

Subordinated Debt and the Quality of Market Discipline in Banking

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Introduction

This paper is very thought provoking and it is thoughtfully done. My comments will be focused on the conclusions of the theoretical model and the unique process of recontracting subordinated debt issues used by the author to motivate some of these conclusions. At the outset, it is imperative that the standard disclaimer be made that my comments, regardless of the degree of accuracy, are my own and are not those of the FDIC or its staff.

Commentary

In this paper, the author intends to demonstrate, using the Black-Scholes-Merton (B-S-M) contingent claims analysis of the valuation of corporate debt and equity, the impact of bank subordinated debt on the safety net contingent liabilities, failure probabilities, incentives for risk taking and the relative ability of subordinated debt holders to provide market discipline compared with equity holders. In addition, the author assesses the information content regarding the comparative risk of individual banking companies of subordinated security spreads compared with equity prices, returns and return volatility. This is a tall order for a single paper, but the author does a highly credible job using the contingent claims model. This speaks equally well to the robustness of the contingent claims model of corporate security valuation as applied to issues of market discipline and to the command of this model that the author obviously displays. Of course, there is always room for analytical critique and expansion.

From my perspective, the author's major conclusions are:

1. Treating a subordinated debt issue as an addition to equity has a policy benefit because it increases the cushion to insured deposits, but, dollar for dollar, an increase in equity would be preferable since leverage would be decreased.
2. Subordinated debt issues that replace equity are harmful because they raise the likelihood of bank insolvency. The exception is that, if forbearance is an issue, the use of subordinated debt may place increased market pressure on bank regulators to close the institution.
3. Subordinated debt yield spreads over risk-free rates of comparable maturity are useful additional sources of information on the market's assessment of bank risk taking, but require interpretation for use in a risk ranking of banks. Stock price changes are just as timely and fundamentally better because they contain the same information as subordinated debt and they are traded in considerably more liquid markets.
4. The moral hazard arising from the limited liability of equity may not be offset by the market discipline from subordinated debt, particularly when banks are near insolvency and/or the debt is not frequently refinanced.
5. The contingent claims model helps to clarify those factors most important in determining subordinated debt spreads, namely, asset volatility, asset market value, debt levels and leverage, and debt or liability guarantees. This model also provides a means to understand the magnitude of the incentives junior debt holders face when a firm is solvent or nearing insolvency.

These conclusions are summarized in Table 1 and combine those that can be readily derived from the B-S-M model and those developed in the paper by the author. The B-S-M conclusions can be found by reference to equations 1 to 8 in the paper and the author's conclusions follow from equations 9 through 15. Table 1 is divided into bank initial states of solvent or nearly, if

not, insolvent. Insolvent is defined as the market value of assets, A_t , being less than the sum of the promised discounted value at expiration of deposits (fully insured), D_T , and subordinated debt, B_T , where T is the date of expiration of the option period and the maturity of the debt. The market value of assets, A_t , can be thought of as the properly risk adjusted present value of the net cash flows from the assets of the bank as a going concern. At the expiration date, T , the bank will reissue debt and continue to operate as a going concern or it will distribute the assets to all claimants according to the priority of claims, with depositors having the highest priority.

For banks that are solvent, an increase in the risk of assets, σ_A , will decrease the value of the subordinated debt and increase the subordinated debt spread, equity value, the probability of failure and value of the contingent liability to the deposit guarantor (Table 1). With the exception of the effect on the increase in the value of equity, each of these changes is in a direction to provide market discipline and encourage greater regulatory concern from the increase in asset risk. All these changes are assuming that the asset value, deposits and promised value of the subordinated debt are constant – in other words a mean preserving increase in the dispersion of asset values. These are the assumptions made in this paper. For banks nearing insolvency or insolvent, an increase in asset risk will have an ambiguous effect on the subordinated debt spread because of the very high possibility that the bank will not be able to repay this debt upon expiration. In this case, uninsured debt holders take on characteristics of stockholders and desire more risk to increase their opportunity to receive repayment in full (be made whole). In the extreme, the value of subordinated debt might actually increase and the spread decline with an increase in asset risk. This is a perverse effect and contrary to the market discipline anticipated from subordinated debt.

Regardless of the solvency state of the bank, an increase in the market value of assets, A_t , all other factors constant, will reduce the spread, increase equity, and reduce the probability of

insolvency and the deposit guarantor's liability. These are each in expected directions and the nearness to insolvency is irrelevant because the likelihood of subordinated debt holders being paid in full has increased.

In these analyses and those of the author, changes in asset risk have been accompanied by the assumption of constant expected present value of assets. Keeping expected asset values constant with an increase in their risk is not consistent with a market equilibrium that would imply that the required return on riskier investments, even in well diversified portfolios, is greater such that the cost of capital to the firm rises and the risk-adjusted present value of net cash flows is less. Considering that the spread on unsecured debt will rise with an increase in asset risk and taking this market adjustment into consideration suggests that the present value of assets will decline with an increase in their risk, particularly if bank managers and investors believe that the increase in asset risk is permanent. The implication is that a better understanding of increased asset risk should account for asset value declines arising from the greater cost of debt and equity capital and that some of the *ceteris paribus* relationships may not be so unambiguous.

A simultaneous increase in asset risk and a decline in asset value (Table 1, third row) for solvent banks will lead to an increase in the subordinated debt yield spread, probability of failure and the contingent liability to the deposit guarantor. However, equity values may not necessarily increase, thus muting the moral hazard incentive of bank stockholders and managers of solvent banks. For banks that are insolvent or approaching insolvency, the incentive is less of a question – the increased risk will most certainly outweigh the decline in asset values and exacerbate the managers and owners willingness to take on more risk to preserve shareholder value. Of course the same can be said of the incentive of subordinated debt holders.

Introduce Subordinated Debt Recontracting

For subordinated debt holders there are always conflicting incentives with respect to increases in asset risk – an increase in risk will increase the likelihood of pay off in full and the risk that the bank will become insolvent. In the case of solvent institutions, the second incentive predominates. The author considers modifying these incentives for subordinated debt holders by permitting the recontracting of subordinated debt upon a change in asset risk. This would be done such that the market value of subordinated debt would always be what the subordinated debt holder had been promised. The additional effect of this debt restructuring is to immediately cause a realized increase in interest costs of subordinated debt with an increase in asset risk. This obviously reduces cash flow from operations and reduces the present value of assets. In addition, it shifts risk to the shareholders for solvent institutions. Furthermore, as the author recognizes, this restructuring can only be accomplished if the bank is not near or at insolvency. If it were, it would impair the ability of the bank to re-issue subordinated debt since investors would require very large increases in interest rates such that the cost alone might put the bank into insolvency. Or, the bank would be unable to turnover the debt, forcing it to rely more heavily upon insured deposits and increase the contingent liability of the guarantor.

For solvent banks, the removal of the moral hazard incentive leads the author to some interesting conclusions regarding three types of subordinated debt proposals. These are summarized in the final three rows of Table 1 for solvent banks and are derived from Table 2 in the paper. The author's conclusions hold for banks that are solvent. For banks that are near insolvency, there is some ambiguity in the author's conclusions particularly when the bank suffers an inability to recontract the debt. In this case any issue of subordinated debt, for example Case I and Case II, would lead the bank to substitute equity or insured deposits for subordinated debt (see Table 1, bank insolvent columns). Substituting insured deposits for subordinated debt would not change leverage, but would increase the contingent liability of the guarantor, whereas

the use of equity would decrease the contingent liability of the guarantor and the moral hazard incentive for managers and stockholders.

A few final comments regarding the use of the recontracting condition as a means of analysis. First, it is somewhat contrived and may not have operational validity without imposing a restructuring of all subordinated debt even though banks clearly must roll over short-term debt, CDs and commercial paper, at a high frequency and in large volumes. Secondly, the subordinated debt becomes like the classical “musical chairs” in that investors do not want to be last one holding the debt when it is time for supervisors to review the condition of the bank. If it is closed, those stuck with the subordinated debt are left without a “chair to sit on.” This provides an incentive for subordinated debt holders to bid up the yield (down the price) to cover the risk of the bank being closed while they hold the debt in the periods near expiration and to bid down the yield (up the price) in the early periods of the contract. However, if there were continuous supervisory review, such that the bank could be closed at any time over the horizon under predetermined conditions, this pricing disparity may not take place. Finally, rational pricing of subordinated debt would need to encompass an expectation of when recontracting would take place, by how much and the bank’s ability to complete a refunding at a higher rate. This implies that investors need to be able to price the changes in a bank’s asset volatility creating an additional contingency for the pricing of the subordinated debt. In effect, this is accomplished in markets for longer term, default risky debt by pricing the debt such that it is consistent with the pricing of implied one-period forward contracts on the risky debt. Presumably this pricing accounts for possible changes in asset values and the risk of these assets up to expiration/maturity of the debt. Thus, the pricing of subordinated debt may be complete and the mechanism of recontracting need not be relied upon to make the points regarding moral hazard incentives and shifting.

Concluding Remarks

The author concludes that subordinated debt spreads and equity value changes have the same information content. In general, I believe this to be the case in the sense that they are derived from the same contingent claims model. However, the interpretation of the effect on equity values from an increase in asset risk requires that the change in asset values can be determined. This requires modeling. In contrast, interpretation of the changes in the subordinated debt spreads requires an understanding of the degree of leverage, in terms of the market value of assets, which also requires modeling asset value changes. In practice, my conclusion is that neither equity value changes or subordinated debt spreads are without some ambiguity in interpretation. Technically, the fair value of assets is based on a joint expectation of future cash flows and capital costs and the risk of these assets is also based on an expectation future variation in cash flow. This implies that these can only be estimated from models of market valuations of debt and equity. Recognition that expectations of asset values and their risk underlie market valuations, points directly to what is needed: simultaneously determined estimates of asset market value and volatility.

I highly recommend reading this paper and considering the issues raised by the author in terms of the market discipline leg of the Basel II capital standards.

Table 1: Signs of Changes in Risk Measures With Respect to Changes in the Contingent Claims Model Parameters

Parameter Changes	Solvent Banks				Insolvent Banks			
	Subordinated Debt Spread	Δ Equity	Probability of Failure	Deposit Guarantor Contingent Liability	Subordinated Debt Spread	Δ Equity	Probability of Failure	Deposit Guarantor Contingent Liability
$\sigma_V (+)$	+	+	+	+	?	+	+	+
V (+)	-	+	-	-	-	+	-	-
$\sigma_V (+)$ and V (-)	+	? (0)	+	+	? (+)	+	+	+
(B+D)/V (+)	+	-	+	0	? (+)	-	+	0
Subdebt Alternatives*								
Case I	+	-	+	0	? +	-	+	0
Case II	0	0	0	-	0	0	0	-
Case III	-	+	-	-	-	+	-	-

* Case descriptions

Case I: Capital Substitute. Subordinated debt replaces part of capital.

Case II: Capital Supplement. Subordinated debt adds to existing capital rather than replacing equity (D declines).

Case III: Equity Capital Increases. The bank holds additional equity capital in the amount that would have been held in subordinated debt in Case II.