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Credit Spreads and Subordinated Debt

by Joseph G. Haubrich and James B. Thomson

Ever since deposit insurance was introduced, economists and policymakers have been trying to correct its unintended consequences. The heart of the problem is that deposit insurance counteracts the natural market forces that would ordinarily keep banks from taking on too much risk. For most firms, taking on more risk means they have to pay more to raise money because investors demand a higher return to cover the risk. But banks can avoid such direct market pressure because depositors, who know that their deposits are guaranteed, have little incentive to demand a higher rate or withdraw their funds.

One proposed means of injecting more market discipline into the banking sector is a subordinated debt requirement. It would compel banks to issue some debt that the government does not guarantee and that is paid off only after all depositors have been satisfied. A mandatory subordinated debt requirement was one of the reforms recommended in a 1986 study commissioned by the American Bankers Association. In addition, the Financial Modernization Act of 1999 requires that large banking companies have outstanding, at all times, at least one (though not necessarily a subordinated) debt issue rated by a commercial credit-rating agency.

Some experts argue that subordinated debt is unnecessary because equity capital already gives depositors and other bank creditors a layer of protection. But banks' equity—that is, their stock—rises when their profits increase, so the prospect of higher equity can encourage them to take greater risks. Debt is more sensitive than equity to the loss aspect of risk because it lacks the upside inducement of higher profits. Subordinated debt thus gives a bank's depositors and general creditors the same protection from losses as equity does, without creating the incentive to assume more risk.

An important channel through which subordinated creditors can exert market-based discipline is the pricing of subordinated debt: Risky banks would have to pay higher interest rates than safe banks to issue such debt. Because subordinated debt is paid back only after depositors are, those holding it absorb losses that would otherwise accrue to uninsured depositors and the deposit insurance fund. Unlike depositors, subordinated creditors cannot be sure they will be able to withdraw their funds from a bank whose solvency comes into question. As a result, the yield on banks' subordinated debt should vary with the riskiness of the bank, and decisions by bank managers and shareholders to increase their institutions' risk would raise the cost of issuing debt.

Whether repricing three to four percent of a bank's funds (the typical share required in most mandatory subordinated-debt proposals) would exert meaningful discipline on risk-taking remains debatable. However, to the extent that yields on new and outstanding subordinated debt reflect underlying risk, mandatory subordinated-debt requirements could give markets and bank supervisors useful information on the riskiness of banking companies. A review of recent research on the information that can be gleaned from these yields, however, suggests that much more work needs to be done on extracting useful, reliable risk indicators from them before a subordinated debt requirement for banks is warranted.

Stock and bond prices contain all sorts of information about investors' beliefs and expectations. For example, the interest rate on bank debt not insured by the FDIC has information about the health of the banks issuing the debt. Unfortunately, difficulties in extracting information from these subordinated debt prices reduces the information's usefulness to regulators and policymakers.

Credit Spreads

To extract information from subordinated-debt yields about investors' perceptions of the underlying riskiness of various issuers, researchers must remove other sorts of information from the yields, such as that which reflects changes in interest rates. To do this, they can construct a credit spread, which is calculated as the difference between the yield on a risky bond and a risk-free bond of the same maturity, typically a U.S. Treasury bond. Such a credit spread is often interpreted as the premium paid to bond holders for default risk. The risky bond's yield must also be adjusted to account for other differences between the two types of bonds, such as embedded options, because these would affect the bond's yield and be reflected in the credit spread. One example of an embedded option is a call provision, which allows the issuer to buy a bond back at a previously set price. The

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issuer pays for this provision by offering a higher yield on the bond issue. If the yield of such a bond were unadjusted for the call provision, the difference in yields between a callable bond and a Treasury bond of the same maturity would overstate the default risk because it includes the value of the call. Collateral is another type of embedded option. By offering a bondholder the security associated with collateral, a company can issue the debt at a lower yield than the overall credit quality of the firm would dictate. Consequently, credit spreads on collateralized bonds understate the issuer's true default-risk premium.

As these examples show, to compute a credit spread consistently across bond issues and across issuers, one must either restrict the sample of risky bonds to plain vanilla issues—that is, straight fixed-coupon debt issues with no embedded options or other provisions—or adjust the yield for whatever bells and whistles come with the issue. The good news is that corporations are increasingly issuing plain vanilla bonds.

However, even a large sample of plain vanilla bonds does not allow us to cleanly observe the information content of credit spreads related to default risk. After all, credit spreads measured as differences in yields between risky bonds and Treasury bonds reflect not only credit risk but also liquidity premiums, tax differences between corporate and U.S. government debt, and other factors. The evidence suggests that on average, as little as 25 percent of measured credit spreads can be attributed to default risk.

Extracting Useful Information

It is helpful to think of the credit spread as a noisy signal of default risk. Credit spread movements may result from changes in default risk or one of the other factors that determine the yield difference between a risky bond and a risk-free bond of the same maturity. In fact, the spread can decrease, even when default risk rises, if there are offsetting changes in tax effects or liquidity premiums. Therefore, using the credit spread as a signal of bank risk makes sense only if the signal-to-noise ratio is high enough to produce reliable information.

Although the simplest way to compute a credit spread is to subtract a risk-free yield from a risky one, an alternative, less straightforward approach offers some significant advantages. It uses advances in the theoretical modeling of credit spreads to construct entire spread curves for a sample of banking companies and for a sample of nonbank firms. The so-called *reduced-form method* of pricing risky bonds, pioneered by Darrell Duffie, Ken Singleton, Robert Jarrow, and Stuart Turnbull, among others, constructs a model of how likely each firm is to default, how much investors will lose if it does, and how the likelihood of default changes with other interest rates. If the default model is calibrated with the yields on both risky and risk-free bonds that are actually traded in the market, it can be used to estimate the yields on bonds that are not traded—those with different maturities or even with embedded options. The observed interest rates imply certain values for items, such as the chance of default, and once we pin down those numbers, the model then lets us price bonds of any maturity, or even options on those bonds. This allows the researcher to create an "implicit" credit spread for every possible maturity, even if no bond of that maturity is currently trading. The credit spread curve is essentially a term structure of credit spreads for each firm at a point in time.

One advantage of backing credit spreads out of a theoretical pricing model is that this method implicitly controls for spread components, such as liquidity and tax premiums, that are unrelated to default-risk premiums. Compared with simple credit spreads (computed as the difference between risky and risk-free bond yields) differences in model-based credit spreads across firms in the sample are more likely to result from differences in default-risk premiums than from liquidity and tax effects. Having an entire term structure of credit spreads makes it easier to compare them across firms and through time. In contrast, the simple yield-differential approach can only use credit spreads at points on the maturity spectrum where both risky and riskless bond yields can be observed. Finally, by constructing an entire credit spread curve for each firm in the sample at each point in time, researchers can assess whether its level, slope, and curvature contain any useful information.

A natural first question is, do credit spreads really reflect credit risk? To rephrase it, do firms with larger credit spreads have a higher risk of default? The answer to this question is encouraging: Data from two different points on the curve, three and seven years, show that banks with larger credit spreads also have a higher risk of default (as measured by balance sheets and income statements). Years three and seven were chosen for evaluation because the credit spread curve is constructed mostly from observed bond prices that have maturities between two and ten years, and the credit spreads in the three- to seven-year range were measured with the most precision.

Measures of bank risk include proxies for earnings strength, asset quality, asset risk, and balance sheet leverage; studies of 1980s' bank failures have shown that these factors are collectively related to the probability of failure. (It is difficult to look directly at failed banks' credit spreads for a couple of reasons: First, bank failures are concentrated in smaller institutions, which are unlikely to have traded issues of subordinated debt. Second, most available data on banks' subordinated-debt prices are from the past 10 to 15 years, a period of relatively strong performance with few problem banks and even fewer bank failures.)

The answer to the next question, whether changes in bank risk are reflected in changes in credit spreads, is less encouraging. There seems to be no consistent relationship between changes in credit spreads and changes in bank-risk measures. If credit spreads reflect risk, why don't changes in one reflect changes in the other? The problem arises because credit spreads depend on changes in three factors: the probability of default, the expected loss in the event of default, and the market price of risk. Only the first two are related to balance sheet fundamentals. If the market price of risk changes, as other evidence from financial markets suggests, it introduces noise into the process of credit spread changes, so the tenuous relationship between credit spread changes and

accounting-risk variables is not surprising. However, it does suggest that yields on bank-issued subordinated debt might not be a useful indicator of changes in a bank's condition.

A single spread may not predict changes in bank risk, but the overall shape of a credit spread curve does. In particular, a steeper curve predicts that the bank will become riskier in the near future. The credit spread slope predicts future bank-specific risk (measured with data from bank balance sheets and income statements), even after controlling for current accounting measures of bank risk, firms' credit ratings, the current level of credit spreads, and economywide information. Overall, the data show a significant relationship between the credit spread slope and future accounting measures of bank risk.

■ Designing a System

Several methods for imposing a subordinated debt requirement on banks have been proposed. Understanding the forces that move credit spreads can inform decisions about how to design a mandatory subordinated debt system; moreover, the objectives of any such design should be carefully considered. For instance, if the debt's purpose is to create a loss buffer to protect uninsured depositors and the FDIC, it might be advisable to issue only long-term subordinated debt, and only infrequently. In that case, questions about how well the credit spread reflects the bank's true risk are immaterial. On the other hand, if the purpose of subordinated debt is to provide a market-based signal of changes in banks' credit quality, then the debt should be designed to enhance that signal. Generating an information-rich credit spread curve might require having several subordinated debt issues outstanding at any point, as well as a wide range of maturities. Moreover, because the greatest amount of information about a firm is generated at the time it issues debt, relatively frequent issuance would be desirable.

Some features of the debt matter a lot for the link between bank risk and the credit spread, and some matter hardly at all. For instance, the information content of credit spreads seems insensitive to whether the bank issues fixed- or floating-rate debt (the bond equivalent of an adjustable-rate mortgage). This leaves no compelling reason for regulators to specify which sort of debt the banks should issue. One of the earliest proposals for a subordinated debt requirement wanted the debt to be putable—meaning that debt holders could sell bonds back to the issuer at a predetermined price—as a way to take some discretion out of the hands of regulators. That is, if investors see a risky bank, they can discipline it by making it buy back the debt and thus reducing the bank's size.

Unfortunately, fixing one problem creates another. Making fixed-rate debt putable destroys its usefulness as a signal of risk. Credit spreads on such debt often bear very little relationship, or even a perverse relationship, to the bank's underlying risk. So it would seem that the designer of a subordinated debt requirement would need to choose between using the debt to limit regulatory discretion in closing banks and using credit spreads on that debt as a risk signal.

Fortunately, a small adjustment, changing the interest rate on the putable debt from fixed to floating, allows the risk signal embedded in the credit spread to be sorted out from the changing value of the put option attached to the subordinated debt. Thus, in principle, it allows both early closure and risk signal properties to be incorporated into a subordinated debt requirement.

■ Conclusion

Evidence on credit spreads and credit spread curves suggests that these sources of information could one day become useful to bank regulatory agencies. At this time, however, the evidence is too weak to justify imposing a mandatory subordinated debt requirement, especially if its purpose is to increase market discipline on banking companies and give bank supervisors better information about banks' changing conditions. Before supervisors add credit spreads from subordinated debt to their dashboard of early warning signals of deteriorating bank conditions, much more work must be done on extracting useful, reliable risk indicators. So, despite some encouraging results, we need considerably more evidence on the value of credit spread information to regulators and markets before deciding to impose any new rule on how banks fund themselves.

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