SELF-DEALING IN SECURITIES ISSUANCE: EVIDENCE FROM STATE GOVERNMENT BOND PRICING*

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Abstract

This paper uses the primary market for state bonds to study the role of self-dealing in security underpricing. Self-dealing occurs in this setting when campaign contributions motivate state politicians to accept low government bond prices. There is no underpricing effect from choosing a contributing underwriter through an auction. In the absence of an auction, state bonds are underpriced by over 2% when the politician selects a contributing underwriter. This outcome is linked to political agency, not politician incompetence. The results are robust to controlling for credit risk, elected treasurers, underwriter quality, a prior relationship, liquidity, year, and state effects.

Key words: Self-Dealing, Securities Issuance, Underpricing, Corruption, Political Agency.

JEL Classification: G24, G28, G29, C31, C35, H74, P16

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1 Introduction

Asymmetric information is a factor in many inefficient corporate finance outcomes, but few have attracted as much attention as security underpricing (Ritter, 2003; Eckbo, Masulis, and Norli, 2007; Ljungqvist, 2007). Issuers immediately observe a substantial price increase on the first trading day, which implies that the initial price is too low. A part of this forgone benefit may arise because of asymmetric information between investors and the issuer group (Rock, 1986). This direct finance case is rare; for most issues, there are intermediaries: the manager and the underwriter. The manager negotiates with the underwriter on behalf of the issuer group, and the underwriter is responsible for security pricing and distribution. An agency problem is clearly present; any decision that the manager takes on behalf of the issuer group may not be in the group's best interest.

Self-dealing is a special type of agency problem. The manager and the underwriter engage in a mutually beneficial transaction at the expense of the issuers. Anecdotal evidence from the 1990s informs us of underwriters using gifts and side payments to influence managers to accept underpricing[1]. Direct evidence however, is notably absent on the topic. One major obstacle in investigating this topic is that a manager is not likely to grant access to his proprietary data on gifts and side payments.

Is there self-dealing in securities issuance? Does self-dealing result in security underpricing? To answer these questions, this paper uses a setting with available side payment data where the self-dealing agency problem is well defined: the primary market for state bonds. The state routinely seeks the services of an underwriter when in need of

[1] See "Underwriters Set Aside IPO Stock for Officials of Potential Customers," *The Wall Street Journal*, November 12, 1997, for a representative article in the popular press.

public funds. Self-dealing occurs in this setting as the result of a political agency problem[2]. The voter-taxpayers are the principals and the elected political executive is the agent. The voter-taxpayers require that the political executive negotiate for a high issue price. Underwriters prefer a low issue price. Self-dealing occurs when the political executive chooses a contributing underwriter and accepts a low issue price. Does self-dealing in securities issuance come about as a result of campaign finance? Does selecting a contributing underwriter result in government bond underpricing?

The approach to answering these questions is not straightforward. Self-selection complicates the analysis. Consider the political executive's decision-making process. First, the political executive must decide whether to choose an underwriter through a sealed bid auction, mostly based on price (competitive method), or to negotiate on the price with an underwriter under flexible rules (negotiated method). Second, the political executive must decide whether to choose a contributing underwriter. The political executive makes these decisions with some knowledge of the potential price impact. Hence self-selection for these two decisions results in two variables being endogenous with respect to bond pricing. In addition to the political executive's decision-making process, identification is further complicated by the fact that the pricing mechanism is fundamentally different between negotiated and competitive issues. Immediately the implication is that the pricing effect of choosing a contributing underwriter is not the same for negotiated and competitive issues.

[2] Political agency comes naturally out of a principal-agent approach to pubic choice (Barro, 1973; Ferejohn, 1986; Besley, 2006). Campaign finance can constitute a political agency problem; campaign contributions may motivate politicians to grant favors to a small group of citizens at the expense of the broad electorate.

This study uses a double selection model to address the two endogenous choices: selection of the underwriter choice method, and selection of a contributing underwriter. I employ a two-stage estimation method, using two endogenous regimes in the final stage to address the pricing mechanism difference between the two underwriter choice methods.

For bonds associated with the competitive method, the act of choosing a contributing underwriter has no statistically significant pricing effect. For bonds associated with the negotiated method, I show that selecting a contributing underwriter results in underpricing of approximately 2.3% when compared to the case where the lead underwriter did not contribute. This result remains robust when controlling for credit risk, underwriter quality, a prior underwriting relationship, after-market liquidity, year and state effects, and when addressing the non-normality of first-day returns, extreme observations, control function estimation error, and heteroskedasticity at the serial issue level.

In addition to estimating the effect of choosing a contributing underwriter, the double selection model can identify whether the pricing effect is driven by political agency as opposed to political executive incompetence. The first-day return is positively correlated with the endogenous decision to select a contributing underwriter. As first day returns increase, the likelihood that the political executive selects a contributing underwriter also increases. This particular result supports the notion that incompetence does not cause the pricing effect; political executives appear to be complicit in terms of political agency.

This paper builds on the literature on agency and security underpricing. This strand of literature focuses largely on the equity initial public offers (IPOs). There are two types

of agents in a security offering: issuing agents and underwriter agents. In the case of underwriter agency, the issuers delegate the pricing decision to the underwriter in order to take advantage of the underwriter's information about demand conditions. Effort is costly to the underwriter; there is underpricing in equilibrium as a result of the informational advantage (Baron and Holmstrom, 1980; Baron, 1982; McAfee and McMillan, 1987).

In an empirical test of underwriter agency and underpricing, Ljungqvist (2003) uses United Kingdom equity IPO data to show that by making the underwriter's compensation optimally sensitive to the offer price, the issuer, through efficient contracting, can reduce the amount of underpricing[3].

In addition to underwriter agency, there may be an agency problem on the issuer side. Ljungqvist and Wilhelm (2003) show that higher pre-issue manager ownership results in less equity IPO underpricing. The authors also provide indirect evidence of self-dealing in securities issuance by showing that managers participating in friends and family programs, and not making secondary offers, are likely to have underpriced equity IPOs. By showing a pricing differential based on whether the underwriter contributed to the political executive's campaign, my paper provides direct evidence of self-dealing in securities issuance, and provides support for agency models of security underpricing.

This paper adds to the literature on conflict of interest in local government bond issuance (Hildreth, 1993, 1994; SEC, 1994; Brozovsky, Filling and Owsen, 2002; Butler, Fauver, and Mortal, 2008). Brozovsky, Filling and Owsen (2002) use data for one state, Louisiana, to show that contributions by financial intermediaries appear to be

[3] Agent incentives also affect real estate pricing. Levitt and Syverson (2005) compare home sales in which real estate agents are hired by others to sell a home to instances in which a real estate agent sells his own home. The authors show that homes owned by real estate agents attract higher prices than those not owned by real estate agents.

disproportionately made to political executives who have direct responsibility for securities issuance. By using a multi-state setting, I show the negative impact of choosing a contributing underwriter on bond pricing, thus providing evidence of the role of self-dealing in the local government bond market.

Finally, this paper adds to the political economy literature on campaign finance. Research in this area characterizes three motives for campaign contributions, which are not mutually exclusive. The first motive is consumption; contributors derive utility from the act of contributing. The second motive is support for a pre-existing policy (Baron, 1994; Bronars and Lott, 1997). The third motive is to receive a service, either through policy (Baron, 1989; Coate, 2004), access (Austen-Smith, 1995), investment (Snyder, 1990; Lopez, 2001), or otherwise.

Closely related to the service-induced campaign contribution motive, campaign finance can constitute a political agency problem (Besley, 2006). Here the contributor seeks to motivate political executives to grant him favors at the expense of the broad electorate. These favors, if granted, result in the misuse of public office, and may even be illegal[4]. This study provides support for the political agency model of campaign finance by showing evidence that suggests that taxpayers are negatively impacted if the political executive chooses a contributing underwriter.

[4]This particular political agency activity can be defined as corruption (Rose-Ackerman, 1975; Shleifer and Vishny, 1993; Svensson, 2003; Svensson, 2005). Corruption is one of the most widely studied classes of political agency problems. It is commonly defined as the misuse of public office for personal gain, and is commonly associated with bribery. In many cases the definition of corruption involves a legal standard. Given that campaign contributions are not necessarily bribes, and the misuse of public office may not involve illegal activities, the general political agency model seems more appropriate than the corruption model. To carry the point further, one major challenge for empirical studies of corruption is that bribes are typically not observed, and illegal activities are only partly verified ex-post. In lieu of bribe data, many scholars have used proxies: political ties (Fisman, 2001), ex-post convictions (Glaeser and Saks, 2006), etc.

This paper is the first transaction-level study to provide direct evidence of self-dealing in securities issuance. In doing so, it is the first transaction-level study to provide direct evidence of the effect of underwriter campaign contributions on government bond pricing in a multi-state setting. It is also the first transaction-level study to provide, in a multi-state setting, direct evidence of campaign finance agency costs in the United States of America.

2 Municipal Bonds and Conflict of Interest Regulation

The municipal bond market provides state and local governments the means to borrow money for projects that have a substantial impact on the general citizenry. Projects funded include schools, highways, hospitals, housing, sewer systems, etc. Given that a decision has been made to issue debt, the first stage of the issuance process is one of security structuring and general financial advice. The issuer's bond counsel and financial advisor play key roles in the first stage. Large issuers with sufficient knowledge of financial markets and local laws, in most cases, do not utilize the services of a financial advisor.

The second stage is one of underwriter choice and bond sale. An issuer can choose to commit to an underwriter through the negotiated method, or allow the underwriters to compete in an auction, mostly on the basis of price and interest cost. In both negotiated and competitive sales, underwriters assume complete risk and responsibility for selling the bonds. For a competitive issue, the underwriter is committed to the price upon the end of the auction. In a negotiated sale the underwriter decides on

the price when the deal is underwritten, based on discussions with the issuer and issue demand, and not on a pre-determined time schedule per se.

The municipal bond market lacks transparency and trading costs are large (Green, Hollifield, and Schuroff, 2005; Harris and Piwowar, 2005). Insured bonds and straight bonds have smaller than average trading costs (Harris and Piwowar, 2005). Harris and Piwowar (2005) show that the maximum effective spread for straight bonds in their sample is 1%. For further details on the municipal bond market, see Hildreth (1993), Nanda and Singh (2004), Green, Hollifield, and Schuroff (2005), and Harris and Piwowar (2005).

In the 1980s underwriters started to give large amounts of money to political executives in the form of campaign contributions. This event coincided with increased use of the negotiated method (Daun and Patterson, 1993). Concerned about conflict of interest problems, the Municipal Securities Rulemaking Board (MSRB) enacted Rule G-37[5] on April 7 1994, prohibiting a broker, dealer, or municipal professional of the broker from engaging in negotiated municipal securities business with an issuer if political contributions have been made to officials of the issuers by the finance agent in the previous two years. After the enactment of Rule G-37, underwriters began to employ consultants as middlemen to lobby on their behalf in order to promote negotiated issuance business.

On January 17, 1996, the MSRB adopted Rule G-38 which required underwriters to disclose information about consultant arrangements. Rule G-38 defines consultants as any person used by a broker, dealer, or municipal securities dealer to obtain or retain municipal securities business through direct or indirect communication by such person

[5] The Municipal Securities Rulemaking Board, http://www.msrb.org

with an issuer on behalf of such broker, dealer, municipal securities dealer, or any other person. It goes on to state that the following persons shall not be considered consultants for the purposes of this rule: (a) a municipal finance professional of the broker, dealer, or municipal securities dealer; and (b) any person whose sole basis of compensation from the broker, dealer, or municipal securities dealer is the actual provision of legal, accounting, or engineering advice, services, or assistance in connection with the municipal securities business that the broker, dealer, or municipal securities dealer is seeking to obtain or retain. Concerned about underwriters avoiding regulatory monitoring through the use of consultants, Rule G-38 was amended in 1999 by the MSRB to require dealers to list not only their campaign contributions, but the contributions of their consultants.

3 State Campaign Finance and Disclosure

Federal law is commonly used as a benchmark for state campaign finance policy. The 1979 Federal Election Campaign Act (FECA) and the 2002 Bipartisan Campaign Reform Act (BRCA) were the last two major campaign finance bills to be passed at the Federal level. Federal law defines a "contribution" to include "anything of value" given to a federal candidate or political committee (Corrado et al., 2005). The Supreme Court construes the term "political committee (POC)" to "only encompass organizations that are under the control of a candidate or the major purpose of which is the nomination or election of a candidate." Candidate committees (CCs), political action committees (PACs), and party committees (PCs) are all different types of POCs. Under FECA, "hard money" campaign contributions to a CC for Federal office can come from three major

sources: individuals, PACs, and PCs. Election cycle contribution limits are imposed for individuals per-candidate, per-PAC, per-PC, and on an aggregate basis (for PACs and PCs). Contribution limits are also imposed on PACs and PCs. Corporations and labor organizations are prohibited from making "hard money" contributions at the Federal level. Nevertheless, these groups can form, or sponsor, PACs for their respective constituents.

In addition to rules governing campaign finance activity, FECA also specifies a code of conduct with respect to campaign finance disclosure. The Federal Election Commission (FEC) is responsible for collecting the data and enforcing campaign finance disclosure laws. Individuals are required to report information about expenditure, whereas political committees (PACs, PCs) are required to report information on fundraising and expenditure. Committee fundraising reports must identify each donor who has given $200 or more to the organization in a calendar year. In addition, committees must make their "best efforts" to secure the name, mailing address, occupation, and employer of each contributor.

Campaign finance policy varies widely by state (Feigenbaum and Palmer, 2002). One major difference between Federal-level campaign policy and state-level campaign policy is that corporations and labor organizations are not necessarily prohibited from making direct campaign contributions to a CC. That is, these entities need not sponsor PACs in order to participate in the campaign finance process. For example, labor organizations are allowed to make direct campaign contributions in Massachusetts, whereas corporations are prohibited. In New York, corporations and labor organizations

are allowed to make direct campaign contributions to a CC. Contribution limits imposed on individuals, PACs, and PCs, also vary widely among states.

In the early to middle 1970s, most states enacted campaign finance disclosure laws based on FECA. The majority of the states began making campaign contribution data available to the public over the Internet circa 1999. The quality of state campaign finance disclosure policy ranges from very good (Ohio) to non-existent (Wyoming). For some states with comprehensive disclosure requirements and full Internet access to information, only scanned images of disclosure forms are available. Feigenbaum and Palmer (2002) and Corrado et al. (2005) go into further detail on the topic of campaign finance regulation.

4 Data

I use a sample of U.S. state-level municipal straight bond offerings in the years 1998 to 2004. The search set of municipal bond issuers includes 50 states and excludes Puerto Rico and other U.S. territories not subject to majority sample political conventions. Given that campaign contribution data quality varies substantially between states, I limit my sample to states that adhere to the following criteria. First, states must document candidate contributions in spreadsheet format: MS Excel and character delimited text files. Second, for contributions by individuals, files must contain the employer name. This restriction limits the set of states to California, Georgia, Hawaii, Massachusetts, Michigan, New Jersey, New York, Ohio, Rhode Island, Virginia, Washington, and Wisconsin.

For the set of potentially conflicted payments, this study uses campaign contributions to political executives (governors and treasurers) from underwriters, underwriter PACs, and individuals employed by underwriters.[6] Election results for governors and treasurers are sourced from various state election Web sites and the *CQ Voting and Elections Collection*. Campaign contribution data—payment date, amount, and contributor information—for the identified political executives are sourced from state election and campaign finance databases through the Internet. Data on the quality of state laws are sourced from the *Better Government Association*.

Each candidate file is filtered for employees and related entities of top-ranked municipal bond underwriters based on the total dollar amount of issues. An underwriter is classified as such if it appears on the list of top 100 underwriters for short-term or long-term issues in any of the fall editions of the *Bond Buyer's Municipal Marketplace Directory* for the years 1997 to 2004. All mergers and acquisitions involving these underwriters are recorded with relevant dates to identify the correct entities through the sample period.

All offer information including price data is obtained from the *Bloomberg* database. I exclude bonds that are callable, bonds with a sinking fund, and bonds that do not trade within the first five days after the issue date. The final sample consists of 1653 bonds. Table I shows the sample characteristics of these bonds.

Underwriter gross spreads are sourced from *SDC Platinum*. Unfortunately, spread data are not available for most of the bonds in the sample, limiting all but the basic tests in the paper. From the price data, first-day abnormal returns are calculated using the Handjinicolaou and Kalay (1984) mean-adjusted returns methodology (see the

[6] Campaign contributions are initially recorded a year into the start of the contribution series for each state.

Appendix). This methodology produces unbiased estimates of single-day returns in an environment with infrequent trading and changes in the term structure (Datta, Datta, and Patel, 1997; Handjinicolaou and Kalay, 1984; Cai, Helwege, and Warga, 2007). Benchmark return data for the Lehman Brothers Municipal Bond Index are collected from the *Datastream* database.

5 Empirical Methodology

In this paper, I would like to identify the effect of choosing a contributing underwriter on the initial pricing of state bonds. In identifying the pricing effect of choosing a contributing underwriter, I must recognize the structure of the economic decision-making process. There are two important decisions that the issuer makes in the debt issuance process. First, an issuer has to decide on whether to choose the underwriter through a sealed bid auction; that is, mostly based on price and interest cost (competitive method), or to negotiate with an underwriter on a broader set of terms under flexible rules (negotiated method). Second, an issuer has to decide whether or not to choose a contributing underwriter. It is likely that these two decisions are correlated[7]. More importantly in considering the impact on identification, the two decisions may be endogenous with respect to first-day bond returns. Therefore, one obvious complication is self-selection i.e. there are two endogenous variables: *Negotiated* and *Contributed*.

In addition to the economic decision-making process, identification is further complicated by the fact that the pricing mechanism is fundamentally different between

[7]In looking at the interaction between the two decisions, the issuer may have less control over whether or not a contributing underwriter is chosen if the issuer first chooses to select an underwriter through the competitive method, so the nature of the correlation may be sequential (Lahiri and Song, 2001). The methodology used in this paper allows for this particular case.

negotiated and competitive issues. This is likely to result in treatment effect heterogeneity for the impact of *Negotiated* on first day returns. One implication of treatment effect heterogeneity is that the pricing effect of choosing a contributing underwriter is not the same for negotiated and competitive issues.

In order to address these complications, I adopt a control function approach to estimate the causal effect of choosing a contributing underwriter on the first day return for a bond. To address endogeneity in more than one explanatory variable, I employ a two-stage estimation method for double selection (Fishe, Trost, and Lurie, 1981; Maddala, 1983; Tunali, 1986; Krishnan, 1990; and Lahiri and Song, 2001), with two endogenous regimes in the final stage to address possible treatment effect heterogeneity.

Consider the following data generating process for the dependent variable, where *i=1,…M* is an index for bonds, *j=1,…J* for states and *t=1,…T* for time (years). ε_1 and ε_2 are mean zero noise terms. a_t and s_j are year and state effects respectively.

$$y_{1ijt} = \boldsymbol{X}_{1ijt}\beta_1 + \gamma_1 C_{1ijt} + a_{1t} + s_{1j} + \varepsilon_{1ijt} \quad \text{if} \quad N = 1 \qquad (1)$$

$$y_{2ijt} = \boldsymbol{X}_{2ijt}\beta_2 + \gamma_2 C_{2ijt} + a_{2t} + s_{2j} + \varepsilon_{2ijt} \quad \text{if} \quad N = 0 \qquad (2)$$

For this process, N is a dummy variable equal to zero if the underwriter is selected through a sealed bid auction, C a dummy variable equal to one if the issuer selects a contributing underwriter, and zero otherwise. Under this process, the coefficients are not identified given the two endogenous explanatory variables; $E[\boldsymbol{X}_1{}'\varepsilon_1] \neq 0$ and $E[\boldsymbol{X}_2{}'\varepsilon_2] \neq 0$. Nevertheless, I assume that I can identify the coefficients using a set of instrumental variables; $E[\boldsymbol{Z}'\varepsilon_1] = 0$ and $E[\boldsymbol{Z}'\varepsilon_2] = 0$. Under the control function (CF) approach the coefficients are identified if there exist two functions, $\sigma_N\lambda_N$ and $\sigma_C\lambda_C$, when included, control for the endogeneity in the model; $E[\boldsymbol{X}_1{}'u_1] = 0$ and $E[\boldsymbol{X}_2{}'u_2] = 0$.

$$y_{1ijt} = \boldsymbol{X}_{1ijt}\beta_1 + \gamma_1 C_{1ijt} + \sigma_{1N}\lambda_{1N} + \sigma_{1C}^{*}\lambda_{1C} + a_{1t} + s_{1j} + u_{1ijt} \quad \text{if } N = 1 \quad (3)$$

$$y_{2ijt} = \boldsymbol{X}_{2ijt}\beta_2 + \gamma_2 C_{2ijt} - \sigma_{2N}\lambda_{2N} + \sigma_{2C}^{*}\lambda_{2C} + a_{2t} + s_{2j} + u_{2ijt} \quad \text{if } N = 0 \quad (4)$$

In using the CF approach, I estimate the following functions.

$$E\left[y_{1ijt}|\boldsymbol{Z}, C, N = 1\right] = \boldsymbol{X}_{1ijt}\beta_1 + \gamma_1 C_{1ijt} + a_{1t} + s_{1j} + E[\varepsilon|\boldsymbol{Z}, C, N = 1] \text{ if } N = 1 \quad (5)$$

$$E\left[y_{2ijt}|\boldsymbol{Z}, C, N = 0\right] = \boldsymbol{X}_{2ijt}\beta_2 + \gamma_2 C_{2ijt} + a_{2t} + s_{2j} + E[\varepsilon|\boldsymbol{Z}, C, N = 0] \text{ if } N = 0 \quad (6)$$

In order to characterize $E[\varepsilon|\boldsymbol{Z}, C, N = 1]$ and $E[\varepsilon|\boldsymbol{Z}, C, N = 0]$, I must first express C and N in jointly in terms of the instrumental variables. Given that C and N are both endogenous variables, I use a seemingly unrelated bivariate probit as the first step in modeling double selection.

$$C_{ijt}^{*} = \boldsymbol{Z}'\delta_C + v_C + \alpha_C \quad (7)$$

$$N_{ijt}^{*} = \boldsymbol{Z}'\delta_N + v_N + \alpha_N \quad (8)$$

Here α_C and α_N are offset terms, $E[v_C] = E[v_N] = 0$, $Var[v_C] = Var[v_N] = 1$, and $Cov(v_N, v_C) = \sigma_{NC}$. C^* and N^* are unobserved latent variables; we observe $C = 1$ if $C^* > 0$, and $N = 1$ if $N^* > 0$. The underlying assumption of the control function model is as follows.

$$E[\varepsilon|\boldsymbol{Z}, C, N = 1] = \sigma_{1N}\lambda_{1N} + \sigma_{1C}^{*}\lambda_{1C} \quad (9)$$

$$E[\varepsilon|\boldsymbol{Z}, C, N = 0] = -\sigma_{2N}\lambda_{2N} + \sigma_{2C}^{*}\lambda_{2C} \quad (10)$$

Given the joint representation of C and N, the generated regressors for the second stage are defined in the following manner.

$$\lambda_{1N} = (1 - C) \times \left(\frac{\phi(\boldsymbol{Z}'\delta_N)\Phi\left(-\boldsymbol{Z}''\delta_C\right)}{\Phi(\boldsymbol{Z}'\delta_N, -\boldsymbol{Z}'\delta_C)}\right) + C \times \left(\frac{\phi(\boldsymbol{Z}'\delta_N)\Phi\left(\boldsymbol{Z}''\delta_C\right)}{\Phi(\boldsymbol{Z}'\delta_N, \boldsymbol{Z}'\delta_C)}\right)$$

$$\lambda_{1C} = (1 - C) \times \left(\frac{-\phi(\boldsymbol{Z}'\delta_C)\Phi\left(\boldsymbol{Z}''\delta_N\right)}{\Phi(\boldsymbol{Z}'\delta_N, -\boldsymbol{Z}'\delta_C)}\right) + C \times \left(\frac{\phi(\boldsymbol{Z}'\delta_C)\Phi\left(\boldsymbol{Z}''\delta_N\right)}{\Phi(\boldsymbol{Z}'\delta_N, \boldsymbol{Z}'\delta_C)}\right)$$

$$\lambda_{2N} = (1 - C) \times \left(\frac{\phi(-\boldsymbol{Z}^{'} \delta_N) \Phi\left(-\boldsymbol{Z}^{''} \delta_C\right)}{\Phi(-\boldsymbol{Z}^{'} \delta_N, -\boldsymbol{Z}^{'} \delta_C)} \right) + C \times \left(\frac{\phi(-\boldsymbol{Z}^{'} \delta_N) \Phi\left(\boldsymbol{Z}^{''} \delta_C\right)}{\Phi(-\boldsymbol{Z}^{'} \delta_N, \boldsymbol{Z}^{'} \delta_C)} \right)$$

$$\lambda_{2C} = (1 - C) \times \left(\frac{-\phi(\boldsymbol{Z}^{'} \delta_C) \Phi\left(-\boldsymbol{Z}^{''} \delta_N\right)}{\Phi(-\boldsymbol{Z}^{'} \delta_N, -\boldsymbol{Z}^{'} \delta_C)} \right) + C \times \left(\frac{\phi(\boldsymbol{Z}^{'} \delta_C) \Phi\left(-\ddot{\boldsymbol{Z}}^{'} \delta_N\right)}{\Phi(-\boldsymbol{Z}^{'} \delta_N, \boldsymbol{Z}^{'} \delta_C)} \right)$$

$$\lambda_{2C} = (1 - C) \times \left(\frac{-\phi(\boldsymbol{Z}^{'} \delta_C) \Phi\left(-\boldsymbol{Z}^{''} \delta_N\right)}{\Phi(-\boldsymbol{Z}^{'} \delta_N, -\boldsymbol{Z}^{'} \delta_C)} \right) + C \times \left(\frac{\phi(\boldsymbol{Z}^{'} \delta_C) \Phi\left(-\ddot{\boldsymbol{Z}}^{'} \delta_N\right)}{\Phi(-\boldsymbol{Z}^{'} \delta_N, \boldsymbol{Z}^{'} \delta_C)} \right)$$

$$\boldsymbol{Z}^{''} \delta_N = \frac{\boldsymbol{Z}^{'} \delta_N - \sigma_{NC} \boldsymbol{Z}^{'} \delta_C}{\sqrt{1 - \sigma_{NC}^2}}$$

$$\boldsymbol{Z}^{''} \delta_C = \frac{\boldsymbol{Z}^{'} \delta_C - \sigma_{NC} \boldsymbol{Z}^{'} \delta_N}{\sqrt{1 - \sigma_{NC}^2}}$$

Equations (3) and (4) are subsequently estimated in the second stage by using ordinary least squares (OLS) and robust regression methods (see Section 7). Essentially, the two-stage estimation method provides unbiased estimates of the coefficients for the following full-information model.

$$N = 1 \text{ if } \quad \boldsymbol{Z}^{'} \delta_N + v_N > 0$$

$$N = 0 \text{ if } \quad \boldsymbol{Z}^{'} \delta_N + v_N \leq 0$$

$$C = 1 \text{ if } \quad \boldsymbol{Z}^{'} \delta_C + v_C > 0$$

$$C = 0 \text{ if } \quad \boldsymbol{Z}^{'} \delta_C + v_C \leq 0$$

$$y_{1ijt} = \boldsymbol{X}_{1ijt} \beta_1 + \gamma_1 C_{1ijt} + \sigma_{1N} \lambda_{1N} + \sigma_{1C}^{*} \lambda_{1C} + a_{1t} + s_{1j} + u_{1ijt} \quad \text{if } N = 1 \quad (11)$$

$$y_{2ijt} = \boldsymbol{X}_{2ijt} \beta_2 + \gamma_2 C_{2ijt} - \sigma_{2N} \lambda_{2N} + \sigma_{2C}^{*} \lambda_{2C} + a_{2t} + s_{2j} + u_{2ijt} \quad \text{if } N = 0 \quad (12)$$

$$\Omega = \begin{bmatrix} \sigma_N^2 & \sigma_{NC} & \sigma_{1N} & \sigma_{2N} \\ \sigma_{NC} & \sigma_C^2 & \sigma_{1C} & \sigma_{2C} \\ \sigma_{1N} & \sigma_{1C} & \sigma_1^2 & . \\ \sigma_{2N} & \sigma_{2C} & . & \sigma_2^2 \end{bmatrix}$$

$$\sigma_{1C}^{*} = -(1 - C) \times \sigma_{1C} + C \times \sigma_{1C} \; ; \sigma_{2C}^{*} = -(1 - C) \times \sigma_{2C} + C \times \sigma_{2C}$$

6 Sample Statistics and Empirical Analysis

Each observation in the sample represents a bond, or a serial debt issue tranche. The primary dependent variable of interest for this study is the abnormal return for the bond on the first day of trading (see the Appendix for the details regarding the abnormal bond return calculation). Given that there is an absolute benchmark used to calculate abnormal returns, first-day abnormal return analysis should be less susceptible to omitted variables bias when compared to ex-ante yield analysis. Table II provides summary statistics and difference in means tests for the bonds in the sample.

Panel A shows summary statistics by underwriter choice method. 751 bonds are associated with a lead underwriter chosen through the negotiated method, whereas 902 bonds are associated with a lead underwriter chosen through a sealed bid auction (competitive method). The difference in first day returns between negotiated bonds and competitive bonds is roughly six basis points. This difference though is not statistically significant at the 10% level. Bonds associated with the negotiated method, on average, have a higher gross spread than bonds associated with the competitive method. The difference in gross spread is 1.371% and is statistically significant at the 1% level. This difference exists most likely because the services that an underwriter provides in the case of the negotiated method are not readily offered in the case where the underwriter must compete on price.

Bonds associated with the negotiated method have a longer time to maturity and are larger in amount when compared to bonds associated with the competitive method. The difference in the time to maturity is approximately 14 months. The difference in amount is 4.186 million dollars. Both differences are statistically significant at the 1%

level. This finding is consistent with the widely held view that the negotiated method allows for better quality service for bonds that are hard to value and distribute.

In the case of third party insurance or credit enhancement[8], bonds associated with the negotiated method, on average, have a higher rate of credit enhancement than those associated with the competitive method. Finally, bonds associated with the negotiated method are of lower underlying quality[9] than those associated with the competitive method. This difference though, is not statistically significant at the 10% level. Even though there is a positive difference for credit enhancement, there is a small negative difference for underlying quality. This finding suggests that bonds of lower underlying quality are more likely to carry credit enhancement.

For each underwriter choice method, Panel B shows summary statistics by contribution status. Let us first investigate these statistics for the issues where the underwriter is chosen through the competitive method. For these issues, based on univariate statistics, pricing seems to be accurate regardless of contribution status. In fact, on average, bonds associated with the competitive method are slightly overpriced. Bonds associated with a contributing underwriter are on average overpriced when compared to bonds associated with an underwriter that did not contribute to the governor's campaign in the previous two years. The difference is approximately 8 basis points, but is not statistically significant at the 10% level. Bonds associated with a contributing underwriter have a shorter time to maturity and are smaller in amount when compared to those

[8] Thakor (1982) shows how the use of third-party insurance can reduce asymmetric information costs. Asymmetric information has been shown to contribute to underpricing (Rock, 1986).
[9] The underlying quality score is based on the credit ratings for the underlying quality of insured bonds (see the Appendix for the definition).

associated with an underwriter that did contribute. These differences though are not statistically significant at the 10% level.

For the competitive category, bonds associated with a contributing underwriter, on average, have a lower rate of credit enhancement when compared to those associated with an underwriter that did contribute. The difference is approximately 0.15 and is statistically significant at the 1% level. For the competitive category, bonds associated with a contributing underwriter are of lower underlying quality when compared to those associated with an underwriter that did contribute. The difference is approximately 0.70 and is statistically significant at the 1% level.

For the negotiated category of issues, bonds associated with a contributing underwriter are on average underpriced when compared to bonds associated with an underwriter that did not contribute. The difference is approximately 14 basis points and is statistically significant at the 5% level. In light of evidence presented in Green, Hollifield, and Schuroff (2005) and Harris and Piwowar (2005), this difference may not be economically significant because of the large spreads associated with the secondary market for municipal bonds.

For the negotiated category of issues, bonds associated with a contributing underwriter have a higher gross spread than those associated with an underwriter that did not contribute. The difference is approximately 16 basis points and is not statistically significant at the 10% level. This finding suggests that if campaign contributions are service-induced, then underwriters may not be benefitting through direct costs.

For the negotiated category, bonds associated with a contributing underwriter have a longer time to maturity when compared to those associated with an underwriter

that did contribute. The difference is approximately 300 days and is statistically significant at the 1% level. For the negotiated category, bonds associated with a contributing underwriter are larger in amount when compared to those associated with an underwriter that did contribute. The difference is 4.27 million dollars and is statistically significant at the 1% level.

For the negotiated category, bonds associated with a contributing underwriter, on average, have a lower rate of credit enhancement when compared to those associated with an underwriter that did contribute. The difference is approximately 0.20 and is statistically significant at the 1% level. For the negotiated category, bonds associated with a contributing underwriter are of lower underlying quality when compared to those associated with an underwriter that did contribute. The difference is 0.65 and is statistically significant at the 1% level. Given that in many cases, variables that are correlated with first-day returns are also correlated with contribution status, I perform a multivariate analysis of first day returns in order to test the following hypotheses (null form).

Hypothesis 6.1 (Contributions and Pricing) For cases where the underwriter is not chosen through a sealed bid auction, bonds that are associated with contributing underwriters do not exhibit significant first-day abnormal returns when compared to bonds that are associated with non-contributing underwriters.

Hypothesis 6.2 (Complicity) For cases where the underwriter is not chosen through a sealed bid auction, the selection of a contributing underwriter is not endogenous with respect to first-day abnormal returns.

To test these hypotheses, I use a control function approach and estimate the coefficients of the model using a two-step method, where the final stage is in the form of an endogenous regime switching model (see Section 5).

Table III shows the results of the regressions, where the two endogenous issuer variables: *Contributed* and *Negotiated*, are dependent variables in the first stage and the second stage dependent variable is the first-day abnormal return. The variable of interest for Hypothesis 6.1, *Contributed*, is a dummy variable equal to one if the lead underwriter for the bond contributed (through employees, or a PAC) to the governor's campaign in the previous two years. *Negotiated* is a dummy variable equal to zero if the lead underwriter was chosen through a sealed bid auction. The basic control variables are log (maturity), log (bond tranche amount), insurance status, and underlying bond quality.

The first-stage seemingly unrelated bivariate probit results are presented in Table III, columns (1) and (2). I use the following identifying instruments in the model: *Election Distance*, the number of calendar days between the issue date and the next gubernatorial election (multiplied by 100 for scale), *Conflict of Interest Law*, a score for the quality of state laws governing how lawmakers disclose their financial interests, and *Freedom of Information Law*, a score for the quality of state laws regarding the ease of access to government records and information.

The motivation for *Election Distance* is given by the literature on electioneering and political business cycles that shows that election timing influences economic policy (Rogoff and Sibert, 1988; Blais and Nadeau, 1992; Brown and Dinc, 2005; Veiga and Veiga, 2007). Moreover, Besley (2006) argues that elections are the primary disciplining mechanism for political agency problems. The motivation for *Conflict of Interest Law* is given by the literature on self-dealing. Djankov et al. (2008) argue that the quality of law can limit self-dealing by members of society. The motivation for *Freedom of Information Law* is given by Alt and Dreyer Lassen (2002) and Besley (2006) who show that the effects of the political agency problem can be mitigated through the use of better quality information.

All first-stage regressions include year effects. The basic control variables are more important in determining the probability of underwriter choice method than they are in determining contribution status. A greater time to maturity, a smaller bond amount, the existence of credit enhancement and lower underlying credit quality are positively associated with the probability of the underwriter being chosen through the negotiated method.

The coefficient for *Election Distance* is positive, which is consistent with elections having a disciplining effect, but this coefficient is not statistically significant at the 10% level. The quality of state laws is important; the coefficient for *Conflict of Interest Law* and the coefficient for *Freedom of Information Law* are negative and statistically significant. Hence increases in both law scores are associated with a lower probability of an underwriter being chosen through the negotiated method. The marginal effect of *Conflict of Interest Law* on the probability of the underwriter being chosen

through the negotiated method is approximately -0.6%. The marginal effect of *Freedom of Information Law* on the probability of the underwriter being chosen through the negotiated method is approximately -1.4%.

For contribution status, none of the coefficients for the basic control variables are statistically significant at the 5% level. The coefficients for the identifying instruments are much more important. Consistent with a conflict of interest explanation, the election appears to have a disciplining effect. In column (2), the coefficient for *Election Distance* is positive and statistically significant at the 1% level. For every 100 days until the next election, the probability of a contributing underwriter being chosen increases by 4%. The quality of state laws also has a disciplining effect. An increase in both law scores are associated with a lower probability of a contributing underwriter being chosen. The coefficients for both variables are statistically significant at the 1% level. The marginal effect of *Conflict of Interest Law* on the probability of a contributing underwriter being chosen is approximately -0.25%. The marginal effect of *Freedom of Information Law* on the probability of a contributing underwriter being chosen is approximately -1.1%.

The decision to choose an underwriter through the negotiated method and the decision to choose a contributing underwriter are negatively correlated through their respective first-stage error terms in the model. The correlation coefficient is -0.225 and is statistically significant at the 1% level. For a test of the joint significance of the identifying instrumental variables, the Chi squared statistics for both first-stage equations are greater than 200; the p-values are less than 0.001.

Columns (3) and (4) use control functions derived from the first stage (see Section 5 for control function definitions). These regressions use year dummy variables and

heteroskedasticity-robust standard errors that cluster at the serial issue level. For bonds that are associated with the negotiated method, the coefficient for contributed is positive and statistically significant at the 1% level, thus rejecting the null for Hypothesis 6.1. The table shows that choosing a contributing underwriter through the negotiated method results in underpricing of approximately 3%. For bonds that are associated with the competitive method, the coefficient for contributed is negative and marginally significant.

All subsequent second-stage regressions use year and state dummies; these dummies greatly improve the fit of the model. Regression results for the first stage are presented in columns (1) and (2). Columns (5) and (6) use control functions derived from the first stage.

For both underwriter choice method regimes, a higher bond amount is associated with greater underpricing, consistent with an asymmetric information explanation of underpricing. The coefficients for *Log(Bond Amt)* are positive and statistically significant at the 5% level. The coefficients for *Log(Maturity)* are negative and statistically significant at the 5% level possibly because of nonlinear effects of maturity on first-day abnormal returns. As expected, the coefficients for the primary control variable for credit risk, *Insured*, are negative, but are not statistically significant at the 10% level.

For bonds that are associated with the negotiated method, the coefficient for *Contributed* is positive and statistically significant at the 1% level, thus rejecting the null for Hypothesis 6.1. Here, choosing a contributing underwriter through the negotiated method results in underpricing of approximately 2.3%. There is no comparable statistically significant effect for bonds that are associated with the competitive method,

implying that this competitive method is effective for mitigating the impact of the political agency problem.

In columns (5) and (6), the coefficients for the control functions provide evidence on political executive behavior. In addition to the effect on the choice of a contributing underwriter, the competitive method limits self-selection by the political executives. For bonds associated with the competitive method, the coefficients for the control functions are not statistically significant at the 10% level. For bonds associated with the negotiated method, the coefficient for *Negotiated CF* is negative and statistically significant at the 10% level. This result suggests that, with respect to selection on unobservables, an issuing state agent or political executive, is less likely to choose the negotiated method if he or she knows that first-day returns are likely to be high.

For bonds associated with the negotiated method, the coefficient for *Contributed CF* is negative and statistically significant at the 5% level. Since most of the bonds in the sample are associated with underwriters that did not contribute, the interpretation (see σ_{1C}^{*} and σ_{1C}^{*} in Section 5) is counter to the sign of the coefficient. Therefore, with respect to selection on unobservables, an issuing state agent or political executive is more likely to choose a contributing underwriter if he or she knows that first day returns are likely to be high, thus rejecting Hypothesis 6.2.

7 Robustness

The baseline results show that selecting a contributing underwriter through the negotiated method results in underpricing. Moreover, the coefficient for *Contributed CF* is negative and statistically significant suggesting that the decision to choose a

contributing underwriter is positively correlated with first-day abnormal returns. Further analysis is needed in order determine whether these results are robust.

Estimates may be biased due to a number of factors. In this section, I present results of tests that attempt to address the most important factors that may affect the consistency of the standard errors, or bias the basic coefficient estimates: limiting analysis to governor contributions, estimation error in the control function variables, non-normality in abnormal returns, extreme observations, and controlling for underwriter services.

A. Elected Treasurers

The treasurer is responsible for matters of state finance including debt issuance. In some states, the treasurer is an elected position and candidates campaign accordingly. The assumption for the construction of the *Contributed* variable is that the governor is the most powerful state executive; his or her political ties are more important than the treasurer's political ties. In this section I relax this assumption and reconstruct the *Contributed* variable; it is now defined as a dummy variable equal to one if the underwriter contributed to the governor of the state in the previous two years, or in the case of elected treasurers, the treasurer of the state in the previous two years.

Table IV uses the base specification with the reconstructed *Contributed* variable. The first stage results are mostly similar to those presented in Table III, but there is a difference in the correlation coefficient. When using the reconstructed *Contributed* variable the correlation coefficient is positive and not statistically significant at the 10% level.

The second stage results are stronger than those reported in Table III. In Table IV, column (3), the coefficient for insurance is now strongly negative and statistically significant at the 1% level. Taken together with the coefficient for the underlying quality of an insured bond, this result suggests that for bonds with a low underlying credit rating, there is price improvement with third party insurance.

For bonds that are associated with the negotiated method, the coefficient for *Contributed* is positive and statistically significant at the 1% level, thus rejecting the null for Hypothesis 6.1. Here, choosing a contributing underwriter through the negotiated method results in underpricing of approximately 3.4%. There is no comparable statistically significant effect for bonds associated with the competitive method.

For bonds associated with the negotiated method, the coefficient for *Negotiated CF* is negative and statistically significant at the 1% level. The coefficient for *Contributed CF* is negative and statistically significant at the 1% level as well, thus rejecting Hypothesis 6.2.

B. Underwriter Quality

Underwriter quality has been shown to affect first-day returns of equity IPOs and corporate debt. The evidence on the impact of underwriter quality on security underpricing is mixed. Fang (2005) uses data on corporate debt to find evidence of a negative relationship between underwriter quality and bond yields. Carter and Manasater (1990) find a negative relationship between underwriter quality and first day returns for equity IPOs. They argue that highly prestigious underwriters may provide certification services that reduce underpricing. On the other hand, Beatty and Welch (1996) and Cooney et al. (2001) find a positive relationship between underwriter quality and equity

IPO returns. They argue that issuers may purchase underwriter services with underpricing.

Consider that underwriter quality may be correlated with contribution status. In this context, underwriter quality should be used in order to control for certification or service purchases. Table V gives the results of the estimation exercise controlling for underwriter quality (see the Appendix for a formal variable definition). Panel B, columns (7) and (8), show the results for the most robust specification.

For bonds that are associated with the negotiated method, the coefficient for underwriter quality, when included, is negative and statistically significant at the 5% level, providing support for the certification hypothesis. The main results are robust to controlling for variation in underwriter quality.

C. Liquidity

Ellul and Pagano (2006) argue that investors who are concerned about after-market liquidity will demand a lower price. The authors use data on British equity IPOs and find evidence in support of their hypothesis. Municipal bonds trade infrequently and exhibit high trading costs; the liquidity effect on pricing may be particularly acute. Consider that liquidity is negatively correlated with contribution status. In this case the coefficient for *Contributed* would be upward biased if liquidity provides price improvement. As a proxy for variation in demand side liquidity, I use *State Taxable*, a dummy variable that is equal to one if the bond is not exempt from state taxes. Presumably, when a bond is state taxable, there is less demand for it.

Table V gives the results of the estimation exercise controlling for *State Taxable*. Panel B, columns (7) and (8), show the results for the most robust specification. For

bonds that are associated with the negotiated method, the coefficient for state tax status, when included, is positive and statistically significant at the 1% level, providing support for the liquidity hypothesis of underpricing. The main results are robust to controlling for variation in after-market liquidity.

D. Prior Relationship

Having a relationship can mitigate the impact of asymmetric information on securities issuance outcomes. Schenone (2004) and Song (2004) provide evidence in support of this hypothesis by showing the positive impact of a prior underwriting relationship on security prices. Schenone (2004) uses equity IPOs to show a negative relationship between the existence of a prior underwriting relationship and first day returns. Song (2004) uses corporate debt to show a negative relationship between the existence of a prior underwriting relationship and bond yields.

In order to address potential omitted variable bias, I control for the prior relationship status of the lead underwriter. Table V gives the results of this exercise. Panel B, columns (7) and (8), show the results for the most robust specification. For bonds associated with the negotiated method, the prior relationship coefficient is negative and statistically significant at the 1% level, providing support for the certification effect hypothesis. The main results are robust to controlling for the existence of a prior underwriting relationship.

E. Non-Normality and Extreme Observations

First-day returns can exhibit non-normal behavior. As a result, second-stage regressions will not produce correct estimates given the normality assumption. A more

appropriate way to estimate central tendency differences in the presence of non-normality is to use quantile regression (Koenker and Hallock, 2001). Koenker and Hallock argue that quantile regression can also reduce the impact of outliers on coefficient estimates.

In Table VII, columns (5) and (6), I use a quantile regression method with bootstrapped standard errors (600 replications) for second stage estimation. Columns (1) and (2) of Table VII provide a naïve OLS model with the homoskedasticity assumption as a benchmark for comparison. For bonds that are associated with the negotiated method, the quantile regression coefficient on *Contributed* is approximately 1.7%, while the standard error is 33.3% larger when compared with the naïve estimates. The quantile regression coefficient on *Contributed* method is statistically significant at the 5% level. In addition, both quantile regression control function coefficients are negative and statistically significant at the 10% level. Hence the main results are robust to extreme observations, and the non-normality assumption.

F. Control Function Estimation Error

The two stage estimation method for this study uses generated regressors for control functions in the second stage. Murphy and Topel (1985) show that generated regressors are not true values; they are estimated with error. If ignored, this problem can lead to inconsistent standard errors. For the baseline model, I assume that in the baseline model the control functions are true values; heteroskedasticity is more of a problem. As a check to see the impact of the generated regressor problem, I adjust the standard errors for control function estimation error and present the results in Table VI, columns (3) and (4). The standard errors for the Murphy-Topel coefficients for *Contributed* and the Murphy-Topel coefficients for the control functions are higher than in the naïve model

(Table VII, columns (1) and (2)), but, as expected, are not as high as the standard errors for the baseline estimates in Table III, columns (5) and (6). Hence the main results are robust to controlling for estimation error in the control functions.

8 Conclusion

Self-dealing occurs in state bond issuance. There are significant agency costs with respect to government bond pricing when a political executive selects a contributing underwriter. Choosing a contributing underwriter for bonds associated with the negotiated method results in an underpricing impact of approximately 2.3%. There is no comparable impact for bonds associated with the competitive method, which implies that the competitive method is effective in terms of mitigating the costs of political agency and self-dealing. The results of the paper remain robust when controlling for credit risk, underwriter quality, a prior underwriting relationship, after-market liquidity, year and state effects, and when addressing the non-normality of first-day returns, extreme observations, control function estimation error, and heteroskedasticity at the serial issue level.

Any study that directly tests for self-dealing in securities issuance must correct for endogeneity. Typically we researchers treat self-selection as a nuisance; something that biases the coefficient of interest. For self-dealing problems, we can use the selection term to uncover complicity and distinguish this behavior from incompetence[10]. In this paper the first-day return is positively correlated with the political executive's endogenous

[10] This is analogous to using self-selection models to uncover the presence of managerial private information (Li and Prabhala, 2007). See Besley (2006) for a discussion of competence in the political agency framework.

decision to select a contributing underwriter[11]. This particular result suggests that incompetence does not cause the pricing effect; political executives appear to be complicit in terms of political agency.

The paper's other results lend further support for the political agency model. The number of days to the next election has a positive effect on the choice of a contributing underwriter, consistent with the common assertion that the election is the primary disciplining mechanism for political executives in a political agency model (Besley, 2006). Moreover, the results lend support to the notion that agency costs increase when contributions are made to the agent most responsible for contracting with the government. Treasurers are the political executives most responsible for state funding. Compared to the case where contribution status is limited to the governor, when treasurer campaign contributions are acknowledged, the results are not just robust; they are stronger.

This paper also furthers our understanding of underpricing through agency when compared to underpricing through asymmetric information. In most cases, the coefficient for credit enhancement is not as economically significant as the coefficient for underwriter contribution status. The result suggests that, for security underpricing, agency is just as—if not more—important than asymmetric information.

No easy policy solution exists for the political agency problem presented in this paper. Any employee of an underwriter has the right to contribute to his or her candidate of choice. But as with the case of construction firms (Rose-Ackerman, 1975), tax-paying

[11] Note that the nature of selection is different when compared to the nature of selection for the underwriter choice method. A political executive is less likely to choose the negotiated method as first day returns increase.

citizens may incur substantial costs when financial service firms become non-competitive in seeking government business. One possible solution would require that states use the competitive method for financing. This option has problems of its own; there may be non-agency reasons for using the negotiated method. In addition to what states can do, regulators should seriously consider applying Rule G-37 to all underwriter employees and consultants. To be precise, there should be more effort put into criminalizing excessive interaction between political executives and underwriters.

The general conclusion of the paper and the aforementioned policy considerations beg for a rigorous treatment of the following questions: What is the optimal contract design for underwriter choice in the presence of self-dealing? Are there agency costs associated with campaign finance when observing other types of deals that involve political executives and financial intermediaries? Future research should address these and other related questions.

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Table I. Sample Characteristics

The table provides the list of state level municipal straight bond tranches that trade within the first five days after the issue date. *Competitive* represents bonds where the lead underwriter choice is through a sealed bid auction. *Negotiated* represents bonds where the lead underwriter choice was not through a sealed bid auction, but through negotiation. *Contributed* represents bonds issued by an underwriter that contributed to the campaign of the governor in office in the previous 2 years. *No Contribution* represents bonds issued by an underwriter that did not contribute to the campaign of the governor in office in the previous 2 years.

State	**Number of Bonds**
California	140
Georgia	103
Hawaii	129
Massachusetts	88
Michigan	84
New Jersey	85
New York	54
Ohio	474
Rhode Island	25
Virginia	20
Washington	309
Wisconsin	142
Year	**Number of Bonds**
1998	73
1999	115
2000	132
2001	253
2002	302
2003	371
2004	407
Underwriter Choice Method	**Number of Bonds**
Competitive	902
Negotiated	751
Contribution Status	**Number of Bonds**
No Contribution	969
Contributed	684
Total	1653

Table II. Sample Statistics

The table provides sample statistics for the bonds in the sample. *Competitive* is a dummy variable equal to one if the lead underwriter choice is through a sealed bid auction. *Negotiated* is a dummy variable equal to one if the lead underwriter choice was not through a sealed bid auction, but through negotiation. *Contributed* is a dummy variable equal to one if the bond is issued by an underwriter that contributed to the campaign of the governor in office in the previous 2 years. *No Contribution* is a dummy variable equal to one if the bond is issued by an underwriter that did not contribute to the campaign of the governor in office in the previous 2 years. *Maturity* is the difference between the dated date and the maturity date of the bond and is measured in number of calendar years. *Bond Amt* is the amount of the bond tranche and is measured in millions of US dollars. *Insured* is a dummy variable equal to one if the bond is packaged with third party insurance. *Underlying Quality* is a score given to an insured bond based on the bond's credit rating; a higher score represents a bond with a higher credit rating. *, **, *** denote statistical significance at the 10%, 5%, and 1% levels, respectively, in a two-sided test of the mean equal to zero.

Panel A

Variable Name		**Negotiated**	**Competitive**	**Difference**
First Trading Day Return	Mean	0.011	-0.047	0.058
	se.	0.033	0.028	0.043
	N	751	902	1653
Gross Spread	Mean	5.058	3.686	1.371***
	se.	0.060	0.297	0.189
	N	214	50	264
Maturity	Mean	6.618	5.406	1.212***
	se.	0.146	0.100	0.173
	N	751	902	1653
Bond Amt (in $M)	Mean	14.900	10.700	4.186***
	se.	0.806	0.416	0.865
	N	751	902	1653
Insured	Mean	0.329	0.222	0.107***
	se.	0.017	0.014	0.022
	N	751	902	1653
Underlying Quality	Mean	2.232	2.261	-0.029
	se.	0.065	0.070	0.097
	N	751	902	1653

Panel B

Variable Name		Negotiated *Contributed*	Negotiated *No Contribution*	Negotiated *Difference*	Competitive *Contributed*	Competitive *No Contribution*	Competitive *Difference*
First Trading Day Return	Mean	0.092	-0.047	0.139**	-0.091	-0.016	-0.075
	se.	0.049	0.044	0.066	0.054	0.029	0.057
	N	314	437	751	370	532	902
Gross Spread	Mean	5.155	4.991	0.164	.	3.686	.
	se.	0.105	0.071	0.123	.	2.097	.
	N	87	127	214	.	50	.
Maturity	Mean	7.106	6.268	0.838***	5.310	5.473	-0.163
	se.	0.273	0.156	0.295	0.150	0.134	0.204
	N	314	437	751	370	532	902
Bond Amt (in $M)	Mean	17.300	13.100	4.270***	10.500	10.800	-0.281
	se.	1.548	0.818	1.628	0.764	0.464	0.845
	N	314	437	751	370	532	902
Insured	Mean	0.210	0.414	-0.204***	0.132	0.284	-0.151***
	se.	0.023	0.024	0.034	0.018	0.020	0.028
	N	314	437	751	370	532	902
Underlying Quality	Mean	1.854	2.503	-0.650***	1.851	2.545	-0.694***
	se.	0.094	0.087	0.130	0.094	0.097	0.031
	N	314	437	751	370	532	902

Table III. Campaign Contributions and Government Bond Pricing

The table presents the results of regression analysis using a control function approach where second stage estimation is in the form of an endogenous switching regression model. The first stage of the model is a seemingly unrelated bivariate probit where the dependent variables are *Negotiated* and *Contributed*. The second stage of the model has two separate regimes for each type of underwriter choice method (*Negotiated* and *Competitive*) where the dependent variable for both regimes is the bond abnormal return on the first day of trading (measured in percentage points). *Competitive* is a dummy variable equal to one if the lead underwriter choice is through a sealed bid auction. *Negotiated* is a dummy variable equal to one if the lead underwriter choice was not through a sealed bid auction, but through negotiation. *Contributed* is a dummy variable equal to one if the bond is issued by an underwriter that contributed to the campaign of the governor in office in the previous 2 years. *Election Distance* is equal to the difference between the issue date and the date of the next election for the governor of the issuing state; this variable is measured in number of days and multiplied by 100 for scale. *Conflict of Interest Law* is a score given to the issuing state based on the quality of the conflict of interest laws in that state. *Freedom of Information Law* is a score given to the issuing state based on the quality of the freedom of information laws in that state. Both law scores are sourced from the Better Government Association. *Log (Maturity)* is the natural logarithm of the difference between the dated date and the maturity date of the bond, where the difference is measured in number of calendar years. *Log (Bond Amt)* is the natural logarithm of the bond amount, where the bond amount is measured in millions of US dollars. *Insured* is a dummy variable equal to one if the bond is packaged with third party insurance. *Underlying Quality* is a score given to an insured bond based on the bond's credit rating; a higher score represents a bond with a higher credit rating. *Negotiated CF* is the control function for the endogenous selection of the underwriter choice method and is calculated from the predicted probabilities in the first stage. *Contributed CF* is the control function for the endogenous selection of a contributing underwriter and is calculated from the predicted probabilities in the first stage. See the main text for a formal definition of both control functions. *p*-values of a Wald test are reported; the null hypothesis is that all independent variables other than year and state dummies are jointly zero. Heteroscedasticity-robust standards errors, corrected for clustering at the bond serial issue level, are reported in parentheses for second stage estimation. *, **, *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	First Stage (Endogenous Variables)		Second Stage (Underwriter Choice Method Regimes)			
	Negotiated	*Contributed*	*Negotiated*	*Competitive*	*Negotiated*	*Competitive*
Log (Maturity)	0.180	0.035	-0.040	-0.156	-0.255	-0.140
	(0.054)***	(0.049)	(0.090)	(0.079)**	(0.112)**	(0.063)**
Log (Bond Amt)	-0.082	-0.039	0.013	0.139	0.142	0.089
	(0.031)***	(0.029)	(0.050)	(0.049)***	(0.054)**	(0.037)**
Insured	6.175	-1.322	2.324	-0.067	-1.775	-0.086
	(0.682)***	(0.204)***	(1.054)**	(0.168)	(1.210)	(0.160)
Underlying Quality	-1.312	0.232	-0.309	0.097	0.383	0.067
	(0.165)***	(0.048)***	(0.223)	(0.033)***	(0.228)*	(0.032)**
Contributed			2.976	-0.369	2.295	-0.334
			(0.771)***	(0.215)*	(0.656)***	(0.229)
Election Distance	0.019	0.115				
	(0.015)	(0.017)***				
Conflict of Interest Law	-0.014	-0.007				
	(0.002)***	(0.002)***				
Freedom of Information Law	-0.038	-0.028				
	(0.003)***	(0.002)***				
Negotiated CF			1.444	0.146	-1.254	0.064
			(0.404)***	(0.122)	(0.684)*	(0.173)
Contributed CF			-1.876	0.267	-1.094	0.161
			(0.507)***	(0.124)**	(0.456)**	(0.138)
Correlation Coefficient	-0.225					
	(0.047)***					
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes
State Dummies	No	No	No	No	Yes	Yes
Number of Bonds	1653		750	890	750	890
p-value	0.000		0.011	0.000	0.000	0.006
Instruments: Chi2	225.57	211.62				
Instruments: p-value	0.000	0.000				

Table IV. Campaign Contributions and Government Bond Pricing: Elected Treasurers

The table presents the results of regression analysis using a control function approach where second stage estimation is in the form of an endogenous switching regression model. The first stage of the model is a seemingly unrelated bivariate probit where the dependent variables are *Negotiated* and *Contributed*. The second stage of the model has two separate regimes for each type of underwriter choice method (*Negotiated* and *Competitive*) where the dependent variable for both regimes is the bond abnormal return on the first day of trading (measured in percentage points). *Competitive* is a dummy variable equal to one if the lead underwriter choice is through a sealed bid auction. *Negotiated* is a dummy variable equal to one if the lead underwriter choice was not through a sealed bid auction, but through negotiation. *Contributed* is a dummy variable equal to one if the bond is issued by an underwriter that contributed to the campaign of the governor in office in the previous 2 years, or in the case of directly elected treasurers, the treasurer in office. *Election Distance* is equal to the difference between the issue date and the date of the next election for the governor and if applicable, the treasurer of the issuing state; this variable is measured in number of days and multiplied by 100 for scale. *Conflict of Interest Law* is a score given to the issuing state based on the quality of the conflict of interest laws in that state. *Freedom of Information Law* is a score given to the issuing state based on the quality of the freedom of information laws in that state. Both law scores are sourced from the Better Government Association. *Log (Maturity)* is the natural logarithm of the difference between the dated date and the maturity date of the bond, where the difference is measured in number of calendar years. *Log (Bond Amt)* is the natural logarithm of the bond amount, where the bond amount is measured in millions of US dollars. *Insured* is a dummy variable equal to one if the bond is packaged with third party insurance. *Underlying Quality* is a score given to an insured bond based on the bond's credit rating; a higher score represents a bond with a higher credit rating. *Negotiated CF* is the control function for the endogenous selection of the underwriter choice method and is calculated from the predicted probabilities in the first stage. *Contributed CF* is the control function for the endogenous selection of a contributing underwriter and is calculated from the predicted probabilities in the first stage. See the main text for a formal definition of both control functions. *p*-values of a Wald test are reported; the null hypothesis is that all independent variables other than year and state dummies are jointly zero. Heteroscedasticity-robust standards errors, corrected for clustering at the bond serial issue level, are reported in parentheses for second stage estimation. *, **, *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	First Stage (Endogenous Variables)		Second Stage (Underwriter Choice Method Regimes)	
	Negotiated	*Contributed*	*Negotiated*	*Competitive*
Log (Maturity)	0.180	0.081	-0.436	-0.132
	(0.054)***	(0.051)	(0.153)***	(0.066)**
Log (Bond Amt)	-0.074	0.014	0.098	0.103
	(0.031)**	(0.030)	(0.071)	(0.036)***
Insured	6.247	0.123	-5.727	0.057
	(0.674)***	(0.252)	(1.370)***	(0.165)
Underlying Quality	-1.330	-0.114	1.343	0.035
	(0.163)***	(0.061)*	(0.280)***	(0.028)
Contributed			3.418	-0.529
			(0.840)***	(0.341)
Election Distance	0.023	0.095		
	(0.015)	(0.013)***		
Conflict of Interest Law	-0.015	-0.011		
	(0.002)***	(0.002)***		
Freedom of Information Law	-0.038	-0.019		
	(0.003)***	(0.002)***		
Negotiated CF			-2.369	-0.021
			(0.894)***	(0.176)
Contributed CF			-2.166	0.302
			(0.546)***	(0.208)
Correlation Coefficient	0.062			
	(0.049)			
Year Dummies	Yes	Yes	Yes	Yes
State Dummies	No	No	Yes	Yes
Number of Bonds	1653		750	888
p-value	0.000		0.000	0.005
Instruments: Chi2	221.08	114.63		
Instruments: p-value	0.000	0.000		

Table V. Campaign Contributions and Government Bond Pricing: Controlling for Underwriter Services

The table presents the results of regression analysis using a control function approach where second stage estimation is in the form of an endogenous switching regression model. The first stage of the model is a seemingly unrelated bivariate probit where the dependent variables are *Negotiated* and *Contributed*. The second stage of the model has two separate regimes for each type of underwriter choice method (*Negotiated* and *Competitive*) where the dependent variable for both regimes is the bond abnormal return on the first day of trading (measured in percentage points). *Competitive* is a dummy variable equal to one if the lead underwriter choice is through a sealed bid auction. *Negotiated* is a dummy variable equal to one if the lead underwriter choice was not through a sealed bid auction, but through negotiation. *Contributed* is a dummy variable equal to one if the bond is issued by an underwriter that contributed to the campaign of the governor in office in the previous 2 years. *Election Distance* is equal to the difference between the issue date and the date of the next election for the governor of the issuing state; this variable is measured in number of days and multiplied by 100 for scale. *Conflict of Interest Law* is a score given to the issuing state based on the quality of the conflict of interest laws in that state. *Freedom of Information Law* is a score given to the issuing state based on the quality of the freedom of information laws in that state. Both law scores are sourced from the Better Government Association. *Log (Maturity)* is the natural logarithm of the difference between the dated date and the maturity date of the bond, where the difference is measured in number of calendar years. *Log (Bond Amt)* is the natural logarithm of the bond amount, where the bond amount is measured in millions of US dollars. *Insured* is a dummy variable equal to one if the bond is packaged with third party insurance. *Underlying Quality* is a score given to an insured bond based on the bond's credit rating; a higher score represents a bond with a higher credit rating. *Underwriter Quality* is a score based on the sample period ranking of the lead underwriter for the bond; rankings are based on long term issues and are sourced from the Bond Buyer. *State Taxable* is a dummy variable equal to one if the bond is not exempt from state taxes. *Prior Relationship* is a dummy variable equal to one if the lead underwriter for the issue has been a lead underwriter for the state in the previous 5 years. *Negotiated CF* is the control function for the endogenous selection of the underwriter choice method and is calculated from the predicted probabilities in the first stage. *Contributed CF* is the control function for the endogenous selection of a contributing underwriter and is calculated from the predicted probabilities in the first stage. See the main text for a formal definition of both control functions. *p*-values of a Wald test are reported; the null hypothesis is that all independent variables other than year and state dummies are jointly zero. Heteroscedasticity-robust standards errors, corrected for clustering at the bond serial issue level, are reported in parentheses for second stage estimation. *, **, *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A

	First Stage (Endogenous Variables)				Second Stage (Underwriter Choice Method Regimes)			
	Negotiated	*Contributed*	*Negotiated*	*Contributed*	*Negotiated*	*Competitive*	*Negotiated*	*Competitive*
Log (Maturity)	0.174	0.053	0.180	0.037	-0.194	-0.128	-0.255	-0.145
	(0.057)***	(0.050)	(0.054)***	(0.049)	(0.097)**	(0.062)**	(0.109)**	(0.064)**
Log (Bond Amt)	0.004	-0.108	-0.091	-0.042	0.154	0.087	0.148	0.091
	(0.034)	(0.030)***	(0.031)***	(0.029)	(0.051)***	(0.036)**	(0.054)***	(0.038)**
Insured	5.741	-1.228	6.570	-1.293	0.063	0.001	-1.805	-0.120
	(0.740)***	(0.212)***	(0.704)***	(0.204)***	(0.803)	(0.137)	(1.044)*	(0.174)
Underlying Quality	-1.176	0.203	-1.395	0.225	0.076	0.050	0.361	0.073
	(0.178)***	(0.050)***	(0.168)***	(0.048)***	(0.169)	(0.026)*	(0.197)*	(0.034)**
Contributed					3.687	-0.371	1.919	-0.326
					(0.550)***	(0.229)	(0.667)***	(0.227)
Underwriter Quality	-1.600	0.719			-0.518	-0.327		
	(0.151)***	(0.081)***			(0.211)**	(0.266)		
State Taxable			-0.497	-0.193			-1.031	-1.433
			(0.144)***	(0.134)			(0.663)	(0.616)**
Election Distance	0.007	0.124	0.022	0.116				
	(0.017)	(0.012)***	(0.015)	(0.012)***				
Conflict of Interest Law	-0.009	-0.009	-0.013	-0.006				
	(0.002)***	(0.002)***	(0.002)***	(0.002)***				
Freedom of Information Law	-0.044	-0.031	-0.038	-0.028				
	(0.003)***	(0.002)***	(0.003)***	(0.002)***				
Negotiated CF					-0.360	0.009	-1.315	0.087
					(0.452)	(0.178)	(0.604)**	(0.169)
Contributed CF					-2.121	0.173	-0.849	0.158
					(0.328)***	(0.133)	(0.458)*	(0.138)
Correlation Coefficient	-0.158		-0.238					
	(0.050)***		(0.047)***					
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State Dummies	No	No	No	No	Yes	Yes	Yes	Yes
Number of Bonds	1653		1653		748	899	750	884
p-value	0.000		0.000		0.000	0.002	0.000	0.006
Instruments: Chi2	218.32	236.01	219.90	213.78				
Instruments: p-value	0.000	0.000	0.000	0.000				

Panel B

	First Stage (Endogenous Variables)				Second Stage (Underwriter Choice Method Regimes)			
	Negotiated	*Contributed*	*Negotiated*	*Contributed*	*Negotiated*	*Competitive*	*Negotiated*	*Competitive*
Log (Maturity)	0.181	0.031	0.172	0.051	-0.273	-0.144	-0.151	-0.133
	(0.054)***	(0.050)	(0.057)***	(0.051)	(0.110)**	(0.064)**	(0.095)	(0.062)**
Log (Bond Amt)	-0.076	-0.061	-0.010	-0.121	0.159	0.092	0.127	0.088
	(0.031)**	(0.029)**	(0.034)	(0.031)***	(0.054)***	(0.039)**	(0.048)**	(0.037)**
Insured	6.218	-1.296	6.220	-1.175	-1.838	-0.096	-0.018	0.004
	(0.684)***	(0.208)***	(0.752)***	(0.213)***	(1.034)*	(0.190)	(0.773)	(0.167)
Underlying Quality	-1.323	0.222	-1.275	0.189	0.368	0.070	0.081	0.051
	(0.165)***	(0.049)***	(0.179)***	(0.050)***	(0.194)*	(0.037)*	(0.173)	(0.031)
Contributed					2.295	-0.316	2.781	-0.330
					(0.664)***	(0.237)	(0.430)***	(0.223)
Underwriter Quality			-1.665	0.612			-0.342	-0.316
			(0.150)***	(0.083)***			(0.165)**	(0.269)
State Taxable			-0.508	-0.328			1.074	-0.880
			(0.149)***	(0.138)**			(0.338)***	(0.990)
Prior Relationship	-0.203	0.696	0.331	0.484	0.027	0.038	-0.429	0.083
	(0.111)*	(0.102)***	(0.131)**	(0.110)***	(0.119)	(0.102)	(0.127)***	(0.101)
Election Distance	0.014	0.135	0.018	0.137				
	(0.016)	(0.013)***	(0.017)	(0.013)***				
Conflict of Interest Law	-0.014	-0.010	-0.008	-0.010				
	(0.002)***	(0.002)***	(0.002)***	(0.002)***				
Freedom of Information Law	-0.038	-0.029	-0.043	-0.031				
	(0.003)***	(0.002)***	(0.003)***	(0.002)***				
Negotiated CF					-1.461	0.073	-0.168	0.035
					(0.600)**	(0.170)	(0.397)	(0.171)
Contributed CF					-1.084	0.148	-1.588	0.146
					(0.456)**	(0.145)	(0.255)***	(0.135)
Correlation Coefficient	-0.210		-0.189					
	(0.047)***		(0.051)***					
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State Dummies	No	No	No	No	Yes	Yes	Yes	Yes
Number of Bonds	1653		1653		750	884	746	891
p-value	0.000		0.000		0.000	0.011	0.000	0.006
Instruments: Chi2	221.68	232.02	215.24	249.63				
Instruments: p-value	0.000	0.000	0.000	0.000				

Table VI. Campaign Contributions and Government Bond Pricing: Econometric Robustness

The table presents the results of regression analysis using a control function approach where second stage estimation is in the form of an endogenous switching regression model. The first stage of the model is a seemingly unrelated bivariate probit where the dependent variables are *Negotiated* and *Contributed*. The results for the first stage are presented in Table III, columns (1) and (2). The second stage of the model has two separate regimes for each type of underwriter choice method (*Negotiated* and *Competitive*) where the dependent variable for both regimes is the bond abnormal return on the first day of trading (measured in percentage points). For columns (1) and (2), the coefficients are estimated using OLS under the assumption of homoskedasticity. For columns (3) and (4), the standard errors are corrected for the case that the control functions are not derived from true values. Finally, in columns five and six, the coefficients are estimated using quantile regression for the median with bootstrap standard errors using 600 replications. Each specification includes year and state dummies. *Competitive* is a dummy variable equal to one if the lead underwriter choice is through a sealed bid auction. *Negotiated* is a dummy variable equal to one if the lead underwriter choice was not through a sealed bid auction, but through negotiation. *Contributed* is a dummy variable equal to one if the bond is issued by an underwriter that contributed to the campaign of the governor in office in the previous 2 years. *Log (Maturity)* is the natural logarithm of the difference between the dated date and the maturity date of the bond, where the difference is measured in number of calendar years. *Log (Bond Amt)* is the natural logarithm of the bond amount, where the bond amount is measured in millions of US dollars. *Insured* is a dummy variable equal to one if the bond is packaged with third party insurance. *Underlying Quality* is a score given to an insured bond based on the bond's credit rating; a higher score represents a bond with a higher credit rating. *Negotiated CF* is the control function for the endogenous selection of the underwriter choice method and is calculated from the predicted probabilities in the first stage. *Contributed CF* is the control function for the endogenous selection of a contributing underwriter and is calculated from the predicted probabilities in the first stage. See the main text for a formal definition of both control functions. *p*-values of a Wald test are reported; the null hypothesis is that all independent variables other than year and state dummies are jointly zero. *, **, *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	Naïve		**Murphy-Topel**		**Quantile Regression**	
	Negotiated	*Competitive*	*Negotiated*	*Competitive*	*Negotiated*	*Competitive*
Log (Maturity)	-0.255	-0.140	-0.255	-0.140	-0.133	-0.078
	(0.062)***	(0.040)***	(0.065)***	(0.039)***	(0.044)***	(0.027)***
Log (Bond Amt)	0.142	0.089	0.142	0.089	0.094	0.061
	(0.032)***	(0.031)***	(0.033)***	(0.031)***	(0.023)***	(0.018)***
Insured	-1.775	-0.086	-1.775	-0.086	-1.148	-0.163
	(1.014)*	(0.219)	(1.035)*	(0.216)	(0.891)	(0.086)*
Underlying Quality	0.383	0.067	0.383	0.067	0.286	0.072
	(0.207)*	(0.045)	(0.209)*	(0.045)	(0.181)	(0.018)***
Contributed	2.295	-0.334	2.295	-0.334	1.681	-0.270
	(0.572)***	(0.217)	(0.612)***	(0.214)	(0.802)**	(0.114)**
Negotiated CF	-1.254	0.064	-1.254	0.064	-0.718	0.054
	(0.488)**	(0.138)	(0.515)**	(0.136)	(0.389)*	(0.115)
Contributed CF	-1.094	0.161	-1.094	0.161	-0.909	0.151
	(0.371)***	(0.137)	(0.394)***	(0.136)	(0.494)*	(0.068)**
Number of Bonds	750	890	750	890	750	890
p-value	0.000	0.000	0.000	0.000	0.000	0.000

Appendix

A. Abnormal Bond Returns

In order to calculate abnormal returns, I use a bond mean-adjusted returns model. Bonds pose two problems in a mean adjusted model: they are traded infrequently and their returns should be adjusted for term structure changes. Handjinicolau and Kalay (1984) provide a method that addresses these two problems. Datta, Datta, and Patel (1997) and Cai, Helwege, and Warga (2007) apply the method to study corporate debt pricing.

Consider the following representation for holding period returns.

$$R_{i,t} = ln\left[\left(F_{i,t} + C_{i,t}\right)/F_{i,t-1}\right], \quad \text{(A1)}$$

where $R_{i,t}$ is the rate of return of bond (i), between closing of trade at day $(t-1)$ to closing at day (t). $F_{i,t}$ is the flat price (quoted plus accrued interest), of bond (i), at day (t). $C_{i,t}$ is the coupon payment (if any) paid to holders of bond (i) of record at end of day $(t-1)$. In the case of infrequent trading, let the sequence index for observed prices for bond (i) be $k = 1,2,3,\dots,K$. In addition, denote the location of the *k*th trade for bond (i). Hence, observations $F_{i,n(i,k)}$ and $F_{i,n(i,k-1)}$ are separated by $[n(i,k) - n(i,k-1)]$ trading days. The multiday holding period return bond (i) between two consecutive trading days is $R_{i,n(i,k)}$.

$$R_{i,n(i,,k)} = ln\left[\left(F_{i,n(i,k)} + C_{i,n(i,k)}\right)/F_{i,n(i,k-1)}\right], \quad \text{(A2)}$$

where $C_{i,n(i,k)}$ is the coupon payment (if any) paid to holders of bond (i) during the interval $[n(i,k) - n(i,k-1)]$.

Stationarity is the key assumption of the mean-adjusted returns model. Therefore, unexpected changes in the terms structure of interest rates must be subtracted before applying it

to bond returns. By subtracting a benchmark return, Handjinicolau and Kalay define the premium bond return, $P_{i,n(i,k)}$ as follows.

$$P_{i,n(i,k)} = R_{i,n(i,,k)} - M_{i,n(i,,k)}, \quad \text{(A3)}$$

where $M_{i,n(i,,k)}$ is the return on a benchmark asset or index whose maturity and coupon interest are closest to that of bond (i). For this study, the premium return is the holding period return for a municipal bond minus the return over the same period for the maturity-matched Lehman Brothers Municipal Bond Index. I assume that these premium returns follow a stationary process. Datta et al. (1997) use the sample premium bond return mean for a "normal" trading period as the expected premium bond return. For a given interval for "normal" returns, $[n(i,j) - ni,j-1$, the expected premium bond return is defined as follows.

$$h_i = \frac{1}{J-1}\sum_{j=2}^{J}\left[\frac{P_{i,n(i,j)}}{n(i,j)-n(i,j-1)}\right] \quad \text{(A4)}$$

Given the expected premium bond return, the abnormal return is defined as the difference between the premium bond return and the expected premium bond return. That is,

$$AR_{i,n(i,k)} = P_{i,n(i,,k)} - h_i \quad \text{(A5)}$$

B. Underlying Quality

Consistent with Nanda and Singh (2004), credit ratings for insured bonds in the sample are converted to a quality score in the following manner.

Underlying Quality	S&P Ratings	Moody's Ratings
1	Not Rated	Not Rated
2	Below BBB+	Below Baa1
3	A-, BBB+	Baa1, A3
4	A+, A	A, A1, A2
5	AA, AA-	Aa2, Aa3
6	AA+, AAA	Aa, Aa1, Aaa

C. Underwriter Quality

For Underwriter Quality, I use a score based on the average underwriter rank for the sample period. Rankings are based on long-term municipal bond issuance totals (*The Bond Buyer*).

Underwriter Quality	Ranking
9	$X < 15$
8	$15 \leq X < 35$
7	$35 \leq X < 50$
6	$50 \leq X < 75$
5	$75 \leq X$