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# Market discipline of banks: Why are yield spreads on bank-issued subordinated notes and debentures not sensitive to bank risks?

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ABSTRACT

The default risk sensitivity of yield spreads on bank-issued subordinated notes and debentures (SNDs) decreased after banks started issuing trust-preferred securities (TPS). The too-big-to-fail (TBTF) discount on yield spreads is absent prior to the LTCM bailout, but the size discount doubles after the LTCM bailout. Prior to TPS issuance and the LTCM bailout, SND yield spreads are sensitive to conventional firm-specific default risk measures, but not after the bailout. We find paradigm shift in determinants of yield spreads after the LTCM bailout. Yield spreads on TPS are sensitive to default risks and can provide an additional source of market discipline.

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## 1. Introduction

Our purpose in this study is to find reasons for the lack of default risk sensitivity in yield spreads on bank-issued subordinated notes and debentures (SNDs) documented in earlier studies. We also identify new determinants of yield spreads that are sensitive to default risks. We define yield spreads as the difference between the yield to maturity of risky debt and the yield to maturity of a risk-free debt of similar characteristics. Krishnan et al. (2005) point out that both yield spread levels and changes should reflect risk along the entire yield spread curve. When bank risks increase, we expect yield spreads on SNDs to increase and provide market discipline because SNDs are uninsured junior claims and are treated as Tier 2 capital for banks.

Flannery and Sorescu (1996) and several later studies find that SND spreads are sensitive to bank risks, particularly after the enactment of the Federal Deposit Insurance Corporation Improvement Act (FDICIA) in 1991 because implicit guarantees, such as too-big-to-fail policy, were removed after FDICIA. Similarly, Imai (2007) shows that sensitivity of yield spreads increased after the removal of implicit guarantees in Japan.

Studies prior to FDICIA find that yield spreads are not sensitive to bank risks (Avery et al., 1988; Gorton and Santomero, 1990). A study by the Federal Reserve Board (FRB) concludes that SND spreads are less risk sensitive during the 1993–1997 period and that market discipline is weak (The Board of Governors, 1999). Krishnan et al. (2005) conclude that yield spreads do not provide useful signals for market discipline of banks because changes in yield spreads do not reflect changes in default risk during the 1994–1999 period, although yield spread levels do reflect firm-specific risks.

Collin-Dufresne et al. (2001), Krishnan et al. (2005) find that traditional default risk variables do not adequately explain yield spread changes on bonds also issued by non-financial firms. Driessen (2005) finds that the premium attributable to firm-specific default risk in a non-default situation is rather small even in yield spread levels. Hence, the bond market signals for banks through yield spreads on bank-issued SNDs in non-default situations is likely to be small for yield spread levels, and even smaller for yield spread changes due to changes in default risks.

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In contrast, Covitz and Downing (2007) find that default risk is a more important determinant of yield spreads than liquidity risk even in very short-term commercial paper that is inherently liquid, although Forte and Peña (2009) show that bond markets lag stock and credit default swap markets in price discovery. The findings of Covitz and Downing (2007) suggest omission of significant default risk factors in the case of long-term bonds.

We identify three omitted factors that affect default risk: (i) The reduction in the default risk of SNDs since October 1996 after banks started issuing trust-preferred securities (TPS) (See Appendix A for details of TPS); (ii) the market's enhanced perception that the government will bail out SND-issuing banks because they are "too-big-to-fail" (TBTF), particularly after the FRB brokered Long Term Capital Management (LTCM) bailout in September 1998; and (iii) ignoring idiosyncratic volatility as a proxy for firm-specific default risk. Our model includes all the variables of the Krishnan et al. (2005) model with the exception of bank-examination ratings. We show that the reduction in default risk due to these omitted factors could have been interpreted as a lack of risk sensitivity of yield spreads by The Board of Governors (1999) and Krishnan et al. (2005). We also show that omitting the tax effects on yield spreads leads to errors in the decomposition of yield spreads.

### 1.1. Trust-preferred securities issuance

TPS are junior capital that creates an additional buffer to SNDs from default risk and is treated on par with common stock. Both the ability to issue TPS and the actual issuance of TPS reduces the default risk of SNDs, and therefore should influence SND yield spreads. Banks started issuing TPS in October 1996 when the FRB approved TPS as Tier 1 capital. To provide a sense of the magnitude of additional default protection available to SND holders because of TPS issuance, we note that the outstanding SNDs issued by all banks at the end of 1998 was $102.8 billion, of which $100 billion was issued by the top fifty banks (The Board of Governors, 1999). In another study by The Federal Reserve System (2005) it is shown that SND-issuing banks also issued TPS totaling $28.1 billion between 1996 and 1999. In fact, over 800 banks issued TPS totaling $85 billion when including banks that had not issued SNDs. The results from the Federal Reserve studies indicate the importance and wide use of TPS because of its tax efficiency as the dividend paid on TPS is a tax deductible expense. We expect the default risk sensitivity of SNDs to decrease as the proportion of TPS increases in the bank's capital structure.

### 1.2. Too-big-to-fail effects

A second possible reason for the lack of sensitivity of SND yield spreads to bank risk is that large SND-issuing banks are often TBTF banks. On August 17, 1998, Russia declared a moratorium on its domestic and dollar debts, precipitating the near collapse of LTCM. The FRB intervened to bail out LTCM because the FRB feared financial contagion if LTCM were allowed to fail. Though the LTCM rescue efforts involved only the private sector, the FRB's brokering of these efforts reinforced the TBTF policy, in spite of regulations such as FDICIA to improve the market discipline of banks, and sent signals to the markets that the FRB will bail out all systemically-important financial firms, whether they are FDIC-insured depository institutions or otherwise. We expect an increase in the size discount on the yield spreads after the LTCM bailout since larger institutions are more likely to be bailed out. Another indication of the importance of the TBTF effect is that in their assessments for rating bank-issued bonds, credit rating agencies such as Moody's and Standard & Poor's (S&P) consider the possibility of direct government support in rating banks believed too-big-to-fail.

### 1.3. Idiosyncratic volatility effects

A third possible reason for the perceived lack of risk sensitivity of SND spreads is ignoring firm-level volatility. Idiosyncratic volatility increases the risk of default for bondholders. During the 1990s, yield spreads on bonds increased when stock returns were also increasing. Campbell et al. (2001) find that market volatility did not increase as much as idiosyncratic volatility. Campbell and Taksler (2003) argue that the increase in idiosyncratic volatility explains the divergence in stock and bond market performance.

Campbell and Taksler (2003) find that equity volatility is an important determinant of yield spread on bonds and the effect is relatively higher for firms with higher long-term debt-to-total assets and total debt-to-equity ratios. Stiroh (2006) shows that volatility of bank stocks increases because risk has shifted to off-balance sheet activities and the income statement, such as non-interest income. Since banks are inherently highly levered, have several off-balance sheet risks, and the proportion of volatile non-interest income-to-total revenue is increasing over time, ignoring idiosyncratic volatility could lead to errors in estimation of the default risk component of yield spreads.

Güntay and Hackbarth (2010) find that yield spreads are higher for firms with higher dispersion of analysts' forecast, and changes in forecast dispersion predict the changes in yield spread. Analysts' forecast dispersion appears to proxy for future cash flow uncertainty. Other studies in asset-pricing suggest that both systematic risks and idiosyncratic risks, as measured by the residual variance of an asset-pricing model, matter in the cross-section and time-series of stock returns (Malkiel and Xu, 1997, 2001; Goyal and Santa-Clara, 2003).

Many researchers including Krishnan et al. (2005) use the Chicago Board Options Exchange (CBOE) Volatility Index (VIX) as a proxy for firm volatility. Becker et al. (2009) find that VIX captures prior and future jump risk and has more information when compared to econometric model-based forecasts. However, Campbell and Taksler (2003) show that market volatility measures such as the standard deviation of index returns did not capture firm-specific default risks as well as total volatility measures such as the standard deviation of stock returns. Although the VIX index is highly correlated with the standard deviation of stock returns (sample correlation = 0.5025), we find that the standard deviation of stock return is a better proxy for volatility than the VIX index.

### 1.4. Tax effects

Omission of the tax effect on yield spread can lead to errors in the decomposition of yield spreads attributable to factors such as liquidity, term structure, market risk, tax, and default risk. For bondholders, interest income on corporate bonds is taxable, but interest from Treasuries is not taxable. Elton et al. (2001) show that bondholders impound the tax cost in the yield spreads on corporate bonds. Driessen (2005) finds that the tax premium constitutes nearly one-third of the yield spread. We observe that the tax effect has been omitted in the study of Krishnan et al. (2005), and we add a tax factor to capture this effect found important in other studies of the decomposition of yield spreads. Following Campbell and Taksler (2003), we use coupon rates as a proxy for tax effects since higher coupons create a larger tax burden.

### 1.5. Hidden leverage

We examine whether or not hidden leverage is a determinant of SNDs yield spreads. Bank leverage can increase or decrease through off-balance sheet activities depending on the contingent liabilities from changing market conditions. The LTCM crisis first highlighted the risks from derivative instruments for several financial

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