Estimating the Signaling Benefits of Debt Insurance: The Case of Municipal Bonds


Abstract

This paper examines the demand for municipal bond insurance in the context of a competitive signaling equilibrium model. The study compares the pricing of new bond issues that are insured to similar issues that are not insured. The results indicate that issuers who purchase bond insurance, on average, are able to reduce their new issue borrowing cost more than enough to offset the cost of the insurance premium. Furthermore, the net benefit to the issuer increases as the underlying credit quality of the bond declines.

I. Introduction

One of the most rapidly growing segments in the tax-exempt bond market is the use of private bond insurance.1 Bond insurance is an irrevocable guarantee by a property and casualty insurance company to pay bondholders’ coupon and/or principal payments in the event of default by the issuer. The insurance may be sold directly to investors or, as is more commonly the case, it may be purchased by the municipality at the time of the initial offering.2 Municipalities purchase bond insurance because they believe it will lower their new issue borrowing cost after adjusting for the cost of the insurance premium. At the same time, investors acquire bonds with insurance contracts because it enhances the risk-reward characteristics of the bonds.

Only a few studies have investigated the use of municipal bond insurance ([3], [5], [8], [12], and [14]). The general conclusion of these studies is that bond insurance impacts on the pricing of municipal debt by lowering the default risk premium, other things being equal. The empirical evidence as to whether the

* School of Business, Tulane University, New Orleans, LA 70118, Salomon Brothers, Inc., One New York Plaza, New York, NY 10004, and College of Business Administration, The University of Tennessee at Knoxville, Knoxville, TN 37996-0540, respectively. The authors acknowledge the computer assistance of Frank Chow and Seck Wong. The research was supported by The University of Tennessee Research Awards Program and The University of Tennessee College of Business Administration Faculty Research Fellowship Program. The authors also would like to thank an anonymous JFQA referee whose suggestions and comments substantially improved the paper.

1 To illustrate the rapid growth in the use of bond insurance, in 1979 less than 2 percent of the dollar volume of new municipal bonds were insured; in 1985 approximately 30 percent of all new issues were insured. Bond insurance is used almost exclusively in the tax-exempt market as opposed to the corporate bond market.

2 Institutional investors sometimes purchase insurance for issues they hold in their portfolios.
purchase of insurance provides a net benefit to issuers after accounting for the cost of the insurance is mixed. Forbes and Hopewell [8], and Braswell, Nosari, and Browning [3] report little or no benefit to issuers who purchase bond insurance. In contrast, Cole and Officer [5] report substantial interest cost savings through the use of bond insurance. Finally, research results reported by practitioners suggest that risk premia on insured bonds are typically larger than on similar uninsured bonds that are rated Aaa or even Aa [7]. This result is in conflict with the triple-A rating granted insured bonds by the major credit rating agencies.

There are some weaknesses common to the prior studies. First, there is little analysis of the efficiency-enhancing functions served by insurance. The prior studies draw little support from the theoretical literature. Second, no analysis is made to account for the impact of the cost of insurance premia upon the equilibrium demand for insurance. Third, the studies have limited (small) data sets and, in some instances, improperly combine nonpoolable data. Finally, all insured bonds are treated as homogeneous without recognizing differences in issuers’ underlying credit ratings.

This paper has two basic objectives. First, we seek to examine the demand for insurance in the context of a competitive signaling equilibrium model developed by Thakor [28]. Thakor argues that from the investor’s viewpoint there are direct and indirect consequences of insurance: (1) insurance coverage increases the expected value of the coupon and maturity payments, thus reducing the perceived default risk of the bond issue; and, (2) insurance coverage may act as a third party signal to investors that reduces their uncertainty about the marketability of the issue. These two aspects of insurance should have an additive effect upon the pricing of new bond issues. Whether or not insurance is allocationally efficient depends in part upon how the market prices insured bonds as compared to the size of the insurance premiums.

The second objective of the study is to compare the pricing of new bond issues that are insured to similar issues that are not insured. As part of this analysis we compute the net ex ante pricing effect of bond insurance that accounts for the cost of the insurance premium. The results indicate that most municipalities benefit when they purchase bond insurance. Moreover, the results are consistent with the signaling hypothesis. Issuers whose bonds are subject to greater informational asymmetry as measured by price uncertainty benefit the most from the signaling aspect of bond insurance.

The balance of the paper is organized as follows. Section II provides a brief description of bond insurance and the insurance process. Section III highlights the theoretical implications of bond insurance in a signaling framework. Section IV discusses the benefits of bond insurance and presents the methodology. Section V presents the findings. The final section summarizes the study and discusses its implications.

II. Bond Insurance Practice

Municipal bond insurance is purchased by state and local governments because they believe it will lower borrowing costs by improving their credit stand-
ing (lower default risk) and/or the marketability of their bonds. A one-time insurance premium is paid in full at the time the bonds are issued by either the issuer or the winning underwriter. The premia are nonrefundable, the coverage is in effect for the life of the issue, and the coverage cannot be canceled by the insurance company. If an owner of insured bonds decides to sell them, the insurance coverage extends to the new owner. Also, if the issuer does default, the interest payments paid by the insurance company remain tax-exempt.\(^3\)

The American Municipal Bond Assurance Corporation (AMBAC) was the pioneer in bond insurance, issuing its first guarantee in 1971. During the 1970s only one other property and casualty insurance company entered this market—the Municipal Bond Insurance Association (MBIA), organized in 1973. Recently, some new competitors have entered the field: Financial Guaranty Insurance Company (FGIC) in 1983, followed by Bond Investors Guaranty (BIG) in 1984. Together, these four companies underwrite 96 percent of the municipal bond insurance business.

A. Bond Rating Agencies and Bond Insurance

Until recently, Moody's Investors Service did not recognize the presence of bond insurance. Moody's contention was that their responsibility was to rate the underlying creditworthiness of the issuing municipality and not the default risk characteristics of the insurance company. During July 1984, however, Moody's reversed its position and began considering the unconditional and irrevocable pledge of a third party insurer. Currently, all bonds insured by MBIA, FGIC, and BIG are considered to be of the highest quality and rated AAA. Moody's has not issued a rating on bonds insured by AMBAC.

Standard and Poor's (S&P), on the other hand, has always recognized the improved credit position provided by the purchase of bond insurance. Historically, S&P rated bonds insured by AMBAC as AA, while those insured by MBIA, FGIC, and BIG were rated AAA. Because of additional credit backing by their reinsurance program, S&P upgraded the credit rating of bonds insured by AMBAC to AAA in 1979.

B. MBIA-Insured Bonds

This study evaluates bonds insured by MBIA, the largest insurer of municipal securities. Until recently, it represented a pool of five nationally recognized insurance companies, each of which was liable for its proportionate share of claims for the life of any bond insured. At year-end 1986, four of these companies invested $427.7 million to form a new company whose only business is to provide municipal bond insurance.\(^4\) Municipalities that purchase insurance can

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\(^3\) When bond insurance for tax-exempt securities first appeared, there was some uncertainty surrounding the tax status of the coupon payment in the event the issuer defaulted. The U.S. Internal Revenue Service resolved this issue by ruling on January 9, 1975, (private ruling #7501090130A) that interest paid by an insurer is also tax-exempt.

\(^4\) The investors in this new company, Municipal Bond Investors Assurance Corporation (MBIA), and their respective shares of capital investment are: Aetna Life and Casualty (49 percent), Fireman's Fund Insurance (23 percent), Aetna Insurance (18 percent), and Continental Insurance (10 percent). As of 1986, MBIA had insured debt obligations totaling $59 billion in par value.
do so in one of three ways: (1) the direct purchase program, (2) the optional bidding program, and (3) the alternative bidding program. Under the direct purchase program, the municipality agrees to purchase the insurance, and offers the bonds to investment bankers with insurance coverage.

The optional bidding program allows underwriters to submit bids with or without bond insurance. The bond issue is then awarded to the underwriter who submits the lowest cost bid. If the winning bid includes bond insurance, this means that the cost of the insurance premium is less than the underwriter’s estimate of the present value of savings from lower coupon rates. Underwriters will purchase bond insurance only if the insurance makes their bids more competitive.

The alternative bidding program allows underwriters to submit bids with bond insurance, without insurance, or both. After the bids are received, the issuer does a cost-benefit analysis to see which alternative provides the lowest net borrowing cost. Bids based on the bonds being insured are adjusted upwards for the cost of the insurance. If an insured bid is the lowest net bid, the issuer then will purchase the insurance. This bidding procedure is not widely used because the municipality must perform the analysis of whether or not to purchase the insurance.5

III. Bond Insurance Theory

Although there are a number of theories that explain why insurance exists [22], [28], Thakor’s [28] seems most appropriate for our analysis. He evaluates the decision to purchase insurance in competitive markets that are characterized by asymmetric information. Specifically, Thakor considers a bond market in which the issuers choose the amount of insurance coverage. Investors are unable to fully determine the default risk characteristics of the uninsured issuers. The purchase of insurance, therefore, has two impacts upon the pricing of the debt if information is asymmetric: (1) the insurance reduces the default risk and thus lowers the yield on the bonds; and (2) the coverage serves as a signal because a third party has provided insurance. The third party produces the information by the act of providing insurance protection against default. The signaling mechanism is the cost of the insurance premium, which increases with the probability of the event that the issuer defaults.6

If market participants are risk neutral and/or markets are complete, the insurance premium will be competitively priced such that sellers will be indifferent between selling bonds with or without insurance [22]. On the other hand, Thakor argues that, in the case of debt, bond insurance may well have "... an informational role to play: investors can observe the insurance coverages purchased by different borrowers and learn something about the true underlying default probabilities of their debt issues" ([28], p. 736).

5 Recently, MBIA introduced a new bidding alternative for insurance: the Mandatory Underwriter Must Pay Program. Under this program, the underwriters must submit only insured bids and the successful bidder assumes the cost of the insurance premium.

6 In other signaling models (e.g., Spence [23]), the seller (or, in this case, the issuer) issues a costly signal directly. For a discussion of costless signals see Bhattacharya [2] and Ross [21].
The Thakor model identifies the amount of insurance as the issuer’s choice variable. The equilibrium solution results in issuers purchasing proportionately lower levels of insurance when their true default risk characteristics are higher. This follows from the proposition that the insurer will learn the true default characteristics of the issuer and charge an insurance premium that represents compensation exactly commensurate with the level of risk borne, while the market imposes a risk premium contingent upon the observed (optimal) insurance coverage.

The Thakor model leads to some empirically testable hypotheses. One is that if insurance enhances efficiency, and if issuers are optimizing, there will be, on average, net benefits to purchasing insurance, part of which accrues to the issuers. Thus, issuers will receive a net cost savings in excess of the insurance premium because of the benefits of signaling.

The second hypothesis is derived from the proposition that the greater the benefits of the signal to the issuer, the greater the likelihood that insurance will be purchased, and the greater the net benefits. If an issuer is of relatively low default risk and the market has a wide divergence of opinion, the information revealed by the act of insuring will be of greater net benefit. If, on the other hand, the market has a consensus opinion that the issuer is of low default risk, the signaling benefit will not be as great because the pricing of the debt will not vary much with or without insurance. Thus, the net benefits of bond insurance should be larger for issuers where there is greater uncertainty about the quality and thus the price of the issue.

IV. Bond Insurance Benefits

The previous discussion suggests that for a new bond issue, the presence of bond insurance should affect its pricing in at least three ways. First, yields should be lower than otherwise because of the reduced default risk. Second, insurance serves as a signal to the market and reduces information asymmetry, which should improve the marketability of the issue, resulting in a lower net borrowing cost to the issuer. Finally, the net benefits of bond insurance may not be homogeneous across issuers. If information production costs are uncorrelated with issuer quality or the degree of informational asymmetry, then issuers subject to a greater degree of price and quality uncertainty may gain larger benefits from insurance.

A. Methodology

To test our hypotheses about the impact of bond insurance on issuer borrowing cost, we need to compare the cost of the insurance with the estimated reduction in coupon rates on average reoffering yield. If the insurer views the default characteristics of the municipality the same as the market does, then the insurance premium should exactly offset any reduction in the risk premium imposed by the market. Any further reduction in yields can be attributed to the benefits of signaling that have accrued to the issuer. The costs and benefits of bond insurance can be expressed as

\[ NBI = GPB - IP, \]
where NBI is the net benefit of bond insurance (in dollars or basis points) to the issuer; GPB is the gross price benefit of bond insurance, which is caused by the reduction in default risk and benefits of signaling as priced by the market; and IP is the insurance premium for the bond issue. In theory, an issuer will select insurance if the estimated gross pricing benefits exceed the insurance premium, thus NBI > 0. This will be the case if the signaling benefits resulting from the production of information and acceptance of risk by the insurance company has value to the marketplace that exceeds the cost of the insurance.

To conduct our empirical analysis, NBI can also be expressed as

\[ NBI = IC_0 - IC_i, \]

where IC_0 is the issuer borrowing cost if insurance is not purchased and IC_i is the borrowing cost if insurance is purchased including the insurance premium. A positive value of NBI indicates that the issuer benefits from the decision to purchase insurance. That is, the interest cost savings from purchasing insurance exceeds the cost of the insurance premium. The values for IC_i can be obtained from actual market price data from our sample of insured bonds. The values of IC_0 are not directly observable and must be estimated for each insured bond issue. To do this, we develop a municipal bond pricing model from a sample of comparable noninsured bonds. The model is then used to estimate the borrowing cost for each insured bond in the absence of insurance.

The above methodology allows us to estimate NBI from Equation (2). Furthermore, because we have obtained insurance premium data, we can then estimate the gross price benefits from Equation (1). That is, GPB = NBI + IP.

B. The Bond Pricing Model

As discussed above, a regression model must be developed to explain the normal variation in municipal borrowing cost. This model is critical to our analysis. Fortunately, a substantial body of research exists on the theoretical and empirical determinants of the interest cost on new long-term serial bond issues ([1], [3], [5], [6], [9], [10], [11], [13], [16], [17], [18], [23], [24], [25], and [26]). A review of these studies reveals a fairly standard set of explanatory variables. In general, researchers have measured the additive or interactive influences of the default risk and other characteristics of the bond issue, contemporaneous market conditions, and regional economic factors. The model estimated by ordinary least squares is

\[ NIC = f \left[ \pm \text{RATING}, \ LNSIZE, \ LNFMAT, \ CALL, \ SLFMAT, \right. \\
\left. + \ IRATE, \ VOL, \ RELSUP, \ STATE \right], \]

where the sign above each variable shows the expected direction of the partial relationships, and
Dependent Variable

NIC = issuer net interest cost.?

Issue Characteristics

RATING = zero-one variables for Moody’s Investors Service credit ratings:
where Aaa, Aa, A1, Baal, and Baa all = 1; A-rated bonds are
the excluded set. For the uninsured bonds, if Moody’s ratings
were not available, Standard & Poor’s ratings were used.

LNSIZE = total dollar size of the issue \((10^5)\) in natural logarithms (with
size deflated by GNP deflator for year of issue); issues with size
less than $250,000 or those with size greater than $40 million
were deleted from the sample.

LNFMAT = years to final maturity in natural logarithms.

CALL = zero-one dummy variable denoting whether or not an issue is
callable (callable bond issue: yes = 1; no = 0).

Market Characteristics

SLFMAT = slope of the yield curve at the time of sale, which is measured as
the product of the final maturity times the spread between the
twenty and one-year yield on good grade (Aa to A-1 ratings)
bonds, data from Salomon Brothers.

IRATE = prevailing level of interest rates in bond market at time of sale as
measured by the weekly Salomon Brothers ten-year new reoffer
yield index for prime rated bonds.

VOL = interest rate volatility, which is measured as the eight-week
moving average of the standard deviation of IRATE.

Regional Factors

RELSUP = relative supply of municipal bonds defined as the ratio of the
dollar value of new municipal issues in a state to the total dollar
value of new municipal bonds sold nationally during the month
the issue was sold.

STATE = a series of twelve state zero-one dummy variables. See the first
column in Table 2 for a complete list of the states; New York
State is the excluded set.

The formula for the net interest cost (NIC) is:

\[
NIC = \frac{\text{total interest payable} + \text{bid discount (or - bid premium)}}{(\text{par value of issue}) \times (\text{average maturity of the issue})}
\]

To convert the insurance premium in dollars to a NIC equivalent \((\text{NIC}_p)\), the above formula is modi-

\[
\text{NIC}_p = \frac{\text{insurance premium}}{(\text{par value of issue}) \times (\text{average maturity of the issue})}
\]

A preferable measure of the borrowing cost for a bond issue is the True Interest Cost (TIC). TIC
considers the time value of money, whereas NIC does not. NIC and TIC bids are comparable as long
as the bond issue’s coupon structure follows the prevailing municipal bond yield curve, which is
usually the case. Regression models similar to those presented in this paper have been estimated with
NIC and, alternatively, TIC with little difference in results (see Hendershott and Kidwell [10], foot-
note 3).
C. Discussion of the Variables

Because most of the variables in the model have been widely used by others, only modest discussion is provided. The dependent variable for the model is the issuer's borrowing cost as measured by the Net Interest Cost (NIC). NIC is the average annual interest cost of a new serial bond issue. It was selected over other measures (reoffer yield or underwriter spread) because the focus of the study is the decision by the issuer whether or not to purchase bond insurance. Nevertheless, it is important to note that variations in NIC are predominantly due to variations in the yields (or coupon rates) in the serial issue that reflect default risk and other exogenous factors.

The measure of default risk is Moody's Investment Service credit rating. During the test period, Moody's provided credit ratings for insured bonds that considered only the underlying credit risk factors of the issuer and did not consider the effect of bond insurance. This is important because the purpose of the pricing model is to estimate the issuer's borrowing cost in the absence of credit insurance.

Finally, evidence of Hendershott and Kidwell [10] suggests that the municipal bond market is segmented geographically because the cost of obtaining information about some issuers is quite high (particularly for smaller municipalities). To capture this effect, we included in our model a relative supply variable (REL-SUP) defined on a statewide basis. Other factors that may segment municipal bond markets are pledging requirements, differing state tax treatment with respect to taxing coupon income on out-of-state bonds, and regional economic conditions ([9], [17], and [23]). To account for these factors, a series of state dummy variables was included in the model.

D. The Data

The data were collected from the Daily Bond Buyer for all MBIA-insured and noninsured general obligation bond issues sold competitively during the years 1975 to 1980. In addition, MBIA provided us with sensitive information about the insurance premiums as well as other pertinent information about bonds they insured.

Furthermore, we limit the test sample to bonds sold by MBIA's optional bidding program (the underwriter decides whether to bid the bond issue with or without insurance). This is done to mitigate a potential measurement problem stemming from the fact that the cost of insurance is paid in the current period, but the benefits (lower coupon rates) are state contingent and accrue to the issuer.

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8 The logarithm of the number of bids that each issue receives is typically used as a proxy measure for competition in municipal bond pricing models (e.g., see [1], [10], and [18]). This variable was not included in our model (Equation (3)) because insured bond issues are believed to receive more bids than noninsured bonds ([3], [5]); thus, the inclusion of the number of bids would bias our results—understate the benefits of bond insurance. However, for those who are interested, we did estimate Equation (3) with the logarithm of number of bids in the model, and there was no significant change in findings or the conclusions drawn. On average, the net benefits of bond insurance were 8.2 basis points less than when the model was estimated without the logarithm of number of bids (see Table 3).

9 See footnote 7 for the formula used to adjust the total dollar cost of the insurance premium for a bond issue to an interest rate equivalent.
over time. Under the optional bidding program, the underwriter must simultane-
ously adjust: 1) the reoffer yields and/or underwriter spread to recoup the cost of
insurance, and 2) the reoffer yields to reflect the higher price investors will pay
for insured bonds. Since bonds are reoffered on a present-value basis, in a com-
petitive market the correct economic decision should be made about whether to
purchase bond insurance, i.e., insurance is purchased when the signaling benefits
exceed the cost of the insurance.

Finally, an examination of the market indicates that MBIA-insured bonds
tend to be clustered in particular states. Therefore, to control more closely for
regional differences in borrowing cost, we limited the sample to states where at
least 6 MBIA bond issues were sold during the test period. The resulting sample
consists of 2,791 bond issues covering 12 states.

Table 1 presents the descriptive statistics for the sample. Of the sample, 333
bond issues (12.2 percent) were insured by MBIA, and 2,393 (87.8 percent)
were noninsured. The 333 insured bonds represent about 80 percent of the com-
petitive general obligation bonds insured by MBIA during the sample period. As
the table shows, compared to noninsured bonds, the average insured bond tends
to have a lower Moody’s rating and a higher interest cost, be smaller in issue
size, have a longer maturity and is less likely to be callable. The reason that
insured bonds are less likely to be callable may reflect the fact that insurance
premiums are nonrefundable if an issue is retired prior to its final maturity date.
Finally, most issuers (83.67 percent) during our sample period used MBIA’s op-
tional bidding program in which the underwriter pays the insurance premium.
Only a few issuers (1.00 percent) elected to use the alternative bidding program
in which the issuer is required to perform the cost-benefit analysis of whether to
purchase bond insurance. The remaining issuers (15.33 percent) elected the di-
rect purchase program.

E. Preliminary Testing

Table 2 presents the regression model used to estimate the interest cost of
the issue without insurance. The data used to generate the model are the sample
of 2,393 noninsured bonds. Equation (2.1) explains nearly 80 percent of the in-
ter-issue variation in NIC. The control variables have the correct signs and are
different from zero at the 1-percent probability level. The high F-statistic and
explained variation suggest that the model fits the data well and is appropriate for
the net benefits test. The coefficients for the bond ratings are important to our
analysis. For example, the market prices a typical Aa rated bond approximately
55 basis points above a similar bond with an A rating, ceteris paribus.

V. The Findings

A. Net Insurance Benefits

Table 3 presents the findings for the costs and benefits of municipal bond
insurance. The estimated gross price benefit for the entire sample (Frame A) is

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10 The states selected are Alaska, Arizona, California, Connecticut, Florida, Massachusetts,
TABLE 1

<table>
<thead>
<tr>
<th>MBIA Insured</th>
<th>Noninsured</th>
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<tbody>
<tr>
<td>Number of Issues</td>
<td>333</td>
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<tr>
<td>Net Interest Cost (NIC)*</td>
<td>6.307</td>
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<tr>
<td>Issue Size ($ Millions)</td>
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<td>Final Maturity (Years)</td>
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<td>Call Provision (Percent)</td>
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<td>Bond Ratings (Percent)</td>
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<td>Aaa</td>
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<tr>
<td>Aa</td>
<td>2.10</td>
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<tr>
<td>A1</td>
<td>27.03</td>
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<tr>
<td>A</td>
<td>45.95</td>
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<td>Baal</td>
<td>20.42</td>
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<td>Baa</td>
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<tr>
<td>Bidding Programs (Percent)**</td>
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<td>Direct Purchase (Issuer Pays)</td>
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<td>Optional Bidding (Underwriter Pays)</td>
<td>83.67</td>
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<td>Alternative Bidding (Issuer Pays)</td>
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</table>

* MBIA bonds with cost of insurance included.
** Based on a sample of 398 insured bonds including bonds sold by MBIA's direct purchase and alternative bidding programs.

34.1 basis points. Thus, if the municipality had not purchased insurance, the average interest costs would have been higher by this amount. At the same time, the average insurance premium charged by MBIA was only 11.7 basis points. The result is a net benefit to the issuers of 22.4 basis points from buying bond insurance. These findings are consistent with the joint hypothesis that third party insurance reduces default risk and additional benefits accrue because of signaling.

To test the null hypothesis that the mean net benefits of bond insurance (NBI) is significantly equal to or less than zero, we used the Wilcoxon matched-pairs signed-rank test. This test was selected over a simple t-test because the Wilcoxon test does not assume that the net benefits are normally and independently distributed. The Wilcoxon Z-value for NBI is −10.12 and is statistically significant at the 1-percent level.\(^{11}\)

The finding that NBI is greater than zero is what we expected. Insured issuers benefit on net, or otherwise insurance would not be purchased. A likely explanation of this result revolves around the insurance company’s information production and risk-bearing action. MBIA’s analysts independently assess the default risk of each potential insured bond issue. They agree to insure an issue for

\[^{11}\text{The null hypothesis is that } NBI \leq 0. The appropriate test statistic is a normally distributed } Z \text{ value and is equal to}

\[ Z = \frac{T - N(N+1)}{4 \sqrt{\frac{N(N+1)(2N+1)}{24}}} , \]

where \(N\) = the number of matched-pairs minus the number of pairs whose differences equal zero, and

\[ T = \text{the smaller sum of like-signed ranks}. \]
TABLE 2

<table>
<thead>
<tr>
<th>Equation (2.1)</th>
<th>Coefficient</th>
<th>t-Value</th>
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<tr>
<td>Contant</td>
<td>-1.983</td>
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**Adjusted R^2** 0.797
**F-Value** 410.76
**Mean NIC** 6.095
**MSE** 0.205
**Sample Size** 2,393

A fixed premium when their analysis of the risk-return relationship is favorable. At the same time, MBIA (or an underwriter) must convince the municipality that the potential yield reduction due to insurance is greater than the insurance premium. Thus the insurance contract must be ex ante beneficial to all parties. In the context of Thakor’s signaling model, MBIA’s willingness to insure and the issuer’s (or underwriter’s) willingness to purchase insurance implies that MBIA has a relative cost advantage in the production of information. Our estimate of the average value of the signal is 22 basis points.

Figure 1 shows the distribution of the net benefits. As is apparent, most of the issuers who purchase insurance have positive benefits. However, the range of cross-sectional variation in benefits (both positive and negative) is quite large. There are several possible explanations for the large variation in net benefits. First, the variation may be due to the misspecification of Equation (2.1) in Table 2. Or, it may indicate that some of the issuers who purchased insurance may have been better off had they not purchased insurance, while others may have received
TABLE 3
Costs and Benefits of Insurance in Basis Points

<table>
<thead>
<tr>
<th>Moody’s Rating</th>
<th>Number of Issues</th>
<th>Gross Price Benefits*</th>
<th>Insurance Premium</th>
<th>Net Benefits of Insurance</th>
<th>Wilcoxon Z Statistic*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frame A: Entire Sample</td>
<td>333</td>
<td>34.1</td>
<td>11.7</td>
<td>22.4</td>
<td>-10.12</td>
</tr>
<tr>
<td>Frame B: Sample Stratified by Bond Rating</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aa</td>
<td>7</td>
<td>6.2</td>
<td>10.0</td>
<td>-3.8</td>
<td>13**</td>
</tr>
<tr>
<td>Al</td>
<td>90</td>
<td>21.6</td>
<td>11.5</td>
<td>10.1</td>
<td>-3.35</td>
</tr>
<tr>
<td>A</td>
<td>153</td>
<td>36.6</td>
<td>11.9</td>
<td>24.7</td>
<td>-7.41</td>
</tr>
<tr>
<td>Baal</td>
<td>68</td>
<td>40.0</td>
<td>11.7</td>
<td>28.3</td>
<td>-5.29</td>
</tr>
<tr>
<td>Baa</td>
<td>15</td>
<td>71.7</td>
<td>12.7</td>
<td>59.0</td>
<td>0**</td>
</tr>
</tbody>
</table>

* Calculation from Equation (1): GPB = IP + NBI.

** For sample sizes between 6 and 25, the critical test value is computed for the smaller of the sum of like-signed ranks (7). T-values are reported for these cases. The critical T-value at the 1-percent level for 7 issues is 0, and for 15 issues is 20. If our reported T-value is the sum of negative ranks and is less than the critical T-value, we reject the null hypothesis that NBI = 0.

larger benefits. In other words, the benefits of insurance may not accrue equally to all classes of issuer. We address this question in the next section of the paper.

FREQUENCY

B. Some Municipalities Benefit More

The previous section’s findings suggest that signaling plays a role in generating the net interest cost savings due to bond insurance. Signaling theory also suggests that the interest cost savings should be larger, the greater the informational asymmetry. Unfortunately, informational asymmetry cannot be directly
measured. A proxy may be the degree of demand uncertainty, which is also difficult to measure. Nevertheless, there are proxies that reflect heterogeneity of opinion about value (or price). One proxy is to use Moody’s ratings. Prior studies have reported that lower-rated bond issues receive fewer bids than higher-rated issues due to underwriters’ uncertainties about their value ([11], [16], and [25]). In addition, underwriter spread is larger and has a higher variance for lower-rated bond issues as opposed to higher-rated issues, indicating that lower-rated issues are more difficult to price ([1], [24]). Thus our hypothesis that signaling benefits vary with demand uncertainty (Moody’s ratings) can be tested by observing the average benefits across bond rating categories. We expect the net benefits of insurance to increase monotonically as bond ratings decline.\(^{12}\)

Frame B in Table 3 presents the mean benefits of bond insurance for each bond rating category. The results confirm that the magnitudes of the interest cost savings are inversely related to Moody’s assessment of credit quality. For example, there appears to be no interest saving for Aa-rated bond issues, for A-rated issues it is 24.7 basis points, and for Baa-rated issues it is 59.0 basis points.

C. New York State

Table 4 presents an analysis of bond issues sold in New York State. New York provides an interesting situation because of the relatively large sample (82 issues) and because it allows us to control closely for regional differences in borrowing cost. It also allows us to examine an additional hypothesis. That is, we expect the net benefits of insurance to be larger for bonds sold in New York State than for the average insured bond. This is because the New York market is one of the largest and most volatile municipal markets in the country. Also, the high tax rate on out-of-state municipal bonds makes it a highly-segmented market [17]. Finally, because of the large number of individuals and institutional investors in high tax brackets, many of whom desire or are required to purchase investment securities, bond insurance provides a vehicle for issuers to upgrade the investment quality of their bond issue. Thus, we expect bond insurance to provide a more dramatic benefit for bond issues sold in New York than for the typical insured bonds in the sample. This supports the theory that insurance provides a positive signal for issues where marketability is questionable.

As can be seen by comparing the results of Frame A in Tables 3 and 4, bond insurance does provide a larger benefit for New York bonds than for the typical bond in the sample. The estimated net benefit for New York bonds is 60.3 basis points, whereas for the entire sample the benefit is 22.4 basis points. The larger New York benefit is due to pricing benefits of 74.2 basis points offset by an insurance premia of 13.9 basis points. Also, as shown in Frame B (Table 4), the benefit of bond insurance increases monotonically as the credit rating declines (except for Baa bonds). This result is similar to that reported in Table 3.

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\(^{12}\) The evidence in Table 3 that the average MBIA insurance premia appear not to vary with the Moody’s rating categories is evidence that MBIA and Moody’s diverge in their estimates of default risk for insured issues.
TABLE 4
Costs and Benefits of Insurance for Bond Issues Sold in New York State in Basis Points

<table>
<thead>
<tr>
<th>Moody's Rating</th>
<th>Number of Issues</th>
<th>Gross Price Benefits+</th>
<th>Insurance Premium</th>
<th>Net Benefits of Insurance</th>
<th>Wilcoxon Z Statistic*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frame A: Entire Sample</td>
<td>82</td>
<td>74.2</td>
<td>13.9</td>
<td>60.3</td>
<td>−7.88</td>
</tr>
<tr>
<td>Frame B: Sample Stratified by Bond Rating</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aa</td>
<td>2</td>
<td>45.2</td>
<td>11.0</td>
<td>34.2</td>
<td>--</td>
</tr>
<tr>
<td>Al</td>
<td>25</td>
<td>55.1</td>
<td>13.7</td>
<td>41.4</td>
<td>−4.37</td>
</tr>
<tr>
<td>A</td>
<td>43</td>
<td>79.5</td>
<td>14.1</td>
<td>65.4</td>
<td>−5.71</td>
</tr>
<tr>
<td>Baal</td>
<td>10</td>
<td>103.4</td>
<td>13.8</td>
<td>89.6</td>
<td>0**</td>
</tr>
<tr>
<td>Baa</td>
<td>2</td>
<td>82.3</td>
<td>16.9</td>
<td>65.4</td>
<td>--</td>
</tr>
</tbody>
</table>

+ Calculation from Equation (1): GPB = IP + NBI.

* The critical value for the Wilcoxon Z test statistic at the 1-percent level is −2.33.

** For sample sizes between 6 and 25, the appropriate test statistic is Wilcoxon T (see Table 3 for details). The critical T-value at the 1-percent level of a sample size of 10 is 5.

For sample sizes less than 6 there is no test statistic.

VI. Conclusions

Bond insurance is a relatively new phenomenon in U.S. capital markets. The recent rise in the volume of insured issues in the market for state and local bond issues is due in part to the unprecedented volatility and uncertainty in the market. This is accompanied by the fact that in recent years individuals have been the dominant buyers, as opposed to commercial banks and insurance companies.

In response to this demand, several insurance companies have begun to supply debt service guarantees for a variety of issuers. The findings of this paper are that issuers who purchase bond insurance, on average, are able to reduce their new issue borrowing cost more than enough to offset the cost of the insurance premium. Furthermore, the net benefit to the issuer increases as the credit quality of the bond issue declines.

One interpretation of our results is that the presence of insurance has enhanced market efficiency, or another is that the insurance companies have, on average, set premia too low. In the final analysis, only the default experience on insured bonds over time will tell us which interpretation has more merit.

References


