"Robin Hood" and Texas School District Borrowing Costs

EARL D. BENSON and BARRY R. MARKS

The "Robin Hood" system of school financing in Texas takes property tax funds from wealthy school districts and gives them to poorer districts. This paper examines Permanent School Fund-insured, school district debt and discovers that under the "Robin Hood" system, Texas school districts with either Aa or A1 underlying credit ratings have higher borrowing costs than districts with lower ratings. Also, the borrowing costs of Texas school districts with underlying credit ratings of Aa and A1 are higher than those for non-Texas, privately insured school districts with the same ratings, while the borrowing costs of A and Baa-rated Texas school districts are lower.

INTRODUCTION

School districts have always been a unique subset of municipal issuers. In fact, more than 65 years ago Hillhouse pointed out that they are one of the safest municipal issuers from which to buy bonds because during the Great Depression they had a default rate that was less than 1/10th that of incorporated municipalities (0.49 versus 5.2 percent).[1] School district issues continue to comprise a significant portion of total municipal bond issues. *The Bond Buyer 1997 Yearbook* shows that in 1996[2] primary and secondary school bonds made up about 13.23 percent of the entire municipal market and reports that:

Earl D. Benson is Professor of Finance at Western Washington University. His teaching interests include investments, portfolio management, and fixed-income securities, while research interests include municipal bond interest cost determinants and the investigation of the determinants of residential real estate prices. He can be reached at *earl.benson@wwu.edu*.

Barry R. Marks is Professor and Chair of Accounting at the University of Houston-Clear Lake. His teaching and research interests are state and local government accounting and financial management and tax planning for individuals. He can be reached at *marks@cl.uh.edu*.

1. Albert. M. Hillhouse, *Municipal Bonds: A Century of Experience* (New York: Prentice-Hall, 1936), 21.

2. The focus here is on 1996 data because that is the ending year of the sample period (1992–96) used in this study.

> Education was the leading specific purpose for municipal financing in 1996, accounting for a record high 20.9% of the $183.49 billion municipal volume for the year. . . . Primary and secondary schools accounted for 63.3% of the education issues . . . public universities and colleges accounted for 25.5% . . . and student loan programs for 10.9%. . . .[3]

In 1996, Texas was the third largest issuer of municipal bonds, behind California and New York, issuing $11.776 billion or 6.42 percent of the total municipal financing for that year.[4] In that year there were outstanding about $9 billion worth of school district bonds, alone, insured by the Texas School Bond Guarantee program.[5]

Hseuh and Kidwell conducted the first thorough examination of the interest costs associated with the Texas School Bond Guarantee program that began in 1984 to back school district debt service repayment with assets of the Permanent School Fund (PSF).[6] Using data from 1980 to 1985 they estimated the cost savings to school districts that participated in the program and the impact of the program on other uninsured Texas debt. On June 1, 1987, Texas State District Judge Harley Clark ruled in the *Edgewood v. Kirby* case that the system of financing public school education in Texas violated the equal protection and efficient system provisions of the Texas Constitution.[7] The Texas Supreme Court upheld his decision on October 2, 1989 with some modifications.[8] The most important of these modifications is that similar levels of tax effort should yield similar levels of tax revenue. This lawsuit forced the Texas Legislature to create a new system of financing public school education that since has become commonly known as the ''Robin Hood'' system. This paper extends the work of Hsueh and Kidwell by examining PSF-insured, general obligation debt that has been issued after the inception of these ''Robin Hood'' statutes.

The objective of this paper is to examine the implications of the ''Robin Hood'' system of financing public education on the borrowing costs of Texas school districts. First, we compare the borrowing costs of different Texas school districts based upon their ability to repay debt as measured by Moody's bond rating. Next, we examine the borrowing costs of insured and uninsured general obligation school district bonds outside of Texas, using a nationwide sample of bond issues. Then, we move to an examination of Texas school district borrowing costs, and compare these costs with the national sample. Since the Texas school district bonds in the sample are guaranteed by the PSF, we (1) examine whether the underlying Moody's bond rating of individual issuers affects the level of bond interest costs and (2) investigate the impact of the ''Robin Hood'' system on the

3. *The Bond Buyer 1997 Yearbook* (New York: American Banker, 1997), 115.

4. Ibid., 19.

5. Office of the State Auditor, the State of Texas, ''A Briefing on School District Debt,'' (February 1998): 1.

6. L. Paul Hsueh and David S. Kidwell, ''The Impact of a State Bond Guarantee on State Credit Markets and Individual Municipalities,'' *National Tax Journal* 41, no. 2 (June 1988): 235–245.

7. B. D. Walker and D. T. Casey, *The History of Texas Public School Finance through 1996* (Austin: Texas Association of School Boards, 2001), 13.

8. Ibid., 14.

pattern of bond risk premiums. In other words, we attempt to find out if the financial markets ignore the default risk associated with individual Texas school districts, given the nature of the insurance and the redistribution of property tax revenues. Next, we compare the risk premiums of Texas school districts to the risk premiums of both insured and uninsured school districts from outside of Texas. This allows us to show how Texas bond costs and risk premiums compare with those elsewhere in the nation and allows us to examine the potential impact of the "Robin Hood" system on these interest cost and risk premium differentials.

The first section of this paper reviews the previous studies of municipal bond insurance, both private and public, with a focus on those studies that examine state-sponsored guarantee programs. The second section describes the operations of the PSF and explains the current "Robin Hood" system of financing public education in Texas. The third section describes the model and data, and the fourth section contains the empirical results. The last section discusses the implications of the results for the borrowing costs of Texas school districts.

PRIVATE AND PUBLIC BOND GUARANTEES: THE EVIDENCE TO DATE

Private Municipal Insurance

Several studies investigate the theoretical justification for the introduction of private municipal bond insurance in the 1970s and its subsequent growth in the 1980s and 1990s, including studies by Joehnk and Kidwell,[9] Kidwell et al.,[10] Bland,[11] Hseuh and Chandy,[12] Quigley and Rubinfeld,[13] and Justice and Simon.[14] Over the past 25 years several questions have been asked by researchers in their investigation of insured municipal debt, including:

1. Does the purchase of insurance lower interest costs?
2. Does the lower "interest cost savings" of insured debt offset the cost of insurance?
3. Is the savings greater for issuers that have a lower underlying rating?

9. Michael D. Joehnk and David S. Kidwell, "Determining the Advantages and Disadvantages of Private Municipal Bond Guarantees," *Governmental Finance* 7 (February 1978): 30–36.

10. David S. Kidwell, Eric H. Sorensen, and John M. Wachowicz Jr., "Estimating the Signaling Benefits of Debt Insurance: The Case of Municipal Bonds," *Journal of Financial and Quantitative Analysis* 22, no. 3 (September 1987): 299–313.

11. Robert L. Bland, "The Interest Cost Savings from Municipal Bond Insurance: The Implications for Privatization," *Journal of Policy Analysis and Management* 6, no. 2 (1987): 207–219.

12. L. Paul Hsueh and P. R. Chandy, "An Examination of the Yield Spread between Insured and Uninsured Debt," *The Journal of Financial Research* 12, no. 3 (Fall 1989): 235–244.

13. John M. Quigley and Daniel L. Rubinfeld, "Private Guarantees for Municipal Bonds: Evidence from the Aftermarket," *National Tax Journal* 44, no. 4 (December 1991): 29–39.

14. Jonathan B. Justice and Stewart Simon, "Municipal Bond Insurance: Trends and Prospects," *Public Budgeting and Finance* 22, no. 4 (Winter 2002): 114–137.

4. Do insured issues, that have been rated Aaa by a rating agency, have the same interest cost as ''natural'' uninsured, Aaa issues; and, if not, why?
5. Does the underlying rating of insured issues affect the interest cost?

Beginning with Cole and Officer,[15] whose work suggests that the true interest cost (TIC) of issues is significantly reduced by the purchase of bond insurance, studies (including those of Kidwell et al., Bland, Bland, and Yu,[16] and Smith and Harper[17]) have consistently shown similar results.[18] Regarding the net benefit of insuring bond issues, the work of Kidwell et al. and Bland and Yu suggests that lower-rated bonds can benefit significantly. In looking at general obligation issues that were competitively sold from 1975 to 1980 the findings of Kidwell et al. indicate the issues rated A1 and lower may enjoy a net benefit from insurance. Lower-rated issues have greater estimated net benefits, with the benefit ranging from 10.1 basis points (bp) for A1-rated issues to 59 bp for those rated Baa. Bland and Yu look at competitively sold, general obligation and revenue issues sold in 1985. After estimating the net interest cost (NIC) savings from insurance and deducting the ''average'' insurance premium, they notice that only issues rated Baa1 and below and nonrated issues would enjoy a net benefit from insurance; and, therefore, the purchase of insurance by ''A-rated and higher'' issues may not be justified. They, also, detect higher savings for lower-rated issues.

Numerous studies, including Feldstein,[19] Bland, Bland, and Yu, Hseuh and Chandy, Fairchild and Koch,[20] and Benson,[21] have found that insured issues (typically rated Aaa by credit rating agencies) sell at higher interest costs (yields) than ''natural'' Aaa issues. For a period from 1974 to 1982 Feldstein finds that the 20-year yield for MBIA-insured, general obligation issues is, on average, 67 bp higher than for uninsured Aaa-rated issues. Both Bland (using 1981–1984 data) and Bland and Yu (using 1985 general obligation and revenue bond data) find that NICs of insured issues are positioned, on average,

15. Charles W. Cole and Dennis T. Officer, ''The Interest Cost Effect of Private Municipal Bond Insurance,'' *Journal of Risk and Insurance* 48, no. 3 (September 1981): 435–439.

16. Robert L. Bland and Chilik Yu, ''Municipal Bond Insurance: An Assessment of its Effectiveness at Lowering Interest Costs,'' *Government Finance Review* (June 1987): 23–26.

17. Stephen D. Smith and Richard B. Harper, ''Private Insurance of Public Debt: Another Look at the Costs and Benefits of Municipal Insurance,'' *Economic Review—Federal Reserve Bank of Atlanta* 78, no. 5 (1993): 27–38.

18. Only the Braswell et al. study (using 1977–1979 data) failed to find a significant impact of insurance on interest costs, but in a follow-up to the study Smith and Harper found that Florida insured bonds sold from 1990 to 1992 did enjoy a significant net benefit over uninsured bonds. Ronald C. Braswell, E. Joe Nosari, and Mark A. Browning, ''The Effect of Private Municipal Bond Insurance on the Interest Cost to the Issuer,'' *Financial Review* 17 (November 1982): 240–251.

19. Sylvan G. Feldstein, ''Municipal Bond Insurance and Pricing,'' in *The Municipal Bond Handbook*, eds. Frank J. Fabozzi et al. (Homewood, IL: Dow Jones-Irwin, 1983).

20. Lisa M. Fairchild and Timothy W. Koch, ''The Impact of State Disclosure Requirements on Municipal Yields,'' *National Tax Journal* 51, no. 4 (December 1998): 733–753.

21. Earl D. Benson, ''The Continuing Cost to Municipalities of Selling Competitive Tax-Exempt Bonds by NIC,'' *Municipal Finance Journal* 20, no. 1 (Spring 1999): 35–67.

between the NICs of issues rated Baa1 and A. The results of Hseuh and Chandy are similar using 1981–1985 general obligation data. Fairchild and Koch (in a study that focused on the impact of disclosure requirements) similarly find insured issue NICs are about midway between the NICs of issues rated A and Baa in an examination of competitively sold, general obligation and revenue issues from 1980 to 1988. Using more recent data (1992–1996) for separate samples of competitively sold, general obligation and revenue issues, Benson finds that in both samples the TIC of insured issues is 15 bp higher than for "natural" Aaa issues. The insured issue TICs are, on average, between the TICs of issues rated A and Baa1.

Three studies, Hseuh and Chandy, Peng,[22] and Benson and Marks,[23] examine whether the underlying rating of insured issues affects the interest cost of the issue. Hseuh and Chandy examine NICs for general obligation issues sold from 1981 to May 1984 and find that insured issues with a Baa rating sold, on average, at an NIC that was 42 bp higher than that of A-rated issues. They conclude, "investors differentiate among insured bonds of different intrinsic credit quality." In June 1984, Moody's began rating privately insured debt as Aaa. Some governments with only privately insured debt outstanding decided to no longer have their underlying credit ratings reported by Moody's. The underlying credit rating is Moody's rating for comparable uninsured general obligation bonds issued by the entity.

Peng examines the impact of Standard and Poor's Underlying Ratings (SPURs) that were initiated in 1995. He uses a 1998 database of insured, general obligation, and revenue issues and calculates an "adjusted" TIC that accounts for the insurance premium and underwriter spread. He finds that insured issues with a SPUR of AA and A (he ignored the "+" or " – " in the rating) sell at lower interest costs than issues with a SPUR of BBB and issues having no SPUR. His conclusion is that since (1) an issuer may choose whether or not to have a SPUR released and (2) they are free, that issuers with a SPUR of A or higher should choose to have it released.

Finally, Benson and Marks look at samples of insured and uninsured, competitively sold, general obligation issues of both school districts and cities during the 1992–1996 period. They used the underlying rating for all the insured issues as reported in Moody's Bond Record. They find that (1) insured school district issues with an underlying rating of A and below and (2) city insured issues with an underlying rating of Baa sell at higher TICs than do comparable issues with underlying ratings of Aa/A1. Their work suggests that insured and uninsured issues should not be pooled when making statistical estimates because the "rating" coefficients are different for insured bonds than they are for uninsured bonds.

---

22. Jun Peng, "Do Investors Look beyond Triple-A Rating? An Analysis of Standard & Poor's Underlying Ratings," *Public Budgeting and Finance* 22, no. 3 (Fall 2002): 115–131.

23. Earl D. Benson and Barry R. Marks, "Bond Insurance and Governmental Accounting Research," *Research in Governmental and Nonprofit Accounting* 11 (2004).

Public Bond Issue "Guarantees"

State credit enhancement/insurance programs can be divided into state guarantee programs, state aid for debt service, and state financial intermediation (bond banks). (For greater detail see Bland.) The focus here is on the first category that is most similar to private insurance. Several previous studies, including Bland, Bland and Yu,[24] Hseuh and Kidwell, Clarke,[25] and Clarke and Bland,[26] focus on whether the guarantee programs sponsored by state governments are effective in benefiting issuers. Bland looks at the school bond guarantee programs in Texas and New Jersey, and compares them to private insurance. He finds that the Texas School Bond Guarantee program reduces NIC more than does private insurance; while, of two New Jersey programs, only one leads to lower interest costs.

Bland and Yu look at credit enhancement programs in five states from 1976 to 1984. While the states that were examined varied in their degree of credit assistance, the empirical tests indicate that the NIC of bond issues was reduced only for the strongest of the guarantee programs (those in Michigan and Texas). Focusing on Texas, they used a sample of 414 city, county, and school district issues from 1984 to 1985. Their tests suggest that the PSF-insured issues had NICs that were 33 bp lower, on average, than noninsured city and county issues.[27]

Hsueh and Kidwell focus exclusively on the Texas School Bond Guarantee program using data from 1980 to 1985 that included 127 PSF guaranteed issues and 889 issues carrying no guarantee. They utilized the underlying credit rating of the issuer of the PSF guaranteed debt to measure the default risk of the issuer. While they find that the PSF-insured issues were selling at NICs that were 18 bp above "natural" Aaa issues, they estimate that issues rated A and B realize cost savings ranging from 40 to 98 bp when backed by the PSF guarantee.[28] They conclude that the Texas bond guarantee lowers issuer interest costs and that the "saving is inversely related to the issuer's intrinsic credit quality."[29] They, also, find that the increased supply of Aaa-rated, PSF-insured debt causes "natural" Aaa-rated bond costs for issues of less than $7 million to rise by 49 bp.

24. Robert L. Bland and Chilik Yu, "State Credit Assistance for Public School Debt: A Comparison of the Cost-Effectiveness of Five State Programs," *Journal of Education Finance* 15 (Spring 1988): 460–476.

25. Wes Clarke, "The Interest Cost Implications of the Financial Advisor Turned Underwriter," *Public Budgeting and Finance* 17, no. 3 (Fall 1997): 74–86.

26. Wes Clarke and Robert L. Bland, "State Guarantees for School Debt and the Texas Penalty," *Municipal Finance Journal* 21, no. 2 (Summer 2000): 1–12.

27. The model used by Bland and Yu, "State Credit Assistance," measures credit rating by using Moody's current credit rating for noninsured issues, while using the preinsurance, 1983 Moody's rating for the PSF-insured issues as an estimate of the underlying credit rating of the issue.

28. To correct for potential multicollinearity, Hseuh and Kidwell use a two-stage least squares estimation where they first regress the number of bids on issuer and market characteristics and use the residuals from this estimate as an explanatory variable in an NIC estimation equation.

29. Hseuh and Kidwell, 241.

Clarke uses a 1990–1995 sample of general obligation and revenue issues from Texas to estimate that school district debt sold for a 14 bp lower NIC than the other issues in the sample. Nearly 80 percent of the school district issues in the sample are guaranteed by the PSF. Clarke does not identify insured issues in the regression equation and does not look at the underlying credit rating of the issuer.

In a recent study, Clarke and Bland focus on the NIC of Texas debt using data from 1995 for two samples of competitively sold issues, one for school districts and another for city-issued debt. The first sample looks at 78 Texas and 70 non-Texas school district issues. The PSF guaranteed 65 of the 78 Texas bond issues. A second sample compares 29 bond issues in Texas to 66 non-Texas issues. They suggest that "Texas municipal issues pay a penalty of about 32 bp" and that "Texas school districts pay about 22 bp in penalty. . . ."[30] They say that PSF-insured issues do realize a savings for school districts, compared with the costs if they had not been guaranteed. This study did not control for the effect of default risk of the issuer because of a collinearity problem, a problem that might have been corrected if underlying ratings of insured issues had been used. In a more recent study of bonds sold in 1999 and 2000, Clarke and Bland estimate that Texas issues pay a "penalty" of only about 15 bp; however, they have no separate estimates for school districts.[31]

In summary, these studies of publicly insured bond issues suggest that public insurance has a similar impact on bond issue interest cost as does private insurance. However, many of these studies suffer from problems that may lead to inaccurate estimates of the effects they are trying to measure. Studies to date suggest that TIC is a better measure than NIC, but most studies have used NIC because it is more readily available. In addition, recent studies suggest that it is not appropriate to pool revenue and general obligation bonds (see Benson), and it is not appropriate to pool insured and uninsured bonds (see Benson and Marks) without using interactive variables with the ratings. Further, researchers should not consider a Aaa rating for an insured bond issue to be equivalent to a "natural" Aaa, because most studies suggest that an insured bond sells at an interest cost at or below that of an A-rated issue. While they used NIC as the measure of interest costs, the Hseuh and Kidwell study is the only previous study of publicly insured debt that does not suffer from one or more of the other problems mentioned above. Their study did not pool revenue and general obligation bonds; and, although they pooled insured and uninsured bonds, they included interactive variables with ratings for their insured bonds. One of the purposes of this study is to see if the results of Hseuh and Kidwell still hold for PSF-insured issues in Texas in light of the new school district financing statutes ("Robin Hood") that were introduced in the early 1990s.

30. Clarke and Bland, 9.

31. Wes Clarke and Robert L. Bland, "State Income Tax and Local Government Borrowing Costs Revisited," *Municipal Finance Journal* 24, no. 2 (Summer 2003): 1–15.

THE TEXAS SCHOOL BOND GUARANTEE PROGRAM AND "ROBIN HOOD"

The PSF and the Texas School Bond Guarantee Program

One unique feature of Texas school district finance is the existence of the PSF. Through the Texas School Bond Guarantee program, the PSF guarantees the timely payment of interest and principal on school district bonds to bondholders (with the only cost to the school district being an application fee of $300 to the State Commissioner of Education during the time period of this study). The size of debt guaranteed by the PSF is not a trivial amount, since the outstanding principal was $8.3 billion at the beginning of our sample period, September 1992.[32]

The PSF is a nonexpendable trust fund. The assets of the Fund consist of cash and temporary investments, investments (such as stocks, bonds, and real estate), receivables, and fixed assets, primarily land. The Texas Constitution requires the PSF to assist public schools.[33] The dividends and interests earned from the Fund's investments are deposited annually to the Available School Fund, an expendable trust fund. The assets in the Available School Fund are then distributed to the public school districts on a per capita basis. During the 1993–1994 fiscal year, school districts received $334 per average daily attendance (ADA).[34] The assets in the PSF guarantee public school bond issues. The proceeds from these issues must be used to construct or rehabilitate school buildings or to purchase additional equipment or land. The amount of bonds that can be guaranteed by the Fund under the Texas Constitution is limited to 200 percent of the cost or market value of the Fund, whichever is less, of the Fund's assets exclusive of land and mineral rights. A second limit on the amount of bonds that can be guaranteed is imposed on the Fund by the Internal Revenue Service and described in a private letter ruling. The limit is based upon 250 percent of the value of the lower of the amortized cost or market value of the Fund adjusted for additions after May 15, 1989.

If a local school board defaults on its debt payments, then the PSF makes the payments.[35] The local school district has its state aid transferred to the Fund until the defaulted debt payments are repaid. Since the establishment of the bond insurance program in 1983 (with the first insured bonds being sold in February of 1984), no Texas school district has defaulted on its guaranteed debt.[36] (An unanswered question is: What would actually happen if the transfer of state aid to the Fund prevented a school district from educating its students? It is not clear that this issue has been completely thought

32. Office of the State Auditor, the State of Texas: 1.

33. *Vernon's Texas Codes Annotated Education Code Sections 41.001 to 64*, (St. Paul, MN: West Publishing, 1996).

34. Texas Education Agency, *Snapshot '94: 1993–94 School District Profiles* (Austin: Texas Education Agency, Office of Policy Planning and Information Management, 1995).

35. *Vernon's Texas Codes Annotated Education Code Sections 41.001 to 64.*

36. Office of the State Auditor, the State of Texas, "Certification of the Permanent School Fund's Bond Guarantee Program" (April 2002): 1–4.

through by lawmakers.) If only a few school districts defaulted, the PSF would obviously be able to continue to make the timely payment of interest and principal on the defaulted debt.

A period of time where there are massive defaults, however, is one that would make buyers of PSF-backed bonds very nervous. As stated earlier, several studies have found that the borrowing costs of privately and publicly insured municipal bonds are dependent upon the underlying credit rating of the bonds. Peng explains this behavior by arguing that investors are concerned with the ability of insurers to fulfill their obligations during a long recession or depression.[37] A long recession or depression could cause a large number of school districts to default on their debt payments. In this situation, under current law the PSF would use the defaulted school district's state aid to repay the defaulted debt. The transfer in state aid from the defaulted school district to the PSF may prevent the school district from educating its students. Under these circumstances, the PSF might delay the transfer of state aid from the defaulted school districts and ask the bondholders of those districts' bonds to have their interest and principal payments delayed. The market value of the assets in the PSF would be dramatically reduced because of the long recession or depression. More than 65 years ago Hillhouse warned about imposing undue penalties on debtors. Hillhouse states:

> Creditors must in the end accept a compromise if the capacity to pay is absent. History is full of grim reminders of this cold fact. It matters little that the courts issue high-sounding writs; they add nothing to the basic ability or inability to pay. Creditors lose by not being patient, sympathetic and willing to do everything fair under the circumstances. The desire to pay is as important as the ability to pay. When a default first occurs, the public body intends, and feels that it ought, to pay; but if, as time elapses, creditors become high-handed and unreasonable, a will not to pay grows. It is a sad day for creditors' interests when this feeling dominates the policies and actions of the defaulters.[38]

The "Robin Hood" System of Financing Public Education

Because of the various court decisions in the late 1980s, the Texas Legislature developed a new school financing system that it hoped would meet the "equal protection and efficient system" provisions of the Texas Constitution. Starting in the 1991–1992 fiscal year, wealthy school districts were required to use locally raised property taxes to accomplish this goal.[39] This system of funding public school education is frequently referred to in the press as the "Robin Hood" system. However, the Texas Legislature had to satisfy two other provisions in the Texas Constitution, the requirement that local voters approve property tax rates and the prohibition of a state property tax. Also, the State of Texas does not have a state income tax. In January, 1992, the Texas Supreme

37. Peng, 117.
38. Hillhouse, 361.
39. Walker and Casey, 16.

Court directed the State to come up with a another financing plan by June 1, 1993, that would provide equity to poorer school districts yet satisfy these two other requirements. The legislature enacted a modified "Robin Hood" plan into law (Senate Bill 7) in May of 1993. The Texas Supreme Court upheld that law in 1995.[40] During the 1991–1992 fiscal year, $280.8 million in local school district property taxes was recaptured from wealthy school districts. The recapture amount increased to $340.0 million during the 1992–1993 fiscal year and then to $398.8 million during the 1993–1994 fiscal year.[41]

During our sample period, the "Robin Hood" system for financing public education does not go into effect unless the school district's property tax wealth is above $280,000 per weighted students in ADA (WADA). WADA is different from ADA because it takes into consideration the characteristics of the education provided the students. Adjustments are made to take into consideration such factors as career and technology education, special education, bilingual education, and gifted and talented education. The primary annual publication on the status of school districts in Texas does not report property tax wealth per WADA.[42] The Office of the Comptroller (Property Tax Division) certifies the valuation of the property in a local school district. The Office of the Comptroller is responsible for verifying that properties are assessed on the same basis throughout Texas.

The two primary sources of revenue for Texas school districts are property taxes and state aid. In the 1993–1994 fiscal year, Texas school districts received 47 percent of their operating revenue from property taxes and 40 percent from state aid.[43] Federal funds accounted for 8 percent of Texas school districts operating revenues. Federal funds are not considered in the formulas for state aid and are not considered available for recapture. Since property taxes are the primary source of funds that are under the direct control of a school district, a bond rating for any school district is heavily dependent upon its property wealth. In this paper, we utilize a school district's bond rating as a proxy for its property wealth, since property tax wealth per WADA is not included in the primary annual publication on the status of school districts in Texas.

For wealthy school districts under "Robin Hood," their only source of state aid is from the Available School Fund that was $334 per ADA during the 1993–1994 fiscal year.[44] This contrasts with less wealthy school districts that receive aid not only from the Available School Fund, but also money redistributed through "Robin Hood" and additional funds appropriated from the state budget for less wealthy districts. Hence, property wealthy school districts are almost entirely dependent upon property taxes for revenue. Property values can dramatically decrease during long recessions and depressions.[45] A long recession or depression should also severely reduce the earnings from the

40. Walker and Casey, 23.
41. Walker and Casey, 38.
42. Texas Education Agency.
43. Walker and Casey, 59.
44. Texas Education Agency, 24.
45. Hillhouse, 239.

PSF so the funds transferred to the Available School Fund should be extremely low during this period. So, if as a result of a long recession or depression many property wealthy school districts defaulted on their debt payments, the PSF would have very little state aid to take away from these school districts to cover their unpaid debt. Furthermore, the state legislature may be more concerned with the financial plight of less wealthy school districts. Therefore, the PSF might not be satisfied with repayments from these property wealthy school districts over a number of years during this period and might limit its payments on the interest and principal payments to bondholders on the defaulted debt by property wealthy school districts to their state aid in this situation. Consequently the value of the guarantee from the PSF may be less for property wealthy school districts.

A wealthy school district has five choices to meet the "Robin Hood" equalization requirements under the current law. They are (1) consolidate with another district, (2) detach territory, (3) purchase attendance credits from the state, (4) contract for education of non-resident students, and (5) tax base consolidation with another district. The last three choices required voter approval. According to Walker and Casey, no wealthy school districts have chosen options (1), (2), or (5) throughout the time period of this study.[46]

MODEL AND DATA

The model and sample are carefully selected to avoid the problems of previous studies. As will be further discussed later, TIC is used as the dependent variable, only school district issues are analyzed (there is no pooling of other general obligation or revenue issues), underlying ratings are used for the insured issues, and interactive variables are used in models that combine insured and uninsured issues. The empirical model analyzed in this paper contains variables included in previous studies (see Benson,[47] Cook,[48] Hseuh and Kidwell, Benson and Marks). The variables reflect market conditions at the time of sale, the individual characteristics of the bonds, and default risk. The linear regression model can be stated as the following:

$$\mathrm{TIC} = \mathrm{f}(\overset{+}{\mathrm{Dbb40}}, \overset{-}{\mathrm{Lnsize}}, \overset{+}{\mathrm{Dur}}, \overset{-}{\mathrm{Lnbids}}, \overset{-}{\mathrm{Ref}}, \overset{+}{\mathrm{Call}}, \overset{-}{\mathrm{Cprem}}, \overset{-}{\mathrm{Bq}}, \overset{+}{\mathrm{A}}, \overset{+}{\mathrm{Baa1}}, \overset{+}{\mathrm{Baa}})$$

where the sign above the variable name in the equation is the anticipated sign of that variable's coefficient.[49] The variables in the model are:

46. Walker and Casey, 20–21.

47. Earl D. Benson, "The Search for Information by Underwriters and Its Impact on Municipal Interest Cost," *Journal of Finance* 34 (September 1979): 871–885; and Benson, "The Continuing Cost."

48. Timothy Q. Cook, "Determinants of Individual Tax-Exempt Bond Yields: A Survey of the Evidence," *Economic Review, Federal Reserve Bank of Richmond* 68 (May/June 1982): 14–39.

49. The two-stage least squares estimation model used by Hseuh and Kidwell (1988) was tested but provided no different results than the single stage TIC model. The variance inflation factor tests suggest that multicollinearity is not a problem in the models and sample set used in this study.

TIC	=	the true interest cost of the bond issue;
Dbb40	=	the general level of municipal interest rates on the day before the sale as measured by the Bond Buyer 40 Index;
Lnsize	=	the natural logarithm of the dollar size of the issue;
Dur	=	the duration of the bond issue;
Lnbids	=	the natural logarithm of the number of bids for the bond issue;
Ref	=	1 if the bond is a refunding bond and otherwise 0;
Call	=	1 if the bond is callable and otherwise 0;
Cprem	=	call premium for the callable bonds;
Bq	=	1 if the issue is bank-qualified and otherwise 0;
A	=	1 if the underlying credit rating is A by Moody's, otherwise 0;
Baa1	=	1 if the underlying credit rating is Baa1 by Moody's, otherwise 0;
Baa	=	1 if the underlying credit rating is Baa by Moody's, otherwise 0;

TIC is a measure of the interest cost of the issue. TIC was calculated for the winning bid for all issues in the sample using the procedure described in Benson.[50] Although many of the issues in the sample were competitively sold using NIC (net interest cost), NIC is an inferior measure to TIC. TIC takes into consideration the time value of money, while NIC does not. Duration is used in this study as a measure of the average life of the bond issue, and is calculated from the data provided in *The Bond Buyer*. Duration is a better measure than average maturity because it is based on the timing of the interest and principal payments of the bond issue. The other variables are defined as in most municipal bond studies.

All the variables except for the underlying credit ratings are either directly taken from *The Bond Buyer* or calculated from *Bond Buyer* data. The sample is drawn from original issue, general obligation bonds that were competitively sold from September, 1992, to July, 1996. All Texas school district bonds issued after September 1, 1992, were subject to a tax limitation rate of 50 cents per $100 assessed valuation for repayment of debt. This tax limitation impacts the ability of a school district to raise property taxes to repay its debt. This issue is important for school districts with low property value wealth. No statewide limitation existed prior to September 1, 1992. For this reason, this sample includes only those Texas and non-Texas school district bonds issued after this date. The three separate samples include: 310 privately insured bonds issued from outside of Texas, 295 uninsured bonds from outside Texas, and 156 bond issues from Texas. The non-Texas, insured bonds used in this study were insured by four different insurers, FGIC, MBIA, FSA, and AMBAC.

The default risk measure for insured school district bond issues (both Texas and non-Texas) is their underlying credit rating, while the default risk measure for uninsured issues is the assigned issue rating. Since all bond issues in this study are general obligation bonds, these default measures are equivalent. Texas school district bonds and privately

50. Benson, "The Continuing Cost."

insured, non-Texas bonds were included in the sample only if the issuer's underlying credit rating was reported in *Moody's Bond Record*. As was done by Hseuh and Kidwell, the underlying credit rating for an insured issue is the credit rating on the issuer's outstanding debt. The underlying credit rating for each bond issue was gathered from *Moody's Bond Record* at the time of its sale.

The underlying credit ratings for the Texas school district bonds were Aa, A1, A, Baa1, or Baa. In order to analyze a comparable sample of non-Texas bonds, the sample of non-Texas bonds was limited to bonds rated Aa, A1, A, Baa1, or Baa. A preliminary analysis of all the Texas and non-Texas bonds (both insured and uninsured) showed that the interest costs (TICs) of the A1-rated bonds were insignificantly different from the costs of the Aa-rated bonds. Because of this and because at least one of the sample groups contained only two Aa-rated bonds, the Aa- and A1-rated bonds are combined into a single group. Therefore, the omitted bond rating category contains both Aa- and A1-rated bond issues.

Tables 1–3 contain descriptive statistics for the three categories of bond issues described above. The Texas school district bonds (Table 3) have a higher average interest cost, 5.681 percent, than do the privately insured (Table 1) and uninsured (Table 2) non-Texas bond issues, 5.322 and 5.019 percent, respectively. As Table 3 indicates, the Texas sample bond issues are larger in average issue size, have a longer average duration, received more bids on average, are more likely to be callable, and are less likely to be bank-qualified than non-Texas bond issues. For the Texas sample, 27.57 percent of the bonds are rated Aa or A1, compared with 20.64 and 41.69 percent for the privately insured and uninsured non-Texas bonds, respectively. The most dramatic difference is that 47.43 percent of the Texas sample is rated Baa1 and Baa, compared with 27.10 percent for the privately insured, non-Texas sample and only 15.25 percent for the uninsured, non-Texas sample. For the non-Texas bond issues this shows the self-selection process at work, where the lower-rated bond's issuers opt more for private insurance, while the higher-rated issuers are less likely to buy insurance.

Five different regression equations are reported in this paper. The previously described regression equation is first estimated for each of our three samples: privately insured non-Texas school district bonds, uninsured non-Texas school district bonds, and Texas school district bonds (PSF-backed). Two modified regression equations, described below, are estimated for a combined sample of Texas bonds with each of the non-Texas bond samples. These results will be utilized to examine the following two hypotheses:

H1: The bond market is not using the underlying credit rating of "insured" school districts in pricing the insured school district bonds.

H2: The difference in default risk premiums between Texas school district bonds and non-Texas school district bonds is zero.

The first hypothesis is examined by using a "two-tailed test" to test if each of the coefficients for the underlying credit rating variables is not zero in the regression equation for both privately insured, non-Texas school districts and Texas school district

TABLE 1
Descriptive Statistics—310 Privately Insured School District Bonds from Outside of Texas

Continuous variables	Mean	Standard deviation	Minimum	Maximum
Panel A. Continuous variables				
TIC	5.322	0.464	4.113	6.697
Dbb40	6.114	0.375	5.350	7.370
Size (in millions)[a]	8.767	8.618	1.000	55.000
Lnsize	15.675	0.750	13.816	17.823
Dur	7.350	1.693	2.807	11.653
Number of bids[a]	4.210	1.878	1.000	12.000
Lnbids	1.347	0.425	0.000	2.485
Cprem	0.763	0.922	0.000	2.000

Binary variables	Number of nonzero observations	Percent of total sample
Panel B. Binary variables		
Ref	13	4.19
Call	222	71.61
Bq	203	65.48
Aa	2	0.64
A1	62	20.00
A	162	52.26
Baa1	58	18.71
Baa	26	8.39

TIC is the true interest cost of the bond issue. Dbb40 is the general level of municipal interest rates on the day before the sale as measured by the Bond Buyer 40 Index. Lnsize is the natural logarithm of the dollar size of the issue. Dur is the duration of the bond issue. Lnbids is the natural logarithm of the number of bids for the bond issue. Ref is 1 if the bond is a refunding bond and otherwise 0. Call is 1 if the bond is callable and otherwise 0. Cprem is the call premium for the callable bonds. Bq is 1 if the issue is bank-qualified and otherwise 0. Aa is 1 if the underlying credit rating for the school district is Aa by Moody's and otherwise 0. A1 is 1 if the underlying credit rating for the school district is A1 by Moody's and otherwise 0. A is 1 if the underlying credit rating for the school district is A by Moody's and otherwise 0. Baa1 is 1 if the underlying credit rating for the school district is Baa1 by Moody's and otherwise 0. Baa is 1 if the underlying credit rating for the school district is Baa by Moody's and otherwise 0.
[a]This variable is not used in the regression model, but is provided for information only.

bonds. If any of the coefficients for the underlying credit ratings are statistically different than zero, then the first hypothesis—that the capital markets are not considering the underlying credit risk of the insured school district in pricing the bonds—is rejected.

The second hypothesis is investigated by comparing the default risk premiums for the Texas school district bonds with the default risk premiums for non-Texas bonds. The default risk premiums are the coefficients of the credit rating variables in each of the regression equations. A regression model that contains Texas school district bonds and

TABLE 2
Descriptive Statistics—295 Uninsured School District Bonds from Outside of Texas

Continuous variables	Mean	Standard deviation	Minimum	Maximum
Panel A. Continuous variables				
TIC	5.019	0.649	3.361	6.896
Dbb40	6.094	0.400	5.350	7.370
Size (in millions)[a]	5.502	5.325	1.000	32.300
Lnsize	15.191	0.786	13.816	17.291
Dur	6.380	2.050	2.157	11.613
Number of bids[a]	5.275	2.932	1.000	22.000
Lnbids	1.526	0.523	0.000	3.091
Cprem	0.283	0.654	0.000	2.000

Binary variables	Number of nonzero observations	Percent of total sample
Panel B. Binary variables		
Ref	22	7.46
Call	180	61.02
Bq	244	82.71
Aa	65	22.03
A1	58	19.66
A	127	43.05
Baa1	18	6.10
Baa	27	9.15

The variables are defined in Table 1.
[a]This variable is not used in the regression model but is provided for information only.

non-Texas school district bonds is utilized to formally test the second hypothesis and compute the difference in borrowing costs and risk premiums between the "insured" Texas bonds and the non-Texas samples. The new regression model includes all the variables from the preceding regression model plus the following variables:

T	=	1 if the bond is from a Texas school district and otherwise 0;
Ta	=	1 if the bond is from a Texas school district and its underlying credit rating is A and otherwise 0;
Tbaa1	=	1 if the bond is from a Texas school district and its underlying credit rating is Baa1 and otherwise 0; and
Tbaa	=	1 if the bond is from a Texas school district and its underlying credit rating is Baa and otherwise 0.

The variable T allows Texas school district bonds to have a fixed difference in TIC across all bond ratings. By adding the interaction variables Ta, Tbaa1, and Tbaa to the re-

TABLE 3
Descriptive Statistics—156 Texas School District Bonds

Continuous variables	Mean	Standard deviation	Minimum	Maximum
Panel A. Continuous variables				
TIC	5.681	0.521	4.339	6.999
Dbb40	6.244	0.453	5.360	7.370
Size (in millions)[a]	11.907	11.529	1.000	64.400
Lnsize	15.858	0.969	13.816	17.981
Dur	8.856	1.660	3.136	12.711
Number of bids[a]	7.013	2.372	3.000	14.000
Lnbids	1.891	0.344	1.099	2.639
Cprem	0.013	0.160	0.000	2.000

Binary variables	Number of nonzero observations	Percent of total sample
Panel B. Binary variables		
Ref	2	1.28
Call	148	94.87
Bq	86	55.13
Aa	16	10.26
A1	27	17.31
A	39	25.00
Baa1	41	26.28
Baa	33	21.15

The variables are defined in Table 1.
[a]This variable is not used in the regression model but is provided for information only.

gression equation, we can measure the difference in risk premium between Texas school district bonds and non-Texas school district bonds. For example, the difference in average risk premium between an A-rated Texas school district bond and an A-rated non-Texas school district bond would be the coefficient of variable T plus the coefficient of variable Ta. If any of the coefficients of T, Ta, Tbaa1, or Tbaa are statistically significant, then the second hypothesis can be rejected because the default risk premiums for Texas school district bonds are different than the default risk premiums for non-Texas school district bonds.

The Variance Inflation Factor (VIF), a measure of multicollinearity, is calculated for each variable in all of the estimated equations used in this paper, but are not reported because of space considerations. According to Gunst and Mason,[51] multicollinearity is not a problem when the VIFs are below 10.0. The largest VIFs ranged from about 2.0 to

51. Richard F. Gunst and R. L. Mason, *Regression Analysis and Its Application: A Data Oriented Approach* (New York: Marcel Dekker, 1980).

3.2 in the individual sample estimates to slightly over 5.0 for the pooled samples. To check for the possible effect of heteroscedasticity on the statistical tests, White's test statistic is computed to verify the statistical significance of each coefficient in the regression equations, and all are verified.[52] Finally, the Shapiro–Wilk statistic does not reject the null hypothesis at the 0.10 level that the residuals are normally distributed in the regression equations.

EMPIRICAL FINDINGS

Individual Sample Estimates

The ordinary least-squares regression equations for the two samples of non-Texas school district bonds and the sample of Texas school district bonds appear in Table 4. To examine the first hypothesis, we first focus on the privately insured, non-Texas sample regression in Equation 1 of Table 4. The coefficients for the variables are as expected except for the issue size variable which has a positive, but insignificant coefficient. The coefficients for the ratings variables—A, Baa1, and Baa—are all positive and significant, being 0.053, 0.046, and 0.114, respectively. (These results are similar to those found by Benson and Marks (2004), using a slightly larger sample over a similar time period.) Using Baa-rated issues as the example, Baa-rated bond issues in Equation 1 have a borrowing cost that is 11.4 bp higher than Aa/A1 bond issues. This suggests that the financial markets do not ignore the underlying default risk of insured, non-Texas bond issues, with lower-rated issues having higher-risk premiums; and the findings are consistent with the findings of Hseuh and Kidwell, Hseuh and Chandy, Peng, and Benson and Marks. Therefore, we may reject the first hypothesis that the bond market is not using the characteristics of the individual bond issuer in pricing privately insured, non-Texas bonds.

It is also instructive to examine the default risk premiums charged on uninsured non-Texas school district bonds (Equation 2 of Table 4). The variables that are statistically significant have the anticipated sign. Refunding issues sell at 17.6 bp lower interest cost than nonrefunding, callable bonds are 11.1 bp higher than noncallable, and bank-qualified issues sell at 17.2 bp lower interest cost. The credit rating coefficients of A, Baa1, and Baa are 0.017, 0.207, and 0.421, the latter two being statistically significant. The coefficient for Baa of 0.421 indicates that a Baa-rated bond has a 42.1 bp higher borrowing cost than an Aa/A1-rated bond. The size of the ratings variable coefficients in the regression for uninsured school districts is increasing as default risk is increasing. The pattern and size of the coefficients is as expected and is similar to the findings in the two

52. Halbert A. White, "A Heteroskedasticity-Consistent Covariance Matrix Estimator and a Direct Test for Heteroskedasticity," *Econometrica* 48 (May 1980): 817–838.

TABLE 4
Results from Regression with True Interest Cost as the Dependent Variable for Texas School District Bonds and non-Texas School District Bonds

	Equation 1		Equation 2		Equation 3	
	Privately Insured, Non-Texas Bonds		Uninsured, Non-Texas Bonds		Texas Bonds	
Variable	Coefficient	*t*-statistic	Coefficient	*t*-statistic	Coefficient	*t*-statistic
Intercept	– 2.175	– 8.87[a]	– 2.478	– 6.52[a]	– 1.233	– 4.68[a]
Dbb40	1.028	54.79[a]	1.163	36.00[a]	1.032	53.90[a]
Lnsize	0.020	1.50	– 0.034	– 1.74[c]	– 0.031	– 2.00[b]
Dur	0.126	23.72[a]	0.166	20.23[a]	0.151	18.81[a]
Lnbids	– 0.094	– 5.18[a]	– 0.066	– 2.29[b]	– 0.114	– 3.89[a]
Ref	0.009	0.25	– 0.176	– 3.59[a]	0.022	0.28
Call	0.219	9.51[a]	0.111	3.13[a]	– 0.052	– 0.91
Cprem	– 0.046	– 4.72[a]	0.009	0.42	– 0.117	– 2.11[b]
Bq	– 0.103	– 5.39[a]	– 0.172	– 4.43[a]	– 0.094	– 3.24[a]
A	0.053	2.86[a]	0.017	0.56	– 0.081	– 3.30[a]
Baa1	0.046	1.97[b]	0.207	3.62[a]	– 0.062	– 2.35[b]
Baa	0.114	3.81[a]	0.421	8.57[a]	– 0.067	– 2.21[b]
Number of observations	310		295		156	
R^2	0.934		0.896		0.962	

The variables are defined in Table 1. The *t*-statistic with one degree of freedom tests that the coefficient is equal to zero.
[a]Significant at the 0.01 level.
[b]Significant at the 0.05 level.
[c]Significant at the 0.10 level.

studies by Benson as well as the study by Hseuh and Kidwell. Further, a comparison of the risk premiums in Equation 1 with those in Equation 2 illustrates the nature of risk premiums for privately insured versus uninsured bond issues. While bond insurance does not eliminate the risk premiums, it does reduce them dramatically, particularly for Baa1- and Baa-rated issues (in this case for Baa-rated issues from 42.1 to 11.4 bp).

We will now turn our attention to the Texas school district bonds (which are insured by the PSF of Texas). To examine the first hypothesis, the focus will be on the Texas sample regression in Equation 3 of Table 4. Except for the variables associated with Moody's credit ratings (A, Baa1, and Baa), the variables that are statistically significant have the anticipated sign. For the nonratings variables the coefficients are similar to those for the insured, non-Texas issues in Equation 1. (One difference is that for the Texas bonds it is Cprem that is significant, not Call; whereas, in Equation 1 this is reversed. However, 95 percent of the Texas bonds are callable, compared with only 72 percent of the insured, non-Texas bonds, so this may explain the dominance of the Cprem variable.)

The coefficients of A, Baa1, and Baa in the Texas school district regression equation are -0.081, -0.062, and -0.067, and are statistically significant. The coefficient of -0.081 indicates that the TIC is 8.1 bp *lower* for a Texas school district bond with an underlying credit rating of A compared with a Texas school district bond with an underlying credit rating of either Aa or A1. Using White's procedure, the coefficient of A is still statistically significant at the 0.01 level and the coefficients of Baa1 and Baa are statistically significant at the 0.01 and 0.05 level, respectively. The fact that the coefficients of A, Baa1, and Baa are *negative* is contrary to expectations that lower-rated bonds will sell at higher interest costs (or have higher risk premiums). The first hypothesis that the bond market is not using the characteristics of the individual bond issuer in pricing insured bonds is rejected, because the coefficients are statistically significant. However, the results are anomalous and merit further analysis.

The negative coefficients for the A-, Baa1-, and Baa-rated bonds in the Texas school district regression were not anticipated. This is not consistent with the findings of Hseuh and Kidwell who found that issues with lower underlying ratings had higher interest costs. In contrast, Equations 1 and 2 of Table 4 present a pattern of risk premiums for non-Texas bond issues that are positive and increasing with higher default risk. The higher borrowing costs for the Texas school districts rated Aa and A1 may be the result of the "Robin Hood" system of property taxation. "Robin Hood" takes property tax revenue from property wealthy school districts, which normally would have the higher underlying credit ratings, and redistributes the revenue to poorer districts. Furthermore, the only state aid that property wealthy school districts receive under "Robin Hood" is from the Available School Fund, while less wealthy school districts have several sources of state aid. As discussed previously, this fact may impact on the timely payment of interest and principal by the PSF on defaulted school district bonds during a long recession or depression.

Pooled Sample Estimates

The different pattern for the coefficients of A, Baa1, and Baa in the three regression equations of Table 4 suggests that the default risk premiums are different in the Texas sample compared with the non-Texas samples. This observation is formally tested using an ordinary least-squares regression equation for two pooled samples, where the Texas school district bonds are combined with each of the two non-Texas samples. The results appear in Table 5. Focusing on Equation 1, where the Texas issues are pooled with privately insured, non-Texas issues, the coefficient of T is statistically significant at the 0.05 level with a positive sign. The coefficients of the interaction variables—Ta, Tbaa1, and Tbaa—are statistically significant with negative signs, indicating that the difference in default risk premiums for the Texas school district bonds compared with insured, non-Texas school districts is not a fixed amount but varies according to rating. Therefore, the

TABLE 5
Results from Regression with True Interest Cost as the Dependent Variable for the Pooled Samples of Texas School District Bonds and non-Texas School District Bonds

	Equation 1		Equation 2	
	Pooled Texas and Privately Insured, Non-Texas		Pooled Texas and Uninsured, Non-Texas	
Variable	Coefficient	*t*-statistic	Coefficient	*t*-statistic
Intercept	– 1.682	– 9.13[a]	– 1.875	– 7.06[a]
Dbb40	1.022	72.81[a]	1.107	50.75[a]
Lnsize	– 0.010	– 0.97	– 0.048	– 3.33[a]
Dur	0.130	29.60[a]	0.158	25.04[a]
Lnbids	– 0.088	– 5.70[a]	– 0.074	– 3.23[a]
Ref	0.029	0.89	– 0.156	– 3.84[a]
Call	0.191	9.10[a]	0.113	3.87[a]
Cprem	– 0.041	– 4.49[a]	0.007	0.41
Bq	– 0.117	– 7.31[a]	– 0.159	– 5.77[a]
A	0.049	2.73[a]	– 0.008	– 0.30
Baa1	0.033	1.46	0.182	3.65[a]
Baa	0.102	3.51[a]	0.403	9.48[a]
T	0.062	2.31[b]	0.171	4.46[a]
Ta	– 0.115	– 3.55[a]	– 0.082	– 1.70[c]
Tbaa1	– 0.060	– 1.70[c]	– 0.245	– 3.83[a]
Tbaa	– 0.126	– 3.05[a]	– 0.469	– 7.51[a]
Number of observations	466		451	
R^2	0.947		0.927	

T is 1 if the bond is from a Texas school district and otherwise 0. Ta is 1 if the bond is from a Texas school district and its underlying credit rating is A and otherwise 0. Tbaa1 is 1 if the bond from a Texas School district and its underlying credit rating is Baa1 and otherwise 0. Tbaa is 1 if the bond is from a Texas school district and its underlying credit rating is Baa and otherwise 0. The other variables are defined in Table 1. The *t*-statistic with one degree of freedom tests that the coefficient is equal to zero.
[a]Significant at the 0.01 level.
[b]Significant at the 0.05 level.
[c]Significant at the 0.10 level.

second hypothesis, that the default risk premiums for Texas school district bonds are equivalent to those for insured, non-Texas school district bonds is rejected.

The difference in borrowing costs between PSF-insured, Texas school districts and insured, non-Texas school districts having Aa and A1 ratings is equal to the coefficient of T in Equation 1 of Table 5, which is 0.062 or 6.2 bp. The difference in school district borrowing costs between A-rated Texas issues and A-rated, insured, non-Texas issues is equal to the coefficient of T plus the coefficient of Ta, which is 0.062 plus – 0.115, or

– 0.053. The difference in borrowing costs between Baa1-rated Texas school districts and Baa1-rated, insured, non-Texas school districts is 0.002, while the difference between Baa-rated Texas school districts and Baa-rated, insured, non-Texas school districts is – 0.064. The results indicate that Texas school district bonds rated Aa and A1 pay *higher* borrowing costs compared with insured, non-Texas school districts with the same credit rating, while A- and Baa-rated Texas school districts pay *lower* borrowing costs compared with similar districts from outside of Texas. These findings may be the result of the "Robin Hood" system of property taxation and school financing.

Because all the bonds in the pooled sample of Equation 1 are insured, the difference in the default risk premiums is likely not due to differences in insurance—although there is some difference in Texas PSF insurance versus private insurance such as AMBAC. It is likely that much of this difference may be attributed to the "Robin Hood" system of financing school districts, for that system actually takes dollars from the wealthy school districts that would have higher credit ratings and gives to the poorer districts and limits the amount of state aid the property wealthy school districts can receive. Equation 2 of Table 5 provides an additional pooled estimate of the Texas sample combined with the uninsured, non-Texas issues. This estimate shows more dramatically the difference between Texas and non-Texas issues; however, the interactive variables—Ta, Tbaa1, and Tbaa—capture the impact of insurance and the impact of the Texas anomaly. In contrast, the interactive variables in Equation 1 capture the effect of the Texas anomaly alone.

CONCLUSION

This study and previous studies suggest that bond investors look beyond the bond insurance "guarantee" to the underlying credit rating of the issuing entity. An examination of school district bond issues indicates that insured issues from outside of Texas have higher risk premiums for lower-rated issues. However, anomalous results appear when we look only at insured *Texas* school districts. The problem is not that underlying credit ratings have no impact on the Texas bond interest costs, but that *lower-rated Texas "insured" issues have lower interest costs than higher rated issues*. Further, a pooled-sample comparison suggests that higher-rated Texas bonds have higher borrowing costs than similarly rated non-Texas issues, while lower-rated Texas bonds had lower borrowing costs than bond issues with the same rating from outside of Texas. These Texas school district bonds are guaranteed by the PSF of Texas, compared with the private insurance used in most other states. However, the differences between the PSF insurance and private insurance cannot explain the dramatic differences found in this study.

In addition, evidence from the previous study by Hseuh and Kidwell shows that the *expected* pattern of risk premiums for PSF-insured debt *existed* in the 1980s—a period prior to the existing Texas "Robin Hood" statutes. Therefore, the anomalous behavior of the default risk premiums for Texas school district PSF-insured debt in the 1992–1996 period may be because of the enactment of the ''Robin Hood'' system of financing public education by the Texas legislature. In the ''Robin Hood'' system, property-wealthy school districts are required to provide local property tax revenue to equalize the wealth of school districts throughout the state. Property wealthy school districts' state aid is limited to the small amount of funds received from the Available School Fund. In the case of a default by a PSF guaranteed bond, the PSF takes a defaulted school district's state aid to cover its payments to the bondholders of the defaulted debt. Because of the limited amount of state aid received by property wealth school districts, the PSF may not take in enough state aid to cover its payments to bondholders and, therefore, may limit the payments to bondholders of property wealthy school districts to the amount of state aid received by those districts especially during a long recession or depression. So, the guarantee by the PSF may not be as strong for higher rated bonds.

Local and state-level politicians are constantly criticizing the ''Robin Hood'' system of financing public education. Both candidates for the governor of Texas in the 2002 election promised to modify the system. Of course, they did not describe how they would change it and, at the same time, continue to satisfy the ''equal protection and efficient system'' provisions in the Texas Constitution. In 2004, the governor called a special session of the Texas Legislature to address just this issue. However, the Texas Legislature was unable to reach a consensus on how to modify ''Robin Hood.'' After the completion of the special session, a state district judge ruled that the law was unconstitutional and gave the State of Texas until October 2005 to remedy the situation or the judge would halt state funding of school districts. The Texas Legislature is scheduled to address ''Robin Hood'' again during its next regular session starting in 2005. The State of Texas has already filed an appeal to the Texas Supreme Court to overrule the state district judge's decision. Hopefully, any new system will not produce unintended results where higher-rated Texas school districts may have higher borrowing costs than lower-rated Texas school districts.

NOTE

We would like to thank the anonymous referees for providing valuable suggestions and comments. We would, also, like to thank the Western Washington University Foundation for financial support in acquiring research data and materials.