Was Bond Insurance a Gift from the FDIC?

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Abstract
The financial crisis of 2008 encouraged government interventions to stabilize the financial system. One important intervention was the Debt Guarantee Program (DGP) wherein banks issued bonds that were insured against default in return for an insurance premium paid to the FDIC. We answer important questions regarding the DGP. Did the FDIC undercharge the premium paid by issuers such that all banks received a subsidy from a government agency? If, in fact, there was a subsidy, what types of banks were most subsidized? Was the term structure of the insurance premiums charged the correct structure or does financial theory suggest an alternative term structure that should have been imposed? Did the slope of the credit spread term structure change from negative to positive after the initial stages of the DGP program? Such a change in slope would indicate that banks improved from noninvestment grade to investment grade. Our findings suggest the FDIC undercharged and that weaker banks, especially those that issued early in the program, realized the greatest gift.

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1. Introduction

The financial crisis of 2008 triggered numerous large U.S. government interventions into the financial sector. Perhaps the best known intervention was the Troubled Asset Relief Program, TARP, wherein the U.S. Treasury purchased preferred stock of numerous banks. The largest banks were required to issue preferred stock under TARP and smaller banks could apply to issue preferred stock.[1] Separate from TARP, the FDIC executed a program called the Temporary Liquidity Guarantee Program, TLGP, which had two parts. The first part of TLGP was the Transaction Account Guarantee Program, TAGP, wherein the FDIC fully guaranteed non-interest bearing transactions accounts. The second part of TLGP was the debt guarantee program, DGP. This research analyzes the second part where the FDIC insured senior unsecured debt issued under the DGP in return for an insurance premium. Morrison and Foerster (2009) estimate that about two-thirds of senior unsecured bank debt issued, after the peak of the crisis, was insured under the DGP program. This unique program was the first direct government guarantee of corporate bonds. As described below, the insured bonds that were issued offer opportunities to answer important questions about bond yields and yield spreads.

The purpose of this research is to answer a myriad of questions about the DGP program that regulators, policy makers, politicians, and bankers would like answered.[2] Did the FDIC charge banks an appropriate premium for the insurance? Did the FDIC undercharge such that all banks received a subsidy from a government agency? There may have been a tendency to undercharge because there was a strong motivation to help stabilize the financial system. Of course,

[1] See Kim and Stock (2012) and Veronesi and Zingales (2010) for analysis of how preferred stockholders, bondholders, and common stockholders were affected by TARP issuances.

[2] Gropp, Gruendl, and Guettler (2011) show that government guarantees for German savings banks, which halted in 2001, were linked to substantial moral hazards.

conservative critics of such government intervention likely maintain that any possible undercharging is an unnecessary subsidy (gift) to banks, which is effectively corporate welfare. Any subsidization is also an important issue given any present and potential future FDIC financial distress. The designated reserve ratio of the FDIC deposit insurance fund was below a target of 1.25% even before the crisis (2006) when the FDIC announced activities to raise the ratio. Unfortunately, the subsequent financial crisis only helped reduce the ratio to a record low in December 2009. The ratio remains well below the 1.35% target dictated by Dodd-Frank and is not projected to reach 1.35% until the year 2020. [3]

If, in fact, there was a subsidy, what types of banks were most subsidized? In other words, if any gifts occurred, which banks received the largest gifts? If the weakest banks received the greatest subsidy, it would seem that poorly managed banks were rewarded for poor management and excessive risk taking. We find evidence that the FDIC generally undercharged for the default insurance provided by the program. Furthermore, the firms with weaker credit quality and firms that issued earlier in the program received greater net benefits.

More specifically, how did the term structure of credit spreads and insurance premiums affect the debt issuance choices, benefits, and subsidies of participating firms? [4] Initially, in October 2008, the proposed insurance premium to be charged by the FDIC was flat with respect to bond maturity. However, in November 2008, before any insured bonds were issued, the premium schedule was changed to increase with maturity. Did banks exploit the upward sloping maturity

[3] See Bloomberg.com, *FDIC Says Deposit Insurance Fund Should Recover*, April 23, 2012, Jesse Hamilton.

[4] As Wutkowski and Aubin (2008) explain, a group of participating banks reported to the FDIC that the initially proposed (October 2008) flat fee of 75 basis points was too high and would not accomplish the goal of the DGP program. The FDIC obliged and created a fee scale that increased the premia with maturity of the debt. However, as the data collected in this research pertaining to the bonds issued under the program indicates, the initial proposed flat fee would have actually benefited issuers in many cases.

structure of insurance premium pricing to take advantage of FDIC generosity and mispricing? For example, did weaker banks with extraordinarily large short term (uninsured) credit spreads issue shorter maturity bonds that allowed them to take extraordinary advantage of lower insurance premiums (greater subsidies) for shorter maturities?

The yields on DGP bonds offer a unique opportunity to test theories of the term structure of credit spreads. Importantly, the shape of credit spreads (with respect to maturity) can be helpful in predicting bank riskiness. Did the slope of bank credit spreads suggest bank bonds were below investment grade in the early stages of the DGP program? Also, did the slope of bank credit spreads in the later stages of the DGP program suggest that bank bonds had become investment grade in 2009 and afterward?

The importance of this research is enhanced by the fact that the U.S. is not the only country to respond to a financial crisis by offering a program that insured bank bonds. The bond guarantees that were adopted by many other nations in response to the financial crisis were thought likely helpful in preventing bank failures and a more severe credit crisis. For example, see Grande, Levy, Panetta, and Zaghini (2011). Schick (2009) finds that guarantees of other countries were useful in curbing the deterioration of the public confidence in the banking system. Levy and Schich (2010) analyze the design of the different bank bond guarantee programs across different countries. Similarly, Levy and Zaghini (2010) investigate the determinants of yield spread differences between guaranteed bonds in different countries.

Few research papers have even acknowledged the bank bonds issued under the FDIC's DGP program, much less analyzed the implications of the issuance. Veronesi and Zingales (2010) analyze the impact of TARP on bank valuation but only briefly acknowledge the existence of the

DGP program. They do not examine the yields of specific insured and noninsured bank bonds issued subsequent to the announcement of the DGP program on October 14, 2008.

The following section describes the DGP in greater detail than above. Then we describe the theory of credit spread structure applicable to the above questions, the structure of insurance premiums charged by the FDIC, and the structure of benefits potentially received by insured bond issuers. Next, we present hypotheses that address the benefits banks may have received according to credit quality and issuance timing. Then, we describe the data as gathered from various sources and the subsequent empirical results. The last section summarizes and concludes the research.

2. FDIC Temporary Liquidity Guarantee Program (TLGP, TAGP, and DGP)

Initially, all eligible financial institutions were automatically enrolled into both TAGP and DGP programs, the two parts of TLGP, with coverage beginning at the peak of the crisis on October 14, 2008.[5] The enrolled entities had until December 5, 2008 to decide whether or not the entity would choose to participate in the programs. The options were a) remaining in both programs, b) opting out of both programs, and c) opting out of just one program (FDIC, 2008a). Each bank was required to notify the FDIC on their choice of options. Once the decision to opt out of a program was made, there was no possibility to opt back in except under the special

[5] The TAGP created a temporary unlimited guarantee of funds that were positioned in noninterest bearing accounts at the participating institution above the increased FDIC level of $250,000. The goal of this program was to instill confidence in the public that funds within institutions were secure. This program went through two extension periods, where participating firms were given the option to opt out again if they desired. Eventually, the Dodd-Frank Wall Street Reform and Consumer Protection Act was signed into law on July 21, 2010. This allowed for the FDIC (2010a) to let TAGP expire on December 31, 2010 as the FDIC implemented Section 343 of the Dodd-Frank Act. Section 343 effectively replaced TAGP by providing all financial institutions with the guarantee of unlimited insurance coverage on all noninterest bearing accounts for the time period of December 31, 2010 to December 31, 2012.

circumstance of a merger between two eligible entities. In contrast to TARP[6], the FDIC published the banks that decided to opt-out of any part of the program, leaving the names of those that chose to stay in the program unannounced with no regard to whether they desired to issue bonds or simply ignore the program.[7] If a bank did not opt out, the market could appropriately assume the bank remained in the program.

The principle function of DGP was to provide a guarantee on new issues of senior unsecured debt offered by the financial institution. The debt guarantee limit was restricted to 125 percent of the face value of senior unsecured debt that was outstanding as of September 30, 2008 and scheduled to reach maturity on or before June 30, 2009 (FDIC, 2008b).[8] Financial entities with no senior unsecured debt within the specified time period were provided a limit for bond guarantees of two percent of the total consolidated liabilities as of September 30, 2008. The last day to issue debt under the DGP was October 31, 2009 and the debt guarantee expires either at maturity or on December 31, 2012, whichever came first.[9] The DGP allowed for approximately 1.75 trillion of insured debt to potentially be issued.[10] The complex possible course of opt-in and opt-out actions facing the entities in regard to the DGP is given in Figure 1. The insurance

[6] Except for the largest banks, which were required to receive TARP funds in October 2008, institutions had to apply for TARP funds where the application was not public information. After the application was approved, the approval became public information. However, the banks that applied for TARP but did not receive approval is unknown.

[7] According to the FDIC (2010b), 6,501 firms opted out of the DGP and 2,077 opted out of the initial TAGP and extensions.

[8] For example, if Firm A had $100 million in senior unsecured debt that was scheduled to mature during the designated period, then Firm A could issue as much debt as desired but only a maximum of $125 million FDIC insured debt could be outstanding.

[9] All the bonds in the sample mature on or before December 28, 2012.

[10] According to Morrison and Foerster, "Funding Transactions under FDIC's Temporary Guarantee Program's Debt Guarantee Program", 2009, there was 1.4 trillion of eligible debt outstanding at the end of September 2008. Thus, firms could have used 1.75 trillion of insured debt (125% of 1.4 trillion). Additionally, other banks without bonds outstanding as of September 2008 could issue insured debt.

premiums applicable to the DGP are outlined in Tables 1 and 2 where Table 1 describes premia for earlier issues and Table 2 describes additional premia for issuances after April 1, 2009.

3. Structure of Yields, Insurance Premiums, and Benefits

What should be the shape of the insurance premium term structure? The fee structure was controversial where some urged the FDIC to adopt a risk-based program with guarantee fees ranging from 10 to 50 basis points depending on CAMEL rating. [11] With regard to maturity, some theorists maintain that the premium should increase with maturity, as actually imposed by the FDIC, while others likely disagree and maintain the premium should decrease with maturity in at least some cases. Those that would agree with an increasing premium likely align with classic theory like Merton (1974)[12] and Longstaff and Schwartz (1995) who plot positive term structures of credit spreads for high quality investment grade debt. If all bank debt issued is investment grade, this perspective would seem very defendable. The idea that the premium term structure should be positive, even for lower quality issuers, is reinforced by the empirical findings of, among others, Helwege and Turner (1999) and Covitz (2007).

On the other hand, one may maintain the premium term structure should not always be positive and, more specifically, that there should be a different structure for lower grade debt. That is, the Merton (1974), Lee (1981), and Longstaff and Schwartz (1995) solutions for term structure of credit spreads give a negative shape for term structure of credit spreads for high risk firms. See Figure 2. If such theory is correct, then there should have been a positive premium term structure for investment grade banks and, in contrast, a decreasing premium structure for lower grade banks. Another even stronger reason to disagree with the FDIC's increasing insurance premium is given by Krishnan, Ritchken, and Thomson (2006) who find that, on

[11] See the Federal Register, Part VII, FDIC, 12, CFR Part 370.
[12] Merton (1974) also shows hump shaped credit structures for strong firms.

average, the credit spread for banks, including strong banks, is negatively sloped. Furthermore, they find the negative slope is stronger for weaker banks. These disagreements with the positive FDIC premium structures suggest that the FDIC structure should have *decreased* with maturity for weak banks, if not, for the latter reason, *all* banks. One could credibly suggest most banks were weak and of low credit quality in 2008 and 2009. In summary, a positive premium structure thus enhances any excess subsidies for weak banks relative to subsidies for strong banks; of course, this is particularly distasteful to many conservative politicians, policy makers, and regulators.

Consider the below system of yield structures developed in order to address these questions. In Figure 3, *NIY(M*) is the yield on a bank- issued bond of maturity *M* that is not insured. Absent FDIC insurance, this is what a bank would have to pay. *IY(M)* is the yield on a bank bond that has been insured by the FDIC. The difference in *NIY(M)* and *IY(M)* is *DS(M),* which is the difference in yield due to default risk where *IY(M)* has no default risk.[13] Next, *TY(M)* is the yield on a U.S. Treasury bond of equal maturity. As Treasury bonds are more liquid and of higher quality than corporate bonds, as suggested by Longstaff (2004), TY*(M)* is less than *IY(M)* where the difference is the nondefault spread, *NDSM).* It has long been a challenge to segregate liquidity and nondefault factors from the default premium for corporate bonds. See, for example, Duffie and Singleton (1999.)[14] However, this data provides the opportunity to cleanly separate

[13] Bond payment default by a firm triggers the FDIC′s payment obligation. Under this obligation the FDIC assumes the role of making the scheduled interest and principal payments through the maturity established in DGP. The FDIC also retains the option to make a payment in full for the entire principal and interest payments at one time.

[14] The liquidity of a bond has a direct impact in determining a portion of a bond's total yield spread as shown by Driessen (2005). The illiquidity premium for a bond tends to grow for all maturities during economic downturns. Furthermore the spread widens across maturities during downturns; see Goyenko, Subrahmanyam, and Ukhov (2011). As given in Bao,Pan, and Wang (2011), longer maturities and older issuances increase the illiquidity of the bond, while the size of the issuance reduces illiquidity. During economic hardships a behavior known as "flight-to-quality" has been observed as investors seek the highest quality securities. A pattern where investors place a high priority on the liquidity of a security and are willing to pay a premium for the liquidity, which has been termed

nondefault premia from default premia as *NDS(M)* provides the base nondefault spread for bonds. Note that the gross benefit for a bank participating in the insurance program is *GB(M)* = *NIY (M) – IY(M)* which is the same as DS(M).

$$NIY(M) = TY(M) + NDS(M) + DS(M)$$

$$IY(M) = TY(M) + NDS(M)$$

$$DS(M) = NIY(M) - IY(M)$$

$$NDS(M) = IY(M) - TY(M)$$

$$GB(M) = NIY(M) - IY(M)$$

Now consider the effects of the insurance premium for a bond of maturity *M*, *P(M)*, charged by the FDIC. The structure of insurance premia charged is given in Table 1 and Table 2 where the premia for different maturities is a three-step function that increases with maturity.[15] The premium is 50 basis points for maturities less than six-months, 75 basis points for maturities between 6 months and one year, and 100 basis points for greater than one year. The below offers two equivalent expressions for the yield spread net benefit, *NB(M)*,[16] where the briefest is merely *GB(M) - P(M)*.

"flight-to-liquidity" by Krishnamurthy and Vissing-Jorgensen (2012). In an analysis of the difference between bond yield spreads, both with equal default-free status, Longstaff (2004) provides evidence that investors are willing to pay a premium associated for the enhanced liquidity of a security.

[15] The DGP provided firms with the option to issue uninsured debt before issuing the entire guaranteed debt limit of 125%. Firms had to choose this possibility prior to the opt out deadline of December 5, 2008 and incurred an immediate 37.5 basis point fee determined by the debt level used to calculate the debt limit under the program.

[16] Kidwell, Sorensen, and Wachowicz, Jr. (1987) test a sample of municipal bonds and determine that purchasing insurance results in a market signal and yield spread benefits are captured by guaranteed bond issuers.

$$P(M) = insurance\ premium\ charged\ by\ FDIC$$

$$NB(M) = [NIY(M) - IY(M)] - P(M)$$

$$NB(M) = GB(M) - P(M)$$

If bond insurance is purchased, the default risk is eliminated. For example, assume the uninsured credit risk spread, *DS(M)*, is 100 basis points for maturity *M*. If insurance is purchased, the default spread shrinks to zero. An issuer would find a positive net benefit of 60 basis points if *P(M)* was only 40 basis points while the benefit would be negative 20 basis points if *P(M)* was 120 basis points.

An alternative very crude benefit measure that may have impacted the firm's bond issuance decisions under DGP is cumulative interest cost savings; that is, the objective of a firm might be to obtain reduced cumulative interest costs over long periods of time. Thus, even though the cost of insurance rises with maturity and the *NB(M)* potentially declines, a longer maturity may be chosen. This interest saving benefit (IS) is calculated as

$$IS = NB(M) * Maturity$$

Next, consider a generalization of bank attitudes toward issuing insured bonds according to the gap between the term structures of credit spreads and insurance premia. Numerous articles have addressed the term structure of credit spreads for bonds of fixed credit quality and many are variations of the seminal theory of Merton (1974). Various authors (Sarig and Warga, 1989; Jarrow, Lando, and Turnbull, 1997; Fons, 1994; Lando and Mortensen, 2005) have found various shapes, where there is a tendency for more speculative (high yield) issuers to have a negative

term structure and higher grade issuers to have a positive term structure.[17] Further, some scholars (Leland and Toft, 1996; Longstaff and Schwartz, 1995) have found a hump shaped term structure of credit spreads, where the slope is initially positive and then turns negative for longer maturities; this humped shape tends to be most commonly observed for intermediate credit qualities.

In this context, consider Figure 4. First consider a weaker credit quality such as Firm 1 where the credit spread term structure is negative. Given the FDIC step-function insurance premium, we hypothesize that such firms would garner greater *NB(M)* from issuing shorter maturities as opposed to longer maturities. In fact, Figure 4 illustrates a case where *NB(M)* is negative for longer maturities; thus firms such as Firm 1 would not issue any long term insured bonds. Next consider Firm 2, which is of higher credit quality and has a positive shaped credit term structure. In this particular case, the insurance would seem underpriced for all maturities where the greatest *NB(M)* would seem to be for longer maturities. For Firm 3, with a gently sloping credit risk structure, FDIC insurance has a positive *NB(M)* for shorter maturities but a negative *NB(M)* for the longest FDIC step. One would expect this firm not to issue insured longer maturity bonds but to tend to issuer shorter term. Finally, consider Firm 4, a very sound bank, where the credit risk is positively sloped and quite low. Here the firm would not find a positive net benefit for any maturity and thus not participate in the FDIC program.

The above suggests yield benefits of *NB(M)* may determine the issuance maturity. However, interest cost savings (IS above) may also play an important role. The issuer may enjoy greater interest cost savings from lengthening maturity. See the above example. This leads to the

[17] However, in contrast, Helwege and Turner (1999) and Covitz (2007) found a positive slope for high yield issuers.

possibility of longer maturities being favored even though the premium may rise with maturity. In fact, longer maturities may be favored even if *NB(M)* declines with maturity.

4. Hypotheses

The motivation to instill confidence in the financial sector and encourage liquidity probably impacted the pricing of the premia for the FDIC debt guarantee. Positive net benefits of DGP may have been experienced by all insured issuers but different banks may have received a greater subsidy.

Benefit Hypotheses

Hypothesis 1a. The DGP was a net benefit (gift) to all participating banks and net benefits were approximately equal across all participating banks. This is conceivable if the insurance premiums charged were less than what a perfectly competitive market of bond insurers would have charged and benefits did not differ with respect to credit quality of the issuer and maturity of the bonds.[18]

Hypothesis 1b. The DGP program was a net benefit to all issuing banks but the benefits were dramatically different across banks.

More specifically, banks with the weakest credit rating and issuing short maturity bonds received the greatest net benefit. On the other hand, banks with strong credit ratings and issuing longer maturity bonds received much less benefit.

Hypothesis 1c. Banks with a credit rating of greater than AA did not issue insured bonds.

[18] This assumes *P(M)* is the credit spread in a perfectly competitive market. That is, issuers would be willing to pay a premium up to the credit spread and no more.

This would tend to occur if an institution was similar to Firm 4 where *P(M)* is greater than the credit spread at all maturities. Part of the reason that weaker banks may enjoy greater *NB(M)* was that the shape of the term structure of credit risk favored firms such as that given as Firm 1 of Figure 4. That is, if the credit term structure is negative, the net benefits of short term debt are greater than longer term debt because *P(M)* is lowest for short term bonds and the resulting difference between credit spread and *P(M)* for weak banks is greatest at short maturities.

Hypothesis 2. Banks that issued bonds during the earlier period of the DGP experienced a greater net benefit because of the heightened uncertainty surrounding the financial industry.

This hypothesis is suggested because instability in financial markets likely declined the further an issuance from the peak of the crisis in October 2008. As markets stabilized, the likelihood of default and value of the insurance likely declined.

Maturity Choice Hypotheses

Hypothesis 3a. Weaker firms tended to issue short term bonds more than stronger banks because *NB(M)* was greater.

The logic for this is provided above. The term structure of credit spreads for weaker banks may have been negatively sloped such that weaker firms would get greater net benefit from issuing shorter maturities.

Hypothesis 3b. Weaker firms were not necessarily inclined to issue short term bonds even though *NB(M)* was greater for short maturities.

On the other hand, weaker firms might have chosen longer maturities to enjoy a greater benefit received from the interest cost savings, *NB(M)*M*, where cumulative interest cost savings (IS) obviously increase with maturity. In other words, any greater *NB(M)* benefit of a short

maturity may have been dominated by locking in a benefit for a longer maturity. Of course, this hypothesis is somewhat weakened if banks chose to issue multiple short term issues to realize the greater *NB(M)* at multiple issuance points; however, such multiple issuances may not have been chosen due to greater flotation costs of multiple issues.

Hypothesis 4a. Stronger credit quality banks were more likely to issue longer maturities.

Stronger credit quality banks were more likely to have a strongly positive sloping credit term structure. Thus, the inclination to exploit the low short maturity insurance premium was much weaker. If the credit structure of a strong firm has a strong positive slope, like Firm 2 above, then longer maturities may give such firms a greater net benefit. The shape of the credit spread term structure for stronger firms has tended to be positive in most previous research (Sarig and Warga, 1989; Leland and Toft, 1996; Longstaff and Schwartz, 1995).

Hypothesis 4b. Stronger credit quality firms were not more likely to issue longer maturities.

This would occur if a bank issuer was similar to Firm 3 where the credit spread rises more slowly than *P(M)*. In this case, there is no net benefit to Firm 3 for issuing longer maturity insured bonds.

Hypothesis 5. Bonds issued in the early stages of the DGP program had a negative credit slope consistent with a highly stressed banking system and bonds below investment grade. In contrast, credit slopes were later positive which is more consistent with investment grade bonds.

In testing the above hypotheses the appropriate statistical analysis required is the Mann-Whitney U test, which is a non-parametric test for differences between two populations. An additional non-parametric statistical tool employed was the Kruskal-Wallis test, which allows for the testing of differences among more than two groups. In regard to hypotheses 1, the first

Mann-Whitney U test is to determine if there is a significant difference between the total costs to the issuer of the insured bonds, *IY(M)+P(M),* compared to the costs of non-insured bonds, *NIY(M)*. Of course, if the bonds are not insured, the costs to the issuer are merely the yield of the bonds. If total costs are less for insured bonds, there is a positive *NB(M)* for insured bonds. If a positive *NB(M)* is observed, we will then separate the DGP bonds into credit quality groups and run a Kruskal-Wallis test between the groups to determine if there was a difference in *NB(M)* received by banks of varying credit qualities. If the Kruskal-Wallis analysis is significant, illustrating differing *NB(M)*, the next appropriate step is to run Mann-Whitney U tests for each possible pair of credit ratings to determine where the differences exist.

5. Data Description

The data used to conduct the research is comprised of bonds that were issued under DGP from October 14, 2008 to November 1, 2009. The earliest issuance date was November 25, 2012 and the latest maturity date is December 31, 2012, which is when FDIC guarantees expire. Thus, the maximum maturity of the bonds was less than four years. Mergent Fixed Investment Securities Database (FISD) lists 82 fixed coupon DGP issuances.[19] These bonds are listed in Appendix I. Bar charts further describing the sample of bonds are in Appendix II.

Table 3 provides descriptive statistics for the fixed-coupon bonds issued under the DGP program used for the non-parametric statistical analysis. The mean (median) issue size of the bond is $1.875 billion ($1.625 B) with a standard deviation of 1.59 B. The mean (median) maturity of the bonds is 2.52 years (3.00). There were 22 different issuers where the credit rating ranged from AAA to CCC. The majority of bonds (51) were rated either A^+ or A. The minimum number of issuances by a firm was one and the maximum number of issuances by a firm was 17.

[19] FISD lists 90 floating rate DGP issuances.

S&P bond ratings at issuance were acquired from Compustat and the Bloomberg information system where it is important to note that this credit rating is absent the guarantee.[20]

To calculate the gross benefit, *GB(M),* associated with bond issuance under the DGP, I needed to match DGP bonds with non-insured bonds of equal maturity and credit quality. This was accomplished by using Bloomberg Fair Market Curve Indices which includes yield curves for bank bonds and financial institutions.

6. Results

Table 4 displays results for the initial Mann-Whitney U test and indicates that there was a significant difference between the total cost of insured bonds and non-insured bonds. The derived Z statistic of 8.65 is significant at the 0.01 level, clearly indicating a strong difference. Therefore, bonds issued under DGP received a subsidy or net benefit from issuing guaranteed bonds. As given in the table, the average net benefit for a bond issued under the program was 179.65 basis points. All but two of the guaranteed bonds realized positive net benefits; these exceptions were single issues of General Electric Capital Corporation and Bank of the Cascades.

Table 5 provides evidence that the difference in benefit received varied across the maturity premium structure as the chi-square value of 17.49 is highly significant. To further analyze the differences in maturity premium, Mann-Whitney U tests were utilized to detect the differences across the three premiums. In Table 6 a strong difference is found between the bonds issued with a maturity under 180 days and those issued with a maturity greater than one year. With only two bonds issued in the middle window, 181-364 days, detecting statistical difference from shorter and longer windows is challenging.

[20] Capturing the issuer credit ratings absent any guarantee is imperative to be able to find a match for my sample of DGP bonds. The Bloomberg Fair Market Curves are derived using the S&P ratings scale.

To determine if a differential in net benefit was received by issuers of different credit quality, the bond issues were grouped by S&P credit rating into the following three categories: 1, if credit rating was higher than A+, 2 if the underlying credit rating was A- to A+, and 3 if lower than A-. Again, the underlying S&P credit rating is absent the default guarantee. Table 7 indicates a highly significant difference in net benefits received dependent on the credit rating (chi-square value = 21.20). To find where the differences occur pair-wise, Mann-Whitney U tests were conducted and the results are reported in Table 8. Comparing the rating Group 1 to Group 2, Group 1 to Group 3, and Group 2 to Group 3 results in Z statistics of 3.91, 3.33, and 2.05, respectively, where the first two are significant at the 1% level and the last at the 5% level. Thus, the difference progressed significantly from each category to the next.

It is interesting that firms with AAA credit rating would purchase the FDIC insurance. These four issuances, three by General Electric Capital Corporation and one by Bank of the Cascades, provide evidence counter to hypothesis 1c---that firms with credit quality greater than AA would not have sufficient incentive to participate in the program. Three of these four issuances received positive net benefits under the program.

To determine if the different issuance periods and premium structures identified in Table 2 had an impact on the net benefit received by issuers, a Kruskal-Wallis test was used to analyze the differences between the three groups. The results provided in Table 9 indicate that there was a significant difference. Table 10, provides evidence of a difference in net benefits received based on the premium structure charged; the smaller the premium the larger the benefit received. These results lend support to hypothesis 2.

Did weaker firms tend to issuer shorter maturities? If, absent insurance, the bond issued would have received an S&P bond rating of greater than A+, given other outstanding bonds of

the firm, then these issues were given the ordinal categorical value of 1 and considered strong credit quality. Issuances that would have been assessed a bond rating between A- and A+ were given the value of 2 and deemed middle credit quality. Finally, issuances that would have received a credit rating less than A- were treated with a categorical value of 3 and considered to possess a weak credit rating. We find evidence supporting hypothesis 3b, where weaker credit quality firms did not take advantage of the premium structure that was lower for short maturities. Only 12 bonds issued were a maturity of less than six months where all of these were issued by Bank of America and classified as middle credit quality. There was only one high quality bond issuance with maturity between six months and one year (Goldman Sachs). All of the weak credit and strong credit rated issues possessed a maturity that was greater than one year, besides the one issue mentioned above by Goldman Sachs. These results also lend support in favor of hypothesis 4a (stronger banks tended to issue longer maturities) as only one bond issue out of the 23 strong credit rating issuances were less than one year maturity. Therefore, it is evident that strong credit quality banks preferred to issue longer maturity bonds under the program.

The previous analysis strongly suggests sizeable differences in net benefit received by various banks. In order to more precisely estimate the benefits for a particular bond issue, we now perform a regression where, consistent with the above hypotheses, we focus upon the impact of credit rating and timing of issuance. Appendix I lists the firms used in the regression. We use the data reported by the FDIC's Statistics on Depository Institutions (SDI) two quarters prior to the debt issuance. Using data from this quarter provides the market the ability and time to fully incorporate the quarterly data for each institution that issued the insured bonds. In the previous analyses we had a total of 82 observations; however in the regression analyses we are only able to utilize 61 observations (21 observations are excluded). Descriptive statistics for

these 61 observations are in Table 11. This is done as these observations are missing FDIC SDI data for the desired quarter as these firms were in the process of being converted into federal bank holding companies; these observations include firms such as Morgan Stanley and Goldman Sachs.[21]

$$NB(M)_i = a_0 + b_1 \text{ Rating}_i + b_2 \text{ LN\_ Days}_i + b_3 \text{ Maturity}_i + \sum c_j X_{j,i} + \sum d_k Z_{k,i} + \varepsilon_i$$

Rating is the credit rating as described above, LN_Days is the natural logarithm of days since September 10, 2008 (Lehman Brothers collapse) and Maturity is the time to maturity at the issuance date. X_j represents macroeconomic control variables such as a volatility index (VIX), and slope of the term structure. Z_k represents microeconomic control variables representing the liquidity, profitability, credit risk, and capital of a particular firm and, also, bond- specific characteristics such coupon rate and size of the bond issue. Of course, bond maturity is another bond-specific feature already given. These control variables are similar to those used by, Balasubramanian and Cyree (2011), among others. [22]

Four different specifications for the net benefit regression were estimated and reported in Table 12. Rating and LN_Days have strongly significant coefficients in all four specifications. Consider the second regression where a unit increase in rating (reflecting a reduction in credit

[21] On September 21, 2008 Goldman Sachs and Morgan Stanley were granted federal bank holding company status by the U.S. Federal Reserve. This change in status allowed the institutions the ability to participate in the FDIC's TLGP.

[22] The coupon should have a negative impact as the indices used do not offer yields for different yields. The size of the offering could have either a positive or negative sign depending on whether the liquidity or credit component dominates. The total assets of a firm should reduce the net benefits as larger firms typically experience smaller yield spreads (Balasubramanian and Cyree, 2011). The ROA impact on the net benefits could be either positive or negative, as the company may simply be more profitable than others or has taken on more risk to achieve the higher levels of profitability (Flannery and Sorescu, 1996; Balasubramanian and Cyree, 2011). The leverage variable is expected to have a positive effect as the variable increases as provided by Flannery and Sorescu (1996). The level of interest rates typically has a positive impact on net benefits, as shown by Duffee (1998) and others. Credit rating has been shown to imperfectly estimate spreads. For example, see Campbell and Taksler (2003), where they include other firm specific financial ratios in addition to rating.

quality) increases net benefit by 48.7 basis points and an increase of one unit in LN_Days reduces the benefit by 214.7 basis points. Consistent with such regressions, an early issuance (December 12, 2008) by New York Community Bank, a bank with one of the weakest credit ratings (BBB-), realized a net benefit of 206 basis points. In contrast, U.S. Bancorp, one of the latest issuers (May 7, 2009), a bank with one of the strongest credit ratings (AA), realized a benefit of only 34.5 basis points.

It is noteworthy that Maturity is not significant in any of the regressions. The coefficient would have been negative if there was a strong tendency for weaker firms with negative credit spread term structures to issue short maturities. The coefficient would have been positive if the net benefits of stronger firms at longer maturities dominated.

Our data allows unique analysis of the credit spread slope. As mentioned above, the theory and empirical testing of the term structure of credit spreads given in classic work such as Longstaff and Schwartz (1995) and others typically shows that credit spreads increase with maturity for investment grade bonds with maturities less than approximately five years. Krishnan, Ritchken and Thomson (2006) maintain that the credit slope of bank bond yields can reveal the future riskiness of banks. The DGP program affords clear and unique observations of credit spreads at issuance. Table 13 provides a list of bonds of differing maturities issued on the same day by the same firm. For example, Morgan Stanley issued insured maturities of both 1.99 and 2.99 on November 26,2008 and JP Morgan Chase and Company issued insured maturities of both 1.99 and 3.30 years on February 18,2009. Being issued by the same firm is a strong control for credit risk as opposed to merely having the same bond rating.

In order to compute credit spreads, we use non-insured yields of (NIY) from Bloomberg Fair Market Curves for banks of the appropriate credit grade. NIY – IY is the credit spread in

the table. We compare longer credit spreads to shorter credit spreads of the same firm. It is noteworthy that the earliest issues provided credit slopes that were negative. Consider the November 26, 2008 issues of Morgan Stanley where the 2.99 year maturity credit spread is less than the 1.99 credit spread. Furthermore, both the paired December 8 issues of Region's Bank and the paired December 17 issues of PNC bank have a negative credit slope. In contrast, the September 15, 2009 and September 29,2009 issues of Citi both had a strong positive credit slope. So that nondefault spreads can also be computed, we gather equal maturity Treasury yields (TY) of the same date. In contrast to credit spreads, these nondefault spreads are always positive.

7. Conclusion

During times of financial stress, governments often react to save the financial system and banks. The crisis that peaked in 2008 generated numerous immediate government actions where the most famous was TARP. However, other programs such as the debt guarantee program, DGP, were also very sizeable. We note that trillions of dollars of bank liabilities were guaranteed by the FDIC in the DGP program.

We address numerous important questions. Many politicians, policy makers, and citizens are obviously curious about whether the insurance was properly priced. Was the positive slope of the pricing structure appropriate given evidence that bank credit spreads are actually negatively sloped? Thus, did the positive slope lead to higher subsidies (net benefits) for banks issuing shorter maturities? Our results suggest the pricing structure may have been ill –advised and thus led to perhaps unnecessarily larger subsidies for shorter maturities. How sizeable was any government subsidy (gift) to the banks? We estimate that the average subsidy was sometimes as large as 200 basis points. Did banks with weaker credit quality enjoy greater

benefits? Our results suggest that a bank with a credit rating one step lower than another tended to enjoy an additional 48 basis points of subsidy. Did banks issuing insured bonds earlier in the crisis enjoy greater subsidies? Our results clearly show earlier issues enjoyed substantially greater benefits. The DGP program imposed greater insurance premia later in the program which helped reduced subsidies but did not eliminate them. Finally, our analysis finds negative credit slopes in the early stages of the DGP program but positive credit slopes later. These credit slopes suggest bank bonds were noninvestment grade early in DGP but became investment grade later.

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Figure 1 – Firm options pertaining to the FDIC's Debt Guarantee Program (DGP)
The figure below illustrates the different options and various paths that firms could choose when deciding their level of inclusion in the Debt Guarantee Program.

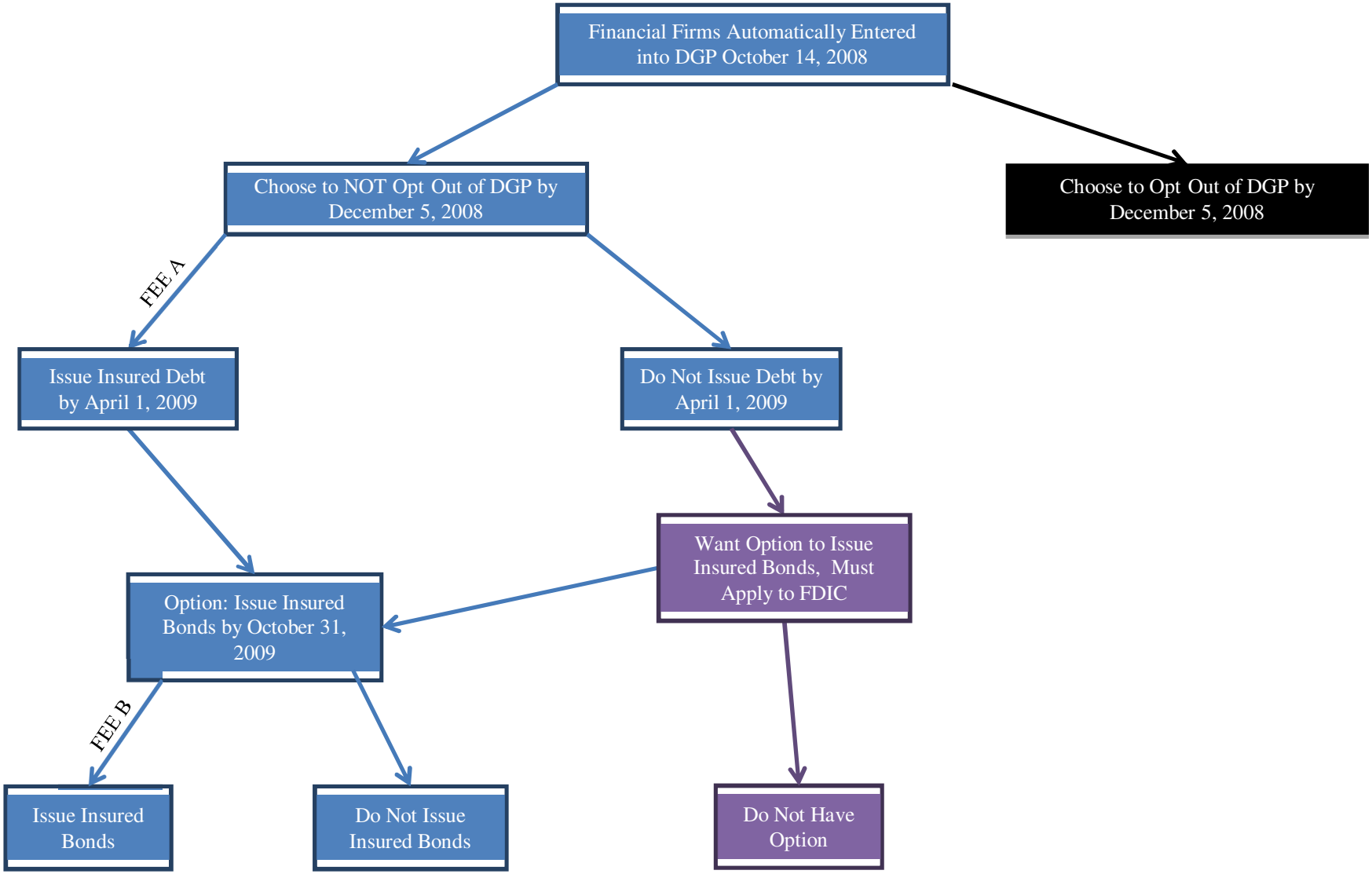


Figure 2. Theoretical yield spreads for issuers of various credit quality
The below figures are generalized from Merton (1974) and Lee (1981). The figure is illustrative of theoretical yields spreads as a function of maturity for issuers of the credit classes of AAA, AA, BBB, and speculative (junk).

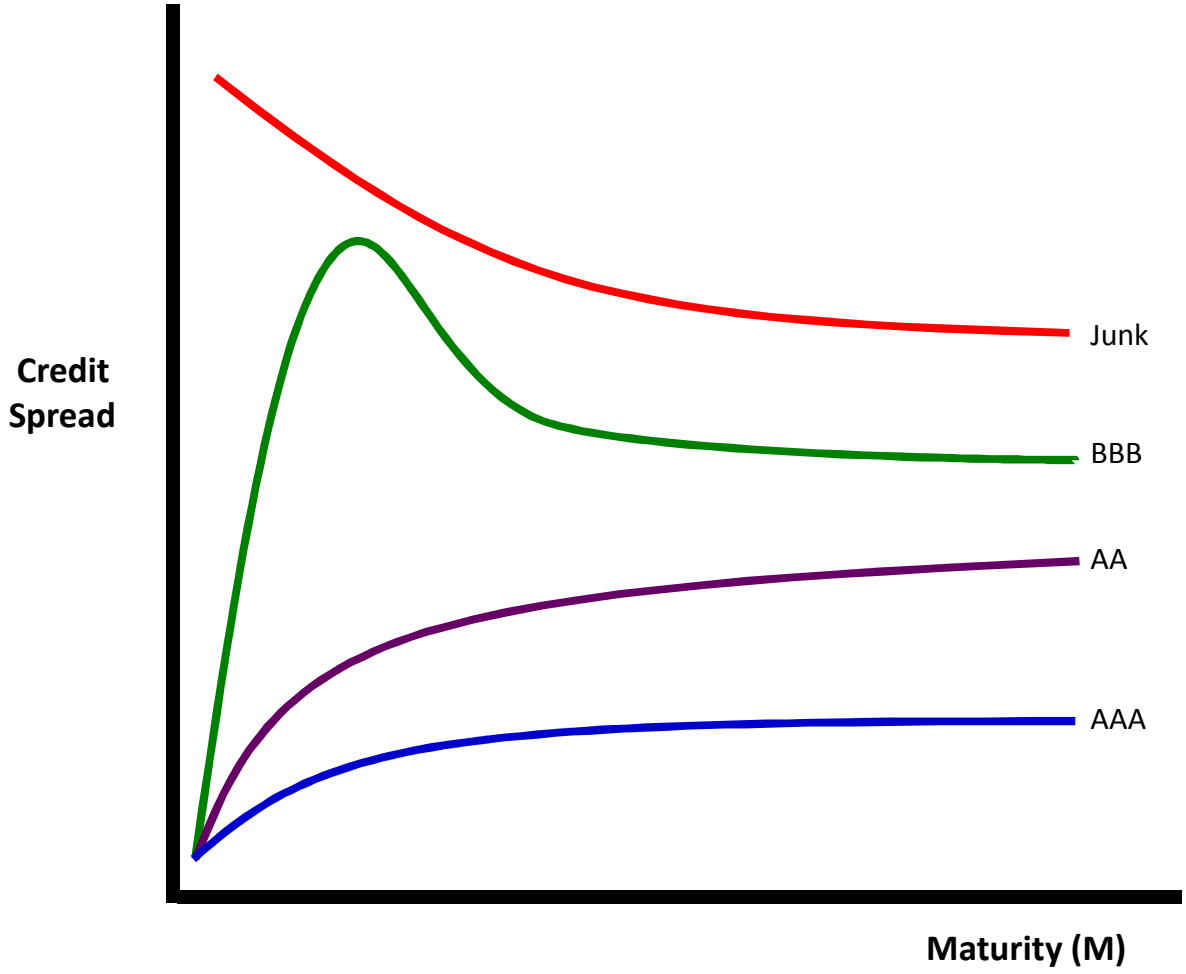


Figure 3 – Bond yield spread differences
The differences in bond yield spreads are measured at a particular maturity, *M**. *NIY(M*)* is the yield of a comparable bond that is not insured, *IY(M*)* is the yield for a bond that is insured against default, and *TY(M*)* is the yield for a Treasury bond. The difference between *NIY(M*)* and *IY(M*)* is representative of the credit premium, *DS(M*)*, which is associated with the default probability of the bond. The difference between *IY(M*)* and *TY(M*)* is attributable to the nondefault spread *NDS(M*)*. These differences allow for testing of the credit term structures, the nondefault structures, and the maturities associated with the bonds issued under the TLGP.

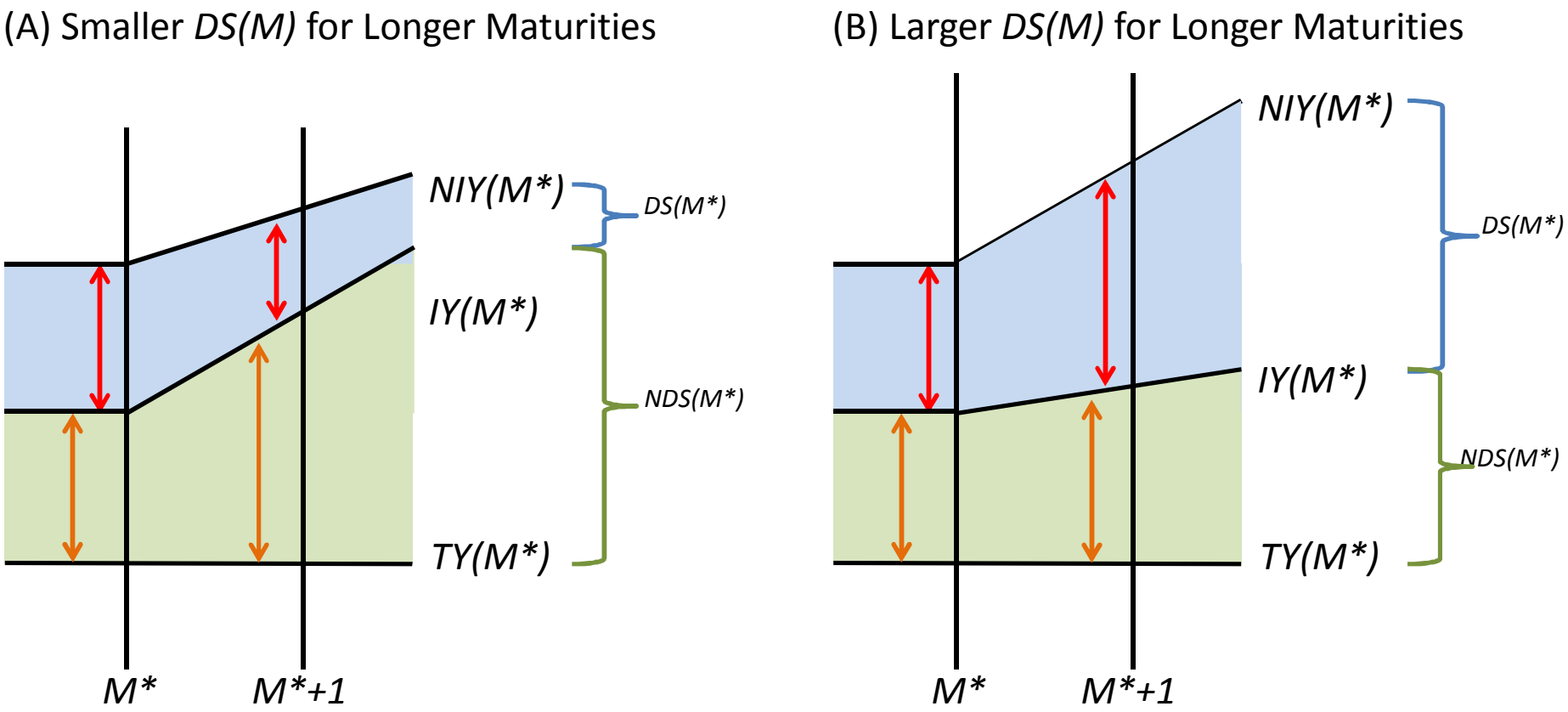


Figure 4 – Alternative Term Structures of Credit Risk Compared to Insurance Maturity Premium Schedules

Firm 1 is a lower credit quality issuer and obtains a benefit from only issuing short-term maturities. Firm 2 is a higher credit quality issuer, who receives underpriced insurance from the FDIC for all maturities. Firm 3 experiences insurance underpricing for shorter maturities and overpricing for longer maturities. Firm 4 finds that insurance is overpriced for all maturities. The red bars represent the FDIC step-function insurance premiums.

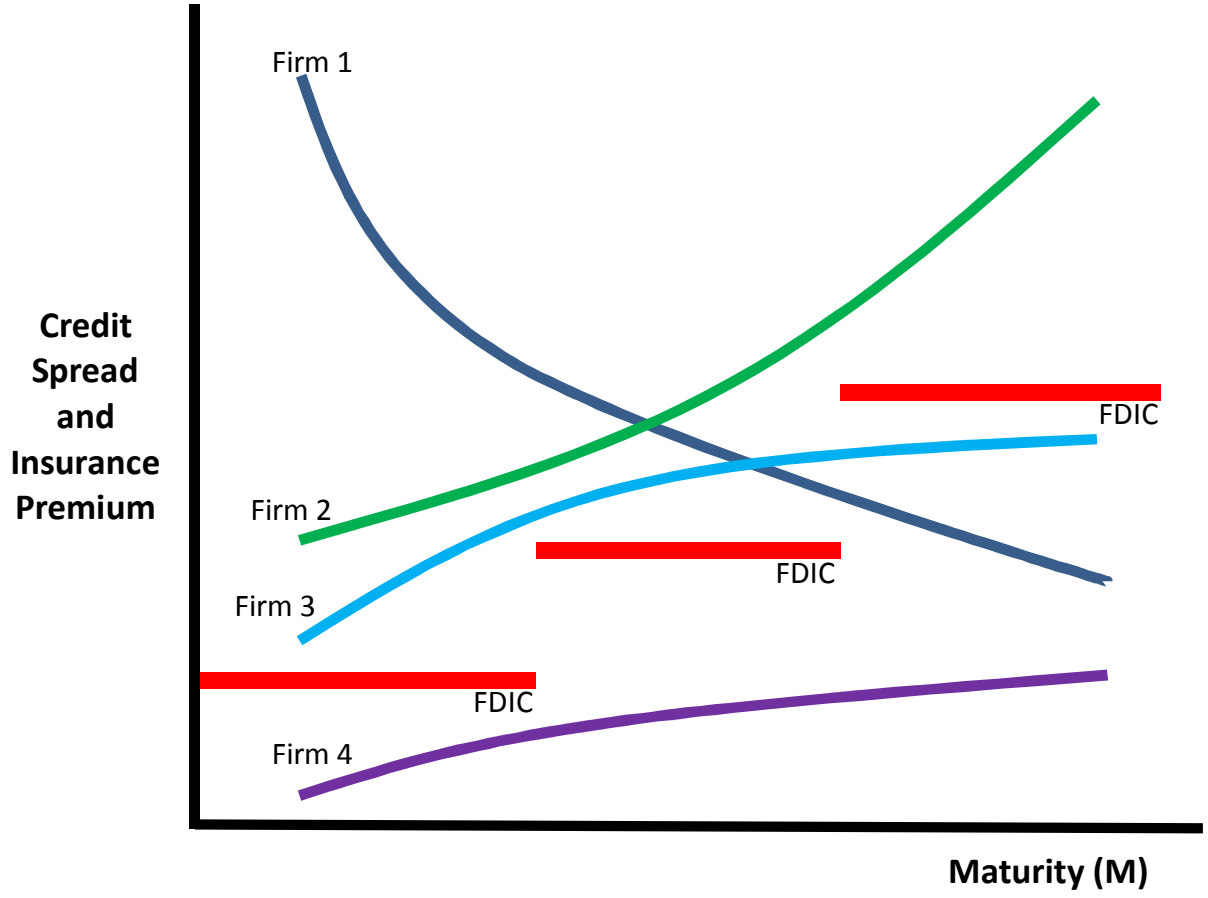


Table 1 – Fee Schedule A

This table illustrates the premiums charged by the FDIC for bonds issued under the Debt Guarantee Program based on the maturity of the issue. These rates were increased by 10 basis points for senior unsecured debt issued by an entity that is not an insured depository institution if, as of September 30, 2008, the combined assets of all insured depository institutions affiliated with such entity constitute less than 50 percent of consolidated holding company assets.

For debt with a maturity of:	**The annualized assessment rate (in basis points) is:**
180 days or less (excluding overnight debt)	50
181 to 364 days	75
365 days or greater	100

Source: FDIC

Table 2 – Additional Fees for Later Issuances (Fee Schedule B)
This table highlights the additional premiums (above that in Table 1) charged by the FDIC for bonds issued after April 1, 2009.

	Insured Depository Institution (basis points)	Non-Insured Depository Institution (basis points)
Issued between April 1, 2009 and June 30, 2009 and Maturing by June 30, 2012	10	20
Issued on or after April 1, 2009 and maturing after June 30, 2012	25	50
Issued after June 30, 2009	25	50

Source: FDIC

Table 3 – Descriptive statistics for the insured bonds

Descriptive statistics for the fixed-coupon bonds issued under the FDIC Debt Guarantee Program (N=82). Issue size is measured in millions of dollars and the maturity of the bonds issued is measured in years. Coupon Size, Offering Yield, Total Cost (IY(M) + P(M)), Gross Benefit (GB(M)), Net Benefit (NB(M), and Net Benefit are reported in basis points. The Credit Rating group of 3 represents rating lower than A-. Gross Benefit is the corresponding index yield less offering yield. The Net Benefit is Insured Gross Benefit less Default Guarantee Premium.

Variable	Mean	Std Dev.	Lower Quartile	Median	Upper Quartile
Issue Size	1,875.52	1,591	750	1,625	2,500
Coupon Size[t]	200.90	78.13	162.50	212.50	262.50
Maturity	2.515	1.017	1.995	2.997	3.321
Offering Yield[t]	204.79	79.50	166.99	213.64	263.79
Total Cost[t]	305.89	95.08	272.27	318.58	377.13
Gross Benefit[t]	280.75	105.23	198.54	296.19	324.76
Net Benefit[t]	179.65	114.05	78.34	192.62	324.76

[t] indicates value is reported in basis points.

Number of Issues by S&P credit rating											
	AAA	AA+	AA	AA-	A+	A	A-	BBB	BBB-	BB+	CCC
Number of Issues	4	7	3	9	21	30	1	2	2	1	2

Table 4 – Analysis of total insured costs versus uninsured yields

Mann-Whitney U Test analyzing the total cost, (IY(M) + P(M)), of FDIC insured bonds, to the corresponding closest match of Bloomberg Fair Market Index yields. This a test for the difference between bonds that possessed the debt guarantee and those that were absent the guarantee. Insured Gross Benefit is the corresponding index yield less offering yield. The Net Benefit is Insured Gross Benefit less Default Guarantee Premium.

Comparison	Number of Issues per Type	Insured Gross Benefit[t]
FDIC Insured versus Uninsured	82	280.75

+, *, ** indicates significance at the 0.10, 0.05, 0.01 levels for a two-tailed Z distribution.

[t] indicates value is reported in basis points.

Table 5 – Analysis of net benefits received by firms across the various maturity premiums
Kruskal-Wallis Test analyzing the FDIC insured bond yields by maturity premium associated with bond issuance to test for a difference in net benefit received across the different maturity premium categories. Bonds were categorized by the maturity premium the bond was assessed. Maturity premium of 1 is representative of the premium charged for bonds issued with a maturity of exactly 180 days or less. Maturity premium of 2 is illustrative of the premium charged for bonds issued with a maturity between 181 to 364 days. The maturity premium of 3 is descriptive of the premium associated for bonds issued with a maturity of 365 days or greater. Insured Gross Benefit is measured as the offering yield subtracted from corresponding index yield. The Default Guarantee Premium is the estimated total premium charged for the bond issuance by the FDIC. The Net Benefit is calculated as Insured Gross Benefit less the estimated Default Guarantee Premium.

Maturity Premium	Number of Issues	Insured Gross Benefit[t]	Default Guarantee Premium[t]	Net Benefit of FDIC Guarantee[t]	Overall chi-Square Value
1	11	283.63	50.00	233.63	17.494** 2 DF
2	2	265.41	80.00	185.41	
3	69	160.59	109.86	50.74	

+, *, ** indicates significance at the 0.10, 0.05, 0.01 levels for a chi-Square distribution.

[t] indicates value is reported in basis points.

Table 6 – Analysis of net benefits received by firms between the various maturity premiums
Mann-Whitney U Tests analyzing the FDIC insured bond yields by maturity premium associated with bond issuance to detect the differences in net benefit received between the different maturity premium categories. Bonds were categorized by the maturity premium the bond was assessed. Maturity premium of 1 is representative of the premium charged for bonds issued with a maturity of exactly 180 days or less. Maturity premium of 2 is illustrative of the premium charged for bonds issued with a maturity between 181 to 364 days. The maturity premium of 3 is descriptive of the premium associated for bonds issued with a maturity of 365 days or greater. The fees charged per bond are based on the maturity of the bond issued under the FDIC Debt Guarantee Program; this fee schedule is illustrated in Table 1. The Net Benefit is calculated by subtracting the estimated Default Guarantee Premium from the Insured Gross Benefit.

Maturity Premium Comparison of A and B	Number of Issues for Type A	Number of Issues for Type B	Net Benefit of FDIC Guarantee Type A[t]	Net Benefit of FDIC Guarantee Type B[t]	Wilcoxon Z Statistic
1 and 2	11	2	233.63	185.41	0.297
1 and 3	11	69	233.63	50.74	3.947**
2 and 3	2	69	185.41	50.74	1.581

+, *, ** indicates significance at the 0.10, 0.05, 0.01 levels for a two-tailed Z distribution.

[t] indicates value is reported in basis points.

Table 7 – Analysis of net benefits received by firms across the various credit rating categories
Kruskal-Wallis Test analyzing the FDIC insured bond yields by credit rating associated with bond issuance to test for a difference in net benefit received across the different credit rating categories. Credit Rating of 1 is representative of all bonds issued with the firm's underlying S&P credit rating being greater than A+. Credit Rating of 2 is illustrative of all bonds issued with the firm's underlying S&P credit rating being A- to A+. The Credit Rating group of 3 is descriptive of all bonds issued with the firm's underlying S&P credit rating being lower than A-. Insured Gross Benefit is measured as the offering yield subtracted from corresponding index yield. The Default Guarantee Premium is the estimated total premium charged for the bond issuance by the FDIC. The Net Benefit is calculated by subtracting the estimated Default Guarantee Premium from the Insured Gross Benefit.

Credit Rating Group	Number of Issues	Insured Gross Benefit[t]	Default Guarantee Premium[t]	Net Benefit of FDIC Guarantee[t]	Overall chi-Square Value
1	23	202.75	112.83	89.92	21.197** 2 DF
2	52	298.22	95.10	203.12	
3	7	407.30	107.14	300.16	

+, *, ** indicates significance at the 0.10, 0.05, 0.01 levels for a chi-Square distribution.

[t] indicates value is reported in basis points.

Table 8 – Analysis of net benefits received by firms between the various maturity premiums
Mann-Whitney U Tests analyzing the FDIC insured bond yields associated with bond issuance to detect the differences in net benefit received between the different Credit Rating categories. Credit Rating of 1 is representative of all bonds issued with the firm's underlying S&P credit rating being greater than A+. Credit Rating of 2 is illustrative of all bonds issued with the firm's underlying S&P credit rating being A- to A+. The Credit Rating group of 3 is descriptive of all bonds issued with the firm's underlying S&P credit rating being lower than A-. The Net Benefit is calculated by subtracting the estimated Default Guarantee Premium from the Insured Gross Benefit.

Credit Rating Group Comparison of A and B	Number of Issues for Period A	Number of Issues for Type B	Net Benefit of FDIC Guarantee Type A[t]	Net Benefit of FDIC Guarantee Type B[t]	Wilcoxon Z Statistic
1 and 2	23	52	89.92	203.12	3.913**
1 and 3	23	7	89.92	300.16	3.334**
2 and 3	52	7	203.12	300.16	2.051*

+, *, ** indicates significance at the 0.10, 0.05, 0.01 levels for a two-tailed Z distribution.

[t] indicates value is reported in basis points.

Table 9 – Analysis of net benefits received by firms across the various issuance premiums
Kruskal-Wallis Test analyzing the FDIC insured bond yields by offer period. Premium structure 1 is the premium charged for bonds issued before April 1, 2009. Premium structure 2 is premium charged for all bonds issued between April 1, 2009 and June 30, 2009 that mature by June 30, 2012. The structure of premium of 3 is the premium associated for bonds issued on or after April 1, 2009 and maturing after June 30, 2012, or, bonds issued after June 30, 2009. The fees charged per bond are based on the time period the bond was offered under the FDIC Debt Guarantee Program, this fee schedule is illustrated in Table 2. Insured Gross Benefit is measured as the offering yield subtracted from corresponding index yield. The Default Guarantee Premium is the estimated total premium charged for the bond issuance by the FDIC. The Net Benefit is calculated by subtracting the estimated Default Guarantee Premium, PM, from the Insured Gross Benefit, GB(M).

Premium Structure (Offer Period Premium)	Number of Issues	Insured Gross Benefit[t]	Default Guarantee Premium[t]	Net Benefit of FDIC Guarantee[t]	Overall chi-Square Value
1	61	294.22	91.80	202.41	16.735** 2 DF
2	12	276.55	127.50	149.05	
3	9	195.10	128.89	66.21	

+, *, ** indicates significance at the 0.10, 0.05, 0.01 levels for a chi-Square distribution.

[t] indicates value is reported in basis points.

Table 10 – Analysis of net benefits received by firms between the various offer premiums
Mann-Whitney U Tests analyzing the FDIC insured bond yields by offer premium associated with bond issuance to detect the differences in net benefit received between the different offer premium categories. Bonds were categorized by the offer premium the bond was assessed. Offer period premium of 1 is representative of the premium charged for bonds issued before April 1, 2009. Offer period premium of 2 is illustrative of the premium charged for all bonds issued between April 1, 2009 and June 30, 2009 that mature by June 30, 2012. The offer period premium of 3 is descriptive of the premium associated for bonds issued on or after April 1, 2009 and maturing after June 30, 2012 or bonds issued after June 30, 2009. The fees charged per bond are based on the time period the bond was offered under the FDIC Debt Guarantee Program, this fee schedule is illustrated in Table 2. The Net Benefit is calculated by subtracting the estimated Default Guarantee Premium, PM, from the Insured Gross Benefit, GB(M).

Premium Structure (Offer Premium) Comparison of A and B	Number of Issues for Type A	Number of Issues for Type B	Net Benefit of FDIC Guarantee Type A[t]	Net Benefit of FDIC Guarantee Type B[t]	Wilcoxon Z Statistic
1 and 2	61	12	202.41	149.05	2.709**
1 and 3	61	69	202.41	66.21	3.255**
2 and 3	12	69	149.05	66.21	2.524*

+, *, ** indicates significance at the 0.10, 0.05, 0.01 levels for a two-tailed Z distribution.

[t] indicates value is reported in basis points.

Table 11 Descriptive Statistics for Regressions

Descriptive statistics for the sample of bond issues used in the regressions. There are a total of 17 different institutions issuing insured debt on 40 different dates.

Variable	*n*	Mean	S.D.	Min	0.25	Median	0.75	Max
Charge_Loans	61	1.548	0.94	0	1.066	1.382	1.704	3.883
Charge_Offs	61	0.519	0.281	0	0.351	0.531	0.657	1.064
Coupon	61	1.897	0.822	0.12	1.375	2	2.5	3.25
Interest_Rate	61	0.152	0.098	0	0.05	0.14	0.23	0.31
Leverage	61	1,101.27	375.025	673.9	937.431	962.542	1,250.75	2,708.74
LN_Assets	61	27.047	1.577	21.6	25.915	27.898	28.221	28.25
LN_Days	61	5.097	0.481	4.344	4.585	5.153	5.447	6.023
LN_Size	61	20.58	1.735	15.425	20.125	21.129	21.64	22.833
Maturity	61	2.401	1.088	0.244	1.995	2.997	3.151	3.723
NC_Loans	61	2.599	1.359	0	1.823	2.21	3.359	5.57
Net_Benefit	61	1.707	1.168	-0.565	0.526	1.852	2.569	5.417
Rating	61	5.607	1.773	2	5	6	6	11
ROA	61	0.4	0.673	-1.736	-0.127	0.705	0.79	1.601
Size_Asset	61	0.679	1.61	0	0.1	0.206	0.537	10.644
Treasury_Slope	61	2.355	0.433	1.75	2.06	2.23	2.62	3.22
VIX	61	45.079	11.779	21.49	36.08	46.67	52.65	68.51
Volatile_Liabilities	61	43.598	14.717	8.967	33.819	45.604	51.692	83.879

Table 12 Regression Analysis

This table provides the regression results for the net benefit received by the issuing firm. Variables used are listed below. These regressions are representative of the time period for the entire FDIC's DGP. Variable definitions are below. *P*-values are reported in the parentheses underneath the coefficient estimates. **, * and + stand for statistical significance at the 1%, 5% and 10% levels, respectively.

	(1)	(2)	(3)	(4)
Coupon	-0.886*	-1.119**	-1.040**	-0.882**
	(0.013)	(0.000)	(0.001)	(0.004)
Interest_Rate	-1.546	2.009	2.218+	1.085
	(0.191)	(0.108)	(0.073)	(0.388)
Leverage	0.001**	0.001*	0.001**	0.001*
	(0.010)	(0.015)	(0.005)	(0.029)
LN_Assets	0.266*	0.187+	0.250**	0.328**
	(0.021)	(0.051)	(0.008)	(0.001)
LN_Size	-0.055	0.017	0.012	-0.008
	(0.497)	(0.809)	(0.868)	(0.910)
Maturity	0.094	0.250	0.197	0.135
	(0.648)	(0.156)	(0.286)	(0.436)
Rating	**0.457****	**0.487****	**0.426****	**0.396****
	(0.000)	**(0.000)**	**(0.000)**	**(0.000)**
ROA	0.346	0.319+	0.105	0.055
	(0.101)	(0.069)	(0.414)	(0.654)
Size_Asset	0.256**	0.239**	0.223**	0.235**
	(0.001)	(0.000)	(0.001)	(0.000)
Treasury_Slope	-0.947*	-0.317	-0.197	-0.313
	(0.026)	(0.391)	(0.584)	(0.366)
VIX	0.023	-0.021	-0.026	-0.030
	(0.244)	(0.265)	(0.182)	(0.111)
Volatile_Liabilities	-0.032*	-0.023+	-0.032**	-0.028**
	(0.022)	(0.052)	(0.007)	(0.009)
Charge_Offs	0.580	0.600		
	(0.239)	(0.143)		
LN_Days		**-2.147****	**-1.922****	**-1.469****
		(0.000)	**(0.000)**	**(0.005)**
NC_Loans			-0.100	
			(0.193)	
Charge_Loans				-0.369*
				(0.011)
Constant	-4.426+	6.883*	5.249	2.304
	(0.097)	(0.039)	(0.117)	(0.499)
N	61	61	61	61
Adj. r^2	0.786	0.853	0.851	0.866

Variable	***Definition***
Charge_Loans	Measured as the net charge-offs to loans (NTLNLSR) as reported by FDIC SDI.
Charge_Offs	Measured as the net charge-offs (NTLNLS) divided by total assets as reported by FDIC SDI.
Coupon	Reported as the coupon amount of the debt issuance by Mergent FISD.
Interest_Rate	Measured as the interest rate of a 3-month Treasury Bill on the day of bond issuance.
Leverage	Measured as total assets divided by the total equity capital (EQTOT) as reported by the FDIC SDI.
LN_Assets	Measured as the natural logarithm of the total assets of the issuing firm as reported two quarters prior to issuance by the FDIC SDI.
LN_Days	The natural logarithm of number of days that passed from the Lehman Brothers Bankruptcy (September 15, 2008) and the issuance of the debt.
LN_Size	Measured as the natural logarithm of the size of the issuance as reported by Mergent FISD.
Maturity	Reported in years as the maturity of the issuance as reported by Mergent FISD.
NC_Loans	Measured as the noncurrent loans to loans (NCLNLSR) as reported by FDIC SDI.
Net_Benefit	Measured as subtracting the issuing yield of the bond, including the estimated DGP premium, from the Bloomberg Fair Market indices value for a bond with similar maturities and credit ratings.
Rating	AAA was assigned 1, AA^{+} was assigned 2, AA assigned 3.……., BBB^{-} assigned 9, BB^{+} assigned 10 and CCC assigned 11.
ROA	Return on assets (ROA) as reported by FDIC SDI for the two quarters prior to the debt issuance.
Size_Asset	The size of the debt issuance divided by the total assets for the issuing institution.
Treasury_Slope	The difference between the 10 year treasury yield and the 1 year treasury yield; values at time of issuance (Bloomberg).
VIX	The VIX value for the day prior to the issuance date as reported by Bloomberg.
Volatile_Liabilities	Volatile liabilities (VOLIAB) adjusted by total assets as reported by the FDIC SDI.

Table 13 Term structure of credit spread and non-default spread

Matches of bonds issued on same day with differing maturities were matched with Treasury yields to compute credit spread and non-default spread. NIY yields are derived from Bloomberg Fair Market Curves for the particular credit quality. Treasury yields are from the constant maturity series of the U.S.

Issuer name	Date Issued	Yield at Offer Date	Maturity at Issuance	NIY	Treasury yield (TY) maturity match *	Long term IY – Short term IY	Long term NIY – Short term NIY	LT Treasury – ST Treasury	Long NIY – Long IY	Short NIY – Short IY	Raw Slope of Credit Spread	Long IY – Long TY	Short IY – Short TY	Raw Slope of NonDefault Spread
CITIBANK N A FDIC GTD TLGP	23-Mar-09	1.638	1.997	4.388	0.93									
CITIGROUP FDG INC FDIC GTD TLGP	23-Mar-09	2.093	3.000	4.910	1.25	0.455	0.522	0.320	2.82	2.750	**0.07**	0.84	0.71	**0.14**
CITIBANK N A FDIC GTD TLGP	15-Sep-09	1.262	1.997	2.586	0.96									
CITIGROUP FDG INC FDIC GTD TLGP	15-Sep-09	1.996	3.082	3.473	1.49	0.734	0.888	0.530	1.48	1.323	**0.15**	0.51	0.30	**0.20**
CITIBANK N A FDIC GTD TLGP	30-Jul-09	1.473	2.008	3.097	1.19									
CITIGROUP FDG INC FDIC GTD TLGP	30-Jul-09	2.337	3.345	4.636	1.87	0.864	1.539	0.680	2.30	1.624	**0.67**	0.47	0.28	**0.18**
CITIBANK N A FDIC GTD TLGP	25-Jun-09	1.535	2.030	3.568	1.12									
CITIGROUP FDG INC FDIC GTD TLGP	25-Jun-09	2.204	3.033	4.693	1.66	0.669	1.125	0.540	2.49	2.033	**0.46**	0.54	0.42	**0.13**
CITIBANK N A FDIC GTD TLGP	29-Sep-09	1.348	2.107	2.672	1									
CITIGROUP FDG INC FDIC GTD TLGP	29-Sep-09	1.932	3.110	3.341	1.48	0.584	0.669	0.480	1.41	1.324	**0.09**	0.45	0.35	**0.10**
CITIGROUP FDG INC FDIC GTD TLGP	28-May-09	1.338	1.995	3.605	0.97									
CITIBANK N A FDIC GTD TLGP	28-May-09	1.979	3.000	4.798	1.52	0.641	1.193	0.550	2.82	2.267	**0.55**	0.46	0.37	**0.09**
GOLDMAN SACHS GROUP INC FDIC GTD TLGP	12-Mar-09	1.700	1.986	6.432	1.03									
GOLDMAN SACHS GROUP INC FDIC GTD TLGP	12-Mar-09	2.169	2.989	6.623	1.42	0.469	0.191	0.390	4.45	4.732	**-0.28**	0.75	0.67	**0.08**
JPMORGAN CHASE & CO FDIC GTD TLGP	18-Feb-09	1.670	1.997	4.565	0.97									
JPMORGAN CHASE & CO FDIC GTD TLGP	18-Feb-09	2.219	3.307	5.071	1.4	0.549	0.506	0.430	2.85	2.895	**-0.04**	0.82	0.70	**0.12**
MORGAN STANLEY FDIC GTD TLGP	26-Nov-08	2.931	1.995	6.048	1.09									
MORGAN STANLEY FDIC GTD TLGP	26-Nov-08	3.262	2.995	6.313	1.38	0.331	0.266	0.290	3.05	3.116	**-0.06**	1.88	1.84	**0.04**
PNC FDG CORP FDIC GTD TLGP	17-Dec-08	1.949	2.496	5.788	0.85									
PNC FDG CORP FDIC GTD TLGP	17-Dec-08	2.335	3.499	5.901	1.09	0.386	0.113	0.240	3.57	3.839	**-0.27**	1.25	1.10	**0.15**
REGIONS BK BIRMINGHAM ALA FDIC GTD TLGP	8-Dec-08	2.786	1.995	5.832	0.97									
REGIONS BK BIRMINGHAM ALA FDIC GTD TLGP	8-Dec-08	3.283	2.992	6.098	1.27	0.497	0.265	0.300	2.81	3.046	**-0.23**	2.01	1.82	**0.20**
BANK AMER N A FDIC GTD TLGP	2-Mar-09	0.720	0.479	3.890	0.45									
BANK AMER N A FDIC GTD TLGP	2-Mar-09	0.750	0.488	3.893	0.45	0.030	0.003	0.000	3.14	3.170	**-0.03**	0.30	0.27	**0.03**
BANK AMER N A FDIC GTD TLGP	8-Jan-09	0.120	0.247	4.349	0.09									
BANK AMER N A FDIC GTD TLGP	8-Jan-09	0.300	0.430	4.434	0.25	0.180	0.085	0.160	4.13	4.229	**-0.09**	0.05	0.03	**0.02**
BANK AMER N A FDIC GTD TLGP	11-Feb-09	0.670	0.471	3.739	0.46									
BANK AMER N A FDIC GTD TLGP	11-Feb-09	0.570	0.482	3.741	0.46	-0.100	0.002	0.000	3.17	3.069	**0.10**	0.11	0.21	**-0.10**
BANK AMER N A FDIC GTD TLGP	3-Mar-09	0.500	0.244	3.748	0.27									
BANK AMER N A FDIC GTD TLGP	3-Mar-09	0.550	0.252	3.748	0.27	0.050	0.001	0.000	3.20	3.248	**-0.05**	0.28	0.23	**0.05**

Appendix I

Insured Bond Description

This appendix provides details of the bonds used in the analysis. The maturity of the bond is provided in years, the rating is the underlying S&P credit rating for the company, and the coupon value for the debt issuance. Prospectus Issuer Names denoted with * are part of the 61 bonds utilized for the regression analyses.

Prospectus Issuer Name	Maturity	Rating	Coupon
AMERICAN EXPRESS BK FSB	2.992	A+	3.15
BANK AMER CORP*	3.247	A+	2.1
BANK AMER CORP*	3.279	A	2.375
BANK AMER CORP*	3.529	AA-	3.125
BANK AMER N A*	0.244	A	0.5
BANK AMER N A*	0.247	A+	0.12
BANK AMER N A*	0.252	A	0.55
BANK AMER N A*	0.43	A+	0.3
BANK AMER N A*	0.471	A+	0.67
BANK AMER N A*	0.471	A+	0.67
BANK AMER N A*	0.471	A	0.75
BANK AMER N A*	0.479	A+	0.72
BANK AMER N A*	0.482	A+	0.57
BANK AMER N A*	0.485	A	0.72
BANK AMER N A*	0.488	A+	0.75
BANK AMER N A*	0.978	A+	1.05
BANK AMER N A*	1.997	A+	1.7
BANK OF THE CASCADES BEND ORE*	2.997	AA+	2.65
BANK OF THE WEST SAN FRANCISCO CALIF*	3	AA-	2.15
CITIBANK N A*	1.997	A	1.625
CITIBANK N A*	1.997	A	1.25
CITIBANK N A*	2.008	A	1.375
CITIBANK N A*	2.03	A	1.5
CITIBANK N A*	2.107	A	1.25
CITIBANK N A*	3	A	1.875
CITIBANK N A*	3	A	1.875
CITIBANK N A*	3.17	A	1.75
CITIGROUP FDG INC*	1.995	A	1.25
CITIGROUP FDG INC*	1.997	A	1.375
CITIGROUP FDG INC*	3	A	2
CITIGROUP FDG INC*	3.033	A	2.125
CITIGROUP FDG INC*	3.082	A	1.875
CITIGROUP FDG INC*	3.11	A	1.875
CITIGROUP FDG INC*	3.345	A	2.25
CITIGROUP INC*	2.997	AA-	2.875
CITIGROUP INC*	3.247	A	2.125

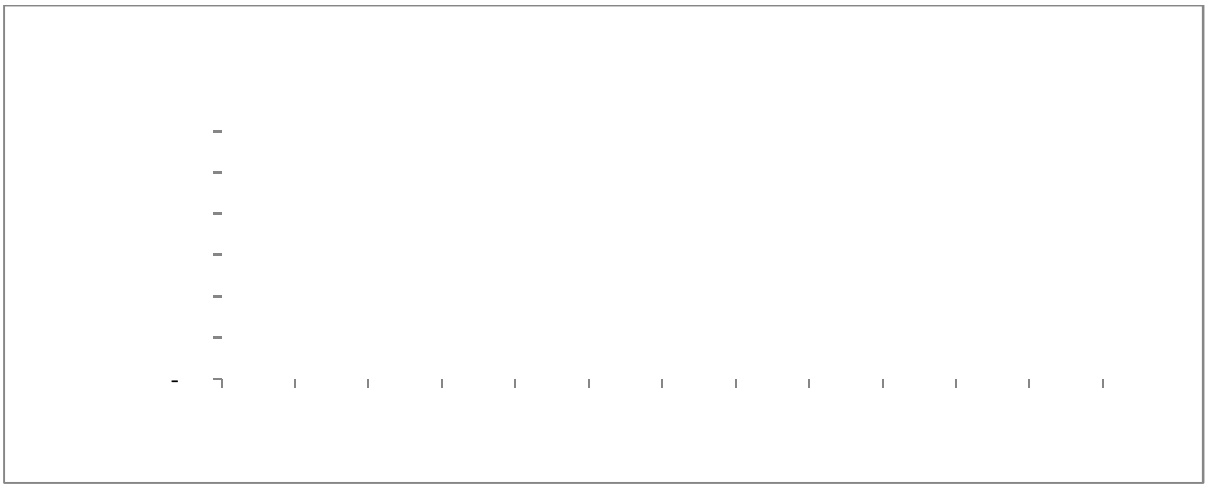
DEERE JOHN CAP CORP	3.499	A	2.875
GENERAL ELEC CAP CORP	1.995	AAA	1.625
GENERAL ELEC CAP CORP	1.995	AA+	1.8
GENERAL ELEC CAP CORP	2.997	AAA	3
GENERAL ELEC CAP CORP	3	AA+	2.25
GENERAL ELEC CAP CORP	3.17	AA+	2
GENERAL ELEC CAP CORP	3.414	AAA	2.2
GENERAL ELEC CAP CORP	3.444	AA+	2.45
GENERAL ELEC CAP CORP	3.529	AA+	2.625
GENERAL ELEC CAP CORP	3.611	AA+	2.125
GMAC INC *	3	CCC	1.75
GMAC LLC*	3.532	CCC	2.2
GOLDMAN SACHS GROUP INC	0.995	AA-	1.82
GOLDMAN SACHS GROUP INC	1.986	A	1.7
GOLDMAN SACHS GROUP INC	2.477	A	1.625
GOLDMAN SACHS GROUP INC	2.989	A	2.15
GOLDMAN SACHS GROUP INC	3.537	AA-	3.25
HSBC USA INC*	2.997	AA-	3.125
JPMORGAN CHASE & CO*	1.975	AA-	2.625
JPMORGAN CHASE & CO*	1.997	A+	1.65
JPMORGAN CHASE & CO*	2.995	AA-	3.125
JPMORGAN CHASE & CO*	3.307	A+	2.2
JPMORGAN CHASE & CO*	3.499	AA-	2.125
JPMORGAN CHASE & CO*	3.723	A+	2.125
KEYBANK N A*	3.499	A-	3.2
MORGAN STANLEY	1.995	A+	2.9
MORGAN STANLEY	2.748	A	2
MORGAN STANLEY	2.995	A+	3.25
MORGAN STANLEY	3	A	2.25
MORGAN STANLEY	3.414	A	1.95
NEW YORK CMNTY BANCORP INC*	3.499	BBB-	2.55
NEW YORK CMNTY BK*	2.995	BBB-	3
ORIENTAL BK & TR*	3	BB+	2.75
PNC FDG CORP*	2.496	A+	1.875
PNC FDG CORP*	3.499	A+	2.3
REGIONS BK BIRMINGHAM ALA*	1.995	A	2.75
REGIONS BK BIRMINGHAM ALA*	2.992	A	3.25
SOVEREIGN BK*	3.068	BBB	2.75
SOVEREIGN BK*	3.479	BBB	2.5
STATE STR BK & TR CO*	1.984	A+	1.85
STATE STR CORP*	3.151	A+	2.15
SUNTRUST BK*	2.915	A+	3
U S BANCORP*	3	AA	2.25

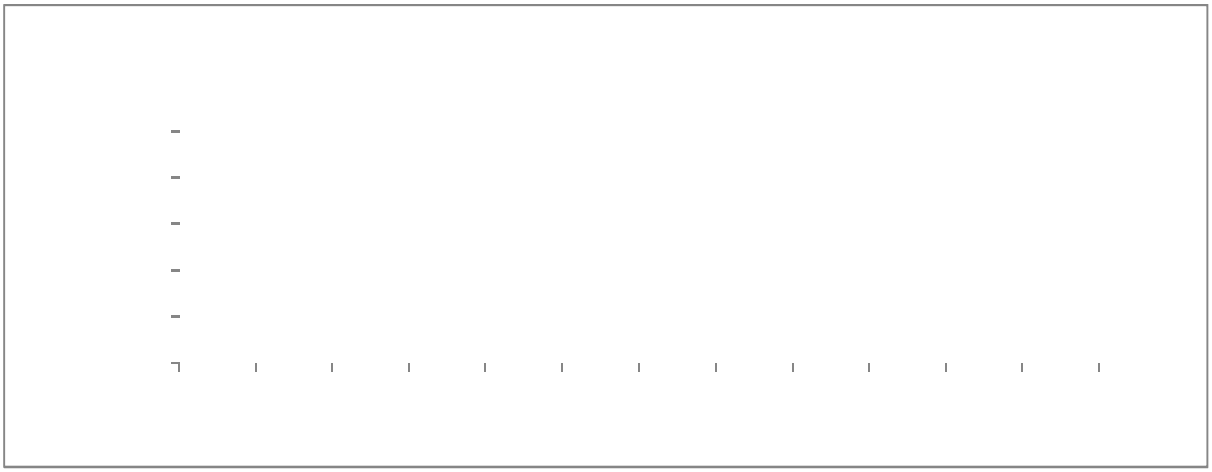
U S BANCORP*	3.008	AA	1.8
WELLS FARGO & CO*	2.995	AA+	3
WELLS FARGO & CO*	3.211	AA	2.125

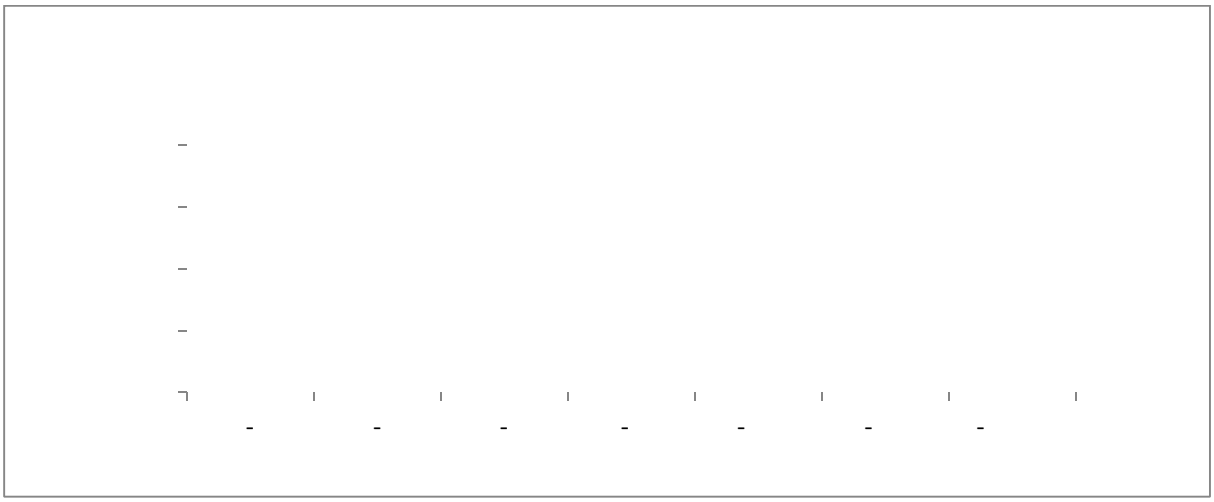
Appendix II

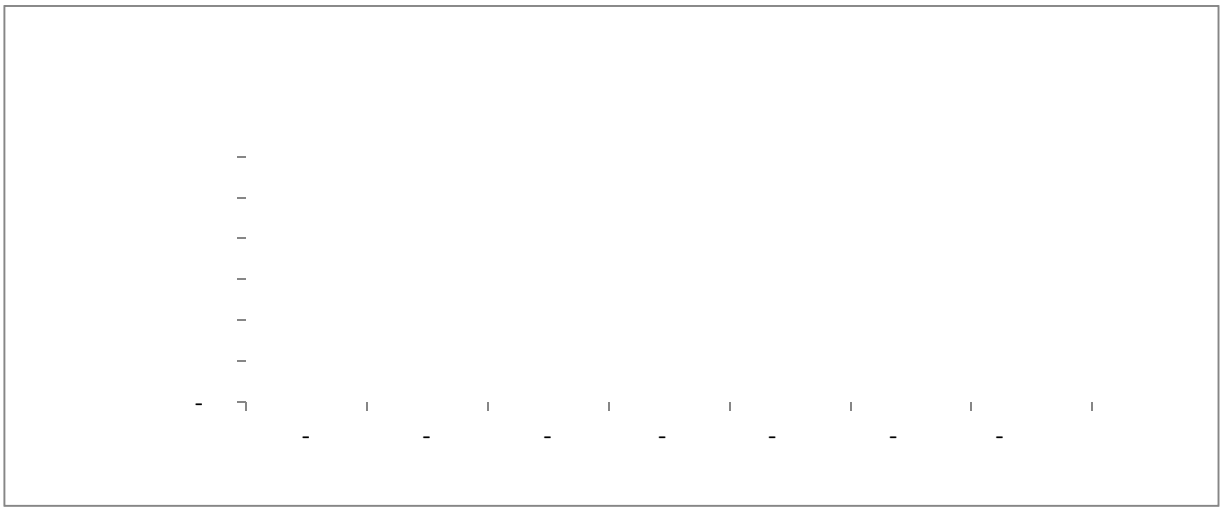
Characteristics of Debt Guarantee Program Bond Issuances

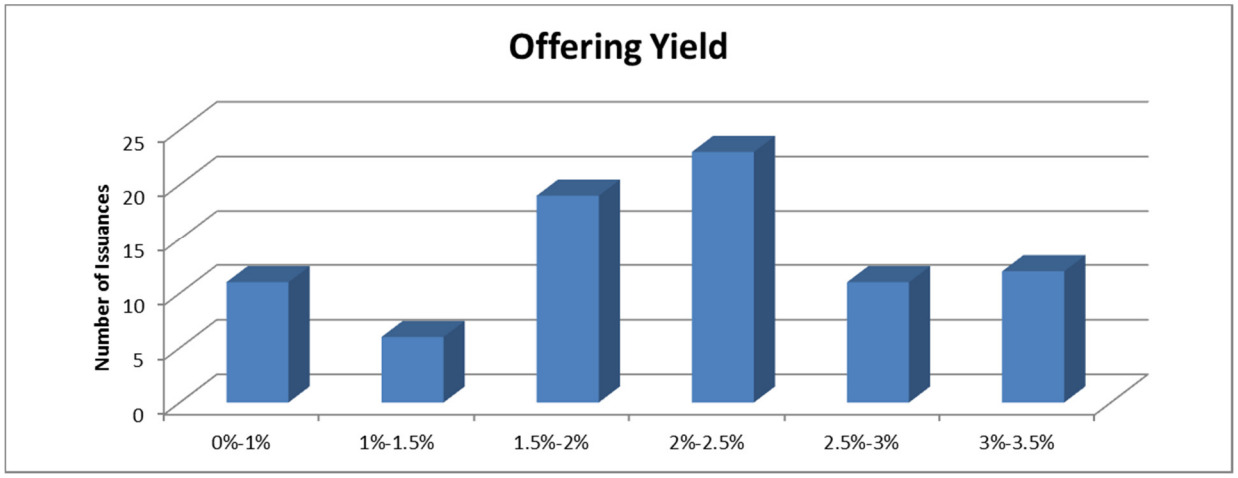
This appendix provides visual details of the bonds issued under the DGP.

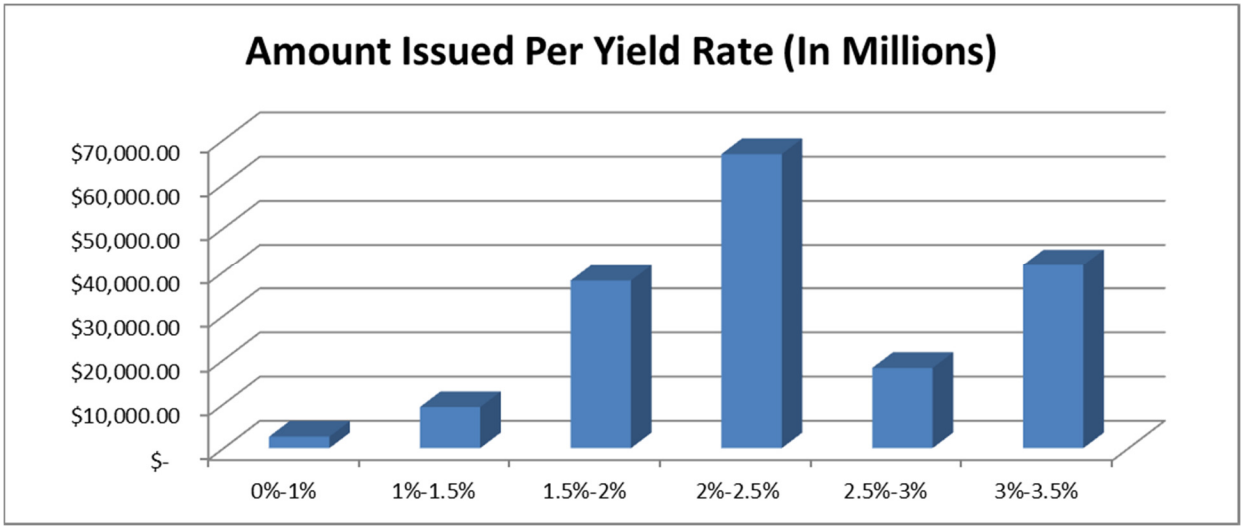









Offering Yield
Number of Issuances
25
20
15
10
5
0
0%-1%
1%-1.5%
1.5%-2%
2%-2.5%
2.5%-3%
3%-3.5%


Amount Issued Per Yield Rate (In Millions)
$70,000.00
$60,000.00
$50,000.00
$40,000.00
$30,000.00
$20,000.00
$10,000.00
$-
0%-1%
1%-1.5%
1.5%-2%
2%-2.5%
2.5%-3%
3%-3.5%