BOND UNDERWRITER COSTS:

TEXAS SCHOOL DISTRICTS AND THE HIDDEN COST OF ISSUING BONDS

A Dissertation

by

MARY KNETSAR STASNY

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

December 2010

Major Subject: Educational Administration

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Approved by:	
Chair of Committee	John Hoyle
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ABSTRACT

Bond Underwriter Costs:

Texas School Districts and the Hidden Cost of

Issuing Bonds. (December 2010)

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Chair of Advisory Committee: Dr. John Hoyle

The purpose of this study was to investigate possible relationships between school district characteristics and bond underwriter costs for Texas independent school districts. Bond data for all school districts issuing bonds in the five-year period 2004 – 2008 was collected from the Texas Bond Review Board. School district information, including financial, socio- economic/ demographic, debt, and managerial information, was collected from those same districts.

The data was analyzed using both descriptive and inferential statistical methods. Descriptive statistics were developed on both bond issue and bond issuer data. Relationships between issue costs and school district characteristics were then examined using multiple regression and factor analysis. Results indicate that, in general, larger districts have an advantage over smaller districts, with underwriter costs generally lower in larger districts. Results also offer modest support for the hypothesis that underwriter

fees are related to financial, socio-economic/demographic, debt, and managerial characteristics of school districts.

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CHAPTER I

INTRODUCTION

Concern over both the condition and funding of school facilities has increased in recent years (Plummer, 2005; Duncombe & Wang, 2009). Nationwide, school infrastructure needs, including new construction, renovation, and major improvements, additions, and deferred maintenance, were recently estimated to total more than $250 billion (Crampton, Thompson, & Vesely, 2004). The American Society of Civil Engineers cautions that assessing need is difficult since no comprehensive, national data on school facility conditions has been collected in ten years (American Society of Civil Engineers, 2005). However, they report that spending on facilities has declined since 2004 and the decline is expected to continue. Additionally, the increased spending on school facilities that did occur earlier this decade was disproportionately centered in the nation's wealthiest school districts. The poorest districts had the lowest investments in school buildings, averaging $4,800 per student, while the wealthiest districts spent, on average, $9,361 per student (American Society of Civil Engineers, 2005).

Funding education is primarily a responsibility of the states; education funding from the federal government plays only a small role (Crampton F. , 2001). In Texas, concerns over facility-related issues have been strongly felt in Texas school districts as

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This dissertation follows the style and format of the *Journal of Educational Research*.

well. Rapid population growth in many districts has created a demand for additional facilities (Clark, 2001) and even districts with little or no growth have faced costs related to maintenance and renovation of existing facilities. Facility-related decisions in Texas districts are generally made at the local level, where needs may best be assessed (Dawn, 1999). More problematic, however, is that paying for school infrastructure is also primarily a local responsibility (Anderson, 1998; Sielke, 2002). Financing new school construction and renovation often requires borrowing the necessary funds. In the ten-year period from 1992-2002 in Texas, school district debt incurred for infrastructure needs increased to nearly $29 billion, an 800% increase (Jepson, 2003). In the five year period from fiscal years 2004 to 2008, Texas school enrollments increased 6.4%; in that same period total debt principal outstanding increased nearly 65% (Jepson, 2003). Of the 1,026 districts with taxing authority, 78% had voter-approved debt outstanding as of August 31, 2008 (Texas Bond Review Board, 2008).

School districts needing to borrow in order to finance facilities commonly do so by issuing bonds. A bond is simply a long-term contract to borrow money (Brigham & Houston, 2000). The borrower agrees to make regular interest payments over the term of the bond issue, and to repay the principal, or amount borrowed, at the end of the bond's term. Bonds issued by school districts are classified as municipal bonds, and most school districts bonds are general obligation bonds, which means they will be repaid by taxes levied by the issuing district (Zipf, 1997).

In any district bond issue, the goal of the district officials is to minimize borrowing costs (California Debt and Investment Advisory Commission, 1993). The

major cost of borrowing is interest, and interest rates are directly related to the perceived risk, or likelihood of default, of the bond issue (Brigham & Houston, 2000). Investors demand a higher interest rate on investments that are considered more risky. To help potential investors determine the riskiness of a planned bond issue, most school districts have the bond rated by an independent rating agency such as Standard & Poor's or Moody's (Hitchcock, 1992). While the exact methods used to determine a bond rating are private information, an established literature on bond ratings has determined that the same general factors are analyzed by all of the ratings agencies (Willson, 1986). These factors include financial, socio-economic/demographic, debt, and managerial characteristics of the issuing district (Denson, Yang, & Zhao, 2007).

A bond issue's rating has a material impact on the interest cost for a school district (Willson, 1986). However, interest is not the only cost associated with a bond issue; numerous costs are incurred at the time of the issue. These costs include attorney's fees, fees paid to the ratings agency, insurance fees, financial advisor fees, and underwriter fees. Since most school districts lack the expert staff required to handle the complex financial calculations associated with bond issues (Simonsen, Robbins, & Helgersen, 2001), they generally employ the services of bond underwriters. The underwriter acts as an intermediary between the district and the investors; the underwriter purchases the bonds from the district and then re-sells the debt to investors. The difference between the underwriter's cost of buying the bonds from the school district and then re-selling to investors is known as the underwriter spread. The spread

compensates the underwriter for costs incurred in selling the bonds, and also provides the underwriter's profit (California Debt and Investment Advisory Commission, 1993).

Statement of the Problem

While school districts and their bond underwriters share the goal of selling bonds to investors, their underlying objectives are very different. District officials are concerned with obtaining favorable borrowing costs (Cooper & Perselin, 2006). The bond underwriter's ultimate objective, however, is profit.

Information collected from school districts and reported by the Texas Bond Review Board shows that underwriter costs to issue bonds vary dramatically across Texas school districts, both in total and as a percentage of the total amount borrowed. As an example, in 2008 Alto ISD issued $6.3 million in bonds and Glen Rose ISD borrowed $6.2 million. The underwriter for Glen Rose earned $38,936 in fees; the underwriter on the Alto deal earned $193,712, nearly five times that amount. On a per bond basis, Glen Rose paid .628%, while Alto paid more than 3%. An examination of bond issues across the state demonstrates similar variations in underwriter fees for similar bond issue amounts, and no reason for these differences is readily apparent.

In fact, district officials rarely know about or even question the spread; it goes almost unnoticed by both district personnel and the public. This is largely due to the bond issue process. Districts don't write a check <u>to</u> the underwriter for his services, instead they receive funds <u>from</u> the underwriter. The underwriter actually sells the bonds, gives the district the par value, then keeps the difference, which is the underwriter

spread. In the five-year period considered by this study, Texas school districts issued almost $43 billion in bonds; the underwriter spread on those bonds totaled more than $343 million. And the spread from district to district varied widely.

This study represents an initial attempt to describe and understand the bond underwriter spread in Texas school districts. When credit ratings agencies rate a bond issue, they base their opinion of the likelihood of repayment on four general characteristics of the bond issuer: financial, socioeconomic/demographic, debt, and managerial or administrative characteristics. Might these same characteristics be related to the underwriter's costs?

Purpose of the Study

The purpose of this study is to investigate relationships between school district characteristics and bond underwriting costs. District characteristics investigated will be organized into financial, socioeconomic, debt, and managerial categories. These characteristics will be studied because they are the same factors used by ratings agencies to determine a bond's rating (Denson, Yang, & Zhao, 2007). The rating is a measure of the relative riskiness of the bond issue, and plays an important part in determining the interest cost of the bond. These same characteristics may be used by underwriters in determining their fee structures for individual school districts.

Research Questions

This study will be guided by the general research question "What relationships exist between school district characteristics and bond issue underwriting costs? More specifically, the research questions are:

1. Are a school district's financial characteristics related to bond underwriting costs?
2. Are a school district's socioeconomic characteristics related to bond underwriting costs?
3. Are a school district's debt characteristics related to bond underwriting costs?
4. Are a school district's managerial characteristics related to bond underwriting costs?

Operational Definition

Underwriting costs – the difference between the price at which an underwriter buys bonds from the bond issuer (school district) and the price at which the bonds are re-sold to investors

Assumptions

The following assumptions apply to this study.

1. Texas school districts have accurately reported district information to the Texas Education Agency.

2. Texas school districts have accurately reported district information concerning bond issues to the Texas Bond Review Board.

3. The Texas Education Agency has accurately reported school district information.

4. The Texas Bond Review Board has accurately reported district bond issue costs and district financial information.

Limitations

The following limitations apply to this study.

1. The study is limited to the five-year period 2003 – 2008, during which specific rules and structures were in place.

2. The results of the study may not be generalized to other states, since bond issue practices and regulations may differ from those of Texas school districts.

Methodology

The findings of this study are to be developed by the following research methods.

Population

The population of this study consists of all Texas school districts issuing bonds during fiscal years 2004 – 2008.

Data

The data used in the study are public information available from two sources, the Texas Education Agency's PEIMS and AEIS data systems and the Texas Bond Review Board. School district information collected will include district accountability ratings, demographic information, and economic information. Bond issue costs, as well as additional financial data, will be obtained from the Texas Bond Review Board.

Procedures

Information on the costs of bond issues in Texas school districts for the years 2003 – 2008 will be obtained from the Texas Bond Review Board. For each year's bond issues, issue cost information will be matched with district characteristics from the prior year, since that would have been the most recent information available at the time of the bond issue. This data will then be analyzed to determine what, if any, relationships exist.

Data Analysis

Analysis will be performed on the data using the Statistical Package for the Social Sciences (SPSS), a statistical software program. First, descriptive statistics will provide a general overview of the data by providing items such as means, medians, modes, ranges, and percentiles for individual factors. Regression procedures will then be used to investigate relationships between bond issue costs and various district characteristics. Based on the results of the regression studies, additional statistical tests may be

performed. Analysis and interpretation of the data will follow the principles described in Educational Research: An Introduction by Gall, Borg, and Gall (1996).

Significance of the Study

An established literature examines municipal bonds issued by cities and counties, but there is limited research focusing on school district bond issues (Gist, 1992; Harris & Munley, 2002). This study will contribute to the existing literature on school district bond issues by examining relationships between school district characteristics and bond issue underwriting costs. The results of the study may also prove helpful to school district officials. Understanding the factors that influence bond ratings and underwriting costs could help district management as they make decisions regarding bonds issues. Finally, school finance policy in Texas has been largely driven in the last thirty years by litigation, as the courts have ruled that state lawmakers find more equitable ways of funding the state's schools (Imazeki & Rechovsky, 2003). The results of this study may contribute to the debate on the topics of adequacy and equity in Texas school finance.

Contents of the Record of Study

The record of study will be divided into five chapters. Chapter I will consist of an introduction and statement of the problem. Chapter II will contain a review of the relevant literature. Chapter III will describe the methodology and procedures of the

research and Chapter IV will provide an analysis and discussion of the results of the research. Chapter V will provide the researcher's conclusions and recommendations.

CHAPTER II

REVIEW OF LITERATURE

This study investigates relationships between bond underwriting costs and school district characteristics. The Texas education code allows districts to issue bonds when funds are needed for facilities construction, new equipment, and buses. The study of bond issues, then, is a critical component of the larger topics of school facilities and school finance. The purpose of this chapter is to review the current literature relevant to these topics. In order to understand bond underwriting costs, this chapter begins with a review of the literature concerning facilities and their importance in an educational program. It then offers an overview of the history of Texas school finance and a discussion of the state's current educational funding system. It concludes with a review of the literature pertaining to municipal bonds and issue costs.

School Facilities

School facilities are an important and costly part of an educational system. The average life span of a school building is estimated to be 50 years; once built, a school building can influence generations of students (Stevenson, 2006; Odden & Picus, 2008). This section of the chapter provides a review of the literature concerning school facilities and addresses two major areas. It first reviews the research concerning the affect of the

physical environment on student outcomes. It then discusses the research concerning current building conditions and the costs required to bring facilities into good condition.

Facilities and Their Impact on Student Achievement and Behavior

It seems obvious that the quality of a school building will have some impact on both students and teachers. However, Odden and Picus (2008) report that despite numerous studies trying to quantify the relationship between student performance and building quality, there are no conclusive findings. Although the research suggests a positive relationship between student achievement and good quality facilities (Earthman, 1998), problems with measurement and data availability seriously limit the ability of researchers to draw definite conclusions (Odden & Picus, 2008). Buildings have numerous factors which are hard to separate, and many of which are hard to measure objectively. Additionally, research studying the effects of facilities on student achievement finds it difficult to control for numerous factors, such as parents' income and occupation, teachers' experience, length of school day and school year. These data, along with objective measures of a building's quality and condition, are rarely available on the large scale needed for definitive research (Odden & Picus, 2008).

Despite these limitations, the research literature does contribute to our understanding of the importance of adequate facilities to an educational program. Much research has been done on individual building components and their effect on students' success. Schneider's (2002) review of the literature shows six major building factors that have been investigated: indoor air quality, heating and ventilation; lighting; acoustics;

building age and quality; school size; and class size. Studies cited indicate that poor indoor air quality is a major factor in the health of both students and teachers; buildings with poor indoor air quality see increased absenteeism which in turn affects student success. Other studies indicate that appropriate lighting both improves student performance and increases perceptions of school safety. Acoustics also play an important role, as too much a background noise causes increased stress and affects students' ability to remain on task.

Schneider's major conclusion is that building condition is in mediating factor in student outcomes. Much of his own research deals with building conditions and teacher turnover, and indicates that poor building conditions make it more difficult for teachers to teach well, affects their health adversely, and increases the likelihood that teachers will leave the profession (Schneider, 2003; Buckley, Schneider, & Shang, 2004). In turn, high teacher turnover creates higher costs for school districts and affects the students, since new teachers are not as effective as more experienced ones (Campaign for Fiscal Equity, Inc., 2001). Several studies support this idea that facility quality is a mediating factory in student achievement. Earthman and Lemasters (1996) describe an investigation in Washington, D.C. that studied the relationships among facility conditions, parental involvement, and student achievement in that city's schools. The researcher hypothesized that parental involvement would lead to better building conditions, which in turn would improve academic quality. The findings of the study supported the hypothesis, indicating that schools with increased parent involvement through PTA membership and fundraising had improved building conditions and higher

student test scores. Another study examined conditions in schools in Canada and found that facility conditions affect school climate (Roberts, Edgerton, & Peter, 2008). Improved building conditions improve morale, commitment, and enthusiasm, in turn creating an improved learning environment. More than 1,000 Canadian school principals participated in the study, completing a questionnaire about their school building conditions and the school's learning environment. Questionnaire responses were then matched with students' scores on a standardized test. In all cases, schools with higher ranked facility conditions were found to have better learning environments and increased academic success.

Tanner and Lackney (2006) cite a wealth of evidence suggesting that facility conditions, rather than being simply a mediating factor, directly impact student achievement and behavior. They report on a 1993 study comparing building conditions and student achievement in rural Virginia high schools. Drawing from earlier studies on building conditions, the researcher developed a building evaluation instrument, the Commonwealth's Assessment of Physical Environment (CAPE), which divided building factors into two categories, structural factors and cosmetic factors. Structural factors included items such as building age, type of flooring, classroom heating and air conditioning, classroom lighting, student density, and exterior noise. Cosmetic items included items such as classroom paint, classroom furniture, the presence of graffiti, overall cleanliness, and school grounds and landscaping. School personnel used the CAPE instrument to evaluate building conditions; student achievement was measured using Virginia's Test of Academic Proficiency. After adjusting for students' socio-

economic status, the researcher concluded that a relationship between building conditions and student achievement does, in fact, exist. Hines (1996) then extended the study; using the CAPE instrument and sampling urban Virginia high schools, he found similar results.

Earthman, Cash, and Van Berkum (1995) conducted a North Dakota study that included all high school building in the state. Facility conditions were described using the State Assessment of Facilities in Education, an instrument based on the CAPE developed earlier; student achievement was measured using 11th graders' scores on the Comprehensive Test of Basic Skills. Again, good building conditions and student achievement were positively correlated. A study by O'Sullivan (2006) used CAPE to evaluate high school facilities in Pennsylvania and then compared those conditions with student achievement. Results of the correlational analysis demonstrated that as building conditions improve, student academic success increases.

However, two Texas provide mixed results regarding school building conditions and student achievement. O'Neill and Oates (2001) used the *Guide for School Facility Appraisal* from the Council of Educational Facility Planners International as a starting point in developing a new facility appraisal instrument. This new instrument, the Total Learning Environment Assessment (TLEA), included 82 items divided into four sections including age of the facility, educational adequacy, environment for education, and additional information. School principals from 76 central Texas middle schools used the TLEA to evaluate the condition of their buildings. Data concerning student achievement, behavior, attendance, and teacher turnover from were obtained from the Texas education

agency and compared with the TLEA evaluations. Results of the study showed a positive relationship between school facilities and student achievement, with the strongest relationship between building age and student reading scores. The study's authors notes that this relationship is particularly important since reading is so highly correlated with other areas of student achievement. But a dissertation study by McGowan (2007) used the TLEA to examine building conditions and student achievement in selected Texas high schools, and the findings were not as clear-cut. Results of this study did not show the same level of relationship between student achievement and building quality as earlier studies, although it did indicate that student behavior and building quality are strongly related.

These studies illustrate that while evidence exists showing a relationship between the condition of a school facility and its students' academic achievement, researchers still cannot say that better quality schools will cause better student academic outcomes. Much of the evidence comes from dissertation studies, which vary in rigor, generally involve small sample sizes, and seldom attempt to show causality (Bosch, 2006). Some is little more than anecdotal (Schneider, 2002). The research has other limitations as well. The number of studies is relatively small; more research is needed before the results may be generalized (Earthman, 1998). Many of the studies were conducted by graduate students; once they finished their educational programs, they did not extend their research (Stricherz, 2000). And the major limitation is that none of the studies have shown a definite cause-and-effect relationship between the built environment and student academic outcomes (Cellini, Ferreira, & Rothstein, 2008). Most researchers will agree,

however, that student achievement suffers when building conditions are inadequate. And while student outcomes improve as conditions improve to acceptable levels, achievement does not continue to rise indefinitely as building conditions move beyond acceptable to luxurious (Stricherz, 2000).

Condition of School Facilities

As concerns grow over the impact of school conditions on students' success, more information is needed concerning the current condition of our schools. But despite increasing interest in school facilities, current national data on school conditions is limited; very little high quality comprehensive data on school facility conditions exists (Sielke, 2002). Few states collect facilities information on a regular basis, and there is no standard as to what data is collected or how it is reported (American Society of Civil Engineers, 2005). The most recent nationwide study of facility conditions is a 1999 United Stated Department of Education report, *The Condition of America's Public School Facilities*. This report was developed from the results of a survey; the National Center for Education Statistics (NCES) surveyed 903 public elementary and secondary schools in the United States to create the report (National Center for Education Statistics, 1999).

The NCES survey included questions about school age. Studies have shown that students in older buildings are less successful academically than those who attend classes in newer buildings (O'Neill & Oates, 2001). In 1999 the average age of public schools main instructional building was 40 years (National Center for Education Statistics, 1999), and many of these buildings were constructed quickly and inexpensively, using poor

quality materials, to meet the growing population of the post World War II baby boom (Tanner & Lackney, 2006). Age alone, however, is not a good indicator of building quality. Some experts prefer to measure the functional age of the school, which is based on the number of years that have passed since the building's most recent major renovation (National Center for Education Statistics, 1999). Using that definition, the average functional age of schools nationwide is 16 years.

Other major findings of the NCES survey involved overcrowding and building condition. The NCES survey found that while overall about half of the public schools were under-enrolled, one fourth were overcrowded. Increasing enrollments from population growth, smaller class size initiatives, and changing migration patterns have all contributed to school enrollment problems. Schools with minority enrollment greater than 50% were more likely to be seriously overcrowded.

The NCES study also reported that three-fourths of the nation's public schools need repairs, renovations, or modernizations to put the building into good condition overall. The survey gathered information on the condition of building features such as roofs, foundations, exterior walls, air quality and ventilation systems, lighting, and acoustics. More than half of the schools reported that at least one feature was in less than adequate, and a majority of those schools reported problems with multiple features. Schools with the poorest children were more likely to report inadequate facilities. And the total amount needed to bring schools into overall good condition was estimated to be $127 billion.

In a more recent survey, the National Center for Education Statistics polled public school principals and found that more than forty percent believe that environmental conditions did interfere to some degree with classroom instruction (American Society of Civil Engineers, 2009). This survey also found that thirty percent of the nation's students attend schools that are overcrowded; thirty-seven percent of schools use portable buildings (American Society of Civil Engineers, 2009).

Facility Needs

Despite the lack of concrete evidence that improvements in school facility conditions cause improved academic outcomes, and despite the lack of definite, standardized data on school facility conditions, there is a growing concern over the vast disparity in school building quality. Facility conditions are becoming an equity issue in many states. Poor students, minority students, and rural students are more likely to attend school in less than adequate facilities (Crampton, Thompson, & Vesely, 2004). Many states are struggling just to meet operational and instructional budget needs (Anderson, 1998). Furthermore, the cost of school facilities has traditionally been a local responsibility (Duncombe & Wang, 2009). Most districts are forced to borrow money to fund new construction or renovations (Anderson, 1998), and differences in districts' abilities to borrow and tax will continue to mean that children in poor districts will continue to attend school in substandard buildings.

According to the U.S. Census Bureau web site, public schools spent more than $64 billion for capital outlay in the 2006-2007 school year (U. S. Census Bureau, 2007).

Texas ranked second in spending behind California, spending $6.7 billion. By the end of the 2007 school year, nationwide public school district debt outstanding was almost $350 billion. In Texas, spending for facilities is expected to continue as projected increases in public school enrollments create a need for additional buildings (Murdock, 2002). Enrollment in public elementary and secondary schools increased 13% between 1993 and 2006, and is expected to increase an additional 9% by the year 2018. Texas ranks third in projected state enrollments, with the Census Bureau projecting a 32% increase from the years 2006 to 2018. The Texas State Data Center is also projecting growth; that center estimates that the decade from 2010 to 2020 will see the population aged 18 and younger grow by more than one million, an increase of more than 16% (Murdock, 2002). Much of the projected enrollment increases will be in non-Anglo populations, caused by both immigration and greater birthrates among Hispanics (Petersen & Assanie, 2005). These projected population changes will strain state and district resources by creating demand not only for additional facilities but also for more expensive specialized programs such as bilingual education, English as a second language, and programs for economically disadvantaged, immigrant, and limited- English-proficiency students (Murdock, 2002).

Factors other than population growth will also create additional demand for facilities. One factor is the growing emphasis on early childhood education. State funded pre-kindergarten programs have increased 40% in the last five years (Schweinhart, 2008). Another factor is growing public demand for both smaller class sizes and smaller schools. Some research has shown academic improvement for students in smaller schools and while there is still no clear evidence that attending smaller schools

leads to bettor scholastic performance, public sentiment seems to favor smaller campuses (Bickel, Howley, Williams, & Glasscock, 2001). Federal education requirements are also driving increased facility needs. The Americans with Disabilities Act, with its goal of providing access for all, and Individuals with Disabilities Education Act, which calls for educating students with disabilities in the least restrictive environment, impact facility requirements (Kemerer & Walsh, 2000) Both new construction and renovations to older buildings must meet the new accessibility standards, and the enormous diversity of specialized needs presents a costly challenge for facility planners to address appropriately (Ansley, 2000).

Texas School Finance

The State of Texas has a long history of vocalized support for public education. The framers of the Texas Declaration of Independence, in outlining their grievances against the government of Mexico, included that government's failure to provide a proper system of public education (Berger & Wilborn, 2010). While their claim made excellent rhetoric, there was very little actual support for the state to finance a system of education (Walker & Casey, 2001). Texas was charged with providing a general system of education; the resulting Education Act of 1839 provided that each county should have three leagues of land set apart for the purpose of purpose of establishing a school.

When Texas was admitted into the United States in 1845, it had considerable public debt. The newly admitted state and the federal government reached a compromise in 1850; Texas would surrender its claim to lands in what would later become parts of the

states of Colorado, Oklahoma, and New Mexico and in return would receive $10 million from the United States government. While most of these funds were used to pay off debt, $2 million was deposited into a special school fund. Revenue from the fund was to be used for the support of public education (Texas Education Agency, 2004). Despite the fund's designation as a school fund, the Texas legislature began to divert its revenues for other purposes. Funds were used to purchase railroad stock In order to encourage new railroads in the state, state prisons were built, and during the Civil War monies from the fund were used to purchase weapons for the confederacy (Walker & Casey, 2001).

In 1876, a new state constitution was written which established a framework for school funding. The new constitution created the Permanent School Fund, which consisted of unspent monies from the original special school fund, plus the addition of some public lands. Payments from the fund were restricted to interest earned; the Constitution also included strict guidelines that payments be made for educational purposes only. In the years since the establishment of the Permanent School Fund, payments into the fund have been expanded to include proceeds from the sale of state lands and oil and gas revenues from offshore drilling (Walker & Casey, 2001).

The constitution of 1876 also formed the basis for state funding of education for the next 75 years. Schools were to be funded on a flat per capita basis. The constitution did not allow for local taxation to support schools except in incorporated cities; independent school districts were also allowed to vote on bonded debt. By 1900 the disparity between urban and rural districts was notable. The state's 391 urban districts served fewer than 25% of the state's students, spending on average $8.35 per pupil; at the

same time more than 7,000 common, that is rural, districts each spent less than $5.00 per pupil (Walker and Casey, 2001).

In the years following World War II, social changes, including increasing school enrollments, the beginnings of the civil rights movement, and concerns over the disparity in spending between urban and rural districts, pressured the Texas legislature to address the problems of Texas school funding (Mauzy, 2010). The resulting Gilmer- Aiken Act, passed by the Texas Legislature in 1949, was the state's first attempt at a more equitable funding system. This bill increased teacher salaries, but more importantly, it established the state's Minimum Foundation Program, intended to provide a minimum educational program for every student in the state. Under this new school finance structure, the state established a minimum level of revenue per pupil, guaranteed to any district that agreed to tax at a state-mandated minimum. Districts that failed to raise the minimum revenue through local taxes had the difference made up by the state. Districts were allowed, with voter approval, to tax at a higher rate (Haas, 1987). The bill did not provide state support for facilities, even though members of the Gilmer-Aiken Committee had recommended that facilities funding be included in the bill. Legislators decided instead to defer that topic, believing that school district consolidations would result in more efficient use of existing buildings (Walker and Thompson, 1989). Consolidations did result, but not to the level anticipated, and the topic of facilities was not revisited by the legislature (Haas, 2005). Gilmer-Aiken's Minimum Foundation Plan created a state-local partnership for funding education, but whether it actually achieved its stated goal of providing an adequate minimum educational opportunity for every student was the issue that would be

debated by the state legislature and the courts over the next sixty years (Haas, 2005). The question of equity stems from the Texas tax structure: the state is constitutionally prohibited from an income tax and local taxes are based on local property values (Farr & Trachtenberg, 1999). The result of using property taxes to fund education is that districts with lower property values must tax at a higher rate in order to raise the same revenues that a high property-value district could earn with a lower rate.

Farr and Trachtenburg (1999) note that while many states have faced similar issues regarding the funding of education, Texas has unique characteristics that make the topic especially contentious. First is that Texans are committed to local control. The state still has more than one thousand school districts; in the 2005-06 school year, the state had 1,033 independent districts and 194 charter schools. Half of the state's districts serve fewer than 1,000 students each (Hansen, Marsh, Ikemoto, & Barney, 2007). And the state's education code explicitly gives local school trustees the "power and duty to govern and oversee the management of the public schools in the district" (Texas Education Code, 2010). Texas is also hampered by its tax structure. The state's constitution prohibits both a state income tax and state property taxes, and the state derives most of its income from sales taxes (Hansen, Marsh, Ikemoto, & Barney, 2007). Local taxes are based on property values which are distributed unevenly across the state. Small areas of the state are enormously wealthy, primarily due to oil and gas reserves (Farr & Trachtenberg, 1999). Finally, Texas is a state with colorful political traditions. And since legislative district boundaries rarely coincide with school district boundaries, a legislator may represent several, highly disparate school districts. This makes it

especially difficult for legislators to know which district's interests to represent (Farr & Trachtenberg, 1999). The state legislature is growing less bipartisan, and political leaders have been able to agree to changes in the school finance system only when forced to by the courts (Hansen, Marsh, Ikemoto, & Barney, 2007).

The last 40 years have seen the school finance system in Texas caught up in a ping-pong match between the legislature and the judiciary. The first volley occurred in 1968 when parents in San Antonio filed suit in Federal District Court, claiming that the state's system of funding schools was unconstitutional because its dependence on local property wealth discriminated against children in property-poor districts. The district court agreed; five years later the case was argued before the United States Supreme Court. That court overturned the lower court's decision, not because it felt the way Texas financed its schools was fair and efficient, but ruling instead that education is not a fundamental interest protected by the United States Constitution (Hobby & Walker, 1991). The court's ruling in this case, *Rodriguez v. San Antonio*, had important nationwide implications for school finance reform efforts. Since that decision all school finance cases have been argued based on violations of the individual state's constitution (Imazeki & Rechovsky, 2003). In Texas, the case succeeded in raising awareness among the state's legislators and citizens concerning the inequities in the school finance systems (Hobby & Walker, 1991).

After the Rodriguez ruling, challenges to the Texas school finance system continued, moving into the state's judicial system. In 1984 the first case in what would become a series of lawsuits known as the Edgewood cases was filed (Acosta, 1996).

Plaintiffs challenged the state's school funding system, claiming that it violated both Article I, Section 3, the equal protection clause of the Texas constitution, and Article VII, Section 1 which requires that the state "make suitable provision for the state support and maintenance of an efficient system of free public schools" (Texas Constitution, 2009). The case moved slowly through the court system; in October 1989 the Texas Supreme Court ruled unanimously that the school financing system was unconstitutional and ordered the state legislature to develop an equitable funding system. In its decision the court described the large disparities in property wealth per pupil – the poorest school district in the state had a property tax base of $20,000 per pupil while the richest school district, at $14,000,000 per pupil tax base, had 700 times that amount (Edgewood v. Kirby, 1989).

The ruling in the Edgewood case made it clear that the problem was not simply a matter of spending more money. According to the Court, "More money allocated under the present system would reduce some of the existing disparities between districts but would at best only postpone the reform that is necessary to make the system efficient. A band-aid will not suffice; the system itself must be changed" (Edgewood v. Kirby, 1989). But change did not come easily. The legislature met in special session repeatedly, finally passing Senate Bill 1 which provided some increased state support to the schools. Unsatisfied, the Edgewood plaintiffs returned to court and again the court ruled in favor of the plaintiff and ordered the state to revise the funding system. The legislature responded by passing legislation that combined the state's school districts into county education districts (CEDs) which would levy a state-mandated property tax. Revenues

raised would then be distributed to students within the CED. Almost immediately this legislation was challenged by a group of wealthy school districts on the basis that the CEDs violated the state's constitutional requirement that local voters approve school property taxes (Imazeki & Rechovsky, 2003). Finally, in May of 1993 the Texas legislature approved Senate Bill 7 in an attempt to develop a more equitable school finance system that would meet the court's approval (Farr & Trachtenberg, 1999).

Senate Bill 7 created a framework for funding Texas schools. Like its predecessor, the Gilmer-Aiken plan, Senate Bill 7 called for a partnership between local districts and the state (Bingham, Jones, & Jackson, 2003). Funding was based on two levels, or tiers; Tier 1 provided a Minimum Foundation Program and Tier 2 provided a Guaranteed Yield component. The amount of state funding a district received depended on local property wealth. Tier 1 required local districts to levy taxes at a minimum rate to provide the local share of revenues. Districts were guaranteed a minimum amount of revenue per pupil; the state would make up the difference to any district that was unable to raise the minimum from local taxes. Tier 2 allowed districts to levy and enrichment tax. Senate Bill 7 also included a controversial feature known as "Robin Hood" which recaptured local revenues above a maximum amount and been reassigned them to less wealthy districts (Hansen, Marsh, Ikemoto, & Barney, 2007).

Despite these advances in Texas school finance, funding for facilities remained problematic. The plaintiffs in the Edgewood litigation had concentrated their efforts on funding for maintenance and operations (Bingham, Jones, & Jackson, 2003) and little consideration was given to funding for facilities. Local districts generally had to bear the

cost of facilities with little help from the state (Haas, 1987). During the ongoing court challenges, Walker and Thompson (1989) described the situation: "because of the finite resources available to the legislature to pursue equity goals in the area of maintenance and operations, interest in a wealth neutral system of facilities funding will be relegated to second priority status". The court did address the issue of funding for facilities in Edgewood IV, saying "An efficient system of public education requires not only classroom instruction, but also the classrooms where that instruction is to take place. These components of an efficient system—instruction and facilities--are inseparable" (Edgewood v. Meno, 1995). The court also warned that the legislature needed to deal with the issue of funding for facilities very soon. Justice Enoch, in his dissent, went even further, writing:

> The unfairness of this system is exacerbated by Senate Bill 7's failure to include any provisions for facilities. With operations and maintenance taxes approaching $1.50 already, there is little room left in Tier 2 for meeting facilities needs. This is not a significant problem for the wealthiest districts, since they are able to generate significant additional funds from their own tax bases by levying debt taxes. Poor districts, however, are able to generate only a small fraction of those amounts. Poor districts are thus forced to choose between funding current operations and funding capital expenditures (Edgewood v. Meno, 1995).

The legislative response to the Edgewood IV ruling was to create two new programs. In 1997 the legislature authorized the Instructional Facilities Allotment (IFA) to provide assistance with debt service payments on new debt, and in 1999 it added the Existing Debt Allotment (EDA) to assist districts with payments on existing debt (Anderson, 1998). According to the Equity Center (2006), these programs did little to

help the districts most in need, the poorest districts in the state. The program is under-funded; applications for funds under the program have exceeded payment awards by hundreds of millions of dollars. Funding is based on biennial appropriations by the legislature, and the amounts approved have been inconsistent, making it difficult for districts to plan efficiently for facilities. The guidelines as to which projects will qualify for funding are very specific and restrictive; districts may have special facility needs but not be eligible to apply for funds (Equity Center, 2006). And finally, funds raised by a district through borrowing are not subject to the recapture provision of "Robin Hood". This means that wealthy districts are able to borrow as much for facilities as the community is willing to approve, thereby furthering inequities across the state (Bingham, Jones, & Jackson, 2003).

The most recent legal challenge to the Texas system of school finance was launched in 2001 when several high-wealth districts filed a lawsuit claiming that the state's limit on local property tax rates acted as a illegal property tax, since about half of the state's districts were forced to tax at the limit in order to provide an adequate educational program. Two other groups of districts joined the suit. Property-poor districts claimed the state's funding was inadequate; another group challenged the state's finance plan claiming that the gap between rich and poor districts violated the state's constitution. This suit was ultimately heard by the state Supreme Court, which ruled the state's school finance plan unconstitutional. The court determined that since so many districts were taxing at or near the state's property tax limit of $1.50 per $100, local

school taxes served as an unconstitutional statewide property tax (West Orange - Cove v. Neeley, 2004).

Financing School Facilities

The Texas legislature's primary consideration in the school finance system has been with operating costs, those costs related to current year expenditures (Haas, 2005). State aid for facilities is limited, and providing for the construction of school facilities remains primarily the responsibility of each individual district. Local school officials facing the need to construct new facilities or renovate older ones must determine how to pay for them. Faas (1982) describes two alternative financing methods: "pay as you acquire" using current revenues or reserve funds and "pay as you use" by borrowing and then repaying in the future. The major advantage to the first method is the interest cost savings (Carey, 2000), but the reality is that this option is usually available only to wealthy districts, to districts with minimal building needs, or to districts located where construction costs are low (Anderson, 1998). This option also raises the question of fairness. Taxpayers may prefer that their funds be used to pay for current needs (Haas, 1987), rather than being set aside for future expenses. The most common method of facilities financing at the district level is through the sale of bonds (Carey, 2000). Districts sell, or issue, bonds, and then use future tax dollars to repay the debt (Anderson, 1998). School buildings usually last for several generations, so it is neither realistic nor fair to require current taxpayers to bear the entire cost (Faas, 1982). Borrowing, then paying back the debt over many years, asks both present and future users to contribute to

the cost (Haas, 1987). The Texas Bond Review Board (2008) cautions, however, that debt must be used carefully. "The state's limited resources must be used wisely so that future generations are not burdened with the debt service of those who came before them. The decision to issue debt should be undertaken only after rigorous review of the financial, legal, and policy implications of issuing the debt. Used wisely, however, debt financing can provide facilities and programs that can enrich both current and future generations."

Bond Basics

A bond is simply a long-term contract between a borrower and a lender. The contract agreement requires the borrower to make payments of interest and principal on specific dates to the lenders, that is, the bondholders. By definition, bonds are long-term debt; to be called a bond, the contract generally must have a term longer than five years (Zipf, 1997). Businesses often issue bonds to raise money for new acquisitions or expansions, but governments can also borrow to finance projects such as new highways, water supply systems, or new school buildings. The federal government borrows by issuing treasury bonds; state and local governments issue bonds known as municipal bonds, or munis. In 2008, the United States municipal bond market amounted to more than $2.6 trillion (Summers & Noland, 2008).

Government borrowing is nothing new. Cities were borrowing as early as the 1820s; by 1843 outstanding municipal debt was $25 million (Zipf, 1997). For investors, municipal bonds have certain advantages over corporate bonds in that most municipal

bonds are exempt from federal income taxes. With the interest earned on their investment in municipal bonds free from federal income taxes, investors are willing to accept a lower interest rate, which, in turn, lowers the cost of borrowing for local governments. Also, investors consider municipal bonds to be one of the safest possible investments; only United States government obligations are considered safer (Ometer, 1992). While few in number, however, defaults on municipal bonds generally receive a great deal of publicity and raise public concern about the safety of bond issues. For example, the 1983 default by the Washington Public Power Supply System on its $2.25 billion bond issue was the largest default in the history of the municipal bond market, and led to increased oversight of municipal bond issues (Peers, 1993).

In any public borrowing, one of the government entity's primary objectives is to borrow at the lowest possible cost (California Debt and Investment Advisory Commission, 1993). The major cost of borrowing is the interest that will be a repaid over the life of the bond. Interest cost is dependent on numerous factors, including the general economic conditions at the time of the bond issue, characteristics of the borrower, and characteristics of the issue (Young, Faas, & Wandschneider, 1982). Economic conditions include both national and local interest rates and inflation rates, and are generally beyond the control of the borrower. Borrower characteristics include population size, economic base and stability, debt per capita, and wealth per capita (Young, Faas, & Wandschneider, 1982). Issue characteristics include issue size, maturity date, special features, and risk. Investors must be compensated for bearing risk; the higher the perceived risk, the higher return investors will demand (Brigham & Houston, 2000). In their investment decisions,

investors consider several types of risk. Interest rate risk refers to changes in interest rates; when interest rates rise bond prices fall and bondholders who must sell will incur a loss. Reinvestment risk refers to the possibility that interest rates may fall. In this case, interest and principle payments received will have to be reinvested at the lower rate (Summers & Noland, 2008). But the most serious risk to investors is default risk, the possibility that the borrower will default and investors will lose some or all of your investment (Summers & Noland, 2008).

In addition to the interest cost, which is paid out over the life of the bond issue, borrowers incur numerous other costs which are incurred at the time of the issue. In a school district bond issue, districts officials generally lack the specialized knowledge and access to markets required to successfully complete a bond issue on their own (Simonsen, Robbins, & Helgersen, 2001). The district must rely on the services of financial professionals in order to bring the bond to market (Cooper & Perselin, 2006). Financial advisors, attorneys, credit rating agencies, and bond underwriters help borrowers determine the best way to structure and market their bond issue (Stevens, 1999). Harris and Munley (2002) describe the basic steps that school district officials make as they prepare to issue bonds. First, they must decide whether to have the bonds rated. Based on the rating obtained, the district may then decide whether to purchase insurance or obtain some other type of credit enhancement.

Bond Ratings

Municipal bond ratings are an important factor in determining the interest costs that a bond issuer will pay. The purpose of a bond rating is to help investors determine the likelihood that the bond will be repaid in full and on time, and help distinguish between financially strong and weak districts (Vogel, 2007). Three characteristics unique to the municipal bond market make it difficult for investors to get a complete picture of the issuing government's credit quality: (1) the number of governmental and quasi-governmental entities ranges in the tens of thousands, and many of these are small, infrequent borrowers, unfamiliar to investors, (2) governmental entities use fund accounting, which is less familiar to investors and therefore more difficult to interpret, and (3) one-third of municipal bonds are purchased directly by individual investors (Peng, 2002). Investors, therefore, rely on credit ratings agencies to overcome the information asymmetry of the municipal bond market (Casillas & Hamill, 2002). And while the bond rating cannot guarantee that the borrower will not default on the loan, it does provide an indication of the borrower's relative financial strength and likelihood of repayment (Adams, 2006). In fact, the bond rating may be the single most important factor in determining the bond interest rate, and the difference between a single rating level has the potential impact of thousands - if not millions - of dollars in interest costs for the borrower (Casillas & Hamill, 2002).

There is no governmental requirement that municipal bonds obtain a rating (Hitchcock, 1992) but the majority of bonds are rated. Of the nearly 1,700 school district bonds issued in Texas between 2003 and 2008, 83.7% were rated by an outside ratings

agency. Harris and Munley (2002) describe three principle reasons why a district might not obtain a rating. If the district believes that the rating will be very low, then having no rating may be preferable. A second reason for not obtaining a rating is that the bond will be sold in the local market and the bond buyers already have sufficient information concerning credit risk. Finally, if the amount borrowed is very small, the additional cost of obtaining a rating may be more than the potential interest savings.

Three major agencies, Moody's Investors Service, Standard & Poor's Corp., and Fitch Investor Services, analyze proposed bond issues and then provide a rating. While each of the ratings agencies uses its own methodology to arrive at its opinion, they all focus on four major areas: economic base, financial position, debt load, and administrative management (Hitchcock, 1992). Both Moody's and Standard & Poor's web sites indicate that a borrower's economic strength is the most important factor in the rating. The agencies also report that they investigate the borrower's size and potential for growth, the diversity of the economic base, profile of the workforce, and socio- economic factors (Standard & Poor's, 2009a; Moody's Investor Services, 2005).

Despite their wide-spread use by investors, credit ratings do have some limitations. The borrowers themselves pay for their credit ratings, and some experts believe this creates a conflict of interest and hinders the agency's ability to remain objective (Overcharging underwriters, 1998). Since the rating agencies use information provided by the borrower in their analysis, there is a potential for faulty, incomplete information or even outright fraud on the part of the borrower (Adams, 2006). Ratings are also criticized because they are based on past performance which may not be a good

indicator of future risk (Adams, 2006). Still, investors rely on credit ratings because overall they do a good job of accurately predicting the likelihood of bond defaults (Overcharging underwriters, 1998).

Many studies have examined the factors that affect the credit ratings of municipal bonds issued by state and city governments, but much less attention has been given to bonds issued by school districts (Denson, Yang, & Zhao, 2007). The research on school bond issues that has been published generally investigates the major variables used by the rating agencies in assigning a rating. Cluff and Farnham (1984) determined that while both Standard & Poor's and Moody's consider several of the same socio-economic factors to be significant, there are some differences between the two agencies in their rating methodologies. Standard & Poor's looks at the age range of the population as an important factor, while Moody's considers several financial factors including gross debt total revenue, and property values. A study by Willson (1986) determined that the strength of the local economy is the most important factor influencing the rating. He also cautions that the ratings process cannot be completely quantified; the ratings analyst uses significant perception and personal judgment in the process.

Research by Simonsen and Robbins (2001) indicates that jurisdiction size is an important factor in a bond's rating and therefore interest costs. Smaller municipalities tend to have smaller staffs with less technical financial training, putting smaller borrowers at a disadvantage and ultimately leading to higher interest costs. Jurisdiction size can also be used as a proxy for economic base diversification, with larger issuers considered more diverse and less risky (Denson, Yang, & Zhao, 2007).

Johnson and Kriz (2005) investigated fiscal institutions to determine their impact on borrowing. Fiscal institutions are limits such as debt limitations, balanced budget requirements, and tax limitations which may be imposed directly by voters or through the legislative process. Johnson and Kriz studied new issue state government obligation bonds issued from 1990 to 1997. They hypothesized that since most fiscal limits are based on sound financial principles, borrowers with limits should obtain higher credit ratings and lower borrowing costs. Their research found, however, that while spending limits do reduce borrowing costs, revenue limits increase them. This finding is supported by Bensen and Marks (2005) who studied Texas school district bonds issued between 1992 and 1996. The Texas school finance system had recently begun operating under the "Robin Hood" Plan, in which property-wealthy districts were required to transfer excess property tax revenues to property-poor districts in an effort to equalize district wealth across the state. This transfer acts as a revenue limit, and according to Bensen and Marks, results in the unintended consequence of higher-rated, wealthy districts having higher borrowing costs than lower-rated ones.

Loviscek and Crowley (1990) reviewed 18 studies that attempted to model the municipal bond rating process. Most of the studies suggest that rating agencies primarily rely on financial factors such as debt burden and revenue, and population variables. However, the studies vary in their findings regarding which specific debt and revenue variables are important. Loviscek and Crowley also expressed concern about the studies' underlying assumptions and cautioned that there was little replicative accuracy.

One early study that did specifically target school district bond ratings examined 50 bonds issued in Texas in the early 1970s (Bolten & Stansell, 1978). The study identified ten factors used in the credit rating analysis: debt service coverage, district size, debt capacity, reserved taxing power, tax collection procedures, county income, special obligations, tax policy, tax base, and floating debt, and concluded that bond ratings are generally consistent and accurate, although smaller issues are not rated as accurately as larger ones. The research also suggests that school districts may be able to positively influence their bond credit rating since several of the factors are controllable by the district.

Gist (1992) extends the research on school district bond issues to include socio-economic/demographic variables. His sample included 153 bonds issued by Texas independent school districts from 1981 to 1983, and used multiple regression to test whether certain socio-economic/demographic variables were significant in explaining bond ratings and net interest cost. Results of the analysis indicated that average daily attendance, the percentage of non-white students, and property value per student are significant in explaining net interest cost. Larger and wealthier districts tend to have higher bond ratings, larger bond issues, and lower net interest costs.

A recent study by Denson, Yang, and Zhao (2007) modeled the bond rating process for school district bonds and added administrative factors to the model. They contend that the management component of the rating, while difficult to quantify, is especially important since it is the factor that is most within management's control. Using school district performance data, such as standardized test scores and college

admission rates as indicators of management performance, the researchers examined whether management factors did influence a district's rating after controlling for socio-economic/demographic and financial factors. They concluded that the performance measure used in their analysis did influence a district's rating, giving school administrators even more incentive to improve test scores.

Bond Underwriting

In addition to deciding whether to have a bond rated and whether to purchase bond insurance, a school district planning a bond issue must also choose whether to use a negotiated or competitive method of sale. Both methods relate to the bond underwriter. The underwriter acts as a go-between for the district and investors; the underwriter purchases the bonds from the district with the intention of reselling them to investors (Cooper & Perselin, 2006). Regardless of whether a negotiated or competitive method of sale is chosen, the underwriter provides three essential services: assistance in the design and timing of the bond issue, assumption of part of all of the market risk, and distribution of the bond issue (Becker & Long, 1997). The underwriter's fee for providing these services is known as the underwriting spread, and is the difference between the price at which the underwriter purchases bonds from the issuer and the amount he later receives from re-selling to investors (California Debt and Investment Advisory Commission, 1993).

A competitive bond offering involves a bidding process; the bonds are awarded to the underwriter offering the lowest qualifying bid (California Debt and Investment

Advisory Commission, 1993). The competitive process is thought to result in the lowest possible cost; the process is open and therefore competitive bidding helps avoid the appearance of impropriety in selecting the underwrite (Stevens, 1999). In contrast, in a negotiated sale a single underwriter is selected by the district in advance of the bond sale. Advocates of negotiated sales argue that the underwriter has an "information advantage" due to pre-sale activities; that information reduces uncertainty about the bond issue and allows the underwriter to more accurately price the bonds (Joehnk & Kidwell, 1980). Critics of the negotiated method point to the lack of competition and the possibility of favoritism in selecting an underwriter (Stevens, 1999). Joehnk and Kidwell (1980) distinguish competitive and negotiated underwriting as follows: (1) negotiated issues use a single underwriter, eliminating competition, (2) the negotiated underwriter is selected well in advance of the sale of bonds, (3) the negotiated underwriter may offer financial advice and origination services, such as arranging for the bond rating, to the issuer, (4) the negotiated underwriter is able to engage in extensive pre-sale promotion and marketing activities, and (5) the size of the underwriter spread is subject to direct negotiation between the underwriter and issuer.

Prior to the 1970's, the majority of municipal bonds were sold competitively (Juarez & Bonpua, 1994), but by 1984 only 46 percent of bonds used competitive bidding (Simonsen, Robbins, & Helgersen, 2001). Today about 80 percent of municipal bonds are sold by negotiation (Stevens, 1999); the corporate bond market has seen a similar movement away from competitive issues. Whether competitive or negotiated sales result in lower borrowing costs has been the subject of a fairly substantial body of research and

is still a matter of debate (Juarez & Bonpua, 1994). A study by Joehnk and Kidwell (1980) used a sample of 700 matched pairs of competitive and negotiated bonds issued over a 16-year period. Their analysis showed that net interest costs were significantly higher for bonds sold by negotiation. Simonsen's (2001) study supports that conclusion. Using data from municipal bond sales in Oregon, Simonsen also found that negotiated sales result in higher borrowing rates.

Other researchers have reached differing conclusions. A 1999 study by Logue and Tinic (1999) used a sample of 93 bonds sold by AT&T and its subsidiaries from 1970 to 1974. In their sample, 25 of the bonds (27%) used a negotiated method of sale; the remaining 63% were sold competitively. The same management team approved all issues. By studying a single issuer, the researchers were able to control for the differential riskiness of a heterogeneous sample. Based on their analysis, Logue and Tinic (1999) found no significant disadvantage to using negotiation. Kriz (2003) added to the research with his study comparing competitive and negotiated issues. The study investigated the relationship between the bond issuer and the underwriter in a negotiated sale. Results of the study indicate that the underwriter in a negotiated bond issue, with his inside information regarding market risk, puts his reputation on the line with the sale, which in turn offers a level of certification to buyers and in turn lowers interest cost.

Altinkihc and Hansen (2000) investigated underwriter spreads as they relate to the par value of a bond issue. They dispute earlier studies indicating that spreads decrease with larger issues, finding instead that underwriter spreads are U-shaped. Their study indicates that underwriting costs are mostly variable; fixed costs include state and federal

taxes, registration fees, research, and setup expenses that are independent of issue size. Initially, spreads decrease as bond issue amounts increase, but beyond some amount the spread will begin to increase. The research implies that the increase is due to diseconomies of scale caused by increasing placement costs. Finding more buyers simply becomes more difficult at some point, creating rising costs to the underwriter.

CHAPTER III

METHODOLOGY

Introduction

The purpose of this study is to investigate relationships between selected school district characteristics and bond underwriting costs. While a substantial body of research has studied corporate bond issues, much less attention has been given to municipal bonds, and even less to municipal bonds issued by school districts (Harris & Munley, 2002). The cost of underwriting, one of the costs of issuing bonds, has received almost no attention. This study, then, is exploratory, representing a first attempt in understanding what, if any, relationships exist between school district characteristics and the underwriting costs districts incur when they borrow money by issuing bonds. The study design is non-experimental; relationships among variables are studied but there is no effort by the researcher to manipulate them (Mertler & Vannatta, 2005). Non-experimental research is especially useful in the social sciences involving situations in which it is not ethical or practical to conduct social experiments (McClendon, 1994).

This study is guided by the general research question "What relationships exist between school district characteristics and bond issue underwriting costs?" More specifically, the research questions are:

1. What relationships exist between school district financial characteristics and bond issue underwriting costs?

2. What relationships exist between school district socio-economic/demographic characteristics and bond issue underwriting costs?

3. What relationships exist between school district debt characteristics and bond issue underwriting costs?

4. What relationships exist between school district managerial characteristics and bond issue underwriting costs?

5. What relationships exist between the multiple interactions of the four aforementioned school district characteristics and bond issue underwriting costs?

Population

The population of the study consists of Texas school districts that issued bonded debt in the five-year period from September 1, 2003 through August 31, 2008; that is, it includes districts issuing bonds in fiscal years 2004 through 2008. During that period, 1,667 bond issues raised nearly $43 billion in debt for Texas schools. Some districts completed multiple bond issues during the five-year period of the study; a few districts completed more than one issue in a single fiscal year. Fiscal year 2007 saw the highest activity, in terms of number of issues, number of districts, and total amount borrowed.

In a bond issue, the borrowing district has several choices in working with a bond underwriter. In competitive and negotiated bond issues, underwriters work with districts to market the bonds, and are compensated for their services. That compensation is known as the underwriter spread. In private placement issues, bonds are sold directly to investors without underwriter involvement. Of the 1,667 bond issues in Texas during the

period of the study, 276 were issued by private placement. These bonds were dropped from further consideration, leaving 1,391 bond issues included in the study.

Data Collection

Data used in the study were obtained from two sources, the Texas Bond Review Board and the Texas Education Agency. The Texas Bond Review Board (TBRB) is a state agency charged with overseeing government debt issued in the state. Its mission is to ensure efficient use of resources for the state's taxpayers (Texas Bond Review Board General Information). As part of this mission the board collects data on all government debt issued and makes that information available on its web site. Using information from the TBRB web site at www.brb.state.tx.us , school districts that issued bonds in the five-year period of the study were identified. Information on the districts' administrative, socio-economic/demographic, financial, and debt characteristics was then collected from the Texas Education Agency's (TEA) web site at www.tea.state.tx.us. The TEA collects extensive data from school districts within the state and publishes them annually. Additional financial information was collected from the Texas Bond Review Board. All bond issues were matched with the issuing district's prior year's information. The decision to use school information from the prior year was made since that would have been the most current district information available at the time the bonds were issued.

All of the data from both the Texas Bond Review Board and the Texas Education Agency were downloaded from the relevant web sites and entered into an Excel spreadsheet. The data was then entered into Statistical Package for the Social Sciences

(SPSS) Version 16.0 software for analysis.

Variable Selection

Once the data set was obtained, the researcher faced numerous decisions regarding which specific data to include as variables in the study. Finding the right balance between including too many and too few variables created a challenge. Exploratory studies provide a first look at complex relationships, and correlational analysis enables the researcher to study relationships among many variables (Gall, Borg, & Gall, 1996). Studying a single independent and a single dependent variable is not particularly useful since few variables actually exist in isolation. Examining multiple variables allows the researcher to look at various possible combinations of predictor variables to more fully understand the effects of relationships, in turn allowing the researcher to develop a more complete description of the study topic. The additional time and cost requirements of obtaining data on multiple measures is often quite small (Mertler & Vannatta, 2005). However, the low cost and easy availability of data can create new problems in a research study. Too much data may result in the "shotgun approach" in which the researcher collects data with no clear goal in the hopes of finding something interesting. Variables should be chosen for inclusion in the study based on some theory or common sense rationale (Gall, Borg, & Gall, 1996). Mertler and Vannata (2005) encourage the researcher to find a parsimonious solution, that is, a solution that explains the most with the fewest number of variables.

In this study the theoretical basis for selecting variables comes from the research literature on bond credit ratings. A credit rating is an independent opinion of a borrower's ability to repay debt. Many borrowers obtain credit ratings prior to issuing debt in order to give lenders information regarding the relative risk involved in making the loan. These credit ratings have an enormous impact on the interest cost the borrower will ultimately pay; bonds that obtain higher ratings are considered less risky and investors are willing to accept a lower interest return (Brigham & Houston, 2000).

Three major credit ratings agencies, Standard & Poor's, Moody's Investor Services, and Fitch, evaluate a borrower's credit worthiness by evaluating issuer characteristics in four major categories: debt, financial, administrative, and economic factors (Ackerman, 1984). Numerous research studies have attempted to model the ratings process and determine the specific factors that the agencies evaluate (Cluff & Farnham, 1984; Hitchcock, 1992; Loviscek & Crowley, 1990). A few of these studies have looked specifically at the ratings process for school district bond issues. Harris and Munley (2002) focused on financial and debt characteristics, such as the local tax effort, cash fund balance, and gross debt. Gist (1992) emphasized socio-economic/demographic factors, including property value per student, average daily attendance, and the percentage of non-white students in the district. A more recent study by Denson, Yang, and Zhao (2007) extended the research to include administrative, or managerial, factors. Based on research from the areas of public administration and management, the authors used factors such as overall passing rates on state mandated exams, drop-out rates, teacher turnover rates, and percentage of students admitted to college as measures of

management performance to determine if district performance influences its credit rating. These studies serve as a starting point for developing this study's research questions and also provide a basis for selecting the variables to be used.

Bond underwriting cost as a percentage of par value was selected as the dependent, or outcome, variable for the study. Larger bond issues generally incur higher total issue costs, but lower issue costs when expressed as a percentage of the bond's par value. The lower percentage amount is the result of the cost behavior of certain issue costs. Some of the costs may be fixed; that is, the costs do not vary proportionately with the size of the issue. Larger issues incur the same cost as smaller ones. To control for the possibility that the underwriting spread may also be inversely related to bond issue amount, the gross underwriting spread was divided by the total par value of the issue. The spread as a percentage of par value was then used as the dependent variable throughout the analyses.

Independent, or possible predictor variables, chosen for inclusion in the study are: (administrative factors) *district accountability rating, attendance rate, long-term drop-out rate, long-term graduation rate, percentage of students passing all parts of the state-mandated accountability exams, percent of students taking college admission exams, average SAT scores, average ACT scores, percentage of teachers with fewer than five years' professional experience, teachers' average years of professional experience, and teacher turnover;* (socio-economic/demographic factors) *total enrollment, percent of non-white students, percent of economically-disadvantaged students, assessed value (property wealth), district population, wealth per student in average daily attendance,*

current year average daily attendance, and average daily attendance growth rate; (financial factors) *total district revenue, revenue per student, percentage of revenue from local sources, fund balance, and fund balance expressed as a percentage of total budgeted expenditures; and* (debt factors) *debt principal outstanding, debt interest outstanding, total debt outstanding, total debt as a percentage of assessed value, and total debt per student in average daily attendance.* Appendix A provides additional descriptions about these variables and shows the source for each.

Data Analysis

Before beginning data analysis, the entire data set was screened for quality. Reasons for screening data before beginning a statistical analysis include the need to check for both accuracy and for missing data (Mertler & Vannatta, 2005). Since the data set is large, accuracy was assessed using frequency distributions, means, and standard deviations to make sure that all reported amounts were plausible. Missing data was checked for randomness, since in general missing values scattered at random throughout the dataset are of less concern than a pattern of missing data which might indicate a problem with data collection procedures (Mertler & Vannatta, 2005).

Univariate and multivariate statistical analyses were conducted to examine the variables and their relationships for the five-year period of the study. Univariate statistics provided measures of central tendency; means, medians, and standard deviations were calculated for the variables included in the study and provide a general description of each. For the variables pertaining to bond issue characteristics, such as par value and

underwriter spread, these statistics were calculated on the total number of bonds issued each year. However, some districts completed more than one bond issue in the same year. In that case, the district was included on once per year in the analysis for variables related to district issuer characteristics. Outliers three standard deviations above and below the mean were removed from the analysis.

A correlation matrix for each of the four categories of variables was obtained to determine the strength and direction of relationships between variables. The matrix revealed strong relationships between several variables. However, since this is an exploratory study, the decision was made to eliminate only those variables with a correlation greater than .9 for the initial analyses, since a correlation that strong indicates the variables are likely measuring the same characteristic.

Based on the .9 correlation coefficient as the cut-off point, several variables were dropped from the study. In the socio-economic/demographic group, total enrollment and current year average daily attendance (ADA) had a .998 correlation. The total enrollment number was provided by the Texas Education Agency, while ADA was obtained with the Texas Bond Review Board Information. And while the two amounts are not exactly the same – one is based on the number of students enrolled in the district and the other is based on actual school attendance – they are both measures of the size of the district in terms of the number of students served. Similarly, taxable value per pupil, obtained from the TEA, and wealth per ADA, obtained from the TBRB, were correlated at .996. Both total enrollment and taxable value per pupil were dropped from the study.

In the debt characteristics category, taxable debt per assessed value and debt service per assessed value were correlated at .976; debt service per assessed value was dropped from the study. Debt per ADA and debt per capita were also highly correlated at .895. This correlation is very close to the cut-off point of .9 and the researcher decided to drop debt per capita as well.

Three variables, total debt outstanding, debt principal outstanding, and debt interest outstanding, also showed strong interrelationships. Total debt outstanding was correlated at .989 with debt principal outstanding and at .986 with debt interest outstanding; debt principal and debt interest were also correlated at .952. Debt principal outstanding and debt interest outstanding were both eliminated, leaving total debt outstanding as a variable. After eliminating variables based on a correlation greater than .9, thirty variables remained for inclusion in the analysis.

The research questions were addressed using multiple regression. While the correlational analysis identifies the strength and direction of relationships between variables, multiple regression identifies the best combination of variables that predict the outcome of the dependent variable (Mertler & Vannatta, 2005). Stepwise multiple regression is a sequential process; variables are added to the analysis one by one. As each variable is entered, the computer calculates which variables to keep and which to drop from further consideration. Stepwise regression is generally used in exploratory studies; when the researcher has a theory as to the importance of variables he should manually determine the sequence in which the variables are added (Mertler & Vannatta, 2005). Stepwise regression analysis was run on each of the four categories of

characteristics for each year of the study data.

The final question of the study asks about interrelationships among the four categories of variables. Both multiple regression and factor analysis were used to address this question. First, stepwise multiple regression using all thirty variables was analyzed. Then factor analysis was performed. Factor analysis is a technique frequently used in exploratory studies; it attempts to reduce the number of variables by grouping those that are moderately or highly correlated into factors (Fraenkel & Wallen, 2000). This technique is useful to the researcher in several ways. It may allow the data set to be reduced to a more manageable size with no loss of important information. Factor analysis may also help the researcher understand the structure of the variables by grouping variables that represent a common underlying characteristic (Field, 2009). In this study, factor analysis was used to determine if variables from the four categories might be re-grouped into new categories which might better explain bond underwriting costs.

Using information obtained from the earlier multiple regression analyses, the researcher made an initial choice of variables to include in the factor analysis. Results of that first analysis led the researcher to select alternate variables for inclusion. Several subsequent attempts were made to find the best combination of factors to include, with each attempt influenced by the results of the previous analyses. The factors chosen from the final factor analysis were then used in a final multiple regression analysis to explore what variables might combine to best explain and predict bond underwriting costs.

CHAPTER IV

PRESENTATION AND ANALYSIS OF DATA

In the five-year period from 2004 to 2008, Texas school districts issued almost $43 billion in municipal bonds. By the end of fiscal year 2008, 78% of the state's 1,026 districts with taxing authority had $53.5 billion in outstanding debt, an average of $11,500 per Texas student. For most of the bond issues, school district officials relied on the services of bond underwriters to market their bonds. During that same five-year period, bond underwriters collected $343 million in fees from Texas school districts, and ultimately, from Texas taxpayers. Table 1 shows the dollar amount of bonds issued and the underwriter spread for each of the five years included in this study. Fiscal year 2007 reported the state's historically highest bond issues, in both issue numbers and amount borrowed, with fiscal year 2005 reporting only slightly smaller numbers.

The state of Texas has both a large number of very small districts and a small number of very large districts, and the bond data illustrate this disparity. For example, in fiscal year 2008, 232 bond issues raised $6.5 billion for Texas schools. 102, or almost half, of those issues were for less than $10 million each, while 20 issues, or fewer than 9%, were for more than $100 million each. More than forty percent of the new debt issued in 2008 was obtained by fewer than 10% of the districts completing bond issues.

Table 1. Texas school district bond issues, 2004 - 2008, excluding private placement bonds

Fiscal year	Number of districts issuing bonds	Number of bonds issued	Dollar amount of bonds issued	Bond underwriting spread
2008	209	232	$8,424,480,006.50	$65,010,463
2007	300	375	$12,772,249,667.00	$94,182,408
2006	184	219	$6,493,046,419.90	$58,008,576
2005	270	372	$10,553,353,692.60	$91,796,657
2004	166	193	$4,755,004,780.90	$34,098,299
Total	1129	1391	$42,998,134,566.90	$343,096,403

Table 2 provides descriptive statistics for the 1,391 bond issues completed by Texas school districts for the five-year period of the study on a year-by-year basis. The data provided in Table 2 offer a sense of the wide disparity among districts in Texas. For the five years included in this study, bond issue amounts ranged from $370,000 borrowed by Roxton ISD, a district serving 260 students in northeast Texas, to almost $500 million borrowed by North East ISD, a fast-growing district in San Antonio with more than 63,000 students enrolled. The underwriter spreads are equally diverse. Houston ISD reports both the smallest and largest total underwriting spreads. In 2005 that district paid underwriters $7.76 million to sell $193 million in bonds. Table 2 also highlights the wide variations in underwriter spread relative to the issue amount. Over the five years of this study, spreads ranged from zero to more than nine percent of the amount borrowed by a school district.

Table 2. Descriptive statistics: Texas school district bond issues, 2004 - 2008

		Issue par value	Underwriter Spread	Spread as a percentage of par value
2008				
N	232			
	Mean	$36,312,414	$280,218	0.9206
	Median	$13,600,000	$127,781	0.7052
	Std. Deviation	$51,667,649	$496,528	0.6966
	Minimum	$1,067,333	$14,390	0.1670
	Maximum	$389,825,000	$6,163,044	4.8862
2007				
N	375			
	Mean	$34,059,332	$251,153	0.8257
	Median	$15,996,088	$122,283	0.7085
	Std. Deviation	$48,829,987	$429,519	0.5399
	Minimum	$535,000	$0	0.0000
	Maximum	$488,590,965	$5,775,622	7.2467
2006				
N	219			
	Mean	$29,648,614	$264,879	0.9587
	Median	$14,014,995	$102,131	0.7122
	Std. Deviation	$42,386,139	$596,167	0.9707
	Minimum	$370,000	$831	0.0384
	Maximum	$290,205,000	$6,473,132	8.2541
2005				
N	372			
	Mean	$28,369,230	$246,765	0.8469
	Median	$13,917,498	$98,027	0.6940
	Std. Deviation	$40,470,639	$617,696	0.6926
	Minimum	$500,000	$4,035	0.3550
	Maximum	$400,000,000	$7,762,469	9.1369
2004				
N	193			
	Mean	$24,637,330	$176,675	0.7682
	Median	$9,700,000	$63,652	0.6764
	Std. Deviation	$40,698,175	$349,606	0.5784
	Minimum	$400,000	$0	0.0000
	Maximum	$300,000,000	$3,208,922	6.4178

Research Questions

Research Question #1

Research question #1 focuses on the relationships between financial characteristics and underwriting costs. Eight variables were chosen to represent financial characteristics of school districts. The variables included are total district revenue (TTLREV), revenue per student (REVSTU), percent of revenue from local sources (PCLOC), end of year fund balance (FUNDBAL), end of year fund balance as percentage of budgeted revenues (PCFUNDBAL), maintenance and operations tax rate (MOTAX), interest and sinking fund tax rate (ISTAX), and total tax rate (TTLTAX). Appendix A provides a more detailed descriptive of each of the variables included in the study. Descriptive statistics for each of these variables are presented in Table 3. In calculating descriptive information for district issuers, each district issuing bonds was included only once each year, regardless of the number of bonds issued by that district.

Two of the variables, total revenue and fund balance, again illustrate the enormous disparity in district size among Texas school districts. For example, 2008 data show total revenue for issuing districts ranging from $1.39 million for Etoile ISD, a district in east Texas serving students in grades K-8 during the time period of this study, to almost $520 million for Ft. Bend ISD in the Houston metropolitan area. The 2008 mean revenue for issuing districts was $74.25 million while the median was only $28.8 million. Over the five-year period of the study, 233 of the 1,129 districts included had less than $10 million in revenue each year; 875 had less than $100 million each year.

Two districts in the state, Houston and Dallas, each have revenues exceeding $1 billion annually; however, revenues for these two districts were eliminated as outlier variables.

The state also has a wide disparity in per pupil amounts, as is illustrated by the revenue per student information. For example, in fiscal year 2007, districts issuing bonds reported per pupil revenues ranging from $6,762 to $14,465, a difference of more than $7,000 per student.

Correlations among the eight financial variables were calculated; the Pearson correlation coefficients are provided in Table 4. Strong relationships exist between several of the variables, but no pairs of variables had a Pearson coefficient greater than .9, although the relationship between total district revenue and district fund balance was very close to that amount. Most of the relationships had a correlation coefficient of less than .3. Since this is an exploratory study, the researcher decided to continue the analysis using all eight of the financial variables originally chosen for inclusion in the study.

The direction of the relationships between variables revealed no surprising findings. Total revenue and revenue per student are negatively related, meaning that as total revenue increases, the amount per student decreases. One possible explanation for this relationship is the economies of scale experienced by larger districts, but other factors may also play a part in this relationship. Revenue per student is also negatively related to both the maintenance and operations tax rate, and total tax rate.

Table 3. Descriptive statistics: Financial characteristics of Texas school districts issuing bonds, 2004 - 2008

2008		TTLREV	REVSTU	PCLOC	FUNDBAL	PCFUNDBAL	MOTAX	ISTAX	TTLTAX
N		204	207	209	203	205	206	209	208
Mean		74,245,205	9202.6087	58.00478	11,070,551	18.65	1.3462	0.1864	1.5312
Median		28,838,468	8880.0000	59.00000	4,839,760	18.00	1.3680	0.1730	1.5385
Std. Deviation		105,480,036	1333.33102	21.427090	15,638,460	8.64	0.0471	0.1141	0.1309
Range		518,843,176	6896.00	80.000	80,000,000	45.00	0.3040	0.4410	0.6650
Minimum		1,390,882	6887.00	11.000	0	0.00	1.1960	0.0000	1.1500
Maximum		520,234,058	13783.00	91.000	80,000,000	45.00	1.5000	0.4410	1.8150
Percentiles	25	11,536,817	8314.0000	41.00000	1,773,063	12.00	1.3300	0.0900	1.4300
	50	28,838,468	8880.0000	59.00000	4,839,760	18.00	1.3680	0.1730	1.5385
	75	78,791,981	9696.0000	78.00000	12,286,814	23.00	1.3700	0.2720	1.6315
2007									
N		295	295	300	294	296	294	300	298
Mean		63,383,187	8759.0678	47.79000	8,839,738	19.10	1.4829	0.1721	1.6533
Median		22,545,404	8488.0000	45.00000	3,450,942	18.00	1.5000	0.1625	1.6500
Std. Deviation		96,734,986	1211.91291	21.990555	12,594,822	8.96	0.0399	0.1140	0.1264
Range		510,803,982	7703.00	83.000	63,841,634	52.00	0.3200	0.5000	0.6550
Minimum		979,453	6762.00	8.000	-662,160	-4.00	1.3200	0.0000	1.3450
Maximum		511,783,435	14465.00	91.000	63,179,474	48.00	1.6400	0.5000	2.0000
Percentiles	25	11,196,385	7894.0000	31.00000	1,503,208	13.00	1.4730	0.0800	1.5548
	50	22,545,404	8488.0000	45.00000	3,450,942	18.00	1.5000	0.1625	1.6500
	75	63,894,320	9218.0000	63.00000	9,862,492	24.00	1.5000	0.2680	1.7493
2006									
N		182	179	184	179	182	180	184	182
Mean		79,542,534	8324.5922	51.32609	9,987,244	18.05	1.4658	0.1842	1.6490
Median		29,282,218	8212.0000	49.50000	3,985,385	17.00	1.5000	0.1755	1.6600

Table 3. Continued

		TTLREV	REVSTU	PCLOC	FUNDBAL	PCFUNDBAL	MOTAX	ISTAX	TTLTAX
Std. Deviation		119,074,096	797.08337	22.984247	13,739,587	7.90	0.0563	0.1090	0.1352
Range		628,438,773	5318.00	87.000	66,463,266	38.00	0.3600	0.5000	0.7600
Minimum		2,021,854	5744.00	7.000	85,933	2.00	1.2400	0.0000	1.2400
Maximum		630,460,627	11062.00	94.000	66,549,199	40.00	1.6000	0.5000	2.0000
Percentiles	25	11,461,958	7807.0000	34.00000	1,506,255	12.00	1.4467	0.0980	1.5548
	50	29,282,218	8212.0000	49.50000	3,985,385	17.00	1.5000	0.1755	1.6600
	75	95,326,735	8701.0000	72.00000	12,188,733	23.25	1.5000	0.2600	1.7425
2005									
N		266	266	270	263	267	265	268	269
Mean		75,061,672	8024.7932	48.36296	8,774,361	16.65	1.4686	0.1678	1.6331
Median		30,999,263	7869.0000	45.50000	3,703,929	16.00	1.5000	0.1625	1.6320
Std. Deviation		105,787,622	792.99625	22.364373	11,782,632	8.97	0.0511	0.0930	0.1130
Range		539,813,961	4512.00	85.000	57,639,350	48.00	0.3050	0.3850	0.6750
Minimum		1,421,293	6231.00	7.000	-637,821	-2.00	1.2950	0.0000	1.2950
Maximum		541,235,254	10743.00	92.000	57,001,529	46.00	1.6000	0.3850	1.9700
Percentiles	25	11,868,045	7476.5000	32.00000	1,525,285	10.00	1.4455	0.1000	1.5620
	50	30,999,263	7869.0000	45.50000	3,703,929	16.00	1.5000	0.1625	1.6320
	75	89,446,690	8462.7500	66.00000	10,596,977	21.00	1.5000	0.2315	1.7155
2004									
N		164	164	166	162	160	164	164	165
Mean		79,190,183	7083.5061	58.13855	8,790,328	14.96	1.4590	0.1593	1.6218
Median		26,531,128	6928.5000	56.00000	3,448,086	14.00	1.4865	0.1615	1.6170
Std. Deviation		116,329,011	870.59869	22.552540	12,109,497	8.25	0.0652	0.0955	0.1246
Range		557,248,625	4884.00	89.000	59,596,426	45.00	0.3620	0.3660	0.7290
Minimum		1,312,645	5552.00	8.000	-887,763	-4.00	1.2380	0.0000	1.2600
Maximum		558,561,270	10436.00	97.000	58,708,663	41.00	1.6000	0.3660	1.9890
Percentiles	25	10,347,997	6547.0000	38.00000	1,567,971	9.00	1.4415	0.0850	1.5455
	50	26,531,128	6928.5000	56.00000	3,448,086	14.00	1.4865	0.1615	1.6170
	75	90,524,501	7446.2500	80.00000	9,116,004	19.00	1.5000	0.2273	1.7100

Table 4. Pearson product moment correlations, school district financial variables

	TTLREV	REVSTU	PCLOC	FUNDBAL	PCFUNDBAL	MOTAX	ISTAX	TTLTAX
TTLREV	1.000							
REVSTU	-.181**	1.000						
PCLOCV	.138**	.073*	1.000					
FUNDBAL	.895**	-.139**	.176**	1.000				
PCFUNDBAL	-.100**	.179**	.053	.055	1.000			
MOTAX	.087**	-.180**	-.050	.048	-.037	1.000		
ISTAX	.268**	-.011	.295**	.269**	-.183**	.019	1.000	
TTLTAX	.266**	-.113**	.218**	.245**	-.168**	.564**	.825**	1.000

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Stepwise multiple regression was used to determine which, in any, of the eight financial variables are useful in predicting underwriter spread. Since underwriter spread generally increases as the size of the bond issue increases, underwriter spread as a percentage of par value was used as the dependent variable in the analysis. The eight financial variables listed previously were all entered into the model.

The multiple regression analysis was conducted using all bond issues completed for each year of the study rather than districts completing bond issues. The number of issues each year is larger than the number of district issuers because some districts completed more than one issue in a given year. The number of cases used is important to the analysis; in general, as more variables are included in the model more cases are required in order for the regression to be reliable. Field (2009) offers guidelines for minimum sample sizes. In order to test the overall model, he offers a rule of thumb that the number of cases should at a minimum be equal to $50 + 8k$, where k is the number of independent variables. In order to test the individual predictors, the minimum should be equal to $104 + k$. This analysis uses eight predictors; using these guidelines would require 114 and 112 cases respectively. For the five years included in the study, 2004 shows the smallest number of bond issues; at 193 that amount easily meets the suggested guidelines.

Table 5 shows the results of the multiple regression models. Only three of the financial variables, total revenue, revenue per student, and percent of revenue from local sources, were found to have any predictive value in determining underwriting spread. From 2004 to 2008, total district revenue was included in the regression model for four of the five years. Standardized beta coefficients for total revenue ranged from -0.247 to

-.146 and all were statistically significant. It is important to note that the total district revenue is inversely related with underwriting costs; that is, as district revenue increases underwriting costs as a percentage of the bond issue amount decrease.

Two other variables contributed to the model. The percentage of funds from local sources was included in the 2004 model; revenue per student was the only predictor used in the 2008 model. Both percentage of local funds and revenue per student are positively correlated with underwriting spread. Overall, financial variables explain very little of the change in underwriting costs. The model for 2004 showed that total revenue and the percentage of local revenue together explain 13% of underwriting costs. Models for the other years of the study showed much less impact from financial variables, with the highest adjusted R^2 of only 5%.

Table 5. Regression analysis, underwriter spread as a percentage of par value with school district financial variables, 2004 - 2008, standardized regression coefficients

	2008	**2007**	**2006**	**2005**	**2004**
TTLREV		-0.232	-0.146	-0.215	-0.247
REVSTU	0.16				
PCLOC					-0.272
F-score	5.685	20.173	4.404	17.118	15.167
Adjusted R^2	0.021	0.051	0.016	0.044	0.135

Dependent variable: Underwriter spread as a percentage of par value

Variables not entered or entered and removed from the analysis: FUNDBAL, PCFUNDBAL, MOTAX, ISTAX, TTLTAX

Research Question #2

Research question #2 studies the relationships between socio-economic/ demographic district characteristics and underwriting costs. Nine socio-economic/ demographic variables were originally selected for the study. The variables selected are total enrollment (TTLENR), percentage of non-white students (NW), percentage of economically disadvantaged students (ECDIS), districts' assessed property value (PVAL), taxable property value per student (TXVSTU), district population (DPOP), district wealth (property value) per student in average daily attendance (WLTHADA), average daily attendance (ADA), and five-year growth rate in average daily attendance (ADAGR). Appendix A provides a more detailed descriptive of each of these variables. Descriptive information on each of these variables is presented in Table 6. Again, descriptive statistics were calculated with each district issuing bonds included only once per year regardless of the number of bonds issued by that district. And again, the descriptive statistics of the socio-economic/demographic district characteristics illustrate the state's diversity. For example, the 2008 data include both tiny Etoile, ISD, serving 129 students and Ft. Bend ISD, with an enrollment of nearly 67,000 students. When state-wide data is examined rather than only those districts issuing bonds, the data reveal that more than half of the state's 1,000 plus districts have fewer than 1,000 students each. In contrast, Houston ISD had more than 180,000 students in average daily attendance during the 2008 school year.

Notable in the socio-economic information is the information on growth rates in average daily attendance. Again, the wide disparity in mean and median values

illustrates disparities in districts. In the five-year period of the study, growth rates ranged from -34.4% in Burton ISD, meaning the district enrollment decreased, to 120.2% for Prosper ISD, outside of Dallas. Several districts, including Plano ISD and Hutto ISD reported even higher growth rates, but were dropped from the study as outliers.

Correlations among the nine socio-economic/demographic variables were calculated; the Pearson correlation coefficients are provided in Table 7. Several of the variables were highly correlated. Not surprisingly, total enrollment, district population, and average daily attendance all show Pearson correlation coefficients greater than .9. Total enrollment was dropped from further consideration, but district population and average daily attendance were both retained for the analysis. Even though the two are so highly related, one measures the population of the district overall, and one measures only the student population. The researcher considered the possibility that some districts with large populations might have small numbers of school-aged residents, or some smaller districts might have a larger than expected number of school children. Taxable value per student and wealth per student in average daily attendance are also highly correlated at .998. The two variables were provided by different data sources, but represent the same variable. Taxable value per student was also dropped from further consideration. The percentage of non- white students and the percentage of economically disadvantaged students also showed a high positive correlation, but both variables were retained for further analysis.

Table 6. Descriptive statistics: Socio-economic/demographic characteristics of Texas school districts issuing bonds, 2004 - 2008

		TTLENR	NW	ECDIS	PVAL	TXVSTU	DPOP	WLTHADA	ADA	ADAGR
2008 N		204	209	209	206	202	198	202	204	203
Mean		8,800	43.64	45.33	3,045,441,706	336,634.13	48,525	359,401.35	8,232	11.12%
Median		3,378	38.00	45.20	1,127,936,389	278,467.50	18,037	296,852.58	3,182	4.93%
Std. Deviation		12,735	26.02	19.23	4,671,336,239	204,435.65	74,702	217,778.35	11,919	23.07%
Minimum		129	2.00	0.00	37,705,804	46,967.00	600	50,192.02	128	-34.43%
Maximum		66,792	99.00	94.50	27,418,334,141	1,201,091.00	420,000	1,273,230.48	63,645	115.83%
Percentiles	25	1,197	21.50	31.50	360,012,049	196,531.00	6,276	208,665.49	1,118	-4.03%
	50	3,378	38.00	45.20	1,127,936,389	278,467.50	18,037	296,852.58	3,182	4.93%
	75	9,813	63.00	57.75	3,723,913,267	435,982.50	51,679	471,007.23	9,384	20.32%
2007 N		295	300	300	296	294	281	294	295	293
Mean		7,913	49.68	51.90	2,027,754,633	246,946.54	42,663	263,680.03	7,369	6.64%
Median		2,696	44.00	52.40	554,846,732	210,813.00	13,900	224,951.00	2,469	2.51%
Std. Deviation		12,202	29.39	22.21	3,451,417,786	163,424.68	68,457	172,756.03	11,344	19.86%
Minimum		56	2.00	1.60	30,770,973	32,956.00	1,194	34,933.80	52	-39.56%
Maximum		63,674	100.00	96.80	19,702,628,029	1,078,488.00	408,000	1,147,956.80	58,782	86.51%
Percentiles	25	1,204	24.00	34.53	208,837,760	146,454.75	6,202	155,923.09	1,111	-5.63%
	50	2,696	44.00	52.40	554,846,732	210,813.00	13,900	224,951.00	2,469	2.51%
	75	8,232	75.75	68.10	2,035,258,525	292,274.75	45,000	311,203.90	7,663	15.07%
2006 N		182	184	184	181	180	178	180	182	182
Mean		10,139	48.13	47.86	2,797,933,250	261,185.24	56,468	275,730.82	9,821	0.12%
Median		3,599	42.00	49.00	851,061,538	232,476.00	19,847	248,110.45	3,457	0.08%
Std. Deviation		15,333	28.02	22.01	4,426,149,536	151,132.51	90,419	158,104.66	14,821	0.19%
Minimum		242	5.00	1.50	11,068,029	21,533.00	775	22,284.74	219	-0.21%
Maximum		79,707	100.00	100.00	27,901,712,003	845,655.00	580,000	876,104.92	74,947	0.81%
Percentiles	25	1,251	25.00	31.10	262,709,964	154,022.75	6,406	161,464.00	1,182	0.00%
	50	3,599	42.00	49.00	851,061,538	232,476.00	19,847	248,110.45	3,457	0.08%
	75	12,503	69.75	59.40	3,647,315,472	333,505.25	61,813	349,185.97	11,811	0.19%

Table 6. Continued

2005	N		266	270	270	266	267	262	268	265	266
Mean			9,845	46.24	47.06	2,313,496,168	239,272.83	50,036	257,729.14	8,999	11.78%
Median			3,929	40.00	45.50	761,675,463	210,243.00	20,365	224,157.98	3,675	8.06%
Std. Deviation			14,037	29.01	22.47	3,614,674,996	150,348.16	74,912	169,955.89	12,619	16.98%
Minimum			79	3.00	0.00	21,768,820	27,404.00	586	29,787.19	68	-20.85%
Maximum			74,730	100.00	97.80	20,471,730,665	821,629.00	394,000	1,277,147.74	67,012	69.90%
Percentiles	25		1,542	21.00	31.10	301,698,312	143,915.00	7,651	151,834.18	1,450	0.91%
	50		3,929	40.00	45.50	761,675,463	210,243.00	20,365	224,157.98	3,675	8.06%
	75		11,764	67.00	60.93	2,759,354,377	278,626.00	55,167	298,526.91	11,113	19.70%
2004	N		164	166	166	163	163	161	163	164	164
Mean			11,491	44.89	43.35	2,667,845,031	258,996.91	68,631	275,102.88	10,704	11.65%
Median			3,898	40.50	40.15	883,173,891	221,609.00	19,500	236,699.27	3,660	9.54%
Std. Deviation			16,847	25.90	20.42	4,209,180,650	148,525.26	119,161	156,033.23	15,653	17.05%
Minimum			156	2.00	5.50	30,505,161	24,310.00	949	25,981.15	152	-26.44%
Maximum			80,989	99.00	95.50	27,170,645,727	837,985.00	667,705	889,083.70	73,695	73.87%
Percentiles	25		1,608	24.00	28.00	349,304,132	156,213.00	7,580	164,828.64	1,500	0.11%
	50		3,898	40.50	40.15	883,173,891	221,609.00	19,500	236,699.27	3,660	9.54%
	75		13,080	62.25	56.28	3,104,647,987	317,317.00	64,839	339,745.30	12,231	20.77%

Again, the direction of the relationships between variables resulted in no unexpected amounts. As expected, the percentage of economically disadvantaged students was negatively correlated with indicators of property wealth.

Stepwise multiple regression was used to determine which, if any, of the seven socio-economic/demographic variables retained in the study are useful in predicting underwriter spread as a percentage of the par value of the bond issue. Using the guidelines described earlier, the minimum number of cases that should be used with seven variables is 106 in order to test the overall model, or 111 to test individual predictors. Again, with the smallest number of bond issues being 193 in 2004, this study easily meets the guidelines.

Using stepwise regression, three of the seven variables were used in the final multiple regression models. Average daily attendance was the only predictor retained in 2005, 2006, and 2007. Both property value and wealth per student in average daily attendance were used in the model for 2004. No socio-economic/demographic factors were found to have predictive value in the 2008 regression analysis. Table 8 presents the results of the multiple regression analysis for socio-economic/demographic district characteristics.

Table 7. Pearson product moment correlations, school district socio-economic/demographic variables

	TTLENR	NW	ECDIS	PVAL	TXVSTU	DPOP	WLTHADA	ADA	ADAGR
TTLENR	1.000								
NW	.320**	1.000							
ECDIS	.012	.785**	1.000						
PVAL	.871**	.167**	-.171**	1.000					
TXVSTU	.006	-.238**	-.409**	.221**	1.000				
DPOP	.935**	.270**	-.020	.866**	.045	1.000			
WLTHADA	.009	-.234**	-.400**	.224**	.998**	.043	1.000		
ADA	.991**	.323**	.009	.878**	.013	.939**	.010	1.000	
ADAGR	.187**	-.055	-.301**	.189**	.037	.137**	.030	.184**	1.000

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

The socio-economic variable that most consistently predicts underwriting costs is average daily attendance, which represents the number of students actually attending school in the district. Standardized beta coefficients ranged from -.159 to -.238 and all were statistically significant. Again, the relationship is negative, meaning that as the number of students increases, underwriting costs decline. Adjusted R^2 for ADA ranged from .021 to .053, representing predictive ability of 2 to 5%.

Table 8. Regression analysis, underwriter spread as a percentage of par value with school district socio-ecnomic/demographic variables, 2004 - 2008, standardized regression coefficients

	2008	**2007**	**2006**	**2005**	**2004**
PVAL					-0.24
WLTHADA					-0.155
ADA		-0.238	-0.159	-0.212	
F-score		20.483	5.271	16.667	10.176
Adjusted R^2		0.054	0.021	0.042	0.091

Dependent variable: Underwriter spread as a percentage of par value
Variables not entered or entered and removed from the analysis: NW, ECDIS, DPOP, ADAGR

Research Question #3

Research question number 3 investigates relationships between school district debt characteristics and bond underwriting costs. Seven variables were initially selected for inclusion in the study: debt principal outstanding (PRIN), interest outstanding (INT), total debt outstanding (TTLDEBT), debt per assessed property value (DEBTPVAL), debt service per assessed property value (DSERPVAL), taxable debt per capita district population (DEBTCAP), and taxable debt per student in average daily attendance

(DEBTADA). Appendix A provides detailed descriptions of these variables. Table 9 provides descriptive statistics for these seven variables. Again, variations in district size are reflected in the descriptive information, as total district debt outstanding ranges from zero to more than $1.2 billion. The range of values is also remarkable on a per student basis; debt per student in average daily attendance ranges from zero to $39.6 thousand.

Of the districts analyzed, 90 districts, or 7%, had no debt prior to the current bond issue while 591 districts, or more than half, had less than $50 million in debt outstanding. Twenty-seven districts, 2.4% of the districts included in this study, each had more than $1 billion in debt outstanding prior to the current borrowing. Generally, these districts are in high-growth, major metropolitan areas near Houston, Dallas, and Austin-San Antonio. At the end of fiscal year 2008, 37% of the outstanding debt of Texas school districts was on the books of just 11 districts; that is, more than one-third of the state's school district total debt was borrowed by only 1% of its school districts.

Table 9. Descriptive statistics: Debt characteristics of Texas school districts issuing bonds, 2004 - 2008

		PRIN	INT	TTLDEBT	DEBTPVAL	DSERVPVAL	DEBTCAP	DEBTADA
2008								
N		206	203	203	209	206	198	209
Mean		114,812,736	75,211,161	180,332,062	0.04	0.07	2,377.70	11,871.73
Median		31,384,510	18,071,437	47,900,926	0.03	0.06	2,009.31	10,192.46
Std. Deviation		181,806,468	114,457,723	274,699,546	0.03	0.06	1,883.38	9,375.03
Minimum		0	0	0	0.00	0.00	0.00	0.00
Maximum		822,938,692	569,654,882	1,292,482,326	0.19	0.29	8,451.19	39,629.37
Percentiles	25	7,526,533	3,412,999	11,414,268	0.01	0.02	908.19	4,659.20
	50	31,384,510	18,071,437	47,900,926	0.03	0.06	2,009.31	10,192.46
	75	129,735,316	94,849,429	229,070,888	0.06	0.10	3,323.98	17,152.69
2007								
N		294	293	293	300	296	277	295
Mean		78,629,201	57,344,633	134,571,515	0.04	0.07	1,738.21	8,598.65
Median		19,607,500	14,252,172	35,287,508	0.03	0.06	1,483.70	7,454.01
Std. Deviation		131,794,102	95,195,495	221,850,769	0.04	0.06	1,301.91	6,925.60
Minimum		0	0	0	0.00	0.00	0.00	0.00
Maximum		665,085,284	558,278,233	1,201,430,442	0.24	0.28	5,951.95	30,811.69
Percentiles	25	4,444,954	1,754,794	6,694,944	0.02	0.02	699.41	3,123.23
	50	19,607,500	14,252,172	35,287,508	0.03	0.06	1,483.70	7,454.01
	75	86,021,482	63,511,294	145,137,553	0.06	0.10	2,470.20	12,739.71
2006								
N		179	178	179	184	182	176	182
Mean		96,553,620	72,164,291	172,823,598	0.04	0.07	1,763.21	9,345.89
Median		26,770,000	17,837,670	45,554,703	0.03	0.06	1,642.91	8,010.81

Table 9. - Continued

		PRIN	INT	TTLDEBT	DEBTPVAL	DSERVPVAL	DEBTCAP	DEBTADA
Std. Deviation		149,345,823	115,541,612	270,068,340	0.06	0.06	1,268.96	6,878.60
Minimum		0	0	0	0.00	0.00	0.00	0.00
Maximum		760,204,890	640,403,142	1,289,536,666	0.68	0.28	6,425.44	31,128.12
Percentiles	25	5,505,000	3,046,769	8,805,250	0.02	0.03	738.36	3,888.49
	50	26,770,000	17,837,670	45,554,703	0.03	0.06	1,642.91	8,010.81
	75	103,675,060	90,405,167	211,628,375	0.06	0.10	2,416.53	13,498.10
2005								
N		263	264	264	270	263	263	267
Mean		79,111,139	63,191,167	144,895,692	0.04	0.07	1,616.71	8,274.62
Median		29,105,000	19,876,296	47,140,354	0.03	0.06	1,358.13	6,777.49
Std. Deviation		119,107,786	101,318,947	222,584,324	0.04	0.06	1,203.21	5,926.46
Minimum		0	0	0	0.00	0.00	0.00	0.00
Maximum		582,756,580	531,037,264	1,151,905,337	0.25	0.29	5,912.97	26,726.84
Percentiles	25	8,320,000	4,716,880	12,628,938	0.02	0.02	685.44	3,874.32
	50	29,105,000	19,876,296	47,140,354	0.03	0.06	1,358.13	6,777.49
	75	85,118,507	71,864,044	151,813,127	0.06	0.11	2,258.29	12,091.79
2004								
N		160	162	162	166	164	161	164
Mean		77,266,483	63,269,454	148,192,302	0.03	0.06	1,435.68	7,492.20
Median		24,697,042	16,995,797	45,665,408	0.03	0.05	1,242.14	6,662.76
Std. Deviation		116,321,932	98,027,533	227,234,668	0.03	0.05	1,110.02	5,770.82
Minimum		0	0	0	0.00	0.00	0.00	0.00
Maximum		529,824,664	543,577,784	1,089,543,995	0.12	0.20	4,513.33	26,663.59
Percentiles	25	6,125,000	2,101,708	8,295,382	0.01	0.02	544.23	2,662.71
	50	24,697,042	16,995,797	45,665,408	0.03	0.05	1,242.14	6,662.76
	75	82,701,615	84,265,416	170,000,003	0.05	0.09	2,087.81	11,728.05

Analysis of the correlations among the seven debt variables reveals numerous high positive relationships, as shown in Table 10. Debt principal outstanding, interest outstanding, and total debt are all very highly related (Pearson correlation coefficient >.9); both debt principal and interest were dropped from further analysis. Debt per assessed property value and debt service per assessed property value are correlated at .973; debt per capita and debt per ADA are correlated at .924. Debt service per assessed property value and debt per capita were also eliminated from further data analysis.

Multiple regression analysis was conducted on the debt variables. Again, underwriting spread as a percentage of par value was the dependent variable, and the stepwise method of regression was used. The three debt variables retained after correlation analysis, total debt, debt per assessed property value, and debt per ADA, were used as independent or predictor variables. The guidelines described earlier require at least 107 cases in an analysis using 3 independent variables; the data used in this study easily meet that requirement. Results of the multiple regression are shown in Table 11.

Only total debt outstanding was retained in the regression models provided by the analysis, and the analysis provided a model for only three of the five years using debt variables. Standardized beta coefficients ranged from -.277 to -.124, and all were significant. Overall, total debt outstanding does very little to explain underwriting costs, since R^2 ranged from 1.3% to 7.1%.

Table 10. Pearson product moment correlations, school district debt variables

	PRIN	INT	TTLDEBT	DEBTPVAL	DSERVPVAL	DEBTCAP	DEBTADA
PRIN	1.000						
INT	.928**	1.000					
TTLDEBT	.985**	.975**	1.000				
DEBTPVAL	.150**	.198**	.163**	1.000			
DSERVPVAL	.235**	.317**	.256**	.973**	1.000		
DEBTCAP	.378**	.427**	.391**	.493**	.657**	1.000	
DEBTADA	.450**	.513**	.472**	.500**	.679**	.924**	1.000

**. Correlation is significant at the 0.01 level (2-tailed).

Table 11. Regression analysis, underwriter spread as a percentage of par value with school district debt variables, 2004 - 2008, standardized regression coefficients

	2008	2007	2006	2005	2004
TTLDEBT		-0.174		-0.124	-0.277
F-score		11.124		5.588	15.166
Adjusted R^2		0.027		0.013	0.071

Dependent variable: Underwriter spread as a percentage of par value

Variables not entered or entered and removed from the analysis: DEBTPVAL, DEBTADA

Research Question #4

Research question #4 focuses on relationships between school managerial factors and bond underwriting costs. Twelve variables were chosen for inclusion in the study: district accountability rating (DRATE), attendance rate (ATTRATE), long-term drop-out rate (DROP), 4-year graduation rate (GRAD), percent of students passing all parts of state accountability exams (PASSALL), percent of students taking college admissions exams (TEST), percent of students scoring at or above the criterion on college admissions exams (CRIT), SAT scores (SAT), ACT scores (ACT), teachers in the district with fewer than five years' professional experience (TCHR5), teachers' average years of professional experience (TCHRAVG), and teacher turnover (TTURN). More detailed information about each of these variables is provided in Appendix A.

Descriptive statistics for the twelve variables are shown in Table 12. Most of these variables are percentages or average amounts, and consequently the variables do not show the wide extremes in values caused by district size that the financial, socio-economic/demographic, and debt categories exhibit. There are some notable amounts, however. Wide ranges appear in the number of teachers with less than five years'

Table 12. Descriptive statistics: Managerial characteristics of Texas school districts issuing bonds, 2004 - 2008

2008		DRATE	ATTRATE	DROR	GRAR	PASSALL	TEST	CRIT	SAT	ACT	TCHR5	TCHRAVG	TTURN
N		206	207	200	201	208	201	202	187	202	206	206	207
Mean		2	95.81	5.40	87.10	73.13	64.20	24.98	991	20.3	33.03	11.96	16.104
Median		2	95.80	4.10	88.80	73.00	64.40	24.00	992	20.3	32.60	11.95	15.4
Std. Deviation		0	0.63	4.39	7.19	9.76	13.65	12.16	63	1.9	9.82	2.04	5.5555
Minimum		1	94.00	0.00	67.10	49.00	30.80	0.00	794	15.1	5.40	6.90	5.8
Maximum		3	97.60	19.70	100.00	96.00	100.00	60.90	1188	25.4	58.80	16.80	39.8
Percentiles	25	2	95.40	2.33	82.40	67.00	54.85	17.23	951	19.2	27.18	10.50	12.1
	50	2	95.80	4.10	88.80	73.00	64.40	24.00	992	20.3	32.60	11.95	15.4
	75	2	96.20	7.48	92.30	80.00	73.60	33.30	1030	21.6	39.63	13.40	19.4
2007													
N		296	298	291	294	299	290	293	263	289	296	298	297
Mean		2	95.91	3.09	88.33	67.87	62.37	22.08	978	19.8	34.39	11.62	16.047
Median		2	95.90	2.30	88.50	68.00	62.45	21.20	985	20.0	33.80	11.60	15
Std. Deviation		0	0.71	2.88	6.07	11.41	14.52	13.02	75	2.0	9.49	1.91	5.30
Minimum		1	93.80	0.00	70.80	41.00	28.80	0.00	793	14.2	5.70	6.00	0
Maximum		3	97.80	12.30	100.00	95.00	100.00	59.60	1190	24.7	63.10	16.30	32
Percentiles	25	2	95.40	0.90	84.98	59.00	52.25	12.50	934	18.5	27.33	10.20	11.9
	50	2	95.90	2.30	88.50	68.00	62.45	21.20	985	20.0	33.80	11.60	15
	75	3	96.40	4.70	92.70	77.00	72.78	30.35	1033	21.3	40.65	13.10	19.9
2006													
N		181	181	178	180	184	178	180	167	175	183	184	181
Mean		2	95.92	2.38	89.34	63.66	62.03	23.46	977	20.0	33.97	11.74	17.503
Median		2	95.90	1.85	89.75	64.00	61.75	22.95	983	20.3	33.30	11.75	16
Std. Deviation		0	0.64	2.19	5.49	12.36	12.61	12.50	76	2.0	9.95	2.09	5.6733

Table 12. Continued

		DRATE	ATTRATE	DROR	GRAR	PASSALL	TEST	CRIT	SAT	ACT	TCHR5	TCHRAVG	TTURN
Minimum		2	94.10	0.00	75.80	32.00	34.60	0.00	733	14.0	8.30	6.30	2.5
Maximum		3	97.40	9.70	100.00	92.00	96.00	58.80	1186	25.2	62.90	17.80	35.6
Percentiles	25	2	95.60	0.60	85.63	57.00	52.23	14.38	935	18.8	27.40	10.33	13.7
	50	2	95.90	1.85	89.75	64.00	61.75	22.95	983	20.3	33.30	11.75	16
	75	2	96.30	3.63	93.30	73.00	69.15	32.33	1030	21.4	39.60	13.00	21.35
2005													
N		268	268	261	266	270	263	265	252	259	269	269	268
Mean		2	95.73	3.08	88.16	69.11	61.88	24.22	985	19.9	32.81	11.97	14.661
Median		2	95.70	2.60	88.70	69.50	60.50	23.90	995	20.1	33.60	11.90	14
Std. Deviation		0	0.67	2.49	6.30	10.69	13.67	12.25	75	1.8	10.21	1.91	4.6283
Minimum		2	93.70	0.00	71.30	40.00	25.00	0.00	791	15.3	3.80	6.40	4
Maximum		3	97.60	10.80	100.00	96.00	97.50	57.90	1187	25.0	63.40	17.60	28.4
Percentiles	25	2	95.33	1.30	83.83	63.00	51.40	16.35	942	19.0	24.95	10.75	11.6
	50	2	95.70	2.60	88.70	69.50	60.50	23.90	995	20.1	33.60	11.90	14
	75	3	96.20	4.60	92.93	77.00	70.80	31.95	1034	21.1	39.60	13.20	17
2004													
N		165	165.00	159.00	161.00	166.00	161.00	162.00	154	160.0	166.00	166.00	163
Mean		3	95.89	3.51	86.68	68.47	62.96	24.16	977	20.0	34.45	11.78	16.256
Median		3	95.90	2.80	87.60	69.45	62.50	24.05	990	20.3	35.50	11.70	15.3
Std. Deviation		1	0.70	2.64	6.23	10.18	13.46	11.49	68	1.6	9.43	1.79	4.8802
Minimum		2	93.90	0.00	71.60	40.60	25.40	0.00	800	15.6	12.50	7.30	6.7
Maximum		4	97.40	10.80	100.00	87.70	100.00	57.20	1129	24.0	62.00	16.60	32.4
Percentiles	25	2	95.50	1.50	82.65	62.38	53.70	16.70	938	19.1	28.38	10.60	13.1
	50	3	95.90	2.80	87.60	69.45	62.50	24.05	990	20.3	35.50	11.70	15.3
	75	3	96.40	5.30	91.00	75.43	71.95	31.23	1022	21.0	40.53	12.90	18.9

professional experience, with the highest percentages generally occurring in high-growth districts.

The correlation analysis of the twelve managerial variables shows several of the variables to be highly related, but none of the pairs of variables have a Pearson correlation coefficient greater than .9, as shown in Table 13. Most of the coefficients are less than .6, but several higher relationships are noteworthy. SAT scores, ACT scores, and the percentage of students scoring above the criterion on college admissions exams show high positive relationships; all are greater than .8. The long-term drop-out rate is negatively correlated to most of the other managerial variables; this is consistent with logic that higher drop-out rates would be found in districts with lower college admission test scores, lower rates of students passing state accountability exams, and lower graduation rates. The number of teachers with fewer than five years' professional experience and teacher turnover are also negatively correlated with the district rating, attendance rate, graduation rates, and college admission exam scores.

Table 13. Pearson product moment correlations, school district managerial variables

	SPRPC	DRATE	ATTRATE	DROR	GRAR	PASSALL	TEST	CRIT	SAT	ACT	TCHR5	TCHRAVG	TTURN
SPRPC	1.000												
DRATE	-.044	1.000											
ATTRATE	.046	.298**	1.000										
DROR	-.046	-.263**	-.411**	1.000									
GRAR	.061*	.229**	.476**	-.725**	1.000								
PASSALL	.022	.446**	.465**	-.377**	.420**	1.000							
TEST	-.003	.159**	.345**	-.182**	.248**	.387**	1.000						
CRIT	.022	.219**	.254**	-.289**	.264**	.681**	.332**	1.000					
SAT	.020	.227**	.294**	-.325**	.329**	.701**	.351**	.864**	1.000				
ACT	.071*	.275**	.320**	-.386**	.399**	.725**	.248**	.856**	.805**	1.000			
TCHR5	-.029	-.164**	-.131**	.218**	-.310**	-.295**	-.178**	-.134**	-.233**	-.226**	1.000		
TCHRAVG	.033	.097**	.014	-.090**	.158**	.131**	.120**	.050	.124**	.104**	-.885**	1.000	
TTURN	.059*	-.093**	-.084**	.025	.070*	-.257**	-.116**	-.151**	-.152**	-.145**	.380**	-.329**	1.000

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Stepwise multiple regression was conducted using the managerial factors for each of the five years of the study; results were inconsistent from year to year. Only four of the twelve variables were used in any of the regression models: long-term graduation rate, teacher turnover, percentage of students scoring above criterion, and SAT scores. Table 14 shows the regression results. Again, the multiple regression analysis was based on all bonds issued. Several districts completed more than one issue in the same year.

Overall, managerial characteristics explain a relatively small amount of the variation in bond underwriter costs per bond. Long-term graduation rates are used as a predictor in two of the five years, with standardized beta coefficients of .170 and .151. Teacher turnover and SAT scores also contribute to the model in one year each, with standardized beta coefficients of .170 and .589, respectively. Finally, the percentage of students scoring above the criterion on college admissions tests is included in one year of the study, with a standardized beta of -.765. The results for the 2004 regression model are somewhat surprising. It would seem reasonable that both SAT scores and the percentage of students scoring above the criterion on college admissions tests would have the same sign; since they are related measures they should influence the model similarly. Yet one is positively correlated with underwriting costs, and one is negatively correlated.

Table 14. Regression analysis, underwriter spread as a percentage of par value with school district managerial variables, 2004 - 2008, standardized regression coefficients

	2008	2007	2006	2005	2004
GRAD		0.170		0.151	
CRIT					-0.765
SAT					0.589
TCHRTURN		0.170			
F-score		6.398		4.382	5.625
Adjusted R^2		0.052		0.017	0.090

Dependent variable: Underwriter spread as a percentage of par value

Variables not entered or entered and removed from the analysis: DRATE, ATTRATE, DROR, PASSALL, TEST, ACT, TCHR5, TCHRAVG

Research Question #5

The last of the five research questions is concerned with multiple interactions between school district financial, socio-economic, debt, and managerial characteristics and their effect on bond underwriting costs. As a first step in attempting to answer this question, stepwise multiple regression was used, with all of the variables used in the four earlier regression analyses included as predictor variables. Results of the regressions for each of the five years are provided in Table 15.

When all 30 of the variables from the four categories previously included in the study are used in the analysis, stepwise multiple regression shows that only three are useful in explaining underwriting costs. The 2007 regression model showed average daily attendance as the only predictor; the standardized coefficient was negative. This negative relationship is consistent with the results of earlier regression, as it again demonstrates that as district size increases, underwriter costs decline. R^2 in the model is .052, meaning that ADA explains slightly more than 5% of the underwriting costs.

Total revenue was the only predictor returned in the 2005 regression model and as expected it also has a negative coefficient. Again, total revenue is associated with larger districts; more revenue is associated with lower underwriting costs.

The regression model for 2004, however, has two variables included as predictor variables. The percentage of revenue from local sources and ADA both contribute to the explanation of bond underwriting costs, and both were negatively related to cost. The negative relationship of ADA and underwriting costs is consistent with prior results, as an increase in size is associated with a decline in underwriting cost as a percentage of bond par value. The negative coefficient for percentage of revenue from local sources, however, is surprising. In the regression models of financial variables, percentage of revenue from local sources was found to be positively related to underwriter costs. No obvious explanation for this inconsistency emerges, although the complex interactions among the numerous variables is a likely starting point.

Table 15. Regression analysis, underwriter spread as a percentage of par value with school district finanical, socio-economic/demographic, debt, and managerial variables, 2004 - 2008, standardized regression coefficients

	2008	2007	2006	2005	2004
ADA		-0.238			-0.251
PCLOC					-0.279
TTLREV				-0.215	
F-score		11.353		9.191	7.845
Adjusted R^2		0.052		0.041	0.128

Independent variable: Underwriter spread as a percentage of par value

As stated previously, multiple regression using all thirty variables showed that only three were useful in predicting underwriting costs. Yet in the regressions done earlier in the study, using variables grouped into separate financial, socio-economic/ demographic, debt, and managerial categories, several other variables are found to be useful in predicting the cost in question. As a final statistical test, factor analysis was conducted to determine if the district variables were in fact describing the same characteristic. If so, these variables could be combined into a single variable, or factor, and the factors then used in multiple regression.

Factor extraction was conducted using principal components analysis; this method is appropriately used in exploratory studies (Mertler & Vannatta, 2005). Initially, all thirty variables used in earlier parts of the study were included in this analysis. This first attempt resulted in no factors. Instead the SPSS output indicated a non-positive definite matrix, which might be caused either by too many variables, or by too many highly correlated variables (Field, 2009). Furthermore, Field cautions that factor analysis requires a great deal of judgment and subjective analysis by the researcher.

Based on the lack of results from the initial factor analysis, correlations between variables in each category were re-examined to determine which factors might be dropped from further study. In the financial variables category, the total tax rate was, not surprisingly, highly correlated with both the maintenance and operations tax rate (.563) and the interest and sinking tax rate (.825). Total tax rate was retained since it is the combination of the maintenance and operations and interest and sinking fund components. Fund balance and total revenue were also highly correlated at .897. The

researcher decided, however, that the two items measure different aspects of a district's financial characteristics, and kept both variables.

Similarly, several variables in the socio-economic category showed high correlations. District population was correlated at .854 with assessed value and at .942 with ADA. Assessed value and ADA were also correlated at .882. District population was dropped from the study, but both assessed value and ADA were retained.

The variables in the managerial category showed the most multicollinearity, with numerous correlations greater than .5. SAT scores, ACT scores, and the percentage of students scoring above the criterion were all highly correlated: SAT and ACT .804; SAT and CRIT .864; ACT and CRIT .856. Both ACT and SAT were dropped. Long-term graduation rate and long-term drop-out rate showed a correlation of -.520, and long-term drop-out rate was removed from further analysis.

No high correlations were found among the three debt factors used previously, so all three were retained for further consideration.

After eliminating the variables named above, 21 variables were entered into the factor analysis. Principal components analysis was conducted using a varimax rotation to determine if any underlying structure exists for the following variables: district accountability rating (DRATE), attendance rate (ATT), long-term graduation rates (GRAD), percentage of students passing all parts of the TAKS exams (PASSALL), percentage of students scoring above the criterion on college admissions exams (CRIT), teachers' average years of professional experience (TCHRAVG), total district revenue (TTLREV), revenue per student (REVSTU), percent of revenue obtained from local

sources (PCLOC), fund balance (FUNDBAL), fund balance as a percentage of budgeted expenditures (PCFUNDBAL), total district tax rate (TTLTAX), total debt outstanding (TTLDEBT), debt per assessed property value (DEBTPVAL), debt per student in average daily attendance (DEBTADA), district property value (PVAL), district wealth per student in average daily attendance (WLTHADA), percentage of non-white students (NW), percentage of economically disadvantaged students (ECDIS), number of students in average daily attendance (ADA), and 5-year growth in average daily attendance (ADAGR). Using the 21 variables, factor analysis was conducted six times in total, once for each of the five years included in the study and once using data from all five years combined. Results of the six analyses were quite similar, with only minor differences from year to year.

After rotation, five components were identified. Factor loadings are shown in Table 16, based on the output from the factor analysis using all five years' of data. Factor 1 is identified as *Size* since the variables that make up the factor are all based on district size. Factor 1 includes total revenue, average daily attendance, district assessed property value, the district's fund balance, and the total debt outstanding. Factor 1 accounted for 27.3% of the variance after rotation, and all items had positive loadings.

Factor 2 is identified as *Students*; it consists of the following variables: percentage of students passing all parts of the state accountability exams, percentage of economically disadvantaged students, percentage of non-white students, the long-term graduation rate, attendance rate, and the district's accountability rating. Factor 2 accounted for 21.29% of the variance after rotation, and items had both positive and negative loadings. The two

negative loading items were ECDIS and NW. Again, this is consistent with previous study results, since increases in the number of economically disadvantaged students and the percentage of non-white students generally are related with lower exam scores, lower attendance, and lower graduation rates.

Factor 3 was identified as *Financial Stress;* it consists of debt per average daily attendance, debt per assessed property values, total tax rate, district growth rate, and the average experience of the district's teachers. One of the variables, teacher experience, has a negative loading. Factor 4 consists of wealth per ADA, percentage of revenue from local sources, and the percentage of students scoring above the criterion on college entrance exams. Factor 4 is identified as *Financial Strength*. All Factor 4 items loaded positively. Finally, Factor 5 consisted of only two items, revenue per student and fund balance percentage. Revenue per student has a positive loading, and fund balance percentage loads negatively, which is somewhat inconsistent. Logic dictates that as each variable increases, a district's financial position would improve. Factor 5 is identified as *Financial position per student.*

Table 16. Rotated component matrix

	Component				
	1	2	3	4	5
TTLREV	.967				
CYADA	.964				
ASSVAL	.929				
FUNDBAL	.926				
TOTALDEBTOUT	.798				
%PASSALL		.777		.428	
%ECDIS		-.752		-.487	
LTGRAR		.719			
%NW		-.717			
ATTRATE		.687			
DRATING		.620			
DEBTPERADA			.847		
TAX DEBT/AV			.717	-.423	
TTLTAXRATE			.712		
ADAGR%			.688		
TCHR AVG EXP			-.669		
WLTHADA				.896	
%LOCREV				.888	
%> CRIT		.540		.547	
REVSTU					.802
FUNDBAL%					-.517

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.
Rotation converged in 7 iterations.

Using the factors identified through factor analysis, multiple regression was again conducted for the five years covered by the study. Results of the regression are shown in Table 17. The results were statistically significant but modest, with R^2 ranging from 2% to almost 18%. Regression models were returned for only three of the five years, and *Size* was included as the primary predictor in all three. Consistent with earlier regression models, variables related to district size appeared often as predictor variables and were

negatively related to the underwriter costs. *Size* also is negatively correlated with underwriter costs as a percentage of par value, meaning that as district size increases, underwriter costs per bond decline.

Financial position per student was included in regression models for two of the five years. This result is unexpected, since the two variables that make up the factor were not influential in the prior regression models. One of the variables, revenue per student, was included in the regression model for financial factors in only one of the five years of the study. The other variable was not included at all.

Factors 2 and 4*, Students* and *Financial strength*, also appeared as predictor variables in one regression model each. Factor 2 generally reflects student strengths and was positively related to underwriter costs, which is contrary to the expected outcome. The expected relationship is negative, since higher student strengths generally correspond to districts with higher bond ratings, and therefore lower bond costs. Factor 4 serves as a measure of a district's financial strength, and does have the expected positive regression coefficient.

Table 17. - Regression analysis, underwriter spread as a percentage of par value with school district factors, 2004 - 2008, standardized regression coefficients

	2008	2007	2006	2005	2004
Factor 1, *Size*		-0.165		-0.225	-0.3
Factor 2, *Students*				0.169	
Factor 3, *Strength*					
Factor 4, *Stress*					-0.256
Factor 5, *Financial position per student*				0.107	0.24
F-score		8.942		10.042	12.862
Adjusted R^2		0.024		0.074	0.179

Independent variable: Underwriter spread as a percentage of par value

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This study was conducted for the purpose of exploring relationships between Texas school district characteristics and bond underwriting costs. Texas allows school districts to issue bonds in order to fund construction and renovation of facilities. Current research suggests the importance of adequate and appropriate learning spaces on educational outcomes, and common sense reinforces the idea that both teachers and students perform better in safe, quiet, clean, healthy environments. Growing student populations in the state coupled with the number of aging school facilities built during the baby boom years indicate that the need for facilities is growing and will continue to grow in the foreseeable future.

Paying for this construction generally requires districts to borrow the needed funds. Both the number and dollar amount of Texas school bond issues have experienced enormous growth in the last decade. Fiscal years 2007, 2005, and 2008, respectively, have witnessed record bond sales in the state; during 2007 districts completed 437 bond issues totaling more than $13 billion. As of August 31, 2008, state school districts had $53.53 billion in debt principal and $40.6 billion in interest outstanding, bringing the total amount owed by taxpayers to more than $94 billion.

Research Questions

Research Question #1

Research question #1 asks about the relationships between school district financial characteristics and bond issue underwriting costs. Multiple regression indicated that of the eight financial variables included in the study, only three were useful in predicting underwriter costs. Total revenue was most often found to have predictive value as it was included in the regression model for four of the five years included in the study, and the relationship between total revenue and underwriter cost was negative. That is, as a district's total revenue increases, bond issue costs decline. Revenue per student and the percentage of revenue from local sources also helped explain underwriter costs. The percentage of revenue from local sources was also negatively related to underwriting costs, which is logical. Higher wealth districts receive less funding from the state, and a district with higher property wealth should pose less risk to the underwriter. Less risk, in turn, suggests the underwriter could accept a lower spread.

Revenue per student, however, had the unexpected result of being positively correlated with issue costs. As another indicator of local wealth, similar results were expected for revenue per student as for the percentage of revenue from local sources. Revenue per student was the only variable used in the model for the 2008 fiscal year; total revenue and percentage of revenue from local sources were not included that year. Numerous explanations are possible for this result, such as overall economic changes, changes in debt conditions in Texas, or effects of the record-high market in the previous year. However, this study has no definite explanation of this result.

Overall, financial variables had a small but statistically significant impact on underwriter costs as a percentage of bond par value. Both Moody's Investor Services and Standard & Poor's list the issuer's financial factors as an important component in their analysis of a bond's rating (Standard & Poor's, 2009b; Moody's Investor Services, 2005). A previous study that attempted to model the ratings process found that the issuer's total revenue did contribute to the ratings model and found that higher revenue was associated with a higher rating (Cluff & Farnham, 1984). The results obtained here are consistent with this earlier study.

Over the five years included in the study, the amount of underwriter cost explained by the financial variables ranged from 1.6% to 13.5%., with the highest relationship shown in the first year of the study. Again, these findings might be explained by many factors, such as overall economic conditions, prevailing changes in interest rates, or specific changes in state school finance, but definite explanations are beyond the scope of this study.

Research Question #2

Research question #2 investigates relationships between school districts' socio-economic/demographic characteristics and underwriter costs as a percentage of bond par value. Seven variables were studied; only three were included in the multiple regression models: district property value, wealth per student, and average daily attendance. All showed a statistically significant but modest ability to explain underwriter costs, and all showed a negative relationship, indicating that in general, as district property values,

wealth per student, and district size increase, underwriter costs decrease. Again, the strongest predictive ability occurred in the first year of the study, with adjusted R^2 equal to slightly more than 9%. For the last year of the study, the regression model returned no results with socio-economic variables.

Research Question #3

Research question #3 studies relationships between districts' debt characteristics and underwriter costs as a percentage of the total bond issue amount. Of the four categories of characteristics, debt characteristics had the fewest variables and showed the smallest relationship with the underwriting costs. Multiple regression returned models in three of the five years, and showed only one variable, total debt outstanding, to be useful as a predictor of underwriting costs. Furthermore, the relationship was negative, which was not expected. A large amount of outstanding debt is generally considered more risky, yet regression indicates that as district debt increases, bond underwriting costs decrease. One possible explanation is that districts with previous debt transactions, and therefore outstanding debt, are "known entities". They have developed relationships with their underwriters, or have a proven track record with the bond market. This, in turn, may result in lower issue costs for the current debt transaction. More research is needed, however, to determine if any of these theories are viable.

Research Question #4

Research question #4 examines relationships between managerial variables and bond underwriting costs. Overall, the results of the multiple regression show that managerial factors are not especially useful in predicting underwriting costs. The regression analysis returned models in only three of the five years, and the results were statistically significant but very modest. Adjusted R^2 ranged from less than 2% to 9%, with the largest explanatory power in the first year included in the study. Twelve variables were entered into the regression model, but only four were found to have predictive ability.

The results of the managerial relationships were also inconsistent from year to year. Four-year graduation rates were included in the model for two of the five years studied; teacher turnover, SAT scores, and the percentage of students scoring above the criterion on college-admission exams were each included in one year's results. Surprising results were obtained from the 2004 model. Both SAT scores and students scoring above the criterion on college-admission tests were included in the regression model. Both variables relate to college-bound student success. It seems logical, then, that the direction of the relationship between the two variables on underwriting costs would be the same. However, while higher criterion scores were negatively related with underwriter costs – that is, more student success predicts lower costs – the percentage of students scoring above the criterion was positively related with costs. No obvious explanation of these seemingly inconsistent results is readily apparent.

Research Question #5

The last research question of this study investigates interrelationships between the financial, socio-economic/demographic, debt, and managerial factors and underwriting costs as a percentage of bond issue amounts. All thirty of the variables used previously in the study were entered into the stepwise regression model. Results of the multiple regression were significantly significant, modest, and inconsistent from year to year. Two of the years covered by the study returned no regression model. Two years, 2005 and 2007, showed only one variable to be predictive of underwriter fees. District total revenue explained 4% and 5%, respectively, of underwriting costs. Also, total revenue was negatively related with the issue cost; as district revenues increased, underwriting costs declined, consistent with results obtained earlier in this study.

The first year covered by the study, however, showed that the percentage of revenues obtained from local sources and average daily attendance both helped account for 12.7% of underwriter costs. Both showed a negative relationship, a relationship again consistent with results obtained earlier in this study. This relationship implies that as local wealth and size increase, underwriter costs decrease.

In a final attempt to answer question 5, factor analysis was conducted. The variables used previously were combined into five new factors, and these factors were then used as the predictor variables in multiple regression. While the results were somewhat inconsistent from year to year, the results did add some new information to the understanding of underwriter costs. In three of the five years for which multiple regression using the results of the factor analysis was conducted, Factor 1, *Size*, was the

only variable used in the regression model, explaining from 2% to almost 11% of the underwriting costs. Total revenue, total average daily attendance, total district property values, total debt, and total fund balance all make up the size factor, and as these amounts increase, underwriting cost per bond amount decreases.

This inverse relationship between district size and cost may be simply due to economies of scale. Other explanations are also possible. Larger districts may have more specialized financial staff members who not only have a better understanding of the complex process of issuing debt and are in a better position to control costs. Larger districts tend to carry more debt, and this may make the district a more "known entity" in the municipal market, which in turn might tend to reduce borrowing costs. Finally, economic competition may play a part in the size benefit. Larger issues, and their larger fees, may be more attractive to underwriters who may then compete more actively for the district's business. However, more research would be required in order to determine which, if any, of the above possible explanations have merit.

One other factor was also found to be useful in explaining underwriting costs. For one year of the regression, the factor for *Financial Stress* was included in the regression model. Increasing debt per student, debt per property value, and tax rates; growing student populations; and decreasing teacher experience all reflect growing districts. With this growth comes the stress of meeting increasing demands on district resources. Not surprisingly, the *district stress* factor and underwriter costs had a positive relationship; as district stress increases, bond underwriting costs also increase. This relationship also might be explained in several ways. The growing district may be a new

entrant into the bond market, and with no previous experience with the district underwriters may require a higher fee. Another possibility is that in districts with high growth rates, the demand for facilities is urgent. Underwriters may require higher costs to compensate for time pressures placed on them to get the necessary funds quickly so that building can begin. Again, more research is needed to determine which, if any, of these explanations has merit.

Conclusions and Recommendations

This exploratory study represents a first attempt at explaining, and therefore understanding, why bond underwriting costs per bond issue amount vary dramatically among Texas school districts. No clear district characteristics emerged as consistent factors in explaining bond issue costs, although of the four categories of district characteristics analyzed, financial variables showed the highest predictive ability. In a state as large and diverse as Texas, perhaps it is unrealistic to expect to find a single factor or set of factors that apply to all districts.

Yet some patterns did emerge from the analysis. It does appear that size matters; larger districts do seem to have some cost advantage over smaller ones. But it is important to remember that while the analysis supports this relationship, it does not necessarily mean that the lower costs are caused by district size. Districts in high-growth areas also seem to pay a premium in underwriting fees. Growing enrollments can create urgent needs to expand facilities.

This study is the first to study bond underwriting costs for Texas school districts, and will hopefully create interest and encourage others to explore the topic more fully. In a speech to business leaders, SEC chairman Christopher Cox reminded his audience that municipal bonds and their related costs are not an abstract theory of interest only to academics. He reminded his audience that

> the municipal market has important affects on everyone in this room, everyone in the city, in the state, everyone in our country and on the business of every enterprise in America. Whether you use the facilities that are financed by bonds, or whether you're an investor who has munis in your portfolio or you're a taxpayer pays higher bills when municipal finance doesn't work out, this topic is all about you…..Municipalities, after all, haven't any money of their own (Cox, 2007).

For whatever reason, the standard practice used by school districts for the issuance of bonds does not lend itself to a simple, transparent analysis of what costs are associated with the issue. The difficulty of analyzing bond costs is confirmed by anecdotal evidence that even some school district financial officers are unable to state what these costs are. Since districts strive to maximize efficiency and are legally obligated to use competitive bidding procedures when acquiring most goods and services, a legitimate question arises as to whether there is significant need for better disclosure of actual cost of issuance. Surprisingly there appears to be a common belief that issue costs have little, if any, consequence to a school district. All compensation to bond underwriters, however, reduces what is available to the district to spend.

It is also hoped that this study, by bringing to light the disparities in underwriting costs among Texas districts, will encourage school district officials to ask hard questions of the underwriters in an attempt to understand and minimize the costs. Further study

including not only the underwriting costs, but also all issue costs and interest costs, is suggested. Further research is suggested with regard to how greater transparency for the bond issue process can be accomplished in light of the inherent complexity of the process as compared to a simple contract for goods or services. Such transparency is essential in order for school districts to be able to meet their essential goal of maximizing the use of taxpayer dollars to meet the needs of their students.

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APPENDIX A

List of variables used, definition, and data source

FINANCIAL VARIABLES

TTLREV	total district revenue, total for all actual revenue, includes all funds: General Fund, National School Breakfast and Lunch Program, Debt Service Funds, and Special Revenue Funds. Shared Services Arrangements, Adult Education Programs, and Capital Projects Funds are not included, Texas Education Agency
REVSTU	district revenue per student, total actual revenue divided by total students, Texas Education Agency
PCLOC	percent local revenue, actual revenue from local taxes, other local sources, and intermediate sources expressed as a percentage of total revenue, Texas Education Agency
FUNDBAL	fund balance; the amount of unreserved, undesignated surplus funds that existed at the end of the prior school year; generally equals the fund balance at the beginning of the current year, Texas Education Agency
PCFUNDBAL	percent fund balance; the amount of surplus fund balance expressed as a percent of total budged expenditures for the general fund for the current year, Texas Education Agency
MOTAX	maintenance and operations tax rate, Texas Bond Review Board
ISTAX	interest and sinking funds tax rate, Texas Bond Review Board
TTLTAX	total tax rate; total of maintenance and operations tax and interest and sinking tax, Texas Bond Review Board

SOCIO-ECONOMIC/DEMOGRAPHIC VARIABLES

TTLENR	number of students in membership in the district as of October 31 of the current school year, at any grade from early education through grade 12; membership is defined as the count of students enrolled with an average daily attendance code that is not equal to zero; that is, students enrolled but who have not attended are not included in membership, Texas Education Agency
NW	percentage of total students reported as other than white, Texas Education Agency
ECDIS	percentage of total students reported as economically disadvantaged (eligible for free or reduced-price meals or other public assistance), Texas Education Agency
PVAL	district's assessed property value; Texas Bond Review Board
TXVSTU	taxable value per student, Texas Education Agency
DPOP	district population
WLTHADA	wealth, calculated as district's assessed property value, per student in average daily attendance, Texas Bond Review Board
ADA	average daily attendance of students enrolled in the district, Texas Bond Review Board
ADAGR	average daily attendance five-year growth rate, Texas Bond Review Board

DEBT VARIABLES

PRIN	debt principal outstanding, Texas Bond Review Board
INT	debt interest outstanding, Texas Bond Review Board

TTLDEBT	total debt principal plus interest outstanding Texas Bond Review Board
DEBTPVAL	debt per district's assessed property value, Texas Bond Review Board
DSERVPVAL	debt service per district's assessed property value, Texas Bond Review Board
DEBTCAP	debt per district population, Texas Bond Review Board
DEBTADA	debt per student in average daily attendance, Texas Bond Review Board

MANAGERIAL VARIABLES

DRATE	district accountability rating, district's rating assigned by the state's accountability system, Texas Education Agency
ATTRATE	student attendance for entire year, includes only students in grades 1 – 12, Texas Education Agency
DROR	number of students who began 9th grade four years earlier and were identified as dropouts before their expected graduation; expressed as percentage of final number of students in the class after four years Texas Education Agency,
GRAR	4-year graduation rate, number of students who began high school four years earlier and graduated before or by the end of their expected graduation year, Texas Education Agency
PASSALL	total number of students who passed all TAKS tests attempted expressed as a percentage of the total number of students who took one or more tests, Texas Education Agency

TEST	number of graduates of the class who took either the SAT or ACT, expressed as a percentage of all graduates, Texas Education Agency
CRIT	the number of examinees in the class who, on their most recent college admissions test, scored at or above the criterion score, Texas Education Agency
SAT	sum of mathematics and verbal SAT scores for all students divided by the number of examinees, Texas Education Agency
ACT	average of the ACT composite scores (an average of English, mathematics, reading, and science reasoning portions of the ACT), created by summing the composite scores and dividend by the number of ACT examinees, Texas Education Agency
TCHR5	the full time equivalent count of teachers with zero through five years of total professional experience expressed as a percentage of the total teacher FTE count; professional experience includes experience earned in Texas or another state, Texas Education Agency
TCHRAVG	teachers' average years of experience, a weighted average obtained by multiplying each teachers' FTE count by his or her years of experience, summing for all weighted counts, and dividing by the total number of FTEs; adjustments are made so that teachers with zero experience are appropriately weighted in the formula, Texas Education Agency
TTURN	teacher turnover, the FTE count of teachers employed in the district in the fall who were employed in the fall of the previous year, divided by the teacher FTE count for the previous year, Texas Education Agency

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