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Deferred Cash Compensation: Enhancing Stability in the Financial Services Industry

1. Introduction

Employee compensation packages at large financial firms have recently been the focus of great concern, in particular because of their possible role in the 2007-09 financial crisis.[1] Especially worrisome is that, while these pay structures are crafted to create shareholder value by rewarding employees for taking risks that increase the value of the firm, they often (perhaps unintentionally) lack robust risk management features. Consequently, the prevailing pay structure before the financial crisis may have created risks to financial stability and, in the downturn, imposed costs on other stakeholders, including taxpayers and creditors.[2] As a result, at no time in recent memory has the balance of risk and return in employee decision making been under greater scrutiny.

A prosperous and healthy banking sector is essential to the growth of the U.S. economy. The health of the banking sector, in turn, rests on a competitive and fluid labor market, especially in the major financial centers. To ensure a competitive market, banks reward employees for their contribution to value creation. In banking, value creation entails risk taking. The costs of poor business decisions in banking are not fully internalized by the employee taking the risk, by the employee's trading desk, or by the firm and its owners and creditors; poor business decisions also inflict costs on other stakeholders. This outcome holds whether decision makers act morally and judiciously or, alternatively, engage in fraud and abuse. The effect, however, is likely to be larger in the latter case, owing in part to the obfuscation of critical information that often accompanies fraudulent activities.[3] Therefore, early detection of the problem may be more difficult in these instances, and the longer the delay in detection, the larger the associated destruction of value and the higher the social costs.[4] The key

[1] See Fahlenbrach and Stulz (2011) and Cheng, Hong, and Scheinkman (2015) for empirical evidence on the compensation of bank executives during a crisis.

[2] Thus, one important lesson from the crisis is that a governance structure focused on enhancing value to the shareholders might be in conflict with social objectives, particularly in the presence of a safety net.

[3] Obfuscation is likely because of the large financial stakes for the material risk takers and the fear of loss of discretion as a result of regulatory oversight.

[4] In crisis management, time is critical and learning about the scope of the problem is not easy (JPMorgan Chase's London Whale, for example).

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issue, then, is how to design incentive schemes to motivate bank employees to increase the value of the firm and, at the same time, ensure that the employee and the firm also serve the broader public interest. A successful approach to designing these incentive schemes could take many forms. In this article, we focus on one such form: incentives based on employee compensation.

In our framework, employee compensation is designed, first, to encourage a conservative approach to risk (which we refer to here as "conservatism") that better aligns the interests of bank employees with those of creditors and the public while still preserving incentives for creating value. Specifically, we explore incentive features associated with performance bonds—funded through the withholding of some portion of bank employees' compensation—and their prudential application in promoting financial stability. We argue that such a deferred cash program is likely to induce conservatism because it better internalizes the costs associated with risk taking. In this way, deferred cash complements both the bank's internal risk management and public enforcement.

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Further, we argue that deferred cash is likely to reduce the free-rider problem because, unlike stock or stock options, deferred cash has no upside potential to gain in value. This effect will, in turn, improve internal monitoring in cases of fraud, abuse, or excessive risk taking because such actions by one or more employees will now potentially have an adverse effect on the welfare of other employees. If a culture of internal information production and sharing exists within the firm, then internal monitoring is akin to a risk control scheme. Therefore, a second motivation for implementing a judicious deferred pay policy is that it is likely to make the firm less risky by promoting information production and sharing.

Third, we argue that aggregation of deferred pay for material risk takers, over many years, can build a liquidity buffer that could be used to help cover any unexpected capital or liquidity shortfall in the event the firm comes under stress.[5] Losses could occur as a result of market factors or management's or employees' poor decisions, as well as abuse and fraud.[6] In extreme adverse cases, the buffer could also help to support regulatory capital and liquidity plans. (In fact, there is evidence that firms with a higher share of deferred pay have lower costs of debt and a higher credit rating.) The difference is that bank employees, as opposed to stockholders, contribute to the buildup of this buffer.[7]

As mentioned, one specific form of deferred cash compensation is the performance bond.[8] With a performance bond, the deferred cash is at risk not only because the firm is experiencing financial stress but also because of possible legal violations. For example, a trader may be implicated in fraudulent activities that lead to fines against the firm. These fines can be paid out of the employee's deferred cash account as well as the accounts of others involved in the related activity, their supervisors, and the firm's senior management. This arrangement is in contrast to the current framework, in which the fines are paid by the firm's equity holders. The deferred cash compensation functions as a performance bond because the employee is essentially posting a financial bond to ensure future performance to standards. If the performance meets standards, the bond is repaid; otherwise, some or all of the bond is forfeited.[9]

[5] This idea is in the spirit of contingent capital: an exchange of one claim for another claim by stockholders or employees when the firm is in poor financial condition. A stock dividend (as a substitute for cash) is the oldest known type of contingent capital. The failure to pay cash dividends depresses prices, just like the failure to pay interest on a debt. Giving stocks as a substitute for wages in distressed firms is another example of contingent capital (and a concept much closer to this proposal). Paying part of bonuses in debt and converting it to equity are also part of the same general structure. Paying bonuses in equity, however, is not an example of contingent capital. Forgoing (writing off) bonus claims for the right to remain employed at the firm is, in essence, a contingent claim.

[6] It should be noted that deferred cash pay without liquidity creation could induce risk taking as funds are needed at the end of a deferral period. If a bank has not performed sufficiently well, it may be unable to cover the promised deferred pay. In addition, some employees may leave the firm and opt to work for a competitor.

[7] The terminology in the proposed approach is rather different from that of inside debt as in Wei and Yermack (2011). In their approach, management's claim is unfunded, while, in our approach, the employees' deferred cash is funded. In both approaches, the claims are unsecured and, consequently, the expected default risk is likely to decrease. In our approach, one could argue that the default risk will be relatively lower because the deferred cash could operate as higher equity capital.

[8] For a general discussion of performance bonds, see Becker and Stigler (1974) and Ritter and Taylor (1994).

[9] An example of a performance bond outside of banking is a security deposit on an apartment rental. If the apartment is not returned in good condition at the end of the lease, the landlord can use the security deposit to defray the expenses incurred in repairing any damage. Another example of a performance bond is a bail bond that helps ensure that the charged individual shows up in court. See, also, John W. Miller and Dan Frosch, "Coal Miners Pressed on Cleanup Costs," *Wall Street Journal*, July 19, 2015.

Deferred cash compensation is not punitive . . . it does not restrict overall pay levels. Rather, it promotes longer employment in a healthy financial sector. Therefore, it may help to promote finance as a profession.

We have outlined three motivations for expanding the use of deferred compensation in banking: its contribution to conservatism, its effect on internal monitoring and control, and its role in the creation of a financial buffer that can be accessed if the firm is in distress. The joint effect of these three economic incentives could be to make banks and the financial system (through interconnectedness) safer. While it will remain an empirical challenge to measure the effect of each motivation in isolation, focusing on one motivation to the exclusion of the others would limit our recognition of the many benefits of deferred compensation for overall financial stability. For example, if we were to focus solely on the financial buffer incentive, then we might learn only whether the aggregate deferred pay by material risk takers over a few years could produce a sufficient buffer to avert the type of default or distress experienced by large firms in the last crisis. Such a narrow inquiry might be misleading because it ignores the effects of deferred pay both on employee conservatism, which may reduce the likelihood that a firm comes under stress, and on managers' incentives to be more proactive in maintaining robust capital to protect their deferred pay. By contrast, an inquiry that takes into account the interplay of these incentives might show that a much smaller buffer might suffice.

To get a sense of the amount of deferred cash that could be generated in the banking sector, we estimate the potential buffer for three large banks created by various choices of deferral and vesting periods, as well as the deferral amount and its composition between cash and equity for 6,000 material risk takers (or managing directors) in each bank. We report these estimates for the average of the three banks. Our baseline estimate (outlined in an October 20, 2014, speech on culture by Federal Reserve Bank of New York President William Dudley)[10] produces deferred cash of $17 billion and deferred equity of $3.5 billion for 2013. The resulting aggregate deferred cash is nontrivial. A large bank could address some financial difficulties inflicted by its own culture of risk taking with the buffer, if needed.[11]

[10] Available at http://www.newyorkfed.org/newsevents/speeches/2014/dud141020a.html.

[11] An interesting question is how deferred cash accounts at Lehman Brothers may have altered the firm's situation during the summer of 2008.

In exploring the three incentives offered by deferred compensation, we do not imply that the firms or their employees should not take risks to create value, only that any adverse consequence of investment choices should be internalized as much as possible. We also argue that deferred cash compensation is not punitive in that it does not restrict overall pay levels. Rather, it promotes longer employment in a healthy financial sector. Therefore, it may help to promote finance as a profession.

The outline of this article is as follows: Section 2 provides a very brief overview of the evolution of compensation in banking. Section 3 presents an economic discussion of the potential financial stability benefits of deferred cash and reviews the supporting evidence on the link between deferred pay and conservatism. A few practical issues with the application of deferred cash are outlined in Section 4. Calibration of compensation estimates under various scenarios is presented in Section 5. Section 6 summarizes our findings.

2. A Brief Sketch of Compensation History in U.S. Commercial and Investment Banking

Evidence on the history of compensation structures and trends in U.S. financial firms is sparse.[12] This is partly because of limited disclosure[13] and partly because most commercial banks were traded as over-the-counter (OTC) through the 1950s and hence were not required to file disclosures with regulators.[14] Adams and Mehran (2003) report executive compensation structure and trends for the thirty-seven largest banks beginning in 1992. For example, they calculate the ratio of option grants relative to the sum of salary and bonus and compare these ratios, by year, to those of manufacturing firms in the S&P 500 index. They document that, over the period from 1992 to 1999, nonfinancial firms granted 60 percent more stock options than banks. Mehran, Morrison, and Shapiro (2012) extend this analysis to 2007 and document the trend in stock options, salary, and bonuses for bank executives for the universe of banks in

[12] Roe (1994) provides an excellent review of compensation scandals around the 1907 crisis and subsequent reforms.

[13] In fact, very few banks were included in Standard and Poor's Compustat database until the early 1960s. See Adams and Mehran (2012) for more discussion of related issues.

[14] OTC securities were exempt from filing Securities and Exchange Commission (SEC) disclosures until the mid-1960s. The OTC markets have different requirements that were expanded over time (as more firms became SEC registrants). For a discussion of the requirements, see Bushee and Leuz (2005) and Greenstone, Oyer, and Vissing-Jorgensen (2006).

Standard and Poor's ExecuComp service. They report that grants of stock options increased over the period from 1992 to 2001 but that the trend reversed very quickly after 2001. In contrast, average bonuses increased over the period from 1992 to 2007, with no reversal similar to options.[15]

The empirical description of bank compensation, however, is not likely to uncover a direct link between top management pay policy and the financial crisis for at least two reasons. First, we have little insight into bank pay policy for those below the very senior management level.[16] Second, other structural or legal developments may have contributed to the observed changes.[17] Among these developments are changes in the public's perception of chief executive officer (CEO) compensation following a number of fraud and abuse cases by large firms in early 2000, and the passage of the Gramm-Leach-Bliley Act of 1999. The publicized enforcement cases (and the subsequent passage of the Sarbanes-Oxley Act of 2002 [SOX]) dramatically altered compensation structures and the reliance on stock options by both financial and nonfinancial firms. While for nonfinancial firms restricted stocks replaced stock options, for banks the shift was mostly from stock options to bonuses, and arguably with less transparency.[18] To the extent that compensation structure affects investment decisions, SOX might have altered the investment choices and corporate policies of banks and nonbanks. Gramm-Leach-Bliley deregulation expanded the scope for investment decisions and, in turn, affected compensation and other bank policies.[19]

The deregulation of the banking sector also influenced the acquisition of investment banking firms by commercial banks. When an acquirer is unfamiliar with its target's business lines, the target firm's management often demands, and is granted, significant autonomy, as well as board representation. Thus, a higher likelihood exists that the target's culture will spill over to the acquirer's culture. In the acquisition process post-Graham-Leach-Bliley, the culture of the investment banks was transferred to the culture of the commercial banks. Prior to deregulation, the compensation and human resources practices of investment banking groups were quite distinct from the policies of the acquiring commercial banks. Over time post-acquisition, the reward structures of the investment banking targets influenced the entire entity.

Yet, some safeguards or risk management tools used (explicitly or implicitly) in investment banking practice did not migrate. For example, investment banks, even those that were public, retained to a degree the risk culture of a partnership. When a partnership is in financial need, the partners supply the necessary capital, if available. In one well-known case, in 1929 Goldman Sachs was almost brought down by a manager-partner, Waddill Catchings. Catchings created what was known as the Goldman Sachs Trading Corporation, essentially a trust that used debt to buy companies that had themselves used debt to buy other companies. When the crash came, the Goldman Sachs partners agreed among themselves to place about half of the partnership's capital of $20 million in the venture to avoid its potential failure.[20] Goldman Sachs Trading Corporation was a "big" risk, but one whose adverse consequences were largely borne by the manager-partners. From a policy perspective, this example is of interest because of the extent to which Goldman's problems, if not addressed, might have jeopardized the welfare of the broader financial system.

Deferred cash bonuses function [like] partnership capital in that the risk takers are required to set aside a fraction of their bonuses every year to manage the bank's need for capital in times of crisis.

This example is not to imply that partnerships do not fail but to make the point that a culture transferred without the mechanisms that contributed to its stability and persistence could become dysfunctional in a new environment. Deferred cash bonuses function in much the same way as partnership capital in that the risk takers are required to set aside a fraction of their bonuses every year to manage the bank's need for capital in times of crisis.

[15] See Core and Guay (2010) and Murphy (2012) for additional evidence on compensation trends in banking.

[16] Nearly every empirical analysis to date has examined the compensation of senior management in relation to various corporate attributes. Pay policy for midlevel managers (about 12,000 managing directors for a large U.S. bank) and its effect on risk taking have not been studied.

[17] In addition to these two reasons, most, if not all, of the empirical research on bank compensation focuses on average statistics of the sample. But inferences on average statistics may not provide insights into the behavior of very large banks. Also, much of the pay of bank executives is in the form of deferred equity and cash, with various vesting periods. This raises a challenge for empirical studies. For example, part of the bonuses observed in the proxies filed with the SEC may reflect different timing of awards. This might create a mismatch between bonuses observed and firm characteristics in a given year.

[18] A few regulatory agencies have advocated a more detailed disclosure of compensation.

[19] See Smith and Watts (1992) on the effect of investment policy on other corporate policies.

[20] See Endlich (1999, 45).

Why should bankers embrace the concept of deferred cash in a world of no bailouts?[21] The reason is that the private costs to bankers associated with their bank's failure are extremely high (Lehman Brothers, for example).[22] In the traditional corporate finance model of a levered firm and the valuation of corporate securities, stockholders have an option on the underlying assets of the firm. If the value of the firm is less than the promised payment to creditors at the option's maturity, the assets are passed to the creditors and the option is not exercised (Merton 1974). This framework may have implications for bankers, because bankers provide large human capital investments to the firm. In addition, the firm's future prospects depend on the continued effective deployment of this human capital. In this setting, employees' deferred cash is analogous to an option premium. At the exercise—that is,

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in a time of crisis—employees forgo their deferred cash but increase the likelihood that their employment at the firm will continue and that they will earn a return on their human capital. Further, they avoid the damage to their earnings capacity that would arise from loss of reputation, as well as other costs. Thus, in an uncertain world, one interpretation is that deferred cash is the capital needed by the firm and supplied by employees (just as in the example of Goldman) to preserve the employees' option to remain with their employer.

Deferred cash compensation can also be viewed as insurance. Just as with any insurance, size (the buffer) is important. In this case, the deferred cash payments are like insurance premiums. If the firm performs well over the vesting period, the insurance premiums are rebated. However, if the firm becomes financially stressed, the premiums are forgone. Unlike traditional insurance, which can increase the likelihood of a bad outcome by persuading the insured parties that they are protected against it, deferred cash compensation unambiguously reduces the likelihood of a bad outcome.

[21] One bank, UBS, has already adopted deferred pay for its risk takers. See Compensation Report 2014 of UBS Group AG.

[22] It should be noted that the private costs to all financial firms of restructuring, including labor relocation and termination, arguably might have been larger in the absence of intervention.

However, the degree of protection that this form of insurance provides against a bank's experiencing distress depends on the extent to which management and senior risk takers participate in the insurance program. If every bank takes part in these deferred cash programs, then in the event of a crisis, not only is the likelihood of financial stress for any participating firm reduced, but also the damage to the banking sector as a whole is likely to be much smaller. Buying insurance is not a perfect remedy in most cases, but it can dampen the adverse outcome. Thus, in a world of no bailouts, deferred cash compensation might be a valuable option for bank employees.

Finally, an important point to underscore is that promoting deferred cash policy as a risk management tool in a complex financial industry and an uncertain world depends on the availability of supporting evidence (or the lack thereof) on the contribution of compensation to financial crises.

3. How Could Deferred Cash Contribute to Financial Stability?

In this section, we discuss in detail the three mechanisms by which a deferred cash compensation program could help to control risk taking by internalizing the costs and benefits of risk. We also review the supporting evidence on the link between deferred pay and risk taking.

3.1 Economic Benefits of Deferred Cash

Deferred cash induces conservatism. Payment in the form of fixed claims, such as deferred cash, alters employee incentives, making employees more likely to act like debt holders. And because deferred cash payments have a lower priority than the claims of other creditors, bank employees would be more inclined to undertake corporate policies that lower the firm's default risk (Jensen and Meckling 1976) in order to protect the value of their fixed claims. Such policies include investing in safer projects, reducing the firm's leverage, economizing on payouts, and engaging in diversification activities.[23] It should be noted that a proper balance is needed between deferred equity and deferred cash. If the balance is tilted too far in either direction, employees may take too

[23] There is a wide range of evidence supporting the link between pay and corporate policies. For a summary of the evidence, see, for example, Murphy (1999) and Frydman and Jenter (2010).

little risk (although more so with deferred equity),[24] which would result in an undesirable transfer of value from equity holders to creditors.[25]

Deferred cash improves internal monitoring. Granting deferred cash to employees has the potential to mitigate the free-rider problem associated with compensation in the form of stock or stock options. This free-rider problem arises because of the potential for gains on deferred equity that depend on firm achievement rather than individual performance. With the introduction of deferred cash bonuses, the asymmetric behavior associated with equity compensation is likely to be reduced, in that the cost of excessive risk taking and poor decisions by an individual or an entity (a trading group, for example) will adversely impact a broader set of employees.[26] Since the deferred cash has debt-like features with no potential for gain, each participant in the deferred cash program is, in effect, a lender to the firm. Further, like any other lender, participants are likely to exert effort to protect their claims. Thus, deferred cash compensation is likely to encourage monitoring among the firm's risk takers (who are likely to be more sophisticated monitors than outside parties). In essence, this is the internal dynamic of partnerships, whereby incentives for risk and reward are more balanced.

The enhanced internal monitoring associated with deferred cash compensation may reduce the cost of enforcement to an individual, a group of employees, or the firm as a whole. For example, suppose that an individual observing an instance of fraud decides to disclose the wrongdoing in order to protect herself. Her action not only protects or limits the damage to the firm but it is also likely to protect the offender (or offenders) from a "slippery slope" dynamic whereby attempts to cover up a problem make the initial situation even worse. Further, an employee's disclosure to the firm of information about the wrongdoing of another employee increases the cost of covering up by those who were expected to take action based on the information disclosed to them, thereby providing an incentive to those employees to take action promptly. Therefore, the deferred pay scheme better aligns the employee's and the firm's interests with those of the public. If this approach is applied successfully—that is, if the firm acknowledges employee disclosures—it is likely to produce earlier disclosure to authorities, which, in turn, may lead to reduced regulatory punishment or enforcement costs.[27]

Deferred cash inventory can be used to offset financial losses. Employees' claims on the firm in the form of deferred cash can be an important resource for risk management. In a severe downturn, employees forgo their (contractually agreed) accumulated deferred cash to support the firm's operation, and the firm writes off the employee liability and can use the cash. (This typically occurs at a time when new equity capital would be relatively expensive.) As a result, the firm exhibits many of the attributes of a partnership, particularly in that material risk takers and senior management contribute capital to the firm to ensure its survival.

A deferred cash compensation program accumulates balances during good years, thus acting like a built-in stabilizer. By design, the scheme allocates more funds to the buffer when a firm's earnings, and thus bonuses, are high. And if the firm is doing poorly and the buffer is used, then the fraction of the deferral amount and vesting schedule may be changed temporarily to help rebuild an adequate buffer. This setup is similar to that of a capital conservation buffer, whereby a dividend cut may be necessary to build up the regulatory buffer if capital has been diverted to bank operations owing to an unexpected reversal.

While deferred cash is not part of regulatory capital, it can mitigate the potential moral hazard consequences of higher required capital: namely, that bank management may take bigger risks. With higher capital requirements, the fact that bank insiders will be using the resources of outside

[24] Morrison and Wilhelm (2004) argue that the holding of long-deferred equity by firm employees produces partnership characteristics.

[25] See William Dudley's 2013 speech "Ending Too Big to Fail," in which he argues that deferred compensation could complement the Comprehensive Capital Analysis and Review (CCAR) to enhance financial stability. He states that restructuring compensation plans in financial firms could "strengthen senior bank managers' incentives to proactively manage risk. For example, imagine how incentives would change if a significant portion of senior bank management's compensation each year were deferred to be available to cover future capital losses."

[26] Different employees have different degrees of discretion to enhance or harm the value of equity (or deferred equity). Further, they might have a different assessment of its future valuation. This kind of heterogeneity is likely to produce an impediment to monitoring, since determining what constitutes an action that damages the equity value becomes rather complex. For example, different employees may have different perceptions of excessive risk taking and its impact on equity value. They might agree more about its impact on deferred cash. Therefore, deferred cash is likely to produce a consensus among employees on how to preserve its value.

[27] Early disclosure arguably benefits the firm and the public in the long run. The key point is to align the bank employees' incentives with those of the stakeholders as a group. Two examples might be instructive. In a case where lack of disclosure hurt the firm, Germany's Federal Financial Supervisory Authority (BaFin) criticized Deutsche Bank's management "for negligent oversight and selective or inaccurate disclosures to regulators who were investigating market manipulation" (see David Enrich, Jenny Strasburg, and Eyk Henning, "Deutsche Bank Hit in Sharp Critique," *Wall Street Journal,* July 17, 2015). An example of self-reporting that was helpful to a firm is the case of Garth Peterson at Morgan Stanley. Peterson was an employee who had a number of improper dealings with Chinese government officials. Morgan Stanley received a public declination (in other words, a decision by the Justice Department not to sue) as a result of its self-reporting and extraordinary cooperation during the investigation. For the full story, see http://www.davispolk.com/Morgan-Stanleys-FCPA-Declination-and-the-Benefit-of-Effective-Compliance-10-09-2012/.

claimholders may give them additional incentives for risk taking. However, they are less likely to take larger risks when their own resources are also at stake—in other words, when they hold unvested deferred cash.

To summarize, the debt-like feature of deferred cash should lead to safer and more independent banks. With the introduction of deferred cash, a firm better internalizes the costs and benefits of risk taking and, at the same time, decreases its dependency on outside parties for financing its capital. This reduced dependency is particularly relevant in a downturn, when banks need equity capital and investors are reluctant to supply that capital. Instead, the bank can write off the liability to its employees and deploy deferred cash in its operation. As a result, the approach may motivate the firm and its risk takers to build up a large cushion above the minimum regulatory buffer in order to avoid any potential write-offs, or to become more proactive in acquiring capital (internally or externally). In fact, a firm's risk takers may opt to cut dividends and impose a cost on stockholders rather than risk their own money.

3.2 Evidence

Recent research suggests that deferred debt-like compensation reduces incentives for risk taking and risk shifting (Bebchuk and Spamann 2010; Edmans and Liu 2011; Mehran 2010; and Sundaram and Yermack 2007).[28] For example, Sundaram and Yermack find that when managers hold large inside debt positions (that is, compensation at risk in the event of default), the expected probability of the firm defaulting on its external debt is reduced. This is consistent with the hypothesis that these managers operate the firm conservatively to protect their deferred compensation. Similarly, Wei and Yermack (2011) construct a CEO's "relative incentive ratio," which estimates how a unit increase in the value of the firm raises the value of the CEO's inside debt versus inside equity claims. They document that, following the disclosure of pensions and deferred pay in proxy statements filed with the Securities and Exchange Commission (SEC) in 2006 and 2007, firms in which CEOs had larger pensions and deferred pay in their compensation packages exhibited lower credit spreads and higher bond prices. The intuition is that in the event of default, top executives' claims have a lower priority relative to creditors' claims, or at least relative to secured creditors' claims. Consequently, top executives are more likely to pursue policies that preserve the value of their claims—for example, by investing in less risky assets or engaging in better risk management. Although many of the actions and decisions of executives are unobservable, Wei and Yermack find that credit markets consider their holdings and price the firms' credit accordingly. Similarly, Anantharaman, Fang, and Gong (2014), using a large sample of firms with private loans over the period 2006-08, document that firms with a higher ratio of CEO inside debt, measured by the ratio of the CEO's pensions and deferred pay to his or her equity-based compensation, have lower credit spreads.

The empirical evidence on deferred debt compensation for banking firms provides support for the existence of conservatism similar to that documented for nonfinancial firms. For example, Bennett, Güntay, and Unal (2015) find that a higher incidence of inside debt relative to inside equity in a CEO compensation package was associated with lower default risk and better performance of banking firms during the crisis period. Further, the authors show that bank internal examination CAMELS ratings[29] (and, specifically, capital, management, earnings, and sensitivity to market risk ratings) are related to CEOs' inside debt compensation proxied by their pensions and deferred pay. Also, Van Bekkum (2014) documents that banks with a higher ratio of CEO inside debt in 2006 experienced lower equity volatility and lower tail and default risk over the period 2007-09.

While deferred cash is not part of regulatory capital, it can mitigate the potential moral hazard consequences of higher required capital: namely, that bank management may take bigger risks.

It should be noted that empirical work to date focuses mostly on the pensions of top management (and some deferred pay) as a proxy for debt-like compensation. There is no study of the effects on corporate policies of deferred bonuses of top management or broad-based deferred bonuses (the approach outlined in this article). Further, in banks where the CEO inside debt ratio (as in Sundaram and Yermack [2007]) is far smaller than the bank debt-to-assets

[28] See, also, the report by the Squam Lake Group (2013). In addition, other approaches to induce conservatism have been suggested in the literature. For example, Bolton, Mehran, and Shapiro (2015) propose tying compensation to a bank's credit default swap (CDS) spread.

[29] The acronym "CAMELS" refers to the components of a bank's condition that are assessed by banking supervisors: capital adequacy, asset quality, management, earnings, liquidity, and sensitivity to market risk.

ratio, a deferred bonus plan is likely to be more potent than pension plans in inducing conservatism because a few good years produce bonuses that are, in the aggregate, larger than pensions.

4. Practical Issues

Below, we address a few matters critical to the concept of deferred cash compensation.

4.1 Factors Influencing the Size of the Deferred Cash Buffer

The accumulated size of the deferred cash buffer is positively related to the percentage of deferred cash bonuses, the length of the deferral and vesting periods, and the number of employees (risk takers) covered by the plan. In addition, as noted earlier, the size of the buffer will grow when the economy, and presumably the firm, is prospering. The deferral amount could be larger and vesting schedules could be longer for more senior bank employees. Further, effective use of a deferral policy, amount, and vesting schedule as a risk management instrument requires design flexibility for different states of nature. That is, as noted earlier, the firm should have the ability (based on contractual agreements) to alter the deferral amounts and vesting schedules.

4.2 How Much Deferred Cash Is Prudent?[30]

As outlined earlier, there are three primary motivations for using deferred cash: to induce conservatism, to promote internal monitoring, and to build a buffer as insurance against unexpected distress. Further, the fund could be designed to partially, if not totally, cover any fines imposed on the firm stemming from abuse or fraud by its employees.[31] In order to induce conservatism or internal monitoring, the deferral amount at the individual level should not be small.

[30] To better answer this question, one needs to get a sense of the employee's conservativeness. That requires information on the employee's degree of risk aversion, income, total wealth, and hedging choices, if any. Simulations based on these characteristics could then be used to better understand the optimal mix between deferred cash and deferred equity.

[31] Many of the post-crisis settlements provide examples of fines that could potentially have been covered by employees.

Determining how much cash should be deferred to produce a buffer to cover a large loss, however, is a much harder question. Acharya, Mehran, and Sundaram (2016) produce a simple framework to determine the amount of cash holdings a bank needs in order to stay above its minimum regulatory capital ratios in stressed times. Specifically, they look at historical debt levels and estimate the marginal expected shortfalls of the market value of common equity to compute the required deferred cash-to-equity ratio for a given bank. Using historical data for the largest banks in the United States, they document that the ideal minimum cash holding is approximately 20 percent of equity value.

4.3 Timing of the Deferred Cash Trigger

Deferred cash can be triggered with the imposition of fines or prior to or at the time of a default. For example, employee deferred cash could be written off when the bank is near a violation of its minimum capital. In a sense, the firm is forced to use its employees' contingent claim to help it recapitalize (in the spirit of partnerships). A trigger based on the firm's status as an "ongoing" concern is appealing because, to all of its claimholders, a firm is more valuable alive than dead. A later trigger is less likely to mitigate fears, given the speed of deterioration in the final stages of a bank's demise.[32]

4.4 Deferred Cash Versus Deferred Equity

A key feature of deferred cash is that it induces conservatism. Deferred equity may also produce conservatism if the vesting period is very long, such as the length of employees' working horizons. A very long horizon, however, seems impractical. In addition, holding a claim on a large amount of deferred equity may increase the incentive for risk taking, unlike deferred cash, which has no potential for gain. Moreover, the operation of a deferred equity program is highly dependent on two corporate policies: ongoing bank stock issuances and ongoing stock repurchases (to avoid dilution). These activities can reduce the effectiveness of a deferred equity program in bank risk management owing to the timing of

[32] If the deferred cash is in the form of bail-in-able debt, then the risk takers' debt can be converted into equity at default. In such a setting, the deferred cash has the potential to align the interests of the current employee risk takers with those of future shareholders at default, which is a plus. However, there are other perverse effects as well, which will need further thought.

repurchases and issuances relative to vesting schedules, particularly if all risk takers are covered by the deferred equity plan. Deferred cash programs are independent of other corporate policies, including equity issuances and repurchases, and they are subject to less potential manipulation by insiders.[33] Finally, deferred cash is likely to reduce the debt overhang problem more than deferred equity.[34] Risk takers fearing big losses of personal wealth are more likely to maintain adequate capital or raise capital ex ante, and the bank is still more likely to be able to raise capital even after using its employees' resources than it would be if it did not use a deferred cash program, since the use of deferred cash could lower the debt overhang problem.[35]

4.5 Deferral and Vesting Periods and Labor Mobility

A concern with the long deferral and vesting period for the cash component of deferred compensation is that it might create a friction for workers moving between firms and thus promote inefficient allocation of the labor force.[36] While it is common for unvested deferred equity to be forfeited if an employee leaves a firm, this should not be a feature of the deferred cash compensation. That is, the vesting and payouts should continue even if a worker has left the firm. This feature prevents the creation of a mobility friction but still maintains the incentive for workers to speak up if they see a problem. In addition, there would be little reason for a firm trying to hire away an employee to buy out the employee's deferred cash compensation. With only short-vesting deferred equity, a worker may decide that it is better to leave a firm before a problem in her area becomes widely visible than to stay at the firm and try to correct the problem. The deferred cash compensation provides an incentive to stay and attempt to bring the problem to management's attention. If, instead, she chooses to leave, her deferred cash compensation is still at risk.

Another concern regarding deferral and vesting periods is that senior managers might try to delay the resolution of a problem in order to continue receiving payouts from their deferred cash accounts. To avoid this behavior, once an investigation has been opened, the vesting for those implicated and their senior managers could be frozen. This will ensure that the responsible parties bear the costs of their actions regardless of how long it takes to resolve the issue. In addition, if a new senior manager is recruited into the firm to help fix a problem, the manager's deferred cash account can be exempted from any fines that might arise owing to the earlier problems.

4.6 Labor Market Consequences

The press and academics, at times, point to the unintended consequences of potential regulatory change.[37] Some may argue that a deferred compensation scheme in the banking sector might deprive the industry of highly talented individuals and that industry growth and returns may suffer as a result. This kind of issue is certainly relevant in a public policy debate. It is important to balance any costs against a potential gain in financial stability. While one could argue that the potential gains are elusive since such plans have yet to exist, we would argue

[33] Market timing is a key factor in any corporate decision, particularly in repurchases and issuances. As outlined earlier, the operation of a deferred equity program, for the most part, is in conjunction with the two policies above. This may raise two potential problems. First, a deferred equity program lends itself to market manipulation and timing of disclosure. Consider a case where insiders have private information about bad news not available to outsiders, including supervisors. Also consider that insiders' deferred equity will be vested in the near future. In cases like this, one or more insiders may delay the disclosure of the bad news so that they can sell their vested shares at higher prices. This problem can be mitigated by implementation of a holding period beyond vesting. To our knowledge, only top management may be subject to a holding period. While major decisions are made by management, risk takers may not share the bad news with top management if they have the right financial incentive. Deferred cash mitigates this problem. Second, there could be an adverse effect on cash conservation. The timing of repurchases versus issuances to support the operation of vested deferred equity may not be most effective in this regard. Firms issue and repurchase throughout the year for many reasons, and rarely are these operations simultaneous. Therefore, there is a possibility that they may repurchase the shares at a higher price than issuances. Thus, more cash leaves the firm. In a downturn, this is more likely, because the tendency for repurchases to stabilize prices is much higher, since issuances depress share prices further.

[34] Debt overhang occurs when a firm loses its ability to raise equity capital because the proceeds are more likely to benefit creditors than equity holders.

[35] The firm might be able to raise equity capital more easily after using its employee deferred cash if the investors are uncertain as to whether the firm will commit its employee deferred cash.

[36] It should be noted that the aim of our framework is not to induce retention (or promote turnover). This is clear for the case of deferred cash. While the

Footnote 36 (continued)
effect of vesting on reducing voluntary departures has been documented in the literature (for example, Mehran and Yermack [1997]), the short deferral of equity and its vesting in our approach is not likely to interfere with bank employees' mobility.

[37] See, for example, Murphy (2013) on bonus caps. However, Benabou and Tirole (2015) argue that bonus caps could restore incentives but could generate other distortions.

Table 1

Average Employee Compensation and Executive Compensation in Top Three Banks, 2004-2013

Year	Total Employee Compensation (Billions of Dollars)	Number of Employees	Average Employee Compensation (Thousands of Dollars)	Average Top Five Executive Compensation (Thousands of Dollars)	Ratio of Top Five Average Compensation to Average Employee Compensation
2004	17.4	215,599	80.7	15,476	192
2005	19.8	223,262	88.9	16,004	180
2006	23.4	244,462	95.9	16,867	176
2007	25.6	264,254	96.8	16,019	165
2008	24.7	267,448	92.2	13,751	149
2009	28.0	262,007	107.0	9,929	93
2010	29.4	268,848	109.3	9,055	83
2011	30.6	276,314	110.9	12,554	113
2012	30.6	267,566	114.4	12,146	106
2013	30.0	252,718	118.8	13,468	113

Sources: Federal Reserve Board, *Consolidated Financial Statements of Bank Holding Companies* (FR Y-9C data); Compustat.

Notes: These figures are the average of the three largest banks. Data on the number of employees and total employee compensation are from FR Y-9C reports. Executive compensation figures are from Compustat's ExecuComp database.

that the costs are likely to be negligible, given our experience with regulatory reforms. For example, in the banking sector, the certification of financial statements by the chief executive or chief financial officer of each firm did not start with SOX; rather, the requirement goes back to the 1991 Federal Deposit Insurance Corporation Improvement Act (FDICIA). While SOX covers listed companies, FDICIA covers banks; therefore, there are two requirements for listed banking firms. Section 36 of FDICIA requires (among other things) that banks report annually on "Management Responsibility for Financial Statements and Internal Controls" and "Internal Control Evaluation and Reporting Requirements for Independent Public Accountants." The management responsibility report must be signed by the CEO and the chief accounting or financial officer.[38] The important point to note is that there is no evidence of adverse labor market consequences resulting from the adoption of FDICIA or SOX. Arguably, there are transition costs, but changes in regulation often affect organizational tax structure and listing choices, and could motivate the firm to change its regulators (to overcome the regulatory burden), rather than result in changes in the managerial and skilled labor market.[39]

[38] See Altamuro and Beatty (2010) for the discussion of FDICIA's internal controls.

[39] See, for example, Mehran and Suher (2009) for the effect of tax changes in the banking industry on organizational tax choices. See Doidge, Karolyi, and Stulz (2015) on the effects of various regulations that affect capital markets.

4.7 Disclosure of the Sum of the Deferred Pay

Arguably, annual disclosure of the amount might help financial stability, given the banks' many stakeholders.

5. Estimation of the Potential Size of Deferred Cash and Equity Compensation

In this section, we provide some basic conservative estimates of the potential size of deferred cash and equity under various assumptions, starting with the terms outlined in President Dudley's October 2014 speech. We rely solely on publicly available data and provide estimates of deferred cash and equity using averaged data from the three largest U.S. banks over the period 2004-13. This horizon is chosen to capture changes in compensation expenses over the crisis period. These calculations should be viewed as illustrative.

Total compensation expenses and employment per year, averaged across the three largest banks, are reported in Columns 2 and 3 of Table 1. Figures are obtained from the FR Y-9C *Consolidated Report of Condition and Income*, a form that is completed on a quarterly basis by each bank holding company with at least $500 million in total assets. Annual compensation is the sum of compensation and

benefits.[40] Column 4 uses the information in Columns 2 and 3 to produce average compensation per employee, regardless of employee rank. Two points should be noted. First, average employee compensation is rather high, reflecting the fact that there are many high-income earners in each bank. Second, there does not seem to be a dramatic post-crisis change in average employee compensation and benefits (it should be noted that the numbers are all nominal). Column 5 presents average compensation for the top five executives as reported in the proxy statements filed with the SEC. Executive compensation is the sum of salary, bonuses, and the value of grants of equity-based compensation. These are estimated using a consistent approach and reported in the S&P Compustat ExecuComp database. In Column 6, we report the ratio of the average top five compensation to the average employee compensation. The column produces two insights. First, top five compensation as a fraction of average employee compensation is declining over the period 2004-10. It should be noted that average employee pay does not seem to be getting smaller. Second, the numbers on pay disparity between top management and average employees are far smaller than those reported in the press for all S&P 500 firms.

We next provide estimates of the running totals for the deferred equity and cash program using averaged data from these three banks, assuming that the deferral programs were put into place in 2005. In order to estimate deferrals, the following assumptions are used (note that all figures are nominal):

1. Each bank has about 6,000 material risk takers (this varies across firms, given differences in lines of operation, size of the work force, and international focus).
2. Assumptions in estimating compensation for the top 6,000 employees:
   - The top 50 employees receive forty-two times the average bank employee's compensation (forty-two times is far below those numbers reported in Column 6 of Table 1).
   - The next 450 employees receive twenty-one times the average bank employee's compensation.
   - The next 2,500 employees receive sixteen times the average bank employee's compensation.
   - The next 3,000 employees receive eight times the average bank employee's compensation.
3. Assumptions regarding the deferred compensation program:
   - Fifty percent of annual compensation is deferred.
   - Equity is deferred for one year, with subsequent uniform vesting over three years.
   - Cash is deferred for five years, with subsequent uniform vesting over the next five years (note that vesting does not depend on continued employment).

In Table 2, we provide estimates for the sums of cash and equity that would be available in each year (2009 to 2013) had the deferral program been implemented beginning in 2004. Deferred compensation is estimated as 50 percent of compensation in each year (for the 6,000 material risk takers in each firm), and 60 percent of the deferred amount is held as cash (and 40 percent as equity). The sum of deferred cash in a particular year is calculated as the sum of the deferred cash from the five most recent years plus the uniformly vested amounts from five years prior to that, beginning with 2004. For example, the 2009 figure is calculated by summing cash deferrals from 2005 to 2009 and adding 80 percent of the 2004 cash deferral, 60 percent of

Table 2

Average Aggregate Firm-Level Cash (60 Percent) and Equity (40 Percent) Deferred in Top Three Banks, 2009-2013

Year	Sum of Cash Deferred (Billions of Dollars)[1]	Sum of Equity Deferred (Billions of Dollars)[2]
2009	12.4	3.0
2010	14.1	3.2
2011	15.4	3.3
2012	16.3	3.4
2013	17.0	3.5

[1]Deferred cash is 60 percent of deferred compensation. Sum of cash deferred is deferred cash held for five years and vested uniformly on a five-year schedule, beginning with 2004.

[2]Deferred equity is 40 percent of deferred compensation. Sum of equity deferred is deferred equity held for one year and vested uniformly on a three-year schedule, beginning with 2004.

Sources: Federal Reserve Board, *Consolidated Financial Statements of Bank Holding Companies* (FR Y-9C data); Compustat.

Note: All figures reflect the average of the three largest banks.

[40] Benefits should be a much larger fraction of employee pay for lower-rank employees than for more senior employees or material risk takers. Thus, our estimates are unlikely to be affected by the size of benefits allocated to bank employees.

Table 3

Average Aggregate Firm-Level Cash (50 Percent) and Equity (50 Percent) Deferred in Top Three Banks, 2009-2013

Year	Sum of Cash Deferred (Billions of Dollars)[1]	Sum of Equity Deferred (Billions of Dollars)[2]
2009	10.3	3.8
2010	11.7	4.0
2011	12.8	4.1
2012	13.6	4.2
2013	14.1	4.4

[1] Deferred cash is 50 percent of deferred compensation. Sum of cash deferred is deferred cash held for five years and vested uniformly on a five-year schedule, beginning with 2004.

[2] Deferred equity is 50 percent of deferred compensation. Sum of equity deferred is deferred equity held for one year and vested uniformly on a three-year schedule, beginning with 2004.

Sources: Federal Reserve Board, Consolidated Financial Statements of Bank Holding Companies (FR Y-9C data); Compustat.

Note: All figures reflect the average of the three largest banks.

Table 4

Average Aggregate Firm-Level Cash (60 Percent) and Equity (40 Percent) Deferred in Top Three Banks, 2009-2013; Shorter Cash Schedule

Year	Sum of Cash Deferred (Billions of Dollars)[1]	Sum of Equity Deferred (Billions of Dollars)[2]
2009	10.8	3.0
2010	11.3	3.2
2011	11.7	3.3
2012	12.1	3.4
2013	12.6	3.5

[1] Deferred cash is 60 percent of deferred compensation. Sum of cash deferred is deferred cash held for four years and vested uniformly on a three-year schedule, beginning with 2004.

[2] Deferred equity is 40 percent of deferred compensation. Sum of equity deferred is deferred equity held for one year and vested uniformly on a three-year schedule, beginning with 2004.

Sources: Federal Reserve Board, *Consolidated Financial Statements of Bank Holding Companies* (FR Y-9C data); Compustat.

Note: All figures reflect the average of the three largest banks.

the 2003 cash deferral, 40 percent of the 2002 cash deferral, and 20 percent of the 2001 cash deferral. Similarly, the sum of deferred equity is calculated as the deferred equity plus two-thirds of the previous year's deferred equity plus one-third of the deferred equity from two years prior. For example, the 2009 figure is calculated by summing the equity deferral in 2009 with two-thirds of the equity deferred in 2008 and one-third of the equity deferred in 2007. The table shows that the aggregate deferred cash over the period 2009 to 2013, averaged for the three banks, is always above $10 billion and nears $20 billion in later years. The aggregate deferred equity is $3 billion in 2009 and climbs to $3.5 billion by 2013.

Table 3 re-estimates the 2009-2013 sums of cash and equity but uses a different proportion of cash to equity. Instead of 60 percent of deferrals being cash, the figures reflect using 50 percent cash (and 50 percent equity) for the deferrals. Under this scheme, the 2013 aggregate deferred cash decreases from $17 billion to $14.1 billion, while equity rises from $3.5 billion to $4.4 billion.

In Table 4, we present an alternative cash schedule based on a program that defers for four years and then vests uniformly for the next three years. The aggregate deferred cash is again always above $10 billion, though it does not climb as high as the figures in Table 2 or Table 3 because of the shorter deferral and vesting period.

Our baseline estimate reported in Table 2 (deferred cash of $17 billion and deferred equity of $3.5 billion for 2013) suggests that the deferred compensation scheme could produce a nontrivial financial buffer. As such, it could address some liquidity shortfalls in adverse scenarios. Acharya, Mehran, and Sundaram (2016) estimate a cash-to-equity ratio requirement of about 20 percent for large banks. We compare our estimate of deferred compensation with that of Acharya, Mehran, and Sundaram, realizing that the two estimates are not directly comparable. We use Compustat to calculate the average equity valuation of the three banks in our study at the end of 2013. We find the average valuation to be $180.8 billion. Therefore, the total deferral compensation for 2013 in Table 2 is 11 percent of the average market capitalization of the three banks, and the cash deferral alone is 9 percent. It should be noted that, while our estimates are not based on an economic model, they are very conservative. For example, managing directors account for 3 to 6 percent of the work force in a large bank, or a lower bound of about 8,000 employees. Our estimates account for 6,000 managing directors. Thus, differences between our estimate and that of Acharya, Mehran, and Sundaram could be much smaller.

6. Conclusion

A healthy banking sector is central to the growth of the U.S. economy (and economies elsewhere). A sound banking sector does not imply little or no risk taking;

rather, it implies prudent decision making. Banks generate a great deal of value to the economy, yet as we saw in the 2007-09 crisis, their demise inflicts significant costs on the economy. Because of the importance of banks, the official sector stepped in during the crisis to rescue the banking sector—indeed, it has done so twice in recent times. In the process of this rescue, resources were diverted from other important social goals. Even if the diversion is justifiable, the reality is that society's resources (and its patience) for these rescue operations are diminishing, partly because banks make up a much larger share of the economy than they did a decade ago.

What should we do differently this time? We need to remind ourselves that finance is a notoriously opaque industry and that future crises are liable to occur because risks are hard to measure and to understand. The goal of public policy should be to reduce the likelihood and severity of these future crises. Essential to this aim is an industry that better manages itself and that limits its reliance on public resources in other potential downturns. In this article, we described the potential benefits of introducing deferred cash compensation for risk takers in the banking industry, including promoting conservatism, inducing internal monitoring, and creating a liquidity buffer. Taken together, these benefits would likely contribute to greater financial stability.

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