THE IMPACT OF A STATE BOND GUARANTEE ON STATE CREDIT MARKETS AND INDIVIDUAL MUNICIPALITIES***

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ABSTRACT

This paper examines the overall effect of a state bond guarantee on state credit markets and individual municipalities. We analyze the Texas School Bond Guarantee program and its impact on the borrowing cost of school districts and other municipalities within the state. We found that although the credit enhancement program allowed school districts to receive a triple-A credit rating, their new bond issues sold for a penalty yield of 18 basis points above that of a comparable natural triple-A bond issue. However, school districts did achieve interest cost savings as a result of the guarantee program, ranging from 40 to 98 basis points for bond issues rated single-A and Baa, respectively. School districts whose bond issues were rated double-A or above did not achieve any interest cost savings. Finally, because of the increase in supply of triple-A debt in the Texas municipal bond market caused by the credit enhancement of school district bonds, the borrowing cost of other municipalities who sell their debt in local credit markets increased by 49 basis points. This finding suggests that state officials need to carefully analyze the distributional effects of credit enhancement programs because they can increase the borrowing costs of some municipalities within a state.

HIGH interest rates and the need to finance capital expenditures have caused state and local governments to examine ways to lower the borrowing cost on their new debt. One alternative is to use a third party credit enhancement to improve the credit rating and marketability of a debt issue. Examples are the purchase of private bond insurance and the formation of state bond banks, both of which have been examined extensively in the academic literature.[1]

Another type of credit insurance that has not received much attention is state sponsored bond guarantee programs. Currently, more than a dozen states employed some forms of guarantee program to enhance the credit backing and, hence, the credit rating of local government debt issues. An improved credit rating usually translates into lower borrowing cost. Critics charge, however, that guaranteed bonds trade at yields above comparable bonds with the same credit rating, interest cost savings from guarantee programs vary substantially among different classes of issuers, and the presence of the guarantee may raise the borrowing cost of municipalities not included in the program.

The purpose of this paper, therefore, is to examine the impact of a state bond guarantee program on a state's credit market and individual municipalities within the state. In this paper, we focus on the Texas school bond guaranteee program and estimate (1) the interest cost savings to Texas school districts because of the state guarantee program, and (2) the possible adverse effect, if any, on the borrowing cost of nonguaranteed bond issues sold in the state. The analysis of the Texas guarantee program should provide some insight into the costs and benefits of existing or proposed bond guarantee programs in other states.

I. Credit Enhancement and the Texas School Bond Guarantee

Credit ratings are used by most borrowers as a way to facilitate the information flow between debt issuers and investors so that the problems of asymmetric information in the market can be efficiently resolved (Wakeman (1981)). One way borrowers of poor credit quality can reduce their borrowing cost is to improve their credit rating. Unfortunately, credit ratings are determined by the issuer's underlying economic characteristics which are difficult to alter in the short run.

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However, borrowers of low credit quality can improve the creditworthiness of their debt through third party assistance programs such as bond insurance sold by private insurance companies or some form of public guarantee. There are substantial differences in the way these two types of insurance are administered.

Private insurance firms are selective in accepting insurance applications because of their profit motive. Their screening process is aimed at maintaining a portfolio of bonds with an acceptable level of default risk and promoting the firm's reputation of financial strength. Consequently, bond issues of low credit quality often cannot qualify for private bond insurance. Public guarantors, on the other hand, are more compelled by equity and political consideration when providing credit enhancement to their political subdivisions and, thus, have minimal qualifying standards. States have adopted a variety of guarantee programs with different degrees of credit backing.

The Texas school bond guarantee program which is the focus of this study was begun February 1984. Under the program, Texas school district bonds are guaranteed by the assets (mostly land) of the Permanent School Fund which are currently valued at over $5 billion. If a school district is not able to service its maturing principal or interest payments, the debt becomes a full faith and credit obligation of the Fund, and the required funds are immediately transferred to the district's paying agent. Because of the School Fund's strong financial backing, both of the major rating agencies—Moody's and Standard & Poor's—assign a triple-A credit rating to debt guaranteed by the Fund.

II. Guarantee and Bond Interest Cost

Enhanced Versus Intrinsic Credit Quality

The function of a bond guarantee can be viewed as transferring the default risk of a bond issuer to its guarantor and, therefore, the bond rating of a guaranteed debt reflects the credit quality of the guarantor. Although all guaranteed Texas school bond issues receive the highest credit ratings from Moody's and Standard and Poor's, they may not trade as a natural triple-A bond issue in the market. The reason is that guaranteed bonds have a higher probability of default than natural triple-A bonds. Although the bond guarantee prevents the potential loss of an investor's principal and interest in the event of a default, it does not reduce certain default-related costs. These costs include added transaction costs of reinvestment, interruption of investment plans, and exposure to reinvestment risk. The higher the default probability of a bond issue, the more likely an investor will bear these default-related costs. Thus, we expect a guaranteed school bond issue to sell for a higher borrowing cost than a comparable natural triple-A bond issue.

The Magnitude of Interest Cost Savings From Guarantee

The potential interest cost savings from a bond guarantee come from two sources. One is from the improved credit quality for guaranteed bonds and we expect bond issues with low credit quality to benefit more from the guarantee than issuers of high credit quality, because all guaranteed bonds receive the same credit rating (triple-A for Texas school bonds) regardless of their underlying credit quality. The other source of interest cost savings is from the increased bidding competition among underwriters for guaranteed debt. Bonds of high credit quality typically are in greater demand because of investor's risk aversion and the fiduciary responsibilities of some institutional investors. The combined effects of improved credit quality and increased bidding competition should lower the borrowing cost for guaranteed bond issues; furthermore, we expect the interest cost savings to increase monotonically as an issuer's intrinsic credit quality declines.

Market Segmentation and Credit Enhancement

Previous studies such as Hendershott and Kidwell (1978) and Kidwell et al. (1984) have shown that the municipal bond market is geographically segmented, especially for smaller bond issues. Market

segmentation is mainly due to differences in information costs between large and small bond issues, state pledging requirements, and tax treatment on coupon income between in-state and out-of-state municipal bonds. As a result, the market for smaller bond issues tends to be local or regional, and for large bond issues it is national in scope.

When the bond guarantee program for school districts was introduced, the supply of triple-A credits in the Texas municipal bond market increased significantly.[2] The increase in the supply of triple-A bonds may exert price pressure on natural triple-A bonds, holding demand constant. Thus, we expect the interest rate differential between triple-A bonds and comparable bonds with a lower credit rating to narrow. In addition, the price pressure effects on the interest rate differential should be greater on smaller bond issues that are sold in local or regional markets than larger issues and it should be negligible on large bond issues sold in the national primary market, as suggested by Hendershott and Kidwell (1978).

In sum, the previous discussions suggest that the Texas school bond guarantee should affect municipal borrowing cost as follows. First, due to the differences in default probability between guaranteed and natural triple-A bonds, guaranteed school bond issues should have a higher borrowing cost than comparable natural triple-A bond issues. Second, the interest cost savings to school districts from the bond guarantee program should increase as the intrinsic credit quality of the issuer declines. Finally due to the effect of geographic segmentation in the municipal bond market, the increase in the supply of triple-A bonds may cause the interest rate differential between natural triple-A bonds and comparable bonds with a lower credit rating to narrow, especially for smaller bond issues which are typically sold in local or regional credit markets.

III. Data and Methodology

Data was collected from *The Bond Buyer* and Moody's *Municipal Government Manuals*. The result was a sample of 1,016 new long-term general obligation bonds sold by competitive bidding in the state of Texas from January 1980 through June 1985: 127 of the issues were guaranteed and 889 bond issues carried no third party credit guarantee.[3]

Table 1 presents the descriptive statistics for the sample. Though other factors are not held constant, guaranteed bonds sell for 26 basis points less than nonguaranteed bonds. Turning to the credit ratings, the ratings for each bond issue represent the ratings granted by Moody's (if not available, Standard & Poor's is used). Since the school bond guarantee program is not retroactive and does not affect a municipality's outstanding debt, we can measure the intrinsic credit quality of a guaranteed bond using the credit rating on the issuer's outstanding debt.[4] Out of 127 guaranteed bond issues, 59.1 percent are rated Baa, 33.1 percent are rated single-A, and the remaining 7.9 percent are rated double-A; none of the guaranteed bond issues are rated triple-A.

Bidding Competition Model

Based on the discussions in previous sections, the potential interest cost savings to guaranteed school districts come from two sources: improved bidding competition and enhanced credit quality. To measure the interest cost savings from improved bidding competition, we develop a bidding competition model. Previous studies such as Hopewell and Kaufman (1977) and Kessel (1978) have indicated that the bidding competition among underwriters on municipal bonds is determined primarily by bond issue characteristics and the market conditions at the time of sale. Specifically, the model tested is:

$$\begin{aligned}\text{NBIDS} = {} & \alpha_0 + \alpha_1\text{SIZE} + \alpha_2\text{SIZE}^2 \\ & + \alpha_3\text{MAT} + \alpha_4\text{UNCER} + \alpha_5\text{SCHL} \\ & + \alpha_6\text{MUD} + \alpha_7\text{RATING} \\ & + \alpha_8\text{INTER} + \delta \qquad (1)\end{aligned}$$

and based on previous studies, we expect

TABLE 1

Descriptive Statistics for a Sample of Texas General Obligation Bonds sold Competitively Between January 1, 1980 and June 30, 1985

Variable	Guaranteed	Nonguaranteed	Total
Number of Bond Issues	127	889	1,016
Net Interest Cost (%)	9.15	9.41	9.38
Issue Size ($ millions)	5.58	8.30	7.96
Final Maturity (years)	17.56	16.43	16.57
Number of Bids	6.13	3.37	3.72
Call Provision (%)	86.61	78.97	79.92
Type of Bond Issue (%):			
City and County	0.00	40.49	35.43
School Districts	100.00	41.63	48.92
Municipal Utility Districts	0.00	17.88	15.65
Credit Rating (%):*			
Aaa	0.00	10.01	8.76
Aa	7.87	17.77	16.54
A	33.07	37.23	36.71
Baa	59.06	34.99	37.99
	100.00	100.00	100.00

* For guaranteed bond issues, the issuer's intrinsic credit rating is used which was obtained from the municipality's outstanding debt that was not guaranteed.

$\alpha_1 > 0$, $\alpha_2 < 0$, $\alpha_3 < 0$, $\alpha_4 < 0$, $\alpha_5 < 0$, $\alpha_6 < 0$, $\alpha_7 < 0$, and $\alpha_8 < 0$. The variables are defined as follows:

NBIDS = the number of competitive bids received from underwriters on a new bond issue.

SIZE = total dollar size of the bond issue in natural logarithms with size adjusted by the GNP deflator for the year of issue (1981 is the base year).

MAT = the natural log of years to final maturity of a bond issue.

UNCER = the eight-week standard deviation of the prevailing market interest (INT) prior to the bond issue sale date.

SCHL = zero-one dummy variable where SCHL = 1 if it is a school bond issue and SCHL = 0 if otherwise.

MUD = zero-one dummy variable where MUD = 1 if it is a municipal utility district bond issue and MUD = 0 if otherwise.

RATING = zero-one dummy variables representing a bond issue's credit rating. That is, Aa =

1 if the bond issue has a double-A credit rating, A = 1 if the bond issue has a single-A credit rating, and Baa = 1 if the bond issue has a Baa credit rating. Bond issues with a triple-A credit rating are the excluded set. For guaranteed bonds, the intrinsic credit quality instead of the actual credit rating (Aaa) is used.

INTER = the bond guarantee-credit rating interactive terms. They are G*aa, G*A and G*Baa where G*Aa = 1 if the bond issue is guaranteed and has an intrinsic credit rating of Aa, and G*Aa = 0 if otherwise; G*A = 1 if the bond issue is guaranteed and has an intrinsic credit rating of single-Aa, and G*A = 0 if otherwise; G*Baa = 1 if the bond issue is guaranteed and has an intrinsic credit rating of Baa, and G*Baa = 0 if otherwise.

Bond Pricing Model

To estimate the interest cost savings from bond guarantee due to improved credit quality, we employ a bond pricing model. A substantial body of research exists on the theoretical and empirical determinants of interest cost on municipal bond issues and a review of these studies reveals a fairly standard set of explanatory variables.[5] The model estimated by ordinary least squares is

$$\begin{aligned} NIC = {} & \beta_0 + \beta_1 SIZE + \beta_2 SIZE^2 \\ & + \beta_3 MAT + \beta_4 CALL + \beta_5 NBIDS \\ & + \beta_6 INT + \beta_7 UNCER + \beta_8 RISK \\ & + \beta_9 SCHL + \beta_{10} MUD + \beta_{11} RATING \\ & + \beta_{12} INTER + \tau \end{aligned} \tag{2}$$

and based on previous studies we expect, $\beta_1 < 0$, $\beta_2 > 0$, $\beta_3 > 0$, $\beta_4 > 0$, $\beta_5 < 0$, $\beta_6 > 0$, $\beta_7 > 0$, $\beta_8 > 0$, $\beta_9 > 0$, $\beta_{10} > 0$, $\beta_{11} > 0$, and $\beta_{12} < 0$. Most of the variables are already defined in Equation (1) and the new variables are described below:

NIC = issuer net interest cost in percent which is defined as: [total interest payment + bid discount (or -bid premium)]/[(par value of the issue) × (average maturity of issue)].

CALL = zero-one dummy variable where CALL = 1 if the bond issue is callable and CALL = 0 if noncallable.

INT = the weekly Salomon Brother's ten-year new issue reoffered yield index in percent for prime-rated bonds.

RISK = the bond risk premium is measured by the yield differentials between Moody's Aaa and Baa municipal bond yield indexes during the week of sale.

One problem in estimating Equation (2) is the potential multicollinearity caused by the dependence of NBIDS on other explanatory variables in the model. As shown in Equation (1), NBIDS is determined by a set of variables that are also present in Equation (2). We correct the problem by using a two-stage least squares (TSLS) estimation. In the first stage we estimate Equation (1). This provides estimates of α's and the residual term denoted RESI. In the second stage, we estimate Equation (2) by replacing RESI for the variable NBIDS. In other words, the bond pricing model estimated by the ordinary least squares becomes

$$\begin{aligned} NIC = {} & \beta_0 + \beta_1 SIZE + \beta_2 SIZE^2 \\ & + \beta_3 MAT + \beta_4 CALL + \beta_5 RESI \\ & + \beta_6 INT + \beta_7 UNCER + \beta_8 RISK \\ & + \beta_9 SCHL + \beta_{10} MUD + \beta_{11} RATING \\ & + \beta_{12} INTER + \tau \end{aligned} \tag{3}$$

Equation (3) not only avoids the multicollinearity problem of Equation (2), because of the orthogonality of RESI and other independent variables, it also al-

lows us to ascertain the incremental effect of the number of competitive bids on bond interest cost.

IV. Empirical Results

The Effect of Bond Guarantee on Bidding Competition

To examine the effect of bond guarantee on the bidding competition of a bond issue, we estimate Equation (1). Regression (2.1) in Table 2 presents the results. By examining the estimates on the three interactive variables, we can see that, relative to the triple-A bond issues which are the excluded set, bond guarantee increases the bidding competition as the bond credit quality declines. Bond issues with double-A receive, on average, 2.31 more bids if they are guaranteed. And, as a bond's intrinsic credit quality declines, the number of bids received increases by

TABLE 2

Regression Estimates for Texas general Obligation Bonds
Sold Between January 1, 1980 and June 30, 1985

	Regression (2.1) Dependent Variable: NBIDS		Regression (2.2) Dependent Variable: NIC		Regression (2.3) Dependent Variable: NIC	
Variables	Coef.	t-value	Coef.	t-value	Coef.	t-value
Constant	6.72	11.78	-4.73	-23.63	-4.51	-23.36
SIZE	0.07	7.18	-0.01	-2.16	-0.01	-2.04
$SIZE^2$	-0.01	-4.63	0.01	1.33	0.01	1.25
MAT	-0.40	-2.12	1.59	28.41	1.55	28.59
CALL			0.10	2.36	0.14	3.22
RESI			-0.06	-9.53	-0.06	-9.55
INT			0.94	73.98	0.93	75.93
UNCER	-0.55	-1.64	0.19	2.38	0.19	2.46
RISK			0.41	24.97	0.40	25.45
SCHL	-0.55	-3.69	0.08	2.44	0.08	2.36
MUD	-1.13	-5.81	0.30	6.78	0.30	7.08
RATING:						
Aa	-0.48	-1.77	0.22	3.47	0.22	3.66
A	-1.11	-4.17	0.54	8.87	0.55	9.03
Baa	-1.97	-6.80	1.26	18.89	1.26	19.76
GAaa			0.19	2.42		
G*Aa	2.31	3.67			0.04	0.27
G*A	2.39	7.33			-0.40	-5.73
G*Baa	3.64	13.91			-0.98	-17.61
Adjusted R^2	0.2830		0.9062		0.9139	
F-value	34.4		754.9		674.1	
Prob > F	0.0001		0.0001		0.0001	
Sample Size	1,016		1,016		1,016	

2.39 and 3.64 for single-A and Baa rated bonds, respectively.

How Do Guaranteed Bonds Trade in the Market?

In the first section, we argue that, due to the differences between the probability of default of guaranteed and natural triple-A bond issues, guaranteed school bonds should have a higher borrowing cost than comparable natural triple-A issues. To test this hypothesis, we estimate Equation (3) by adding another credit rating dummy variable GAaa where GAaa = 1 if it is a guaranteed bond issue and GAaa = 0 if otherwise. In this regression, other credit rating variables (Aaa, Aa, A, and Baa) represent only the credit ratings of unguaranteed bond issues; bond issues rated triple-A (Aaa) are still the excluded set.

As shown in Regression (2.2), the variable GAaa is statistically different from zero and enters the equation with the expected positive sign. The finding suggests that, on average, bond issues guaranteed by the Texas Permanent School Fund sell for 19 basis points more than a comparable natural triple-A Texas bond issue.

To see what credit rating category guaranteed school district bonds sell for, we perform a standard F-test on the difference between the estimated coefficient on the guaranteed bonds and the other credit rating categories. The result indicates that guaranteed school district bonds which are rated triple-A sell at interest cost most like natural double-A bond issues, holding other factors constant.[6]

Bond Guarantees and New Issue Borrowing Cost

The second hypothesis we wish to test is whether the interest cost savings that accrue to school districts that sell guaranteed bond issues increases as the intrinsic credit quality of the issuer declines. Regression (2.3) in Table 2 shows the empirical results where the three interactive variables represent the interest cost savings to guaranteed bond issues with different intrinsic credit quality.

For school districts whose intrinsic credit rating is a double-A, there is no significant interest cost saving because of the school fund guarantee. This is not surprising since our previous results indicate that guaranteed school district bonds sell at interest cost most similar to bond issues rated double-A. For bond issues rated below double-A, school districts do achieve significant interest cost savings from the bond guarantee. Specifically, for bond issues rated single-A and Baa, school districts save 40 and 98 basis points by the presence of the bond guarantee, respectively. The findings support the hypothesis that the bond guarantee improves the credit risk of a school district's bond issues, and that the interest cost saving is inversely related to the issuer's intrinsic credit quality.[7]

The Effect of Guaranteed Bonds on Borrowing Cost on Triple-A Bond

The final hypothesis we wish to test is whether the increase in triple-A bonds in the Texas bond market caused by the school district guarantee bond program exerts price pressure on natural triple-A bond issues, and whether this price pressure effect, if any, is more significant on small bond issues that are sold in local markets. To test the price pressure hypothesis, we need to examine the interest cost change on nonguaranteed bond issues sold before and after the bond guarantee program. Since guaranteed school district bonds first appeared in the market in February 1984, we create a zero-one dummy variable (T) to separate the two time periods; that is, T = 1 if the bond issue is sold after February 1984 and T = 0 if sold on or before February 1984. Then, using the time period dummy variable (T), we construct three time-credit rating interactive variables—T*Aaa, T*Aa, and T*A—to measure the difference in interest cost for nonguaranteed bond issues before and after the introduction of the guarantee program.

We test the price pressure hypothesis by adding the three time-credit rating interactive terms to Equation (3). We use only nonguaranteed bond issues in this test, and treat bond issues with Baa credit

rating (Baa) as the excluded set. The results are summarized in Table 3 where for brevity only the estimated coefficients for the interactive variables are presented.

The first equation presented in Table 3 is Regression (3.1) which is estimated with the entire sample of 889 nonguaranteed bond issues. As can be seen, none of the estimated coefficients are statistically significant on the interactive variables, indicating that the adoption of the school bond guarantee program did not have a significant impact on the interest cost of nonguaranteed bond issues, regardless of their credit quality. However, since the effect of market segmentation is stronger for smaller bond issues, the insignificant results in Regression (3.1) may be due to the fact that the price pressure effect on smaller bonds is masked by the inclusion of larger bond issues in the sample. Therefore, subsequent regressions are estimated by systematically excluding larger bond issues from the test sample.

Turning to Regressions (3.2) through (3.8), none of the estimated coefficients on the T*Aa and T*A variables are statistically significant, indicating that the bond guarantee program did not affect the interest cost on bonds with double-A or single-A credit ratings. However, the estimated coefficient of T*Aaa becomes significant when the size of bond issues in the sample is less than $7 million. Thus, bond issues sold after the start of the bond guarantee program with a natural triple-A credit rating paid about 49 basis points more than comparable bond issues sold before the guarantee program. The increase in borrowing cost for natural triple-A bond issuers is consistent with the hypothesis that the school district bond guarantee progam increased the supply of triple-A bond issues in the Texas bond market and exerted downward price pressure on the price of small triple-A bond issues.

In sum, the borrowing cost of Texas municipalities which sell their bond issues in the national primary market (large bond issues) appears to be unaffected by the bond guarantee program. However, municipalities which sell triple-A credits in local or regional credit markets (smaller bond issues) pay higher interest cost because of the guarantee program. Thus, it appears the interest cost savings that Texas school districts gained by the introduction of the guarantee program are achieved at the expense of small municipalities which sell bond issues of high credit quality.

TABLE 3

Issue Cost Regression Estimates for the Time-Credit Rating Interactive Variables With the Sample Stratified by Bond Issue Size

Regression Number	Size of Bond Issues in the Sample (millions)	Estimated Coefficients (t-value) T*Aaa	T*Aa	T*A	Number of Bond Issues	F-value	Adjusted R^2
(3.1)	All Bonds	0.03(0.34)	-0.01(-0.05)	-0.05(-0.76)	889	873	0.907
(3.2)	< $10	-0.03(-0.67)	-0.08(-0.67)	-0.03(-0.48)	697	497	0.907
(3.3)	< $9	-0.03(-0.21)	-0.08(-0.73)	-0.04(-0.44)	674	467	0.905
(3.4)	< $8	0.12(0.57)	-0.09(-0.64)	-0.04(-0.39)	647	451	0.905
(3.5)	< $7	0.49(2.06)*	-0.07(-0.32)	-0.05(-0.46)	611	448	0.908
(3.6)	< $6	0.48(1.98)*	-0.06(-0.35)	-0.05(-0.64)	585	430	0.904
(3.7)	< $5	0.44(1.66)*	-0.11(-0.68)	-0.04(-0.35)	539	395	0.904
(3.8)	< $4	0.59(1.93)*	-0.14(-0.74)	-0.04(-0.41)	476	344	0.903

* significant at the 10 percent level

Cost/Benefit Analysis of Texas School Bond Guarantee

To better understand the distributional effects of a guarantee program on regional credit markets, we perform a cost/benefit analysis. From the empirical estimates, we know that school districts whose bonds are guaranteed and rated single-A or Baa are able to reduce their new issue borrowing cost between 40 and 98 basis points, respectively. On the other hand, municipalities whose bond issues are less than $7 million, rated triple-A, and are not guaranteed found their borrowing cost increased by an average of 49 basis points.

Table 4 summarizes the interest savings or cost to Texas municipalities by the introduction of the Texas school bond guarantee program during the period between February 1984 and June 1985. Columns (1) and (2) identify the municipalities that were affected by the guarantee program; they are 1) nonguaranteed bond issues rated triple-A and less than $7 million in issue size, and 2) guaranteed school district bonds with a single-A or Baa underlying credit quality. Column (3) identifies the number of bond issues sold during our test period whose borrowing cost was affected by the bond guarantee program. Column (4) shows the estimated coefficients for the interest savings (−) or cost (+) for each type of bond issue. Column (5) shows the effect of the bond guarantee program on the borrowing cost in dollars for a typical $1 million bond issue in the sample. Column (6) shows the total dollar amount of bonds that were affected during the study period. Column (7) shows the total dollar savings (−) or cost (+) for each category of bonds affected by the bond guarantee program.

As can be seen in Table 4, municipalities which issue triple-A bonds in local markets sold $58 million in bonds during the test period and paid $1.10 million in additional interest payments because of the guarantee program. In contrast, school districts whose underlying credit quality was single-A or Baa sold $633 million ($368 + $265) in bonds and saved $16.47 million ($5.96 + $10.51) interest cost payments. Overall, Texas municipalities saved $15.32 million dollars in interest pay-

TABLE 4

The Interest Savings (-) or Cost (+) to Texas Municipalities by the Introduction of the Texas School Bond Guarantee Program From February 1, 1984 to June 30, 1985

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Credit Rating	Type of Bond Issue	Number of Bond Issues Sold During the Study Period*	Change in Issue Cost (percent)**	Change in Issue Cost per $1 million bond issue+	Total Amount of Affected Bond Sold (millions)	Total Change in Issue Cost (millions)++
Aaa	Nonguaranteed	16	+ 0.49	$19,837	$58	+ $1.15
A	Guaranteed	42	- 0.40	$16,598	$368	- $5.96
Baa	Guaranteed	75	- 0.98	$39,673	$265	- $10.51
Total Net Interest Cost Savings for Texas Municipalities						- $15.32

*Only bond issues affected by the guarantee are included which includes small nonguaranteed triple-A bond issues and guaranteed school district bonds with A or Baa intrinsic credit quality.

**Based on the estimated coefficients from Table 2 and Table 3.

+The estimate assumes a $1 million serial bond issue with a 17-year maturity (sample mean), 10 percent average yield to maturity, semi-annual coupon payment, and equal amount of face value maturing each year.

++Column (7) = Column (5) x Column (6)

ments.[8] Though the overall net savings are large, they are achieved at the expense of higher borrower cost for small municipalities of high credit standing whose bonds are marketed in regional or local credit markets.

V. Conclusion

This study examines the impact of state bond guarantee programs on state credit markets and the borrowing cost of individual municipalities within the state. We use the Texas Permanent School Fund bond guarantee program which guarantees Texas school district bonds as the focus of our empirical analysis. The findings from our study suggest that although the guarantee program enables Texas school districts to receive a triple-A credit rating, school district bonds sell at interest costs similar to natural double-A bond. This finding is consistent with the evidence from other studies of credit enhancements. In addition, we found that the interest cost savings to school districts vary systematically with the issuer's intrinsic credit quality: Baa credits save 98 basis points, single-A credits saved 40 basis points, and for double-A or above credits there was no interest cost savings. Finally, because the guarantee program increased the volume of triple-A bonds coming to market, the borrowing cost for municipalities which sell natural triple-A bonds in local or regional credit markets was increased by 49 basis points. The borrowing cost of other municipalities within the state was not affected.

Though this study focused on the Texas school bond guarantee program, the finding should be valuable to public policy makers in other states and provide some insights into the distributional effects of state credit enhancement progams on municipalities within their state. Specifically, we found that in an attempt to lower the borrowing cost of one class of borrower (school districts) within Texas, state officials unintentionally increased the borrower cost to smaller municipalities of the highest credit standing which sell bonds in regional or local credit markets. Though in our Texas example there was an overall net interest cost saving to the state because of the guarantee program, this may not always be the case. In Texas, the interest cost savings resulted because the number of municipalities whose borrowing cost was increased was small relative to the number of school districts which benefited from the bond guarantee progam. This may not always be the case. As noted in this study, state credit enhancement programs may impact unfavorably on some municipalities within a state. Thus, state officials should be aware that the municipal bond market is geographically segmented and, because of this, government policies which affect bond issues sold in local or regional markets must be carefully analyzed for their distributional effects.

ENDNOTES

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[1]See, for example, Braswell, et al. (1982), Cole and Miller (1982), Cole and Officer (1981), Katzman (1980), Kidwell et al. (1987), Kidwell and Rogowski (1983).

[2]Before the guarantee program, the number of triple-A issues over total bond issues in the Texas market was 8.1 percent. After the guarantee program, the ratio increased to 56.3 percent. In terms of dollar amount, the ratios before and after were 29.7 and 58.5 percent, respectively.

[3]To focus on the effect of state guarantee program, bond issues with private default insurance which represents another type of credit enhancement were excluded from the sample.

[4]There are 30 guaranteed bond issues which do not have outstanding bond issues prior to the guarantee program. Hence no intrinsic credit information is available on these bond issues. They are not included in the sample.

[5]See, for example, Benson et al. (1981), Cook (1981), Hendershott and Kidwell (1978), Hopewell and Kaufman (1977), Kessel (1978), Kidwell et al. (1984).

[6]Four null hypotheses are tested. They are GAaa − Aaa = 0, GAaa − Aa = 0, GAaa − A = 0, and GAaa − Baa = 0. The F values for all except GAaa − Aa = 0 are significant at the 1 percent level and hence the null hypothesis of GAaa − Aa = 0 cannot be rejected.

[7]It should be noted that the estimated coefficient of RESI in Regression (2.3) is statistically significant. This indicates that the number of competitive bids received by a bond issue has incremental effect on bond interest cost over and above the impact captured by other variables in Equation (1). Thus, the interest cost

savings to school districts, as represented by coefficients of G*A and G*Baa is Regression (2.3), are conservative estimates.

[8]To be more exact, the interest savings (or cost) are spread over the life of a bond issue.

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