

Board of Governors of the Federal Reserve System



Staff Study

172

Using Subordinated Debt as an Instrument of Market Discipline

Study Group on Subordinated Notes and Debentures
Federal Reserve System

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The following paper is summarized in the *Bulletin* for January 2000. The analyses and conclusions set forth are those of the authors and do not necessarily indicate concurrence by the Board of Governors, the Federal Reserve Banks, or members of their staffs.

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Using Subordinated Debt as an Instrument of Market Discipline

Introduction

Since the mid-1980s a growing number of observers, both within and outside the bank regulatory agencies, have proposed using subordinated notes and debentures (SND) to increase market discipline on banks and banking organizations. The perceived need for more-effective market discipline has continued to receive attention, even after implementation of the reforms contained in the FDIC Improvement Act (FDICIA) of 1991, in part because of the increasing size and complexity of banking organizations and in part because of the desire to lower the potential vulnerability of the banking and financial system to systemic risk. Indeed, market discipline has become one of the three “pillars”—along with improved capital standards and more risk-based supervision—of the Federal Reserve’s approach to bank supervision and regulation. In light of the ongoing interest in using SND as an instrument to augment market discipline, staff of the Federal Reserve System undertook a study of the issues surrounding an SND policy.¹ This study presents the results of the staff’s work.

The study proceeds as follows. Section 1 defines market discipline, discusses the motivation for and theory behind an SND policy, and summarizes existing policy proposals. Section 2 summarizes and reviews the economic literature on the potential for SND to exert market discipline on banks. It also presents a wide range of new evidence acquired by the study group. Section 3 analyzes many characteristics that an SND policy could have, in terms both of their contribution to market discipline and

of their operational feasibility. The final section provides a brief conclusion.

During its work, the study group acquired and analyzed a large amount of information and assessed a broad range of ideas. In many cases, these activities resulted in written products, and these are provided in the appendixes. In an effort to keep the body of the study to manageable proportions, the text often refers to material in an appendix. Thus, although the study attempts to present the group’s findings fully, we have tried not to repeat many details that can be found in the appendixes.

1. Why a Subordinated Debt Policy?

The banking industry is undergoing profound changes, many of which tend to make the supervisor’s job of protecting bank safety and soundness increasingly difficult. For example, the abolition of constraints on interstate banking has helped lead to the creation of a growing number of very large and geographically diverse banking organizations. In addition, the traditional barriers separating the financial system into different industries are breaking down as technological advances and the relaxation of legal and regulatory barriers permit firms in previously separate industries to provide a greater variety of financial services. The increasing consolidation of bank and nonbank activities, especially in ever-larger banking organizations, has further complicated bank supervision and regulation. Moreover, the expansion of nonbank firms is reducing bank supervisors’ margin of error when imposing costly regulations: If bank regulators impose unnecessarily costly regulations on a particular activity, then that activity will likely shift out of the banking organization and into nonbank firms. Overlaying these trends is the fact that banks are using innovations in information processing and financial technology to create new tools for measuring, taking, and controlling risks. These new tools often greatly increase the complexity of assessing a bank’s financial condition. They are also allowing banks to more effectively arbitrage differences between the risk measures used by regulators, such as those for

NOTE. This study was completed in May 1999, before enactment of the Gramm–Leach–Bliley Act (Public Law 106–102) on November 12. The act requires that the Federal Reserve Board and the U.S. Department of the Treasury conduct a joint study of the feasibility and appropriateness of requiring large insured depository institutions and depository institution holding companies to hold a portion of their capital in subordinated debt. The joint study must be submitted to the Congress within eighteen months of the date of the enactment.

1. The members of the study group and their affiliations are listed in appendix A. It should be understood that, although this study represents a consensus of views among the study group, not all members necessarily agree with every conclusion.

risk-based capital, and the true riskiness of the organization.

Why Subordinated Debt?

In such a complex and changing environment, one way to encourage safety and soundness is to enhance the “market discipline” imposed on banking organizations. In this study, we distinguish between direct and indirect market discipline. Direct market discipline is exerted through a risk-sensitive debt instrument when a banking organization’s expected cost of *issuing* that instrument increases substantially with an increase in the organization’s risk profile. For such discipline to occur, investors must gather and collect information about the banking organization’s risks and prospects and then incorporate that information into the decisions to buy and sell the organization’s debt. The anticipation of higher funding costs provides an incentive *ex ante* for the banking organization to refrain from augmenting its risk.²

Indirect market discipline is exerted through a risk-sensitive debt instrument when private parties and possibly government supervisors monitor secondary market prices of that instrument to assist in determining the risk exposure (or default probability) of the banking organization. In response to a perceived increase in bank risk, such parties could then take various actions that increase the cost of the bank’s operations. For example, private parties could increase the banking organization’s cost of funds, limit its supply of credit, or reduce its ability to engage in certain types of contracts, such as counterparty positions on derivative contracts, long-term commitments, or syndication agreements. Government supervisors could conduct examinations, limit a bank’s activities, or raise capital requirements. The anticipation of these types of penalties, from either private parties or government supervisors, provides banking organizations with additional incentives to refrain from augmenting their risk.

Direct and indirect market discipline could, at least in principle, complement supervisory discipline and provide some advantages over it. Advantages of market discipline include (1) the aggregation of information from numerous market participants, (2) a clear focus on the goals of reducing failures or losses, and (3) the ability to shift the burden of proof from supervisors, who need to show that a bank is unsafe, to bank managers, who need to demonstrate to the market that their banking organization is not

2. These higher funding costs are imposed over the entire life of the debt.

excessively risky. Market information could also be used to allocate scarce supervisory resources: Secondary prices on risk-sensitive debt instruments could be considered in establishing CAMELS and BOPEC ratings, in setting deposit insurance premiums, in triggering prompt corrective action, and in deciding when an on-site examination or supervisory action is warranted.³

Although direct and indirect market discipline may be imposed on banks whenever they choose to issue risk-sensitive debt instruments, a policy that *requires* regular issuance of homogeneous instruments would, in principle, enhance both types of market discipline. Required issuance ensures that a banking organization incurs a higher cost of funds if it chooses to increase its risk, an outcome that enhances direct market discipline. Further, issuance compels disclosure to the market about the firm’s current condition and prospects, which refreshes secondary market prices and thereby enhances indirect market discipline. A policy that requires relatively homogeneous debt instruments across banking organizations further augments indirect discipline by facilitating market and supervisory interpretations of the signals about banking organization risk contained in secondary market prices.

SND are clearly not the only bank liability capable of providing market discipline. Indeed, a considerable economic literature, summarized in the beginning of section 2, indicates that holders of uninsured certificates of deposit (CDs) and other uninsured liabilities impose market discipline on banks. This econometric result is, in addition, consistent with supervisory experience. However, SND issues have several characteristics that make them particularly attractive for providing increased market discipline.

For the price of a bank debt instrument to be risk-sensitive, investors must perceive that they will not be bailed out by the government should the banking organization fail. Among bank liabilities,

3. The federal banking agencies summarize the composite financial condition of banks and bank holding companies according to the CAMELS and BOPEC scales respectively. Each letter in the CAMELS stands for a key element of bank financial condition—capital adequacy, asset quality, management, earnings, liquidity, and sensitivity to market risks. Similarly, the components of BOPEC stand for bank subsidiaries, other (nonbank) subsidiaries, the parent company, consolidated earnings, and consolidated holding company capital adequacy.

For supervisors to benefit from using market data, the market does not need to be generally more informed than supervisors about the banking organization’s risks and prospects. Rather, it is necessary only that the market and supervisors respond to different information. If such is the case, supervisors may expand their information about a banking organization’s risks and prospects by incorporating information contained in secondary markets.

SND are uninsured and among the first (after equity) to lose value in the event of bank failure. SND holders likely view a bailout in the event of bank failure as highly improbable. Depositor preference laws reinforce this view. Hence, the issuance price of SND should be particularly sensitive to the risks of a banking organization, making SND an especially strong instrument of direct market discipline.⁴ Further, SND holders would have a greater incentive to demand disclosure of the banking organization's risk than would other bank liability holders.⁵ The subordinated status of SND relative to other liabilities (especially deposits) provides another important benefit—SND that are issued in place of insured deposits are an extra “cushion” for the Federal Deposit Insurance Corporation (FDIC) in the event of bank failure.

Another important characteristic of SND is the incentive that their holders have to monitor risk. Investors in SND are exposed to loss, but they do not benefit from any upside gains that accrue to excessive risk-taking. Thus, the incentive of SND investors to monitor and limit bank risk-taking is similar to that of bank supervisors and in stark contrast to that of equity holders. Equity holders, while exposed to loss, can also reap gains from risk and thus have a much stronger preference for risk than SND investors have.⁶ Indeed, standard option-pricing theory suggests that, all else being equal, the value of equity increases with the risk of a banking organization's assets.

A final advantage of SND is their relatively long maturity. Thus, while SND have the potential to provide effective market discipline, SND investors are not able to “run,” possibly mitigating a systemic risk situation. The long maturity also magnifies the risk sensitivity of SND investors.

4. Early in its deliberations, the study group sought to identify hybrid capital instruments (for example, preferred stock and trust preferred stock) that could substitute for SND. Preferred stock seemed like the most attractive candidate. However, study group interviews with market participants indicated that preferred stock was not as homogeneous and liquid as SND. For a discussion of this point, see appendix B.

5. One reason that current disclosures may be inadequate is that the federal safety net, including the “certification of soundness” provided by federal supervision of banks and bank holding companies, leads market participants to demand less disclosure than they would in the absence of the safety net.

6. An important caveat is that, as a bank approaches insolvency, the risk preferences of SND holders become more like those of stockholders. The reason for this development is that, if a bank becomes insolvent, the only way that SND investors will be paid in full, or possibly at all, is for the bank to save itself by winning a large and risky bet. Thus, SND are probably best thought of as providing “supervisor-compatible” market discipline only on banks that are clearly going concerns.

A policy that would require regular issuance of fairly homogeneous SND might also impose little regulatory burden on large banking organizations. As discussed below, the market for SND appears to be well established (that is, many large banking organizations currently issue SND frequently), and the maturity and option characteristics of recent issues do not differ markedly across banking organizations. Therefore, an SND policy that is based on current market conventions may not impose a substantial regulatory burden.

The benefits of enhancing market discipline do not come without potential costs. First, although SND holders cannot run, market discipline provided by SND may encourage “deposit runs” with potential systemic risk implications. For example, if uninsured creditors (such as uninsured depositors and sellers of federal funds) witness a dramatic decrease in the secondary market price of a banking organization's SND, then they may withdraw their funds. Such actions would increase the liquidity pressure on the banking organization and could bring about or hasten bank insolvency. If a very large bank were to fail, or more generally if there were a period of financial crisis, some instability in the SND market could arise, and other (safely managed) banking organizations could potentially be affected.

Second, when a banking organization is experiencing difficulty, or in a time of financial stress, bank equity has an advantage over SND in that dividends on common stock do not have to be paid. Although it is unlikely that the interest expenditure on SND would cause a bank to fail, in some instances such expenditures would limit the ability of a banking organization to build capital through retained earnings. For these reasons, supervisors have the right to suspend interest payments on SND as part of the policy for prompt corrective action.

Third, enhancing market discipline through mandatory issuance of SND could increase a banking organization's moral hazard incentive to augment its risk (at the expense of the SND debt holders) following shocks to the organization's condition. This moral hazard incentive always exists after an organization issues debt, and it increases with the spread on the debt.⁷ Therefore, if a shock increases the required

7. Suppose that a bank has had a negative shock that has depleted its capital. Suppose further that this shock has also raised the cost of issuing the bank's risk-sensitive debt. A safer banking organization that has issued debt at the higher cost has a higher probability of actually having to pay the higher cost than does a riskier bank. This fact implies that riskier organizations have a relatively lower expected cost of debt payment, and this benefit increases with the interest rate on the debt issued.

spread of an organization's SND by a sizable amount, then mandatory issuance might increase its moral hazard incentive.⁸

Finally, a cost of all forms of market discipline is that they reduce the flexibility of supervisors and may force the supervisor's hand. The limit on forbearance is one reason to use market discipline. But policymakers should recognize that at times it may at least seem that reduced flexibility is a significant problem. Indeed, all of these potential costs highlight the importance of supervisory discretion in the implementation of any policy designed to enhance market discipline. They do not, however, narrow the set of risk-sensitive debt instruments that might be viable candidates for such a policy.

In sum, although any policy designed to enhance market discipline would have some potential costs, an SND policy appears, at least in theory, to be viable and effective. SND have a number of advantages over other instruments that could be used. The advantages generally derive from their very junior status and long maturity. Moreover, the current, relatively frequent issuance of homogeneous SND instruments suggests that a policy based on SND issuance would likely impose minimal regulatory burden on banking organizations.

SND Proposals

Banking analysts have suggested several ways in which SND could be used to enhance market discipline imposed on banking organizations. A summary of these proposals is provided in table 1.

The first generation of proposals focused on the use of SND as a method of providing direct discipline by increasing the bank's cost of funding rather than by affecting its ability to obtain funds. In these proposals, the SND instrument was intended to provide gradually increasing penalties for risk-taking rather than the all-or-nothing discipline associated with runs on deposits. SND were chosen for this purpose because they would provide an additional cushion for the FDIC and possibly a margin of error in closing failing banks. Most of these proposals were made between 1983 and 1986, but the proposal by Litan and Rauch (1997) is also of this type.

The maturity of SND is generally not specified, but typically the proposals recommend requiring sufficiently frequent rollover to enhance direct

discipline but not so frequent that the SND holders might escape a distressed bank before it fails.

One advantage of allowing or requiring banks to issue SND under these proposals is that regulators can effectively set higher capital requirements without imposing excessive costs on banks. The reason is that the cost of SND is typically lower than the cost of equity because the tax code permits corporations to deduct interest payments on debt but not dividend payments on equity. The FDIC may have benefited further from a requirement that banks issue SND because of the way its closure rule worked during the mid-1980s. Before FDICIA, banks were not closed until the book value of their equity reached zero, which generally implied that the value of failed banks' liabilities exceeded the market value of their assets. If the bank had outstanding SND equal to 3 to 5 percent of assets, then SND holders might have absorbed a large fraction of the losses that otherwise the FDIC would have borne.

The second generation of proposals was developed between 1988 and 1992. Proposals from this era reflect a deep dissatisfaction with the forbearance policies of the Federal Home Loan Bank Board during the thrift debacle, and they use SND to limit forbearance. This generation built on the direct discipline arising from first-generation proposals by requiring the issuance of SND and by using each bank's ability to issue SND as a trigger to force supervisory discipline. Each of the proposals required banks either to issue new debt on a frequent basis or to issue debt that contained a provision allowing the holder to "put" the debt back to the issuing bank. According to the proposals, each bank's ability to issue SND would then be a market signal of its viability. Banks that encountered problems would typically be given some time to persuade the market that they were solvent and to issue new obligations. However, a bank's inability to issue SND would at some point be taken as a signal that the bank was considered insolvent by the market and that it should be closed.

A weakness of the second-generation proposals is that they rely exclusively on banks' ability to issue debt as a trigger for regulatory action and fail to use the information available in the issuance or secondary market prices of SND. The proposals allowed banks to issue SND at whatever promised rate was necessary to attract willing investors.⁹ Thus, banks

8. This augmented incentive to increase risk occurs only at the margin. Banks may still choose to refrain from increasing their risks to avoid even more direct market discipline.

9. This is not to say that a bank could issue SND regardless of its riskiness. The supervisors could take action independent of the bank's ability to issue SND. Further, at some sufficiently high promised rate, the investors would refuse to buy a bank's SND reasoning that, if the bank is willing to promise such high

could be operating at very high risk levels without SND's exerting indirect discipline through supervisors. Wall (1989) would impose the strictest limits on highly risky banks by requiring that a bank be closed if it could not maintain a minimum level of SND. Although such an approach may permit supervisors to take earlier action to reduce the probability of failure, it does not guarantee supervisory intervention until the bank cannot issue debt. Further, the market may perceive the penalty for the inability to issue SND to be so draconian as to be not credible. The severe nature of Wall's proposal may be softened by requiring frequent, partial rollovers of SND and by integrating SND requirements into prompt corrective action (see Evanoff, 1993). However, the Evanoff SND proposal could potentially allow insolvent banks to continue in operation for a long time.¹⁰

Calomiris (1997 and 1999) provides a third-generation proposal that builds on the earlier proposals by requiring monthly rollovers of SND that mature in two years but sets a cap on the rate that a bank would be permitted to pay. As with previous proposals, the focus is on direct discipline imposed in the issuance market. Banks that are unable to issue SND at rates under the rate cap would be required to shrink by approximately $\frac{1}{24}$ per month for those months in which they are unable to issue new SND. Calomiris's proposal is intended to provide discipline that would start taking effect before the bank was so distressed that it would be unable to issue new SND at any promised interest rate. In practice, even a distressed bank is likely to have some assets in its portfolio that it could liquidate to meet Calomiris's requirements for a few months. However, most banks would not be able to shrink 50 percent in one year, as his proposal would require in some circumstances.

Other possible weaknesses of the Calomiris-type approach are that it requires banks to be in the market very frequently to issue SND and that it allows SND levels to decline at distressed banks. However, his recommendation that an SND proposal incorporate the rate paid on the debt combined with Evanoff's suggestion of integrating SND requirements into prompt corrective action suggests another

option for generating indirect discipline: The rates paid on SND could be used to define capital adequacy for purposes of prompt corrective action. For example, banks whose SND were issued or traded at Aaa rates could reasonably be considered to be highly capitalized regardless of their capital levels measured under existing regulatory requirements, whereas banks trading at junk bond rates could be considered to be undercapitalized (possibly severely or critically undercapitalized), again regardless of their position under the existing regulatory capital ratios. This approach provides the opportunity for progressively stricter supervisory action as a bank's financial condition deteriorates, with the potential for beginning supervisory discipline long before the bank becomes insolvent. Further, if the SND trade in active secondary markets, then such a proposal would permit almost continuous (indirect) market discipline.

2. Evidence on the Potential Market-Discipline Effects of Subordinated Debt

The previous section argued that SND issues have the potential to impose direct and indirect market discipline on banks and bank holding companies. This section examines the available evidence on this potential through a review of the literature, a summary of the views of market participants, and an analysis of new econometric evidence. It ends with the study group's conclusions as to whether the available evidence suggests that SND provide statistically and economically significant market discipline and whether such discipline could be augmented.¹¹

Literature Review

The most common test for market discipline in banking has been analysis of the cross-sectional relationship between interest rates paid on bank liabilities (typically large, uninsured CDs) and various measures of bank risk. Using inside information on the risk of the firm (for example, CAMELS ratings), accounting measures as proxies for risk, or market measures of risk, most studies have found rates to be positively and significantly associated with the risk measures. Additionally, the studies found that "bad" news was quickly incorporated

interest rates, it must be planning on taking very high risks. Thus, even though the contract interest rate would be very high, the expected return to holders of the debt would likely be very low or negative.

10. The proposal would not prevent supervisors from closing insolvent banks. None of these proposals precludes earlier intervention by the supervisors. However, the benefit of SND from decreasing the probability of forbearance is reduced to the extent that the proposals rely on supervisors to close insolvent banks.

11. The literature on market discipline in other countries is not surveyed. A review of the literature for developing countries, and an additional contribution, is provided in Peria and Schmukler (1998).

1. A Summary of Various Subordinated Debt Proposals

Generation	Bibliographic citation	Required cushion	Debt characteristics	
			Maturity	Issuance
1st	Federal Deposit Insurance Corporation (FDIC), "Deposit Insurance in a Changing Environment: A Study of the Current System of Deposit Insurance Pursuant to Section 712 of the Garn-St Germain Depository Institutions Act of 1982," A Report to Congress on Deposit Insurance, Washington, D.C.: U.S. Government Printing Office, June 1983.	Banks would be required to maintain a minimum protective cushion to support deposits (say, 10 percent), which would be met by use of a combination of equity and subordinated debt.	Maturity selection should take into consideration the desirability of frequent exposure to market judgment. The total debt perhaps should mature serially (say, one-third every two years).	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.
1st	Benston, G., R.A. Eisenbeis, P.M. Horvitz, E. Kane, and G.C. Kaufman, <i>Perspectives on Safe and Sound Banking</i> , Cambridge, Mass.: MIT Press, 1986.	A significant level (say, 3 to 5 percent of deposits or a certain proportion of equity).	Short maturity, but long enough to prevent runs.	Frequent.
1st	Horvitz, P.M., "Subordinated Debt Is Key to New Bank Capital Requirement," <i>American Banker</i> , December 31, 1986.	A minimum of 4 percent of deposits.	Not discussed.	Not discussed.
1st	Litan, R.E., and J. Rauch, <i>American Finance for the 21st Century</i> , U.S. Treasury, U.S. Government Printing Office: November 17, 1997.	A minimum of 1 to 2 percent of risk-weighted assets.	The subordinated bonds would have maturities of at least one year.	A fraction of the subordinated debt outstanding would come due in each quarter.

NOTE. FDICIA = Federal Deposit Insurance Corporation Improvement Act of 1991.
SND = subordinated notes and debentures.

1. Continued

Debt characteristics			Insolvency procedures	Banks subject to proposal
Covenants	Rate cap	Putable debt		
Penalties would be imposed on banks that fell below minimum levels. Provisions that 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 that would not benefit stockholders and subordinate creditors. This aid could be accomplished by effecting a phantom merger transaction with a newly chartered bank that has been capitalized with FDIC financial assistance. The new bank would assume the liabilities of the closed bank and purchase its high-quality assets.	Not discussed.
Yes, to restrict the ability of the banks to engage in risky activities.	None.	Small percentage of the issue should be redeemed at the option of the holder.	Prompt closure when market value of equity is zero. 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.	Large banks would be able to sell subordinated debt notes through the national financial markets, small banks might be able to sell capital notes over the counter to customers locally (or locally by other means), but medium-size banks would be too large to sell sufficient notes locally but not large enough to have access to national markets.
Not discussed.	None.	Not discussed.	FDIC would choose when to close the bank. Subordinated debt holders would provide a margin of error in the determination of when a bank should be closed and would reduce the loss to the FDIC.	Not discussed.
Not discussed.	Not discussed.	Not discussed.	Not discussed.	Subordinated debt would be required only of banks in organizations above a certain size (say, \$10 billion in total assets).

1. A Summary of Various Subordinated Debt Proposals—Continued

Generation	Bibliographic citation	Required cushion	Debt characteristics	
			Maturity	Issuance
1st	The Bankers Roundtable, <i>Market-Based Incentive Regulation and Supervision: A Paradigm for the Future</i> , Washington, D.C., April 1998.	A minimum of 2 percent of liabilities.	Not discussed.	Not discussed.
2nd	Keehn, S., <i>Banking on the Balance: Powers and the Safety Net: A Proposal</i> , mimeo, Chicago, Ill.: Federal Reserve Bank of Chicago, 1988.	Ratio of a minimum of 4 percent subordinated debt to risk assets 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.
2nd	Cooper, K., and D.R. Fraser, "The Rising Cost of Bank Failures: A Proposed Solution." <i>Journal of Retail Banking</i> , vol. 10 (fall 1988), pp. 5-12.	A specified percentage of deposits (say, 3 percent).	The subordinate putable 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.

1. Continued

Debt characteristics			Insolvency procedures	Banks subject to proposal
Covenants	Rate cap	Putable debt		
Not discussed.	Not discussed.	Not discussed.	Not discussed.	Banks would have the option of complying with either a Basel-type risk-based capital standard or on approaches that rely on more market-based elements. Those banks that (1) are "adequately capitalized" but not subject to the leverage requirements under prompt corrective action, or (2) determine appropriate capital levels using internal management procedures would be <i>required</i> to issue subordinated debt.
Sanctions on bank dividend policy, payment of management fees, deposit growth, and deposit rates to be progressively increased as the bank's performance deteriorated.	None.	Not discussed.	Bank ownership would be converted to the subordinated debt holders following a judicial or regulatory determination of insolvency. Creditors would be converted to common shareholders and would have a prescribed period to recapitalize the bank or find an acquirer; failing that, the bank would be liquidated.	Small banks could be allowed alternative means to meet the debt requirement.
Convertible to equity.	Yes, bonds would be putable 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 (say, 95 percent). The subordinated put notes would be redeemable not by the issuing bank but at the FDIC.	When a put occurred, the FDIC would be compensated for its payments on behalf of the issuing bank with nonvoting equity shares of the bank. The bank would have a prescribed period in which it could repurchase these equity shares. If it did not do so by the end of the period, revocation of the bank's charter would occur, and the FDIC would deal with the insolvent bank.	The put feature of the proposed subordinated debt would create a viable market for the instrument, no matter how small the issuing bank. If not, these banks could receive assistance from the FDIC or Federal Reserve in the placement of this debt with investors.

1. A Summary of Various Subordinated Debt Proposals—Continued

Generation	Bibliographic citation	Required cushion	Debt characteristics	
			Maturity	Issuance
2nd	Wall, L.D., "A Plan for Reducing Future Deposit Insurance Losses: Putable Subordinated Debt," <i>Economic Review</i> , Federal Reserve Bank of Atlanta (July/August 1989), pp. 2–17.	Par value of putable subordinated debt greater than 4 to 5 percent of risk-weighted assets.	Bondholders would be allowed to request redemption in cases in which such redemption did not violate regulatory standards.	At the bank level, not the holding level.
2nd	Evanoff, D.D., "Preferred Sources of Market Discipline," <i>Yale Journal on Regulation</i> , vol. 10 (1993), pp. 347–67.	A significant proportion of total capital would be held in subordinated debt. The 8 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., five years).	Staggered so that banks would have to approach the market on a frequent basis (e.g., semi-annually).
3rd	Calomiris, C.W., <i>The Postmodern Bank Safety Net: Lessons from Developed and Developing Countries</i> , Washington, D.C.: American Enterprise Institute, 1997.	2 percent of total nonreserve assets or 2 percent of risk-weighted assets.	Not discussed.	To roll over debt and to accommodate growth in the bank's balance sheet.

1. Continued

Debt characteristics			Insolvency procedures	Banks subject to proposal
Covenants	Rate cap	Putable debt		
Restrictions on the percentage of putable debt that could be owned by insiders individually and collectively.	Not discussed.	Yes. Bondholders would be allowed to request redemption in cases in which 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 subordinated debt requirements—say, through the sale of assets.	Any bank that could not honor the redemption requests on its putable subordinated debt at the end of 90 days without violating the regulatory requirements would be deemed insolvent and would be closed. If the proceeds of the sale or liquidation exceeded the total of deposits, that excess would first be returned to the subordinated debt holders; the remainder, if any, would be paid to equity holders.	Small banks, defined as those with less than \$2 billion in assets, would be exempted because of the limited market they might face for subordinated debt instruments. Those banks would have the option of operating under the putable subordinated debt standard.
Following the prompt corrective action (PCA) provisions of FDICIA, sanctions on bank dividend policy, payment of management fees, deposit growth, and deposit rates to be progressively increased as the bank's performance deteriorated. Implicit in the discussion seems to be the incorporation of the SND requirements into PCA.	None.	A variant of the proposal would require the bank to issue putable 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.	Suggests that a few investment bankers had indicated some interest in establishing mutual funds for the subordinated debt instruments issued by small banks. Also, author's conversations with small bankers suggested that they could raise this type of debt relatively easily.
"Insiders" would not be permitted to hold subordinated debt. Further, holders of subordinated debt would have no direct or indirect interest in the stock of the bank that issues the debt. Author suggested that the ideal subordinated 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.	Subordinated debt holders must have their money at stake when a bank becomes insolvent.	Yes.

1. A Summary of Various Subordinated Debt Proposals—Continued

Generation	Bibliographic citation	Required cushion	Debt characteristics	
			Maturity	Issuance
3rd	Calomiris, C.W., "Building an Incentive-Compatible Safety Net," <i>Journal of Banking and Finance</i> , forthcoming. NOTE: This plan is labeled "A subordinated debt plan for a developing country." (We understand from discussions with the author that although a plan targeted at the United States 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.)	Banks must "maintain" a minimum fraction (say, 2 percent) of their risky (non-Treasury bill) assets in subordinated debt (sometimes called uninsured deposits).	Two years.	1/24 of the issue would mature each month.

into the cost of issuing CDs. A few of the earlier studies did not find evidence of a risk premium, but most did.¹² In fact, even the largest banks, which many would argue were "too big to fail" (TBTF) and therefore may have been viewed as having liabilities essentially guaranteed by an implicit safety net, were shown to have risk premiums embedded in their CD rates. One study even found that *insured* deposits at riskier thrifts included risk premiums.¹³ Similarly, studies that have examined the relationship between deposit growth and portfolio risk have generally found a relationship consistent with market discipline: Uninsured depositors' holdings at riskier institutions decline relative to those at safer institutions.

More relevant for this study, however, is an assessment of the evidence of market discipline in the market for subordinated debt issued by banking organizations. Again, the standard method to test for market discipline is to analyze the relationship between debt prices, or yield spreads over the rate

on Treasury securities, and accounting measures of risk specific to banking organizations.¹⁴ These studies can be divided into three groups. Early studies tested for market discipline in the subordinated debt market by investigating the relationship between the interest rate premium (defined as the rate on subordinated debt minus the rate on matched maturity U.S. Treasury securities) and various risk measures derived from balance sheets and income statements (for example, leverage ratios, measures of profit variability, and loss ratios). Most of these studies did not find much of a statistical relationship between measures of risk and the expected return demanded by investors.¹⁵

The second group of studies improved upon the methodology employed in the earlier studies in a number of ways. The yields on SND were adjusted to account for the value of any embedded call options.¹⁶ The option-adjusted spread over a Treasury bond with matched maturity was calculated and related to balance sheet measures of banking

12. Risk premiums were found by 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.

13. This premium on deposits at savings and loan institutions most likely reflects the perceived vulnerability of the thrift insurance fund during the late 1980s, before it was recapitalized. See Cook and Spellman (1994).

14. Standard balance sheet proxies for bank risk include measures of nonaccruing loans, past due loans, other real estate owned, leverage, the gap between interest-sensitive assets and interest-sensitive liabilities, and the ratio of insured deposits to total deposits as a measure of the bank's reliance on the safety net.

15. These early studies include Beighley (1977), Fraser and McCormack (1978), Herzig-Marx (1979), and Pettway (1976).

16. As will be discussed further in a later section, call options were a relatively common feature of bank and bank holding company SND until fairly recently.

1. Continued

Debt characteristics			Insolvency procedures	Banks subject to proposal
Covenants	Rate cap	Puttable debt		
Debt must be issued to large domestic banks or foreign financial institutions. (See the "Banks subject to proposal" column for details.)	Rates would be capped at the one-year Treasury bill rate plus a "maximum spread" (say, 3 percent).	Not discussed.	Banks that could not issue would be required to shrink their assets by $\frac{1}{24}$ (4.17 percent) during the next month. If additional contraction is required (because of prior growth), then the additional shrinkage can be achieved over three months. (The author also discusses measuring assets and subordinated debt using a three-month moving average.) Presumably, this would result in the bank's liquidating all of its assets over 24 to 27 months if it could no longer issue SND.	The plan would apply to all banks. Debt issued by small banks (those that might have difficulty accessing foreign banks and international finance markets) could be held by large domestic or foreign banks. Debt issued by large banks must be held by foreign financial institutions.

organization risk. After incorporating these methodological adjustments, Avery, Belton, and Goldberg (1988) analyzed banking organization SND data for 1983 and 1984 and still found no evidence of market discipline.¹⁷

Gorton and Santomero (1990) improved upon the methodology of earlier studies by incorporating alternative measures of bank risk and, most important, by demonstrating that the relationship between spreads on large, uninsured bank liabilities and risk cannot be assessed by using a linear function. Rather, they imputed the implied volatility of the bank's assets from a highly stylized valuation model and related those volatilities, which can be shown to be linearly related to risk measures, to bank-specific measures of risk. Using the Avery, Belton, and Goldberg data sample, Gorton and Santomero continued to find virtually no relationship between bank risk measures and the bank's implied asset volatility. Thus, even with the methodological improvements in these more recent studies, the results offer little support for the argument that there was statistically significant market discipline in the banking organization SND market during 1983–84.¹⁸

17. The authors did, however, find evidence of a relationship between spreads and bank credit ratings.

18. This lack of evidence is particularly perplexing given that, as discussed earlier, there did appear to be evidence of discipline in the market for bank CDs—a more senior liability. A potential reason for this apparent conflict is offered below.

A more recent study (Flannery and Sorescu, 1996) analyzed SND secondary market data for a longer period and generated empirical results that were consistent with the earlier findings of both Avery, Belton, and Goldberg and Gorton and Santomero and also with the hypothesis that market discipline can be exerted in the SND market. Flannery and Sorescu argue that the apparent lack of market discipline in the earlier studies was most likely a result of real or implied government guarantees during the 1980s. These perceived guarantees were reinforced by the regulatory treatment of SND holders during Continental Illinois's rescue in 1984 and the formalization of the TBTF doctrine by the Comptroller of the Currency in congressional testimony.¹⁹ Flannery and Sorescu argue that, as a result of these actions, the market believed that banking policy would at least partially protect the owners of banks during this period. Holders of SND, which were senior to bank equity, could have rationally believed that they were protected as well.

The implication of this perceived guarantee is that the evidence concerning market discipline in SND secondary markets should vary over 1983–91, with market discipline more apparent near the end of the period. Indeed, Flannery and Sorescu found that firm-specific risk measures were correlated with option-adjusted spreads in 1983–91 for a sample

19. See Carrington (1984).

of 422 bonds issued by eighty-three banking organizations. Further, this correlation appears to have increased as conjectural government guarantees weakened in the late 1980s and early 1990s. The option-adjusted spreads on subordinated debt also appear partially to have reflected the market's banking-organization-specific estimate of a government bailout. Of the banking organizations included in Flannery and Sorescu's sample, those included in either the Comptroller's list or *The Wall Street Journal's* list of TBTF banks paid significantly lower option-adjusted spreads on their subordinated debt in 1985–87 and in 1991 after one takes into consideration accounting and market-based risk measures.²⁰ Thus, participants in the subordinated debt market appear to be willing to invest in evaluating banking-organization-specific risks as long as they believe that they are at risk and that their investment is not protected by an implicit or explicit guarantee.²¹

The results of the Flannery–Sorescu analysis were affirmed by DeYoung et al. (1998), who used data from 1989–95. Over this period, spreads were found to be closely related to balance sheet and market measures of bank risk.²²

Although SND policy proposals have typically focused on individual banks, the market discipline studies discussed earlier have used data primarily on SND that were issued by bank holding companies. In large part, they have done so because publicly traded SND were and continue to be issued mainly at the bank holding company level.

However, one study that evaluates publicly traded SND issued directly by banks is currently under way. Analyzing SND issues for nineteen banks and forty-one bank holding companies over 1992–97, Jagtiani, Kaufman, and Lemieux (1999) attempt to compare the extent of market discipline imposed on the banks with the extent of market discipline imposed on the bank holding companies. Although

the analysis is ongoing and alternative specifications are being tested, the consistent finding, and the one most relevant for our purposes, is that the market does indeed impose a risk premium on SND issued at the bank level. These authors also find that the market tends to price risk more severely at poorly capitalized banks—that is, the spread–risk relationship is nonlinear based on the capitalization of the bank. This information is useful because most SND proposals would require that the debt be issued by the bank.

Finally, although the recent literature on market discipline in SND markets seems to indicate that risk premiums are imposed, there is reason to believe that these studies may underestimate the full extent of such discipline by ignoring banks that did not issue debt. If the decision not to issue debt is associated with the riskiness of the non-issuing banking organization, market discipline will not be captured fully in the studies that analyze only secondary prices of the SND that reached the market. This issue is addressed in the study group's own econometric research, which is discussed in the section "New Evidence."

To summarize, most of the literature suggests that the market can account for risk when pricing SND issued by banking organizations. During the periods that SND premiums were not found to be related to risk measures, there is significant evidence that SND holders viewed themselves as not at risk regardless of the riskiness of the debt-issuing bank. During these periods, debt holders were most likely relying on a presumed implicit government guarantee. As this guarantee was decreased through 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 responded rationally by more effectively taking banks' risk into account. In short, SND holders appear to be willing and able to invest in evaluating the riskiness of bank assets but do so only when they need to.

A related topic concerns whether the information used by private market participants to discipline banks differs significantly from that available to bank supervisors, either in content or in the timing of its availability. It has been argued that through the on-site examination process, bank supervisors have access to inside information that the market generally does not have. Alternatively, the private market has the strongest incentive to obtain the necessary information to make informed investment decisions. Additionally, the various "bank-watchers" may seek different information because they have different roles. Equity holders, for example, may be concerned with the potential for a bank to generate efficiency

20. In an earlier study, O'Hara and Shaw (1990) found that equity holders also received a wealth windfall as a result of the TBTF policy.

21. It may be that during 1983–91 the bank SND investors were more sophisticated and aware of the potential guarantee than were holders of other bank liabilities (for example, CDs). If so, this difference could explain the apparently conflicting findings, discussed above, that evidence of market discipline could not be found in the market for bank SND but was consistently found in the market for bank CDs—a more senior liability.

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

gains instead of concentrating on the bank's probability of failure. In contrast, the objectives of SND holders and bank supervisors probably align quite well in that both are most interested in protecting against failure. Thus, it would be informative in considering an SND proposal to contrast the availability of information to the different bank watchers.

Most of the recent research in this area suggests that supervisors may temporarily have inside information not immediately available to the market. Dahl, Hanweck, and O'Keefe (1995) found that significant contributions to loan-loss reserves typically occurred immediately after a bank examination, a finding that suggests that new information may be uncovered during exams. Cole and Gunther (1998) attempted to predict bank failure with models using publicly available financial data and then augmented their model with the supervisor's CAMELS ratings to test whether the additional information improved the predictive power of the model. They found that the augmented model more accurately predicted bank failure but only if the CAMELS rating was less than six months old. After six months, the data appeared to be "stale" and to have already been incorporated into the market's information set. The finding that information becomes stale, rather typical in the literature, suggests that over time the additional information diffuses into the broader market. Berger and Davies (1994), for example, found that CAMELS upgrades were quickly integrated into market prices (a finding that suggests that banks may have been releasing the new examination information to the market) but that downgrades were incorporated only with a lag (suggesting that, at least for a time, banks were able to keep this bad information from the market but not from examiners).

More directly related to SND proposals, a study by DeYoung et al. (1998) considered the information content of bank examinations as it relates to secondary market spreads of the SND of the bank's holding company. The study compared CAMELS ratings with various market assessments of bank condition and found that bank examination ratings contained additional private information about a bank's safety and soundness. The authors 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. Unfortunately, the study did not consider the opposite effect: Whether there was information in the private market beyond that to which the examiners already had access.

This last issue was examined by Berger, Davies, and Flannery (1998) when they analyzed the information sets of examiners and private market participants to see "who knows what when?"²³ They tested whether private market assessments of the condition of bank holding companies changed before or after supervisors changed their assessments. Similarly, they tested whether information in private markets was preceded by changes in the assessments of supervisors.²⁴ This study's general conclusion was that supervisory assessments and private market participant assessments complement one another, 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.

Different market participants (supervisors, bond market participants, rating agencies, and others) appear to generate complementary information that could be useful in the discipline of bank risk-taking. This conclusion, however, is based on relatively few research studies, and more research is clearly warranted.

Views of Market Participants

Early in the design of its work plan, the study group identified as critical the development of a thorough understanding of the existing market for bank and bank holding company SND. Such understanding was acquired through reviewing the existing literature, tapping the expertise of supervisory staff, developing original empirical work, and conducting many interviews with market participants. A detailed summary of these interviews is provided in appendix B, and this appendix is frequently referred to in the text of the study. This subsection summarizes the study group's judgment of the way interviewees saw the potential for SND to exert market discipline.

The typical U.S. bank or, more commonly, holding company SND instrument issued today is a fixed-rate, noncallable, ten-year maturity bond with few

23. In this study and others, the information available to examiners is assumed to be summarized in the official bank or holding company ratings—that is, CAMELS or BOPEC ratings.

24. More formally, the authors tested whether lagged supervisory variables helped predict current market variables and whether lagged market variables helped to predict current supervisory variables. They used Granger causality tests to determine whether information from one group helped to "predict" the assessment of the other group. The private market participant assessment was measured by using ratings made by bond market rating agencies.

bells and whistles. Banking organizations usually swap the interest payments on these fixed-rate bonds for floating-rate payments tied to *libor* to better match the flows of interest on their assets. The relative homogeneity of the SND instrument makes comparisons of prices in the bank and bank holding company SND market relatively straightforward and is an important, indeed perhaps the single most critical, reason for the depth and efficiency of the market. The overwhelming impression given by interviewees is that the market for the SND of the largest banks and bank holding companies is, in the context of corporate bond markets, quite liquid, to the point that it provides a useful vehicle for trading and hedging.²⁵

Market participants generally felt that, subject to a number of important caveats, existing market prices of SND reflect risk differences across firms.²⁶ Indeed, SND spreads (over comparable-maturity Treasuries or the swapped *libor* rate) appear to be followed closely, sometimes daily, by market participants. Because changes in spreads tend to be positively correlated across banks and bank holding companies, changes in an institution's relative position within its peer group of institutions is viewed by some as the most important signal of a change in the perceived credit quality of an institution. While SND and equity prices were viewed as normally tending to move together, SND price movements were generally deemed to have value added relative to stock price movements.

Having said this, all interviewees felt that spreads need to be interpreted with great care. For example, the general level of spreads is quite sensitive to cyclical fluctuations. In good times, spreads tend to be rather narrow, reflecting the view that all banks and bank holding companies are in good shape. In bad times, spreads balloon, reflecting broad skepticism regarding the financial health of banking institutions. Indeed, the August–October 1998 market turmoil was widely considered a prime example of what market stress can do to spreads. Interviewees also tended to feel that daily fluctuations in spreads were overly sensitive to news and rumors. Particularly troublesome were so-called technical factors, which include idiosyncracies such as news or rumors about mergers and supply shortages or surpluses in particular issues or maturities.

25. An important exception to this generalization is the post-Russian default experience in August–October 1998. This exception is discussed in more detail below and in appendix B. In addition, it should be noted that equity markets are generally more liquid than corporate bond markets.

26. See appendix B.

Secondary market prices were viewed as being quite efficient, at least in normal times, and as tending to reveal changes in market sentiment ahead of rating agency actions.²⁷ New issue prices were thought to have significant value added. New issues were seen as focusing investors' attention on the financial condition of a firm and as requiring a firm to disclose its most recent and complete information. Moreover, new issue prices reflect actual transactions, not hypothetical (for example, model-based) prices that have been posted by a market-making firm.

These evaluations by market participants are consistent with the view that SND have the potential to impose both direct and indirect market discipline on issuing institutions, and that indeed they do so today. As discussed in section 1, direct discipline is exerted if issue prices are sensitive to risk, a condition that market participants clearly believe to hold. Moreover, a number of interviewees argued that new issuance particularly encourages new disclosure. Indirect (and to some extent direct) discipline can be exerted if secondary market prices are sensitive to risk changes, and this condition was also supported by study group interviewees. However, interviewees argued that prices can be subject to a fair amount of noise, particularly on a daily basis, and can be quite misleading in times of systemwide financial distress. Thus, interpretation of SND price movements would have to be done with much care and might require considerable practical experience before being done with an acceptable degree of reliability.

New Evidence

This subsection summarizes the results of ongoing research being conducted by members of the study group and discusses the implications of this research for using SND as an instrument of market discipline.²⁸ This research focuses on the additional discipline that may be associated with *mandatory* SND issuance and models the decision of each banking organization to issue SND.

Model Specification

The decision to issue SND depends upon the expected issuance spread for the banking organiza-

27. Nevertheless, rating changes were considered highly significant events that moved prices of SND.

28. A full research paper by Covitz, Hancock, and Kwast is in process.

tion's debt and the private benefits associated with the debt issuance.²⁹ Our discussions with market participants suggested that the expected spread, which is not observable, is a function of risk, bond market conditions, and macroeconomic conditions.

To proxy for banking organization risk, we use various accounting measures that have previously been used to analyze secondary market SND spreads—namely, the ratio of non-accruing loans to total assets (denoted by *NATA*), the ratio of accruing loans past due ninety days or more to total assets (denoted by *PDTA*), the ratio of other real estate owned to total assets (denoted by *OREO*), the absolute value of the difference between assets and liabilities maturing or repricing within one year as a proportion of equity value (denoted by *AGAP*), and the ratio of total book liabilities to the sum of the market value of common stock and the book value of preferred stock (denoted by *MKTLEV*). To proxy for bond market risk, we use implied stock volatility measures that are calculated from option prices traded on the Chicago Board Option Exchange (denoted by *MKTVOL*).³⁰ And to proxy for macroeconomic conditions we use an NBER recession indicator (denoted by *NBER*).

Study group discussions with SND market participants also indicated that an important determinant of a banking organization's issuance price, and therefore its spread, is the extent to which the market is familiar with the issuer. Since frequent issuers are likely to have issued SND more than once during an annual period, we included an indicator variable that equaled one when the banking organization had issued SND in the previous period (denoted by *ISSUE_{i-1}*). Also, studies of secondary market spreads and study group interviewees suggest that larger banking organizations tend to have lower spreads than smaller banking organizations have. Such differentials may reflect the fact that larger banking organizations are more likely to be known and are

considered to be more diversified. To control for the size of each banking organization, we include the natural log of its asset size (denoted by $\ln[ASSET]$).

To capture each banking organization's private benefit from SND issuance, we include two variables. The first variable is the banking organization's foreign and domestic income taxes as a percentage of net income (denoted by *AVGTAX*). Presumably, the higher the banking organization's tax rate, the greater its benefit from being able to deduct the interest payments paid to SND bondholders.³¹ The second variable, which is the ratio of book equity to book total assets (denoted by *KA*), controls for the capital structure of the banking organization at the time that the issuance decision is made. On the one hand, banking organizations with larger equity-to-asset ratios may be perceived to be less likely to fail for a given level of risk than those organizations with smaller equity-to-asset ratios.³² Thus, they may have a lower expected SND spread than other banking organizations and be more willing to issue. On the other hand, banking organizations with smaller equity-to-asset ratios may have a greater desire to issue SND because they believe that they need to raise tier 2 capital.

Using the notation for each variable, the decision to issue SND for bank *i* at time *t* can be represented by

$$(1) \quad ISSUE_{it} = h(NATA_{it}, PDTA_{it}, OREO_{it}, AGAP_{it}, \\ MKTLEV_{it}, MKTVOL_{it}, NBER_{it}, \\ ISSUE_{i-1}, \ln(ASSET_{it}), AVGTAX_{it}, KA_{it}),$$

where *ISSUE* is an indicator variable that equals one when a bank has issued SND in the current or previous quarter and equals zero otherwise. Without compelling theory to suggest otherwise, *h(.)* is assumed to be linear in all of the variables.³³ This equation yields the following specification:³⁴

29. We also consider a model with regulatory benefits associated with SND issuance. In empirical specifications of that model, we include two regulatory benefit variables. First, we include shortfalls of total capital below 8 percent of risk-weighted assets because they capture the fact that banking organizations with such shortfalls face regulatory or supervisory restrictions on their conduct. Second, we include shortfalls of SND below 2 percent of risk-weighted assets because they capture the fact that banking organizations that have such shortfalls may count new SND issues toward tier 2 capital. Inclusion of such variables, however, does not materially affect the results summarized below. Moreover, neither of these shortfall variables is statistically significant in any of the empirical specifications.

30. Implied stock volatility is exogenous to, but highly correlated with, bond market volatility.

31. We assume that the higher the average tax rate is, the higher the marginal tax rate for the organization.

32. See Berger (1995).

33. For continuous right-hand variables, the average value for a two-quarter interval is used. To enhance the exogeneity of the right-hand variables, explanatory variables are lagged by one quarter.

34. Based on Flannery and Sorescu (1996), we also considered a more general specification in which all of the accounting measure of risk, except *MKTLEV*, were interacted with *MKTLEV* and *MKTLEV*². The empirical results from this more general specification were consistent with those of the linear specification described in the text, with similar conclusions about market discipline.

$$\begin{aligned}
 (2) \text{ ISSUE}_{it} = & \alpha + \beta_1 \text{MKTLEV}_{it} + \beta_2 \text{NATA}_{it} \\
 & + \beta_3 \text{PDTA}_{it} + \beta_4 \text{OREO}_{it} + \beta_5 \text{AGAP}_{it} \\
 & + \beta_6 \text{MKTVOL}_t + \beta_7 \text{NBER}_t \\
 & + \beta_8 \text{ISSUE}_{i-1} + \beta_9 \ln(\text{ASSET}_{it}) \\
 & + \beta_{10} \text{AVGTAX}_{it} + \beta_{11} \text{KA}_{it}.
 \end{aligned}$$

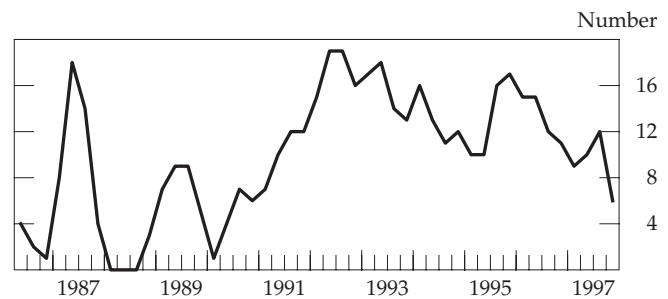
Expected signs for accounting risk measures are negative because additional risk-taking would be expected to raise the expected issuance spread and thus lower the probability of issuance. Greater bond market volatility and poor macroeconomic conditions are expected to reduce the probability of issuance, *ceteris paribus*, so the expected signs for *MKTVOL* and *NBER* are also negative. The expected signs for the frequency of issuance proxy (*ISSUE*_{*i-1*}) and for the banking organization size proxy (*ln[ASSET]*) are positive. For the reasons discussed earlier, the expected sign for the banking organization's average tax rate (*AVGTAX*) is positive. *KA* may be either positively or negatively related to a banking organization's decision to issue SND.

The decision to issue is a continuous, but unobservable, variable, so latent variable techniques were used to consider the probability that a banking organization issues SND. The resultant probit model was estimated using overlapping two-quarter intervals for the top fifty bank holding companies in each quarter, 1986:Q2 to 1997:Q4 inclusive.³⁵ The numbers of top fifty bank holding companies that issued SND in each two-quarter interval (current or previous quarter) are presented in figure 1. Notably, the percentage of top fifty bank holding companies issuing SND within a six-month period dropped sharply during 1987–88 and generally rose during the phasing-in of the Basel Accord. Interestingly, there is considerable variation in the number of top fifty bank holding companies issuing SND even during the recent economic expansion.

Empirical Results

First, we consider whether the banking organization's risk, size, and frequency of SND issuance affect its probability of issuance. In table 2, parameter estimates for a "bare bones" probit model with only accounting measures of risk, bank holding company size, and an indicator variable for whether the bank

1. The number of top bank holding companies issuing SND in the current or previous quarter, 1986:Q2–1997:Q4



holding company issued in the previous six-month interval are presented for separate two-year sample periods.³⁶ Many of the parameter estimates are of the expected sign, and such estimates are indicated with an "X."

In the first column, the parameter estimates for the 1986:Q2 to 1987:Q4 period suggest that accounting measures of risk individually did not significantly affect the SND issuance decision. Indeed, the five accounting measures of risk taken together did not provide significant explanatory power during this period.³⁷ These results are consistent with those of Flannery and Sorescu (1996), who found that such accounting risk measures did not significantly affect SND secondary prices in this time interval.³⁸

In the 1988:Q1 to 1989:Q4 period and in the 1990:Q1 to 1991:Q4 period, the parameter estimate for the ratio of accruing loans past due ninety days or more to total assets is significant and has the expected negative sign. In the latter of these two periods, the parameter estimate for the ratio of total book liabilities to the sum of market value of common stock and book value of preferred stock is also significant and is of the expected negative sign. Also, the five accounting measures of risk, taken together, have a significantly negative effect on the issuance decision both in the 1988:Q1 to 1989:Q4 period and in the 1990:Q1 to 1991:Q4 period. These results are also consistent with Flannery and Sorescu, who found that secondary SND prices were significantly affected by such accounting measures of risk in the 1989–91 period. These results also suggest that riskier banking organizations chose not to issue SND during 1988–91.

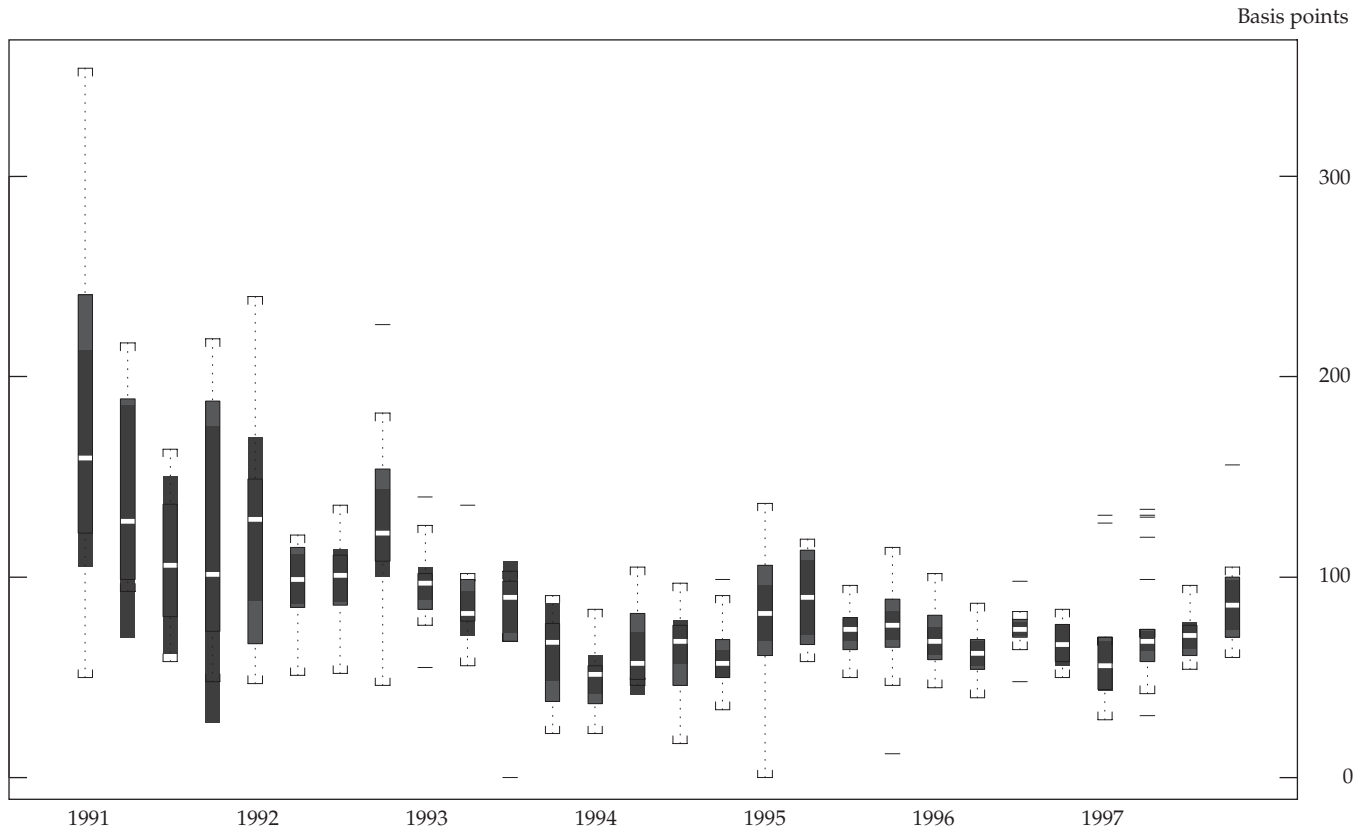
36. The exception is that the first sample period is only eighteen months.

37. The Wald test of the restriction that all accounting measures of risk coefficients are zero was not significant at the 5 percent confidence level.

38. Flannery and Sorescu used a different sample of banks.

35. In each quarter, the top fifty bank holding companies are defined as those organizations that were among the largest fifty when such organizations were ranked by asset size. Thus, the top fifty bank holding companies can be different in each quarter.

2. Top bank holding company SND spreads over Treasury securities with comparable maturities, 1991:Q1–1997:Q4



In each of the next three periods (1992:Q1 to 1993:Q4, 1994:Q1 to 1995:Q1, and 1996:Q1 to 1997:Q4), the accounting measures of risk were as likely to have positive parameter estimates as to have negative ones. Indeed, taken together the five accounting measures of risk had a significant *positive* effect on the issuance decision in each of these three periods.³⁹ These results may at first seem counter-intuitive, but data on SND spreads at issuance over comparable-maturity Treasury securities for the top fifty bank holding companies over 1991–97 offer a partial explanation. These spreads can be used to explain why there is not a negative relationship, but not why there is a positive relationship, between risk measures and the issuance decision during this period.

We first consider figure 2, which shows box plots for such spreads in each quarter for the 1991:Q1 to 1997:Q4 period. These box plots are graphical representations of the center and width of a distribution,

along with outliers. The height of each black box is equal to the interquartile width, which is the difference between the third quartile and first quartile of data. This width has narrowed considerably since 1992:Q1. It is also notable that in the middle to late 1990s the top quartile of the SND spread over comparable-maturity Treasuries is below the medians of such spreads (which are represented by horizontal lines in the interior of each box) that were observed during 1991. The brackets ([]) for each box plot are located at extreme values of the data for the quarter or at a distance equal to 1.5 times the interquartile distance from the center, whichever is less.⁴⁰ During the middle to late 1990s, there are many quarters in which the upper brackets are considerably *below* the median SND spread over comparable maturities that were observed in 1991. Therefore, although market discipline may have been imposed in terms of *relative* prices of issuance during 1992–97, these spreads may have been too small to induce any change in issu-

39. The Wald tests reject the restrictions that all five coefficients of the accounting measure of risk are zero at the 5 percent confidence level. Moreover, the sums of all the marginal effects were positive for each of the three periods.

40. For data having a Gaussian distribution, approximately 99.3 percent of the data fall inside the brackets. Horizontal dashes represent “unusually deviant data points” that are further than 1.5 times the interquartile distance from the center of the box.

2. Does the Banking Organization's Risk, Size, and Frequency of SND Issuance Affect Its Probability of Issuance?

Explanatory variables	Dependent variable: the decision to issue					
	Sample 86:Q2–87:Q4	Expected sign?	Sample 88:Q1–89:Q4	Expected sign?	Sample 90:Q1–91:Q4	Expected sign?
<i>Accounting risk measures</i>						
The ratio of non-accruing loans to total assets (<i>NATA</i>) .....	.023 (0.00)		10.238 (.86)		-15.512 (-1.42)	X
The ratio of accruing loans past due 90 days or more to total assets (<i>PDTA</i>)	45.372 (.86)		-171.250 (-2.35)	X	-135.636 (-2.11)	X
The ratio of other real estate owned to total assets (<i>OREO</i>)	-37.503 (-.82)	X	-38.501 (-1.08)	X	42.509 (1.75)	
The absolute value of the difference between assets and liabilities maturing or repricing within one year as a proportion of equity value (<i>AGAP</i>)	-.026 (-.86)	X	.014 (2.00)		.008 (1.36)	
The ratio of total book liabilities to the sum of the market value of common stock and the book value of preferred stock (<i>MKTLEV</i>) .....	.024 (.75)		.020 (.62)		-.073 (-2.08)	X
<i>Other bank-specific factors</i>						
The natural log of total assets ($\ln[ASSET]$) .....	.712 (3.57)	X	.093 (.48)	X	1.102 (5.91)	X
An indicator variable that equals one if the banking organization issued SND in the preceding six-month period, and zero otherwise ($ISSUE_{i-1}$) .....	.046 (.19)	X	.334 (1.31)	X	.717 (3.21)	X
<i>Goodness-of-fit measures</i>						
Fraction of correct predictions .....	.866		.886		.840	
Percent that issued SND	16.66		11.37		18.09	

NOTE. All specifications include a constant term that was significant at the 5 percent level. Year indicator variables, which were equal to one in the first year of each panel and zero other-

wise, were also included, though those coefficient estimates are not reported here. Numbers in parentheses are *t*-statistics.

ance decisions. However, the general low level of spreads does not explain why relatively risky banks were more likely than safer banks to issue during this period.

To interpret the latter result, we consider the possibility that SND spreads during 1993–97 did not reflect the risk of banking organizations to the same degree that spreads did in the early 1990s.⁴¹ On the

41. This interpretation is not inconsistent with market discipline studies that have found evidence of spread sensitivity to risk in the mid-1990s (for example, Jagtiani, Kaufman, and Lemieux, 1999). The interpretation requires only that spreads be relatively insensitive to a banking organization's risk, which does not rule out the possibility that the spreads are statistically sensitive to an organization's risk.

margin, a drop in relative spreads would have provided the riskiest banks with the greatest incentive to issue SND. Therefore, our finding that the riskiest banks were most likely to issue SND from 1992 to 1997 is consistent with a reduction in the risk sensitivity of SND and weaker market discipline during this period, a view supported by a number of market participants that the study group interviewed.⁴²

42. An alternative explanation for the positive coefficients on risk variables is that relatively risky banks during 1988–91 were unable to issue SND and, therefore, issued in 1992–97 to ease the banks' pent-up desire to issue debt.

2. Continued

Explanatory variables	Dependent variable: the decision to issue					
	Sample 92:Q1–93:Q4	Expected sign?	Sample 94:Q1–95:Q4	Expected sign?	Sample 96:Q1–97:Q4	Expected sign?
<i>Accounting risk measures</i>						
The ratio of non-accruing loans to total assets (<i>NATA</i>)	13.516 (.96)		-33.397 (-.98)	X	-.029 (-.00)	X
The ratio of accruing loans past due 90 days or more to total assets (<i>PDTA</i>)	114.618 (1.89)		113.623 (1.05)		44.794 (1.45)	
The ratio of other real estate owned to total assets (<i>OREO</i>)	-67.462 (-2.37)	X	8.472 (.14)		300.890 (2.81)	
The absolute value of the difference between assets and liabilities maturing or repricing within one year as a proportion of equity value (<i>AGAP</i>)	-.014 (-.45)	X	-.035 (-.79)	X	-.102 (-1.12)	X
The ratio of total book liabilities to the sum of the market value of common stock and the book value of preferred stock (<i>MKTLEV</i>) .....	.093 (2.20)		.090 (1.77)		.093 (1.97)	
<i>Other bank-specific factors</i>						
The natural log of total assets ($\ln[ASSET]$) .....	.609 (4.90)	X	.641 (4.89)	X	.565 (5.13)	X
An indicator variable that equals one if the banking organization issued SND in the preceding six-month period, and zero otherwise ($ISSUE_{i-1}$) .....	.733 (4.06)	X	.567 (2.88)	X	.428 (2.34)	X
<i>Goodness-of-fit measures</i>						
Fraction of correct predictions .....	.819		.837		.795	
Percent that issued SND	31.47		24.78		28.81	

In all two-year periods considered in table 2, the coefficients on the frequency of issuance and the banking organization's asset size are of the expected (positive) sign, and almost all are significantly different from zero at the 5 percent level. These positive coefficients are consistent with studies of SND secondary market spreads over comparable-maturity Treasuries, which find that larger banking organizations have narrower secondary market spreads than smaller banking organizations. The only discernible pattern in the significance of the coefficients is that issuance in the previous six-month interval is becoming more important over time. This finding suggests a trend toward more-frequent issuance by some top fifty bank holding companies in recent years, a view that was supported by study group interviews with market participants.

We next consider how private benefits, bond market volatility, and macroeconomic conditions are estimated to affect the decision to issue SND by top fifty bank holding companies. In table 3, parameter estimates for a probit model that includes the "bare bones" model variables, additional bank-specific variables, and variables for bond market and macroeconomic conditions are presented. Based on the findings presented in table 2, we provide parameter estimates for the period in which market discipline is strongest (1989–92) and for the entire sample period (1986:Q2 through 1997:Q4). With regard to private benefits, neither the variable for foreign and domestic income taxes as a percentage of net income (*AVGTAX*) nor the variable for the ratio of book equity to total assets (*KA*) was significant. The sign of the bond market volatility parameter estimate was

3. How Do Bank-Specific Factors, Bond Market Risk, and Macroeconomic Conditions Affect the Probability of Issuance?

Explanatory variables	Dependent variable: the decision to issue			
	Sample 89:Q1–92:Q4	Expected sign?	Sample 86:Q2–97:Q4	Expected sign?
<i>Accounting risk measures</i>				
The ratio of non-accruing loans to total assets (<i>NATA</i>)	-10.078 (-1.45)	X	-6.896 (-1.39)	X
The ratio of accruing loans past due 90 days or more to total assets (<i>PDTA</i>)	-41.949 (-1.01)	X	7.137 (.35)	
The ratio of other real estate owned to total assets (<i>OREO</i>)	7.322 (.47)		-4.698 (-.40)	X
The absolute value of the difference between assets and liabilities maturing or repricing within one year as a proportion of equity value (<i>AGAP</i>).....	.001 (.41)		-.001 (-.39)	X
The ratio of total book liabilities to the sum of the market value of common stock and the book value of preferred stock (<i>MKTLEV</i>) .....	.010 (.36)		.024 (1.56)	
<i>Other bank-specific factors</i>				
The natural log of total assets ($\ln[ASSET]$) .....	.625 (6.03)	X	.637 (11.79)	X
An indicator variable that equals one if the banking organization issued SND in the preceding six-month period, and zero otherwise ($ISSUE_{i-1}$) .....	.724 (5.20)	X	.641 (7.90)	X
Foreign and domestic income taxes as a percentage of net income (<i>AVGTAX</i>)	-.0001 (-.15)		-.182 (-.42)	X
The ratio of book equity to book total assets (<i>KA</i>)	4.424 (.50)		5.857 (1.37)	
<i>Bond market risk</i>				
The implied stock volatility measure calculated from option prices traded on the Chicago Board Option Exchange (<i>MKTVOL</i>)	-.032 (-1.03)	X	-.049 (-4.22)	X
<i>Macroeconomic conditions</i>				
National Bureau of Economic Research recession indicator that equals one during a recession and zero otherwise (<i>NBER</i>) .....	.227 (1.07)		.247 (1.26)	
<i>Goodness-of-fit measures</i>				
Fraction of correct predictions .....	.82		.83	
Percent that issued SND	21.17		21.89	

NOTE. All specifications include a constant term that was significant at the 5 percent level. Year indicator variables, which were equal to one in each specific year of each panel and zero

otherwise, were also included for all years except the first year, though those coefficient estimates are not reported here. Numbers in parentheses are *t*-statistics.

in the predicted direction in both periods, although bond market conditions appear to be significant only for the longer sample. Despite the reduction in the number of top fifty bank holding companies issuing SND during the 1991 recession (see figure 2), after controlling for differences in the bank holding company (BHC) risks and other BHC-specific factors, there does not appear to be a statistically significant relationship between macroeconomic conditions (*NBER*) and the issuance decision.

Implications for Direct and Indirect Market Discipline

Our analysis of the SND issuance decision has several implications for the potential extent of direct market discipline imposed by a *mandatory* SND requirement. First, during periods of financial stress or uncertain bond market conditions, the SND market appears to impose rather strong direct discipline on banking organizations. Earlier research established that SND spreads are related to a banking organization's risk. Our finding that some banking organizations during 1989–92 revealed a preference for not issuing SND when they became riskier clearly indicates that mandatory issuance would impose a penalty for risk-taking beyond the penalty associated with not issuing SND. The result that some banking organizations during the current regime do not issue when bond markets are volatile suggests that mandatory issuance would impose additional costs during such conditions. However, the fact that some banking organizations continue to issue SND during such times possibly suggests that these banking organizations are able to convey their soundness to the market. Therefore, mandatory SND issuance might increase disclosure by banking organizations during periods of bond market turbulence and enhance safety and soundness.

Second, direct discipline may vary with banking market conditions. Issuance was statistically sensitive and *positively* related to accounting-based risk measures during 1993–97. This finding suggests that SND prices did not fully reflect banking organization risk because, if they did, the riskiest banking organizations would not have had an incentive to issue SND. Therefore, market discipline appears to have been relatively weak during this period of favorable banking market conditions.

Third, mandatory issuance may enhance indirect market discipline during periods of financial stress. This inference follows because (1) relatively riskier banking organizations choose not to issue during periods of banking industry distress and (2) issuance

prices may refresh secondary prices because disclosure generally increases at issuance. The results also suggest that, in the absence of mandatory issuance, information exists in the decision to issue itself, particularly in periods of financial stress. Therefore, our results suggest that a systematic analysis of banking organizations' decisions to issue SND could be used to enhance supervision during or after such periods.

Could an SND Policy Be Expected to Improve Market Discipline?

As discussed earlier, direct discipline is exerted through a risk-sensitive debt instrument when a banking organization's expected cost of issuing the instrument increases with its risk profile. This form of market discipline may induce the bank to lower its riskiness and even not to issue SND when the expected cost is relatively high. In contrast, indirect market discipline is exerted through a debt instrument when private parties and possibly government supervisors monitor secondary market prices of the instrument to determine the risk exposure (or default probability) of the banking organization. Although direct discipline generally operates through the SND issuance market and indirect discipline operates through the secondary market, indirect discipline could be enhanced by SND issuance if such issuance affected the information that is contained in secondary market SND spreads.

Overall, there is fairly strong evidence that market discipline, both direct and indirect, is exerted on banking organizations that issue SND. The extent to which direct market discipline is imposed on banking organizations appears to depend on (1) whether SND market participants perceive that there are government guarantees and (2) what banking market conditions are. The larger the perceived guarantee, the smaller the amount of direct SND market discipline that is exerted. Thus, for an SND policy to enhance direct market discipline, bondholders would have to believe that they would not be bailed out when the bank became insolvent or financially distressed. During periods of financial difficulty, the SND market appears to impose rather strong direct discipline on banks: The evidence indicates that in such periods some of the riskier banking organizations do not issue SND. Therefore, an SND policy with mandatory issuance would likely impose greater market discipline on riskier banking organizations during periods of financial stress, when such discipline would presumably be most beneficial. In more quiescent periods, SND spreads over com-

parable Treasuries may be less reflective of banking organization risk (that is, direct market discipline appears to be weaker), but nonetheless, some direct market discipline still seems to be imposed on the relatively risky banking organizations.⁴³

With respect to indirect market discipline, academic studies that use readily available historical time-series information on SND secondary market spreads found that it would have been useful after 1988 for private parties to have monitored such information to assess the relative riskiness of banking organizations.⁴⁴ Given this finding, it is not surprising that, in many cases, study group interviewees indicated that market participants monitor SND spreads for peer groups of banks. Indeed, some of these participants indicated that they viewed relative changes in SND spreads as the most important signal of a change in the perceived credit quality of a banking organization. SND market participants also suggested that different information was contained in SND spreads than was contained in stock price movements. Therefore, an SND policy that would make information on SND secondary prices less costly to obtain would likely increase the extent of indirect market discipline provided by the SND market.⁴⁵

The evidence also supports the view that an SND policy that requires regular issuance would enhance indirect market discipline. SND market participants interviewed by the study group claimed that substantially more information is revealed to the SND market at issuance. Therefore, issuance appears to compel disclosure to the market of information about a banking organization's current condition and prospects, and such disclosure would refresh secondary market prices and enhance indirect market discipline. This observation, together with the finding that some riskier banking organizations choose not to issue during periods of financial strain, implies that an SND policy that would require banking organizations to issue SND in shorter time intervals

would improve the information content of SND spreads and therefore presumably increase their use by private parties that monitor the condition of banking organizations.

Also important is whether supervisors could use SND market information to monitor the condition or perceived credit quality of a banking organization. Empirical evidence suggests that assessments about a banking organization's risks are reflected in its supervisory opinions, its decision to issue SND, and its secondary market SND spreads over comparable Treasuries. Supervisory opinions are refreshed by conducting bank examinations. Market assessments are refreshed by new issuances that compel disclosure to the market about an organization's current condition and prospects or by other events that provide information to the market. Therefore, if bank examinations and new SND issues occur at different times, then these assessments likely reflect different information about a banking organization's risks. Further, markets probably would focus on different aspects of a banking organization than would supervisors. The few empirical studies that consider whether market assessments about banking organization risks would be valuable information to supervisors, although simplistic in their measurement of supervisory opinions, suggest that such assessments would be useful supervisory tools, despite the fact that existing studies do not consider whether market information had been refreshed by new issuance. On the whole, it seems likely that information contained in the SND market would supplement supervisory assessments of banking organizations.

In sum, academic studies, SND market participant interviews, and research undertaken by study group members suggest fairly strongly that an SND policy would be likely to improve both direct and indirect market discipline on the institutions subject to the policy. The next section considers a number of key design features of an SND policy likely to affect the expected improvement in direct and indirect market discipline.

3. Analysis of the Key Characteristics of a Subordinated Debt Policy

As discussed in section 1 (see especially table 1), proposals for an SND policy can and do vary widely. This section analyzes the critical characteristics identified by the study group. At the outset, one should recognize that, although the characteristics are examined in separate sections, many of them are interdependent. For example, a larger SND requirement would allow for more-frequent issuance, as

43. Studies of secondary market SND spreads during the mid-1990s have found these spreads to be risk-sensitive. Because issuance prices are likely to be correlated with secondary prices, direct market discipline was probably imposed during this period.

44. In many cases, the authors adjusted the secondary market spreads over comparable Treasury securities for non-credit-related factors that affect bond yields. The most important of such adjustments is for the value of call options, which can be embedded in many of the bank SNDs. See Flannery and Sorescu (1996).

45. SND market participants that monitor prices daily said that they feel calling at least five dealers for their quotes is necessary (see appendix B). Interestingly, in the interviews conducted by study group members, SND market participants did not indicate that a lack of standardization across SND instruments made it difficult to compare the credit quality of banking organizations within a peer group.

would limiting the SND policy to the very largest banks. Thus, a decision regarding the preferred SND policy will need to resolve several trade-offs.

What Institutions Should Be Subject to an SND Policy?

Size Alone or Size Plus Other Criteria?

According to study group interviews with market participants, about fifteen to twenty, and perhaps as many as thirty, of the largest banks and bank holding companies have actively traded SND, although many more have issued some SND. In addition, market participants argued that the principal issuers have total assets of at least \$50 billion. The secondary market for the SND of such firms was generally said to be highly liquid most of the time, to the point that the market provides a useful vehicle for trading and hedging. Market liquidity for the SND of smaller firms was, by implication, problematic. If correct, and the data presented next support the market participants' views, these arguments suggest that unless policy-makers are willing to require substantial augmentation of the existing market for bank or BHC SND, an SND policy will have to be limited to the largest firms, probably considerably less than the largest fifty banks or bank holding companies.

More important, if an SND policy is focused on using market discipline to help constrain systemic risk, then limiting an SND policy to the largest institutions has considerable appeal. Clearly, the largest institutions are generally the firms that hold the most significant potential for systemic risk. However, a criterion based solely on total assets, or even risk-weighted assets, may be too rough to capture the banks or bank holding companies most likely to pose significant systemic risks. An appealing alternative set of criteria is that used by the Federal Reserve Board's Division of Bank Supervision and Regulation to define large, complex banking organizations (LCBOs). These criteria are meant to capture those banking organizations most likely to raise concerns about systemic risk. In general, LCBOs (1) have significant on- and off-balance-sheet risk exposures, (2) offer a broad range of products and services at the domestic and international levels, (3) are subject to multiple supervisors in the United States and abroad, and (4) participate extensively in large-value payment and settlement systems.

Tables 4 and 5 provide a variety of data on SND issuance by U.S. banks and bank holding companies,

respectively. Each table is arranged in selected years in the 1990s and selected size classes. As is clear from the tables, SND issuance at both the bank and the BHC levels is overwhelmingly accounted for by the largest institutions. For example, as of the end of 1998, 90 percent of the top fifty banks and 96 percent of the top fifty bank holding companies had SND outstanding.⁴⁶ In contrast, even among size class 3 banks and bank holding companies (those with total assets between \$500 million and \$10 billion), less than 20 percent of banks and less than 12 percent of bank holding companies issued SND.

With the exception of the group of the very largest (the top fifty) institutions, the percentage of both banks and bank holding companies issuing SND declined over the 1990s. For the three smallest size classes of firms, the declines were substantial. Although the reasons for this decline are uncertain, part of the explanation may lie in the increasing minimum size of an individual SND issue, which was noted by many of the market participants interviewed by the study group.⁴⁷ This hypothesis is supported by the dramatic increase in outstanding SND at both banks and bank holding companies during the 1990s, virtually all of which occurred at the largest institutions (see tables 4 and 5). Indeed, the total amount of BHC SND outstanding grew from \$24.6 billion (in 1998 dollars) at the end of 1991 to \$102.8 billion at the end of 1998, a compound annual growth rate of 23 percent. At the end of 1998, \$100.0 billion (97 percent) of outstanding SND had been issued by the top fifty bank holding companies. In short, over the 1990s a rapidly growing amount of SND was accounted for by an increasingly small number of institutions, which were overwhelmingly in the top fifty.

Even the level of disaggregation given in tables 4 and 5 can hide important characteristics of the market for bank and BHC SND. Thus, tables 6 and 7 provide data, as of the end of 1998, for the fifty largest U.S. banks and bank holding companies, respectively, ranked by total assets. As may be seen in the tables, the \$50 billion asset size cutoff indicated by market participants suggests that an SND policy would apply only to the top fifteen banks or the largest twenty bank holding companies.

The LCBO columns of tables 6 and 7 identify whether the bank or bank holding company is a large, complex banking organization. Clearly, the

46. It is important to note that most bank SND are not traded, a point that will be discussed later.

47. Currently, the minimum size of issuance appears to be about \$150 million. For more on this point, see appendix B.

4. Subordinated Debt Issuance by U.S. Insured Commercial Banks, 1991–98

Item ¹	Size 1	Size 2	Size 3	Size 4	Top 50	All banks
<i>Total banks (number)</i>						
1991	9,925	1,417	576	49	50	11,967
1995	7,823	1,483	604	74	50	9,984
1997	7,029	1,498	595	65	50	9,187
1998	6,593	1,566	588	70	50	8,817
<i>Banks issuing subordinated debt</i>						
<i>Number</i>						
1991	186	110	156	41	42	493
1995	65	53	116	59	42	293
1997	42	29	105	53	43	229
1998	35	26	109	56	45	226
<i>Percent</i>						
1991	1.87	7.76	27.08	83.67	84.00	4.12
1995	0.83	3.57	19.21	79.73	84.00	2.93
1997	0.60	1.94	17.65	81.54	86.00	2.49
1998	0.53	1.66	18.54	80.00	90.00	2.56
<i>Amount of subordinated debt</i> <i>(millions of 1998 dollars)</i>						
1991	204	310	4,091	23,569	23,608	28,175
1995	52	164	6,338	38,078	35,210	44,631
1997	37	112	6,865	54,686	52,844	61,700
1998	35	84	6,432	65,595	62,889	72,145
<i>Compounded annual growth rate (percent)</i>						
1991–98	-22	-17	7	16	15	14
<i>Average ratio of subordinated debt to total</i> <i>assets for those banks issuing subordinated debt</i>						
<i>Equally weighted</i>						
1991 .....	.0156	.0080	.0080	.0122	.0120	.0113
1995 .....	.0122	.0108	.0142	.0167	.0177	.0136
1997 .....	.0136	.0016	.0172	.0181	.0188	.0160
1998 .....	.0148	.0116	.0170	.0202	.0203	.0168
<i>Weighted by total assets</i>						
1991 .....	.0145	.0086	.0077	.0166	.0165	.0141
1995 .....	.0121	.0105	.0148	.0180	.0184	.0174
1997 .....	.0132	.0121	.0189	.0189	.0191	.0189
1998 .....	.0135	.0111	.0186	.0201	.0202	.0200
<i>Average ratio of subordinated debt to</i> <i>risk-weighted assets for those banks issuing</i> <i>subordinated debt</i>						
<i>Equally weighted</i>						
1991 .....	.0223	.0134	.0102	.0139	.0136	.0158
1995 .....	.0209	.0137	.0169	.0203	.0215	.0185
1997 .....	.0225	.0158	.0215	.0214	.0222	.0210
1998 .....	.0245	.0167	.0206	.0227	.0231	.0213
<i>Weighted by risk-weighted assets</i>						
1991 .....	.0228	.0130	.0102	.0187	.0185	.0166
1995 .....	.0190	.0151	.0183	.0227	.0233	.0219
1997 .....	.0200	.0167	.0226	.0233	.0235	.0232
1998 .....	.0196	.0163	.0221	.0238	.0240	.0237

NOTE. Size 1: total assets < \$150 million;
Size 2: \$150 million ≤ total assets < \$500 million;
Size 3: \$500 million ≤ total assets < \$10 billion;
Size 4: total assets ≥ \$10 billion;
Top 50: top fifty banks by total assets.

1. As of December 31 of each year.

5. Subordinated Debt Issuance by Top-Tier U.S. Bank Holding Companies (BHCs) with Consolidated Assets of Greater than \$150 Million

Item ¹	Size 1	Size 2	Size 3	Size 4	Top 50	Top-tier BHCs
<i>Total top-tier BHCs (number)</i>						
1991	0	739	349	56	50	1,144
1995	0	844	338	65	50	1,247
1997	0	943	406	60	50	1,409
1998	0	1,039	420	62	50	1,521
<i>Top-tier BHCs issuing subordinated debt</i>						
<i>Number</i>						
1991	0	120	122	54	49	296
1995	0	75	60	61	48	196
1997	0	69	47	56	49	172
1998	0	63	49	55	48	167
<i>Percent</i>						
1991 .....	.00	16.24	34.96	96.43	98.00	25.87
1995 .....	.00	8.89	17.75	93.85	96.00	15.72
1997 .....	.00	7.32	11.58	93.33	98.00	12.21
1998 .....	.00	6.06	11.67	88.71	96.00	10.98
<i>Amount of subordinated debt</i> <i>(millions of 1998 dollars)</i>						
1991	0	477	3,053	21,075	20,863	24,605
1995	0	152	1,945	63,753	61,842	65,850
1997	0	161	1,924	84,701	83,681	86,786
1998	0	137	1,876	100,780	100,040	102,790
<i>Compounded annual growth rate (percent)</i>						
1991-98	0	-16	-7	25	25	23
<i>Average ratio of subordinated debt to total assets for those top-tier BHCs issuing subordinated debt</i>						
<i>Equally weighted</i>						
1991 .....	.0000	.0141	.0084	.0093	.0098	.0109
1995 .....	.0000	.0077	.0108	.0179	.0193	.0118
1997 .....	.0000	.0080	.0104	.0182	.0192	.0120
1998 .....	.0000	.0076	.0110	.0185	.0201	.0122
<i>Weighted by total assets</i>						
1991 .....	.0000	.0174	.0100	.0115	.0117	.0114
1995 .....	.0000	.0077	.0103	.0214	.0219	.0207
1997 .....	.0000	.0082	.0116	.0227	.0230	.0222
1998 .....	.0000	.0078	.0124	.0223	.0226	.0219
<i>Average ratio of subordinated debt to risk-weighted assets for those top-tier BHCs issuing subordinated debt</i>						
<i>Equally weighted</i>						
1991 .....	.0000	.0134	.0121	.0123	.0130	.0126
1995 .....	.0000	.0123	.0165	.0241	.0258	.0172
1997 .....	.0000	.0124	.0148	.0234	.0245	.0167
1998 .....	.0000	.0116	.0161	.0233	.0251	.0168
<i>Weighted by risk-weighted assets</i>						
1991 .....	.0000	.0124	.0146	.0135	.0137	.0137
1995 .....	.0000	.0118	.0144	.0276	.0281	.0268
1997 .....	.0000	.0121	.0157	.0288	.0291	.0282
1998 .....	.0000	.0116	.0172	.0283	.0286	.0279

NOTE. Size 1: total assets < \$150 million;
Size 2: \$150 million ≤ total assets < \$500 million;
Size 3: \$500 million ≤ total assets < \$10 billion;
Size 4: total assets ≥ \$10 billion;
Top 50: top fifty banks by total assets.

1. As of December 31 of each year.

6. The Fifty Largest U.S. Insured Commercial Banks by Total Assets, 1998:Q4

Rank	Bank name	City	State	Total assets (millions of dollars)	LCBO	MRMB
1.	Bank of America National Trust & Savings Association ¹	San Francisco	CA	574,606	1	1
2.	Citibank, National Association	New York	NY	300,895	1	1
3.	Chase Manhattan Bank	New York	NY	296,717	1	1
4.	First Union National Bank	Charlotte	NC	222,483	1	1
5.	Morgan Guaranty Trust Company	New York	NY	175,827	1	1
6.	Wells Fargo Bank, National Association	San Francisco	CA	118,556	1	0
7.	Bankers Trust Company	New York	NY	104,558	1	1
8.	Fleet National Bank	Providence	RI	75,601	1	0
9.	First National Bank of Chicago	Chicago	IL	74,201	1	1
10.	Keybank, National Association	Cleveland	OH	73,862	1	0
11.	PNC Bank, National Association	Pittsburgh	PA	71,230	1	0
12.	U S Bank, National Association	Minneapolis	MN	69,713	1	0
13.	BankBoston, National Association	Boston	MA	69,547	1	1
14.	Wachovia Bank, National Association	Winston-Salem	NC	62,006	1	0
15.	Bank of New York	New York	NY	60,078	1	1
16.	Republic National Bank of New York	New York	NY	46,460	1	1
17.	State Street Bank & Trust Company	Boston	MA	43,185	1	1
18.	Mellon Bank, National Association	Pittsburgh	PA	42,235	1	0
19.	Southtrust Bank, National Association	Birmingham	AL	38,054	0	0
20.	Regions Bank	Birmingham	AL	37,128	0	0
21.	Marine Midland Bank	Buffalo	NY	33,776	1	1
22.	Chase Manhattan Bank USA, National Association	Wilmington	DE	32,988	1	0
23.	Union Bank of California, National Association	San Francisco	CA	32,053	0	0
24.	National City Bank	Cleveland	OH	31,049	1	0
25.	Bank One, National Association	Columbus	OH	30,413	1	0
26.	Summit Bank	Hackensack	NJ	29,504	0	0
27.	Comerica Bank	Detroit	MI	29,375	0	0
28.	Huntington National Bank	Columbus	OH	28,108	0	0
29.	Fleet Bank, National Association	Jersey City	NJ	27,978	1	0
30.	Crestar Bank	Richmond	VA	27,620	1	0
31.	Union Planters Bank, National Association	Memphis	TN	27,407	0	0
32.	Branch Banking & Trust Company	Winston-Salem	NC	25,985	0	0
33.	Bank One Texas, National Association	Dallas	TX	25,543	1	0
34.	Chase Bank Texas, National Association	Houston	TX	24,488	1	0
35.	MBNA America Bank, National Association	Wilmington	DE	23,602	0	0
36.	Northern Trust Company	Chicago	IL	23,304	0	0
37.	NBD Bank	Detroit	MI	22,955	1	0
38.	Mercantile Bank, National Association	Saint Louis	MO	22,791	0	0
39.	LaSalle National Bank	Chicago	IL	22,445	1	0
40.	Bank One Arizona, National Association	Phoenix	AZ	20,983	1	0
41.	First American National Bank	Nashville	TN	20,359	0	0
42.	Manufacturers & Traders Trust Company	Buffalo	NY	20,074	0	0
43.	Amsouth Bank	Birmingham	AL	19,833	0	0
44.	National City Bank Milwaukee/Ilinois	Bannockburn	IL	19,827	1	0
45.	Suntrust Bank	Atlanta	GA	19,635	1	0
46.	Harris Trust & Savings Bank	Chicago	IL	18,101	1	0
47.	First Tennessee Bank, National Association, Memphis	Memphis	TN	17,786	0	0
48.	Star Bank, National Association	Cincinnati	OH	17,331	0	0
49.	First Security Bank, National Association	Ogden	UT	17,239	0	0
50.	First Maryland Bancorp Bank	Baltimore	MD	17,115	0	0

NOTES. LCBO = Large, complex banking organization. MRMB = Market risk model bank. 1 = member of group, 0 = not member.

1. Includes Nations Bank.

7. The Fifty Largest U.S. Bank Holding Companies (BHCs) by Total Assets, 1998:Q4

Rank	BHC name	Total assets (millions of dollars)	RWA (millions of dollars)	Bank assets ¹ / BHC assets (percent)	Tier 1 / RWA (percent)	SND / RWA (percent)	LCBO	MRMB
1. ...	Citigroup	668,641	481,411	36.12	8.70	1.65	1	1
2. ...	BankAmerica Corporation	617,679	521,576	90.47	7.07	3.16	1	1
3. ...	Chase Manhattan Corporation	365,875	289,291	91.49	8.32	2.93	1	1
4. ...	Bank One Corporation	261,496	244,472	93.78	8.04	3.00	1	1
5. ...	J P Morgan & Company, Inc.	261,067	140,171	40.81	8.02	3.65	1	1
6. ...	First Union Corporation	237,363	193,818	95.12	7.01	4.91	1	1
7. ...	Wells Fargo & Company	202,475	153,772	84.62	8.08	1.77	1	0
8. ...	Bankers Trust Corporation	133,115	67,962	63.22	7.92	5.83	1	1
9. ...	Fleet Financial Group, Inc.	104,554	105,670	93.44	6.99	3.22	1	0
10. ...	SunTrust Bank, Inc.	93,170	80,586	94.09	8.17	1.71	1	0
11. ...	National City Corporation	88,246	72,055	98.62	8.65	2.71	1	0
12. ...	KeyCorp	79,966	74,660	98.45	7.21	3.63	1	1
13. ...	PNC Bank Corporation	77,232	71,121	97.38	7.80	2.22	1	0
14. ...	U S Bancorp	76,438	76,790	95.14	6.40	3.98	1	0
15. ...	BankBoston Corporation	73,513	70,370	94.94	7.15	3.81	1	1
16. ...	Wachovia Corporation	64,123	69,929	97.27	7.99	3.96	1	0
17. ...	Bank of NY Company, Inc.	63,503	61,319	97.45	7.91	3.24	1	1
18. ...	ABN Amro North America, Inc.	61,308	40,516	...	7.30	2.21	1	0
19. ...	Mellon Bank Corporation	51,018	49,283	96.81	6.41	4.45	1	0
20. ...	Republic New York Corporation	50,424	26,495	...	12.92	9.99	1	1
21. ...	State Street Corporation	47,082	19,230	99.31	14.17	0.01	1	1
22. ...	Regions Financial Corporation	39,140	25,939	...	10.12	0.77	0	0
23. ...	Firststar (Wi) Corporation	38,476	31,230	98.85	9.01	1.69	0	0
24. ...	SouthTrust Corporation	38,134	33,158	99.77	6.58	2.94	0	0
25. ...	Bankmont Financial Corporation	38,080	23,949	...	9.66	2.29	0	0
26. ...	Comerica, Inc.	36,697	43,144	...	6.24	3.20	0	0
27. ...	Mercantile Bancorporation, Inc.	35,974	25,374	99.96	9.66	1.68	0	0
28. ...	Branch Banking & Trust Corporation	34,427	23,098	98.01	9.97	3.72	0	0
29. ...	HSBC Americas, Inc.	33,944	26,081	...	8.62	2.39	1	1
30. ...	Summit Bancorp	33,130	23,645	98.89	10.85	0.95	0	0
31. ...	UnionBanCal Corporation	32,301	30,753	...	9.64	0.97	0	0
32. ...	Union Planters Corporation	31,692	20,591	100.00	13.4	2.34	0	0
33. ...	Fifth Third Bancorp	28,922	24,345	99.66	12.02	1.02	0	0
34. ...	Huntington Bancshares, Inc.	28,296	24,239	99.95	7.10	2.88	0	0
35. ...	Northern Trust Corporation	27,870	20,074	100.00	9.78	2.12	1	0
36. ...	MBNA Corporation	25,808	24,738	92.98	11.44	2.03	0	0
37. ...	Popular, Inc.	23,160	13,485	...	10.76	0.93	0	0
38. ...	First Security Corporation	21,689	16,207	98.95	8.98	1.23	0	0
39. ...	Marshall & Ilsley Corporation	21,566	16,121	97.42	12.78	0.62	0	0
40. ...	First American Corporation	20,722	14,995	...	10.36	0.66	0	0
41. ...	M & T Bank Corporation	20,584	16,279	100.00	8.43	1.08	0	0
42. ...	Amsouth Bancorporation	19,919	17,912	...	6.55	3.37	0	0
43. ...	First Tennessee National Corporation	18,735	13,100	99.88	7.13	2.46	0	0
44. ...	Citizens Financial Group, Inc.	18,430	12,540	...	10.89	0.00	0	0
45. ...	First Maryland Bancorp	18,408	14,817	...	9.38	2.08	0	0
46. ...	Compass Bancshares, Inc.	17,301	13,491	...	8.81	1.00	0	0
47. ...	Zions Bancorporation	16,650	11,830	...	8.46	1.92	0	0
48. ...	Old Kent Financial Corporation	16,589	11,735	99.86	9.32	0.85	0	0
49. ...	Bancwest Corporation	15,050	13,219	...	8.17	1.54	0	0
50. ...	Pacific Century Financial Corporation	15,017	11,708	100.00	9.42	1.01	0	0

NOTE. RWA = risk-weighted assets. SND = subordinated notes and debentures. LCBO = Large, complex banking organization. MRMB = Market risk model bank.

... = a missing value. 1 = member of group, 0 = not member.

1. BHC banking assets = BHC total assets – BHC net nonbank assets. BHC net nonbank assets = Total nonbank assets – Balances due from parent BHC – Balances due from other nonbank subsidiaries of the BHC.

link between size and the LCBO list is close. The largest eighteen of the top twenty banks are part of an LCBO organization, and all the largest twenty bank holding companies are LCBOs. Of the thirty-two LCBOs, all but eight foreign banking organizations are among the top fifty bank holding companies. However, once below the top twenty banks and bank holding companies ranked by total assets, the link with size deteriorates. Only six of the twelve banks ranked from 21 through 32 are LCBOs, and just two of the twelve bank holding companies so ranked are LCBOs.

An alternative criterion that might be considered is to apply an SND policy to those banks or banking organizations that use market risk models to meet a portion of their risk-based capital requirements. Such banks must have met several criteria established by the bank regulators that identify them as having acceptable, normally state-of-the-art, risk-management policies and procedures. Thus, by this definition they are “sophisticated” banking organizations, although the link with systemic risk concerns is not so clear as with the criteria of either size or size plus complexity. In addition, as of mid-March 1999, only thirteen banks or bank holding companies were using market risk models to meet their risk-based capital requirements. These organizations are identified in the MRMB columns of tables 6 and 7. As can be seen in the tables, all of the banks and bank holding companies that are MRMB organizations are also currently listed as LCBOs. In addition, eleven of the twelve banks that are on the MRMB list are among the top twenty banks ranked by total assets, and eleven of the thirteen bank holding companies that are on the MRMB list are among the top twenty.

Banks or Bank Holding Companies?

A critical decision point for designing an SND policy is whether to apply the policy to banks or to bank holding companies. Most SND proposals seem to apply the policy to banks, and there are strong public policy reasons for doing so. Most fundamentally, insured commercial banks have direct access to the federal safety net, and thus banks are where the dangers of moral hazard and the consequent risks to the taxpayer are concentrated. Therefore, to reduce moral hazard incentives, efforts to increase market discipline should be focused on banks rather than on their parent or affiliated organizations. Also, SND at the bank level could provide increased protection for the FDIC. Finally, an SND policy applied to banks would reinforce the regulatory

philosophy that the safety net and associated policies are limited to insured commercial banks. Conversely, applying the policy to bank holding companies would risk encouraging market participants to believe that the safety net extends implicitly to bank holding companies.

Although the arguments favoring a bank-oriented policy are strong, a number of counterarguments, most of which are of a practical nature, support application of an SND policy at the holding company level. One of these arguments builds on the fact that the current market for banking organization SND is overwhelmingly a market for BHC SND. Although banks issue SND, supervisory reports suggest that the vast majority of SND issued by major banks are held by the issuing bank’s holding company parent and are not traded.⁴⁸ This view is supported by a recent tabulation by Board staff members that indicates that, as of March 9, 1999, only eight of the top fifty banks had SND that were rated by a major rating agency. Because a rating is virtually required for bank SND to be publicly traded, the suggestion is that few banks have traded SND. In contrast, thirty-six of the top fifty bank holding companies had rated SND. These arguments suggest that if an SND policy were applied to banks, even the very largest banks, then the existing market for bank SND would need to be increased substantially.

Although study group interviews with market participants supported the view that primarily bank holding companies currently issue traded SND, there was some indication that requiring large banks to issue traded SND might not be particularly costly for such banks. As indicated, some large banks already issue SND. Moreover, a few major banks provide augmented disclosures at the bank level. In addition, it is conventional for bank SND to trade at a lower interest rate than BHC SND, in part because banks are commonly rated one to two notches higher than their holding company parent. According to Board staff calculations, the typical bank discount is around 8 basis points, but it can rise to much higher levels in times of individual firm or systemic financial stress. Indeed, some market participants asserted that many of the bank SND currently outstanding were issued in the early 1990s, when the banking crisis made issuing SND at the bank level considerably less costly than issuing them at the BHC level. As the spreads between bank and BHC SND have declined during the 1990s, the advantages of issuing at the BHC level, such as increased flexibility in allocating

48. No data source identifies who owns bank SND.

funds within the total organization, have come to dominate the interest cost disadvantage.

A second reason for applying an SND policy at the BHC level is that, at least today, banks tend to dominate the holding company even at the largest banking organizations. This tendency is seen in the Bank assets/BHC assets column of table 7, which gives the estimated percentage of total BHC assets accounted for by the banking assets of each of the top fifty bank holding companies. For the top fifty bank holding companies, the estimated ratio of bank assets is greater than or equal to 95 percent at twenty-seven of the forty-one institutions for which data are available. However, there are some notable exceptions to this tendency (for example, CitiGroup at 36 percent and J.P. Morgan at 41 percent), and significantly, the exceptions are concentrated among the very largest bank holding companies. For example, among the top twenty bank holding companies, only eight have a banking ratio of 95 percent or more; and among the top ten, only one holding company (First Union) meets this criterion.

Study group interviews with market participants suggested that today the market makes little distinction between the bank and the bank holding company, beyond the basis point differences in interest rates implied by a one or two notch difference in debt ratings. In particular, market participants claimed that distinguishing differences in credit quality between the two parts of the organization was difficult. However, some speculated that the CitiGroup model, if it became more widespread, might significantly change the way analysts look at widely diversified bank holding companies. Some interviewees suggested that the CitiGroup model might facilitate issuance of SND by the bank because such a structure would force analysts to look more carefully at each major component of the holding company.

A third reason for applying an SND policy at the BHC level derives from the fact that various sources indicate that bank holding companies are often, and perhaps normally, managed on a "product" or a "business line" basis, with relatively little attention paid to any one legal entity. Recognition of this evolution is an important motivation for many current efforts at supervisory and regulatory reform, including revision of the Basel Capital Accord. Such a management approach by bank holding companies suggests that continued, much less increased, focus by bank supervisors on the legal entity of the bank may become more and more unrealistic over time and could impose significant costs on banking organizations as they were forced, in essence, to keep one set of books for their supervisor and

another for their internal management and external market purposes. However, if the CitiGroup model becomes more common, application of SND or other supervisory and regulatory policies at the holding company level may be quite unattractive for several reasons, including the possibility of implying an expansion of the safety net.

A final point on the issue of whether an SND policy should be applied to the bank or the bank holding company relates to the potential impact of a bank-only policy on the likelihood that the parent holding company would continue to choose to offer SND and to the cost of reduced SND issuance at the parent level. Bank SND that were issued to third parties would, when the holding company's books were consolidated, also count as SND at the holding company level. Thus, a bank-only SND policy would probably reduce the need for the holding company to issue SND. As a consequence, while the quality of the market discipline (including the signal provided by SND prices) would be enhanced at the bank, the degree of market discipline at the bank holding company could be reduced.⁴⁹ In particular, the information content of BHC SND prices might decline. At a time when a less-intensive supervisory regime might be in place for financial services holding companies, degradation of the quality of the price signal for the overall holding company might be costly to supervisors.

The last issue examined in this subsection is, assuming that an SND policy is applied at the bank level, how banks in a multibank holding company should be treated. Study group discussions with market participants suggest that today market participants focus on the lead (largest) bank in a multibank holding company and are aware of the cross-guarantee provisions of FIRREA.⁵⁰ Thus, limiting an SND policy to the lead bank might result in the most effective market discipline with the least disruption to current market practice. On the other hand, if an SND policy were applied to a limited number of very large and relatively complex banks, that a bank was part of a multibank holding company would appear to make little difference as to whether the policy should apply to a given bank. In any event, the easing of interstate branching restrictions is likely to reduce over time the number of multibank holding companies for which this would be an issue.

49. However, decreased supervisory attention to the holding company would likely encourage market discipline at the BHC.

50. Under the Financial Institutions Reform, Recovery, and Enforcement Act of 1989 (FIRREA), the FDIC may apportion losses among all of the banks within a multibank holding company in the event that one or more of the related banks fail.

What Amount of SND Should Be Required?

Existing proposals for mandatory SND vary considerably with respect to the amount that should be required. When proponents view SND as a supplement to existing capital regulations, or when a cap on the rate that banks can pay on their SND is proposed, the minimum percentage is typically in the range of 2 percent to 3 percent of risk-weighted assets. Calomiris (forthcoming), for example, would require banks to issue at least 2 percent of risk-weighted assets in the particular form of SND that he proposes. When authors view SND as a substitute for equity or regulatory capital, the minimum percentage required is typically boosted to the 4 percent to 5 percent range.

None of the existing SND proposals attempt to derive the appropriate amount of SND from an optimizing model of, say, the desired level of bank safety and soundness. Indeed, when stated this way, the task seems problematic at best. Also, because under the Basel Accord a limited amount of SND is considered part of tier 2 capital, the issue of how much SND a bank should issue is inevitably part of the broader question of how much capital a bank should maintain.⁵¹ The answer to this question is highly complex, as we know from the ongoing work both domestically and internationally relating to revising the Basel Accord. Indeed, some observers may question whether bank safety and soundness would be improved if an SND policy encouraged banks to substitute SND for common stock.

A lower bound on an SND requirement is the amount of SND needed to provide a liquid and efficient market in an institution's SND. But this question is also complicated, and the answer is unclear. The answer depends primarily upon the minimum efficient size of an offering (currently around \$150 million and apparently rising), the size of the bank or bank holding company, and the required frequency of issuance. The larger the bank, the smaller the required percentage of, say, risk-weighted assets can be for the purpose of establishing a liquid and efficient market. More-frequent issuance may also allow the minimum percentage to be smaller for a given size of banking organization because the greater disclosure required by issuance means that the market is more likely to have the information it needs to assess a firm's financial condition. All that can be said with certainty is that

the current level of SND outstanding at the very largest bank holding companies, in most cases from 1.7 percent to 4.0 percent of risk-weighted assets, has been sufficient to provide a liquid and efficient market for the SND of these firms.

In light of these considerations, the study group has not attempted to develop an optimizing model of the amount of SND a bank should be required to hold under an SND policy. Rather, we have considered the more straightforward issue of whether an SND minimum should deviate substantially from the existing Basel Accord guidelines.

As indicated, the Basel Accord limits the amount of SND that qualifies as tier 2 capital to 50 percent of a bank's or a BHC's tier 1 capital. Thus, a bank or BHC with tier 1 capital equal to 4 percent of risk-weighted assets could include SND in tier 2 capital in an amount up to 2 percent of its risk-weighted assets. Moreover, because currently virtually all U.S. banks are considerably above the well-capitalized minimum of a 6 percent tier 1 ratio, for such firms the maximum allowed ratio for SND is 3 percent or more.⁵²

If an SND policy sought to stay within the context of current market conventions, then setting the SND minimum close to the current Basel Accord maximum standards would have considerable appeal. From this point of view, a required minimum ratio of 2 percent or 3 percent of risk-weighted assets is probably reasonable. Such amounts are within the current outstandings for forty-eight of the top fifty bank holding companies that had SND outstanding at the end of 1998 (see the "top 50" column of the bottom panel of table 5, which gives the equally weighted and weighted [by risk-weighted assets] averages of SND to risk-weighted assets, respectively, for those bank holding companies that issued SND). As of the end of 1998, the average ratio was 2.5 percent, and the weighted average ratio was 2.9 percent. Moreover, these ratios had been rather stable since 1995.

However, once again a more disaggregated analysis of the 1998 data suggests a more complex story and further supports the view that an SND policy should probably be focused, at least initially, on the very largest organizations. As shown in the SND/RWA column of table 7, at the end of 1998, fifteen of the top twenty bank holding companies had a ratio of SND to risk-weighted assets greater than or equal to 2.5 percent, but only five of the next thirty bank holding companies had ratios this high.

51. Under the Basel Accord, the amount of SND that may be included in tier 2 capital is limited to a maximum of 50 percent of the issuing bank's or BHC's tier 1 capital. For more on this point, see appendix E.

52. The "well-capitalized" minimum tier 1 ratio was defined in the implementation of prompt corrective action.

Indeed, eighteen of the next thirty bank holding companies had ratios below 2 percent. In addition, as may be seen in the tier 1/RWA column of the table, all of the top fifty bank holding companies had tier 1 ratios over 6 percent.

The implications of a 2 percent to 3 percent standard for banks are more uncertain. On the one hand, the data in table 4 indicate that, as of the end of 1998, the top fifty banks that issued SND had outstandings slightly in excess of 2 percent of their risk-weighted assets. On the other hand, and as indicated earlier, most bank SND, even those of the major banks, appear to be held by the holding company parent and not traded. Thus, a requirement that banks issue tradable SND, even if it were limited to only the very largest banks, would likely cause some disruption in current market arrangements. It seems reasonable to assume, however, that an appropriate phase-in period could reduce any problems to minimal proportions (see the later discussion in the section regarding a transition period).

From the point of view of the effectiveness of market discipline, a 2 percent to 3 percent requirement would, at least for the largest banks, likely be sufficient to provide a clear signal regarding the market's evaluation of a bank's financial condition. Indeed, there is substantial evidence that this is currently the case for the SND of the largest bank holding companies. Thus, indirect market discipline would almost surely be enhanced at the largest banks. With respect to direct discipline, 2 percent or 3 percent of a bank's risk-weighted assets is clearly a small portion of its total portfolio, and thus the direct effect on a bank's average cost of funds and the resulting direct market discipline could be small. However, the arguments and evidence presented in sections 1 and 2 suggest that a 2 percent or 3 percent requirement may well exert substantial direct market discipline, especially if the policy includes a minimum frequency of issuance. Moreover, raising the minimum amount of SND to a level high enough to significantly and directly affect the bank's average cost of funds would likely require levels of SND substantially above those that exist today. The competitive implications of such an increase and other key aspects of the way the market would react to such an increase in the supply of bank SND are unknown.

What Characteristics Should the Required SND Have?

Advocates of an SND policy have proposed many specific characteristics that an SND instrument

should have to meet particular policy objectives. This subsection examines what the study group judges to be the most important of these instrument characteristics.

Tradability

If an SND policy is to increase market discipline, it is virtually essential that the SND instrument be tradable, or issued quite frequently, in a competitive market to independent third parties. This is a requirement of virtually all SND policy proposals.⁵³ Only in this way could the primary policy objectives be achieved. Put differently, SND issued to insiders of the bank or bank holding company would clearly subvert the incentive and price-signaling objectives, although they could provide extra protection for the FDIC.⁵⁴ The fact that a large and liquid market already exists for the SND of the major bank holding companies and for some of the major banks demonstrates that requiring the largest banks to issue tradable securities is operationally feasible.

Market Participants

According to study group interviews with market participants, about eight major independent investment banks are the most important underwriters and dealers of bank and BHC SND. In addition, some Section 20 subsidiaries of large bank holding companies were said to play a role. Indeed, one interviewee suggested that Section 20 subsidiaries sometimes purchase their holding company's SND to support its price. The study group had no way of substantiating this claim, but in principle there may sometimes be an incentive for Section 20 subsidiaries to engage in such behavior, and an SND requirement, especially if it included a rate cap, would increase that incentive.⁵⁵

The incentive for a Section 20 holding company subsidiary to support the price, or otherwise subsidize the SND, of its bank affiliate or holding company parent is a potentially serious impediment

53. An exception is the recent proposal by Calomiris. However, his proposal is aimed primarily at banks in emerging markets and would require, *inter alia*, that the SND be held only by specific institutions that had been pre-approved by both the domestic regulator and the International Monetary Fund.

54. Also, private placements to independent third parties could increase direct market discipline. Private placements would not encourage indirect market discipline.

55. See appendix C for a discussion of this and other means by which banking organizations might seek to avoid the market discipline of SND.

to achieving the objectives of an SND policy and is an argument for prohibiting such activity. Indeed, this concern was discussed in the context of a more general consideration of potential conflicts of interest when the Federal Reserve Board was considering Section 20 subsidiaries in the 1980s. In light of these concerns, regulatory firewalls were established that prohibited such activity.

In August 1997, the Board rescinded these firewalls on the grounds that the National Association of Securities Dealers (NASD) Rule 2720 imposes essentially the same restrictions. Rule 2720, to which Section 20 subsidiaries are now subject, provides that if a member of the NASD proposes to underwrite, participate as a member of the underwriting syndicate or selling group, or otherwise assist in the distribution of a public offering of its own or an affiliate's securities, then (1) the securities must be rated by a qualified, independent rating agency, (2) the price or yield of the issue must be set by a qualified independent underwriter, who shall also participate in preparing the registration statement and prospectus, offering circular, or similar document, exercising due diligence, or (3) in the case of equity securities only, there must be an independent market in the security.

Besides these rules and regulations, there are economic incentives that deter a banking organization from artificially maintaining the price of its own securities. Rational market participants are aware of the incentive for Section 20 subsidiaries to manipulate the price of their organization's securities and should discount the price at which they are willing to buy from such a subsidiary its "own bank" securities, including SND. Thus, to preserve its own business reputation and to allow its SND to trade, a banking organization should be reluctant to support the price of its SND.

Despite these regulatory and economic safeguards, it is unclear whether the incentive to support would dominate, and the answer may well vary with market conditions. For example, during normal times the benefits from price-supporting behavior may be considerably smaller than the costs of doing so. But in times of financial stress, the temptation could be great to support the price of an affiliate's or a parent's SND, especially if the SND included an interest rate cap. Most important to the consideration of achieving an effective SND policy, times of financial stress are precisely when the market-disciplining effects of SND would be most powerful and most desirable.

Allowing banks and bank holding companies to hold in their investment and trading portfolios their own affiliates' and subsidiaries' SND would be

inconsistent with maintaining and encouraging a competitive market for bank and BHC SND. Thus, a strong case exists for prohibiting or, at a minimum, limiting severely such holdings. For example, it might be acceptable to limit holdings of "own firm" SND only to amounts that do not qualify for the minimum required by an SND policy. Put differently, it would be desirable to limit SND that would qualify as acceptable under an SND policy to those that were not held in the portfolio or trading accounts of any affiliated entity.

Maturity

Study group interviews indicated that virtually all recent bank and BHC SND have an initial maturity of ten years. Some interviewees argued that the ten-year standard maturity is driven in large part by the requirement in the Basel Accord and in the banking agencies' capital rules that to qualify as risk-based capital the SND must be amortized on a straight-line basis over the five years preceding its maturity. That is, 20 percent of an SND issue is disqualified from inclusion in tier 2 capital for each of the last five years before maturity.

The standard ten-year initial maturity is an important element of the homogeneity of the current market for bank and BHC SND. This homogeneity eases the interpretation and comparison of secondary market yields, and their easing, in turn, facilitates both the direct and the indirect market discipline roles of SND. In addition, current market participants are obviously familiar and comfortable with the ten-year format. Thus, continuing the convention of the ten-year initial maturity would presumably help to minimize any additional costs incurred by market participants, including regulators, if an SND policy were implemented. All of these arguments suggest that adopting an SND policy that preserves the standard ten-year initial maturity has considerable appeal.

Study group interviewees also frequently maintained that shorter-maturity bank and BHC SND would be issued and demanded by investors if the five-year amortization schedule were relaxed. Market participants argued that the three-year and five-year maturity bond markets were particularly deep and would be attractive to banking organizations. From the point of view of achieving the objectives of an SND policy, shorter maturities would still impose direct and indirect market discipline and would augment direct discipline if issuance became more frequent. More-frequent issuance would also be likely to improve the quality of the price signal,

and therefore the indirect market discipline provided by SND. The only real concern would be if the SND became so short-term that it was “runable,” but this possibility seems remote. Encouraging varying maturities would, however, obviously complicate matters and cause some disruption to the existing market—a market that has many advantages from the point of view of achieving the objectives of an SND policy. Indeed, preserving the existing ten-year initial maturity while implementing a policy that expanded the supply of tradable SND would likely help to improve the liquidity, depth, and overall efficiency of the current market. Allowing for shorter maturities would also require changes in the existing Basel Accord if we intend for SND to go toward satisfying an SND requirement and, at the same time, to count completely toward tier 2 capital. The reason is that the Basel Accord amortizes SND with remaining maturities of five years or less.

Call and Put Option Features

According to market participants interviewed by the study group, the standard SND instrument currently issued by banks and bank holding companies has no call options attached. Previous research and data collected by the study group suggest that call options were not an unusual feature of SND in the middle to late 1980s. In recent years, call options have fallen out of favor. Some market participants indicate that call options are less common today because institutional investors have wanted to lock in their yields and have attached very high prices to calls given the recent backdrop of declining interest rates.

In regard to SND policy considerations, the lack of a call option facilitates the interpretation of price changes and interest rate spreads observed in the market. Thus, the absence of options clarifies the primary signal on which direct and indirect market discipline is based. In short, the existing well-developed market for BHC (and some bank) SND has evolved to the point at which call options are not usually attached to the SND, and from the point of view of implementing an effective policy, one has no reason to encourage their development.

The arguments for and against put options are less clear. As discussed in section 1, some advocates of an SND policy have proposed attaching a put option to strengthen (1) market discipline by giving the SND holders a strong say (and perhaps even control) over when the issuing bank would be closed and (2) supervisory discipline by encouraging supervisors to promptly resolve troubled banks. These virtues of a put feature, however, are poten-

tially also its vice. The put option would inevitably complicate the interpretation of price signals provided by SND. Perhaps more important, the put option could nullify, or at least complicate greatly, bank supervisors’ ability to choose when to close a bank. Putting aside the consideration of whether attempting to remove the closure decision from supervisors’ hands is realistic, giving the closure decision to decentralized SND holders could easily be pro-cyclical because many banks tend to have financial difficulty as macroeconomic activity declines. Given the observed positive correlation of risks across many banks, the nearly simultaneous exercise of put options across many banks could exacerbate a situation with potential systemic risk implications much as a bank run would. Although the threat of a bank run provides strong market discipline, introducing such a threat as part of an SND policy seems problematic at best and is inconsistent with the “nonrunable” benefit of SND.

Fixed Rates, Floating Rates, and Rate Caps

According to study group interviews, the typical U.S. bank or BHC SND instrument is a fixed-rate security.⁵⁶ Banking organizations usually swap the interest payments on these fixed-rate bonds for floating-rate payments tied to *libor* in order to better match the interest flows on their assets. As with the ten-year maturity and the noncallability of SND, the fixed-rate characteristic is an important element of the homogeneity of the current market for bank and BHC SND. Thus, for all of the reasons discussed in previous portions of this study, maintaining the fixed-rate nature of SND would help to ensure the success and minimize the costs of an SND policy.

The recent SND policy proposal by Calomiris would set a maximum yield spread over comparable Treasuries (he suggests 50 basis points) or a “rate cap.” Under the proposal, SND could not be issued at yields over that spread. The purpose of this provision is to impose a clear penalty on highly risky banks: “Banks that fail to roll over their debts at or below the mandated yield spreads eventually would have to contract their risk-weighted assets to remain in compliance” with the minimum subordinated debt requirement.⁵⁷ In the limit, a highly risky bank could be forced to close. If truly enforced, a rate cap could be quite effective for preventing a widespread

56. Floating-rate SND were said to be somewhat common in Europe.

57. Calomiris (1998), p. 18.

deterioration of the banking system's assets, such as occurred in the 1980s.

On the down side, a rate cap on bank or BHC SND would almost surely be pro-cyclical, perhaps in a highly damaging way. As SND risk spreads widened during an economic downturn, banks would have to take actions to offset the impact on their perceived riskiness. These would include tightening lending standards and asset portfolio components in a pro-cyclical manner and shifting funding away from deposits and toward equity or SND. Although any binding capital (or other supervisory) policy tends to be pro-cyclical, the macroeconomic implications of a 2 percent to 3 percent SND requirement would be expected to be minor, so long as the policy did not include a rate cap (see appendix D). The need to take pro-cyclical steps in the face of an actual or anticipated downturn would be particularly imperative if the rate cap were defined relative to a riskless rate. Also, a rate cap could become binding during illiquid bond markets even for "safe" banks, and thus the constraint could exacerbate a liquidity squeeze on the corporate sector, with potential macroeconomic consequences.⁵⁸

These potential consequences suggest that a less-restrictive approach would be to define the SND spread relative to some private rate, perhaps the average rate on the SND of a bank's peer group. However, this approach would be aimed more at identifying individual banks that the SND market viewed as highly risky than at limiting risks undertaken by the entire banking system because, if all of a bank's peers were very risky, relative spreads might show little change.

Even if a rate cap were deemed desirable in principle, the problem of determining the optimal level of the cap would remain. If the maximum spread were too wide, it would have little or no effect on bank behavior. But if the maximum spread were too small, banks would be prevented from taking the prudent risks that lie at the core of their economic function. If the maximum spread were based on SND rates among a bank's peer group, too narrow a limit might suppress some healthy diversity among banks. A single rate cap for all institutions would surely introduce significant behavioral distortions; but determining a unique cap for individual institutions seems a practical impossibility. Moreover, even assuming an optimal cap could be determined for use under normal market conditions, such a cap could lead to major banking disruptions

during a period such as the U.S. financial markets experienced in the fall of 1998. This argument suggests that the spread limit might best be defined on an average or moving average basis or that a mechanism would be needed to allow its suspension in the presence of extraordinary market shocks. Addressing all of these concerns would greatly complicate an SND proposal.

Frequency of Issuance

Besides requiring banks or bank holding companies to fund a portion of their assets with SND, one might require that institutions issue SND regularly. Regular issuance would force banks to pay a wider spread on at least a small additional portion of their liabilities if their risk profile had deteriorated since their last issue. Thus, more-regular issuance would bolster direct market discipline. More-regular issues would also impose indirect market discipline because yields on new issues reflect actual transaction prices rather than brokers' "indicative" prices, which likely provide a less-accurate measure of the market's view of a banking organization. Several market participants noted that new issues focused investors' attention on the issuer, thereby encouraging issuer disclosure, and thus the pricing on a new issue would likely reflect a more up-to-date evaluation of the borrower.

Requiring highly frequent issuance could, however, raise borrowing costs for reasons unrelated to risk—perhaps because issues would either have to be smaller or have shorter maturities than they would otherwise. For example, if the requirement were for banks to have SND outstanding equal to 2 percent of risk-weighted assets and issues had to be made twice a year, then each issue for a bank with risk-weighted assets of \$100 billion, issuing standard ten-year noncallable subordinated debt, would be about \$100 million.⁵⁹ Because \$100 million would be a fairly small issue in the current market for bank SND, the debt would likely carry a higher yield than a larger issue would. It also would be less likely to trade actively in the secondary market, and so it would provide supervisors with less timely and precise information on secondary market spreads.

58. Appendix D discusses the potential macroeconomic effects of an SND policy.

59. There would be a total of twenty issues outstanding, and the total amount issued would be \$2 billion. This calculation assumes that there is no growth in risk-weighted assets. If there were growth, then new issues would be somewhat larger relative to risk-weighted assets because the past issues would have been smaller. At the end of 1998, only six banks in the United States had risk-weighted assets of more than \$100 billion.

In other words, indirect market discipline would be impaired.

Financial innovations could, of course, change these tradeoffs over time. For example, if investment banks began to issue collateralized bond obligations (CBOs) backed by smaller banks' subordinated debt, then smaller issue sizes might become cost-effective. Because secondary market price information for a particular bank would not be available from the secondary market price of the CBO, however, it is not clear that such an innovation would be desirable from a supervisory point of view. Indeed, such a development would likely require even more-frequent issuance so that prices in the primary market—when the debt was sold to the CBO—could be observed on a more timely basis. In essence, the decline in indirect market discipline caused by the CBO would need to be offset by an increase in direct discipline. More generally, that changes in financial markets and practices might affect SND markets in unforeseen ways suggests that the Federal Reserve and the other banking agencies would need to retain the flexibility to alter the terms of an SND requirement.

Another consideration is that strict requirements about the timing of SND issues could considerably raise the costs of SND without materially improving information gathering and market discipline. Market participants noted that an SND issue by one bank could cause a temporary fall in the price of other, similar banks' subordinated debt as the market absorbed the new issue. Restrictive rules on the timing of issuance could also force banks to sell SND when financial markets were temporarily unsettled. Also, as the previously discussed empirical results indicate, there is useful information in a bank's or bank holding company's voluntary decision to issue (or not to issue) SND. Thus, it would seem desirable for an SND policy that required a minimum frequency of issuance to set the minimum low enough so that institutions would also have a realistic opportunity to issue voluntarily. In this way, some market information could continue to be provided by the pattern of voluntary issues.

A Transition Period

How a transition period might work depends upon the specific details of the SND policy. For example, somewhat different approaches would be appropriate depending on whether the SND policy required "qualifying" subordinated debt to be issued at the bank level or at the holding company level or if all subordinated debt would qualify wherever issued.

Related issues are which asset or other measure to use as a base for the minimum subordinated debt requirement and the size of the minimum requirement. The universe of institutions that would be covered by an SND rule would also have a significant effect on transition and grandfathering issues. Each of these factors could determine whether an institution would be in immediate compliance with the mandated minimum and, if not, how long a period would reasonably be needed to allow institutions to comply with the rules.

If the SND policy required that qualifying subordinated debt be issued at the bank level, existing SND that were issued by bank holding companies would generally need to be replaced by bank-level SND as the holding company debt matured or was redeemed. If, under this scenario, policymakers did not wish to require the consolidated banking organizations that now issue sufficient SND to issue more SND than is currently outstanding, a rather long transition period would be necessary. Given that the existing SND in the marketplace are typically non-callable with an original maturity of ten years, banking organizations could need as much as ten years to substitute bank SND for existing BHC SND.⁶⁰ Even with such a long transition period, both direct and indirect market discipline would be imposed on the bank with the first (and each subsequent) bank issue. Additional market discipline would be provided by any new bank SND that were issued because of bank growth. If the SND requirement were imposed at the BHC level, virtually no transition period would be needed unless the minimum requirement exceeded current levels of outstanding BHC SND.

With regard to grandfathering, costs to banking organizations that currently issue SND would be minimized if existing SND that currently qualify as tier 2 capital, whether issued at the bank or BHC level, including SND that did not specifically conform to any structural requirements that might be imposed by the policy, were allowed to count as qualifying SND during their remaining life. However, if the final policy required subordinated debt to be issued at the bank level, SND issued by the holding company after implementation of the rule (that is, during or after the transition period) should not count as qualifying subordinated debt.

60. An amortization rule on the SND that qualify for the mandatory SND requirement (like the amortization rule currently imposed on SND qualifying as tier 2 capital) could shorten this transition period by a couple of years.

How Should the Requirements Be Enforced and SND Information Used?

Examination and Surveillance Procedures

A mandatory SND policy could be monitored and enforced as part of the normal examination, inspection, and overall supervisory process. As discussed in section 2, a significant source of uncertainty about a mandatory SND policy is whether it would provide new information to bank supervisors. If new and valuable information were in fact provided, examiners might be able to use that information as a factor influencing the scope of exams and special supervisory reviews. For example, if the market signal—perhaps a sharp drop in the secondary market price of a bank's SND relative to that of the bank's peers or a disruption in the bank's normal SND issuance pattern—suggested that the market perceived major problems with an institution's financial condition or market position that supervisors had not already observed, an examination or less-formal supervisory inquiry could be scheduled to evaluate the market's perception. Examiners could perhaps decide upon the breadth and depth of the examination based, in part, on their perceptions of the seriousness of the market's reactions.

More generally, information from the SND market could perhaps be used to help focus scheduled examinations or other supervisory activities. For example, if the market demand and pricing for a bank's SND were strong, examiners could possibly use this information as a factor in deciding to defer or to limit the scope of an examination. Another possibility would be for supervisors to consider SND issuance decisions and spreads as factors in assessing the amount of capital over the minimum Basel capital standards that banking organizations would be expected to hold. In a similar vein, examiners could take account of the market signals provided by SND when setting banks' CAMELS ratings and bank holding companies' BOPEC ratings. Positive or negative signals from the SND market could, for example, be explicitly used as arguments for giving a higher or lower CAMELS or BOPEC score. Such considerations could be particularly useful for institutions falling on the borderline between ratings under the BOPEC or CAMELS systems. If successful, such practices could help improve the efficiency and lower the cost of supervisory activities for all parties.

Data Requirements

Decisions regarding the potential for SND data to aid in the bank examination, surveillance, and overall

supervisory process would require the collection and analysis of appropriate data. Existing data, although useful for research, would need to be augmented. Existing research, new research conducted by the study group, and study group interviews with market participants suggested several specific useful items: transaction prices and yield spreads (both at issue and in the secondary market), bid-ask spreads, libor swap rates, and issuance history. A number of market participants suggested that the collection of such data would not be difficult for the Federal Reserve. Apparently a growing number of vendors are attempting to provide some of the needed information, and the major dealers in bank and bank holding company SND would probably be willing to provide data that could not be acquired from vendors.

Once a data collection process were in place, acquiring time series that could be analyzed and conducting the research would take some time. In this regard, historical time series going back to the implementation of FDICIA would be highly desirable.

The Relation among SND Policy, Increased Disclosure, and an Improved Basel Accord

If SND are to exert appropriate market discipline, market participants clearly need to be well informed regarding the true financial condition of banks and bank holding companies. Study group interviews with market participants indicated some concern among participants about the current "opacity" of banks, including the lack of good information on some key business lines such as off-balance-sheet products. Some interviewees suggested that banks will occasionally shrink assets rather than issue SND because the banking organization does not want to disclose adverse information.

That some major participants in today's market feel that existing disclosures are insufficient is troubling. This unease with current disclosures is especially disturbing given that the current market for the SND of large bank holding companies and some large banks is substantial and well developed. Whatever the reason, market participants' feelings may suggest that there is room for supervisory and regulatory efforts to improve disclosures. Such improvement seems particularly appropriate if any mandatory SND policy were adopted because the spotlight would be focused more strongly on the quality of the market discipline imposed by the SND market. In short, these arguments highlight that a viable SND policy

and an effective disclosure policy are closely connected.

As is well known, “regulatory capital arbitrage” is a prime motivator behind current efforts to revise the Basel Accord.⁶¹ But it is also a potential problem for an SND policy. Assuming that a minimum SND requirement would be some percentage of total or risk-weighted assets, one way for banks or bank holding companies to lower the amount of SND they would need to issue would be to remove assets from their balance sheets. Removing assets from the balance sheet, while retaining much or all of the risk of those assets, is of course the primary goal of regulatory capital arbitrage. Regulatory capital arbitrage would be unlikely to subvert SND market discipline completely because the rate on a bank’s SND would presumably remain little changed if risk remained the same (assuming that the market could accurately assess the risk of the capital arbitrage transaction through, among other things, additional public disclosure). Indeed, the rate might even rise somewhat if the holders of the smaller amount of SND came to feel more exposed to losses. Nevertheless, the possibility of using regulatory capital arbitrage to evade an SND policy reinforces the view that SND policy and Basel Accord policy are best viewed as complements, not substitutes.⁶²

4. Conclusion

This study has attempted to describe the motivations for a subordinated debt policy, to examine and contribute to the evidence regarding the current

extent of market discipline provided by SND, and to analyze the pros and cons of various key characteristics that an SND policy might have. Our purpose was to conduct a broad review and evaluation of the issues but not to advance policy conclusions at this time. Indeed, as the study progressed, many issues proved to be more complex than we had anticipated.

Although we do not draw policy conclusions, our study makes clear that assessment of the benefits and costs of a policy proposal would be helped greatly by more research in a number of areas. For example, a better understanding of the marginal benefits of requiring banks to issue SND relative to the benefits of the existing SND market, along with associated marginal costs, would be quite useful. Such a study would need to examine the market discipline benefits of currently outstanding SND as well as the benefits of other medium- and long-term uninsured liabilities. A second area of useful research would be a close examination of the potential benefits of using the existing SND market for banking organizations, and the current markets for BHC equity and selected uninsured bank liabilities, as aids to bank supervisory surveillance activities. Finally, the data currently available for bank and bank holding company SND prices, bid-ask spreads, and other key pieces of information clearly have significant deficiencies. Construction of a high-quality data set for use in policy analysis and research would be a prerequisite for obtaining a better view of the potential benefits and costs of a mandatory subordinated debt policy.

61. For a discussion of regulatory capital arbitrage, see Jones (1999).

62. Using risk-weighted assets as the denominator for an SND requirement would also allow the SND policy to evolve along with the risk measure used for regulatory capital purposes.

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**Appendix A:
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Appendix B: A Summary of Interviews with Market Participants

Between early October 1998 and early March 1999, members of a Federal Reserve System study group studying the market for subordinated notes and debentures (SND) interviewed various market participants regarding a wide range of aspects of the markets for subordinated debt and preferred stock of banks and bank holding companies (BHCs). Interviewees included staff members of large commercial banks, investment banks, mutual funds, pension funds, insurance companies, and rating agencies. Interviewers included staff members from the Divisions of Research and Statistics, Supervision and Regulation, and Monetary Affairs of the Board of Governors and from the Research Departments of the Federal Reserve Banks of Boston, New York, Atlanta, and Chicago.

This appendix summarizes the key information gained in the interviews. The primary goal is to report accurately what market participants told us, and an explicit attempt is made to avoid evaluating the validity of their views.¹ The paper is structured around a set of questions submitted in advance to each firm interviewed (attached to the end of this appendix). Although not all interviewees had expertise in all areas in which we had questions, the entire set of questions was provided to all to help interviewees understand the full range of our inquiry.

1. Instrument and General Market Characteristics

The typical (90 percent of the market by several estimates) U.S. bank or BHC SND instrument is a fixed-rate, noncallable, ten-year maturity bond with few “bells and whistles.” Such instruments were generally viewed as homogeneous and were often referred to as “plain vanilla” or “benchmark” issues.² Banking organizations usually swap

the interest payments on these fixed-rate bonds for floating-rate payments tied to *libor* in order to better match the interest flows on their assets.

Most publicly traded SND of banking organizations are issued at the BHC level, although a moderate amount of bank SND are also traded. BHC issuance is generally preferred because of the flexibility it provides issuers for allocating funds within the total organization and other efficiency gains from centralized issuance. Interviewees also asserted that much of the bank SND currently outstanding was issued in the early 1990s, when the banking crisis made it considerably less costly to issue SND at the bank level than to issue them at the BHC level. However, some banks have recently issued substantial amounts of bank SND because they need significantly more tier 2 capital at the bank level (for example, because of an acquisition at the bank level) and do not want to increase their debt at the BHC level.

The secondary market for the SND of the fifteen to twenty largest banks or BHCs is a dealer market dominated by institutional investors. It is highly liquid most of the time, although after the Russian default in August 1998 and the subsequent market turbulence, liquidity essentially dried up, as it did in most other markets. Indeed, most interviewees seemed somewhat traumatized, or at least considerably chastened, by their post-default experiences. In addition, a few interviewees expressed some skepticism regarding the market’s liquidity during more-normal times. Nevertheless, the overwhelming impression given by interviewees was that the market for the SND of the largest banks and BHCs is quite liquid, to the point that it provides a useful vehicle for trading and hedging.

An important reason for the market’s liquidity is the relative homogeneity of bank and BHC SND, which are structured to satisfy regulatory criteria for eligibility as tier 2 capital. In general, banks and BHCs issue SND as tier 2 capital to satisfy that portion of their total risk-based capital needs (the required level plus any additional capital required by the market) not met by tier 1 capital, qualifying allowances for loan-loss reserves, and other eligible

NOTE. Myron L. Kwast, Associate Director, Division of Research and Statistics, Board of Governors of the Federal Reserve System, Washington, D.C., prepared this appendix. The author thanks his study group colleagues and others at the Boston and New York Reserve Banks who helped by conducting interviews, by writing up their discussions, and by giving him extremely useful comments on drafts of this summary. However, the views expressed are those of the author and do not necessarily reflect those of the Board of Governors or its staff.

1. An effort was made, however, to edit out the rare statement that was clearly incorrect or potentially misleading.

2. A recent innovation is the so-called “5×5” bond, which is a ten-year callable security that pays a fixed rate for the first five

years, but if not called at par at the end of that time, the rate steps up significantly and floats over the next five years. Some European, Australian, and Canadian banks have recently begun to issue 5×5s, but we did not hear of any such issuance by U.S. banks or BHCs. More generally, floating rate SND were viewed as somewhat common in Europe and virtually unknown in the United States.

components of tier 2 capital.³ SND are attractive relative to other possible components of tier 2 capital for banks because the tax deductibility of their interest makes them relatively inexpensive.⁴

Section 20 securities subsidiaries play a role in underwriting SND, but independent investment banks are more-important players. One interviewee suggested that Section 20 subsidiaries sometimes purchase their holding company's paper to support its price. Some interviewees discussed the benefits of involving several debt underwriters in each SND issuance and even more underwriters in some aspect of underwriting and making markets in their outstanding SND. About eight major dealers appear to be the most important marketmakers, and about five more firms help to provide liquidity.

Bank preferred stock and BHC preferred stock, even the recently popular trust preferred stock (sometimes called capital securities), are not viewed as reasonable substitutes for SND. Preferred stock is much more heterogeneous than SND (for example, it comes in both fixed- and floating-rate varieties and with different maturities and call provisions), making the market substantially less liquid and prices more difficult to compare across issuing firms. Furthermore, traditional preferred stock is a substantially more expensive form of capital than SND (one participant said probably 200 basis points more in good times) because dividends on traditional preferred stock do not receive the tax deductibility applied to interest on debt. Even trust preferred stock is somewhat more expensive than SND despite being treated as debt for tax purposes, probably because both traditional preferred stock and trust preferred stock are less senior than SND in liquidation. Also, preferred stock dividends can be waived (traditional preferred) or deferred for five years (trust preferred) at issuer discretion without creating an event of default. Trust preferred stock generally has a thirty-year maturity.

The demand side of the preferred stock market is heavily influenced by relatively uninformed retail investors, but institutional investors are also important. Trust preferred stock is primarily a BHC instrument because regulators allow it to be treated as tier 1 capital at that level but not at the bank level. The fact that the rating agencies give equity credit to trust preferred stock only in the context of its

being a limited part of a BHC's total equity mix lowers its attractiveness as a major element of BHC equity capital.⁵

2. Supply Issues

Start-up and fixed costs for issuing SND are rather low and not a significant consideration in larger banking companies' decisions regarding whether to issue. For example, one interviewee suggested that the standard fee paid to the underwriting group is equivalent to about an additional 9 basis points of an issue's interest rate. In addition, the marginal one-time fee charged by a rating agency is typically 2 to 3 basis points of the notional amount, and SEC registration fees for a large bank or BHC are about 3 basis points of the notional amount.⁶

The major banking firms tend to use shelf registrations to stand ready to issue when their own financing needs and market conditions allow them to do so at reasonable cost.⁷ Banks and BHCs attempt to gauge the market carefully for an opportune time to issue SND, and they can usually issue quickly when they judge the timing to be right. Their primary concern is the interest rate paid on the debt or, more exactly, the spread of their rate over *libor* (assuming they swap fixed- for floating-rate payments) or Treasuries. Also relevant is a given firm's spread relative to spreads being paid by firms in its peer group, although the appropriate peer group may be difficult to define for some institutions.

The amount of disclosure required can be relevant for deciding whether to issue SND. For example, some interviewees argued that, even today, firms might choose to shrink assets rather than make an unwanted disclosure. More disclosure is required of BHCs, which are subject to Securities and Exchange Commission (SEC) registration and disclosure requirements, than of a subsidiary or an independent bank. Generally, more information is provided on the lead bank than on other bank subsidiaries in a multibank holding company.

3. The risk-based capital regulations limit the amount of SND that can be included in tier 2 capital to one-half of the issuing bank's or BHC's tier 1 capital.

4. Trust preferred stock is also tax advantaged at the holding company level and thus has become a popular form of tier 2 capital for the BHC, but not for the bank.

5. Despite the overall negative tone of the interviewees, a large volume of trust preferred stock has been issued by BHCs since the Board's 1996 approval of its inclusion as part of BHCs' tier 1 capital.

6. Another major issuer said that the bond rating agencies charge about \$250,000 for the initial rating of a major bank or BHC. The agencies charge an additional \$80,000 each year to remain on their rosters and charge \$10,000 to \$15,000 to rate each new issue. Trust preferred stock is usually issued through a special-purpose vehicle, which costs from \$10,000 to \$30,000 to create.

7. Under SEC shelf registration rules, a firm with adequate financial disclosures is permitted to issue securities within a given two-year period at a specific time chosen by the firm.

Publicly available bank Call Report data appear not to be widely used by market participants. Interviewees claimed that the market rewards disclosure with lower rates on SND.

Only about fifteen to twenty (but perhaps as many as thirty) banks and BHCs have actively traded SND, although many more issue some SND. If any bank in a multibank BHC issues SND, it is likely to be the lead bank. Investors seem to prefer the lead, or largest, bank despite the cross-guarantee provisions of FIRREA (which were well known to market participants). Interviewees expressed some feeling that money center banking organizations tend to issue out of the holding company, whereas regional organizations are more likely to issue bank SND. *Ceteris paribus*, smaller and otherwise less well known institutions tend to pay higher spreads than larger firms. The principal issuers have total assets of at least \$50 billion, and a practical lower limit on the size of firms that could issue SND in today's market appears to be total assets of \$5 billion to \$10 billion.

The typical issuance size of SND is around \$250 million to \$400 million. Some issues in the past have been as small as \$50 million, and some recent issues have been as large as \$500 million and more.⁸ Average issuance size has been increasing over time, and larger issues appear to be considerably more liquid in the secondary market than smaller issues. The fact that smaller issues tend to trade relatively poorly in the secondary market is probably a major reason that smaller issues are more difficult and expensive to sell to institutional investors at issuance. On balance, for the largest banks and BHCs the minimum efficient issuance size appears to be currently about \$150 million, although the market generally seems to prefer larger issues and the "practical" minimum appears to be rising over time.

The representative of one bank suggested that banks and BHCs attempt to sell a strong "benchmark" issue that receives market attention and that helps to create a favorable impression of the issuer with institutional investors and the broader market. The interviewee stressed the importance of having a positive "name" in the market. Becoming a known name was said to lower issuance costs and to increase market demand and liquidity. Conversely, a small, illiquid issuance serves as a negative signal and impairs the pricing and liquidity of the issuer's SND and other securities.

8. The *American Banker* reported on January 21, 1999, that the previous day J.P. Morgan had successfully issued \$1 billion of SND, "the biggest issue of such securities ever" by a bank holding company.

Some interviewees suggested that the market makes some distinction between on-the-run and off-the-run SND. Older, or off-the-run, issues are less liquid, particularly if the issuer of the older debt has not brought any large issues to market recently. One bank representative said that in a couple of limited situations the bank reopened outstanding issues that had been initially issued earlier in the same year. The objective of this action was to increase the liquidity of the two combined issues.

Issuance of SND twice a year appears to be common at the largest banking organizations. Indeed, participants suggested that, although issuance is still basically episodic, some banking organizations are evolving toward more-regular issuance. However, regional organizations were said to issue new debt much less often. Indeed, interviewees generally made a sharp distinction between the characteristics of the market for the SND of the fifteen to twenty largest banks or BHCs and the market for the SND of smaller and regional firms.

The interviews suggest that the banking industry would likely oppose any requirement for the regular issuance of SND. The grounds for this opposition would probably be concerns about (1) possible monopoly rents provided to underwriters and purchasers, (2) the creation of excess supply, (3) the high cost of perhaps being forced to issue (and make disclosures) at a time when the market was disrupted by some outside event, (4) the high cost of being forced to issue during idiosyncratic events such as ongoing merger discussions, and (5) the increased cost and reduced liquidity of the relatively small issues that regular issuance would require.⁹

There was some indication that requiring large banks, as opposed to BHCs, to issue tradable SND would not be a major problem. Some banks already issue bank-level SND, and some banks already provide augmented disclosures (for example, bank-only audited financial reports). In addition, it is conventional for bank SND to trade at a lower interest rate than BHC SND. The bank discount is typically 3 to 10 basis points, but it can rise to much higher levels in times of individual firm or systemic financial stress, and it is higher for lower-rated firms. Banks are commonly rated one notch higher than their holding company parent.¹⁰

9. For example, if a bank with total assets of \$100 billion were required to issue ten-year SND totaling 2 percent of assets and new issues had to be sold twice a year, then each issue could be only \$100 million—at the low end of current issue size minimums.

10. This information is consistent with data collected and analyzed by staff members of the Board of Governors.

However, the conventions previously mentioned apply to a world in which the bank dominates the holding company. Some interviewees speculated that the CitiGroup model might significantly change the way analysts look at widely diversified BHCs. Indeed, they pointed out that CitiGroup is unusual in that it has the same rating as CitiBank because of the amount of diversification at the parent. Some interviewees suggested that the CitiGroup model might facilitate issuance of SND by the bank because such a structure would force analysts to look more carefully at each major component of the holding company.

3. Demand Issues

Demand for bank and BHC SND comes largely from institutional investors. The key players (and their estimated percentage of the market) are insurance companies (50–70 percent), mutual funds (20 percent), and pension funds (10–30 percent). Obviously, interviewees expressed a range of estimates. Some institutional investors, particularly insurance companies, prefer fixed-rate debt with long-term duration to match the long-term nature of their liabilities. Mutual funds and other money managers tend to be the most active traders. Foreign investors appear to have increased in importance in recent years.

Retail demand is small, and such investors were widely viewed as quite uninformed. In any event, retail customers typically buy SND and hold them to maturity. Retail customers tend to prefer “names,” especially at the regional level.

Many, and perhaps the vast majority of, large institutional investors do their own analysis of banks and BHCs. They claim that they are willing and able to pick winners (high yield, low risk). However, representatives of mutual funds in particular said that they did not want to be caught holding bad paper and would sell SND of a firm that appeared to be in, or getting into, financial trouble. In their analysis, asset quality (including problem loan and loan-loss reserve ratios) is a prime focus, but other aspects that were mentioned included a firm’s product mix, the qualitative nature of its business, its loan and income composition, capital levels, liquidity, earnings volatility, and the nature of its geographic service area.

Some institutional investors divide banks and BHCs into peer groups and examine levels of and changes in spreads within such peer groups. The homogeneous nature of bank and BHC SND is a major plus because it facilitates price comparisons.

An issuing firm’s size was also mentioned as being of some importance. Larger buyers want to purchase large amounts of a given firm’s SND, in part to economize on analysts’ time. It was noted that recent mergers among some large buyers may have hurt demand for the SND of smaller banks and BHCs.

Satisfactory ratings and rating agency views were seen as essential by some interviewees, but not by others. However, as will be discussed shortly, ratings changes were generally viewed as significant events. Some interviewees discussed the relatively close relationship during most periods of ratings and debt spreads. Some investors can purchase only highly rated paper.

The “name” of a bank or BHC was important to some large, sophisticated investors. Others expressed a preference for bank paper over BHC paper because bank SND are viewed as being closer to the underlying assets and earnings. One interviewee said that he took some comfort from the fact that banks are regulated. Perceived relative degrees of “too big to fail” seemed to be important to some institutional investors; one indicated that large retail banks were viewed as most likely to be considered too big to fail. In addition, because of the cyclical nature of banking, the SND of banks and BHCs tend to trade at higher rates (generally 15 to 20 basis points) than debt of equally rated nonfinancial firms.

Institutional investors seem to be increasing their demand for disclosures by banks and BHCs, in part because of growing sentiment that few, if any, banks are truly too big to fail. Off-balance-sheet activities were singled out as an area where more disclosure would be especially useful. Disclosures by U.S. banks and BHCs are better than disclosures by non-U.S. banks. In general, the opacity of banks and BHCs was said to hurt demand for SND, but there was some disagreement regarding the importance of distinguishing between banks and BHCs. Participants seemed to agree that transparency was considerably better at the BHC level than at the bank level, and some argued that this situation gave them some preference for BHC SND.

Our discussions about disclosure issues suggest that if banks (again, as opposed to BHCs) were required to issue tradable SND, then the market might well demand that banks increase their disclosures. However, interviewees generally seemed to believe that, so long as a bank was the bulk of its holding company, investors would attribute the information on the BHC to the bank and therefore no further disclosure would be required. However, if the bank were a smaller part of the BHC (perhaps less than 80 percent or 90 percent of the total firm’s assets), and especially if its business mix were

different (as in the CitiGroup model), then several participants thought that disclosure at the bank level comparable to disclosure at the BHC level could well be required by the market. One interviewee indicated that such disclosure could be fairly costly because large banking organizations do not currently focus much attention on specific bank subsidiaries but rather on lines of business.

The existing plain vanilla, ten-year SND instruments seemed popular with institutional investors. However, the more-sophisticated players were certainly willing to consider more-complex instruments and to price them accordingly. There also seemed to be potential demand for shorter-term bank and BHC SND.

4. Pricing Issues

Interest rate spreads over Treasuries and (swapped) libor of the SND of banks and BHCs are followed regularly (typically daily) by market participants. Subject to a number of important caveats, such spreads are widely viewed as sensitive to (primarily credit) risk differences both across banking organizations and over time. Even banks thought too big to fail can see their SND spreads widen considerably because of risk aversion by investors. Although the amount of noise in daily price movements is substantial, interviewees said that “large” changes in an institution’s spread, perhaps of more than 5 or 10 basis points, are normally viewed as significant. Perhaps more important, because changes in spreads tend to be positively correlated across banks and BHCs, changes in an institution’s relative position within its peer group of banks and BHCs can be the most important signal of a change in the perceived credit quality of an institution.

The market has tended recently to place banks and BHCs into three groups, or tiers. Spreads among the top tier organizations, which since the fall of 1998 have been regional organizations with a history of minimal credit quality problems, are usually within 5 basis points of each other. Spreads tend to cluster around 10 basis points of each other within each of the other two groups, money centers and weaker regionals. The total range in spreads in the months before the Russian default has tended to be around 20 basis points. Relative spreads within a group have generally been fairly stable over time.

Although spreads are useful, all interviewees felt that spreads need to be interpreted with great care and that rules of thumb are difficult to establish. Again, the absolute level of spreads is quite sensitive to cyclical fluctuations. In good times, spreads tend

to be very narrow, reflecting the view that all banks and BHCs are in good shape. In bad times, spreads balloon, reflecting broad skepticism about the financial health of banking institutions.

The market turmoil in August–October 1998 was widely viewed as a clear example of how market stress can affect spreads. During that time, institutional investors were staying on the sidelines, and market rumors were rampant. As a result, spreads widened dramatically. For example, posted rates of libor plus 40 to 80 basis points were typical in April 1998, but rates of libor plus 150 to 240 basis points were common in September. In addition, such posted rates were not likely to indicate the price at which dealers were actually willing to transact. By late November, spreads had returned to around 40 basis points over libor for banks and BHCs viewed as the most creditworthy.¹¹

Interviewees tended to feel that daily fluctuations in spreads were overly sensitive to “news” and “rumors.”¹² Particularly troublesome were so-called technical factors, which include idiosyncracies such as merger news and rumors and supply shortages or surpluses in particular issues or maturities. For example, a new issue can decrease prices temporarily solely because of the increased supply of a firm’s securities and have little or nothing to do with a change in the firm’s perceived credit risk. The same can happen if a major investor must sell securities solely to raise cash for its own purposes.

Interviewees saw SND and equity prices as normally tending to move together but generally deemed SND price movements to have value added relative to stock price movements. A number of interviewees suggested that bond investors were seen as being more concerned about earnings stability, more averse to risk, and more interested in the long run than equity investors. According to some market participants, the implications were that SND prices should be more sensitive to changes in credit risk than equity prices are. Nevertheless, bond prices were viewed as being less volatile, at least on a daily basis, than equity prices. One interviewee suggested that a 10 percent change in a banking company’s equity price was needed to move its SND prices.

Secondary market prices were viewed as being quite efficient, but new issue prices were nevertheless

11. These spread data are generally consistent with the limited data available to Board staff on BHC SND spreads over ten-year Treasuries during this period. Our data indicate that, although spreads had shrunk by the end of November, they were still not back to levels observed before the Russian default.

12. It was noted that dispelling rumors can sometimes require increased disclosures.

thought to have significant value added. New issues were seen as focusing investors' attention on the financial condition of a firm and as requiring a firm to disclose its most recent and complete information. In addition, new issue prices are always "real" transaction prices, not hypotheticals that have been posted by a market-making firm.

Dealer bid-ask spreads are probably a good indicator of market liquidity. In normal times, such spreads may be only 2 to 5 basis points, and perhaps as large as 10 basis points. In times of stress, they can expand to 30 basis points or more. Indeed, it was argued that on relatively rare occasions bid-ask spreads can be set so high that dealers do not expect any trades to occur and that, if trades are solicited, they will be refused. The setting of bid-ask spreads appears to be where the views of the dealers' bank and BHC analysts come heavily into play. That is, traders solicit analysts' views when they are deciding where to set their bid-ask spreads. A widening of bid-ask spreads for a single firm relative to its peers could signal an increase in the market's uncertainty about a banking organization's financial condition.

All participants viewed the market for bank and BHC SND as being relatively efficient, but they also agreed that reliable public sources of bank and BHC SND price data are difficult to find. This situation may be changing, as we heard of a number of private vendors who were at least advertising the availability of current data, but data availability appears to be a problem. SND are currently traded in a dealer-controlled market that is conducted through telephone calls among participants. To get accurate price data, participants recommended calling at least five dealers for their current quotes. In times of severe stress, as discussed earlier, participants must also be able to distinguish live bid-ask prices from nominal prices that dealers have set with no intention of using for conducting transactions but that allow them to claim that they remain in the market. Having said this, interviewees noted that in normal times price differences across dealers are typically quite small, perhaps only 2 to 5 basis points.

Market participants generally believed that changes in rating agencies' opinions tended to lag information revealed in secondary market prices.¹³ This was true more for upgrades than for downgrades. Nevertheless, some interviewees said that

ratings were a major determinant of investors' portfolio and pricing decisions, and ratings changes were widely viewed as changing yields. One interviewee claimed that a rating change at one bank or BHC could change prices at other banks or BHCs in its peer group. Differences among rating agencies were viewed as potentially significant pieces of information.

5. Regulatory and Tax Effects

In general, regulatory and tax effects were seen as important, and in some cases critical, to understanding key aspects of the markets for bank and BHC SND and preferred stock. Some participants believed that the bank and BHC SND market exists largely because SND are included as a component of tier 2 capital used in satisfying risk-based capital requirements. However, when pressed, interviewees acknowledged that SND have other benefits, including (1) not being "runable" while not diluting existing shareholder equity and (2) helping to meet the rating agencies' preference for long-term debt in bank and BHC liability structures.

Some interviewees argued that the ten-year standard maturity of SND is driven in large part by the requirement in the Basel Accord and in the banking agencies' capital rules that SND must be amortized on a straight-line basis over the five years preceding their maturity. That is, 20 percent of an SND issue is disqualified from inclusion in tier 2 capital for each of the last five years before maturity. Interviewees also maintained that shorter-maturity bank and BHC SND would be issued, and demanded by investors, if the five-year amortization schedule were relaxed. They argued that the three-year and five-year maturity bond markets were particularly deep and would be attractive to banking organizations. A market constraint on shorter-term SND is the limited taste of the rating agencies for such debt and their preference for longer-term debt.

Another example of the importance of regulations and taxes is the emergence of trust preferred stock as a popular instrument in BHC capital structures after it received Federal Reserve approval in 1996. Under the risk-based capital standards, trust preferred stock is treated as tier 1 capital for BHCs but not for banks. Also, dividends on trust preferred stock are treated as interest on debt for tax purposes. Not surprisingly, most trust preferred stock is issued at the BHC level today. Moreover, under Board policy, trust preferred stock must include a call option to be counted as tier 1 capital. Market participants said that noncallable trust preferred stock

13. Comments by some of the rating agency interviewees seemed to suggest that they agreed with this view. It is consistent with the fact that the rating agencies explicitly attempt to average through the economic cycle, while market prices clearly do not.

would almost surely be issued if Board policy were changed. An additional regulatory constraint is that trust preferred stock, together with other cumulative preferred stock, is limited to be no more than 25 percent of tier 1 capital.

There was some speculation that corporations' tax deduction for dividends received might depress the dividend yields observed on preferred stock.¹⁴ Because this tax rule applies only to corporate owners of preferred stock, it probably helps to explain the large share of institutional investors in the preferred stock market.

Besides regulatory constraints, market constraints limit the use of trust preferred stock. An important constraint mentioned by interviewees is that the rating agencies do not give a BHC full equity credit for trust preferred stock. Its use is considered appropriate only as a portion of a BHC's equity capital structure, which relies primarily on common stock and retained earnings.

Some interviewees explained that they manage their regulatory capital by identifying the levels of tier 1 and total risk-based capital that they need to satisfy regulatory and market standards. They issue the amount of tier 1 needed for regulatory, rating agency, and other market reasons. Then, after adding the amount of loan-loss reserves that qualify for tier 2 treatment, they generally issue SND in the amount needed (up to the 50 percent of tier 1 limit on SND) to reach their total risk-based capital target.

On balance, an underlying theme of our discussions was that banks, BHCs, and other market participants take very seriously the risk-based capital standards and that the banking agencies' capital requirements profoundly affect bank and BHC capital markets. Some interviewees said that banking organizations are careful to achieve the regulators' well-capitalized stamp of approval.¹⁵

Some market participants also mentioned the regulations regarding prompt corrective action. They argued that because regulators can intervene before bankruptcy, prices of preferred stock react more quickly than do SND prices to bad news because of concerns that regulators may suspend payment of dividends by troubled banks. Even in normal times, the overall level of spreads on preferred stock and SND may be affected because of regulatory risk and uncertainty. Some market participants speculated that the next recession will permanently widen spreads on bank and BHC SND and preferred stock because investors will learn that prompt corrective action, depositor preference laws, and the cross-guarantees in FIRREA stack the cards against holders of SND and preferred stock in favor of depositors.¹⁶

Some market participants suggested that if supervisors begin to use SND prices as a trigger for taking supervisory action, then the behavior of market participants may change significantly. However, no one was specific about just what they meant by this "Lucas" critique.

14. Dividends paid by one corporation to another corporation are partially deductible on the receiving corporation's tax return.

15. Some also said that, *ceteris paribus*, institutions seek to minimize capital requirements and that the current capital standards encourage regulatory capital arbitrage.

16. As indicated earlier, market participants seem well aware of FIRREA's cross-guarantees, but their focus of concern is currently the lead bank of a multibank holding company.

Questions on Subordinated Debt and Preferred Stock for Market Participants

I. Instrument Characteristics

1. What are the key characteristics of contracts that are currently being issued or that are outstanding in the bank and bank holding company subordinated debt (SND) and preferred stock (PS) markets? Please describe important trends in these markets.
2. Please describe the key characteristics of the secondary market for SND and of the secondary market for PS.

II. Supply Issues

3. Please describe the key factors (e.g., size of firm, frequency of issuance) that affect the costs of issuing SND. Are there different factors that affect the costs of issuing PS?
4. Discuss fixed versus variable costs of issuance. Is there an optimal issuance size?
5. What key characteristics of a bank or bank holding company make it most likely to issue SND and/or PS?
6. What factors determine whether a banking organization issues SND or PS at the bank or holding company level?
7. How is a bank's ability to issue SND and/or PS related to (a) rating agencies' views or other market participants' perceptions of its risk profile and (b) its market-determined and regulatory capital levels?
8. Are there any other characteristics of the bank or the overall market that are closely related to an individual bank's ability to issue SND and/or PS?

III. Demand Issues

9. What types of investors (e.g., insurance companies, banks, mutual funds, individuals) hold bank or bank holding company SND? What types of investors hold PS? Have there been any important changes in recent years?
10. What are the most important factors that influence investor decisions to purchase SND and/or PS?

IV. Pricing Issues

11. What do issuance prices on SND reflect? What do issuance prices on PS reflect?
12. What do secondary market prices for SND reflect? What do secondary prices for PS reflect? How quickly do changes in prices reflect changes in risk?

V. Regulatory/Tax Effects

13. How have bank regulatory policies (e.g., risk-based capital guidelines) affected the SND and the PS markets?
14. How important are tax considerations, either federal or state, to the markets for SND and PS?

Appendix C: Avoiding Subordinated Debt Discipline

Regulators may use subordinated notes and debentures (SND) in various ways to discourage banks from excessive risk-taking. If such an SND plan is to be effective, then it must impose costs on at least some risky banks at some time. The intent in imposing such costs is to induce banks to change their behavior in ways that reduce their risk of failure or the losses they impose on the Federal Deposit Insurance Corporation (FDIC) if they should fail or both. However, banks may also try to avoid the costs of the SND policy by taking steps that are within the legal framework of the policy but work to defeat the regulatory goals behind the policy. In extreme cases, some banks evade costs by taking actions that are outside the legal framework of the policy.

This appendix addresses the questions of how banks might avoid the regulatory goals of an SND policy and how supervisory and regulatory procedures might deal with this avoidance. The focus is on bank actions that are legal within the framework of an SND plan. The appendix also considers bank actions that induce other market participants to take actions that frustrate the public policy goals of an SND plan. Limited consideration will also be given to actions that are outside the legal framework of the policy.

How SND May Contribute to Regulatory Goals

The objective of regulating individual banks for safety and soundness is generally taken as some combination of the goals of reducing expected losses to the FDIC if the bank should fail and reducing the risk that a bank will fail. The goal of reducing expected losses to the FDIC is desirable in itself for reducing the probability that taxpayers will be expected to cover losses at banks. The goal of reducing losses to the FDIC is also desirable in that the pricing of the current deposit insurance appears to be insufficiently sensitive to the riskiness of various banks. Thus, the existing deposit insurance system may encourage some banks to take additional risk, which increases their risk of failure. Reducing

or eliminating expected losses to the FDIC may thereby reduce the risk of bank failure to that which would be observed in the absence of distortionary deposit insurance pricing. If the objective is to reduce the risk of failure to something below that which would be observed without the safety net, then merely eliminating the subsidy to risk-taking is not sufficient.

One way in which an SND requirement may help to achieve the goals of deposit insurance is through the discipline exerted directly by the subordinated debt holders in response to changes in the riskiness of a bank. SND exercise discipline by raising the bank's cost of funds, thereby offsetting some or all of the gains that may flow to equity holders from increased risk exposure. Thus, the extent to which subordinated debt may exercise direct discipline depends on the extent to which it raises a bank's cost of funds. Because SND issues may raise a bank's cost of funds when the debt is repriced, a requirement that banks frequently reprice SND is essential for obtaining this discipline. Furthermore, the effect of SND on a bank's cost of funds depends both on the amount of subordinated debt as a proportion of the risks being borne by all creditors of the bank (including the deposit insurer) and on the extent to which the rate on outstanding SND reflects the riskiness of the bank.¹ SND may also facilitate greater direct market discipline to the extent that they reduce the cost of complying with the capital requirements and, thus, permit an increase in required total capital levels.

A second way in which an SND requirement might help achieve the goals is through indirect market discipline exerted by private parties that do not hold SND obligations but that monitor SND rates to determine the risk exposure of a bank. An argument could be made that many banking organizations already issue SND and that market participants

NOTE. Larry D. Wall, Research Officer, Research Division, Federal Reserve Bank of Atlanta, Georgia, prepared this appendix. The views expressed are those of the author and not necessarily those of the Federal Reserve Bank of Atlanta or the Federal Reserve System. The author thanks Dan Covitz, Robert Eisenbeis, Douglas Efanoff, and Myron Kwast for helpful comments.

1. The relationship between outstanding SND and the risk exposure of the bank is important in evaluating the effect of SND on the moral hazard arising from the safety net. If the regulators could and did guarantee that any bank that became insolvent would be closed before the losses exceeded the bank's outstanding subordinated debt, the SND holders would bear all of the risk, even if the amount of SND issued equaled only 1 percent of assets. If the rate paid on the SND accurately reflected the risk borne by SND holders, then stockholders could not gain from making the bank more risky. Conversely, if the regulators followed a policy of closing a bank only after its losses had exceeded its equity and SND, other creditors (including the FDIC) would be at risk even if SND equaled 20 percent of assets. The existence of prompt corrective action limits opportunities for forbearance in practice, but forbearance is still possible if banks are not required to recognize losses.

may observe the rate paid on these issues; thus, a new regulation encouraging SND issuance would be unlikely to add to indirect discipline. However, an SND policy might stimulate additional indirect discipline in several ways. First, more banks could become subject to this indirect discipline to the extent that the policy induced more banks to issue SND. Second, to the extent that the policy reduced the cost of obtaining SND prices, it might encourage more private-sector participants to use SND prices. Timely SND prices are currently available from investment banks only at a cost that may discourage some potential users from obtaining them. Third, the policy might facilitate comparisons across banks to the extent that it resulted in a further standardization of SND contracts or caused banks to issue SND in more concentrated time intervals. Fourth, the policy might encourage private parties to place greater weight on SND prices by setting regulatory benchmarks for these prices. Private-sector participants are at risk in dealing with a financially troubled bank only if the regulators close the bank or impose other restrictions on the bank during the time of that dealing. Thus, if market participants know that the regulators are using a particular risk measure, then they have an incentive to use the same measure. A good example is the market's emphasis on risk-based capital ratios. The risk-based capital measures are not necessarily good measures of the riskiness of any individual bank, but they are good measures of the probability that the regulators will sanction a bank. As a consequence, banks face significant market pressure not only to remain in compliance with the risk-based capital regulations but also to comfortably exceed the regulatory standard so that the risk of future regulatory intervention is reduced.

Another way in which an SND requirement might help achieve the goals of deposit insurance is through indirect regulatory discipline exerted by regulators incorporating SND rates into their evaluation of the risk exposure of a bank. The methods for such incorporation of information range from informal use, in which SND rates are primarily an additional source of information, to formal use of the rates as a trigger for some supervisory action. Possible regulatory responses to high SND rates include increased frequency of examination, triggers for prompt corrective action, requiring banks paying high rates to shrink, and requiring banks that cannot issue SND to be closed.

Thus, an SND requirement may induce greater discipline either by influencing a bank's cost of funds or by providing a signal for other market participants or the regulators. Direct discipline exerted

by funding costs depends on the amount of debt that is repriced after a bank becomes riskier and the rate the bank must pay on that debt. In contrast, the amount of debt being repriced is, by itself, unimportant to the use of SND prices as a signal for indirect market discipline and regulatory discipline. Indirect market discipline and regulatory use of SND rates depend on the accuracy of the pricing signals obtained from the primary and secondary markets for SND. This analysis suggests that the methods a bank may use to avoid the costs associated with increased discipline depend on the type of discipline the bank is seeking to avoid.

Avoiding Direct Discipline by Reducing the Amount of Debt Subject to Repricing

Direct market discipline arises to the extent that a bank's cost of funds increases in proportion to increases in its risk exposure. This fact suggests that a bank may be able to avoid direct market discipline by reducing the debt that is subject to repricing if the bank's risk exposure increases. Reducing the debt subject to repricing can be accomplished by minimizing the total amount of SND that the bank must issue relative to its risk exposure or by minimizing the fraction of the total outstanding SND that must be rolled over at any given time.

Banks may reduce the level of SND relative to their risk exposure by increasing their exposure to risks that are underweighted by the SND requirements and avoiding exposure to risks that are overweighted. The methods for avoiding SND requirements are the same as those that could be used to avoid similarly structured requirements on equity capital.²

Structuring an SND policy that avoids the problem of banks' exploiting inaccuracies in the risk measure used to determine the required quantity of SND would not be easy. The problems involved in setting the amount of SND that banks must issue are similar to those associated with fixing the current risk-based capital system. The only difference is that the after-tax cost of SND may be lower than the after-tax cost of equity to a bank; hence a bank's incentive to engage in regulatory arbitrage may be less under a pure SND policy. That is, if SND requirements

2. For a recent discussion of bank avoidance of the risk-based capital regulations, see David Jones, "Emerging Problems with the Accord: Regulatory Capital Arbitrage and Related Issues," paper presented to the "Conference on Risk Models and Regulatory Implications," organized by the Bank of England and Financial Services Authority, on September 21–22, 1998, in London.

substituted for risk-based equity requirements, then banks would have somewhat less of an incentive to arbitrage the SND requirements.

A bank may reduce the amount of SND that is subject to repricing by maintaining a sufficient stock of SND outstanding so that it could remain in compliance with the minimum SND standard for a year or more without issuing more SND. In this case, even if rollover provisions required the issuance of some new subordinated debt, the bank could issue the minimum required to satisfy the rollover requirement. To illustrate: A large (\$200 billion) bank is required to issue at least \$100 million in new debt once a year, but it does not need to issue any more debt to satisfy the regulatory requirements. Even if the bank has to issue the SND at junk bond prices, the effect on the bank's overall cost of funds will be rather small.

The regulators may minimize this form of avoidance by requiring the banks to reprice a substantial amount of SND on a regular basis. One way of doing so, for example, is to require that the bank issue a given fraction of its total SND needs every year. Another way is to shorten the maximum maturity of the SND issues. If a bank may issue ten-year debt and the debt is not subject to the existing discounting, then the bank must maintain SND equal to only 110 percent of its capital requirement to eliminate its need to issue new SND to comply with the yearly minimum SND levels. However, if a bank cannot issue SND with a maturity of more than three years, then it would need to maintain SND levels equal to at least 133 percent of the minimum requirements to minimize its required issuance in any given year. A third way that increases market discipline is to require that all of the bank's SND be repriced on a regular basis. This repricing could be accomplished in various ways, including (1) requiring the debt to be rolled over every period (such as once a year), (2) requiring that the rate on outstanding debt be periodically changed based on observed primary or secondary market prices, or (3) requiring that SND holders be given a put option on the debt so that the bank would have an incentive to reprice the debt regularly in line with the bank's risk exposure.

Avoiding Direct and Indirect Discipline by Minimizing the Actual and Observed Rate in the Primary Market

A bank may avoid all three types of SND-induced discipline to the extent that the actual total price paid by a bank in the primary market does not fully reflect the bank's risk exposure. A bank may also

avoid indirect market discipline and regulatory discipline to the extent that it can reduce the observed rate paid on the debt even if it must compensate investors in other ways for the bank's risk exposure.³ However, reducing the observed rate by compensating investors in other ways does not reduce direct market discipline and may even increase the total cost of the debt to the extent that other forms of compensation are less valued by investors.

The key to reducing the actual price paid on a new SND issue is to mislead investors about the actual financial condition of the issuing bank. Banks may issue statements that fail to disclose material exposures or that provide inaccurate or misleading information about its exposure. The buyers of SND generally understand banks' incentives to mislead and would charge a premium for bearing this risk. Moreover, financially strong banks would have an incentive to become more transparent to reduce the risk premium on their SND. Nevertheless, banks still try to mislead investors about their risk exposure and may succeed for a time.⁴

Various supervisory and regulatory mechanisms already exist to encourage banks to fairly disclose their financial condition because banks currently have some incentive to mislead investors. The principal way in which an SND policy could further reduce this type of avoidance is by increasing bank regulators' efforts to promote transparency. At times, the regulatory agencies have been, at best, ambivalent about the merits of promoting enhanced transparency. The adoption of a plan in which SND play an important role in disciplining bank risk-taking may encourage supervisory authorities to more aggressively promote greater transparency.

3. Banks can also delay indirect market discipline arising from the pricing of SND issues if they can substitute privately placed debt for a public SND issue. Discussions with Continental Illinois's chief financial officer shortly after the bank was required to accept FDIC assistance revealed that Continental relied on privately placing debt rather than risk sending an adverse signal to the market by issuing public debt at market rates. Banks typically report key terms of major debt issues in their financial statements; thus, this type of avoidance may only delay the release of information about the pricing of SND. Furthermore, if banks are required to issue SND in the public markets, then this method of avoiding indirect market discipline can be stopped.

4. The same incentive applies to banks' dealings with examiners. Banks may be less successful in carrying out certain types of deception because examiners have access to superior information. However, banks may be more successful with other types of deception because examiners may have less of an understanding of certain types of risk exposure, such as very complex market trading strategies or affiliation with some types of nonbanking activities.

Banks may also reduce the observed rate by providing other forms of compensation to investors in the debt. One way of providing such compensation is to structure the debt so that it is more attractive to investors, such as issuing shorter-term debt or embedding valuable options in the debt. However, outside observers, including other market participants and the regulators, would recognize such compensation and could seek to add back the estimated effects of the compensation to obtain the actual cost of the debt. Moreover, the SND policy could be structured in a way that substantially reduces banks' ability to embed compensation in the debt contract.

The other way of reducing the observed cost is to provide the compensation outside the debt contract. Attempts to provide such compensation through an explicit promise by the bank to compensate investors outside the contract would be risky and might constitute fraud. However, such compensation may nevertheless be attempted in various subtle ways. The bank could pay above-market rates on deposits by SND holders, offering below-market prices on transactions services or loans. If the SND issue were being underwritten by outside investment bankers, then the bank could tie its purchases of future investment banking services to the investment banks' willingness to underwrite the issue at a below-market rate. If an affiliated investment banker were underwriting the SND issue, then the affiliate might support the price in the secondary market and provide buyers of the issue with discounted services and a favored position in attractive investments (such as Internet initial public offerings) underwritten by the investment bank.

Supervisory and regulatory steps can be taken to substantially reduce banks' ability to provide compensation outside the SND contract, but completely eliminating such compensation may be impossible. The banking agencies could collect information on the relationships that buyers and current holders of SND have with the issuing bank and its corporate affiliates. These relationships could then be reviewed for evidence of the bank's providing compensation. However, the bank and the investor may not have an explicit agreement, and the compensation may be provided some time after the SND issue is sold. For example, if the regulatory agencies set a trigger price (or rate) on SND issues that will automatically produce some substantial regulatory sanction, a major investor in bank securities is likely to be aware of this trigger point and the benefit the bank gains from avoiding the sanction. Such an investor may be willing to buy part of the issue at a slightly above-market price (below-market

rate) to help the bank avoid the regulatory sanction. The investor may do so based not on any explicit agreement but rather on an implicit understanding that the bank owes the investor a favor.⁵ An additional step that the regulatory agencies can take to reduce the potential for such implicit compensation is to monitor the placement of issues relative to the set of large SND holders. The placement of almost all of a new issue with a few buyers, especially those that rarely invest in SND, could signal that the buyers anticipate compensation outside the SND contract.

A bank may also try to mislead investors by shifting risk outside the bank with the expectation that, if serious problems arise, then the risk may be shifted back into the bank or otherwise covered by the safety net. An argument could be made that such an attempt to exploit a bank SND policy is misguided because the bank has no direct exposure to losses at its separately incorporated affiliates and the supervisors would not permit the bank to assume risks from its affiliates. This argument may have some merit with respect to affiliates whose operations are independent of the bank. The argument has less merit in those cases in which the bank and its nonbank affiliate are marketing a package of bank and nonbank services. In this case, the failure of the nonbank affiliate may have a significantly adverse effect on the bank even though the bank is not technically liable for the affiliate's losses. However, SND investors should recognize that the bank may have some exposure to its nonbank affiliates and incorporate this risk into the price of an SND issue. Thus, increased reliance on bank-issued SND may help in addressing one of the more difficult problems faced by regulators—how to evaluate the implications of nonbank affiliates for the safety and soundness of banks.

Avoiding Indirect Discipline by Minimizing the Observed Rate in the Secondary Market

Secondary market rates and prices may be important for indirect market discipline and regulatory discipline based on SND rates. Thus, banks may avoid these types of discipline by reducing the observed rates paid on SND to a level below that which

5. For example, suppose that the fair-market value of a new SND issue would trigger regulatory sanctions. A manager of a potential or existing corporate borrower might be willing to direct the borrower's pension fund to purchase the issue at a below-market rate in the expectation that the bank would remember this favor if the corporation suddenly needed help in obtaining a loan.

reflects the riskiness of the bank. Both mechanisms for reducing the observed rate on primary issues may also be used to reduce the observed rate in the secondary market. However, reducing the observed rate by other forms of compensation may be both easier and more expensive to do. It may be easier because a smaller fraction of the SND issues is likely to be sold in the secondary bond market. A significant fraction of this debt is likely to be purchased by investors after a buy-and-hold strategy. Moreover, because some investors may be unable to readily observe market prices, they may not realize that the secondary market price is being artificially inflated and, thus, may keep their SND claims because they believe that they would receive only fair-market value for their holdings. However, any additional compensation the bank does offer to purchasers in the secondary market will add to the cost of the issue. That is, when the bank compensates primary-market investors for receiving a below-market rate, the bank is merely changing the form of the compensation, substituting a lower rate on SND for more-favorable terms on some other product. After the debt is issued, however, the bank is under no obligation to increase the total compensation provided to the holders of the debt. Yet when a bank provides implicit compensation (such as loans at a below-market rate), it is effectively increasing its payments to at least some debtholders.

The observed rate in the secondary market could also be reduced if the dealers in the bank's SND issues reported inflated prices to the regulators. The SND market is a dealer market with no central collecting of transactions prices and a notable reluctance on the part of dealers to provide actual transactions prices. The only effective check the regulators have on the estimates provided by dealers may be the actual transactions prices of primary issues. Dealers may expect to receive some compensation for providing biased estimates, perhaps in the form of implicit understandings about future dealings with the investment bank. Given the low cost of providing misleading information to the regulator, the required compensation for doing so may not need to be very large. Indeed, investment banks already seek to win business from bank and nonbank firms by having their stock analysts produce favorable reports.

Supervisors could seek to minimize investment bankers' incentive to report inflated prices by obtaining actual transactions prices from several dealers. Supervisors might also compare reported secondary market prices with new issue prices to obtain information on the quality of the estimated prices obtained from investment bankers.

Finally, observed rates in the secondary market could be reduced by placing a large fraction of the more actively traded issue or issues with a single investor.⁶ Often the supervisory interest in protecting the safety net is consistent with the SND holders' interest in receiving the promised payments on the SND issue. However, if a bank is sufficiently distressed, then the bank's and the SND holders' interests may diverge. A small investor with adverse information may be able to liquidate most or all of its position before triggering increased indirect market and regulatory discipline. An investor with a very large position may not be able to sell a significant portion of the holdings before triggering increased discipline.⁷

Supervisors may minimize this risk by monitoring the fraction of each bank's SND held by the largest investors. A small number of investors holding a large fraction may signal potential problems, particularly if these investors are purchasing SND on the secondary market and the rate paid on the SND is close to the regulators' trigger point. Also, weak banks may benefit from a concentration of SND ownership, but stronger banks may be threatened by such a concentration. If SND are concentrated in a few holders, these holders may be able to blackmail the bank by threatening to dump their holdings on the market and significantly reduce the market price. Thus, healthy banks may seek to ensure that their SND are widely distributed when they are sold in the primary market.

Avoiding Direct and Indirect Discipline by Exploiting the Noise in the SND Signal

The prices of SND issues may move significantly in a short time. In some cases, a large change in price may reflect a realistic reassessment by the market of a bank's prospects. However, in other cases the magnitude of the movements may appear to be out of proportion to any fundamental news about the bank. Furthermore, the liquidity in the SND market

6. The placement of a large fraction of one issue with a single investor is likely to be effective only to the extent that trading is concentrated in only a few of the most recent issues.

7. As an extreme example, a large investor in a particular bank's SND may choose to purchase debt on the secondary market rather than let the secondary price fall to a level that would trigger increased regulatory discipline. However, such a case is unlikely. A large SND holder would take such action only if the economic value of the bank's equity had fallen to such a level that the SND were valued more as equity than debt. Yet in such extreme cases, the bank's supervisor would almost certainly know that the bank was experiencing severe financial distress. Further, the investor would likely be unable to unwind the position before maturity, at least at prices approximating those paid for the SND.

may plunge to levels that call into question the accuracy of any price quotes. For example, market participants have stated that SND prices fell and liquidity dropped substantially in September and October 1998 after the Russian bond default. Price movements that appear unrelated to fundamentals and periods when the SND market has minimal liquidity potentially challenge the use of SND to generate market discipline and to signal the regulators. The implications of large price movements and reduced liquidity depend on whether the shock is influencing (1) only a specific bank or group of banks or (2) the entire bond market (bank and nonbanks).

Shocks That Affect Specific Banks

One shock that may affect a specific bank or banks is false rumors about them that significantly reduce SND prices. Two problems could be associated with false market rumors about specific banks. First, banks themselves could try to exploit the vulnerability of SND prices to rumors by starting false rumors to discredit regulatory use of SND. However, it is not clear that a bank would gain from starting rumors about itself. If the rumors were quickly dispelled, then the harm from the drop in SND prices would be minimal, and regulatory confidence in their long-term value might not be reduced. If the rumors were not quickly dispelled, then they might have a greater effect on regulatory confidence, but they might also have a negative effect on the bank's dealings with some of its customers and suppliers independent of any change in SND prices.⁸ In practice, banks may find it safer to wait for others to start the rumors.

The other problem arising from rumors is that the bank could be forced to issue new subordinated debt or that the regulators would respond to an SND rate trigger before the rumors were dispelled. However, the effect of such rumors should be short-lived. Banks could offset the impact of rumors by providing additional information to the market. In one of our interviews, we were told that the interviewees' firm had been the subject of false rumors and that the firm had countered the rumors by providing additional information to reassure market participants. Banks may prefer to keep some of this information confidential. However, the risk of being forced to reveal confidential information is greatest for financially weak banks. Thus, the banks that are

most at risk of having to make costly disclosures are those that, from a safety and soundness perspective, the regulators would most want to bear this risk.

Another source of noise in SND risk measures is that the market may receive valid information, but the implications of that information for specific banks may be unclear. For example, if a very large borrower experiences financial distress, then the prices of the SND of all potentially significant creditors may decline. In this case, SND traders are likely to be worried that the other side in their transaction knows more than they do. Thus, traders will tend to post very large bid-ask spreads to protect them from losses arising from trades with informed investors.⁹ Given large spreads, investors that do not have superior information may be unwilling to trade. Further, if an investor is willing to transact at the posted prices, the dealer may take that as a signal that the investor has superior information and refuse to trade even at the posted price.

That bank regulators may not rely on SND prices as a risk signal during periods of adverse rumors or illiquidity raises the possibility that a bank could try to exploit this situation by taking on additional risk when its SND are illiquid. The debt may not remain illiquid for long, so this risk appears remote. A potentially more significant problem is that a bank may be required to issue SND during a period of illiquidity or that a "false" price signal from the SND market could trigger a regulatory response.

The possibility that rumors or incomplete pieces of information will significantly influence a bank's SND prices has several implications for the structure of an SND policy. Any policy that requires banks to issue SND during a short interval risks imposing costs on the bank that serve to provide no safety and soundness benefits. Banks may be able to counter false rumors or supply missing information about actual exposures to new sources of loss if given a few days. Thus, banks should generally be given some period of time within which to issue SND.

However, giving banks a window within which to issue SND raises two potential problems. First, banks may seek to time issues during "good" periods so that the prices of primary issues are not a random sample of the bank's financial condition. The timing of bank SND issuance could be a problem to the extent that the regulators rely heavily

8. Examples of such customers include firms relying on the bank's loan commitments and potential derivatives counterparties.

9. Dealers like to boast in their marketing to issuers and investors that they maintain continuous markets. The posting of very wide bid-ask spreads allows the dealer to claim that they were in the market while allowing them to effectively withdraw.

on prices from infrequent primary market issues. This seems less of a problem to the extent that secondary market prices are also used, as they would for larger, longer-term debt, or that banks are required to make frequent primary market issues, as may be the case for smaller, shorter-term debt issues. Second, banks may try to exploit regulatory concern about the impact of rumors and incomplete information by deferring the issuance of new debt until the end of their window and then hoping that a market disturbance will allow them to further defer such issuance. Regulators may counter this incentive to defer issuance by following a policy of rarely granting permission to defer issuance because of bank-specific market disturbances. If banks know that regulatory permission to defer their issuance of SND will rarely be granted, then they will generally try to complete their SND issue during the early to middle parts of the window.

If the regulators are using SND prices as a signal, then automatic triggers based on a single day's price may not be desirable. Instead, a large jump in the SND rates paid by a bank might trigger the supervisors' second look at the bank to determine whether the price contains new information. However, if the intent of an automatic trigger is to prevent lengthy forbearance, then the regulators should give the bank some time (a few days to two weeks) to tell its story to the market and correct any mispricing.

Shocks That Affect the Overall Corporate Bond Market

The implications of a large move in SND prices are different if changes in the bank SND market mirror changes in the overall bond market. Sharp increases in the spreads of all corporate debt over comparable Treasury securities have been called flights to quality and are sometimes explained as an increase in risk aversion. This overall increase in risk premiums may be due to information about the economy, but it may also reflect an increase in market concern about the probability of an event that has not yet occurred.¹⁰

10. I find the claim that individuals' utility functions change to be improbable. An alternative story with the same implications relates to changes in subjective probabilities of future outcomes. Before some shock occurs, market participants may have assigned a probability measure of zero to events with very bad outcomes. As a consequence, investors do not demand compensation for these events. Then new information arrives, and investors assign these events a probability greater than zero. Even if the probability assigned is very low, the event prices may be extremely high, leading to a sharp increase in risk premiums.

Neither banks nor bank regulators may be able to counter sharp increases in overall corporate bond spreads over Treasuries. Nonfinancial corporations will generally defer long-term bond issuance during such a period, preferring to wait for spreads to narrow. Requiring banks to issue long-term SND during this period may impose substantial costs on them. One alternative is to grant forbearance to banks that defer issues for a fixed time when overall corporate bond spreads over Treasuries exceed a given threshold. Such a policy, however, may take away the SND signal just when such a signal may be especially valuable. To prevent banks from exploiting the temporary absence of an SND signal, another alternative is to require banks to issue subordinated obligations but allow them to shorten the maturity to one year or less. Permitting banks to issue shorter-term obligations would have two beneficial effects: (1) Shorter-term obligations are generally likely to have smaller risk premiums, and this difference may be more pronounced during periods of flight to quality, and (2) shorter-term obligations can then be refunded at lower rates when market concerns dissipate. However, allowing banks to issue shorter-term obligations implies that the signal from the SND market is likely to be more focused on the short-term prospects of the bank than it would be with longer-term issues.

The potential for a general increase in corporate bond spreads argues against setting SND rate triggers for regulatory action at fixed spreads over Treasury securities. Any trigger should be based on a measure that adjusts for overall risk premiums. Examples of such measures include bank SND rates relative to corporate bonds of a given rating (such as Baa) and converting SND spreads by the swap curve to a premium over *libor*.

Assessment of Methods of Avoiding SND-induced Discipline

The preceding analysis suggests several ways in which banks may seek to avoid SND-induced discipline (see table C.1 for a summary of these methods). However, virtually any plan that seeks to create a substitute for adverse effects of the safety net on market discipline is going to have some weaknesses. The relevant question is whether any SND plan could be effective given banks' alternative methods of avoiding this type of discipline.

Most banks may engage in only minimal efforts to undercut SND discipline most of the time. Unfortunately, this point is of limited comfort because

C.1. Summary of Avoidance Methods

Method of avoidance	Implications for direct discipline	Implications for indirect discipline and signal to regulators
<i>Reducing debt being repriced</i>		
Reducing required SND outstanding	Substantial problem with no obvious remedy. ¹	Quantity issued is not relevant.
Reducing the fraction of SND to be rolled over	Significant problem. ¹ May be reduced by minimum mandatory repricing.	Quantity issued is not relevant.
<i>Minimizing actual and observed price</i>		
Misleading investors	Significant but temporary. ¹ May be reduced by enhanced disclosure.	Significant but temporary. ¹ May be reduced by enhanced disclosure.
Non-rate compensation in SND contract	Form of compensation is not relevant.	Not significant and easily remedied.
Explicit or implicit compensation outside the SND contract	Form of compensation is not relevant.	Plausible reduction in observed rate is small. Can be reduced but not eliminated.
<i>Observed rate in the secondary market</i>		
Explicit or implicit compensation outside the SND contract	Raises rate on outstanding debt, reinforcing direct discipline.	Plausible reduction in observed rate is small. Can be reduced but not eliminated.
Secondary market dealer reporting low prices	Not relevant.	Plausible reduction in observed rate is small.
Large investor could keep rates from rising	Not relevant.	Plausible reduction in observed rate is small.
<i>Noise in the signal for specific banks</i>		
Undermining by starting rumors about self	This avoidance is unlikely because it would be highly risky.	This avoidance is unlikely because it would be highly risky.
Accurate but incomplete information make issuing debt too costly	Potentially costly to banks and SND credibility. ¹ Allow time for rollover.	Potentially costly to banks and SND credibility. ¹ Allow time for rollover.
<i>Noise in all bond signals makes issuing debt too costly</i>		
	Significant problem. ¹ Allow time for rollover or short maturity SND or both.	Significant problem. ¹ Allow time for rollover or short maturity SND or both.

1. More important problems.

banks that are experiencing financial difficulty are those that we are most concerned about and that are most likely to seek to avoid SND discipline.

The potential problems with using SND to obtain direct market discipline are substantial, particularly if the plan must operate within the rules of the 1988 Basel agreement. Many observers are exploring alternative methods of inducing greater discipline precisely because of weaknesses in the existing risk-based capital measure. Moreover, our current five-year discounting period results in bank SND issues typically having ten-year maturities. As a consequence, at worst a bank might need to roll over only 10 percent of its SND requirements, which may be limited to 2 percent of risk-weighted exposure under the Basel agreement. The bottom line is that the bank may need to reprice only 0.2 percent of its risk-weighted exposure in any given year, and the risk-weighted exposure measure almost surely

understates the actual risk of a financially weak bank.

Although banks may have several ways of reducing the observed rate paid on their SND issues, this problem may not be insurmountable. Banks might be able to reduce their observed SND rates a few basis points by offering compensation outside the SND contract. However, banks that sought to reduce their observed SND rates enough to place them in a higher rating category (for example, to move the rate paid by Ba2 firms to the rate paid by Baa3 firms) would have difficulty doing so in the United States.¹¹ Investors, the rating agencies, and the supervisors

11. Bond markets in some other countries are significantly less liquid and efficient than U.S. markets, a situation that raises the possibility that banks in some countries could cause larger reductions in observed SND rates. Whether such reductions are possible, however, is a topic that is outside the scope of this study.

would likely suspect avoidance activity by the bank, and the bank would risk incurring additional supervisory sanctions for such avoidance. Moreover, to the extent that the regulators may anticipate that banks will be able to reduce observed SND rates, they may also reduce their trigger point for taking supervisory or regulatory action. Finally, the incentive to mislead regulators may be reduced by imposing discipline in a series of smaller regulatory actions rather than in a few draconian measures. Such a continuous response reduces the gains from moving observed SND rates a few basis points.

Probably the biggest concern with using SND rates for indirect market discipline and supervisory discipline is that banks will temporarily mislead investors about their true risk exposure. This problem is not unique to an SND policy, however; it may occur in any attempt to use market forces to discipline bank risk-taking. Probably the best supervisory response to inadequate transparency—besides continuing efforts to enhance it—is to maintain bank supervisors’ ability to act independently of the SND signals.

Appendix D: Macroeconomic Effects of Mandatory Subordinated Debt Proposals

As one of the most junior of all bank funding instruments, subordinated notes and debentures (SND) qualify under the Basel Accord as an eligible component of tier 2 capital, up to a limit equal to 50 percent of tier 1 capital. Although SND and equity thus are part of total capital under the accord, holders of equity and SND have very different exposures to the issuing bank's risk profile: Holders of SND and holders of equity stand to suffer if risks a bank takes turn out poorly, but only equity holders are potential beneficiaries of outsized positive outcomes. Thus, SND holders generally should be more averse than equity holders to a bank's risk-taking (an exception might occur for a bank already in danger of failing). Holders of uninsured deposits should view bank risk-taking much as SND holders do. However, SND's junior ranking suggests that its holders should be more sensitive to changes in the perceived riskiness of the issuing bank than depositors, even those with large, basically uninsured accounts.

Proposals for mandatory SND attempt to take advantage of these characteristics. The proposals typically would require a bank to fund a small fraction—perhaps 2 or 3 percent—of its risk-weighted assets with SND. Some proposals stipulate no further conditions, using the observed market rates on mandatory SND as additional information for regulatory monitoring and intending the higher yields that investors would demand of riskier banks to discipline bank risk-taking. Other proposals include regulatory conditions on issuance designed to leverage up the relatively small influence on bank behavior that holders of marketable SND would likely have at the stipulated issuance levels. A well-known proposal, for example, would cap the spread of the yield on a bank's SND over a Treasury instrument at a pre-established maximum. Other proposals—designed to deal with the possible unavailability of creditable, high-frequency information on the market rate on SND—would make SND puttable at some specific discount to par or impose a relatively short maturity to require frequent issuance (for example, quarterly). Under such mechanisms, the SND market's perceptions of the riskiness

of a bank could have a substantial influence on its behavior.

This appendix examines the macroeconomic implications of some SND proposals. It begins with a static analysis of the implications of mandatory SND (with or without a rate ceiling) for the efficiency of financial intermediation. It then examines the possible cyclical effects of an SND requirement, noting the generally forward-looking nature of a mandatory SND requirement and the generally backward-looking nature of risk-based and leverage capital requirements. This section also discusses the connection between the expected behavior of bank supervisors and yields on SND. Some implementation issues are noted in section 3, and some concluding remarks are given in section 4.

1. Static Analysis

The Effect of Mandatory SND

Setting required levels of capital—either equity capital or SND capital—at a higher share of assets (or risk-weighted assets) than banks would otherwise choose would add to the cost of financial intermediation, putting upward pressure on loan rates and downward pressure on deposit rates and on profits.¹ As a result, the level of financial intermediation would fall below that which would otherwise occur. However, if the reduction in financial intermediation offset a part of the increase in overall intermediation made possible by the subsidy banks receive from improperly priced deposit insurance and other aspects of the safety net (excluding the burden of zero-interest required reserves and other regulatory costs), it could actually improve the efficiency of resource allocation.

In any case, the added cost associated with an SND requirement would likely be small, at least for most large banking organizations. Given the Basel rules, a bank that just meets the total capital requirement of 8 percent of risk-weighted assets, and that holds equal amounts of tier 1 and tier 2 capital, probably could easily meet a mandatory SND requirement of 2 percent of risk-weighted assets.

NOTE. Thomas F. Brady, Chief, Banking Analysis Section, and William B. English, Senior Economist, both in the Division of Monetary Affairs, Board of Governors of the Federal Reserve System, Washington, D.C., prepared this appendix. The views expressed are those of the authors and do not necessarily reflect those of the Board of Governors or its staff.

1. To some degree, the higher costs of issuing equity or SND to meet regulatory requirements would be offset by the consequent reduction in the cost of wholesale deposits and similar instruments. Overall costs must rise, however, or else banks would be indifferent to the imposition of regulatory minimums.

Such a bank would likely meet as much of its tier 2 requirement as allowed under the Basel Accord with SND and loan-loss reserves.² The Basel rules limit the amount of loan-loss reserves that can be counted as tier 2 capital to 1.25 percent of risk-weighted assets and the amount of SND that can be counted as tier 2 capital to one-half of tier 1 capital. Thus, a bank meeting the minimum standard of 4 percent of risk-weighted assets for tier 1 capital could hold up to 2 percent of SND and so would satisfy a 2 percent SND requirement.

In practice, most large banks hold much higher levels of total capital than the 8 percent minimum. Although these banks generally tilt capital heavily toward tier 1, the SND component typically exceeds 2 percent of risk-weighted assets. For example, as of September 30, 1998, the twenty-five largest banks (by assets) had an average ratio of total capital to risk-weighted assets of 11.3 percent, but a tier 2 ratio of only 3.2 percent, of which 2.1 percent was attributable to SND. Of these twenty-five banks, seventeen had SND ratios at or above 2 percent, and three others, at about 1.8 percent, were close to that level. Thus, four-fifths of the largest banks would have had little or no trouble meeting a 2 percent SND requirement at that time. (This assessment ignores any issues that might arise from the banks' having to issue SND to the market rather than to their holding companies, as apparently is commonly done, and any increase in the costs of SND issuance owing to the structure of the SND requirement.)

The five banks that had SND well below 2 percent of risk-weighted assets fell into two groups: two banks with relatively low levels of total capital and three banks with average or above-average levels of total capital. For the better-capitalized banks (two with no SND and the third with SND equal to only 1.3 percent of risk-weighted assets), a mandatory SND requirement could lead to the substitution of tier 2 capital for tier 1 capital.³ Encouraging such a substitution appears to be counterproductive to safety and soundness because regulators would be promoting the use of a weaker, instead of a stronger, form of capital.

2. The bulk of banks' tier 2 capital is typically accounted for by loan-loss reserves (because using them is costless for this purpose) and SND (the interest on which is tax-deductible). However, banks may (and some do) provide tier 2 capital by issuing perpetual preferred stock, hybrid capital instruments, or equity contract notes.

3. Total risk-based capital ratios for the three banks were 11.3, 13.2, and 14.9 percent. Boosting these ratios as much as another 2 percentage points to meet an SND requirement would place total capital well above the twenty-five-bank average of 11.3 percent.

To summarize, a mandatory SND requirement of 2 percent would appear to have only minor implications for bank balance sheets and for the costs of intermediation by the largest banks because most have already issued this amount of SND (although likely to their bank holding companies, rather than to the public, in most cases). However, some of the banks that have not issued this level of SND nonetheless appear to be very well capitalized, and so a requirement might lead these banks to weaken their capital positions by substituting SND for equity.⁴

The Effect of Imposing a Rate Cap

If, besides requiring banking organizations to issue SND, regulations limited the rate that banks could pay on SND, then some banks' behavior could be more significantly affected. If such a rate cap were binding, or were expected to bind in the near term, banking firms could respond in a number of ways. Most straightforwardly, they could lower the rate on their SND by reducing the riskiness of their assets, either by reducing their leverage or by shifting the composition of their portfolio toward less-risky assets. Such steps would likely reduce the amount of bank loans available to riskier borrowers—but the requirement is intended to limit banks' risk-taking. A second adjustment would be to cut the yield investors require on SND by boosting equity. Doing so would raise the average cost of funds to the bank and would lead to higher loan interest rates and lower deposit interest rates. Again, however, these changes would reflect the intent of the requirement to limit the risks banks impose on the financial system. A third adjustment would be to increase issuance of SND and to curtail deposit funding. For a given set of bank assets, a shift toward funding with SND rather than with deposits (with no change in equity) could cut the yield investors demand from the SND by boosting the return on SND in the event of default.⁵ As with an increase

4. The picture for large bank holding companies is similar to that for large banks. Among the top twenty-five BHCs, the average ratio of SND to risk-weighted assets on September 30, 1998, was 2.7 percent. All of these bank holding companies had issued at least some SND, but four had ratios below 2 percent. Of those, three had total capital in excess of the group average.

5. For example, if all deposits were replaced with SND, the likelihood that holders of SND would get nothing in the event of default would be far lower than if SND were only 2 percent of assets. However, this effect on the cost of SND depends on the banks' being able to credibly assure SND investors that the SND will not be leveraged up once they are sold. So long as supervisors are expected to take account of secondary market spreads on SND, however, the bank may not really have the opportunity to take advantage of existing SND investors in that way.

in equity, a substitution of SND for deposits would raise funding costs and reduce intermediation at least to some extent.

Finally, banking organizations could attempt to evade the SND requirement by engaging in regulatory capital arbitrage. However, it is not clear how capital arbitrage could be used to cut the rate on subordinated debt. Thus far, the point of capital arbitrage has been to remove assets from bank balance sheets—thereby reducing risk-weighted assets—while allowing the bank to retain much of the associated risk and earnings. Such methods have been used by some banking companies to limit the impact of the Basel Accord's 8 percent capital requirement on lending activities.⁶ However, because such techniques are designed to leave the risk of loss primarily at the bank, they likely would do little to reduce the rate on SND. Indeed, if capital arbitrage allowed a bank to curtail its SND issuance without trimming the risks it faced, the yield on the SND might be expected to rise.

Unless regulatory capital arbitrage allowed banking organizations to evade the SND rate cap, the response to a binding cap would likely imply some reduction in the availability of credit to riskier bank borrowers, at least in some periods. Even if mandatory SND were limited to, say, the top twenty-five banks, those banks hold more than 60 percent of banking system assets. Thus, even if only a few large banks were affected by binding SND rate ceilings, the effect on credit availability for some types of borrowers could be noticeable. How serious such an effect would be, however, is hard to gauge. Clearly, if the cap were set high enough, it would have no effect, whereas if the cap were set at a very low level, the effect on the economy could be profound.

2. The Cyclical Effect of an SND Requirement

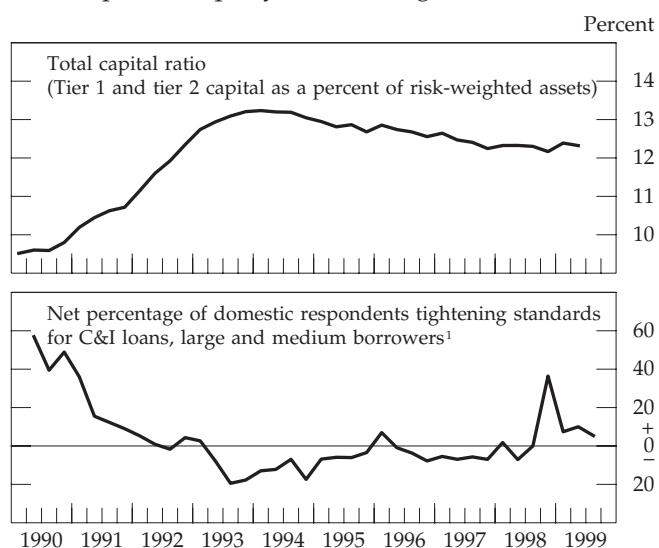
The Pro-cyclical Nature of Capital Requirements

Capital requirements are by their nature pro-cyclical.⁷ When the economy is on the upswing, for example,

6. For example, in some cases a bank can reduce its regulatory capital requirements by securitizing and selling loans that had been on its books while structuring the sale in a way that leaves the bank with virtually all of the risk of loss.

7. This is not to assert that a regulated banking system is more cyclical than one with no capital regulation.

D.1. Capital adequacy and lending standards



1. Commercial and industrial (C&I).

strong bank profits are likely to generate high levels of retained earnings, and conditions for equity issuance should be favorable. With equity capital thus readily available, risk-based capital constraints would tend to be of minimal importance, and banks would likely be relatively aggressive lenders. The weaker profits and less robust equity market characterizing a flagging economy would, by contrast, raise the cost of capital and curb banks' appetite for risky lending. For example, the period of capital building by big banks in the early 1990s was accompanied by lending stringency, whereas more recent years, in which substantial stock buy-backs suggest excess capital at banks, have until recently been characterized by an easing of lending standards (see figure D.1).

Given the subordinate status of SND, the sensitivity of their cost to economic developments should exceed that of other interest-bearing liabilities of the bank and likely that of bank assets as well. Thus, the effects of the mandatory issuance of SND for overall bank lending should be pro-cyclical. However, the effect of a modest SND requirement would probably be fairly minor. As noted earlier, most large banks already have SND outstanding equal to 2 percent or more of risk-weighted assets, and so a requirement at that level would not raise funding costs. Even a moderate increase in SND issuance, if it were required, would not greatly affect average funding costs because the higher rate on SND would apply to only a small fraction of liabilities, and as already noted, there should be some offset due to lower rates on more senior liabilities.

The Implications of a Maximum Spread

The imposition of a maximum spread on SND could amplify the cyclical effects of mandatory SND. As noted, spreads of SND rates over those on other instruments would be expected to widen in reaction to the prospect of a cyclical downturn. To resist the tendency for the spread to widen, therefore, banks would have to take one or more actions to offset the effect of the business cycle on perceived loan quality. As noted earlier, these adjustments could include pro-cyclical changes in lending to riskier borrowers or changes in funding mix from deposits to equity or SND. The need to take such steps in the face of an actual or anticipated downturn would be particularly acute if the cap on SND yields were a relatively narrow spread over a riskless rate because the spread of SND yields over those on comparable Treasury securities would likely be quite cyclical. In contrast, the pressure on banking firms to adjust their balance sheets to reduce the rate on their SND would be eased, and the cyclical effects of the requirement thereby reduced, if the cap on SND yields were set relative to an index of private corporate bond yields or a peer group of banking institutions, because those yields would also be expected to rise relative to those on Treasuries in an economic downturn.

Forward- and Backward-Looking Capital Requirements

The preceding discussion considered the effects of mandatory SND in isolation. But such a requirement, if implemented, would coexist with risk-based capital requirements. The two requirements would appear to differ to the extent that the risk-based capital requirements tend to be backward looking and mandatory SND forward looking. The SND requirement, for example, could start to affect bank lending as soon as the outlook for the economy began to sour by raising the yield on SND relative to the riskless rate (or by making required scheduled issuance of SND more difficult). Risk-based capital and leverage ratios, by contrast, might remain largely unaffected by an economic slowdown and have little effect on lending until loan delinquency and charge-off rates eventually increased, necessitating higher loan-loss provisioning.⁸ Thus, the combination of the two requirements could smooth the effects of capital regulation during downturns.

8. Leverage and tier 1 capital limits would be forward looking if all assets were marked to market, as trading assets and available-for-sale investment account assets now are.

3. Implementation Issues

What Level of SND is Desirable?

The appropriate level of SND to require depends on the intended purpose of the requirement. If the intention is simply to allow bank supervisors to obtain a measure of the way financial markets view banking institutions, then a quite small requirement could be sufficient. In contrast, if the intention is to provide for market discipline of bank risk-taking through the availability or cost of SND, a larger amount of SND might be appropriate. Similarly, if the regulation is intended to offset distortions generated by improperly priced deposit insurance and the safety net, then a more substantial SND requirement might be needed. However, concerns about the effects of a high level of SND on the cyclical behavior of bank lending might offset, to some degree, these arguments and lead bank supervisors to choose a lower requirement than appeared optimal on static grounds.

What Rate Cap Is Desirable?

Similar complications arise in evaluating whether or not there should be a cap on the interest rate and, if so, what it should be. If the cap is intended to prevent a widespread deterioration of the banking system's assets, such as took place in the 1980s, then a relatively narrow fixed spread over the yield on riskless Treasury securities would likely be most effective. However, if the spread were too narrow, it might lead the banking industry to cut back sharply on lending to riskier borrowers, especially when the economy appeared likely to weaken. Such a response would be undesirable if it prevented the banking system from taking prudent and desirable risks and increased the amplitude of cyclical fluctuations. However, if the spread were too wide, then the cap might have little effect on bank risk-taking in periods when the economy was healthy. One way to damp the cyclical effects of a rate cap while constraining risk-taking in good times would be to set the cap relative to an index of yields on private securities with a given rating, thereby allowing for some increase in risk spreads during downturns.

Even if an optimal base rate and spread could be determined, the cap would likely require some flexibility in its administration to prevent disruptions in the financial markets, like those experienced in the fall of 1998, from triggering major cutbacks in the supply of bank credit. These considerations suggest that banking organizations should be required to meet the rate cap on an average or

moving-average basis or that supervisors be allowed to suspend the cap in light of unusual market shocks.

In contrast, if the cap were viewed primarily as a way to identify individual banking organizations that investors in the SND market viewed as particularly risky rather than as a way to limit risks undertaken by the banking system as a whole, then the rate cap for each institution could be set relative to a peer group with similar markets and opportunities. Such an approach, of course, would provide much less protection against the undertaking of greater risks by the banking industry as a whole. Again, the issue of selecting the appropriate size of the maximum allowed spread would need to be dealt with: If it were too wide, it would generally have no effect; if too narrow, it might squelch some healthy diversity among banks.

One further complication in the setting of a rate cap for SND is that the spread required by investors would depend in part on the expected behavior of regulators. On the one hand, if SND investors believed that the regulatory authorities would successfully close banks before their capital had been exhausted, as intended under the prompt corrective action provisions of FDICIA, then the yield on SND could be considerably sheltered from current and anticipated developments affecting the issuing banks. In this case, there would be little reason other than the costs of closure for SND yields to rise much above the risk-free rate.⁹ On the other hand, if SND investors thought that regulators would not close banks sufficiently rapidly, or that the costs of closure would be large, they might nonetheless demand only modest risk premiums for holding the SND of impaired banks if they also anticipated regulatory forbearance or bailouts.

In practice, the market doubtless would place some probability on a various regulatory responses to difficulties at a particular bank. Changes in yields on banking organizations' SND could, therefore, reflect changes in investors' beliefs about the probable behavior of regulators as well as changes in the outlook for the issuers.

4. Concluding Remarks

Requiring banking organizations to issue SND has several advantages. The rates that investors require

offer bank supervisors a measure of how the market views the risks the issuer is taking. Also, banking firms may limit risk-taking to reduce the rate that they must pay on SND, or they may provide additional information to investors to explain those risks. Moreover, SND owners may be able to affect decisions made by issuers with respect to risk, and those owners are more likely than equity holders to have incentives that are close to those of supervisors. An SND requirement might also encourage some banks to boost their total capital ratios.

However, an SND requirement might have adverse macroeconomic effects, which should be considered in the design of the regulation. The imposition of an SND requirement could, by raising the banking organization's cost of funds, reduce intermediation and consequently cause a less efficient distribution of resources. A requirement that included a cap on SND rates could, if the cap were tight, lead issuers to harshly curtail lending to riskier borrowers. A second possible drawback is that, with an SND requirement in place, bank-lending behavior might be more pro-cyclical than it is now. This problem would be particularly likely if a cap on SND yields were set at a relatively narrow spread over the rate on comparable Treasury securities because such a spread would probably bind more tightly for more institutions when the economy was (or was expected to be) weak.

So long as the SND requirement is fairly small and the rate cap, if there is one, relatively high, these macroeconomic effects would likely be modest. The inclusion of SND in tier 2 capital already disposes banks toward issuing it, and most large banking organizations have enough outstanding to meet a requirement of 2 percent of risk-weighted assets. Moreover, banks have revealed a strong preference for tier 1 over tier 2 capital (perhaps responding to market demands). As a result, many banks could raise total capital through additional SND issuance since their SND are currently well below the ceiling of 50 percent of tier 1 capital allowed under the Basel Accord. Nonetheless, an SND requirement in excess of 2 percent might have significant effects on the balance sheets of some banking organizations.

A further complication arises for those banks with high total capital. These institutions' preference for tier 1 over tier 2 capital raises the possibility that, if markets allowed, they might react to an SND requirement by substituting SND for equity capital

9. Regulators cannot interfere with the payment of interest on SND for solvent banks; to do so would be to force the banks to default. However, regulators must by law require critically undercapitalized banks (total tangible equity capital of 2 percent

or less of assets) to suspend interest payments on SND. Such banks, however, are likely to be closed fairly rapidly.

and thus weaken their overall capital structure.¹⁰ One possibility would be to allow banks to hold excess tier 1 capital rather than issuing SND.

Given the large effects on bank lending that a rate cap could have and the difficulty of deciding on an appropriate level for such a cap, it may be desirable

10. Possibly the banks and bank holding companies that we have identified as holding low SND but above-average tier 1 and total capital are judged by the market to have above-average risk. In that case, they would be less likely to trim their tier 1 capital in response to a regulation-induced rise in tier 2 capital.

to accumulate more experience with the cyclical behavior of SND spreads before attempting to establish one. Considering whether such a proposal would provide banks with an “escape” mechanism may also be useful. Regulatory arbitrage, as noted earlier, has provided a method for some banks to escape the “one size fits all” aspect of the current risk-based capital standards, and such arbitrage may have been beneficial on balance. It is not clear that a similar mechanism would be available to banking organizations or the banking system as a whole if regulators specified spreads for SND that proved too constraining.

Appendix E: Treatment of Subordinated Debt in Risk-Based Capital

The following extract is taken from Federal Reserve Regulation H—Membership of State Banking Institutions in the Federal Reserve System. The specific subparts below are found in Appendix A of the regulation, which contains the guidelines for the risk-based capital adequacy of state member banks (12 CFR Part 208, Appendix A.II.A.2). Substantially the same guidance is also applicable to bank holding companies and may be found in Federal Reserve Regulation Y—Bank Holding Companies and Change in Bank Control (12 CFR Part 225, Appendix A.II.A.2). Although the precise wording varies for regulations applying to national banks and state nonmember banks, the substance of their regulations is the same as that for member banks and bank holding companies.

d) *Subordinated debt and intermediate term preferred stock.* The aggregate amount of term subordinated debt (excluding mandatory convertible debt) and intermediate-term preferred stock that may be treated as supplementary capital is limited to 50 percent of tier 1 capital (net of goodwill and other intangible assets required to be deducted in accordance with section II.B.1.b of this appendix). Amounts in excess of these limits may be issued, and, while not included in the ratio calculation, will be taken into account in the overall assessment of a bank's funding and financial condition.

Subordinated debt and intermediate-term preferred stock must have an original weighted average maturity of at least five years to qualify as supplementary capital. (If the holder has the option to require the issuer to redeem, repay, or repurchase the instrument prior to the

original stated maturity, maturity would be defined, for risk-based capital purposes, as the earliest possible date on which the holder can put the instrument back to the issuing bank.)

In the case of subordinated debt, the instrument must be unsecured and must clearly state on its face that it is not a deposit and is not insured by a federal agency. To qualify as capital in banks, debt must be subordinated to general creditors and claims of depositors. Consistent with current regulatory requirements, if a state member bank wishes to redeem subordinated debt before the stated maturity, it must receive prior approval of the Federal Reserve.

e) *Discount of supplementary capital instruments.* As a limited-life capital instrument approaches maturity, it begins to take on characteristics of a short-term obligation. For this reason, the outstanding amount of term subordinated debt and any long- or intermediate-life, or term, preferred stock eligible for inclusion in tier 2 is reduced, or discounted, as these instruments approach maturity: One-fifth of the original amount, less any redemptions, is excluded each year during the instrument's last five years before maturity.¹²

12. For example, outstanding amounts of these instruments that count as supplementary capital include: 100 percent of the outstanding amounts with remaining maturities of more than five years; 80 percent of outstanding amounts with remaining maturities of four to five years; 60 percent of outstanding amounts with remaining maturities of three to four years; 40 percent of outstanding amounts with remaining maturities of two to three years; 20 percent of outstanding amounts with remaining maturities of one to two years; and 0 percent of outstanding amounts with remaining maturities of less than one year. Such instruments with a remaining maturity of less than one year are excluded from tier 2 capital.

Appendix F: The Argentine Experience with Mandatory Bank SND

Argentina appears to be the only country that has required banks to issue subordinated debt. Because the rule has just begun to be implemented, only limited lessons can be drawn from the Argentine experiment at present, but greater perspective ought to be possible in the foreseeable future because the government appears to be firmly committed to continuing with the policy. The market discipline that subordinated debt is intended to elicit is viewed by the Argentine central bank as a complement to supervision rather than as a substitute.

In late 1996, Argentina announced, as part of a five-point regulatory initiative, that banks would be required to carry liabilities in the form of subordinated debt in an amount equaling at least 2 percent of deposits. The other components included enhanced supervisory powers; a measure for financial accountability (that is, risking their own money) on the part of external auditors; a requirement that all banks obtain a credit rating; and efforts to increase the public availability of information about individual banks, including fairly detailed monthly accounting information that is now accessible through the central bank's web site. Because deposit insurance is capped at a fairly low level per account holder (10,000 pesos on short-term deposits and 20,000 pesos on time deposits over ninety days), better information about a bank's condition might induce further market discipline from depositors.

The subordinated debt rule had originally been scheduled to take full effect at the beginning of 1998, but enforcement was delayed until July 1998 because the Argentine central bank decided that persistently high domestic interest rates associated with apparent spillover from the Asian financial crisis had made timely compliance too costly. However, by late 1998, most privately owned banks had satisfied the requirement. The exceptions were approximately twenty of the smaller banks, collectively accounting for only about 1 or 2 percent of Argentine banking assets, which were permitted further extensions.

The subordinated debt, which must have a maturity of at least two years, may take one of three forms. First, a bank may issue bonds that are registered for public trading. A number of the larger banks had tradable debt securities outstanding before

the policy was announced, in both the euro market and the domestic bond market. Second, a bank may accept an uninsured deposit from a foreign bank that has a credit rating of at least A. Such a deposit would be more likely to be forthcoming from the foreign entity when the two banks are otherwise affiliated. Slightly more than half of Argentine banking assets are held by subsidiaries or branches of foreign banks. Some of the smaller, domestically owned banks had been expected to make use of the third alternative, by which they take a deposit from another domestic bank that has otherwise satisfied the requirement. It is not clear whether any banks have used this route to compliance.

In evaluating the Argentine situation, one should keep in mind that about 30 percent of bank assets are held by banks controlled by the national or provincial governments, which may not be subject to central bank regulation in any meaningful way. The industry has become highly concentrated as well, with the ten largest private banks, which are mostly foreign branches or subsidiaries, holding 40 percent of system assets and the two largest government banks holding another 20 percent. Although a majority (by number) of Argentina's 120-odd banks are domestically owned and private-sector, these account for less than 20 percent of bank assets. At the end of 1998, the median Argentine bank held assets of about \$250 million, and a quarter of the banks had \$50 million or less. Many of these smaller banks may disappear as industry consolidation continues. Only ten banks are traded on the Buenos Aires stock exchange.

About twenty of the banks in Argentina have become first-time issuers of publicly traded bonds since the subordinated debt requirement was announced. Most of these bonds were issued in the domestic bond market, with maturities typically between two and six years, and are denominated in dollars rather than in Argentine pesos.¹ Generally, they were placed at yields to maturity at least 100 basis point higher than where BB-rated dollar bonds of the Republic of Argentina were then trading, suggesting that investors were not regarding these bank obligations as sovereign-backed. Nevertheless, the issue yields may include a premium to compensate buyers for liquidity. Many of the bonds have less than \$10 million in face value outstanding

NOTE. John Ammer, Economist, Division of International Finance, Board of Governors of the Federal Reserve System, Washington, D.C., prepared this appendix. The author thanks Jennifer Crystal for helpful conversations. Opinions expressed herein should not be construed to represent those of the Board of Governors or any other employees of the Federal Reserve System.

1. The distinction is less important than it might be because Argentina's currency board arrangement pegs the peso to the dollar.

(still enough to cover 2 percent of the deposit base of all but the twenty-five largest banks in Argentina), and they do not appear to be heavily traded. However, on March 30, 1999, Bloomberg L.P. had bond prices for fourteen Argentine banks—four banks that had issued securities only in domestic markets and ten more that are large enough to sell debt in international markets.

The lack of secondary market prices for the other banks limits the extent to which the central bank can rely on external warning signals that supervisory action may be needed. This shortcoming is exacerbated somewhat by the minimum debt maturity of two years, which reduces the frequency at which banks are subject to primary market discipline. The minimum maturity was motivated by the notion that investors would convey a stronger signal about a bank by committing funds for a longer period—thus, it meant stiffer discipline imposed less often. A compromise would have been to require staggered two-year issues at, say, a quarterly frequency, but this alternative might entail prohibitively higher costs for the typical Argentine bank.

Discipline will be forthcoming from the subordinated debt market, of course, only if investors believe that their money is at risk. A closely related

question—whether bank SND in Argentina are fully at risk—has already been tested once, by the failure in late 1998 of Banco Mayo, Argentina's twenty-ninth largest bank, a credit cooperative with about \$1 billion in total assets. The answer to that question thus appears to be "yes." Banco Mayo had been in compliance with the subordinated debt requirement, with two euro medium-term notes outstanding, as well as a sinking floater that was listed in Buenos Aires, with the three instruments having an aggregate face value of \$124 million. The bank had received emergency lending from the Argentine central bank and the deposit insurance fund in the midst of a run on deposits during the third quarter. In October, Banco Mayo's operations were suspended, and its deposit liabilities and about half of its branches were assumed by Citibank in an agreement reached with the Argentine central bank in November. The remaining assets of Banco Mayo were to be liquidated, with Citibank to receive the first 400 million pesos in proceeds, and the loans from the Argentine central bank (328 million pesos) and from the deposit insurance fund to be repaid ahead of other creditors' claims. Thus, bondholders stand to lose unless the bank turns out, *ex post*, to have been solvent, and bond creditors may well lose their entire stake.