An Empirical Examination of the Determinants of Municipal Bond Underwriting Fees

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The municipal bond market has undergone dramatic changes over the last 20 years. Some of these changes relate to the use and activities of financial intermediaries, including financial advisors and investment banks, both of which have come under increasing scrutiny in light of the Great Recession's impact on the finances of subnational entities. Given this evolving context and escalating criticisms, it is necessary to revisit the activities of these market actors in the municipal bond issuance process. To that end, this paper empirically investigates the factors associated with the fees charged by investment banks in the underwriting of municipal securities in the State of Texas between 1999 and 2010. The results of this analysis have direct policy implications for efficient subnational debt management practices as well as broader theoretical implications related to underwriter monopsony power, information asymmetry, financial intermediation, and debt management networks.

INTRODUCTION

The capital activities of state and local governments often require financing from the municipal securities markets. The issuance of such municipal securities involves the services of many actors,

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including legal counsel, credit rating agencies, auditors, financial advisors, and investment banks. The role and activities of some of these financial intermediaries in the municipal bond market, most notably financial advisors and investment banks, have come under increasing scrutiny in light of the Great Recession and its impact on the finances of subnational entities. The independent financial advisory market, which is made up of independent financial consulting firms that advise state and local governments on all facets of their financings, has grown dramatically over the last 30 years (Johnson, 1994). However, concerns about these firms' fitness, accountability, and fiduciary responsibility led to the adoption of formal regulation of independent financial advisors as set forth in the landmark 2010 Dodd-Frank financial reform law (Quigley, 2011a). Subtitle H of Title IX of the Dodd-Frank law mandates that independent financial advisors to state and local governments register with the Securities and Exchange Commission (SEC) and designates to the Municipal Securities Rulemaking Board (MSRB) regulatory authority over these consultants. The law also clearly states that the advisor's fiduciary duty is solely to the state or local government and requires the MSRB to develop professional qualifications standards for financial advisors that will be assessed through a competency examination as yet still under development (Quigley, 2011b).

With respect to municipal bond underwriters, there has been ongoing concern over the years regarding rent-seeking and other improper behavior on the part of investment banks in the underwriting of municipal securities, as most notably evidenced by several very large legal settlements to the federal government related to the yield-burning scandal of the mid-1990s (McGeehan, 2000). Yield burning refers to an underwriter's practice of selling reinvestment securities at inflated prices to a state and local government in connection with the government's bond refinancing as a means of circumventing IRS arbitrage regulations. Many of the largest investment banks settled with the federal government, paying more than $120 million in fees (McGeehan, 2000). However, the actions of these large Wall Street investment banks have most acutely affected the finances of state and local governments recently, as a result of the market upheaval during the global financial crisis. That is, state and local governments' use of interest rate swaps, auction rate securities, and variable rate bonds, as marketed heavily by investment banks, put a tremendous strain on the finances of many of these government entities during the global financial crisis and after. As a result, federal and state regulators have settled with several large investment banks to force them to provide billions of dollars in liquidity remedies to state and local governments and their investors related to some of these financial products (Kardos, 2008).

Given this evolving context and the actions of these financial intermediaries, it is necessary to revisit the activities of some of these market actors in the municipal bond issuance process. To that end, this paper empirically investigates the underwriting function and, more specifically, the factors associated with the fees charged by investment banks in the underwriting of municipal securities in the State of Texas between 1999 and 2010. Although a robust literature developed over the last few decades on the impact of market forces and issue/issuer characteristics on the transaction costs of state and local governments, recent years have seen diminishing studies in the particular area of underwriting fees even as the municipal bond market has changed greatly over the last 20 years (Hildreth and Zorn, 2005). The increasing use of financial advisors, bond insurance, complex financial instruments, different types of securities, and the sheer increase in size of the municipal market merits an updated analysis on the determinants of underwriter fees, taking into account some new variables of interest. This study pays particular attention to the relationship of underwriting fees to several aspects of financial advisors, underwriters, and financial advisor-underwriter arrangements that have not been explored previously in the literature but are especially salient given recent bond market and sector developments. These variables of interest include underwriter-financial advisor interaction intensity, use of local financial advisors, financial advisor-turned-underwriter, financial advisor reputation, and underwriters who purchase bond insurance. In addition to introducing new explanatory variables to the determination of underwriting fees, this study contributes to the literature by using much more recent data, with all previous studies on tax-exempt municipal bond underwriting fees using data at least 10 years old and most using data well over 20 years old. As such, this work will also shed empirical and theoretical light on this study's control variables, which have been found to be determinants of underwriting fees in previous studies.

The paper proceeds as follows. The next section provides a brief overview of the underwriting process of municipal bonds from a descriptive and theoretical perspective. The following section offers a literature review on the determinants of municipal bond underwriting fees, positioning this paper as a logical and important extension of previous studies. The next section describes the data, variables, hypotheses, and methods used to test the research question, with empirical findings presented in the following section. The paper concludes by offering some policy implications emanating from its empirical findings with respect to efficient subnational debt management practices, as well as broader theoretical implications related to underwriter monopsony power, information asymmetry, financial intermediation, and debt management networks.

MUNICIPAL BOND UNDERWRITING

State and local government capital budgets often demand substantial upfront funding to pay for large-scale infrastructure improvements and other capital projects. These governments can pay for these projects on either a "pay-as-you-go" or "pay-as-you-use" basis. On a pay-as-you-go basis, municipal governments use current revenues (taxes, fees, or "other" revenue sources) to fund project costs. "Pay-as-you-use" refers to the use of debt finance to pay for such capital undertakings. This funding option spreads out the cost of the project over several years, using the taxes and fees of current and future beneficiaries to pay off the amortized debt. Under the pay-as-you-use option, state and local governments access the capital markets to borrow funds for such capital improvement projects. "Underwriting" refers to the process of accessing these funds through the sale of securities in the capital markets through the use of an investment bank. In this process, the investment bank buys the securities from the subnational government and then resells them to investors. The difference between the purchase price paid by the investment bank and the price at which the bonds are resold to investors represents the underwriter's profit, also known as the "gross underwriter spread." The gross underwriter spread (also referred to as "underwriter fees") is the dependent variable in this study.

From a theoretical standpoint, underwriting represents a type of third-party certification of financial intermediation. The theoretical foundation undergirding financial intermediation and certification stems from the information asymmetry and reputational signaling literatures. The literature on information asymmetry contends that a market failure (similar to Akerlof's description) can result when firm insiders cannot credibly communicate their beliefs about a security's true value or when outsiders are unable to buy such information (Akerlof, 1970; Booth and Smith, 1986). The reputation signaling literature posits that the use of financial intermediaries in the capital markets serves to certify an issue's price and/or interest costs. That is, issuers can "lease" the brand name of a financial intermediary, such as an investment bank, to certify that a particular issue's price reflects all available inside information (Booth and Smith, 1986). In sum, financial theory implies that the reputation of an investment bank in the underwriting should positively influence the pricing of the securities.

In the municipal bond market, third-party certification is often necessary due to a high volume of first-time and small-size issuers, the presence of many individual investors who do not possess the institutional capacity of organizations to collect and process information, and lack of full disclosure in municipal security offerings because state and local governments often provide late and/or incomplete reports on their economic and financial conditions. An investment bank assumes a great deal of the risk from

the issuer through its role of absorbing the information asymmetry. In this role, the underwriter assumes the pricing and marketing risks. However, the process of information collection and then product distribution is very costly and is reflected in the fees investment banks charge an issuer to underwrite its securities. This paper attempts to explore the associative factors of the fees underwriters charge state and local governments for absorbing such risks and costs.

LITERATURE REVIEW

Two major strands of research examining underwriters and underwriting processes on various bond finance outcomes including underwriting fees in the corporate finance literature are the variables underwriter prestige and competition in bidding (e.g., negotiated versus competitive bond method of sales). Research in the municipal bond market, while not as robust, has also followed these two tracks. However, many of these studies, both in the corporate and municipal bond literatures, look at the impact of these underwriting variables on bond borrowing costs (e.g., IPO prices, true interest cost, net interest cost, reoffer yields) rather than underwriter fees. The previous literature on underwriting prestige on municipal bond underwriting fees is relatively limited; two of the studies focusing on prestige evaluated it on the basis of interest costs (Peng and Brucato, 2004; Roden and Bassler, 1996), and only three included the impact of prestige on underwriter spreads (Butler, 2008; Butler, Fauver, and Mortal, 2009; Daniels and Vijayakumar, 2007). These three studies will be discussed later in this section.

The literature on the impact of bond method of sale is more substantial but still mostly focuses on the dependent variable of bond interest cost (Benson, 1979; Bland, 1985; Braswell, Nosari, and Summers, 1983; Fruits et al, 2008; Kriz, 2003; Leonard, 1996, 1999; Maese, 1985; Peng and Brucato, 2003; Robbins, 2002; Simonsen and Robbins, 1996; Sorensen, 1979). Because this paper focuses on the associative factors of underwriter fees, the literature review will cover only studies that evaluate the impact of specific variables on underwriting fees in the municipal bond market.

West (1967) examined the determinants of underwriter spread on tax-exempt bond issues including the variable of underwriter competition. For his variable of interest, West concluded that the extent of competition among underwriters of municipal bonds has significant influence on the level of underwriter spread. For example, West found that if only one bid is submitted for a new issue, spreads show a strong tendency to rise above "competitive" levels. West also found that credit quality, term to maturity, and "money market tightness" were also statistically significant (West, 1967). Joehnk and Kidwell (1979) empirically examined the comparative costs of competitive and negotiated underwritings of general obligation

and revenue bonds in order to document the effects of underwriter procedure on three dependent variables: net interest cost, underwriter spread, and reoffering yield. Joehnk and Kidwell contended that reoffering yield, net interest cost, and underwriter spread were all higher for negotiated sales due to both the additional services provided by negotiated underwriters as well as these firms' monopsony pricing power. Joehnk and Kidwell used a matched-pair analysis of securities that were similar on other variables that affect underwriting fees, including market conditions, type of issue, default risk, term to maturity, and issue size, which controlled for those other factors in the analysis (Joehnk and Kidwell, 1979).

Joehnk and Kidwell (1984) extended their analysis to include market uncertainty as a variable that could affect underwriter spread. In addition, they included issue size, term to maturity, call provisions, credit ratings, issue purpose, market interest rates, bond method of sale, and bidding intensity as control variables that could affect underwriter spread (Joehnk and Kidwell, 1984). This phase of research on municipal bond underwriter spreads concluded with Leonard's (1994) comprehensive literature review on underwriting method of sale for the corporate and municipal bond markets. Leonard found that most studies found that a higher level of competition, measured by the number of bidders and the intensity of bids, reduced underwriter spreads and reoffering yields (Leonard, 1994). The present study will include all of the variables included in this initial phase of research on underwriter spreads.

The next phase of research focused on extending the variables that could affect underwriting fees beyond market and issuer variables. One such strand of research includes several studies empirically investigating the impact of financial advisors on underwriting fees based on the underwriter monopsony power hypothesis.[1] The underwriter monopsony power hypothesis states that because underwriters have private information about the demand for an issuer's securities and the level of effort needed to distribute them, underwriters have an incentive to misstate their distribution level of effort and overcharge for such service. Contracting with financial advisors to monitor the terms of the bond sale should result in more favorable terms to the issuer (Johnson, 1994). Forbes, Leonard, and Johnson (1992) tested the underwriting monitoring

[1] Forbes, Leonard, and Johnson (1992) claim that financial advisors are also justified based on the certification hypothesis whereby financial advisors, like underwriters, resolve information asymetries between issuers and investors by certifying the true price of the municipal security. Financial advisors provide additional certification to the true price over the underwriter's certification in that they have more knowledge of the finances of the issuer than the underwriter has. Thus, for the purposes of this study, the additional certification provided by a financial advisor can serve to reduce the investor search by underwriters and, thus, indirectly results in lower underwriting fees.

hypothesis and found only weak support of the monitoring hypothesis, not enough to empirically support the theory that financial advisors are effective at extracting rents from underwriters on behalf of issuers in the form of lower gross underwriter spreads when an advisor is used on the bond issue (Forbes, Leonard, and Johnson, 1992). On the contrary, Vijayakumar and Daniels (2006) found that for a sample of municipal bonds sold between 1990 and 1999, revenue bond issues with financial advisors have lower TICs, lower reoffering yields, and lower underwriter spreads than issues without financial advisors. For general obligation bonds, they found significantly lower underwriter spreads (but not TICs or reoffering yields) and an even greater impact for negotiated offerings and refunding bonds. The authors interpreted these results as supporting the theory that financial advisors provide valuable underwriter monitoring services that help issuers "counteract the monopsony power of underwriters in circumstances such as when issues are negotiated with underwriters" (Vijayakumar and Daniels, 2006).

Clarke (1997) tested whether financial advisors who participate in the bidding process affect the interest cost of debt. Clarke assesses nearly 1,000 competitively sold municipal debt issues in the state of Texas from 1991 to 1995, analyzing the impact of financial advisor-turned-underwriter on the net interest cost of bonds. For general obligation debt and state-backed school bonds, there are no interest cost implications for allowing an advisor to bid on bonds. However, for unrated issues, advisors are much more likely to win the bid, indicating that cities should be concerned about the guidance of their advisor when that advice is to take unrated issues to market (Clarke, 1997). Although the Clarke study focuses on the impact of interest costs, it is notable for this study because we will evaluate the "advisor-turned-underwriter" on underwriting fees, which has not been analyzed in the municipal market to date to the best of our knowledge. In addition, our study will look at other aspects of financial advisors (e.g., the impact of high-reputation financial advisors, financial advisor-underwriter intensity, use of a local financial advisor) to try to gain a more nuanced understanding of the specific benefits of financial advisors for issuers as they relate to underwriting fees.

More recent studies have focused on extending the research on municipal underwriting fees to even more specific variables of interest, including underwriter prestige. Daniels and Vijayakumar (2007) analyzed a sample of municipal bonds issued between 1990 and 1999 and found that issues sold by larger and more reputable investment banks have significantly lower underwriting spreads. Butler (2008) analyzed a sample of taxable municipal bonds issued from 1997 to 2001 and introduced a locational variable, whether an underwriter is "local" or not, to determine if "distance" matters in underwriting spreads. Butler found that local investment banks, firms

with an ongoing presence in the state, charge lower underwriting fees. Butler also found that higher reputation investment banks charge lower underwriting spreads than lower reputation firms (Butler, 2008). Locational variables (although different from Butler's formulation because this study examines only one state) will also be evaluated in our study. Butler, Fauver, and Mortal (2009) analyzed the impact of a state's corruptive culture on underwriting fees for a sample of tax-exempt municipal bonds sold between 1990 and 2004. He found that underwriting fees were higher in eras when investment banks made political contributions to attempt to win business (Butler, Fauver, and Mortal, 2009). In this study, Butler once again found that underwriters with larger market share were associated with lower underwriting fees (Butler, Fauver, and Mortal, 2009). However, underwriter prestige was a control variable and not the primary focus of the study for both Butler articles.

The U.S. Treasury Department (2010) assessed differences in underwriting fees based on the tax status of the municipal security, taxable or tax-exempt, in the context of the new Build America Bond program, which authorized the issuance of taxable municipal bonds with the federal government providing a 35% interest cost subsidy to state and local governments. This research attempted to assess criticism from some market participants about the size of fees earned by underwriters of BABs. The U.S. Treasury Department showed that the average BAB underwriting fees were almost $2 more per bond than the average tax-exempt underwriting fee for the initial issuances under the program. The Treasury Department speculated that this initial underwriting fee premium may have been related to unfamiliarity or uncertainty about these securities from investors (i.e., information asymmetry), causing underwriters to work harder to sell BABs and thus charge higher fees. However, the report also showed a decreasing BAB spread during the course of the program, so much so that by mid-2010, there was only a minimal difference between the underwriting fees for traditional tax-exempts and BABs (Treasury, 2010). Type of security (BABs or traditional tax-exempts) will not be analyzed in our study due to the relatively small amount of BAB issues included in the sample.

In addition to extending the literature on underwriting fees, this study also contributes to some previous research on debt management networks. Miller (1993) argues that debt managers have become more dependent on market intermediaries that reside in the debt management network such as financial advisors and investment banks. These debt managers are overly deferent to such intermediaries because these actors tend to be privy to the secrets or nuances of these complex finance products and processes. This undue deference often leads to scandal, waste, and suboptimal financial advice as it relates to financing efficiency. Miller uses a repeated measures design using MPA students in a game to determine whether group

stability, resources, and rewards affect group outcomes. In sum, Miller finds from his game research that group stability leads to insularity and not learning, that group diversity has short-term costs but long-term benefits, and that redundancy of skills is good for the system (Miller, 1993). Thus, Miller argues that these findings support the idea that diversity of financial advising has short-term costs but long-term benefits, that competition among members in a debt management network is good, that extremely clear priority schedules must be provided by governments as a way of disciplining network actors, and that redundancy and mutual expectations must exist among network actors. More generally, Miller argues that not all debt management networks are alike in their ability to extract the greatest financial value to state and local governments. Miller's research is related to this study in that we test a particular arrangement in a debt management network, the stability of financial advisors and underwriters on bond transactions, to determine whether the arrangement has any impact on underwriting fees.

In sum, the recent empirical literature on the determinants of municipal bond underwriting fees is not sufficiently robust. Many of the previous studies are dated, and even the more recent studies include data that are primarily 10 years old or older. Moreover, changes and developments in the municipal bond market warrant a fresh look at this area of municipal finance because other factors have come to light that may affect bond underwriting fees, including relationships among financial advisors and underwriters, financial intermediary type and roles, new kinds of municipal securities, and the growth of other financial products such as bond insurance. Concerns raised by Dodd-Frank with respect to municipal market financial intermediaries and their fiduciary responsibilities to state and local governments only further reinforce the need for this line of research. The next section of the paper begins this exploration, starting with a description of the data, variables, hypotheses, and methods used to evaluate the empirical determinants of municipal bond underwriting fees.

DATA, VARIABLES, AND MODELS

In this section, we describe the sources of data, the variables that we constructed, the formal hypotheses that we are testing, and the models that we are fitting in relation to our hypothesized associations.

Data

The final data set for this study includes 8,958 bond issues sold by Texas municipalities between 1999 and 2010. This is an absolute majority of 12,156 issues, which is the population of fixed-income municipal bonds reported by the Texas Bond Review Board (TXBRB). Data on bond issue costs, including the dependent variable, are provided by the TXBRB. Our

analysis focuses on the state of Texas because the dataset provided by the TXBRB is the only one we are aware of that includes data on underwriting fees. As such, the generalizability of our empirical findings is limited. However, even though we are studying only one state, the generalizability of our results is buttressed by the fact that Texas is a market setter in the municipal bond market given its diversity of municipal bond issues in terms of amount, size, bond credit type, and issuer type. Generalizability is also supported by the fact that the results for several of our variables are consistent with previous findings from research using national samples (Butler, 2008; Butler, Fauver, and Mortal, 2009).

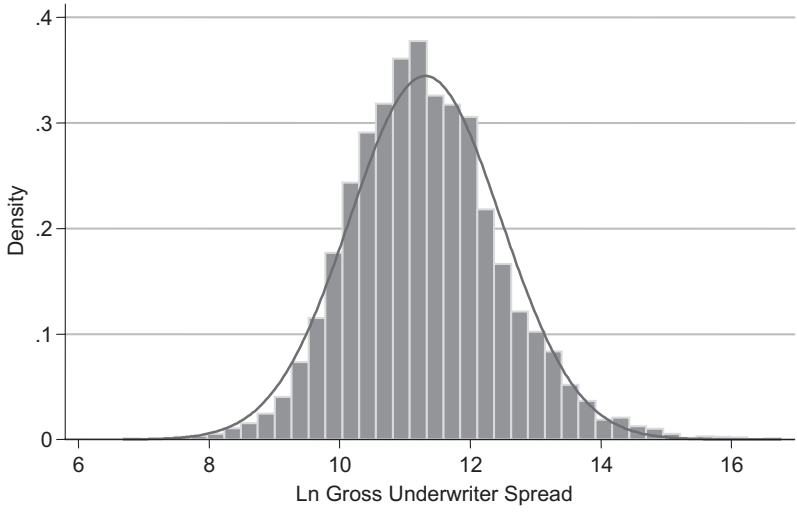
We matched the population of Texas municipal bonds to the municipal primary market database from Bloomberg for relevant issue-specific characteristics and CUSIP numbers. We obtained market measures from the *Bond Buyer.* Of the initial full 12,156 population, 2,909 (about 24%) issuers used private placements with underwriting firms.[2] Only about a dozen of these privately placed issues reported gross underwriter spreads, which is the outcome variable in the study. Therefore, we must discard privately placed municipal debt obligations due to missing values on the variable of interest. This truncation leaves us with 9,247 fixed-income bond issues, or 76% of the original sample, that were sold either by a competitive or negotiated method. Of these 9,247 issues, we dropped 289 observations due to missing values on one or more independent and control variables. After the final filtering of data, we retained 8,958 observations (about 97% of the combined competitive/negotiated subsample), or about 74% of all fixed-rate municipal securities issued by Texas municipalities. The final sample includes a diversity of issuer types such as cities, towns, counties, school districts, and other special districts (e.g., water or hospital districts).

Variable Constructs and Hypotheses

The paper focuses on the determinants of municipal bond underwriting fees, and the natural dependent variable for the analysis is the gross underwriter spread for each bond issue. Gross underwriter spread is the dollar compensation an investment bank receives for placing and underwriting an entire primary market municipal bond offering. In this study, we have operationalized the gross underwriter spread as the total dollar fee received by the underwriter for an issue. The natural log of gross underwriter spread

[2] It is possible that the most severe forms of information asymmetry or rent-seeking are associated with private placements. Although we are discarding the privately placed issues due to missing observations for the outcome of interest, any findings in the competitive/negotiated sample analysis would most likely be more pronounced in the private sales. Despite the absence of data on underwriting fees for private placements, any conclusions from our results, we believe, can be extended to the omitted subsample.

Figure 1: Density Distribution of Natural Log of Gross Underwriter Spreads (Outcome of Interest), Texas Municipal Debt Issuers, Fiscal Years 2000–2010, *N* = 8,958



is used in the analysis to ensure a normal distribution of the variable, which helps to meet the necessary assumptions for statistical inference. This variable transformation is a practical solution for the highly skewed (to the right) measure of gross underwriter spreads. Figure 1 shows the density distribution for the natural log of gross underwriter spreads, which fits a "perfect" bell-shaped curve.

Major Explanatory Variables of Interest and Formal Hypotheses

The major explanatory variables of interest used in the analysis consist of a set of identity variables including a measure of financial advisor-underwriter interaction intensity, a financial advisor-turned-underwriter on the issue, use of a financial advisor, use of a local financial advisor, use of a local underwriter, use of a high-reputation financial advisor, use of a high-reputation underwriter, bond sale method type (competitive or negotiated), and an underwriter who paid for bond insurance. We measure two levels of financial advisor-underwriter interaction intensity in the sample. The first level measures whether at least 10% of an advisor's transactions are related to a particular underwriter (in Models 1 and 2). We then move to a higher level of financial advisor-underwriter interaction intensity, where we identify whether at least 20% of an advisor's transactions are related

to a particular underwriter (in Models 3 and 4). These two thresholds of interaction intensity are built from a linear measure of interaction intensity, which is a ratio of annual frequency of transactions for any given financial advisor with a particular underwriter over the total frequency of transactions for this financial advisor. As such, this measure has values anywhere from 0 = no other interaction with an underwriter during a calendar year to 1 = all interactions are related to just one single underwriter. Therefore, when moving from Models 1 and 2 to Models 3 and 4, we want to test whether a move from a financial advisor-underwriter interaction intensity level of 0.10 to 0.20 (10% to 20% of all transactions, respectively) has any significant association with municipal underwriting fees, as well as whether the effects of remaining measures in our regression models remain consistent. Previous game theory research has shown that the stability of debt management networks (of which underwriters and financial advisors are members) can affect financial outcomes, with more stable teams more likely to include network members that attempt to extract rents from issuers (Miller, 1993). Thus, in our context, we hypothesize that greater financial advisor-underwriter interactions may weaken the benefits derived from an arms-length transaction and the financial advisors may not prudently represent the issuers of municipal debt, allowing underwriters to charge higher fees. Therefore, we formally state Hypothesis 1 as follows:

- **Hypothesis 1: All else held equal, greater levels of financial advisor-underwriter interaction intensity have a positive association with gross underwriter spreads.**

An important group of factors that we hypothesize to be associated with gross underwriter spread involves the use of financial advisors who advise on the bond offering. These factors are one of the primary focuses of this paper because financial advisors have increasingly been used by state and local government bond issuers and have also come under increased scrutiny in light of the Great Recession as described in the introduction of this paper. The presence of a financial advisor is expected to be associated with lower underwriter fees based on the underwriter monitoring theory whereby financial advisors will monitor the terms of the sale to ensure underwriters do not overcharge for their services. Hence, we state Hypothesis 2:

- **Hypothesis 2: All else held equal, issues with no financial advisors have a positive association with gross underwriter spreads.**

A high-reputation financial advisor presumably can represent the issuers even better than other financial advisors and, thus, is further associated with lower underwriting fees. We measure high reputation based on market shares. Thus, the top five financial advisors by total frequency of issues in Texas during the period of study are considered to be high-reputation financial advisors. This specification is similar to that in other studies (see, e.g., Butler, 2008). The top financial advisor is First Southwest (consistently

during the years under review), which has advised on about 43% of all bond issues in our sample. For robustness purposes, we also re-estimate the models with a re-specified measure of reputation, where high-reputation advisors are the top three financial advisors by total frequency of issues in Texas during the period of study. Hence, we state Hypothesis 3:

- **Hypothesis 3: All else held equal, high-reputation financial advisors have a negative association with gross underwriter spreads.**

Previous research has shown that financial advisors who later bid on a competitive offering may not be providing proper guidance to issuers as it relates to market timing (Clarke, 1997). As such, we hypothesize that financial advisors-turned-underwriters will be associated with higher underwriting fees based on the concern that there may be some conflict-of-interest issues in that arrangement that can affect underwriting fees. Below we state Hypothesis 4:

- **Hypothesis 4: All else held equal, issues with financial advisors-turned-underwriters have a positive association with gross underwriter spreads.**

Previous research has also shown that local investment banks charge lower underwriting spreads (Butler, 2008). Based on similar logic, local financial advisors may be more diligent in representing the issuer vis-à-vis underwriters. Local financial advisors are firms domiciled in Texas. When a firm has a multi-state presence, we rely on headquarter addresses. We formally state Hypothesis 5:

- **Hypothesis 5: All else held equal, local financial advisors have an inverse association with gross underwriter spreads.**

The final group of factors involves the various aspects of the underwriting process as well as attributes of the underwriters themselves. A high-reputation underwriter generally has the ability to take advantage of economies of scale and, thus, will charge less for its services. Alternatively, high-reputation underwriters may charge a premium for their services, regardless of the economies of scale. Similar to our approach with financial advisors, we code high-reputation underwriters if they are the top five underwriters by total frequency of issues in Texas during the period of study. For example, First Southwest has been consistently a number one underwriter every year during the decade under review; in our sample, this investment firm has underwritten about 17% of all issues. Accordingly, we expect high-reputation underwriters to be associated with gross underwriting spreads; however, the direction of the effect is uncertain. Therefore, we state Hypothesis 6 below:

- **Hypothesis 6: All else held equal, high-reputation underwriters have a significant association with gross underwriter spreads.**

Previous research has found that local underwriters provide greater benefits to municipal debt issuers. In line with these findings, we expect

local underwriters to charge lower underwriting fees. Local underwriters are investment firms domiciled in Texas; and again, when a firm has a multi-state presence, we rely on headquarter addresses. Below we state Hypothesis 7:

- **Hypothesis 7: All else held equal, local underwriters have an inverse association with gross underwriter spreads.**

Many studies have shown that competition in the bidding for bonds is negatively associated with interest costs. In this study, competition is operationalized based on whether the bonds are sold on a negotiated basis or on a competitive basis. Negotiated bond sales involve the issuer's preselecting the underwriter to purchase the bonds based on a price negotiation between the underwriter and issuer. In competitive bond sales, multiple investment banks compete with each other in bidding on the bonds, with the lowest bidder receiving the bonds. By their very nature, competitive bond sales are assumed to provide a higher level of competition and, thus, are expected to be associated with lower underwriting fees. However, some scholars have found that after controlling for selectivity bias, a negotiated method of sale is negatively associated with true interest costs, all else held equal (Fruits et al., 2008; Kriz, 2003; Leonard, 1996; Peng and Brucato, 2003). Therefore, it is still unclear whether a competitive method is associated with lower overall interest costs than the negotiated method. However, there does seem to be evidence of some endogeneity associated with method of sale choice and other outcome variables of which one could be underwriting fees. As such, we follow Kriz (2003) and estimate a first-stage selectivity model for the method of sale and introduce the Inverse-Mill's ratio in the second-stage equation. Hence, our Hypotheses 8 is as follows:

- **Hypothesis 8: All else held equal (after correcting for the first-stage switching effect), a negotiated method of sale has a significant association with gross underwriter spreads.**

Issuers often pay for bond insurance to enhance the credit of their debt. However, sometimes in competitive bond sales, underwriters will pay for this insurance on their own to better market the bonds and reduce yields. The concern is that underwriters will just pass this insurance cost onto issuers in the form of higher underwriting fees.[3] Based on this concern,

[3] It should be noted that the overall borrowing costs to the government may still be less than the alternative if the underwriter purchases insurance but raises its underwriting fee, because the reduction in yield associated with the bonds now being insured may more than compensate for the increased underwriting fee. Thus, this variable is introduced to purely evaluate whether there is any cost shifting taking place between the underwriter and issuer through the purchase of bond insurance by the underwriter.

bond sales where underwriters pay for insurance are hypothesized to be associated with larger gross underwriter spreads. We state our final formal Hypothesis 9 as follows:

- **Hypothesis 9: All else held equal, issues where underwriters pay for bond insurance have a positive association with gross underwriter spreads.**

Control Variables

We also make use of a set of dichotomous control variables that show (1) whether the issue is "wrapped" by a financial guaranty, (2) whether it has split credit ratings, (3) the number of credit ratings, (4) the credit ratings, (5) sinking fund and call provisions, and (6) various issue and issuer type categories. The control measures also consist of several continuous variables including issue size, maturity, municipal bond market supply, municipal bond market yield, municipal bond market volatility, municipal bond market default risk spread, municipal bond market yield curve, and the taxable/tax-exempt interest rate spread. Each of these control variables has either been found to be associated with or is being hypothesized to be associated with municipal bond underwriting fees, as further described in the following paragraphs. However, because our main focus is not on these control variables, our discussion of their roles and effects will be limited.

In general, based on financial intermediation theory and the theory of information asymmetry, factors that decrease the relative default risk of a bond issue will likely increase the overall level of demand for those bonds from investors. With greater interest from the investor community, there is a reduced risk of an unsuccessful underwriting, which would decrease the need for the investment bank to "take the bonds" into its own portfolios, which it may not want to do. In addition to reduced underwriting risk, there is generally less "investor search" needed for bonds that are of higher credit quality, due to the likely strong investor demand for higher rated securities. Smaller issue size also should result in less investor search because there are fewer bonds "to place."[4] Both of these factors, reduced underwriting risk and lower investor search efforts, should result in a reduction in underwriter compensation.

As such, based on this theory, we expect that higher credit rated issues, smaller issue size, familiar types of debt structure (i.e., non-callable), the presence of a financial guaranty, less credit risky issuer types, less credit

[4] Issue size is also likely to be positively associated with gross underwriter spread based on the operationalization of the dependent variable and the customary method of compensation for underwriters. That is, underwriters often are paid per bond issue sold. Thus, the larger the issue size, the larger the gross underwriter spread is.

risky issue types, non-split credit ratings, and multiple credit ratings (two or three ratings) will be associated with lower gross underwriter spreads. Related to this, market factors that minimize the likelihood of an unsuccessful underwriting and require less investor search are also expected to be associated with lower underwriting fees. These factors often relate to market uncertainty and the difficulty for underwriters in finding investors when the bond markets are volatile and have been shown in previous studies to be associated with underwriting costs (Joehnk and Kidwell, 1984). Thus, we expect that reduced market volatility, smaller municipal market bond supply, lower overall tax-exempt interest rates, less default risk spread, a more compressed municipal bond market yield curve, and smaller spread in taxable/tax-exempt interest rates will be associated with lower underwriting fees.

Estimated Model

This study uses a selectivity model for the method of sale and estimates the various determinants of gross underwriter spread. The analysis necessitates estimation of an endogenous selection model rather than traditional ordinary least squares (OLS) estimation due to the fact that the method of sale may be endogenously determined (Kriz, 2003; Peng and Brucato, 2004; Robbins and Simonsen, 2007). For example, the use of high-reputation underwriters may be correlated with certain types of bond issues or with higher risk bond issues. Performing statistical estimations (such as OLS) that do not address this possible endogeneity could result in biased estimates on the coefficients of some or all of the independent variables.

Therefore, when selectivity bias is a concern, the covariance in the error terms must be closely considered (Heckman, 1978; Kriz, 2003; Maddala, 1983). The goal then becomes to estimate the gross underwriter spread (equation 1) that accounts for the selectivity problem in the method of sale:

$$E(GrossSpread_i \mid Negotiated = 1) - E(GrossSpread_i \mid Negotiated_i = 0) = X_i(\beta_1 - \beta_2) + (\sigma_{2\varepsilon} - \sigma_{1\varepsilon})\frac{\phi(Z_i\lambda)}{\phi(Z_i\lambda)}. \quad (1)$$

Consequently, we estimate the Inverse-Mill's ratio (the last term in equation 1) after a first-stage probit model estimation for the method of sale (equation 2):

$$Negotiated_i = f(explantory\ variables, control\ variables). \quad (2)$$

We then estimate the second-stage log-linear model (equation 3), which accounts for the value of the Inverse-Mill's ratio when estimating the regression coefficients:

$$GrossSpread_i = f(explantory\ variables, control\ variables, IMR). \quad (3)$$

Therefore, based on the estimates of λ, we will be able to draw conclusions about selectivity bias, if any, in the two-stage switching regression model.

EMPIRICAL RESULTS

In this section, we discuss univariate and multivariate statistical results. In addition, we address the issues of robustness due to variable selection, parameter stability, model fit, and functional form specifications for a select set of variables.

Univariate Results

Table 1 displays the results of the descriptive statistics for the various variables in the analysis, where we detail the most salient ones for this study. The dependent variable, gross underwriter spread, varies from a low of $800 to a high of $19,000,000 on a single bond issue. The mean size of underwriter spread was approximately $191,000. The relatively large mean and high range of this variable (skewness remains even at per bond basis) underscores the importance of examining this fee in the municipal finance research field. Only about 4% of the bond issues (more than 330 issues) did not include a financial advisor, whereas 78% used a high-reputation financial advisor. The very low number of issues without a financial advisor underscores the importance of this role as perceived by issuers. About 76% of all municipal issuers chose local financial advisors.

Table 1: Descriptive Statistics, *N* = 8,958

Variable	Mean	Std.Dev.	Min	Max
Gross Underwriter Spread, in thousands	186.84	559.33	0.80	19,000.00
Financial Advisor-Underwriter Interaction Intensity, 0.10 level (yes = 1, else = 0)	0.36	0.48	0.00	1.00
Financial Advisor-Underwriter Interaction Intensity, 0.20 level (yes = 1, else = 0)	0.11	0.32	0.00	1.00
Financial Advisor-Turned-Underwriter (yes = 1, else = 0)	0.08	0.27	0.00	1.00
No Financial Advisor (yes = 1, else = 0)	0.04	0.19	0.00	1.00
Local Financial Advisor (yes = 1, else = 0)	0.76	0.43	0.00	1.00
Local Underwriter (yes = 1, else = 0)	0.40	0.49	0.00	1.00

(*Continued*)

Table 1 (*Continued*)

Variable	Mean	Std.Dev.	Min	Max
High-Reputation Financial Advisor (yes = 1, else = 0)	0.78	0.42	0.00	1.00
High-Reputation Underwriter (yes = 1, else = 0)	0.52	0.50	0.00	1.00
Negotiated Method of Sale (yes = 1, else = 0)	0.58	0.49	0.00	1.00
Underwriter Paid for Insurance (yes = 1, else = 0)	0.21	0.41	0.00	1.00
Issue Size, in millions	20.08	50.25	0.14	1,770.00
Average Maturity, in years	10.32	3.97	1.00	39.78
Sinking Fund Provision (yes = 1, else = 0)	0.52	0.50	0.00	1.00
Call Provision (yes = 1, else = 0)	0.88	0.32	0.00	1.00
Financial Guaranty (yes = 1, else = 0)	0.80	0.40	0.00	1.00
Split Credit Ratings (yes = 1, else = 0)	0.07	0.25	0.00	1.00
Two Credit Ratings (yes = 1, else = 0)	0.50	0.50	0.00	1.00
Three Credit Ratings (yes = 1, else = 0)	0.10	0.31	0.00	1.00
Credit Rating, low to high	8.03	2.16	1.00	9.00
Credit Rating: AAA range (yes = 1, else = 0)	0.76	0.43	0.00	1.00
Credit Rating: AA range (yes = 1, else = 0)	0.15	0.35	0.00	1.00
Credit Rating: A range (yes = 1, else = 0)	0.03	0.16	0.00	1.00
Credit Rating: Junk bonds (yes = 1, else = 0)	0.02	0.13	0.00	1.00
Credit Rating: Unrated (yes = 1, else = 0)	0.05	0.23	0.00	1.00
Issue Type: Tax (yes = 1, else = 0)	0.41	0.49	0.00	1.00
Issue Type: Voter-Approved Tax (yes = 1, else = 0)	0.28	0.45	0.00	1.00
Issue Type: Combined Tax/Revenue (yes = 1, else = 0)	0.17	0.38	0.00	1.00
Issue Type: Revenue (yes = 1, else = 0)	0.11	0.32	0.00	1.00
Issue Type: Maintenance/Operations (yes = 1, else = 0)	0.02	0.12	0.00	1.00
Issue Type: Other (yes = 1, else = 0)	0.01	0.11	0.00	1.00
Bond Buyer Municipal Weekly Visible Supply, in millions	9,288.28	3,200.83	2,854.94	18,481.05
Market Yield, Bond Buyer 20 index	4.71	0.45	3.82	6.07
Market Volatility, standard deviation of the 8-week moving average of the Bond Buyer 20 index	9.79	5.46	2.99	41.52
Default Risk Spread, Moody's 20-y Aaa vs. 20-y A	40.12	23.43	12.00	99.20

(*Continued*)

Table 1 (*Continued*)

Variable	Mean	Std.Dev.	Min	Max
Market Yield Curve, Bond Buyer 20-y and 5-y	72.78	28.59	8.80	136.50
Spread, Bond Buyer 20 index vs. Treasury 20-y	–20.87	45.24	–81.50	235.75
Issuer Type: City (yes = 1, else = 0)	0.33	0.47	0.00	1.00
Issuer Type: County (yes = 1, else = 0)	0.07	0.25	0.00	1.00
Issuer Type: College District (yes = 1, else = 0)	0.02	0.14	0.00	1.00
Issuer Type: Health District (yes = 1, else = 0)	0.01	0.08	0.00	1.00
Issuer Type: School District (yes = 1, else = 0)	0.30	0.46	0.00	1.00
Issuer Type: Special District (yes = 1, else = 0)	0.01	0.08	0.00	1.00
Issuer Type: Water District (yes = 1, else = 0)	0.27	0.44	0.00	1.00
y1999	0.03	0.16	0.00	1.00
y2000	0.07	0.26	0.00	1.00
y2001	0.08	0.28	0.00	1.00
y2002	0.09	0.28	0.00	1.00
y2003	0.08	0.27	0.00	1.00
y2004	0.06	0.23	0.00	1.00
y2005	0.11	0.31	0.00	1.00
y2006	0.09	0.29	0.00	1.00
y2007	0.11	0.32	0.00	1.00
y2008	0.11	0.31	0.00	1.00
y2009	0.09	0.29	0.00	1.00
y2010	0.07	0.26	0.00	1.00

Data sources: Primary debt issue data: Texas Bond Review Board & Bloomberg; Market data: Bloomberg and the *Bond Buyer.*

About 8% of the bond issues (or more than 700 individual debt issues) were bid on and won by financial advisors-turned-underwriters. Moreover, about 36% of transactions in the sample involved high-reputation financial advisor-underwriter interaction intensity at a level of 0.10. In roughly 11% of observations in the sample (well over 1,000 issues) financial advisors had at least 20% of their transactions with a single underwriter (i.e., interaction intensity level of 0.20). High-reputation underwriters were involved in 52% of the bond issues. Underwriters purchased insurance on their own for 21% of the bond sales on which they won the bid. Finally, 58% of the bonds were sold by negotiation and 42%

by competitive bid, once again reinforcing the movement toward more negotiated bond sales since the 1980s. Table 2 displays the coefficients and levels of significance for binary correlations for these major explanatory variables. We find low to moderate levels of pair-wise correlations and no reasons for multicollinearity concerns.

The average bond issue size in the sample is $20.1 million; however, the distribution is skewed to the right from $140,000 to $1.8 billion. Average maturity is 10 years, with the range extending between one year and 40 years. About 52% and 88% of issues had sinking fund and call provisions, respectively. Exactly 80% of the bonds were credit enhanced with a financial guaranty policy, which is not surprising given the growth in the bond insurance market over the last 20 years. About 91% of the bonds were rated in the AA or higher category (75% AAA rated), representing a universe of relatively high rated bonds. Slightly less than two-thirds of issues were tax- or voter-approved tax issues, which generally tend to be highly rated and low-risk municipal bonds. The largest categories of bond issuer types were cities (33%), school districts (30%), and water districts (27%), which illustrate a nice balance of different issuer types for most of the bonds under study.

First-Stage Selectivity Probit Results

We find that a number of factors are important determinants of municipal debt underwriting method. Issues with high levels of financial advisor-underwriter interaction intensity, issues without an advisor, a local financial advisor, and high-reputation financial advisor are positively associated with the negotiated method of sale. Potentially, there may be agency problems in frequent advisor-underwriter transactions that result in significantly higher odds of negotiated sales of municipal securities. Issues without a financial advisor appear to go directly for a negotiated sale with underwriters. It also appears that local advisors and prestigious underwriters are more likely to be involved in negotiated sales. As expected, underwriters pay for insurance to boost their chances of winning a bid in a competitive sale and not in negotiated contracts. We further find that in regressions where interaction intensity between financial advisors and underwriters increases to levels over 0.20, financial advisor-turned-underwriter transactions result in a lower likelihood of negotiated sales but that reputational underwriters are more likely to be involved in negotiated sales (Table 3).

Table 2: Correlation Coefficients and Significance Levels Among Major Explanatory Variables (Stated in Hypotheses 1 Through 9), *N* = 8,958

Item #	Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1)	Financial Advisor-Underwriter Interaction Intensity (0.10 level)	1.000									
(2)	Financial Advisor-Underwriter Interaction Intensity (0.20 level)	0.482 0.000	1.000								
(3)	No Financial Advisor	–0.147 0.000	–0.071 0.000	1.000							
(4)	High-Reputation Financial Advisor	0.066 0.000	–0.110 0.000	–0.365 0.000	1.000						
(5)	Financial Advisor-Turned-Underwriter	–0.217 0.000	–0.105 0.000	–0.057 0.000	0.052 0.000	1.000					
(6)	Local Financial Advisor	0.090 0.000	–0.105 0.000	–0.350 0.000	0.373 0.000	–0.048 0.000	1.000				
(7)	High-Reputation Underwriter	0.664 0.000	0.321 0.000	0.017 0.106	0.037 0.000	0.204 0.000	0.003 0.751	1.000			
(8)	Local Underwriter	0.300 0.000	0.345 0.000	0.041 0.000	0.011 0.300	0.172 0.000	–0.032 0.003	0.495 0.000	1.000		
(9)	Negotiated Method of Sale	0.310 0.000	0.097 0.000	0.121 0.000	0.078 0.000	–0.199 0.000	0.002 0.874	0.185 0.000	0.154 0.000	1.000	
(10)	Underwriter Paid for Insurance	–0.149 0.000	–0.037 0.000	–0.074 0.000	–0.013 0.208	0.087 0.000	0.025 0.017	–0.086 0.000	–0.062 0.000	–0.511 0.000	1.000

Data sources: Primary debt issue data: Texas Bond Review Board & Bloomberg; Market data: Bloomberg and the *Bond Buyer*.

Table 3: Probit Model Estimates and Test of Fit for the Method of Sale in the First-Stage Switching Models, *N* = 8,958								
Variables	**Financial Advisor–Underwriter Interaction Intensity at 0.10**				**Financial Advisor–Underwriter Interaction Intensity at 0.20**			
	Model 1		**Model 2**		**Model 3**		**Model 4**	
	Coef.	**t-score**	**Coef.**	**t-score**	**Coef.**	**t-score**	**Coef.**	**t-score**
Negotiated Method of Sale	–1.82***	–4.43	–2.17***	–5.10	–1.87***	–4.60	–2.20***	–5.24
Financial Advisor-Underwriter Interaction Intensity	0.87***	15.11	0.90***	15.14	0.36***	5.36	0.36***	5.31
No Financial Advisor	1.81***	15.74	1.80***	15.54	1.55***	13.38	1.54***	13.20
High-Reputation Financial Advisor	0.28***	5.67	0.27***	5.52	0.29***	5.83	0.28***	5.70
Financial Advisor-Turned-Underwriter	–0.02	–0.25	–0.01	–0.17	–0.51***	–7.06	–0.51***	–6.97
Local Financial Advisor	–0.05	–1.12	–0.06	–1.22	–0.01	–0.16	–0.01	–0.25
High-Reputation Underwriter	0.07	1.06	0.06	0.98	0.63***	14.68	0.63***	14.63
Local Underwriter	0.37***	8.79	0.38***	8.82	0.32***	7.47	0.32***	7.49
Underwriter Paid for Insurance	–1.99***	–35.16	–2.00***	–35.17	–2.01***	–35.95	–2.01***	–35.96
Issue Size, natural log	0.26***	13.01	0.26***	13.05	0.25***	12.95	0.25***	12.98
Average Maturity, in years	–0.02***	–2.71	–0.01**	–2.47	–0.02***	–2.88	–0.02***	–2.66
Sinking Fund Provision	–0.22***	–5.34	–0.22***	–5.21	–0.23***	–5.50	–0.22***	–5.38
Call Provision	–0.38***	–5.56	–0.38***	–5.53	–0.39***	–5.76	–0.39***	–5.74
Financial Guaranty	1.19***	15.89	1.09***	13.47	1.18***	16.05	1.08***	13.55

Two Credit Ratings	0.13***	2.75	0.12**	2.44	0.17***	3.54	0.15***	3.25
Three Credit Ratings	0.35***	5.29	0.36***	5.42	0.37***	5.65	0.38***	5.77
Credit Rating (low to high)	–0.05***	–3.83	—	—	–0.05***	–3.77	—	—
Credit Rating: AA range	—	—	–0.12	1.61	—	—	0.11	1.66
Credit Rating: A range	—	—	0.42***	3.38	—	—	0.39***	3.21
Credit Rating: Junk bonds	—	—	0.22	1.45	—	—	0.21	1.40
Credit Rating: Unrated	—	—	0.24**	1.99	—	—	0.24**	1.99
Issue Type: Voter-Approved Tax	–0.87**	–2.33	–0.82**	–2.20	–0.83**	–2.23	–0.78**	–2.10
Issue Type: Combined Tax/Revenue	0.20***	3.66	0.20***	3.64	0.20***	3.71	0.20***	3.69
Issue Type: Revenue	0.54***	8.08	0.52***	7.75	0.57***	8.75	0.55***	8.43
Issue Type: Maintenance/Operations	–0.76*	–1.92	–0.70*	–1.77	–0.70*	–1.70	–0.61	–1.54
Issue Type: Other	0.13	0.58	0.13	0.57	0.20	0.90	0.20	0.91
Bond Buyer Municipal Weekly Visible Supply	–0.00***	–3.54	–0.00***	–3.60	–0.00***	–3.36	–0.00***	–3.42
Market Yield, Bond Buyer 20 index	–0.46***	–9.91	–0.46***	–9.88	–0.44***	–9.57	–0.43***	–9.55
Market Volatility, St.Dev. of the 8-week moving average of the Bond Buyer 20 index	0.00	0.74	0.00	0.67	0.00	0.91	0.00	0.84
Default Risk Spread, Moody's 20-y Aaa vs. 20-y A	0.01***	8.42	0.01***	8.44	0.01***	8.41	0.01***	8.44

(*Continued*)

Table 3 (*Continued*)

Variables	Financial Advisor–Underwriter Interaction Intensity at 0.10				Financial Advisor–Underwriter Interaction Intensity at 0.20			
	Model 1		Model 2		Model 3		Model 4	
	Coef.	t-score	Coef.	t-score	Coef.	t-score	Coef.	t-score
Market Yield Curve, Bond Buyer 20-y and 5-y	–0.00	–1.52	–0.00	–1.66	–0.00*	–1.93	–0.00**	–2.06
Spread, Bond Buyer 20 index vs. Treasury 20-y	0.00	1.67	0.00*	1.68	0.00	1.44	0.00	1.45
Issuer Type: County	0.44***	5.30	0.41***	4.97	0.42***	5.20	0.40***	4.87
Issuer Type: College District	0.46***	2.79	0.46***	2.76	0.43***	2.65	0.43***	2.62
Issuer Type: Health District	0.69***	2.88	0.68***	2.83	0.71***	2.92	0.70***	2.88
Issuer Type: School District	0.63*	1.70	0.55	1.50	0.60	1.64	0.53	1.43
Issuer Type: Special District	0.67***	2.71	0.71***	2.85	0.73***	2.91	0.77***	3.04
Issuer Type: Water District	–1.01***	–16.70	–1.00***	–16.36	–1.00***	–16.70	–0.99***	–16.36
AIC		6,437.30		6,428.70		6,641.50		6,634.40
BIC		6,678.70		6,691.40		6,883.00		6,897.20
–LL		–3,184.66		–3,177.35		–3,286.77		–3,280.23
% Predicted Correctly								
0		84.97%		85.42%		85.39%		85.53%
1		84.87%		85.01%		84.11%		84.17%
Overall		84.91%		85.16%		84.58%		84.67%
McKelvey and Zavoina's R^2		0.687		0.689		0.674		0.676

Levels of significance: * p<0.10; ** p<0.05; *** p<0.01.

Issue characteristics such as bond size, financial guaranty, and multiple credit ratings appear to be associated with negotiated sales. However, municipal issues with longer maturities, sinking fund and call provisions, and higher credit quality are more likely to involve competitive sales. In terms of issue type, combined tax/revenue issues and revenue issues are found to be more likely to use a negotiated method, while voter-approved tax issues and maintenance/operations issues (marginally) are less likely to use negotiated sales compared to plain tax issue type. In terms of issuer type, counties, college, health, school, and special districts are all more likely than cities to be underwritten using a negotiated method. Water districts are the only exception; they appear to be less likely than city debt issuers to use the negotiated sales. Finally, we find that market factors are important for the method of sale. High levels of municipal bond supply and market yield have an inverse association with the negotiated method of sale, while the widening default risk spread appears to increase the likelihood of negotiated sales.

Multivariate Results

The results of the two-stage selectivity model are listed in Table 4. We present four sets of models. Model 1 is a regression of gross underwriter spreads (natural log values) on financial advisor-underwriter interaction intensity level of 0.10 and an ordered specification of issue credit ratings, including other explanatory and control variables. Model 2 is a re-specification of Model 1 with binary credit rating categories instead of the ordered credit ratings approach, where the omitted category is the triple-A-rated set of issues. Model 3 involves a more intense financial advisor-underwriter interaction level of 0.20 along with an ordered specification of credit rating values. Model 4 is a re-specification of the credit rating measures in Model 3 to binary comparisons, triple-A vs. others. We find evidence in full support of our hypotheses H1 and H2, H4, H5, H6, and H8. However, the results suggest that we do not have enough evidence to support H3 and H7. The results also suggest that H9 flips between marginal significance to insignificance in the four models. The estimated coefficients for hypothesized associations are generally stable regardless of variable and functional form specification in these four models. In this section, we provide a detailed discussion of the findings.

We find that the increasing levels of financial advisor-underwriter interaction intensity (a move from a 0.10 level specification to a 0.20 level) result in higher gross underwriter spreads, all else constant. Thus, high-intensity (at 0.20 level) financial advisor-underwriter transactions appear to increase average gross underwriting spreads by about 2.55% ($100 \times (\exp(\beta_i) - 1)$. In other words, the marginal effect of high financial advisor-underwriter transaction intensity for an average level of gross underwriter

Table 4: Log-linear Second-Stage OLS Regression Results (Corrected for Selectivity in the Method of Sale) and Test of Fit of Gross Underwriter Spreads on Explanatory Variable, *N* = 8,958

Variables	Financial Advisor–Underwriter Interaction Intensity at 0.10				Financial Advisor–Underwriter Interaction Intensity at 0.20			
	Model 1		Model 2		Model 3		Model 4	
	Coef.	t-score	Coef.	t-score	Coef.	t-score	Coef.	t-score
Gross Underwriter Spread, Natural log	–3.14***	–29.57	–3.61***	–33.23	–3.15***	–29.34	–3.61***	–32.92
Financial Advisor-Underwriter Interaction Intensity	0.02	0.98	0.01	0.33	0.03**	1.96	0.03*	1.69
No Financial Advisor	0.36***	10.64	0.35***	10.41	0.37***	11.37	0.36***	11.18
High-Reputation Financial Advisor	0.02**	1.99	0.02*	1.85	0.03**	2.38	0.03**	2.18
Financial Advisor-Turned-Underwriter	0.11***	5.64	0.10***	5.23	0.10***	5.26	0.10***	5.21
Local Financial Advisor	–0.03***	–2.83	–0.03***	–2.87	–0.03**	–2.29	–0.03**	–2.42
High-Reputation Underwriter	0.03*	1.79	0.03**	1.96	0.04***	2.84	0.03**	2.43
Local Underwriter	0.00	0.23	–0.00	–0.01	–0.00	–0.02	–0.00	–0.21
Negotiated Method of Sale	–0.25***	–20.27	–0.24***	–19.84	–0.26***	–21.21	–0.25***	–20.80
Underwriter Paid for Insurance	0.03	0.80	0.06*	1.79	0.02	0.67	0.06*	1.69
Issue Size, Natural log	0.93***	170.82	0.92***	170.61	0.93***	168.81	0.92***	168.57
Average Maturity, in years	0.01***	8.47	0.01***	8.60	0.01***	8.39	0.01***	8.52
Sinking Fund Provision	0.06***	5.66	0.06***	5.82	0.06***	5.67	0.06***	5.85
Call Provision	0.12***	7.28	0.12***	6.95	0.12***	7.12	0.11***	6.83

Financial Guaranty	0.25***	10.93	0.24***	10.54	0.25***	10.85	0.24***	10.47
Split Credit Ratings	–0.01	–0.43	–0.02	–0.79	–0.01	–0.45	–0.02	–0.81
Two Credit Ratings	–0.09***	–7.26	–0.09***	–7.30	–0.09***	–7.09	–0.09***	–7.19
Three Credit Ratings	–0.06***	–3.88	–0.07***	–4.48	–0.06***	–3.71	–0.07***	–4.33
Credit Rating (low to high)	–0.06***	–17.21	—	—	–0.06***	–17.10	—	—
Credit Rating: AA range	—	—	0.12***	7.62	—	—	0.12***	7.58
Credit Rating: A range	—	—	0.12***	3.76	—	—	0.12***	3.75
Credit Rating: Junk bonds	—	—	0.38***	9.60	—	—	0.38***	9.60
Credit Rating: Unrated	—	—	0.53***	18.25	—	—	0.53***	18.12
Issue Type: Voter-Approved Tax	0.22***	2.77	0.20**	2.49	0.22***	2.76	0.20**	2.47
Issue Type: Combined Tax/Revenue	–0.00	–0.02	0.00	0.06	0.00	0.07	0.00	0.11
Issue Type: Revenue	–0.13***	–7.94	–0.13***	–7.56	–0.13***	–7.64	–0.12***	–7.33
Issue Type: Maintenance/Operations	0.22**	2.54	0.23***	2.67	0.23**	2.57	0.23***	2.68
Issue Type: Other	0.39***	7.76	0.38***	7.56	0.40***	7.83	0.38***	7.59
Bond Buyer Municipal Weekly Visible Supply	–0.00	–0.85	–0.00	–0.75	–0.00	–0.84	–0.00	–0.75
Market Yield, Bond Buyer 20 index	–0.07***	–5.41	–0.07***	–5.26	–0.07***	–5.44	–0.07***	–5.28
Market Volatility, St.Dev. of the 8-week moving average of the Bond Buyer 20 index	0.00***	3.11	0.00***	2.82	0.00***	3.08	0.00***	2.79
Default Risk Spread, Moody's 20-y Aaa vs. 20-y A	0.00***	5.59	0.00***	5.84	0.00***	5.57	0.00***	5.88

(*Continued*)

Table 4 (*Continued*)

Variables	Financial Advisor–Underwriter Interaction Intensity at 0.10				Financial Advisor–Underwriter Interaction Intensity at 0.20			
	Model 1		Model 2		Model 3		Model 4	
	Coef.	t-score	Coef.	t-score	Coef.	t-score	Coef.	t-score
Market Yield Curve, Bond Buyer 20-y and 5-y	–0.00	–1.54	–0.00	–1.36	–0.00	–1.57	–0.00	–1.37
Spread, Bond Buyer 20 index vs. Treasury 20-y	0.00*	1.82	0.00*	1.68	0.00*	1.84	0.00*	1.71
Issuer Type: County	–0.00	–0.05	–0.00	–0.23	0.00	0.01	–0.00	–0.19
Issuer Type: College District	0.04	1.28	0.04	1.10	0.04	1.32	0.04	1.14
Issuer Type: Health District	0.01	0.16	0.02	0.48	0.01	0.19	0.03	0.49
Issuer Type: School District	–0.37***	–4.67	–0.34***	–4.30	–0.37***	–4.66	–0.34***	4.28
Issuer Type: Special District	0.26***	4.88	0.26***	5.05	0.26***	4.94	0.27***	5.09
Issuer Type: Water District	0.40***	19.76	0.41***	20.31	0.40***	19.08	0.41***	19.68
Lambda, Inverse Mill's ratio	0.15***	6.77	0.13***	5.96	0.15***	6.53	0.13***	5.68
AIC	9,096.10		9,025.50		9,106.40		9,037.90	
BIC	9,358.80		9,309.60		9,369.20		9,321.90	
–LL	–4,511.00		–4,472.80		–4,516.20		–4,478.90	
R^2	0.881		0.882		0.880		0.881	
R^2-adjusted	0.880		0.881		0.880		0.881	

Note: Inverse Mill's ratio is regression equation specific; levels of significance: * p<0.10; ** p<0.05; *** p<0.01.

spread of $186,840 is about $4,700 ($\overline{GrossSpread} \times \beta_i$). The results for this variable in Models 3 and 4 are significant at less than 5% to 10% levels of statistical significance. These findings support Hypothesis 1. Issues without financial advisors appear to incur significantly higher gross underwriting fees, all else constant. On average, lack of a financial advisor is associated with a more than 43% increase in gross underwriter spreads. This is in excess of $67,000 above the mean underwriter spread in terms of marginal effects. The result is significant at less than 1% in all our models. We find overwhelming support for Hypothesis 2. We further find that issues with high-reputation financial advisors have a positive association with gross underwriter spreads. This is counterintuitive to our hypothesized direction of the effect. All else held constant, issues with high-reputation financial advisors are found to have from 2.3% to 2.75% higher levels of gross underwriter spreads across all models, or about $4,220 to $5,070 above the mean gross underwriter spread. We fail to find any support for Hypothesis 3 in our regression models.

Financial advisor-turned-underwriter municipal issues appear to be associated with higher levels of gross underwriter spreads, all else equal. Debt issues where financial advisors become underwriters have, on average, gross underwriter spreads that are 10.50% greater, which translates to a marginal effect of $18,640 above the mean gross underwriter spread. This effect is consistent across all models and is significant at less than 1% level of significance. These results provide strong support in favor of Hypothesis 4. As hypothesized, the results suggest that, on average, local financial advisors are associated with lower levels of gross underwriting fees. We discover that the issues with local financial advisors achieve gross underwriter spreads that are about 2.80% lower. In terms of marginal effects, the gross underwriter spreads appear to be about $5,150 lower for municipal issues with local financial advisors, all other variables held constant. This result is significant in every regression model at less than 1% level of significance. Therefore, we find consistent evidence in support of Hypothesis 5.

High-reputation underwriters indeed appear to be charging a premium fee for their services. We confirm that prestigious underwriting firms have a 3.3% higher gross underwriters spread on average. In monetary terms, this is a difference of more than $5,900 above the mean gross underwriting spread. This finding is significant across all the models at less than 1% to 10% level of significance. Our results provide full support for Hypothesis 6. However, we fail to find any support toward our expectation of an inverse association between local underwriting firms and gross underwriters spread. The results are consistently insignificant in all of our regression models. We find no significant evidence to support Hypothesis 7. Negotiated issues, on the contrary, are highly significant. All else equal,

a negotiated method of sale appears to result in greater than 28% lower levels of gross underwriter spread, which is a decrease of at least $46,000 below the mean gross underwriter spread. The coefficients in every model are significant at less than 1% level of significance. Moreover, selectivity in the method of sale appears to be a very significant issue. All Inverse-Mill's ratio values are statistically significant. We have significant evidence in favor of Hypothesis 8. Finally, we do not find consistent evidence that the issues where the underwriters pay for insurance have greater levels of gross underwriter spread. The results cross back and forth in terms of levels of statistical significance; hence, we are hesitant to take any definitive conclusions about Hypothesis 9 based on our findings. Table 5 summarizes the statistical results for each of our nine hypotheses.

Table 5: Summary of Statistical Support for Research Hypotheses

Hyp. #	Hypothesis Statement	Statistical Support in Hypothesized Direction?
1	All else held equal, greater levels of financial advisor-underwriter interaction intensity have a positive association with gross underwriter spreads.	Yes
2	All else held equal, issues with no financial advisors have a positive association with gross underwriter spreads.	Yes
3	All else held equal, high-reputation financial advisors have a negative association with gross underwriter spreads.	Not in hypothesized direction; high-reputation financial advisors are found to have a significant *positive* association with gross underwriter spreads
4	All else held equal, issues with financial advisors-turned-underwriters have a positive association with gross underwriter spreads.	Yes
5	All else held equal, local financial advisors have an inverse association with gross underwriter spreads.	Yes
6	All else held equal, high-reputation underwriters have a significant association with gross underwriter spreads.	Yes; high-reputation underwriters have a significant *positive* association with gross underwriter spreads
7	All else held equal, local underwriters have an inverse association with gross underwriter spreads.	No
8	All else held equal (after correcting for the first-stage switching effect), a negotiated method of sale has a significant association with gross underwriter spreads.	Yes
9	All else held equal, issues where underwriters pay for bond insurance have a positive association with gross underwriter spreads.	Marginal

In terms of control variables, debt issue size is, naturally, a very significant positive factor for levels of gross underwriter spread. So are average bond maturities and sinking fund and call provisions in the issue. Bond issues with a financial guaranty are associated with higher underwriting fees, a finding that seems counterintuitive because these bonds should be less risky and thus generally involve less work and risk to underwrite. One possible explanation is that underwriters need to expend more time placing credit-enhanced AAA bonds rather than natural AAA bonds because investors have to analyze both the credit enhancement and underlying credit of insured bonds in making their purchase decisions. Lower risk bond issues are associated with smaller underwriting fees, as illustrated by the statistically significant variables with a negative sign for credit rating (low to high), three credit ratings, and two credit ratings. Of the market variables, market yield, market volatility, default risk spread, and muni-Treasury risk spread are all significant. Type of issuer also appears to matter for underwriting fees because school districts are associated with lower underwriting fees and special districts and water districts are associated with higher gross underwriter spreads than cities. Some of the statistically significant variables do not carry their expected signs. Voter-approved tax bonds were associated with higher underwriting fees, whereas revenue bonds were associated with lower fees compared to plain tax bonds. This does not fit prior expectations in that revenue bonds are generally riskier bonds because their repayment source is confined to specific revenues compared to tax-supported debt, which is supported by one or more main tax sources of the government.

Model Robustness Checks

We adopted two other specifications for the outcome variable in the model and re-ran Models 1 through 4. The first alternative specification is the gross underwriter spread per bond. This value is a dollar amount of gross underwriter spread per $1,000 value of the bond. The second alternative specification of the outcome variable is the gross underwriter spread per bond as a percentage of par (i.e., $1,000). These alternative specifications do not change the conclusions statistically or in terms of the magnitude of the effect for our main hypothesized associations or control variables.[5] Because these alternative specifications standardize all issues by par value, the only change occurs with the effect of issue size. The added value of these alternative specifications is that, in addition to our knowledge that issue size has a positive association with "unstandardized" gross

[5] The results are omitted for concerns of brevity. We will promptly provide them upon request.

underwriter fees, we learn that there are economies of scale in municipal underwriting on a per bond basis. In other words, conditional on per bond ("per capita") normalization of the outcome variable, any further effect of debt issue size is an indicator of the economies of scale. All held constant, issue size is found to have an inverse association with per bond gross underwriter spread.

We also re-ran all four models by using an alternative measure of interaction intensity. Ianotta and Navone (2008) measured issuer-underwriter interaction intensity, similar to our measure of financial advisor-underwriter intensity. The first difference is that their study looks at the aggregate transactions for the past five years (five-year lags), whereas we are looking at aggregate transactions within a given calendar year. The second difference is that their study used the aggregate dollar volume of transactions while we used the aggregate frequency of transactions. Although the aggregate dollar volumes are important, we think the frequencies of transactions between the financial advisors and underwriters are also important. Finally, their study employs time-weights while we have not. In their study of five-year lagged transactions, time-weight adjustment makes more sense than in our study, where we focus on individual calendar year transactions (hence, time distance is less of an issue). Nevertheless, Ianotta and Navone (2008) report that their non-time-adjusted results were significantly similar to the time-adjusted regression model results for interaction intensity. We find, using this alternative measure of interaction, that higher levels of financial advisor-underwriter intensity are associated with greater levels of underwriter fees, all else held constant. This is consistent with the initial expectations and findings using our main construct of financial advisor-underwriter interaction intensity.

We ran additional models for the determinants of gross underwriter spread, similar to our proposed Models 1 through 4, where we specified high-reputation financial advisors and high-reputation underwriters if they were in the top three firms by the frequency of transactions during the period under study. The results are statistically and substantively comparable to the results we reported.[6] We also specified credit quality of municipal issues using ordinal (from low to high) and binary categories of credit ratings (triple-A-rated issues are the omitted category). This change in functional form of credit quality does not appear to affect the consistency of parameters for our main hypothesized variables or any other control variables. The conclusions we draw are still unaffected. We also conducted a list-wise deletion of our main variables with subsequent

[6] These additional results are available upon request. They have been omitted for reasons of brevity from the paper.

replacement and re-ran the models to see how consistent the estimates were. At no time did the coefficients and the directions of the effect change substantively to warrant different conclusions. Finally, we re-ran the models where we added dichotomous identifications for year effects (i.e., 1999, 2000, etc., where 2008 was the omitted category). As expected, the year-specific effects weakened the market condition parameters but did not have any substantive influence on the coefficients of the main hypothesized associations.

POLICY AND THEORETICAL IMPLICATIONS

The empirical results described above offer some interesting policy and theoretical implications. We will begin by describing the implications from a debt management policy perspective. First, it is clear that reduced risk and volatility in the municipal bond markets, as proxied by the various market, issue, and issuer control variables, are associated with lower underwriting fees. This confirms much of the previous research in the 1960s, 1970s and 1980s on the determinants of underwriting fees. Some of this volatility and risk is not really in the control of issuers because it is a function of the aggregate overall bond markets. However, this result does imply that issuers may want to "time" their bond sales for periods when there is less volatility in the market, not only to avoid a premium on their interest rates but also on the underwriting spreads. In addition, because creditworthiness and risk is negatively associated with gross underwriter spread, subnational governments are advised to maintain and improve their creditworthiness not only to reduce interest costs but also as a means of minimizing underwriting fees.

Second, the findings illustrate that financial advisors matter in reducing underwriter costs, which supports previous research by Vijayakumar and Daniels (2006) and seems to refute the previous study by Forbes, Leonard, and Johnson (1992). The negative association between negotiated bond sales and underwriting fees may also support this finding in that financial advisors perform most of their services on these types of bond sales rather than competitive sales. In addition, issuers seem to receive a benefit from using local financial advisors, a finding that supports previous research by Butler on the beneficial impact of local underwriters on underwriting fees (Butler, 2008). However, high-reputation financial advisors do not seem to provide an incremental benefit to issuers and, in fact, are associated with higher underwriting fees. Moreover, situations in which financial advisors turn and bid on competitive bond issues actually result in higher gross underwriter spreads. Finally, the positive association between underwriting fees and financial advisor-underwriter intensity strongly argues for the use of switching up teams on bond deals with financial advisors and underwriters, especially for financial intermediaries

that often work together on transactions. In sum, issuers should strongly consider using financial advisors to reduce underwriting fees, and local financial advisors, if possible, but need to be very careful in crafting the specific financial advisor arrangement because they may be paying for something that does not have significant value (i.e., high-reputation financial advisors if they charge more for their services than other financial advisors) or using a specific financial advisor arrangement that actually leads to higher costs (i.e., allowing financial advisors to bid on competitive bond sales, teaming financial advisors and underwriters who regularly work together).

Third, issuers need to carefully select their underwriters as well. It has been hypothesized in previous research that high-reputation underwriters may be willing to increase their market share by reducing their fees (Daniels and Vijayakumar, 2007). Conversely, it has also been hypothesized that high-reputation underwriters may demand a premium for their services due to the increased reputational capital issuers will be "renting" from them. This study's finding that high-reputation underwriters are associated with higher gross underwriter spreads supports the latter hypothesis and should encourage issuers to closely weigh the pros and cons of using high-reputation underwriters for their negotiated bond sales. That is, issuers should use high-reputation underwriters only if they believe such intermediaries are going to find superior pricing on their bond sale vis-à-vis lower reputation underwriters. This may be the case for new credits, lowly rated credits, or for issuances when there is significant market uncertainty or volatility. Lack of statistical support for local underwriting firms providing gross underwriting fee benefits to state and local governments should caution governments from expecting to receive a benefit from their "home town" investment bank. The discrepancy in underwriter fees based on issuer type is troubling because one interpretation of this finding is that underwriters may be taking advantage of certain types of issuers. If the issuers that experience higher underwriting fees (i.e., special districts and water districts) are not as sophisticated as the other kinds of issuers, this finding would lend empirical support to the rent-seeking activities of investment banks on subnational governments. Also potentially worrying is the finding in some of the models that underwriters who purchase insurance on competitive bond sales are associated with higher gross underwriter spreads. Although this insurance may be beneficial to the issuer in that it allows underwriters to offer more attractive prices in the competitive bid for the bonds, all or a portion of the cost of such insurance may ultimately be borne by the issuer, which may not want its bonds insured so as to maintain capacity for purchasing insurance in the future. In all cases, the empirical results imply that careful selection of underwriters, additional monitoring of underwriters, and rotating of underwriters on

transactions is necessary to mitigate these financial intermediaries' rent-seeking attempts.

From a theoretical perspective, this paper offers several findings with respect to information asymmetry, financial intermediation, underwriting monopsony power, and debt management networks. First, the findings relating to market volatility, credit riskiness, and use of a financial advisor can be interpreted as reducing the information asymmetry between the security's true price and what an investor is willing to pay. Bond issues that are sold in a stable market, using a financial advisor, and are highly rated are likely to have less information asymmetry between the issuer and investor. These securities are therefore likely to have more demand for them from investors, which reduces the investor search, resulting in smaller underwriter fees. Financial intermediation, in this case the use of a financial advisor, affects the information asymmetry between parties. Interestingly, the results indicate that high-reputation financial advisors and high-reputation underwriters do not reduce information asymmetries to the extent of having a statistically significant impact on reducing underwriting fees. In sum, the degree of information asymmetry, caused by endogenous and exogenous factors, affects underwriting fees by affecting the effort level of underwriters, which is a determinant in the fees these parties charge issuers. This confirms many of the results of the older theoretical studies on information asymmetry established in the corporate and municipal finance literatures.

With respect to the theory of underwriter monopsony power, whereby underwriters have informational advantages that allow them to misstate their investor outreach efforts, the findings illustrate the existence of such a power relationship and the degree in which issuers need outside "experts" or consultants to help mitigate such underwriter power. Lower underwriter fees for bond issues with the use of a financial advisor, use of a local financial advisor, and for negotiated bond sales, and higher fees for financial advisor-turned-underwriter bond issues, high-reputation underwriters, and higher intensity relationships between underwriters and financial advisors evidences the existence of underwriter monopsony power. Interestingly, it does not seem that high-reputation financial advisors do a better job in countering the monopsony power of underwriters than other financial advisors. The finding that higher intensity relationships between financial advisors and underwriters result in higher underwriting fees may offer evidence that underwriters are able to "co-opt" financial advisors over time because their collaborations increase, which may mitigate these advisors' ability to counteract underwriter monopsony power. The financial advisor-underwriter intensity finding may also support the debt management network theory on team stability, which claims that more stable teams create an atmosphere where financial outcomes for the state or local government

may not be optimal due to rent-seeking actions by one or more of the teams in the debt management network. In this context, financial advisors in a stable debt management network, as proxied by higher underwriter-financial advisor intensity levels, may not be optimally representing the interests of their clients, as evidenced by higher underwriting fees associated with this type of debt management network arrangement.

Although the aforementioned policy and theoretical implications clearly emanate from the empirical results, there are limitations to this study associated with the financial advisor and underwriter variables that should be addressed in future research. The primary limitation of the study is the potential association between underwriting fees and overall borrowing costs. That is, the determinants described may be associated with higher or lower underwriting fees but also with borrowing costs that may be in the opposite direction. For example, high-reputation underwriters may charge more for their services but may provide more detailed search for investors, leading to lower interest costs that outweigh the increased underwriting fee. Future research should look at the impact of the financial advisor and underwriter variables used in this study on the impact of underwriting fees and the true interest cost (TIC) on bond issues. That said, while limited, this study still contributes to our understanding of a primary component of bond borrowing costs, underwriting fees, using much more recent data and new variables of interest that are especially salient given the current policy context and concerns related to financial intermediaries. Moreover, even without data on TICs, the study is able to directly test theories related to debt management networks and underwriter monopsony power.

CONCLUSION

This paper attempts to revisit and update the question of how underwriting fees are determined in the municipal bond market. Dramatic changes in the nature and size of the municipal bond industry over the last 20 years, bond market events caused by the Great Recession that have significantly compromised the finances of state and local governments, and the financial regulatory efforts by Dodd-Frank provide the backdrop and justification for such an updated analysis. This study builds on previous analyses of underwriting fees by focusing on several new variables of interest, most notably aspects of financial advisory arrangements, underwriters, and the underwriting process. The results from this study offer several policy and theoretical implications with regard to optimal subnational debt management practices and theories of information asymmetry, financial intermediation, underwriter monopsony power, and debt management networks. In sum, the findings show the relative importance of underwriting fees as they relate to the efficient management of debt, as well as the various actions subnational governments can take to minimize such fees. Although

a portion of underwriting fees is determined outside the scope of state and local government influence, there are several strategies governments can employ to reduce these costs related to financial advisors, underwriters, underwriting arrangements, and financial condition. The findings also provide empirical support for several of the theoretical propositions undergirding the determinants of underwriting fees shown in previous research, such as information asymmetry and financial intermediation, while offering empirical support to the underwriter monopsony power theory and debt management network theory using variables of interest not explored in previous research.

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Discussion of "An Empirical Examination of the Determinants of Municipal Bond Underwriting Fees" by Martin Luby and Tima Moldogaziev

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The paper by Luby and Moldogaziev is a step forward for our understanding of drivers of the costs that issuers pay when they issue municipal bonds. The authors' key innovation is their focus on joint consideration of the financial advisor and the underwriter. Some of the existing literature has focused on the financial advisors,[1] and other parts of the literature have focused on underwriters and the underwriting process. Luby and Moldogaziev consider these factors together in an innovative

[1] See Jayaraman Vijayakumar and Kenneth N. Daniels (2006). "The Role and Impact of Financial Advisors in the Market for Municipal Bonds." *Journal of Financial Services Research, 30(1),* 43–68.

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way. In particular, they construct an empirical measure capturing the intensity of interaction between the financial advisor and the underwriter and investigate the relationship between this measure and underwriting spreads.

Specifically, the authors construct a variable that captures situations in which a given underwriter underwrites at least 20% of the transactions handled by a financial advisor. The authors describe these issues as being characterized by a "high-intensity" relationship between the financial advisor and underwriter. The authors then test many hypotheses, but their central one is that bonds issued in circumstances where advisor and underwriter have a high-intensity relationship will have higher gross underwriting spreads when they are issued.

Luby and Moldogaziev find some support for this hypothesis. In a sample of 9,000 bond issues sold by Texas issuers between 1999 and 2010, they find a coefficient estimate suggesting that high-intensity (using their 20% threshold) advisor-underwriter relationships are associated with a 2.55% increase in underwriter spreads. At the mean level of underwriter spreads, the impact is about $4,700 per bond issue.

The authors use their dataset to test a number of other hypotheses. For example, they test the hypothesis (Hypothesis 8 in their paper) that bonds sold through the negotiated process have a higher gross underwriter spread than bonds sold through the competitive process. This question has been an important one for the literature. As the authors rightly point out, it a difficult and important question to get right. The underlying measurement problem, as highlighted by Kriz and others,[2] is the challenge of constructing an "apples-to-apples" comparison when one compares bonds sold through the negotiated process to bonds sold through the competitive process—their characteristics are different for a number of reasons. Any observed difference in yields or spreads may reflect differences in underlying characteristics, rather than the impact of method of sale.

One could make an analogy (or point out the lack of an analogy) to medical research. In clinical trials, a researcher can randomly assign drugs and placebos to patients and have confidence in a true, statistically valid, test. Because the test sample and control sample are randomly assigned, the researcher has a true apples-to-apples comparison. Observed differences in outcomes reflect the impact of the treatment. In economic research, particularly in this context, one does not have the luxury of a true clinical trial, and the researcher is forced to use other methods to obtain a valid empirical estimate of the relationship in question.

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[2] Kenneth A. Kriz (2003). "Comparative Costs of Negotiated versus Competitive Bond Sales: New Evidence from State General Obligation Bonds." *The Quarterly Review of Economics and Finance, 43(2),* 191–211.

One approach used in the literature studying negotiated versus competitive sale method, and used by the authors in this part of their paper, is to set up a first-stage empirical model that captures the factors that drive the use of a competitive or a negotiated process. If this first-stage model is correctly specified, there is some hope that a second-stage model can then estimate the true impact that the method-of-sale decision has on spreads or yields. The resulting coefficient estimate will be "purged" of the pollution that comes from the underlying differences in characteristics between the two types of bonds. The big question in this literature is always whether an author has truly found a valid empirical approach to purging the impact of these underlying differences.

With this as background, it is worth noting that Luby and Moldogaziev make an interesting choice. When addressing the competitive versus negotiated issue, they follow the literature and use a two-stage empirical model to control for underlying differences. On that front, their work follows the existing literature.

But on the points where their paper breaks new ground—on the consideration of the financial advisor-underwriter relationship—my impression is that the similar concerns that arise in the earlier empirical work on competitive versus negotiated sales will also arise. Specifically, the bonds that are sold using high-intensity underwriter-advisor pairs may be different, in some underlying way, from other bonds. This means that any empirical evidence of differences in spreads may reflect differences in the underlying bond characteristics and must be treated with extreme caution

That critique aside, it is important to acknowledge that the authors have made an important contribution. Their work is pioneering—they break new ground and turn our attention to an important facet of the underwriting process. Subsequent work can refine their methods and evaluate the extent to which their findings survive different empirical approaches. The authors' focus on advisors highlights the devilish complexity of empirical work here. Once we start analyzing the advisor, we must also consider the fact that the design of the bond itself can be influenced by the advisor. The bond structure is not handed down as in some clinical trial. The structure itself is the outcome of a process that is important to understand. The authors are doing a vital job of pointing us in the direction of understanding these relationships and the impact that they can have.