



Federal Reserve Bank of Chicago

Subordinated Debt and Bank Capital Reform

By: Douglas D. Evanoff and Larry D. Wall

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Douglas D. Evanoff*
Federal Reserve Bank of Chicago

and

Larry D. Wall*
Federal Reserve Bank of Atlanta

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Subordinated Debt and Bank Capital Reform

ABSTRACT

In recent years there has been a growing realization that there are significant problems with the current bank risk-based capital guidelines. As financial firms have become more sophisticated and complex they have effectively arbitrated the existing capital requirements. They have become so good at avoiding the intent of capital regulation that the regulations have essentially ceased being a safety and soundness issue for supervisors and have become more a compliance issue. There is also a growing realization that bank regulation must more effectively incorporate market discipline to encourage prudent risk management. One means recommended to accomplish this is to increase the role of subordinated debt in the bank capital requirement. Arguments have been made that this could lead to improvements in both market and supervisory discipline. Although a number of such proposals have been made, there appears to be significant misunderstanding of how bank capital requirements would be modified and what might be accomplished by the modification. On the one extreme, some discussions of sub-debt seem to imply that merely requiring banks to issue debt would solve all safety and soundness related concerns. At the other extreme, are a series of questions that raise doubts as to whether any change in the role of sub-debt could contribute toward safety and soundness goals.

The goal of this article is to provide a comprehensive review and evaluation of the purpose and potential of subordinated debt proposals, and to present a regulatory reform proposal that incorporates what we believe are the most desirable characteristics of subordinated debt. The article is intended as a reference piece from which readers new to the topic may find a thorough review of the issues, and others can draw on specific aspects of the debate. Coverage includes: (1) a discussion of the characteristics of sub-debt that make it attractive for imposing market and supervisory discipline on banks; (2) explanation of how current regulatory arrangements do not allow these features to be fully utilized; (3) discussion of the role of debt markets, equity markets and supervision in disciplining firm behavior, and how the use of sub-debt avoids many of the problems associated with alternative regulatory proposals; (4) a review of the evidence on the extent of market pricing and disciplining of risk imposed by holders of bank liabilities; (5) a review of some of the existing sub-debt proposals emphasizing their differences and the reasoning for those differences; (6) a new regulatory reform proposal which increases the role of sub-debt and (7) a discussion of some of the standard questions raised about sub-debt proposals and, when appropriate, explanation of how our proposal addresses these concerns.

Subordinated Debt and Bank Capital Reform

I. INTRODUCTION AND OVERVIEW

In the early 1980s Paul Horvitz recommended that mandatory bank capital requirements, which had been introduced in the U.S. only a few years previously, be modified to increase the amount held in the form of debt. Since then several proposals have recommended that banks increase reliance on subordinated debt (sub-debt) to serve the role of bank capital. Recent responses to those recommendations include the expressed interest by financial regulatory authorities in the U.S. [see Ferguson (1999) and Meyer (1999)], recommendations by academics and regulatory scholars [see U.S. Shadow Regulatory Committee (2000) and Benink and Schmidt (2000)], and the introduction of a bank regulatory framework in Argentina which has characteristics similar to those suggested in recent sub-debt proposals [see Calomiris and Powell (2000)]. More importantly, in the U.S. the 1999 U.S. Financial Services Modernization Act (Gramm-Leach-Bliley Act) requires large U.S. national banks to have outstanding debt that is highly rated by independent agencies to fund expansion of financial activities into areas not previously allowed. The Act also instructs the Board of Governors of the Federal Reserve System and the Secretary of the Treasury to conduct a joint study of the potential use of sub-debt to protect the financial system and deposit insurance funds from "too big to fail" institutions.¹

The argument behind proposals to increase the role of sub-debt in the bank capital structure is the potential improvement in market and supervisory discipline over bank risk-taking activities. Although a number of such proposals have been made, there appears to be significant misunderstanding of how bank capital requirements would be modified and what might be accomplished by the modification. On the one extreme, discussions of sub-debt seem to imply that merely requiring banks to issue some debt would solve all safety and soundness related concerns. At the other extreme, are a series of questions that raise doubts as to whether any change in the role of sub-debt could contribute toward safety and soundness goals.

The goal of this article is to provide a comprehensive review and evaluation of bank capital reform proposals that incorporate a mandatory sub-debt component, and to present a new proposal that we believe incorporates the most desirable characteristics of sub-debt.

As general background, in the basic model of financial intermediation, bankers purchase short-term funds in the marketplace and transform them into risky earning assets. The risk of these assets derives both from their maturities and from default prospects. Absent the safety net (particularly deposit insurance) the providers of this funding are at risk. Uninsured depositors as providers of these funds can reduce their risk by evaluating the banks' activities to insure that the portfolio generated is of acceptable risk. If the quality of the portfolio declines, or the capital, which serves to absorb variations in income, decreases, the depositors will demand a higher return on their investment commensurate with the increased risk; or will simply withdraw their funds. Banks, needing a steady flow of reasonably priced funds, have an incentive to maintain high quality portfolios.

For numerous reasons, policymakers moved away from this market-driven environment and introduced a bank safety net. However, the presence of this safety net can sever the investor relationship between the depositor and the bank, weakening market discipline. Without this discipline, the risk-taking incentives of bank management and investors are distorted and increased risk is likely to be incurred.

For years, industry scholars argued that industry risk-taking was too far removed from this market-driven model. The resulting distortions were labeled moral hazard problems.² The arguments intensified during the 1980s as substantial public funds were used to recapitalize the S&L sector following depletion of its deposit insurance fund. Indeed, during this period numerous alternative means to increase reliance on market forces and market discipline were proposed.³

To maintain social welfare, discipline not provided by the marketplace must be supplemented or replaced via the supervisory process. During the 1990s, discipline was imposed primarily through supervisory oversight and through risk-based capital requirements. In many cases, however, depository institutions have employed methods that weaken the relationship between capital levels and risk.⁴ Indeed, in today's markets there is little doubt that, particularly at larger institutions, there has been a significant deterioration in this relationship. As the bank's ability to measure and manage their risk exposures improved, their ability to avoid binding capital requirements also improved. At the same time, as banks became more complex, supervising and

regulating banking organizations became more difficult.⁵ Thus, once again there has been a call for increased reliance on market discipline to augment supervisory discipline, particularly in overseeing the activities of large financial conglomerates.

With the growing interest in increasing market discipline, there have been a number of proposals to increase the role of sub-debt in the bank capital structure. Although the specifics of these proposals differ, all rely on one or both of two arguments that sub-debt has desirable properties for regulatory purposes. One argument is that expanded use of sub-debt allows regulators to require banks to have more private funds at risk without mandating that they adopt ratios of debt-to-equity that place them at a competitive disadvantage. Bankers have long complained that regulatory equity capital requirements placed them at a competitive disadvantage because, for example, the interest on debt is deductible but dividends to equity-holders are not. Expanded use of sub-debt may allow banks to choose their debt-to-equity ratios while assuring regulators that at least a minimal amount of private funds are outside the safety net and are at risk. The other argument for sub-debt is that the risk signals from this debt more closely follow the needs of the regulators. That is, both are concerned more with guarding against the potential for bank failure than they are with the potential for higher profits from taking on additional risk. In contrast, equity-holders may gain from increased risk taking since they reap all of the profits and do not bear all of the costs because the current pricing of the safety net is insufficiently sensitive to changes in risk exposure. Thus, sub-debt yields are likely to be more informative about a bank's risk exposure.

Authors of reform proposals generally agree that increasing the role of sub-debt in the bank capital structure should result in greater discipline over the risk-taking activities of banks, decrease potential losses to the deposit insurance funds, and, by having the debt-holders gradually apply increasing pressure to the bank as its condition deteriorates, help manage the failure resolution process when larger banks encounter difficulties. However, there are differences in the proposals based on the specific goals and objectives of the author. Some attempt to supplant supervisory oversight while others strive to provide supervisors with an additional tool to enable them to better supervisor banks. Some rely on pressure being exerted on the bank by increasing its cost of funding while others rely more on the signal sent by changing debt prices in the

secondary market.

A requirement for these proposals to be effective as a regulatory tool is that the debt-holders be capable of distinguishing between banks with different risk profiles. Studies dating back to the 1970s have evaluated whether various holders of bank liabilities price differences in banks' risk. The majority of this literature suggests that liability holders do effectively price such risk in the expected manner. The exception to this finding concerns debt-holders at large U.S. banks during the 1980s. This too, it is argued, can be explained by rational, informed behavior. During this period it was commonly known that these investors fell under an implicit too-big-to-fail guarantee.⁶ Investors rationally expected to be protected from bank problems. Thus, the literature suggests that investors behave rationally and demand higher compensation from banks when they are at risk of loss.

After a discussion of the relevant issues, we present a new sub-debt proposal that incorporates many of the characteristics, and resulting advantages, of earlier proposals, but offers some new characteristics that address specific regulatory concerns. The timing seems particularly good for consideration of such a plan as the U.S. Congress has expressed interest in the potential merits of sub-debt as a regulatory tool. Additionally, recognizing problems with the current Basel Capital Accord, the Basel Committee on Banking Supervision is currently evaluating alternative means to improve capital regulation to make capital more reflective of banks' actual risk levels. In the U.S., banks as a group are relatively healthy which allows time for a carefully thought out plan instead of quickly imposing a plan in response to a financial crisis. Worldwide, there seems to be the realization that regulators need to find means to avoid the financial crises seen in recent years, and increased reliance on market discipline is gaining acceptance as a means to regulate banks.⁷ Sub-debt proposals seem to be gaining support as a preferred means to impose this discipline.

In the remaining pages we provide a comprehensive review of issues associated with sub-debt proposals. The article is intended as a reference piece from which readers new to the topic may find a thorough review of the issues, and others can draw on specific aspects of the debate. Readers most familiar with the topic may want to go directly to the new regulatory reform proposal. The paper is organized as follows: in the next section we discuss the characteristics of

sub-debt that make it attractive for imposing market and supervisory discipline on banks and explain how current regulatory arrangements do not allow these features to be fully utilized. We emphasize the role of debt markets, equity markets and supervision in disciplining firm behavior, and show how the use of sub-debt avoids many of the problems associated with alternative regulatory proposals (such as elimination or significant reductions in deposit insurance). Since the effectiveness of sub-debt proposals rely on the market's effectiveness in influencing firm behavior, in Section III we review the evidence on the extent of market pricing and disciplining of risk imposed by holders of bank liabilities. Section IV summarizes some of the existing sub-debt proposals emphasizing their differences and the reasoning for those differences. Our regulatory reform proposal which increases the role of sub-debt is presented in Section V. Finally, for completeness, in Section VI we address some of the standard questions raised about the sub-debt proposals and, when appropriate, explain how our proposal addresses these concerns. The last section summarizes.

II SUBORDINATED DEBT AS THE PREFERRED MECHANISM FOR REIMPOSING MARKET DISCIPLINE.

The problem of disciplining firm risk taking is not unique to banks. Ordinarily the focus in evaluating risk taking is on the equity-holders' incentives. Limited liability, however, may provide equity-holders with an incentive to have the firm take excessive risk, particularly when equity is low. This occurs because limited liability gives equity-holders almost all of the gains if the risky investment pays off, whereas their losses are limited to the extent of their investment. Losses in excess of their investment are borne by the firm's creditors. This asymmetry in the sharing of risks leads equity-holders to demand excessive risk.⁸ Similarly, it leads debt-holders to be more risk adverse.

If the desire is to rely on equity holders to impose discipline, the most straightforward means to insure they do not have an incentive to take excessive risk is to require that the firm have sufficient equity to absorb *any* potential losses. In this case, the equity-holders would obtain all of the benefits and, similarly, bear all of the costs of risks undertaken by the firm. The costs of all-equity financing, however, are typically too high, and a firm will choose to issue debt to help

finance activities. The U.S. tax code heightens the advantages of debt financing by allowing the interest expenses to be deducted as a business expense.⁹ An important characteristic of debt in determining the degree of discipline that debt-holders can exert on the issuing firm is its maturity structure. The shorter the maturity, the more discipline that can be imposed by either requiring higher yields to rollover the debt or simply by refusing to roll it over.¹⁰ Flannery (1994) and Calomiris and Kahn (1991) argue that portfolio composition, particularly, the opaqueness and information intensiveness of the assets (particularly loans), leads banks to rely on lower capital ratios and more short-term debt. This results from the dynamic characteristic of bank portfolios; that is managers have the ability to quickly change risk profiles by altering asset composition. Flannery emphasizes that high debt levels constrain managerial discretion in making investment decisions. However, the high debt levels also afford managers a chance to own a larger fraction of the equity, which increases their incentive to maximize shareholder wealth by increasing risk. The combination of high debt levels with long-term debt would induce a strong preference for risky projects on the part of management. Shortening the maturity of the debt can reduce this incentive. Thus, banks typically issue the shortest-term debt possible, debt that must be repaid upon demand.

The extensive use of short-term debt raises concerns about the stability of the financial system.¹¹ Depositors, lacking full information about the quality of a bank's assets may demand repayment and make a bank illiquid even though it remains solvent. Policy makers responded to this concern and introduced a safety net in the form of deposit insurance, the discount window, and payments system guarantees. While the bank safety net addresses liquidity concerns, it also distorts behavior and alters the effectiveness of market discipline as it reduces incentives for depositors to discipline banks through higher interest rates. In the absence of closure by the regulatory agencies, depositories could, as some did in the 1980s, continue to operate and be primarily funded by deposits even though they were insolvent; e.g., see Kane (1989). Thus, instead of depositors discouraging excessive risk-taking, they were essentially indifferent to it. Equity-holders at poorly capitalized banks were put in a position that can be summarily described as "heads, I win; tails the deposit insurer covers most of the losses."¹²

Losses can continue to accumulate in this environment as long as the bank is allowed to

operate once it becomes insolvent. This was a somewhat common occurrence in the U.S. in the 1980s, particularly in the Savings and Loan industry, as regulatory forbearance allowed losses to grow and be passed on to the deposit insurance funds. In response, in 1991 Congress adopted prompt corrective action as part of the Federal Deposit Insurance Corporation Improvement Act (FDICIA). The goal is to require banks to adhere to capital requirements by having progressively stricter supervisory action as the ratio of capital to portfolio risk declines. This action is triggered in a stepwise fashion by declining bank capital-to-risk-weighted-asset ratios.¹³ However, weaknesses in both the numerator and denominator of this ratio raise concerns that, as currently structured, prompt corrective action may be inadequate.

One major problem with the current procedures, but one that can be relatively easily fixed, is that the “triggers” are based on capital valued at book rather than at market-value. A more fundamental problem exists however in accurately measuring the riskiness of the bank and having meaningful triggers to initiate the restrictions. Although portfolio risk measurement, especially estimating the probability of large losses, is difficult, banks are almost always in a better position, *vis a vis* supervisors, to estimate that risk. As a result, they are positioned to exploit any inefficiencies in the regulatory capital requirements. Moreover, with the development of improved risk management tools and more accurate internal models, banks are in a better position to decrease over-weighted, and increase under-weighted risks; that is, to arbitrage or “game” the capital requirements.¹⁴

If under current regulatory procedures the safety net is creating moral hazard, and the relationship between bank risk and the triggers used to initiate supervisory action is making the prompt corrective action procedures less effective at resolving troubled institutions, then alternative means to reduce these problems should be pursued. One potential method frequently recommended is to reduce the safety net by severely limiting deposit insurance coverage.¹⁵ The U.S. has attempted to move in this direction with passage of prompt corrective action and the least-cost resolution provisions of FDICIA, and the depositor preference provision as part of the Omnibus Budget Reconciliation Act of 1993. In theory these provisions make all other liability holders junior to domestic deposits and limit deposit insurance coverage to the *de jure* coverage limit of \$100,000. These provisions should provide uninsured liability holders an incentive to

discipline troubled banks and force the closure of insolvent ones before they can generate large losses. As a result, this should further reduce the insurance fund's expected losses. Additionally, the net effect of substantially reducing the safety net should be to decrease banks' *ex ante* risk exposure, and, hence, reduce their probability of failure.

Although curtailing deposit insurance may have substantial merits, it also has some potentially significant drawbacks. Banks, especially banks that obtain a large fraction of their funding from retail customers, may reduce the effectiveness of *ex ante* discipline by reducing their reliance on uninsured funds relative to insured funds, and by providing collateral to uninsured non-depositor creditors. Moreover, while explicit insurance coverage may be reduced, there are a number of reasons to expect that total coverage may remain relatively high. The experience around the world in recent decades has been that *de facto* deposit insurance exists regardless of the extent of *de jure* coverage. For example, in the U.S. the least cost resolution provisions of FDICIA provide for what is commonly called the systemic risk exception. The FDIC may nevertheless cover losses to liability holders that are not covered by *de jure* insurance in an attempt to preclude systemic problems. Such coverage is possible if the Secretary of the Treasury, the FDIC Board and the Federal Reserve Board concur that least cost resolution would "have serious adverse effects on economic conditions or financial stability." Implicit coverage may also be provided by Federal Reserve discount window loans that provide banks with the funds needed to redeem uninsured liabilities prior to closure.¹⁶

Not only might implicit deposit insurance lead to more severe moral hazard problems, but it may also induce government actions that could further decrease market discipline beyond what an explicit deposit insurance system would. Milhaupt (1999) reviewed the experience of Japan in the 1990s; which had a very limited explicit deposit insurance system, but an implicit system essentially promising 100 percent coverage of deposits. He argues that the existence of the implicit system of deposit insurance likely resulted in substantially worse outcomes than would have an explicit system with more extensive coverage. The major argument is that implicit safety nets provide more scope for regulatory officials to make *ad hoc* decisions that appear optimal in the short-run (during their tenure in office) but led to sub-optimal long-run outcomes. In contrast, an explicit safety net can be accompanied with explicit closure and resolution rules that

provide adequate weight to the long-run consequences of bank closure and resolution decisions.¹⁷

Although least cost resolution and depositor preference may reduce moral hazard, their potential weaknesses suggest that regulators could benefit from another source of market information and discipline. Ideally, this alternative source could not be repaid by insolvent banks, could not be collateralized, and would be highly unlikely to benefit from an *ex post* extension of the safety net. Liabilities that may meet these requirements are bond issues that explicitly state that their repayment is subordinated to the payment of all other creditors and the FDIC; that is, sub-debt.

From a regulatory standpoint, sub-debt has a number of attractive characteristics. One is that the debt-holders would take the entire portfolio risk into account when pricing a bank's risk exposure and not, as is common under current supervisory procedures, emphasize individual asset risks. Existing evidence, summarized in section III, indicates that sub-debt yields are sensitive to the risk exposure of the issuing banking organization. Therefore, the regulator could structure the terms of qualifying sub-debt to make it homogeneous across firms so that the pricing of the debt could serve as a signal of the financial market's assessment of a bank's risk. Other market participants could also use the debt pricing to obtain a low cost signal of the bank's risk which they could then use to determine if, and on what terms, they would contract with the bank. Additionally, as detailed below in our proposed sub-debt plan, supervisors could use information from the sub-debt markets in the examination and supervisory process.

The existing capital requirements, however, hinder the use of sub-debt as an effective source of market discipline. Required characteristics for sub-debt to qualify as capital have been imposed which attempt to essentially transform it into a cheaper form of equity. For example, to qualify as capital under the existing guidelines, the debt must have an original maturity of at least five years and must be discounted on a straight-line bases when it has a maturity of less than five years. This effectively prevents distressed banks from having to redeem sub-debt that is being counted as regulatory capital, but it also hinders the direct disciplining role of debt since the bank does not have to approach the market very often. Additionally, the regulators' ability to use the pricing of bank's sub-debt to initiate prompt corrective action is inhibited by the lack of restrictions on who may own the debt. Currently it is common practice for banks to issue sub-

debt to their parent holding company. Most large parent bank holding companies issue sub-debt to the financial markets, but nothing in the current regulations prevent the parents from issuing the debt in a private placement under which the yield on the outstanding debt would not be publicly observable.

Although current restrictions on sub-debt limit its effectiveness as a capital source, on the surface there appears to be three potential means by which sub-debt could be used to achieve regulatory goals. It could provide (1) a cushion to absorb losses and, thereby, reduce the expected cost of failure to the safety net, (2) a source of *direct discipline* on the bank in the form of higher funding costs, and (3) a source of *derived discipline* by providing risk signals to other market participants and to supervisors who can then discipline the bank. Whether sub-debt adequately serves as a *cushion* to absorb losses depends largely on the size of the debt issues, and, when appropriate, the type of funding source that sub-debt is substituting for. Whether it provides *direct discipline* depends on the extent to which the funding costs of banks are sufficiently affected by introducing sub-debt requirements and, therefore results in a change in their risk-taking behavior. This depends on the size of the debt requirement and the resulting degree to which the marketplace prices the risk and disciplines the bank. The extent to which sub-debt may be used to provide *derived discipline* depends largely on whether its yield accurately reflects changes in a bank's riskiness and the extent to which it is used by supervisors and other market participants.

For both direct and derived discipline the market must be capable of distinguishing risk differentials across banks and translating those into differential yields. Thus to be effective at achieving regulatory goals, the characteristics of a sub-debt program must be carefully determined to allow some combination of these three forces to operate. We will return to what we believe to be the preferred characteristics of a sub-debt program in a later section. Next we evaluate the evidence on whether the market is capable of differentiating riskiness across banks.

III. SUBORDINATED DEBT PRICING AND DIRECT DISCIPLINE IN BANKING:

THE EMPIRICAL EVIDENCE

Above we argue that there are potential benefits of moving to a regulatory regime in which banks are required to issue sub-debt to have it comprise a significant portion of their capital. Many of these benefits occur because holders of sub-debt are likely to be at risk if a bank should fail, and they have an incentive to demand compensation for that risk. The demands for compensation for risk bearing should exert direct discipline on banks and provide a risk signal. These benefits, however, exist only to the extent that holders of sub-debt effectively price the riskiness of the bank in a manner suggested by economic theory. Therefore, before consideration can be given to introducing a version of a sub-debt proposal one must evaluate whether holders of sub-debt can be expected to demand a higher yield from riskier banks. Will investors gather information about a bank's activities and prospects, and the current condition of the bank, and effectively incorporate that information into the decision to buy and price that bank's debt? More generally, is market discipline effective in banking?

Here we summarize the empirical research on market pricing of risk and exerting of direct discipline in banking. We briefly touch on the pricing of risk in general, as revealed through analyses of bank liability prices and deposit flows, and we then give a more detailed coverage of the recent literature on sub-debt yields.¹⁸ Most of the work on direct and derived discipline focuses on the pricing of sub-debt, however there is some analysis of the resulting behavioral changes of banks resulting from risk-related yield differentials. This literature is also reviewed. Finally we review the literature on whether there is additional information in debt prices beyond the information set of bank supervisors.

The most common empirical tests have analyzed the cross sectional relationship between interest rates paid on bank liabilities (typically large, uninsured certificates of deposit) and various measures of bank riskiness. Using supervisory information on the riskiness of the firm (e.g., CAMEL ratings), accounting measures or market measures of riskiness, most studies have found rates to be positively and significantly associated with the risk measures.¹⁹ Additionally, the studies found that "bad" news was quickly incorporated into the cost of issuing large, uninsured certificate of deposits (CDs). In fact, even the largest banks, which many would argue were too-big-to-fail, and therefore had liabilities essentially guaranteed by an implicit safety net, were

shown to have a risk premia embedded in the CD rates. Similarly, studies which have viewed the relationship between deposit growth and portfolio risk have generally found a relationship consistent with market discipline: uninsured depositors reduce their holdings at riskier institutions relative to those held at safer institutions.

More relevant for our purposes, however, is an assessment of the evidence of market pricing of risk and exerting of direct discipline in the market for sub-debt issued by banking organizations. We divide these studies into two groups. The early studies tested the relationship between the interest rate premium (defined as the rate on sub-debt minus the rate on long term U.S. Treasury securities) and various risk measures derived from balance sheets and income statements; e.g., leverage ratios, measures of profit variability, and loan loss ratios. These studies evaluated the pre-FDICIA period and did not find a significant statistical relationship between risk and the expected return demanded by investors.²⁰

More recent research, however, analyzes data for a longer time period and generates results consistent with the earlier findings, and consistent with the market pricing of risk in the sub-debt market. Flannery and Sorescu (1996) argue that the apparent lack of relationship between risk and sub-debt yields in the earlier studies was most likely a result of conjectural government guarantees during the 1980s. This perceived guarantee was re-enforced by the regulatory treatment of holders of sub-debt during the rescue of Continental Illinois National Bank, and the formalization of the too-big-to-fail provision by the Comptroller of the Currency in Congressional testimony. The market clearly believed that banking policy would at least partially protect the owners of banks during this period. Being senior to bank equity, sub-debt-holders could have rationally believed that they were protected as well. This implicit guarantee lasted until the late 1980s.

The implications of this perceived guarantee are that the degree of evidence concerning market pricing of risk in sub-debt markets should vary over the pre- and post-FDICIA period. Market pricing of risk should be more apparent in the latter portion of the period as Congress passed legislation (FIRREA and FDICIA) which was explicitly directed at curtailing these guarantees. Indeed, Flannery and Sorescu found bank-specific risk measures to be correlated with option-adjusted spreads in the 1983-91 period for a sample of 422 bonds issued by 83 different

banking organizations. Further, this correlation appears to have increased as conjectural government guarantees weakened in the late 1980s and early 1990s. Despite this trend, however, option-adjusted spreads on sub-debt may also reflect the market's bank-specific estimate of a government bailout. The primary empirical model contains the log of bank assets as an explanatory variable and it is statistically significant in six of nine years in their sample, sometimes at the one percent level. This variable could indicate that the other balance sheet variables overstate the risk borne by sub-debt holders because these banks are safer (better diversified, or better managed) or because the conjectural guarantee is of greater value to large banks, or both. The paper addresses the conjectural guarantee issue more directly by replacing the log of total assets, with a binary variable for inclusion on either the Comptroller's list or The Wall Street Journal's list of too-big-to-fail banks [see Carrington (1984)]. The binary variable is negative and statistically significant at the 10 percent level in explaining option-adjusted spreads on their sub-debt in 1985-87 and in 1991. However, this binary variable does not exclude the possibility that balance sheet variables overstate the risks of banks on too-big-to-fail lists because these banks are more diversified or have better managers. Thus, based on these findings, it appears that bank sub-debt market participants are willing to invest in evaluating bank-specific risks when it is clearly in their interests to do so.

DeYoung, Flannery, Lang and Sorescu (1998) reaffirmed the results of the Flannery-Sorescu analysis over the 1989-95 period. This is valuable information because the earlier study had a relatively few number of years for inclusion in the post too-big-to-fail period. Over this longer period, without the presence of a conjectural government guarantee, spreads were found to be closely related to balance sheet and market measures of bank risk.²¹

Although the required sub-debt proposals have typically focused on individual banks, the studies discussed above have by necessity focused on sub-debt issues of bank holding companies. Until very recently almost all publicly traded debt was issued at the bank holding company level. Since problems at a bank holding company's bank affiliate can affect the profitability and value of the organization, there are incentives for investors to put pressure on the bank holding company to resolve these problems. These incentives, however, are less direct than are the incentives for investors that hold sub-debt that is issued directly by the bank; that is, the holder of bank holding

company debt has a claim on additional assets controlled by the holding company and a lower priority claim on the bank's assets. Additionally, the strength of market discipline that is exerted by sub-debt-holders may also depend on who the owners are. In the case of independent banks, discussions with bank supervisors suggest that "insiders" hold most of their sub-debt. Although such debt does provide an additional cushion for the FDIC, it is not clear that these debt-holders would have risk-preferences that are closely aligned with the risk-preferences of the deposit insurer. Nor is it obvious that they would have the incentive to pressure regulators to intervene promptly with capital deficient banks. If sub-debt was issued by a bank that was part of a bank holding company, then it was typically held or guaranteed by the bank holding company itself. Such investors may not have the same incentives as would third-party investors when a bank was under financial stress.

One recent study evaluates publicly traded sub-debt issued both by bank holding companies and directly by banks. Analyzing sub-debt issues for 19 banks and 41 bank holding companies over the 1992-97 period, Jagtiani, Kaufman and Lemieux (1999) attempt to contrast the extent of market pricing of risk for two samples of debt issuers. They find that the market prices risk for both types of sub-debt about equally although bank holding company debt yields a higher risk premium. This reflects the lower priority on the bank's assets in case of insolvency or, as argued by others, is a result of the safety net being directed at the bank.²² The important finding is that under a number of alternative specifications the market did appear to impose a risk premia on sub-debt issued at the *bank* level. They also find that the market tends to price risk more severely at poorly capitalized banks--that is, as predicted by theory, the spread-risk relationship is nonlinear based on the capitalization of the bank. This is important since most sub-debt proposals require that the bank issue the debt.

Finally, Morgan and Stiroh (2000) analyze whether or not the market is "tough enough" in pricing bank risk. Evaluating new bond issues between 1993-98 they test to see whether debt spreads reflect the risk of a bank's portfolio; thus they are evaluating whether the market prices *ex ante* risk. They do similar analysis for non-banks to evaluate whether the risk-spread relationship varies between the two sectors. Finally, they evaluate subsamples of the bank data to see if the "toughness" of the market differs across different sized banks. Their concern is that too-big-to-fail

policies may still result in the market being “easier” on larger institutions.²³

They find that the market does price risk exposure at banks. As the bank shifts its portfolio into riskier activities it is forced to pay greater spreads to investors. The risk-spread relationship is nearly identical across the bank and non-bank sectors. However they find that the risk-spread relationship is weaker for the larger banks. One interpretation of this result, the one they provide, is that larger banks are more likely to benefit from implicit guarantees. While there may be merit in this interpretation, balance sheet variables could be poorer proxies for several other (non-mutually exclusive) reasons including: (1) balance sheets may comprise a smaller fraction of the available information about larger banks because these banks appear more frequently in the news media and are covered by more analysts, (2) larger banks may have a larger fraction of their earnings determined by off-balance sheet items and non-traditional activities, such as securities underwriting, and (3) loans within a given category may be less homogenous for some large banks because of their greater involvement in foreign markets.

In summary, the majority of the literature suggests that the market accounts for risk when pricing sub-debt issued by banking organizations. During those periods when sub-debt premia was not found to be related to risk measures, there is significant evidence indicating that debt-holders were not at risk in spite of the riskiness of the debt-issuing bank and were relying on the government's conjectural guarantee. As the guarantee was decreased via policy and legislative changes in the late 1980s and early 1990s, debt-holders came to realize that they were no longer protected from losses and they rationally responded by more effectively taking market risks into account. Therefore, sub-debt-holders appear to be willing and able to invest in evaluation of the riskiness of bank assets, but only when they benefit from doing so.

While the above discussion indicates that the market incorporates risk differences into debt prices, a few related studies evaluate whether banks respond in an attempt to decrease the adverse (costly) impact of the higher yields. That is, do banks logically respond to market discipline in the expected manner, or do they essentially ignore the discipline and continue operating as usual. Is bank behavior affected by market pricing of risk in sub-debt markets?

Billett, et al. (1998) evaluated the change in bank liability composition following a rating downgrade. Analyzing 109 downgrades by Moody's during the 1990-95 period they found that in

the quarter of downgrades, bank's insured deposits significantly increased in both a relative and absolute sense. In contrast, the interest-sensitive uninsured liabilities (uninsured deposits and commercial paper) decreased significantly (by 6.6% and 28.0% respectively) over this same period. The authors found the shift toward insured deposits to continue into the following quarter. Similarly, evaluating the response to ratings upgrades they found that banks responded by significantly increasing their reliance on uninsured liabilities for two quarter following the ratings change. Both sets of findings are consistent with banks responding in the expected manner to market discipline.

Marino and Bennett (1999) found similar results when analyzing the shift in liabilities at large failing banks prior to their demise. Viewing portfolio trends for several years before failure they found that the liability structure of a troubled bank changed significantly in the period prior to failure, with uninsured and unsecured liabilities declining rapidly just before failure. "At failure, the amount of uninsured deposits and unsecured liabilities is much less than it was in the months or years before failure." They argue that the introduction of depositor preference legislation may lead to even stronger responses by liability holders in future bank failures as uninsured (and other lower priority depositors) seek means to protect themselves.

Instead of evaluating the relationship between risk and sub-debt yield spreads, Covitz, et al. (2000) evaluated the decision of banking organizations to issue sub-debt. That is, was the riskiness of the institution associated with the decision to approach the market? The failure of riskier institutions to issue, other things constant, would be consistent with a rational response to market discipline; to avoid the associated high costs. Findings on the issuance decision also have implications for the yield spread analysis reviewed above. If the issuance decision is negatively associated with bank risk then spread analysis may actually *understate* the actual extent of market discipline.

Evaluating the issuance decision for the 50 largest banking organizations for each quarter over the 1987-1997 period, the findings of Covitz et al. were somewhat similar to those of Flannery and Sorescu (1996) in that there was little evidence of bank risk measures being associated with the probability of debt issuance in the earlier period. However, they had a significant negative effect on the decision during the 1988-92 period. Again, the changing

relationship is typically associated with the regulator's decision to remove implicit coverage of all liabilities. These results are consistent with the firm avoiding new debt issues to circumvent the additional associated costs, and with the contention that the debt pricing literature may actually understate the full extent of market discipline by excluding banks which avoided issuing debt. The findings are not as strong after 1992, and the authors attribute this to the rather sanguine time period for banks and the resulting narrow spreads for all banks.

While most of the research reviewed here deals with banks in the U.S., Martinez Peria and Schmukler (1998) evaluate market discipline in banking in Argentina, Chile, and Mexico during the 1980s and 1990s. Using an unbalanced panel of banks in these countries, they test whether changes in bank fundamentals result in changes in deposits. They find evidence of market discipline. Accounting for macroeconomic influences, banking system factors, and bank-specific characteristics, they find that bank fundamentals are at least as important as other factors affecting changes in deposits.²⁴ Both insured and uninsured deposits respond to changes in bank fundamentals (risk measures), as do both large and small deposits. They attribute the market discipline imposed on insured deposits to a possible lack of credibility in the insurance scheme and the potential for delays in repayments. They conclude that their results are *prima facie* evidence in favor of recent regulatory efforts to increase the reliance on market discipline to control bank risk taking.

Finally, Bliss and Flannery (2000) stress that while previous studies found evidence of the ability of the market to *evaluate* the riskiness of banks (that is, to monitor firm behavior) they questioned whether the debt markets were able to *influence* the behavior of bank managers. Does management respond with portfolio shifts in an attempt to decrease the risk of the bank after debt holders inform them that they have become concerned with their risk profile (via larger debt spreads)? Evaluating large U.S. bank holding companies over the 1986-97 period the authors find no evidence that bank managers respond to changes in debt spreads by adjusting variables that they control in an attempt to realign the risk profile of the bank in a manner consistent with the wishes of debt holders. They conclude that there is no evidence of influence by debt holders and argue that regulators would be unwise to pursue a sub-debt program. Instead, efforts to influence the behavior of management must be retained by bank supervisors.

The Bliss and Flannery findings are significant outliers in the literature. Unlike the findings of Billett, et al., Covitz, et al., Marino and Montgomery, and Martinez Peria and Schmukler, they do not find bank management responding to market signals in a way that elicits a positive response from the securities market. They conclude: “we find no prima facie support for the hypothesis that bond holders or stock holders consistently influence day-to-day managerial actions in a prominent manner consistent with their own interests.”

Actually, they do not test this hypothesis. They attempt to capture one aspect of discipline imposed by the debt markets—*ex post* discipline. Do managers change their behavior following a change in yield spreads? However, this ignores the discipline most typically associated with sub-debt proposals—that is, the steady pressure or discipline that encourages management to behave in a conservative manner to avoid having the market impose direct costs through increased yield spreads. It is this *ex ante* discipline that encourages the firm to prudently manage risk, and is what most people think of when considering market discipline.²⁵ Their conclusions are analogous to saying that speed limit laws (or laws against robbing banks) are not effective in influencing behavior because speeders (bank robbers) are often repeat offenders. However, the argument entirely ignores the influence these laws have on the behavior of the vast majority of people. Similarly, viewing *ex post* responses to changing sub-debt yields totally ignores the influence on managers seeking to avoid “punishment” by the market.

More fundamentally, however, there are potential biases in the Bliss-Flannery methodology against finding evidence of debt holder influence. Security prices may change as a result of a bank announcing a new policy or as a result of new information reaching the market about existing policies. Consider first the case of a bank announcing a new policy. In the course of setting the policy, management should anticipate the impact on the wealth of the firm’s shareholders.²⁶ If management anticipates that the action will reduce shareholder wealth then it should not undertake the policy. This is the *ex ante* discipline discussed above that will be unobservable because the managers do not announce and implement the policy change. Although corporate finance theory suggests that managers should not undertake actions that reduce shareholder wealth, the evidence suggests that they sometimes do. For example, a managerial action that often appears to reduce shareholder value is the acquisition of another firm.²⁷

However, in this case a manager with rational expectations would expect that announcing the new policy or action would be accompanied by a reduction in the per share value of the firm's common stock.²⁸ Given that the manager rationally anticipated the reduction in shareholder wealth, and nevertheless proceeded with the action, there is no reason to expect the firm to undertake some further action in response to the drop in share price (or increase in debt spreads). Thus, in those cases where market discipline is ineffective *ex ante*, we would ordinarily not expect to observe such discipline *ex post*

Now consider the case of adverse new information arriving about past policies. Assume first that the signal to the market is fully revealing; that is, the market knows the exact extent of the loss to the bank. In this case, the bank managers must compare the costs and benefits of alternative means of responding to the new information. If the loss is small and the cost of all the responses is high then senior bank management may rationally do nothing. Alternatively, senior management may respond, but in ways that do not appear in the banks' financial statement, such as by firing the individuals responsible for the losses. Finally, Bliss and Flannery also evaluated whether the securities markets responded favorably to any response that does come from management. However, if management responds in an observable manner, we will not observe a subsequent positive market response unless market participants were sufficiently uncertain that management would take the appropriate action. If such action is assigned a high probability at the time the bad news is revealed then most of the positive effect of the subsequent action will be priced into the stock at the time the bad news is announced. Thus, unless we confine our observations to large stock price changes, we are unlikely to see them undertake costly responses, and even when the losses are large the response may take a form not readily observable in financial statements or may not be a surprise to the financial markets.

Next consider the case of adverse new information arriving about past policies, where the signal is only partially revealing to the market. In this case, management's response to the news may provide additional information to the market. If management does nothing then the market may assign a higher probability to the belief that the losses were small relative to their initial expectations. This could encourage fewer responses by managers. However, if management takes drastic action, such as cutting dividends or issuing new stock, then the market may infer that the

losses were larger than they initially anticipated and further reduce the firm's share price. In this case, the Bliss and Flannery test would find that the market was effective in inducing managers to act but that the effect of their action was perverse which in their model raises doubts about market discipline.

Thus, the Bliss and Flannery methodology and tests are likely to reveal beneficial market discipline only if: (1) new information arises about past policies, (2) the signal to the market reveals almost all of the information, (3) market participants assign a significant probability that the manager will not take the appropriate action, (4) the gain from taking action exceeds the cost of the action, and (5) the optimal set of actions includes actions observable on the balance sheet. Such situations undoubtedly occur. However, Bliss and Flannery incorporate all stock price moves and, hence, their sample almost surely includes a large number of shocks to stock prices where we would not expect to identify a managerial response using their empirical technique. Thus, one should not be surprised if noise from all other possible situations where the firm's stock price declines obscures the market signal that the authors are looking for.

Nevertheless, based on their findings, Bliss and Flannery claim a rather strong policy position. They argue that “supervisors would be unwise to rely on investors—including subordinated debenture holders—to constrain BHC risk-taking....(S)upervisors must retain the responsibility for influencing managerial actions.” The conclusions seem rather strong given the rather limited scope of their analysis and the associated biases against finding evidence of “influence.”

In summary, the literature on the behavioral response of banks to market and supervisory discipline suggests that they respond in the expected manner: to decrease the costs of the discipline. Bliss and Flannery seem to be the only exception to this finding. The literature, however, is rather limited and there is a need for additional research.

A related topic concerns whether the information used by private markets to price bank risk is similar to that available to bank supervisors; either in content or the timing of its availability. It has been argued that via the on-sight examination process, bank supervisors have access to insider information, which the market generally does not have. Alternatively, the private market has the stronger incentive to obtain the necessary information to make informed

investment decisions. Additionally, it may be that the information sought by the various “bank-watchers” differs since they each serve different roles. Equity-holders, for example, may be concerned with the potential for banks to generate efficiency gains instead of concentrating on the bank’s probability of failure. In contrast, the objectives of sub-debt-holders and bank supervisors probably align quite well in that both are most interested in protecting against failure. Thus, it would be informative to contrast the availability of information available to the two potential disciplinarians.

Most of the recent research in this area suggests that supervisors may temporarily have inside information not immediately observable on bank financial statement and, hence, possibly not known by the market. Dahl, Hanweck and O’Keefe (1995) found that significant contributions to loan loss reserves typically occurred immediately following a bank examination, suggesting new information was uncovered during the exam and/or pressure exerted to have the bank report more accurately. Cole and Gunther (1998) attempted to predict bank failure with models using publicly available financial data, and then augmented their model with CAMEL ratings to test if the additional information improved the predictive power of the model. They found that the augmented model did more accurately predict bank failure, but only if the CAMEL rating was less than six months old. After that, the data appeared to be “stale” and to have already been incorporated into the market’s information set. This staleness finding is rather typical in the literature suggesting that over time the additional information permeates to the broader market. Berger and Davies (1994), for example, found that CAMEL upgrades were quickly integrated into market prices (suggesting that the bank's may have been releasing the new examination information to the market) but downgrades were only incorporated with a lag (suggesting the bank was able to temporarily keep adverse information from the market, but not from examiners).

More directly related to sub-debt proposals, the study by DeYoung, Flannery, Lang, and Sorescu (1998) considered the information content of bank examinations as it relates to secondary market sub-debt spreads. The study compared CAMEL ratings against various market assessments of bank condition and found that bank examination ratings contained private information about a bank’s safety and soundness not available to the market. They tested whether

the market incorporated new private supervisory information into the risk premium paid on holding company debentures, with a lag. They concluded that bank exams provided significant new information that was not internalized by financial markets for several months. The study did not consider the opposite effect: whether there was information in the private market beyond that which the examiners already had access to.

This last issue, however, was examined by Berger, Davies and Flannery (1999) when they analyzed the information sets of examiners²⁹ and the private market to see "who knows what, when?" They test to see whether private market assessments of the condition of bank holding companies change before or after supervisors change their assessments. Similarly, they evaluate whether information in private markets precedes changes in the assessments of supervisors?³⁰ Their general conclusion was that supervisory assessments and private market assessments complement each other in that pertinent information obtained by each group is only subsequently incorporated into the other group's assessments. Thus, each group appears to bring new and valuable information to the table, and that information is incorporated with a lag into the other group's information set.³¹

The bottom line appears to be that different market participants (supervisors, bond market participants, rating agencies, etc.) generate valuable complementary information which can be useful in the governance of banks, albeit more work in this area is warranted.

Therefore the evidence as a whole appears to be consistent with the presumption that sub-debt-holders effectively discipline banks in the expected manner. The effectiveness of a sub-debt requirement, however, would depend critically on the structure of the program. Below we briefly review previous sub-debt proposals and present a new one that we believe to have the most desirable characteristics.

IV. SUMMARY OF PAST PROPOSALS

Since the mid-1980s there have been a number of regulatory reform proposals aimed at capturing the benefits of sub-debt.³² A detailed survey of past proposals is provided in Kwast et al. (1999) and is summarized in Table 1. Below we provide a partial review of these proposals stressing only those that emphasize the characteristics on which the proposal we develop in the

next section is based. The typical benefits emphasized in the previous proposals result from the ability of sub-debt to provide a capital cushion, to impose both direct- and derived-discipline on banks, and from the tax benefits associated with debt.³³ Summarily, this results in the following benefits:

- a bank riskiness or asset quality signal for regulators and market participants,
- the potential for a more prompt failure resolution process resulting in fewer losses to the insurance fund,
- a more methodical failure resolution process resulting from the rather methodical pressure imposed by debt-holders as they, unlike depositors, are forced to wait until the debt matures to “walk” away from the bank rather than run, and
- lower cost of capital because of the tax advantages of deducting interest payments on debt as an expense, enabling bank’s cost of capital to decrease and/or supervisors to increase capital requirements.

Horvitz (1983, 1984, 1987) discussed each of these advantages in his initial sub-debt proposal and extended that discussion in Benston, et al. (1986). He challenged the view that equity capital is necessarily preferred to debt. While equity is permanent and losses can indeed be charged against it, he questioned why one would want to keep a troubled bank in operation long enough to make this feature relevant. Similarly, while interest on debt does represent a fixed charge against bank earnings, whereas dividends on equity do not, a bank with problems significant enough to prevent these interest payments has most likely already incurred deposit withdrawals and has reached, or is approaching, insolvency. Arguing that higher capital levels were needed at the bank level, and were simply not feasible through equity alone, Horvitz stated that sub-debt requirements of “say, 4% of assets” were a means to increase total capital requirements to nine or 10 percent. Without providing specifics, it was argued that debt-holders would logically require debt covenants that would give them the right to close or take over the bank once net worth was exhausted. Thus, sub-debt was seen as an ideal cushion for the FDIC.

In a comprehensive bank regulatory reform proposal, Keehn (1989) incorporated sub-debt as a centerpiece of the “FRB-Chicago Proposal” for deregulation.³⁴ The plan called for a modification of the eight percent capital requirement to require a minimum of four percent of risk-

weighted assets be held as sub-debt. The bonds would have maturities of no less than five years, with the issues staggered to insure that between 10 and 20 percent of the debt would mature and be rolled over each year. The inability to do so would serve as a clear signal that the bank was in financial trouble triggering regulatory restrictions and debt covenants.³⁵ Debt covenants would enable the debt-holders to initiate closure procedures and would convert debt-holders to an equity position once equity was exhausted. They would have a limited time to recapitalize the bank, find a suitable acquirer, or liquidate the bank. It was argued that debt-holders could be expected to effectively discipline bank behavior, and provide for an orderly resolution process when failure did occur. The discipline imposed by sub-debt-holders could differ significantly from that imposed by depositors as outstanding sub-debt could not run from the bank. The potential for regulatory forbearance was also thought to be less as holders of sub-debt would be less concerned with giving the troubled bank additional time to correct its problems and would pressure regulators to act promptly when banks in which they were invested encountered difficulties.

To address concerns about the mispriced bank safety net and potential losses to the insurance fund, Wall (1989) introduced a sub-debt plan aimed at creating a banking environment that would function similar to one without deposit insurance; but the insurance would be maintained. The plan was to have banks issue *and maintain* 'puttable' sub-debt equal to four or five percent of risk-weighted assets. If the debt was put on the bank by debt-holders, the bank would have 90 days to make the necessary adjustments to insure the minimum regulatory requirements were satisfied. That is, it could either retire the debt and continue to meet the regulatory requirement because of excess debt holdings, issue new puttable debt, or shrink assets to satisfy the requirement. If after 90 days the bank could not satisfy the requirement, it would be resolved. The put option has advantages in that it would force the bank to continually satisfy the market of its soundness and not just when new debt issues come due. Additionally, while earlier plans discussed the need for bond covenants to protect debt-holders, *all* contingencies would be covered under this plan as the market could demand redemption of the bonds without cause. This would essentially eliminate the practice of regulatory forbearance, a significant concern during the late 1980s, and would subject the bank to increased market discipline. Wall also stressed the need

for restrictions on debt-holders to limit insider holdings.

Calomiris (1997, 1998, 1999) augmented previous sub-debt proposals by imposing a minimum sub-debt requirement (say two percent of total assets) *and* imposing a yield ceiling (say 50 basis points above the riskless rate). The spread ceiling is seen as a simple means of implementing regulatory discipline for banks. If banks cannot roll over maturing debt at the mandated spread, they would be required to shrink their risk-weighted assets to maintain regulatory compliance. Debt would have two-year maturities with issues being staggered to have equal portions come due each month. This would limit the maximum required monthly asset reduction to approximately four percent of assets. To insure adequate discipline, Calomiris also incorporated restrictions on who would be eligible to hold the debt.³⁶

The effectiveness of any sub-debt requirement depends critically on the structure and characteristics of the program. Most importantly, the characteristics should be consistent with the regulatory objectives such as increasing direct discipline to alter risk behavior, to increase derived discipline, or to limit or eliminate regulatory forbearance. The proposals discussed above each have some of these objectives in mind in determining their characteristics. Keehn, for example, was particularly interested in derived discipline. Wall's proposal is most effective at addressing regulatory forbearance. Calomiris' spread ceiling most directly uses derived discipline to force the bank into mandated behavioral changes when the spread begins to bind.

We believe that subordinated debt's greatest value in the near term is as a risk signal. However, the earliest proposals had limited discussion of the use of sub-debt for derived regulatory discipline. The next round of plans, such as those by Keehn and Wall, use derived discipline but the only signal that they obtain from the sub-debt market is the bank's ability to issue debt. We have considerable sympathy for this approach. These types of plans maximize the scope for the free market to allocate resources by imposing minimal restrictions while eliminating forbearance and protecting the deposit insurance fund. However, the cost of providing bank managers with this much freedom is to delay regulatory intervention until a bank is deemed by the markets to be "too risky to save." As Benston and Kaufman (1988a, 1988b) argue, proposals to delay regulatory intervention until closure may be time inconsistent in that such abrupt action may be perceived by regulators as suboptimal when the tripwire is finally triggered. Moreover, market

discipline will be eroded to the extent that market participants do not believe the plan will be enforced. Benston and Kaufman argue that a plan of *gradually* stricter regulatory intervention as a bank's financial condition worsens may be more credible. A version of that proposal, commonly labeled "structured early intervention" or "prompt corrective action," was adopted as a part of the FDIC Improvement Act of 1991.

In theory, by imposing limits on sub-debt rates Calomiris provides a mechanism for this progressive discipline that could last for approximately two years. In practice, however, his plan would likely provide the same sort of abrupt discipline as would the prior proposals, with the primary difference being that Calomiris would likely trigger the discipline while the bank was in a stronger condition. By requiring banks to shrink if they cannot issue sub-debt at a sufficiently small premium, his plan would provide banks with a period of time during which they could respond by issuing new equity. If the bank could not issue equity then it would have to shrink and would most likely accomplish this by calling in maturing loans to good borrowers and selling its most liquid assets to minimize losses. However, the most liquid assets are also likely to be among the lowest risk assets implying that with each monthly decline in size, the bank would be left with a less liquid and more risky portfolio. This decrease in liquidity and increase in risk is likely to reduce most banks' viability significantly within, at most, a few months. Yet, the prior proposals that would rely on bank's ability to issue sub-debt at any price also gave managers some time to issue new equity either by automatically imposing a stay (Wall's proposal) or by requiring relatively infrequent rollovers (Keehn's proposal). Thus, Calomiris' proposal is subject to the same sorts of concerns that arise with the earlier proposals.

Although Calomiris' proposal for relying on progressive discipline is more abrupt than it appears at first glance, his suggestion that regulators use the rates on sub-debt to trigger supervisory action provides a mechanism for phasing in stricter discipline. In the next section we provide a combination of Calomiris' idea of using market rates with Benston and Kaufman's proposal for progressively increasing discipline.³⁷

V. A COMPREHENSIVE SUBORDINATED DEBT PROPOSAL

As discussed earlier, banking organizations' entry into new activities is raising additional

questions about how to best regulate the risk behavior of financial firms. Ideally the new activities could avoid either greatly extending the safety net beyond its current reach or imposing costly supervision procedures to new activities. A plan incorporating sub-debt could help in meeting these challenges. Markets already provide most of the discipline on non-depository financial institutions, as well as virtually all non-financial firms. A carefully crafted plan may be able to tap similar market discipline to help limit the safety net without extending costly supervision.

Below we present and describe a detailed sub-debt proposal.³⁸ While the U.S. banking sector is the target, there are broader implications as international capital standards come into play. While others have argued that U.S. banking agencies could go forward without international cooperation, we think there are benefits from working with the international banking agencies, if possible. The explicit goals of our proposal are to (1) limit the safety net exposure to loss, (2) establish risk measures that accurately assess the risks undertaken by banks, especially those that are part of large, complex financial organizations, and (3) provide supervisors with the ability to manage (but not prevent) the exit of failing organizations. The use of sub-debt can help achieve these goals by imposing some direct discipline on banks, providing more accurate risk measures, and providing the appropriate signals for derived discipline and, ultimately, failure resolution.

Setting the Ground Rules

As a starting point, a decision has to be made as to whether a new sub-debt program should be “fitted” within the existing regulatory framework, or whether adjustments to the framework are necessary to have the debt effectively fulfill its stated role. Obviously there are tradeoffs. In our view, however, the goals of the proposal cannot be effectively achieved in the current regulatory environment which *allows* banks to hold sub-debt, but does not require it. As a result, banks are most likely to opt-out of rolling over maturing debt or introducing new issues precisely in those situations when sub-debt would restrict their behavior and signal regulators that the bank is financially weak. Indeed, Covitz, et al. (2000) found evidence of such behavior. Only a mandatory requirement would achieve the expected benefits. Thus, our proposal requires banks to hold minimum levels of sub-debt.

Similarly, other restrictions in the current regulatory environment limit the potential effectiveness of a sub-debt program. In our view, when developing a sub-debt policy, the form of

the proposal should follow function. However, the role that sub-debt serves is significantly driven by its role in bank capital guidelines. In the current regulatory environment, that role is determined by the Basel Accord that counts sub-debt as an element of Tier 2 capital, with the associated restrictions, and limits the amount that may be counted as regulatory capital.

Maintaining the current restrictions has two bothersome implications. First, it dictates almost all of the terms of the sub-debt proposal. For example, U.S. banks operating under current Basel constraints have generally chosen to issue 10-year sub-debt. If there are perceived benefits from having a homogeneous debt instrument, in the current regulatory environment the optimal maturity would appear to be ten years. This is not to say that if left unconstrained financial firms would prefer 10-year maturities. Indeed bankers frequently criticize the restrictions imposed on sub-debt issues that, as discussed above, make it a less attractive form of capital. Ideally, without the restrictions imposed by Basel, the maturity would be much shorter to allow it to better match the duration of the bank balance sheet. However once the 10-year maturity is decided upon as a result of the restrictions, to avoid "chopping" the debt requirement too finely the frequency of issuance is operationally limited. For example, with a two percent sub-debt requirement, mandating issuance twice a year would require a \$50 billion bank to regularly come to the market with \$50 million issues—significantly smaller than the standard issue in today's markets. Thus adhering to the current Basel restrictions would determine one of the interdependent parameters, and thus drives them all. Adjusting the Basel restrictions would "free up" the parameters of any new sub-debt proposal.

The second implication of following the current Basel Accord is that sub-debt is not effectively designed to enhance market discipline. Given that sub-debt was considered an equity substitute in the capital structure, it was designed to function much like equity and to provide supervisory flexibility in dealing with distressed institutions. In particular, the value of the sub-debt is amortized over a five-year period to encourage banks to use longer-term debt. Further, the interest rate on the debt does not float; thus it is limited in its ability to impose direct discipline when there are changes in the banks risk exposure. Finally, because sub-debt is regarded as an inferior form of equity, the amount of sub-debt is limited in the Accord to 50 percent of the bank's Tier 1 capital.³⁹

If indeed there are benefits to giving sub-debt a larger role in the bank capital structure, then consideration should be given to eliminating the current disadvantages to using it as capital. That is the approach taken in our proposal presented below.

The Proposal

Our sub-debt program would be implemented in stages as conditions permit.

Stage 1: Surveillance stage

For immediate implementation:

-Sub-debt prices and other information should be used in monitoring the financial condition of the 25 largest banks and bank holding companies in the U.S.⁴⁰ Procedures should be implemented for acquiring the best possible pricing data on a frequent basis for these institutions, with supplementary data being collected for other issuing banks and bank holding companies. Supervisory staff could gain experience in evaluating how bank soundness relates to debt prices, spreads, etc., and how changes in these elements correlate with firm soundness.

-Simultaneously, in line with the mandate of the Gramm-Leach-Bliley Act, staffs of regulatory agencies should study the value of information derived from debt prices and quantities in determining bank soundness, and evaluate the usefulness of sub-debt in increasing market discipline in banking. Efforts should be made to obtain information on the depth and liquidity of debt issues, including the issues of smaller firms.

-If deemed necessary, the regulatory agencies should obtain the necessary authority (via congressional action or regulatory mandate) to allow the federal banking agencies to *require* banks and bank holding companies to issue a minimum amount of sub-debt with prescribed characteristics, and to use the debt levels and prices in implementing prompt corrective action as described in FDICIA. The legislation would explicitly prohibit the FDIC from absorbing losses for sub-debt-holders, thus excluding sub-debt from the systemic risk exception in FDICIA.

-The bank regulatory agencies should work to alter the Basel Accord to eliminate the unfavorable characteristics of sub-debt: the 50 percent of Tier 1 limitation and the required amortization.

Stage 2: Introductory Stage

To be implemented when authority to mandate sub-debt is obtained:

-The 25 largest banks would be required to issue a minimum of two percent of risk-weighted assets in sub-debt on an annual basis with qualifying issues at least 3 months apart to avoid long periods between issues or “bunching” of issues during particularly tranquil times.⁴¹

-The sub-debt must be issued to independent third parties and be tradable in the secondary market. The sub-debt's lead underwriter and market makers may not be institutions affiliated with the issuing bank, nor may the debt be held by affiliates. Additionally, no form of credit enhancement could support the debt.⁴²

-The terms of the debt should explicitly state and emphasize its junior status, and the understanding that the holder would not have access to a “rescue” under the too-big-to-fail systemic risk clause. It is imperative that the debt-holders behave as unsecured, junior creditors.

-Failure to comply with the issuance requirement would trigger a presumption that the bank was critically undercapitalized. If the bank’s outstanding sub-debt traded at yields comparable to those of firms with a below investment grade rating (Ba or lower---that is, junk bonds) for a period of two weeks or longer then the bank would be presumed to be severely undercapitalized.⁴³

-Regulators would investigate whether the remaining capital triggers or tripwires associated with prompt corrective action could be augmented with sub-debt rate-based triggers. The analysis would consider both the form of the trigger mechanism (e.g., rate spreads over risk-free bonds, or relative to certain rating classes, etc.) and the exact rates/spreads which should serve as triggers.

-The sub-debt requirement would be phased in over a transition period.

Stage 3: The Mature Stage

To be implemented when adjustments to the Basel Accord allow for sufficient flexibility in setting the program parameters, or at such time as it becomes clear that adequate modifications in the international capital agreement are not possible:

-A minimum sub-debt requirement of at least three percent of risk-weighted-assets would apply to the largest 25 banks, with the expressed intent to extend the requirement to additional banks unless regulator's analysis of sub-debt markets finds evidence that the costs of issuance by

additional banks would be prohibitive. The increased flexibility is expected to allow for an increase in the number of banks which can cost effectively be included in the program.

- The sub-debt must be 5-year, non-callable, fixed rate debt.

- There must be a minimum of two issues a year and the two qualifying issues must be at least two months apart.

Discussion of the Proposal

Stage 1:

Stage 1 is essentially a surveillance and preparatory stage. It is necessary because more information about bank debt markets is needed, and the rest of our proposal requires that the regulators have the ability to require sub-debt issuance and access to data to implement the remaining aspects of the plan. This step is already being implemented in part. Information on bank debt markets is currently being developed. Staff at the Board of Governors of the Federal Reserve System are collecting and analyzing sub-debt price data, and research is underway at the Reserve Banks evaluating the relationship between bank risk and debt spreads.

Stage 2:

Stage 2 is designed to introduce a sub-debt program and begin using sub-debt as a supplement to the current capital tripwires under prompt corrective action. The ultimate goal of Stage 2 is to use sub-debt-based risk measures to augment capital-based measures, assuming a satisfactory resolution of some practical problems discussed below. The requirement that the debt be sold to independent third parties, be tradable, that the market makers be unaffiliated with the bank, and that affiliates cannot hold the debt are all intended to prevent the bank or its affiliates from “jamming” the signal by buying the debt at above market prices.

The sub-debt tripwires initially set out in Stage 2 may reasonably be considered “loose.” Banks that cannot issue sub-debt are probably at or near the brink of insolvency, especially given that they only need to find one issuance window during the course of a year. If a bank’s sub-debt is trading at yields comparable to junk bonds then the bank is most likely having significant difficulties and supervisors should be actively involved. We would not ordinarily expect the

supervisors to need assistance in identifying banks experiencing this degree of financial distress. However, the presence of such tripwires would reinforce the current mandate of prompt corrective action. Further, it would strengthen derived discipline by other market participants by setting lower bounds on acceptable sub-debt rates.

The use of sub-debt yields for all of the tripwires under prompt corrective action could offer significant advantages. As discussed earlier, market based tripwires are expected to be more closely associated with bank risk. It should be emphasized, however, that the sub-debt signal is intended to augment and not replace supervisory oversight. In theory, it is clear how combining market signals with supervisory decisions can lead to improved bank regulation. For example, the financial condition of banks may be such that some obviously need intensive oversight, and others obviously do not. However, there may be a third group where the need is less obvious. Combining market with supervisory information may increase the potential for correctly identifying the problem institutions in the third group. Additionally, if supervisors would, absent use of a market-based signal, exercise forbearance for banks that they know need intensive oversight, then supervisory effectiveness may be enhanced by also incorporating the market signal.

Two dimensions will need further work, however, before heavy reliance on sub-debt spreads for supervisory intervention is possible. First, regulators need to review the history of sub-debt rates to determine how best to extract the risk signals from sub-debt yields, and how best to deal with periods of illiquidity in the bond market.⁴⁴ Concerning the risk signal, should sub-debt spreads be measured relative to Treasury obligations? The yields on Aaa bonds? The yields on the lowest investment grade category (Baa) or some other instrument? Is it feasible to map sub-debt yields to implied ratings by comparing the yields on sub-debt with comparable maturity corporate bonds of similar maturity? What are the properties of sub-debt yields through time? In particular, are there times when the yields become unreliable, as claimed by some market participants in discussions with Kwast et al. (1999)? If so, how long are these periods and how can they best be identified?

A second dimension that needs further analysis deals with determining “acceptable” bank failure rates. The linking of sub-debt rates to prompt corrective action will imply a tighter link

between the prompt corrective action categories and the risk of failure than is possible under the current Basel Accord risk measures. As emphasized by Mingo (1999), this increased precision will force senior policymakers to be careful in deciding where to set the tripwires. This decision is less important under the current risk based capital framework because the risk measures used by the capital adequacy standards are so inaccurate that there is little point in trying to estimate the expected failure rate associated with any given capital adequacy standard. With credit spreads, decisions will need to be made concerning what risk of failure is acceptable for a bank to be identified as “well capitalized,” “adequately capitalized,” or “undercapitalized”? If regulators require failure rates that are too low then some intermediation activity will be inefficiently pushed out of the banking system. If acceptable failure rates are set too high then both the FDIC’s insurance fund and the financial system may be subject to excessive risk. Thus far, neither supervisors nor the academic literature has seriously addressed this problem. However, Mingo’s question cannot be avoided if supervisors start using more accurate risk measures. We address these issues by initially setting rather loose prompt corrective action triggers, and in so doing keep supervisory judgement as the primary risk measure and using sub-debt spreads as a failsafe mechanism. Thus, at this stage we recommend rather loose triggers and further study by regulators, academics and bankers to determine the proper course to take before proceeding to the next stage of the plan.

Stage 3:

This is the mature stage. The increased amount of required sub-debt and the shorter maturity in Stage 3 should enhance the opportunity for sub-debt to exercise direct discipline on banks. Another advantage of this proposal is that banks would be somewhat compensated, via the increased attractiveness of sub-debt as regulatory capital, for any increased regulatory burden from holding the additional debt. The removal of these restrictions could be quite significant, as it would serve as a ‘carrot’ that will make the cost of holding the debt less burdensome than under current regulatory arrangements. While it is not obvious whether total regulatory burden will increase as a result of the proposal, it seems more likely that as a result of this carrot the net burden would be less. The 5-year maturities in this stage allow for more frequent issuance, which should increase direct market discipline and market information. At the same time, five years is

thought to be sufficient to tie the debt to the bank and limit bank runs.

The principal difference in this stage is the recommendation to shorten the maturity of the sub-debt. The advantages of requiring a shorter maturity are that it will allow more frequent issuance and result in a larger fraction of the sub-debt being repriced every year. Banks should find this advantageous. A minor downside is that it may require regulators to recalibrate the sub-debt yield trigger points for prompt corrective action for the categories of well capitalized, adequately capitalized and undercapitalized. However, as indicated above, this recalibration will most likely be an ongoing process as additional market expertise is obtained.

One aspect of our proposal that may appear to be controversial is the movement toward eliminating restrictions on sub-debt imposed by the Basel Accord. However, once the decision is made to employ sub-debt for overseeing bank activities, the restrictions appear unnecessary and overly burdensome. They only serve to increase the cost to participating banks and to limit the flexibility of the program. Without the current restrictions banks would prefer to issue shorter-term debt and, in some situations, would be able to count more sub-debt as regulatory capital. Similarly, as discussed earlier, the parameters of any sub-debt policy will be driven in great part by current regulatory restrictions. Keeping those restrictions in place would therefore place an unnecessary burden on participating banks, and would limit regulators, without any obvious positive payoff. This is not to say that initiating changes to the Accord would be costless. Obviously negotiations would be required since other country members may want to continue to have sub-debt be an inferior form of capital. But from the participating U.S. banks' perspective, and the regulators' perspective concerning program flexibility, the elimination of these restrictions should result in net benefits. The effort to adjust Basel also does not slow the movement toward implementation of a sub-debt program since the program would be phased in through the three-stage process. However, laying out the broad parameters of the complete plan in advance would indicate a commitment by regulators and could increase the credibility of the program.⁴⁵ Once fully implemented, sub-debt would become an integral part of the bank regulatory structure.

VI. COMMON CONCERNS AND FREQUENTLY ASKED QUESTIONS ABOUT SUB-DEBT PROPOSALS

There are a number of common issues raised about the viability of sub-debt proposals. For completeness, below we address some of these issues and clarify exactly what sub-debt programs can be expected to accomplish. We also highlight where our proposed sub-debt program specifically addresses these issues. Indeed these issues were important in the development of that program and we believe the concerns to be significantly less important under our proposal.

- *Won't the regulatory agencies 'bail out' troubled institutions by making sub-debt holders at failed institutions whole if they would have suffered losses otherwise, thus eliminating the purported benefits of a sub-debt program?*

This is probably the most fundamental concern raised about the viability of sub-debt proposals. An implicit guarantee may at times be more distorting to market behavior than is an explicit guarantee. If debt-holders *believe* an implicit guarantee exists, that is, regulators will make them whole if the issuing bank encounters difficulties and cannot make payment on their debt, then they will behave accordingly. Acting as if they are not subject to losses, they will fail to impose the necessary discipline on which the benefits of sub-debt proposals rely. There was evidence of such indifference to bank risk levels in the 1980s when the handling of the Continental Illinois National Bank situation ingrained the too-big-to-fail doctrine into bank investor's decision making. In essence, if the market discipline is not allowed to work, it will not. This applies to sub-debt.

However, a bailout is unlikely under current arrangements and our proposal makes it even less likely. Sub-debt-holders are sophisticated investors. They understand their position of junior priority, and the resulting potential losses should the issuing firm encounter difficulties. There can be little merit in, nor sympathy to, arguments that the debt-holder was unsophisticated and unaware of their claimant status. Additionally, since banks are not subject to bankruptcy laws, the debt-holders could not argue for a preferred position by refusing to accept the bankruptcy reorganization plan. Thus they are unable to block the resolution. So pressures to rescue debt-holders should not result from their status as unsophisticated investors, nor their bargaining power in the failure resolution process.

The FDIC guaranteed the sub-debt of Continental Illinois National Bank in 1984, but it did so to avoid having to close the bank and not to protect the sub-debt-holders per se. The effect of FDICIA and its prompt corrective action, least cost resolution requirements, and too-big-to-fail policies, was to significantly curtail and limit the instances when uninsured liability holders would be protected from losses. Benston and Kaufman (1998) found that policy did change as a result of FDICIA, as significantly fewer uninsured depositors were protected from losses at both large and small banks after passage of the legislation. Similarly, Flannery and Sorescu (1996) found evidence that the markets viewed FDICIA as a credible change in policy and, as a result, sub-debt prices began reflecting differences in bank risk exposures. Thus, the market apparently already believes that sub-debt-holders are unlikely to be bailed out in the future.

Under our sub-debt proposal there would be still less potential for debt-holder rescues. Unlike deposits that are callable on demand, the intermediate term debt could only leave as it matured instead of initiating a bank run which has typically prompted the rescues we have seen in the past. Additionally sub-debt yield spreads are likely to provide more accurate risk measures for prompt corrective action rather than are book value capital ratios. Finally, under our proposal the sub-debt-holder would be explicitly excluded from the class of liabilities that could be covered under the systemic risk exception. This exclusion should be viewed favorably by banks since under the terms of the too-big-to-fail exception in FDICIA, losses from the rescue would have to be funded via a special assessment of banks. Therefore, they should encourage the FDIC to strictly limit the extent of the liabilities rescued.

□ *Are there cost implications for banks?*

Interestingly, the costs associated with issuing sub-debt have been used as an argument both for *and* against sub-debt proposals. The standard argument is that there are relative cost advantages of issuing debt resulting from the tax treatment associated with it.⁴⁶ It is also argued that closely held banks may find debt to be a less expensive capital source as new equity injections would come from investors that realize they will have a minor ownership role.⁴⁷ Both influences would suggest increased reliance on sub-debt would be cost saving.

There are, however, some additional actual or potential costs to increased sub-debt issues. First, increased reliance on relatively frequent debt rollovers would generate transaction costs or issuance costs. There is disagreement as to just how expensive these costs would be. Some argue that the cost would be similar to that required for issuing bank CDs while others argue that the cost could be quite substantial. The issuance frequency discussed in most sub-debt proposals, however, is not very different from the current frequency of large banking organizations. Two issues per year, which is well within the recommendations in most sub-debt proposals, is relatively common in today's banking markets.⁴⁸

A more significant concern seems to be where, within the overall banking organization, the debt would be issued. Most sub-debt proposals require the debt to be issued at the bank level whereas, until recently, most sub-debt was issued at the bank holding company level. This allowed the holding company the flexibility to distribute the proceeds throughout the affiliated firms in the organization. This occurred in spite of the fact that rating agencies typically rated bank debt higher than the debt of the holding company and, similarly, holding company debt typically traded at a premium to comparable bank debt.⁴⁹ This would suggest that the additional flexibility from issuing at the holding company level has value for the banking organization, and elimination of this flexibility, which most of the proposals would do, would impose costs. The recent trend toward issuing more debt at the bank level, however, would suggest the value of this flexibility has become less important than in the past.

A more important cost implication is imbedded in our sub-debt proposal. In the past, regulators have restricted the use of sub-debt by limiting the amount that could count as capital and by requiring that the value of the sub-debt be amortized over the last five years before maturity. These restrictions are imposed because, unlike equity, the firm will still need to make periodic payments on the debt, regardless of its financial condition. However, this does not decrease the effectiveness of sub-debt in serving the capital role as a cushion against losses. It still buffers the insurance fund. By eliminating these restrictions in our sub-debt proposal we enhance the value of the debt as capital and decrease the net cost of introducing the proposal.

□ *Isn't there a problem in that sub-debt proposals are procyclical?*

A possible concern with sub-debt requirements is that they may encourage procyclical behavior by banks, increased lending during economic expansions and exacerbating the decline in lending during recessions. However, this is not unique to sub-debt programs; any regulatory requirement that does not adjust over the course of a business cycle has the potential to be procyclical if banks seek to only satisfy the minimum requirements. For example, Appendix D of Kwast et al. (1999), points out that bank capital adequacy ratios are likely to decline during recessions as banks experience higher loan losses, implying that regulation based on capital adequacy ratios has the potential to be procyclical.⁵⁰

The procyclicality of a regulatory requirement may be at least partially offset if banks seek to maintain some cushion above minimum regulatory requirements that they may draw on during economic downturns. In the case of the regulatory capital adequacy requirements, both casual observation of recent bank behavior and formal empirical analysis from the 1980s and early 1990s suggest that banks do indeed seek to maintain such a cushion for contingencies.⁵¹

Moreover, a regulatory program that uses sub-debt yields as triggers for regulatory action can be designed to induce less procyclical behavior than would other types of regulatory requirements. Consider two ways to design the sub-debt triggers as discussed in Kwast et al. (1999). One design is to base regulatory action on a constant basis point spread over bonds with little or no credit risk, such as Treasury securities. Such a standard is more likely to become binding during recessions when banks are experiencing loan losses and investors demand higher risk premiums to continue holding bank bonds. Thus, a policy that sets triggers at a constant premium over Treasury may result in procyclical regulation in a manner similar to that of standard capital requirements.

Another way of designing the triggers, however, is to base them on a measure that has yields which vary countercyclically over the business cycle. One such measure is the yields on corporate bonds of a given rating. There is evidence that bond-rating agencies seek to smooth ratings through business cycles. For example, Theodore (1999, p.10) describes Moody's ratings policies as follows:

Moody's bank ratings...aim at looking to the medium- to long-term, through cyclical trends. For example, a drop in quarterly, semi-annual or even annual earnings is not necessarily a reason to downgrade a bank's ratings.

However, if the earnings drop is the result of a structural degradation of a bank's fundamentals, credit ratings need to reflect the new developing condition of the bank.

If the rating agencies are trying to "look through the business cycle," then the spreads on corporate bonds over default risk-free securities should be small during expansions because investors, but not the rating agencies, recognize a lower probability of default during expansions. Similarly, the spreads on corporate bonds over default risk-free bonds should rise during recessions as the market, but not the rating agencies, recognize the increased probability of default. Thus, prompt corrective action triggers based on sub-debt yields relative to corporate yields introduce an element of smoothing into the triggers. The triggers may be relatively tight during expansions when banks should be building financial strength and relatively loose during downturns as they draw down part of their reserves.

One case where the use of sub-debt yields may tend to reinforce the business cycle is when liquidity drops in all corporate bond markets and risk premiums (including liquidity risk premiums) temporarily soar.⁵² However, our proposal recognizes this potential problem and provides for temporary relief until liquidity improves.

□ *Aren't supervisors better gauges of the riskiness of a bank because they know more about each bank's exposure than does the market? If so, then why not rely exclusively on the supervisors instead of holders of sub-debt?*

In some cases the market's knowledge of a bank's exposure may indeed be a subset of the examiner's knowledge. However, we rely on markets to discipline firm risk taking in virtually every other sector of our economy, so markets must have some offsetting advantages. One such advantage is that the financial markets are likely to be better able to price the risks they observe because market prices reflect the consensus of many observers investing their own funds. Another advantage of markets is that they can avoid limitations inherent in any type of government supervision. Supervisors are rightfully reluctant to be making fundamental business decisions for banks unless or until results confirm the bank is becoming unsafe or unsound. Further, even when supervisors recognize a serious potential problem, they have the burden of being able to prove to

a court that a bank is engaged in unsafe activities. In contrast, in financial markets the burden of proof is on the bank to show it is being safely managed. A further weakness of relying solely on bank supervisors is that they are ultimately accountable to the political system which suggests that noneconomic factors may enter into major decisions no matter how hard supervisors try to focus solely on the economics of a bank's position.⁵³ Sub-debt investors have no such accountability; they may be expected to focus solely on the economic condition of individual banks.

A typical concern surrounding sub-debt proposals is that the perceived intent is to supplant supervisors and rely solely on the forces of the marketplace to oversee bank behavior. In our proposal, the intent is to augment, not reduce supervisory oversight. If supervisors have additional information about the condition of a bank, there is nothing in the sub-debt proposals limiting their ability to impose sanctions on the activities of the bank. In addition to sub-debt serving the standard role as a loss absorbing capital cushion, it serves as an additional tool for use by both the private markets *and* the regulators to objectively discipline banks. In fact, one of the major components of our proposal was to have the supervisors incorporate the yield spreads for use in prompt corrective action. With private markets providing information, supervisors can focus their efforts on exceptional circumstances, leaving the well-understood risks for assessment by the marketplace.

□ *Can't the case be made that sub-debt is inferior to equity?*

An alternative argument against greater reliance on sub-debt is that the same benefits, plus additional ones could be obtained by relying exclusively on equity. For example, Levonian (1999) argues that (1) each dollar of increased equity will generate the same discipline as an additional dollar of sub-debt, (2) sub-debt is not a superior source of information about bank condition because market participants and regulators may use equity prices to infer the same information (thus, there is not difference in the extent of derived discipline), and (3) equity is more desirable because it can absorb losses without forcing the closure of the bank. These arguments have some theoretical merit, but are not nearly as strong in practice.

Levonian's argument that additional equity can generate as much direct discipline as a comparable amount of sub-debt is correct under certain circumstances. In some cases equity-

holders benefit from increased risk exposure because they receive all of the benefits, but bear only part of the losses if the bank should become insolvent. Sub-debt generates direct discipline by adjusting the bank's cost of funds to offset changes in the risk borne by sub-debt-holders and, thereby making equity-holders bear more of the expected losses resulting from failure. Indeed, *if* the closure rule is independent of a bank's equity level then equal increases in outstanding equity and sub-debt will have the same effect on the proportion of losses in failure borne by equity-holders. The key to this result is that sub-debt-holders as well as equity-holders face limited liability. Thus, just as equity-holders do not demand compensation for risks they do not bear, sub-debt-holders similarly do not demand compensation for risks they do not bear.

One weakness of Levonian's arguments on direct discipline is the assumption of a fixed closure rule; that is, the value of assets is assumed to be random and the bank will be kept open, regardless of its condition, until time T at which time it can be closed. As such, his analysis is incapable of fully analyzing the merits of many sub-debt proposals, *including ours*, that are partially or wholly justified on the grounds that regulators have an incentive to engage in forbearance towards financially weak banks. These proposals advocate the use of sub-debt with mandatory triggers for regulatory action to limit bank regulators' ability to engage in forbearance. Moreover, if sub-debt is used to trigger regulatory action and this leads to reduced forbearance then that would have the desirable side effect of increasing the effectiveness of the direct discipline from both equity and sub-debt-holders. Equity-holders' incentive to take additional risk arises in large part because the bank's owners retain virtually all of the gains from successful, high risk ventures, but the safety net absorbs a large fraction of the losses. If the probability of forbearance is reduced then so is the probability that equity-holders may gain at the expense of the safety net.

An additional weakness of Levonian's argument on direct discipline is that it ignores the tax benefit of debt. One of Horvitz's arguments in favor of increased sub-debt requirements is that regulators could impose higher sub-debt requirements than they would impose on equity because of the cost advantages of sub-debt. Thus, Levonian's comparison of a bank issuing equal amounts of equity or sub-debt may understate the amount of discipline that would be generated by a plan that increases the role of sub-debt.⁵⁴ Furthermore, even if regulators do not impose

higher capital requirements, banks' expected after tax earnings will be higher if they are allowed to issue debt rather than equity.

Levonian's finding that debt and equity provide equally good signals of a bank's risk exposure also collapses when we recognize some real world features that are not in his model. He builds his case by modeling subordinated debt as a contingent claim on the bank's assets and showing that, like equity-holders, debt-holders may also benefit from increased risk taking. He acknowledges that one important assumption of his analysis is that in constructing the model, one must know what investors assume about the rules used by regulators to determine when a bank will be closed. Without this knowledge, the size of the safety net subsidy impounded in equity prices cannot be inferred and, thus, neither can the value of the bank absent the safety net. The result could be that regulators could infer that a bank was solvent when it is actually insolvent, and vice versa.

A second, unacknowledged assumption is that in constructing the model one must also know the statistical process generating bank returns and the model parameters can be accurately estimated using historical data. Losses sufficiently large to generate bank failure are relatively rare events or, in the terms used in Value at Risk (VaR) analyses, are tail events. VaR analysis is used to estimate the largest loss on bank market risk portfolios that could occur with a given probability. However, the results from analyzing different VaR models suggest that their results are sensitive to the statistical distribution of the returns and the method used to estimate the parameters from historical data.⁵⁵ Both the statistical process generating bank portfolio returns and the parameters of that distribution must be estimated from stock return data in order to obtain information about a bank's probability of failure. Significant errors in estimating either may translate into large errors in estimating a bank's risk of failure.⁵⁶

The problems with model error are especially severe in interpreting equity returns and prices because the relationship between risk and equity prices is likely to be non-monotonic. That is, over some ranges equity prices may decline in response to an increase in risk, especially if the risk is not adequately compensated for by higher expected returns. However, over other, higher risk ranges, a similar uncompensated increase in risk may lead to higher stock prices. Why is the relationship not monotonic? At lower levels of risk, any increase in risk will be borne almost

entirely by equity-holders and they may respond to the higher risk by bidding down the firm's stock price. However, at higher levels of risk, most of the increase in risk of losses will be borne by creditors, whereas equity-holders will obtain most of the gains and, therefore, will bid up the firms' stock price.⁵⁷ Thus, merely observing an increase in equity returns is not sufficient to determine whether a bank has become more or less risky. In order to interpret the returns, one must have an accurate model of bank portfolio returns.

In contrast, over the normal range of bank operations, an increase in risk will unambiguously lead to lower sub-debt prices.⁵⁸ Supervisors would need the correct model of bank portfolio returns to obtain *all* of the information embedded in sub-debt prices. However, the monotonicity of the relationship implies that an increase in sub-debt risk premiums is almost certainly associated with an increase in a bank's risk.⁵⁹ Moreover, if the yield on sub-debt is at rates comparable to other credits rated "A" then all of the other bank's liabilities must similarly be no more risky than "A" because sub-debt is junior to all other debt.

A further practical problem with using equity prices arises if supervisors seek to focus on the riskiness of the bank, since that is the entity covered by the safety net. In the U.S., all large banks are virtually 100 percent owned by holding companies and do not have publicly traded stock. One possible reason for this is that the existence of minority shareholders at the bank level would inhibit managers' ability to operate the bank and its affiliates as a single entity. Thus, the regulators may be imposing substantial costs on holding companies if they require the subsidiary banks to issue publicly traded stock. In contrast, while most of the publicly traded sub-debt that is issued by banking organizations is issued by the holding company, a significant amount of traded sub-debt is also issued by the bank subsidiaries; and as noted above, this amount has increased in recent years. That some banks issue publicly traded sub-debt suggests that while the costs of issuing debt at the bank level may be greater than issuing at the holding company level, the cost difference may not be very large.

Finally, Levonian's analysis of the relative merits of increased equity and sub-debt in reducing the risk of failure relies on the argument that sub-debt will not generate additional direct discipline or provide superior risk signals. If sub-debt provides superior risk signals that may be used for derived supervisory discipline then a system relying on regulatory sub-debt requirements

may be more effective at reducing the probability of failure than a system relying on equity. As argued in our proposal, the regulators may be able to use sub-debt yields in combination with prompt corrective action to encourage banks to reduce their risk of failure by setting the prompt corrective action triggers at yields comparable to highly rated firms. Thus, if further reducing the probability of failure is an important regulatory goal then the use of sub-debt yields as prompt corrective action triggers is more likely to be effective.

Thus, the argument that sub-debt is merely an inferior form of equity does not hold under closer analysis. Sub-debt does not have magical powers and higher equity levels do provide some discipline. However, the tax benefits of sub-debt reduce the cost of the debt relative to equity and imply that the regulators may impose higher total capital requirements if sub-debt is an important part of the mix. Furthermore, sub-debt may provide a useful signal about the riskiness of a bank's other liabilities even in the absence of a formal model of bank portfolio returns. In contrast, equity prices may be interpreted only in the context of a specific model, a model that will almost surely be wrong. Thus, sub-debt is superior both in providing information to regulators and as a trigger that limits regulatory forbearance.

□ *Won't banks attempt to circumvent sub-debt discipline?*

Banks may be reasonably expected to minimize their costs of production, including the costs of complying with supervisory requirements. If the sub-debt is used to help enforce discipline, banks will seek to minimize those costs just as they currently seek to minimize the costs associated with meeting the capital requirements. This involves efforts to reduce both direct and derived discipline. Banks may reduce the burden of direct discipline by minimizing the amount of debt they are required to issue. They can reduce the effectiveness of both direct and derived discipline by minimizing the rate they pay on the debt.

Banks will attempt to minimize the amount of required sub-debt in the same way they currently reduce their capital requirements; by exploiting inaccuracies in the measurement of their risk exposure. Indeed, the problems with setting appropriate sub-debt requirements are identical to the problems with setting appropriate Tier 1 and total capital requirements under existing capital regulations. Consequently, the gains in direct discipline from sub-debt may be limited and

may yield little more direct discipline than would result from an increase in the current capital requirements. Although efforts are ongoing to improve the regulatory risk measures used in the capital standards, we are not particularly sanguine about the near term prospects for the development of reliable, accurate measures of risk from direct analysis of bank portfolios. The problems of accurately measuring risk are likely to be especially severe for the banks the regulators are most concerned about, financially weak ones. Thus, while our proposal seeks to enhance direct discipline, it does not rely exclusively on this to discipline banks' risk exposure. As additional expertise is developed, it may be possible to place greater reliance on direct discipline in the future.

Banks may try to avoid derived discipline based on sub-debt yields by minimizing the rate they pay on sub-debt by misleading investors about the condition of the bank. However, again, this is not new. Banks currently have incentives to mislead investors (for example, to boost their stock price, or pay lower interest on current sub-debt or certificate of deposits). In fact, a variety of regulatory measures have been taken to reduce banks' ability to mislead; perhaps the most important of these being the disclosure and audit requirements imposed by the Securities and Exchange Commission on issuers of publicly traded securities. Bank regulators also require banking organizations to file financial statements and have on-site examinations during which the accuracy of the statements can be evaluated.

The ability of market participants to evaluate bank risk exposures given existing disclosure requirements may be seen from the performance of bank securities around the time of disclosures related to Latin American loan problems in the 1980s. Banks were not required to disclose lending by country at the start of these problems and refused to recognize the extent of the losses on their financial statements for several years. Nevertheless, several studies, most recently Musumeci and Sinkey (1990a, 1990b) find evidence that investors were able to determine which banks were most at risk early in the crisis. Moreover, when banks finally recognized the loan losses in their financial statements the markets interpreted this as good news, suggesting that bank stock prices had already discounted the losses associated with the loans.

Derived discipline depends on the ability of bank regulators and other market participants to observe market prices that accurately reflect the riskiness of issuing banks. Financially troubled

banks may try to reduce the sensitivity of market prices by encouraging related parties to buy the debt at artificially high prices. While this course may be tempting to banks facing significant regulatory sanctions, successful deception is likely to be limited. The investors, the rating agencies and the regulators are all likely to notice big discrepancies between observed sub-debt prices and prices that fairly reflect the riskiness of the bank.

□ *Do we currently know enough about the sub-debt market to proceed?*

Although we would like to know more about the sub-debt market, we think considerable information is already available. The studies surveyed and the new evidence presented in Kwast et al. provide considerable insight into the sub-debt market. These studies suggest that investors in sub-debt do discriminate on the basis of the riskiness of their portfolios.

Moreover, a review of the regulatory alternatives suggests that any durable solution to achieving an objective measure of banks' risk exposure will look something like our proposal. The problems that plague the existing risk-based capital guidelines are inherent in any attempt by the supervisors to measure the riskiness of a bank's portfolio based on a pre-specified set of criteria. Overtime, banks will find or will manufacture claims whose intrinsic contribution to the riskiness of the bank's portfolio is underestimated by the supervisory criteria.⁶⁰ That is, banks will attempt to arbitrage the capital requirements.

An alternative to supervisory determined criteria is to use market evaluations. The Basel Committee on Banking Supervision correctly moved in this direction with its proposed new capital adequacy framework. However, it chose to ask opinions of market participants rather than observing market prices and quantities. The Committee then compounded this by proposing to ask the opinions of the two parties, the banks and their rating agencies, with incentives to underestimate the true risk exposure.

A superior system for obtaining a market based risk measure will use observed data from financial markets on price or quantity, or both. That is, it will use a market test. The relevant question to be addressed is which instruments should be observed, how should these instruments be structured, and how can supervisors best extract the risk signal from the noise generated by other factors that may influence observed prices and quantities. In principle, any uninsured bank

obligation can provide the necessary information. We favor sub-debt because we think it will provide the cleanest signal.

There are alternatives to sub-debt. Common equity may currently have the advantages of being issued by all large banks and of trading in more liquid markets. However, investors in bank common equity will sometimes bid up stock prices in response to *greater* risk taking so their signal can only be interpreted in the context of a model that backs the option value of putting the bank back to the firm's creditors (including the deposit insurer). In contrast, valuable information can be extracted from sub-debt without a complicated model. If a bank's debt trades at prices equivalent to Baa corporate bonds then its other liabilities are at least Baa quality.

Banks also issue a variety of other debt obligations that could be used to measure their risk exposure.⁶¹ The use of any debt obligation that was explicitly excluded from the systemic risk exception in FDICIA could provide a superior risk measure to those proposed by the Basel Committee. We think that sub-debt is the best choice because it is the least senior of all debt obligations if a bank should fail and, therefore, its yields provide the clearest signal about the potential risk that the bank will fail. We think sufficient information exists to adopt a sub-debt proposal with the understanding that the plan will be refined and made more effective as additional information and analyses becomes available.

VII. SUMMARY AND CONCLUSIONS

The goal of this article has been to provide a comprehensive review and evaluation of bank capital reform proposals that incorporate a mandatory sub-debt component. Toward that goal, we provided the arguments behind capital proposals incorporating sub-debt, and emphasized that the stated objective of the capital program should dictate which of the characteristics are included. We then reviewed the evidence on the extent of market pricing of risk and the direct discipline imposed by holders of bank liabilities and briefly summarized some of the existing sub-debt proposals emphasizing their differences and the reasoning for those differences. Next, we presented a new sub-debt proposal which incorporates many of the characteristics, and resulting advantages, described in the early sections of this article, as well as some new characteristics. Finally we responded to some of the common issues raised about the potential viability of sub-

debt proposals.

We conclude that although legislative and regulatory reform during the 1990s attempted to properly align the incentives of both banks and bank supervisors, ongoing market developments are undercutting the effectiveness of both market and supervisory discipline. Arguably, the potential for systemic risk has increased in recent years as banks have grown larger and more complex. Unquestionably, banks' ability to game the regulatory risk measures has grown significantly over the same period.

We argue that a well structured sub-debt program provides a viable mechanism for providing increased market *and* supervisory discipline in banking. While markets do not have perfect foresight, they are both flexible enough to accept promising innovations and willing to acknowledge their mistakes, even if such recognition is politically inconvenient. Sub-debt is already proving to provide workable signals in today's financial markets. We propose to combine these signals with the gradual discipline provided under prompt corrective action with a goal of augmenting supervisory oversight with market-based discipline.

Our sub-debt proposal is couched within the existing evidence on market discipline in banking and draws on the insights of previous proposals and policy changes. It provides for phased implementation and leaves room for future modifications as additional details concerning the market for sub-debt are determined. The plan calls for specific changes in those areas where we feel confident the evidence is relatively clear, such as the fact that large solvent banks should be able to issue sub-debt at least once a year. In those areas where the evidence is weak to non-existent, we defer decisions until additional study has taken place. This should enhance the credibility of the plan. Although the details of the plan can evolve over time, once the basics are implemented the industry and the public would have the benefit of having bank behavior be significantly influenced by both market and supervisory oversight. The effective combination should make for a more efficient, safe and sound industry.

ENDNOTES

1. See Title 1, Section 108 of the Gramm-Leach-Bliley Act.
2. For a relatively recent discussion of this issue see Stern (1992).
3. Alternatives include eliminating or lowering deposit insurance coverage (Volcker 1985), privatizing deposit insurance (England 1985, Ely 1985), introducing co-insurance programs in which publicly provided deposit insurance would be heavily augmented with private insurance coverage (Baer 1985, Stern 1988,1997), as well as returning deposit insurance to the *de jure* levels and encouraging regulatory discipline to mimic market discipline through some form of structured early intervention by supervisors (Benston and Kaufman 1988a, 1988b, 1994).
4. Kane's (1977) analysis suggests that any binding regulation will elicit avoidance behavior by firms. Numerous empirical studies of banking support his contention; e.g., Pyle (1974), Startz (1979), Brewer (1988), Evanoff (1988).
5. For example, see Carey and Hrycay (2000).
6. Some would argue it was an explicit guarantee as a result of Comptroller of the Currency Conover's comments surrounding the Continental of Illinois reorganization in the 1980s; see O'Hare and Shaw (1990).
7. For example, see Caprio, Hunter, Kaufman and Leipziger (1998).
8. A key assumption in the argument that shareholders prefer more risk is that they may diversify across many companies so that their losses from the failure of any given firm is a small proportion of their total wealth. A firm's managers are likely to have a substantially larger part of their wealth invested in the firm, especially when the manager's human capital is included in wealth. Thus, managers may be more risk averse than are shareholders and may have an incentive to take less than the optimal amount of risk. However, equity-holders are likely to recognize the manager's incentives and to encourage managers (through additional compensation) to take more risk when the increased risk maximizes the value of the firm's equity. Noe, Rebello and Wall (1996) provide an example of how such compensation would work for banks.
9. See Buser, Chen and Kane (1981).
10. In contrast, if a firm issues long term debt and the debt matures after the investment is completed, then the firm may take on relatively high-risk projects before debt-holders can respond. Firms with long-lived, illiquid assets tend to rely more on long-term debt in part because they have a greater potential to experience an involuntary increase in their riskiness (such as during a recession) and want to avoid the additional funding cost short-term debt would impose during these periods.

11. See section 4 of Berger, Herring and Szego (1995) for a discussion of “systemic risk.” In the literature there is disagreement on precisely what constitutes systemic risk and the extent to which it exists; see Bartholomew and Caprio (1998), Kaufman (1996) and Basing (1993).

12. It should be emphasized that introduction of the safety net did not result in all banks immediately taking excessive risks. In most cases the expected gains from excessive risk taking were less than the expected gains from operating prudently—those being the value of the government charter and the value of existing intangible assets that would be lost if the bank failed. Furthermore, both suppliers of funds and customers may be less likely to commit to long-term relationships with a bank that has a substantial probability of failing. However, the distorting impact of the safety net should not be understated. As the riskier banks took on additional risk, they funded those activities by paying more for deposits. To remain competitive, the banks choosing not to take on risky projects still had to respond by paying more for funding. The higher funding cost might then make riskier investments look more attractive for all banks.

13. For example, dividend payments may become restricted if the bank’s total capital ratio falls below eight percent. Interest rates paid on new deposits may be restricted when it falls to six percent.

14. See Jones 2000. While the development of more accurate risk models opens up the possibility for basing regulatory capital requirements on a bank’s internal model, there are problems with confirming the accuracy of these models. Measuring the probability of large losses is extremely difficult, especially for those parts of the bank portfolio that are not traded in liquid financial markets. Moreover, the problems are exacerbated in that the very banks that are most likely to produce models that underestimate their true risk (i.e., financially weak banks) are precisely the ones that are likely to be of greatest supervisory concern.

15. Somewhat surprisingly, however, there have recently been statements by U.S. financial regulators about increasing deposit insurance to \$200,000 per account [see Tanoue (2000)].

16. FDICIA discourages such loans. However, the Federal Reserve is only penalized and not prohibited from making extended discount window loans to undercapitalized banks. Additionally, the FDICIA penalties arise only if the bank is undercapitalized under the regulatory capital measures. A bank with market-value capital that is clearly inadequate for its actual risk exposure may have *book value* capital that is easily sufficient to cover its risks as measured by existing regulatory capital measures. For a discussion of potential problems induced by inappropriate discount window administration see Broaddus (2000).

17. Calomiris (1998) also strongly advocates the advantages of an explicit safety net over an implicit one. While regulators cannot prevent market participants from assigning positive probability to the existence of an implicit safety net, the approach currently being taken in the U.S. towards least cost resolution is likely contributing to the belief that the future use of implicit guarantees will be uncommon. Statements by regulatory authorities projecting the end of too-big-to-fail policies may also contribute to this belief [see Greenspan (2000)]. However, the closure of

a large, complex bank raises a number of difficult questions about the treatment of some of its more complex activities, such as its derivatives activities. The market may reasonably conjecture that a high probability exists that the systemic risk exception will be invoked in the absence of a credible, previously announced plan for closing such a bank. Thus, if least cost resolution is to help generate additional market discipline at the largest and most complex banks, the regulatory agencies should develop and announce how these banks would be closed without invoking the system risk exception.

18. With few exceptions we only survey the literature on market discipline in the U.S. A review of the literature for developing countries is provided in Martinez Peria and Schmukler (1998). A more comprehensive literature survey of U.S. banking is provided in Kwast, et al. (1999).

19. A risk premia was found in Baer and Brewer (1986), Cargill (1989), Ellis and Flannery (1992), Hannan and Hanweck (1988), James (1988, 1990), and Keeley (1990). Earlier studies by Crane (1976), and Herzig-Marx and Weaver (1979) did not find evidence of market discipline. These earlier studies are reviewed in Gilbert (1990); particularly pp. 13-15. A more recent study of CD rates is Hall, et al. (1999).

20. These early studies include Beighley (1977), Fraser and McCormack (1978), Herzig-Marx (1979), Pettway (1976), Avery, Belton and Goldberg (1988), and Gorton and Santomero (1990).

21. Although an analysis of the spread-to-bank-risk relationship was not the expressed purpose of this study, it was a byproduct. Rather the purpose was to determine the extent to which bank examiners could ascertain information about banks beyond that obtained by private market agents. Nevertheless, part of the analysis included changes in bank spreads regressed on an array of balance sheet and market risk measures.

22. For a discussion of the latter argument see Kwast and Passmore (1997).

23. Kane (2000) and Penas and Unal (2000) also question whether too-big-to-fail, and the resulting implicit guarantees, is exclusively a policy of the past.

24. The authors compute the proportion of the variance explained by the bank risk measures and find that these variables explain a significant portion of the variance of deposits; a larger portion in more recent years.

25. The authors acknowledge that they ignore this aspect of potential influence by debt holders. Nevertheless, they still draw rather strong policy conclusions.

26. The bank should, of course, consider the impact of the action on its creditors. However, the impact on the creditors is important through its affect on the expected profitability of the action to the firm's shareholder.

27. See Pilloff (1996) and Pilloff and Santomerro (1997) for a review of the literature on merger

effects.

28. While acquiring another firm may reduce shareholder wealth, such actions are unlikely to materially increase a bank's risk of failure given that bank supervisors must have approved all acquisitions during the Bliss and Flannery sample period. Indeed, we have difficulty imagining a situation where a manager would undertake action that would materially increase a bank's risk of failure and simultaneously reduce shareholder wealth. If the bank fails then the manager lose not only their investment in the bank's stock but also any firm specific human capital they may have developed and they may damage their reputation in the managerial labor market.

29. In this study, and others, the information available to examiners is assumed to be embedded in the official bank or holding company ratings; i.e., CAMEL or BOPEC ratings.

30. Formally the authors test to see if lagged supervisory variables help predict current market variables and if lagged market variables help predict current supervisory variables. They use Granger causality tests to determine whether information from one group helped 'predict' the assessment of the other group. The private market assessment used was ratings by Bond Market Rating agencies.

31. They also found that after taking into account the market assessment of bank condition, additional supervisory information (BOPEC data) did not contribute significantly to predicting future bank holding company performance.

32. More generally, in recent years there have been growing concern about the need to increase the role of market discipline in banking. See, for example, Ferguson (1999), Meyer (1999), Stern (1998), Boyd and Rolnick (1988), Broaddus (1999), and Moskow (1998).

33. This benefit is not relevant for all countries. Our emphasis is on U.S. banks.

34. Additional discussion of the role of sub-debt in this plan can be found in Evanoff (1993, 1994).

35. Regulatory restrictions would be prompt-corrective-action-type constraints such as limits to dividend payments, or restrictions on deposit and asset growth rates once core equity fell below two percent of risk weighted assets.

36. The sub-debt requirement is only one component of Calomiris' regulatory reform proposal aimed at modifying industry structure and the operating procedures of the International Monetary Fund. It would also include a mandatory minimum reserve requirement (20 percent of bank debt in Calomiris (1998)), minimum securities requirement, and explicit deposit insurance. Although some details of his proposal, such as requiring the debt be issued to foreign banks, may not be feasible for U.S. banks, the general approach provides interesting insights into the issues in designing a sub-debt plan for the U.S.

37. This is not the first time proposals have suggested sub-debt be linked with prompt corrective action, see Evanoff (1993, 1994) and Litan (2000).

38. The proposal is also discussed in Evanoff and Wall (2000a) and a more detailed description of the potential use of debt spreads for prompt corrective action is discussed in Evanoff and Wall (2000b).

39. As discussed earlier, the current bank capital requirement framework is being reevaluated [see Bank for International Settlement (1999)]. As part of the debate, some have recommended total elimination of the Tier 1 versus Tier 2 distinction [e.g., Litan (2000)]. If this approach is taken we would recommend that minimum leverage requirements be maintained to insure sufficient levels of equity (although it would be in sub-debt holders self interest to insure this occurs) and to provide supervisors with an official tool for intervening when equity levels fall to unacceptable levels.

40. When fully implemented, the policy would apply to ‘banks’ instead of the bank holding company. During this surveillance stage, however, information could be gained at both levels.

41. The only exception would occur if general market conditions precluded debt issuance by the corporate sector (both financial and nonfinancial firms). This exception requires more specific details, but it would be an industry-wide exception instead of bank-specific.

42. The objective is to limit “regulatory gaming”; see Jones (2000). Additional minimum denomination constraints could be imposed to further insure that debt holders are sophisticated investors [e.g., see U.S. Shadow Regulatory Committee 2000)].

43. Depending on the depth of the secondary market, this time period may need to be extended to a couple of weeks. Again, the timeframe could be modified as more market information is obtained. Additionally, to allow for flexibility under extreme conditions, procedures could be introduced by which the presumption could be overturned given the approval of the FDIC upon request by the bank’s primary federal supervisor. The procedures for this exception, however, would be quite stringent. It would be somewhat similar to the procedures currently in place for too-big-to-fail exceptions; e.g., submission of a public document to Congress, etc.

44. For example, should risk be measured as the spread between the yield on a sub-debt issue and a comparable maturity U.S. Treasury security? The yield on a bank’s sub-debt versus the yield on comparable maturity corporate bonds in different ratings classes? Or the spread over Libor after the bond is swapped into floating rate funds?

45. This is not to say that the detailed parameters should be introduced at this time. As argued above, additional analysis is required before these could be decided upon.

46. Jones (1998) suggests the cost of equity could be twice that of debt once the tax differences are accounted for. Benston (1992) discusses the cost differences and other advantages of sub-

debt over equity capital.

47. Alternatively, the current owners could inject equity but that may be costly in that it places them in a situation where they are relatively undiversified.

48. See Kwast et al. (1999) for a discussion of current market practices.

49. This holding company premium is typically associated with the bank having access to the safety net and the associated lower risk of default during times of financial stress. Alternatively, it has been argued the differential results from the different standing of the two debt-holders. Holders of bank debt have a higher priority claim on the assets during liquidation of the bank than do the holders of holding company debt, which essentially have an equity claim on the bank.

50. The appendix was prepared by Thomas Brady and William English of the Board of Governors of the Federal Reserve System. Most of the comments in this section attributed to Kwast et al. come from this appendix.

51. Arguably, to the extent the capital requirements caused a reduction in bank lending during the early 1990s, it was because banks were trying to increase their capital ratios due to new requirements at the same time they were experiencing higher loan losses. A discussion of this “capital crunch” literature is provided in Hancock and Wilcox (1997, 1998). After banks have time to rebalance their portfolios in response to new capital requirements they are likely to have a cushion to absorb the higher loan losses incurred during recessions. Wall and Peterson (1987, 1995) find evidence that banks seek to maintain capital ratios in excess of regulatory requirements and speculate that part of the reason for the higher ratios is to absorb unexpected losses.

52. The liquidity crunch in the Fall of 1998, or the Long Term Capital episode, is a possible example of such a problem period.

53. For example, the *American Banker* reports that the OCC is threatening to downgrade bank’s safety and soundness rating if they fail to supply accurate CRA data; see Seiberg (1999).

54. To be fair to Levonian’s analysis, he also assumes that the sub-debt may be continuously repriced to reflect changes in the bank’s riskiness whereas existing regulatory standards prohibit any risk-based repricing. Thus, his analysis also overstates the amount of direct discipline arising from sub-debt designed to qualify as capital under existing capital standards.

55. See for example Kupiec (1995). The difficulty of identifying the probability of extreme events with small samples is also highlighted by Christoffersen, Diebold and Schuermann (1998) who argue that “for performing statistical inference on objects such as a ‘once every hundred years’ quantile, the relevant measure of sample size is likely better approximated by the number of nonoverlapping hundred-year intervals in the data set than by the actual number of data points.”

56. One way of addressing the problem of determining the regulatory closure rule would be to use

risk measures derived from equity returns to trigger a regulatory response. However, the use of such a rule would create a circular feedback from equity prices to regulatory action to equity prices that would need to be disentangled to properly interpret equity returns. We conjecture that if the return generating process and its parameters are known then it may be possible to disentangle the circular feedback to provide accurate risk measurements. However, if return generating process, its parameters, or both, are unknown then using equity prices as a trigger for regulatory action would likely compound the errors in estimating the bank's financial condition.

57. This analysis assumes that debt-holders cannot obtain adequate compensation for the increase in risk, as is likely to be the case with the existing safety net.

58. The exception arises when a bank suffers sufficient losses in excess of its equity. However, these exceptions should be relatively easy to identify from very high observed sub-debt yields since investors will likely not be expecting to be repaid in full.

59. The exception to this occurs when the risk-free interest rate increases or when the liquidity risk premium substantially increases. The risk-free rate is readily observable and easy to account for. We consider the issues associated with increasing liquidity premiums in the discussion of our sub-debt proposal.

60. Supervisor agencies could short-circuit this avoidance by having their examiners conduct subjective evaluations but that could easily result in examiners serving as shadow managers of banks.

61. Preferred stock is a form of equity but it would yield a clean signal unlike common equity. We do not propose the use of preferred stock for two reasons. First, dividend payments on preferred stock are not a deductible expense to the bank. Thus, forcing them to issue preferred stock would increase their costs. Second, discussions with market participants, as reported in Kwast et al. (1999, page 45), indicated that the preferred stock market is more heavily influenced by "relatively uninformed retail investors."

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TABLE 1. A SUMMARY OF VARIOUS SUBORDINATED DEBT PROPOSALS

<i>Bibliographic Citation</i>	<i>Required Amount?</i>	<i>Debt Characteristics</i>					<i>Insolvency Procedures?</i>
		<i>Maturity?</i>	<i>Issuance?</i>	<i>Covenants?</i>	<i>Rate Cap?</i>	<i>Putable Debt</i>	
Federal Deposit Insurance Corporation (1983).	Banks would be required to maintain a minimum protective cushion to support deposits (e.g., 10 percent) which would be met by use of a combination of equity and sub-debt.	<p>Maturity selection should take into consideration the desirability of frequent exposure to market judgment.</p> <p>The total debt perhaps should mature serially (e.g. one-third every two years).</p>	As banks grow they would be required to proportionately add to their "capitalization." Those heavily dependent on debt, primarily the larger banks, would have to go to the market frequently to expand their cushion and to refinance maturing issues.	Penalties would be imposed on banks that fell below minimum levels. Provisions where debt holders receive some equity interest and exercise some management control such as in the selection of members of the board of directors may be appropriate as may convertibility to common stock under certain provisions.	None.	Not discussed.	FDIC assistance might still be granted and serious disruption avoided in a manner which would not benefit stockholders and subordinate creditors. This could be accomplished by effecting a phantom merger transaction with a newly- chartered bank which has been capitalized with FDIC financial assistance. The new bank would assume the liabilities of the closed bank and purchase its high-quality assets.

<i>Bibliographic Citation</i>	<i>Required Amount?</i>	<i>Debt Characteristics</i>					<i>Insolvency Procedures?</i>
		<i>Maturity?</i>	<i>Issuance?</i>	<i>Covenants?</i>	<i>Rate Cap?</i>	<i>Putable Debt</i>	
Benston, Eisenbeis, Horvitz, Kane and Kaufman (1986).	A significant level (e.g., 3 to 5 percent of deposits or a certain proportion of equity).	Short maturity, but long enough to prevent runs.	Frequent.	Yes, to restrict the ability of the banks to engage in risky activities.	None.	A small percentage of the issue should be redeemed at the option of the holder	Advised prompt closure when market value of equity is zero. Noted that in order to protect the FDIC, the notes would have to allow for wide discretion by the FDIC in arranging purchases and assumptions in cases of insolvency.

<i>Bibliographic Citation</i>	<i>Required Amount?</i>	<i>Debt Characteristics</i>					<i>Insolve Procedu</i>
		<i>Maturity?</i>	<i>Issuance?</i>	<i>Covenants?</i>	<i>Rate Cap?</i>	<i>Putable Debt</i>	
Horvitz (1986).	A minimum of 4 percent of deposits.	Not discussed.	Not discussed.	Not discussed.	None.	Not discussed.	FDIC would choose whether to close the bank. Sub-debt holders would provide a margin of safety in the determination of when the bank should be closed and would reduce the loss to FDIC.
Litan and Rauch (1997).	A minimum of 1 to 2 percent of risk-weighted assets.	The subordinate bonds would have maturities of at least 1 year.	A fraction of the sub-debt outstanding would come due in each quarter.	Not discussed.	Not discussed.	Not discussed.	Not discussed.

<i>Bibliographic Citation</i>	<i>Required Amount?</i>	<i>Debt Characteristics</i>					<i>Insolve Procedu</i>
		<i>Maturity?</i>	<i>Issuance?</i>	<i>Covenants?</i>	<i>Rate Cap?</i>	<i>Putable Debt</i>	
The Bankers Roundtable (1998).	A minimum of 2 percent of liabilities.	Not discussed.	Not discussed.	Not discussed.	Not discussed.	Not discussed.	Not discu

<i>Bibliographic Citation</i>	<i>Required Amount?</i>	<i>Debt Characteristics</i>					<i>Insolve Proceeds</i>
		<i>Maturity?</i>	<i>Issuance?</i>	<i>Covenants?</i>	<i>Rate Cap?</i>	<i>Puttable Debt</i>	
Keehn (1989).	A minimum of 4 percent sub-debt to risk assets ratio along with a 4 percent equity requirement.	The subordinated bonds would have maturities of no less than five years.	Issues would be staggered to ensure that no more than 20 percent, and no less than 10 percent, mature within any one year.	Sanctions on bank dividend policy, payment of management fees, deposit growth, and deposit rates would be progressively increased as the bank's performance deteriorated.	None.	Not discussed.	Bank ownership would be converted to sub-debt holders following judicial or regulatory determination of insolvency. Creditors would be converted to common shareholders and would have a prescribed period to recapitalize the bank or file for acquisition; if that fails, the bank would be liquidated.

<i>Bibliographic Citation</i>	<i>Required Amount?</i>	<i>Debt Characteristics</i>					<i>Insolve Procedu</i>
		<i>Maturity?</i>	<i>Issuance?</i>	<i>Covenants?</i>	<i>Rate Cap?</i>	<i>Putable Debt</i>	
Cooper and Fraser (1988).	A specified percentage of deposits (e.g. 3 percent.)	The subordinate puttable notes would not be long-term, but would be rolled over at frequent intervals. These notes would be variable rate instruments with rate adjustments and interest payments made frequently.	Frequent.	Convertible to equity.	Yes, bonds would be puttable at 95 percent of par value.	The notes would carry a "put" feature. They could be redeemed at the option of the note holders at a fixed percent of par value (e.g., 95 percent). The notes would be redeemable not by the issuing bank but at the FDIC.	When a pt occurred, FDIC wo compensa for its payments behalf of t issuing ba with nonv equity sha the bank. bank wou have a prescribec period in it could repurchas these equi shares. If not do so end of the period, revocation the bank's charter wo occur and FDIC wo deal with insolvent

Bibliographic Citation	Required Amount?	Debt Characteristics					Insolvency Procedures?
		Maturity?	Issuance?	Covenants?	Rate Cap?	Putable Debt	
Wall (1989).	Par value of putable sub- debt greater than 4 to 5 percent of risk-weighted assets.	Bondholders would be allowed to request redemption in cases where such redemption did not violate regulatory standards.	At the bank level, not the holding company level.	There would be restrictions on the percentage of putable debt that could be owned by insiders individually and in toto.	Not discussed.	Yes. Bondholders would be allowed to request redemption in cases where such redemption did not violate regulatory standards. With the exercise of a put, a bank would have 90 days to meet the requirements by issuing new debt or through reducing its sub-debt requirements, e.g., through the sale of assets.	Any bank that could not honor the redemption request on its putable sub-debt at the end of 90 days without violating regulatory requirements would be deemed insolvent and would be closed. If the proceeds of sale or liquidation exceeded the total deposits, that excess would first be returned to the sub-debt holders; the remainder, if any, would be paid to equity holders.

Bibliographic Citation	Required Amount?	Debt Characteristics					Insolvency Procedures?
		Maturity?	Issuance?	Covenants?	Rate Cap?	Putable Debt	
Evanoff (1993).	A significant proportion of total capital would be held in sub-debt. The eight percent minimum capital requirement could be restructured to require a minimum of 4 percent equity and 4 percent subordinated debt.	Short enough so that the bank would have to go to the market on a regular basis, but long enough to tie debt holders to the bank and make the inability to run meaningful (e.g., 5 years).	Staggered so that banks would have to approach the market on a frequent basis (e.g. semi-annually).	Following the prompt corrective action (PCA) provisions of FDICIA, sanctions on bank dividend policy, payment of management fees, deposit growth, and deposit rates would be progressively increased as the bank's performance deteriorated. Implicit in the discussion seems to be the incorporation of the sub-debt requirements into PCA.	None.	A variant of the proposal would require the bank issue puttable subordinated debt. The bank would have 90 days to issue replacement debt. If it could not do so, it would be taken over by the regulators.	Once a bank's debt capital fell below the required level, existing subordinated debt holders would be given an equity position and would have a prescribed period to recapitalize the bank or find an acquirer; failing that, the bank would be liquidated.

Bibliographic Citation	Required Amount?	Debt Characteristics					Insolvency Procedures?
		Maturity?	Issuance?	Covenants?	Rate Cap?	Putable Debt	
Calomiris (1997).	2 percent of total nonreserve assets or 2 percent of risk-weighted assets	Not discussed.	For rollovers, and to accommodate growth in the bank's balance sheet.	"Insiders" would not be permitted to hold subordinated debt. Further, holders of sub-debt would have no direct or indirect interest in the stock of the bank that issues the debt. Author suggested that the ideal sub-debt holders would be unrelated foreign financial institutions.	The subordinated debt would earn a yield no greater than 50 basis points above the riskless rate.	Not discussed.	Sub-debt holders must have their money at stake when a bank becomes insolvent.

Bibliographic Citation	Required Amount?	Debt Characteristics					Insolvency Procedures?
		Maturity?	Issuance?	Covenants?	Rate Cap?	Putable Debt	
<p>Calomiris (1999).</p> <p>NOTE: This plan is described as "a sub-debt plan for a developing country." While a plan targeted at the U.S. would differ in some important details (especially in terms of acceptable investors), such a plan would generally work along the lines of the developing country proposal.</p>	<p>Banks must "maintain" a minimum fraction (say 2 percent) of their risky (non-Treasury bill) assets in subordinated debt (sometimes called uninsured deposits).</p>	<p>Two years.</p>	<p>1/24 of the issue would mature each month.</p>	<p>Debt must be issued to large domestic banks or foreign financial institutions. See the "All Banks?" column for details.</p>	<p>Rates would be capped at the one-year Treasury bill rate plus a "maximum spread" (say, 3 percent.)</p>	<p>Not discussed.</p>	<p>Banks that could not issue would be required to shrink their assets by 1/24 (4.17%) during the next month. If additional contraction is required (because of prior growth) then the additional shrinkage could be achieved over three months. (He also discusses measuring assets and sub-debt using a three month moving average.) Presumably, this would result in the bank liquidating all of its assets over 2 to 27 months if it could no longer issue SND.</p>

<i>Bibliographic Citation</i>	<i>Required Amount?</i>	<i>Debt Characteristics</i>					<i>Insolvency Procedures?</i>
		<i>Maturity?</i>	<i>Issuance?</i>	<i>Covenants?</i>	<i>Rate Cap?</i>	<i>Putable Debt</i>	
The U.S. Shadow Regulatory Committee (2000).	2 percent of assets and off-balance sheet commitments	Must have a remaining maturity of at least one year to qualify.	If the debt traded frequently enough, secondary market prices would be adequate for signals to both the market and regulators. If the debt does not trade frequently in secondary markets, the bank would be required to make regular offerings in the primary market.	The debt should be of “minimum remaining maturity (say, one year), would be held at arm’s length, and could not be repaid by the government or the FDIC. It could not be collateralized, and there would be a prohibition on its repayment in the event other uninsured debts were protected by the FDIC. The debt can be redeemed before maturity only when the proceeds from a new debt issue of at least equal size are realized.	Typically the market may “cap” yields on the debt through credit rationing. An imposed cap may also occasionally be necessary. If for three consecutive months the yield on the debt of a bank was above that on moderately risky corporate bonds with similar maturities, the bank would be in violation of its sub-debt requirement.	No.	Sub-debt holders must have their money at stake when a bank becomes insolvent.

Source: The bulk of the information and the format are from Table 1 of Kwast, et al. (1999). Some marginal adjustments have been made.