or earthquake. The manufacturer of a chair does not depend on the owner of the chair
after the sale because revenue has been received.
bank management uses to form its estimate of defaults and reserves set aside for loan losses. There is some leeway or wiggle room creating a reasonable range within which the bank’s expectations of loan defaults can reside. The leeway effect of the lag is compounded if loan volume is growing over time. The ratio of defaults to loans outstanding could be steady or falling, not because defaults (the numerator) are steady or falling, but because the increase in lending in the current period raises the denominator as fast as, or even faster than, the numerator. This masks (at least temporarily) the deterioration of loan quality. A reasonable loan loss reserve range leads to the tempting feedback loop (an agency problem) sketched above and to the problem of moral hazard. By setting the provision for loan defaults at the lower bound of the reasonable range the banker can be prudently imprudent. Moreover, if the quality of the loans currently made is weakening, then even an increase in the provision for loan defaults (which gives the appearance of prudence) could be ineffective if it fails to adequately provide for the deteriorating quality of the newly originated loans. Basing compensation on profitability creates the perverse incentive for management to push expected loan defaults to the lower end of the reasonable range (or to raise the provision more slowly than warranted) in order to raise profitability (or slow profitability’s decline). Interestingly, the owner is happy because reported current period profit is increasing as the cost imposed by loan loss reserves falls as provisions for (or additions to) loan loss reserves are reduced. The bank’s owner is like the frog put into a pot of cool water on a stove; he does not realize until it is too late that there is a flame heating up the water and that he is in the soup.

This perverse incentive is even stronger when loans are not kept in the bank’s own portfolio (i.e. warehoused) as done traditionally by banks. If loans are sold off into the secondary market, the originator gains the origination fees while simultaneously freeing itself from the future cost of loan default by shifting this cost to the buyer of the mortgage (or mortgage backed security). That the default risk will be shifted to the buyer of the loans who possess the inferior side of the information asymmetry on loan quality gives rise to moral hazard. The originator of the loans is now less concerned about the ability of the borrower to repay since the sale of the loan into the secondary market shifts the default risk from the originator’s portfolio to whoever buys the mortgage (or mortgage backed security). Essentially, any lowering of underwriting standards plays upon the asymmetric information inherent in the lag between the external metric of default risk (mentioned above) and the bank management’s superior knowledge of the quality of the loans it is making. With costs of default to the bank lowered by shifting the default risk to the purchaser of the securitized loans, and the origination fees adding to the revenues of the bank, there is a strong incentive to grow aggressively the amount of loans made, despite deteriorating credit quality inherent in lending to higher risk loan customers.
4. Model of Bank Profit Maximization

This section develops a simple model of bank management’s decision process in making loans. The model incorporates the feedback between loan decisions \( L \), bank management’s expectation of loan defaults \( \Delta \), profits, and management compensation by assuming management’s compensation is a proportion \( K \) of profits. Thus management’s goal of maximizing its compensation is the same as maximizing profits \( \pi \). The solution to the profit maximization problem illustrates the effect of expected loan defaults on the scale of bank lending, bank profits, and management compensation, \( K\pi \).

The bank is assumed to be perfectly competitive in all loan markets. Consequently, the bank can make as many loans as it chooses at the going loan rate of interest \( r_L \) and sell as many loans \( Q \) into the secondary market as it chooses at the going fee rate \( \phi \). The bank funds these loans with deposit dollars \( D \) or funds generated by selling the loans into the secondary market. The bank is assumed to face deposit interest rates \( r_D \) that rise with the amount of deposit dollars the bank borrows.

The bank’s objective is to maximize its profits by choosing the total amount of its lending \( L \). The bank sells a quantity \( Q \) of its loans into the secondary market and the remaining quantity it retains (i.e. warehoused) \( W \) in its own portfolio. For simplicity, we assume that \( Q \) is \( \alpha L \) (i.e. \( 1 > \alpha > 0 \)) and \( W \) is \((1-\alpha)L\).

The notation for the model is:

\[
\begin{align*}
L & \text{ is the } \$ \text{ amount of loans made.} \\
Q & \text{ is the } \$ \text{ amount of Loans sold into the secondary market } = \alpha L \\
W & \text{ is the } \$ \text{ amount of Loans retained in Bank’s portfolio (i.e. warehoused) } \\
& = (1-\alpha)L
\end{align*}
\]

We assume loans sold into the secondary market are a percentage of loans made giving equation [4]:

\[
Q = \alpha L \quad \text{where } \alpha \text{ is } 1 \geq \alpha \geq 0 \tag{4}
\]

\[
L = Q + W = \alpha L + (1-\alpha)L \tag{5}
\]

\( D \) stands for the $ amount of deposits held.

\[ L = D + Q \quad \text{Loans funded from two sources, deposits and sales to the} \]
secondary market. \[7\]

\[W = D\] By combining [7] and [5] \[8\]

\(r_L\) stands for the rate of interest earned on loans. \[9\]

\(r_D\) stands for the rate of interest paid to depositors. \[10\]

with \(r_D = r_0 + D \cdot \rho\) where \(\rho > 0\) \[10.1\]

\(\Delta\) stands for the bank management’s expected default rate on loans, \(1 > \Delta > 0\) \[11\]

Profits are derived from the interest revenue earned on warehoused loans \((W \cdot r_L)\) plus the fees net of expenses \((\phi > 0)\) earned on loans sold into the secondary market \((Q \cdot \phi)\) less the interest expense on deposits \((D \cdot r_D)\) less the expected losses due to defaults \((W \cdot \Delta)\) less the expected loss of interest revenues on warehoused loans that default \((W \cdot \Delta \cdot r_L)\). Profits are written as equation [12]. (See the appendix for the algebraic substitutions and factorings that produce equation [12].)

\[\pi = (1 - \alpha) \cdot L \cdot r_L + \alpha \cdot L \cdot \phi - (1 - \alpha) \cdot L \cdot r_0 - (1 - \alpha)^2 \cdot L^2 \cdot \rho - (1 - \alpha) \cdot L \cdot \Delta \cdot (1 + r_L)\] \[12\]

The bank’s decision problem is:

\[\text{Max } \{ \pi \}\]

\[-\{ L \}\]

Differentiating [12] with respect to \(L\) gives equation [13]:

\[\delta \pi \over \delta L = (1 - \alpha) r_L + \alpha \phi - (1 - \alpha) [r_0 + (1 - \alpha) L \rho] - (1 - \alpha) \Delta (1 + r_L)\] \[13\]

Setting this first order condition equal to zero and solving [13] for the \(L^*\) that maximizes profits gives equation [14]:

\[\text{Max } \{ \pi \}\]

\[-\{ L \}\]
5. Interpretation of the Bank’s Optimal Lending Decision

Equation [14] shows that loans depend on three sources. The numerator contains two sources. The term \( (1 - \alpha)(r_L - r_0 - \Delta[1+r_L]) \) is the traditional source of bank profit. It is composed of the spread between interest revenue and interest expense for the proportion of loans warehoused, \( (1 - \alpha)(r_L - r_0) \), and the effects of expected losses of principal and interest due to defaults on warehoused loans, \( -(1 - \alpha)\Delta(1+r_L) \). Traditional bank lending (the warehoused component) increases with the interest rate spread as the rate earned on loans \( r_L \) increases and as deposit cost \( r_0 \) decreases. As expected defaults \( \Delta \) increase, the bank traditionally reduces its lending in order to reduce exposure to the costs imposed by defaults. A second, new source of profit appears in the numerator: the fees earned on loans sold into the secondary market, \( -\alpha\phi \). This new source of bank lending increases as the net fees earned \( \alpha\phi \) increase. And this new type of lending is independent of default risk as this risk is eliminated from the bank’s portfolio by selling loans into the secondary market. The proportion of loans sold into the secondary market \( \alpha \) influences the contribution of both the new source of bank profitability, selling loans into the secondary market, and the traditional source of bank profitability, the warehousing of loans. Note that as \( \alpha \) approaches one, the traditional source of profit from warehousing loans (the \( 1 - \alpha \) portion) has less impact, and it disappears when \( \alpha \) is one. Concurrently, the new source of profit from fees earned on loans sold into the secondary market has greater impact as \( \alpha \) approaches one.

The denominator contains the third source affecting the amount of bank lending. Like the numerator this source consists of two parts. There is the traditional effect of the cost of deposit funding on warehoused lending represented by \( \rho \). As \( \rho \) rises, this rising cost of deposits reduces lending (the denominator gets bigger as \( \rho \) rises). The second and newer effect is found in \( 1 - \alpha \). Since \( 1 - \alpha \) is less than one, this new term reduces the ability of deposit costs represented by \( \rho \) to limit total bank lending. As \( \alpha \) approaches 1, \( (1 - \alpha) \) approaches zero, which means the bank holds fewer of the loans it originates. Consequently the bank has less need for deposits to fund its lending activities and thus is less affected by the interest cost of deposits represented by \( \rho \).

At \( \alpha \) equal to one, the numerator’s \( (1 - \alpha)(r_L - r_0 - \Delta[1+r_L]) \) is zero and the bank incentive to warehouse loans is eliminated while its incentive to sell loans into the securitized loan market \( \alpha\phi \) reaches its maximum value. At alpha equal to one the denominator’s \( 2(1 - \alpha)^2\rho \) equals zero. This shrinking denominator reinforces the numerator’s decline in the traditional source of profits from lending and amplifies the numerator’s impact of the new source of profits (fees). Most notably, as \( \alpha \) approaches one and the denominator approaches zero, there is no limit on lending...
If the loans can be sold into the secondary market in a timely fashion. This dramatic rise in lending simultaneously raises profitability and senior management's profit-based compensation, while also contributing to a credit bubble.

6. Agency Issue and Moral Hazard Issue Developed

The narrow inspection of equation [14] provided a sense of reasonableness for the implications of the model. In this section stepping back and taking a broader view of equation [14] provides two profound insights.

First, the numerator reveals the avenue by which asymmetric information leads to a new agency problem in banking. The term \((r_L - r_0 - \Delta[1+r_L])\) is the bank’s traditional earnings of net interest revenue less the expected defaults, i.e. the provision for defaults. As the bank’s expected defaults, \(\Delta\), rises, total lending \(L\) falls. That is, the \(\Delta\) term imposes a discipline on traditional bank lending (to warehouse loans). This discipline imposed by expected defaults is weakened by the asymmetry of information between the bank that originated the loans and the rest of world, and relies on either the reputation of the bank or their evaluation by the ratings agencies.

The asymmetric information exerts its influence on two levels. On the first level, because bankers know best the quality of the loans they are creating (and given the wiggle room that lags in verification of loan performance entails), bankers can provide expected default estimates on the low end of the acceptable range. The lower \(\Delta\) stimulates traditional bank lending, enhances the reported profits and gives both the bank owner (who gets the reported profits) and bank management (whose compensation is based on reported profits) the incentive to estimate loan defaults on the lower end of the acceptable range. However, there is simultaneously a second level of the asymmetry of information, this time within the bank itself, separating the interests of the owner from that of management (agency problem). The owner relies on management’s estimated loan defaults because management better understands the quality of the loans originated. While management is interested in its bonus based on current period (short-term) reported profits, the owner’s interest lies in long-term profits. This second level of asymmetric information thus produces a more subtle effect. Reliance on the bank management’s expectations of defaults, \(\Delta\), can underestimate the biggest cost of lending—the actual defaults. This cost occurs in the future but is ignored by relying on the bank management’s expectation of \(\Delta\) at the time current-period reported profits are computed, i.e., before loans reach maturity. If managers plan to retire from the bank before the loans mature and the actual defaults are realized, they can have their bonuses based on short-term current period reported profits and leave the owner holding the risk of the actual long run defaults.

A second, and perhaps even more significant insight is found in the numerator’s new bank earnings term \(\alpha\phi\) in combination with the denominator’s \((1-\alpha)\). The proportion of loans sold in the securitized loan market represented by \(\alpha\) and the fees earned from selling loans represented
by \( \phi \) suggest how banks can avoid the limiting effects of defaults, at least in the short run. As \( \alpha \) approaches 1, the role of traditional bank net interest revenue less expected defaults \( (1 - \alpha)(r_L - r_0 - \Delta[1+r_L]) \) has less influence and the new fee source of revenues, \( \alpha \phi \), has a greater influence. A rising \( \alpha \) frees the bank more and more from the default risk captured by \( \Delta \), and because the \( (1 - \alpha) \) term approaching zero propels \( L \) to infinity suggesting a problem of moral hazard. The temptation arises for bank management to let credit underwriting standards decline. Bank management knows the bank no longer must bear the default risk attending more risky lending when it sheds default risk by selling more loans into the securitized loan market (i.e. increasing \( \alpha \)). Bank management also knows that they can earn more fees, since they are dependent on volume that is rising as \( \alpha \) rises. Thus, banking is changed from a credit underwriting business of slowly earning the interest spread over time from traditional bank warehousing of loans (while keeping a watchful conservative eye on default risk), to a fast volume, fee-driven sales business. This new business generates greater volume by succumbing to the incentive to weaken credit standards and increase the proportion of loans sold into the securitized loan market.

7. **Role of Financial Accounting and Auditing**

Analysis of the economic model of bank profit maximization developed in Section III revealed two significant effects created by the presence of asymmetric information concerning default risk. This asymmetry (1) could adversely impact the incentive effects of bank’s reported earnings or (2) encourage the lowering of credit standards and the passing of increased default risk to non-bank investors through securitization of bundled loans.

Several papers underscore these problems from an accounting perspective and suggest the need for more effective financial accounting standards. Bebchuk and Fried [2004] note that compensation consultants representing senior executives are masters at using metrics that allow their clients to report better than average performance, justifying higher compensation. Walker [2007] echoes Bebchuk and Fried [2004], noting that artificially inflating reported earnings can make an executive shine in comparison to one’s peers. He also notes that a study of empirical literature on accounting and corporate behavior confirms that accounting rules and procedures matter, and that much of the empirical evidence supports the notions of self-serving management and the agency cost theory of accounting choice. Furthermore, Walker (2007) stated that the trend is to use accounting performance to determine equity-based compensation, and that this reliance on accounting performance increases the sensitivity of managerial compensation to financial accounting.

In a prescient paper, Macey and O’Hara note that very little attention has been paid to the corporate governance of banks, and argue that “commercial banks pose unique [emphasis added] corporate governance problems for managers and regulators, as well as for claimants on the firms’ cash flows such as investors and depositors” [Macey and O’Hara 2003, pg. 91]. They further note that the underlying Anglo-American model of corporate governance focuses on
shareholder values, and conflicts with the interest of other corporate constituencies. They view “a corporation as a complex web or 'nexus' of contractual relationships among the various claimants to the cash flows” [Macey and O’Hara 2003, pg. 92], requiring that managers and directors of firms protect the interests of stakeholders other than shareholders. From an accounting perspective, Macey and O’Hara [2003] underscore the essential informational role of audited financial statements. We believe that statements generated by the financial accountants must disclose the correct risk profile of the bank. Further, it is the duty of the independent auditors (who are professionals trained in financial accounting rules, auditing procedures, internal control risk assessment, and other types of risk assessment having a bearing on the firm’s future as a going concern) to ensure that management is complying with the desired disclosure requirements. Macey and O’Hara's [2003] argument can be used to assert that both bank financial accountants and the independent auditors were culpable in these disclosure and audit failures.

Following the implications of the work of Walker [2007], Bebchuk & Fried [2004], and Macey and O’Hara [2003], we argue that when there is asymmetric information about loan quality, and hence default risk, it becomes imperative that the information generated by financial accounting and auditing protect the interests of non-management stakeholders in the bank (investors both in the bank’s equity and the securitized loans, borrowers given loans that they will not be able to repay, the financial markets, and in general, the economy). It is the joint responsibility of the government and the financial market participants to set informational standards that facilitate and assure the effective and efficient functioning of financial markets. In particular, since asymmetric information is the source of the problem, the effective information provision role of financial accounting and auditing is of paramount importance.

It has been argued that auditors face a conflicts of interest. They exist to protect the interests of investors and are required by the Sarbanes-Oxley Act of 2002 to be selected by the audit committee composed only of outside directors. For all practical purposes, the auditors are selected and paid by firm management. This can lead to inadequate audits and improper financial reporting, because auditors may be sacrificing the quality of audits to please bank management. In the absence of control provided by an effective audit, it becomes possible for senior bank executives to report inflated accounting earnings and not report the true risks of its loan portfolio.

Mishkin [2007] provides three rationales for auditors to perform a less than optimal audit. These are:

1. Auditors may be willing to skew their judgments and opinions to win consulting business.
2. Auditors may be auditing information systems or tax plans installed by their non-audit counterparts.
3. Auditors may provide an overly favorable audit report and downplay business risks to retain the audit engagement.
We would add an additional reason:

4. Auditors may curtail audit tests to cut down on audit fees to gain cost advantage over competing auditors.

8. Policy Recommendations

8A. Recommendations Regarding Management Compensation Structure

The conflicts inherent in the current system motivate bank managers to increase risk, and thereby increase their personal compensation, to the detriment of all other stakeholders in the bank. Therefore, any recommendations offered must be systemic, i.e., backed by the full force and authority of the federal government. Anything less would be cosmetic at best and ineffective at worst.

**Recommendation 1: Institute a “claw back” compensation scheme.** Claw backs that allow recapture of previously paid compensation to atone for the managerial decision making sins of the past have the benefit of precedent. Their shortcoming is that they require legal action for enforcement and once the compensation has been paid, getting it back can be very expensive. Managers may claim ignorance of any malfeasance in the past transactions and decisions by blaming underlings. The claw back becomes mired in due process, with the burden of proof placed on the prosecution.

**Recommendation 2: Use a longer duration for paying compensation.** As claw backs can be problematic to enforce, another approach is to tie the payment of compensation to the realized cash flows from the loans. This practice, in essence, matches the maturity of the compensation to the maturity of the debt. In this approach, compensation payments are based on realized cash flows for loans that have not defaulted. Full payment of the managers’ compensation would require total repayment of the loan. The disadvantage of this compensation scheme is that managers may find the long payout period unacceptable and leave the firm. As a compromise to make this approach more palatable to managers, the compensation could be paid using a Macaulay Duration calculation for the loans. For example, a $100,000 loan with a 5% interest rate over 15 years has a Macaulay Duration of 7.1 years (assuming annual payments -- see Appendix II for the calculation of this figure). Similarly, a $350,000 loan at 5% for 30 years has a duration of just under 12 years. By utilizing this duration approach, the compensation would be paid in a more timely manner, but still spread out over enough time to reduce the likelihood of paying excessive compensation for defaulted loans.

As indicated, any such change in compensation plans would require enforcement by federal law, including fines against the banks for failing to follow the proper payout formula, and fines and possible imprisonment for managers accepting compensation that does not follow the legal
procedure. Anything less would be a mere suggestion, and unlikely to change managerial behavior.

**Recommendation 3: Limiting \( \alpha \).** Banks have traditionally warehoused loans; the trend in securitizing is a recent development. Since the securitization process shifts the default risk of those loans to the investors who purchase the securities, banks should be limited by regulation to a reasonable mix of warehoused loans and resold loans (i.e., there should be a cap on \( \alpha \)). Whatever cap on \( \alpha \) is chosen, it should be verified through the external audit process.

**Recommendation 4: Requiring investment in sold loans.** Since the securitization process shifts the default risk from the banks to the owners of the securities backed by those loans, the banks should be required to invest in a percentage of those securitized loans proportional to the percentage of loans securitized. In that way, they are required to keep a stake in the game.

**Recommendation 5: Partial recourse for defaulted securitized loans.** Extreme though this recommendation may be, to avert systemic failures of the securitized loan markets, banks should be required to be partially responsible for those loans they sell off that end up in default. Partial recourse will still leave the securities investors at some risk, but they should be responsible for the due diligence necessary to quantify the risk they accept.

**Recommendation 6: Institute shareholder “say-on-pay” policies.** Hamilton [2009] reports that Citigroup Inc. and Merrill Lynch (now owned by Bank of America Corp) paid out nearly $9 billion in bonuses while suffering combined losses of $54 billion and receiving $55 billion in government help. Travesties like this have increased calls for corporations to institute “say-on-pay” rules that would allow stockholders to vote on executive compensation packages. Even supporters of this policy concede that it would make a minor dent in the years-long struggle to restrain corporate paydays. Proponents contend that this policy has proven effective in countries like Britain where it has limited egregious payouts at deeply troubled companies.

**Recommendation 7: Directors and bank management should be severely scrutinized and penalized, if necessary.** Macey and O’Hara [2003] recommend that directors and officers of banks should be charged with a heightened duty to ensure the safety and soundness of these enterprises. Regarding directors and officers, they opined that “Their duties should not run exclusively to shareholders. Thus, we support a hybrid approach to corporate governance in which most firms are governed according to the U.S. model, while banks are governed according to a variant of the Franco-German paradigm. Our variant calls for bank directors to expand the scope of their fiduciary duties beyond shareholders to include creditors. In particular, we call on bank directors to take solvency risk explicitly and systematically into account when making decisions, or else face personal liability for failure to do so.” (Macey and O’Hara, 2003, pg. 92)
8B. Recommendations for Accounting Policy and Auditors

**Recommendation 8: Changes in financial accounting rule setting and practices.**
It should be determined whether accounting standards can serve a useful policy role in helping to shape bank executive behavior such that information asymmetry and moral hazard are eliminated or sharply reduced. Once it is understood that financial accounting standards have strong behavioral effects and economic consequences, this power should be used to create explicit accounting incentives as public policy tools. They should be used as a supplement to the direct subsidies, mandates, and tax incentives that are currently used by Congress to shape corporate behavior [Walker 2007, pg. 934]. Macey and O’Hara’s [2003] argument also can be used to recommend that U.S. financial accounting standards should be modified to protect the interests of other stakeholders in the firm and not just shareholders.

The Securities and Exchange Commission (SEC) and/or the Financial Accounting Standards Board (FASB) should mandate that banks hire actuaries to determine loan portfolio risk in total and by some meaningful categorization of loans. This risk profile should be highlighted in the notes to the audited financial statements. The risk estimation of securitized loans should not be left to just rating agencies, and the overall risk of banks should not be evaluated just by auditors.

**Recommendation 9: Changes in accrual accounting calculation and recognition of bank revenues.** In general, for most industries, the accrual accounting rules for revenue and expense recognition lead to better disclosure of a firm’s financial results. However, in the case of banks, it has a severe drawback. As noted earlier a bank’s greatest risk and potential expense is that of loan default. The magnitude of this expense becomes clear only with the passage of time. To guard against the possibility of unduly compensating senior managers for bad loan decisions, banks should be forced to recognize revenues from originating loans over the life of the loan and not when cash is collected. There is precedence for this practice in financial accounting, for example, the revenue recognition rules for installment sales.

**Recommendation 10: Auditors should be forced to conduct effective audits, through penalties, if necessary.** Auditors should have correctly estimated risks associated with bad loans. At least the major auditing firms are set up in industry groups and supposedly are experts in detecting risks in those industries. The banking crisis was partly caused by audit failures. Auditors should have insisted on greater testing and disclosure of bank financial numbers and risks. We believe that financial accounting regulators have not been tough enough in penalizing audit failures. Accounting regulators should assign some culpability to auditors of banks that suffer massive loan losses, unless the auditors had properly disclosed the relevant risks in their audit reports. Of course, the auditors should not be held culpable in cases of bank management fraud because auditors are not responsible for detecting fraud, per se. They should also not be held responsible for events that occur due to the systemic failures of the financial system.
9. Conclusion

The model offered in this paper reveals how bank managers are perversely incentivized to relax credit criteria and engage in profligate lending. The development of the securitization-disintermediation process in recent years exacerbates that behavior by allowing banks to shift the risk of default to the owners of the securities. However, bank managers are not the only parties responsible for the devastation in the loan markets: the credit rating agencies, accountants, auditors, financial regulators, and the purchasers of the securities backed by those loans are also culpable. The model presented here reveals the need for change in the governance of the loan markets. We offer ten recommendations for such change. Regardless of the nature of the specific changes made, it is necessary for those changes to be overseen and enforced by the federal government and the private and professional agencies regulating these markets.
Appendix 1.

Profit \( \pi = W * r_L + Q * \varphi - D * r_D - (W * \Delta) - (W * \Delta * r_L) \) \[A.1\]

Profit \( \pi = W * r_L + Q * \varphi - D * r_D - (W * \Delta) * (1 + r_L) \) \[A.2\]

By factoring out \( W * \Delta \) in [A.1]

\[ \pi = W * r_L + Q * \varphi - D * [r_0 + D * \rho] - (W * \Delta) * (1 + r_L) \] \[A.3\]

By substituting \( [r_0 + D * \rho] \) from in [10.1] for \( r_D \) in [A.2]

\[ \pi = (1-\alpha) * L * r_L + Q * \varphi - D * [r_0 + D * \rho] - (1-\alpha) * L * \Delta * (1 + r_L) \] \[A.4\]

By substituting \( (1-\alpha) * L \) from [4] for \( W \) in [A.3]

\[ \pi = (1-\alpha) * L * r_L + Q * \varphi - (1-\alpha) * L * [r_0 + (1-\alpha) * L * \rho] - (1-\alpha) * L * \Delta * (1 + r_L) \] \[A.5\]

By substituting \( (1-\alpha)L \) from [4] for \( W \) & \( W \) from [8] for \( D \) in [A.4]

\[ \pi = (1-\alpha) * L * r_L + \alpha * L * \varphi - (1-\alpha) * L * [r_0 + (1-\alpha) * L * \rho] - (1-\alpha) * L * \Delta * (1 + r_L) \] \[A.6\]

By substituting \( \alpha * L \) from [3] for \( Q \) in [A.5]

\[ \pi = (1-\alpha) * L * r_L + \alpha * L * \varphi - (1-\alpha) * L * r_0 - (1-\alpha)^2 * L^2 * \rho - (1-\alpha) * L * \Delta * (1 + r_L) \] \[12\]

By multiplying out [A.6]

Note that the second order condition guarantees that \( L^* \) maximizes profits

\[ \frac{\partial^2 \pi}{\partial^2 L} = -(1-\alpha)^2 \rho < 0 \text{ since } \rho > 0 \] \[15\]
APPENDIX 2: Macaulay Duration Calculation.

The Macaulay Duration is essentially the present value of the loan’s cash flows, weighted by the length of time until receipt of the cash flows, and divided by the principal of the loan:

\[
\text{Macaulay Duration} = \frac{\sum_{t=1}^{n} t CF_t \frac{1}{1+i}^t}{P}
\]

where t is the year the payment is made, CF is the annual payment amount, i is the annual interest rate, and P is the principal amount of the loan. Assuming the compensation is paid annually, the duration would be calculated based on annual loan payments. So for a $100,000 loan at 5% interest for 15 years, the annual payment would be $9,634.23, and the duration is calculated as 7.1 years, as shown in the spreadsheet analysis below (PVIF is the Present Value Interest Factor):

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<th>Pmt</th>
<th>Interest</th>
<th>Principal</th>
<th>End Amt</th>
<th>Period * CF PVIF</th>
<th>PV of CF</th>
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<td>709,731.37</td>
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If the manager has contracted for a 1% bonus payment on such a loan, the manager would receive an annual payment of $1,000 \left(\frac{1}{7.1}\right) = $140.85, with the final payment coming 1/10 of the way into the eighth year.
BIBLIOGRAPHY


Murphy, Kevin J. Explaining Executive Compensation: Managerial Power Versus the Perceived Cost of Stock Options. 69 University of Chicago Law Review 847, 860.

