

Native American Governments' Borrowing Costs: Evidence from Municipal Bond Markets

Serena Loftus
Assistant Professor of Accounting
Ambassador Crawford College of Business and Entrepreneurship
Kent State University
Kent, OH 44242
sloftus2@kent.edu
+1-330-672-1109

Sarah Shonka McCoy
Assistant Professor of Accounting
Anderson School of Management
University of New Mexico
Albuquerque, NM 87131
mccoys@unm.edu
+1-505-277-0965

R. Z. Zhang
Assistant Professor of Accounting
Ambassador Crawford College of Business and Entrepreneurship
Kent State University
Kent, OH 44242
rzhang28@kent.edu
+1-330-672-1113

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Abstract. The United States contains sovereign tribal nations that issue municipal bonds to fund their governments' activities. This study investigates whether these tribal governments face higher borrowing costs for municipal bonds than do other state and local governments. Comparing 362 municipal bonds issued by tribal governments to similar securities issued by state and local governments, we show that tribal governments pay significantly higher yields than state and local governments. Specifically, we find that Native American governments pay a premium of 64 to 251 basis points on their municipal debt, after controlling for several bond characteristics. Given that the average tribal (nontribal) municipal yield is 577 (288) basis points, tribal governments pay 22% to 87% higher borrowing costs than nontribal governments, which translates to approximately \$79,000 to \$310,000 in higher annual interest payments for the average tribal issuer. Overall our results highlight the challenges that U.S. tribal nations face in accessing capital markets and inform policymakers reviewing legislative acts intended to increase tribal governments' access to the municipal bond market.

I often equate economic development to farming and water. If you set out to be a farmer and you go out and buy the best equipment, you have good lands, good workers, and infrastructure like barns and silos, you will fail if you do not have access to water. So, in the economic world, and the currency of the country, for economic development, capital is water. Viewing things through that lens is really helpful because Indian Country has been starved by not receiving the capital it needs – the water it needs – and it is reflected in the policies. —Dante Desiderio, CEO of the National Congress of American Indians

1. Introduction

The United States government currently recognizes 574 sovereign tribal nations located within 35 states (NCAI 2020). The governments of these tribal nations are responsible for collectively managing approximately 100 million acres of land (more land than all but three state governments) (NCAI 2020) and providing a broad range of services to many of the 9.7 million Americans who identify as American Indian and Alaska Native alone or in combination with other races (U.S. Census Bureau 2021b).¹ Tribal governments have significant unmet capital needs, estimated at over \$44 billion annually (Way 2016; Clarkson 2007), and this shortage of funds hampers the economic development of their communities. Like state and local governments, tribal governments can fund operations and finance capital projects by issuing municipal bonds. However, little is known about the borrowing costs of tribal governments that succeed in issuing these bonds. Our study investigates whether tribal issuers of municipal bonds face higher borrowing costs than state and local governments.

We seek to inform policymakers’ understanding of the borrowing landscape for tribal governments by providing timely, comprehensive, and independent evidence. Policymakers are reviewing two legislative acts that would increase tribal governments’ access to capital, the Build Back Better Act and the Tribal Tax and Investment Reform Act of 2021. In April 2022, the U.S. House Select Committee on Economic Disparity and Fairness in Growth of the 117th Congress held a roundtable event with tribal government leaders to discuss their unmet capital needs, including the challenges in accessing capital through the municipal bond market. Our study informs these policymakers by highlighting that tribal

¹ We use the term Native American to refer to Indigenous individuals who are enrolled members of federally recognized tribes. U.S. census data uses the Office of Management and Budget’s term, American Indian or Alaska Native, which “refers to a person having origins in any of the original peoples of North and South America (including Central America) and who maintains tribal affiliation or community attachment” (U.S. Census Bureau 2021a, pp. B-5).

governments' challenges do not end when they issue debt; rather, these governments experience significantly higher borrowing costs than state and local governments that may temper the benefits of their borrowing. This novel empirical evidence is immediately applicable to the debate surrounding current policy proposals.

We begin by searching a large sample of municipal bonds to identify issuances by tribal governments. We identify a 30-year sample (1992–2021) of 362 municipal bonds issued by 56 tribal governments, totaling approximately \$4.9 billion. We focus on bond yields at issuance, as greater yields reflect higher borrowing costs. Our estimations control for bond features shown in the literature to impact yields, including the amount raised, maturity of the loan, taxability at the federal and state level, state and year of issuance, and presence of call provisions and bond insurance, among others. We also control for the creditworthiness of the borrower by including the issuer's credit rating in our model. Overall our model specifications provide assurance that any differences observed between tribal and nontribal governments' bond yields do not arise from bond characteristics or issuer creditworthiness.

Across all specifications and analyses, our results indicate that tribal governments face significantly higher borrowing costs than nontribal governments. Univariate analyses show that municipal bonds issued by tribal governments pay 289 basis points higher yields than bonds issued by state and local governments, resulting in tribes paying 100% more than state and local governments for their municipal debt. All specifications of multivariate analyses indicate that tribal governments pay significantly higher yields than nontribal governments, with differences in yields ranging from 154 and 251 basis points. Given that the average tribal loan amount is for \$12.4 million, this difference in yield corresponds to approximately \$190,000 to \$310,000 in higher annual interest payments for tribal governments.

To further address the differences between tribal and nontribal issuances, we employ a matched sample analysis and find that tribal governments' initial bond yields are 1.5 times those of state and local governments. In the multivariate analysis using the matched sample, our estimate of the yield difference

ranges from 158 to 174 basis points. All specifications overwhelmingly indicate that tribal governments pay significantly more to borrow than do state and local governments.

We also provide evidence that documents the impact of *regulatory* restrictions on tribal governments' debt issuances. Specifically, our descriptive evidence reveals that tribal governments are more likely to issue taxable municipal debt than are state or local governments (27% versus 7% for nontribal governments), consistent with the argument that restrictions in the tax code prevent tribal governments from obtaining tax-exempt financing for many capital projects. Limiting our sample to only tax-exempt issuances, we continue to find that tribal governments pay higher yields on their debt than state and local governments, with the yield penalty estimated at 146 basis points.

We conduct several robustness tests. To investigate the potential concern that tribal governments' credit risk is higher than that of state and local governments, we analyze a subsample of bonds issued by tribal governments that are rated by Fitch, Moody's, or S&P. Our descriptive evidence indicates that only 27% of municipal bonds issued by tribal governments receive credit ratings, so this analysis substantially limits our sample. Despite the small sample, we continue to observe that rated issuances by tribal governments pay higher yields (by 64 basis points) than those of state and local governments. All other subsample analyses indicate that tribal governments pay significantly more to borrow than do state and local governments.

This study makes several contributions. First, we inform current policy discussions about tribal governments' access to capital via municipal bonds. Policymakers are reviewing two legislative acts that aim to increase tribal governments' access to the municipal bond market. We provide timely and comprehensive evidence of market-based obstacles to borrowing by tribal governments, namely higher borrowing costs than state and local governments. While tribal governments' access to municipal finance has been widely discussed by policymakers and practitioners, the evidence referenced is typically anecdotal. In contrast, we systematically examine the borrowing costs of tribal governments over the last 30 years, benchmarking differences in tribal governments' borrowing costs against those of comparable bonds issued by state and local governments. Thus our research produces independent evidence that tribal

governments pay higher borrowing costs than state and local governments for comparable bonds, highlighting an additional obstacle to tribal governments' municipal borrowing.

Second, we contribute to the emerging literature on minority borrowers' access to capital. Research in this area almost exclusively examines individual consumers' borrowing costs for residential mortgages (Bartlett et al. 2022; Fuster et al. 2022; Ambrose et al. 2021; Begley and Purnanandam 2021; Bhutta and Hizmo 2021; Bayer et al. 2018). While a growing body of research examines the borrowing costs of minority-owned small businesses (Fairlie et al. 2021; Chatterji and Seamans 2012), little evidence exists about the borrowing costs of *institutions* representing minorities. A notable exception is the work of Dougal et al. (2019), who show that historically black colleges and universities (HBCUs) face higher borrowing costs than non-HBCUs. We answer their call for further research on racial discrimination in financial markets, finding that Native American governments pay higher yields on municipal debt, relative to other state and local governments.

Third, we contribute to the growing literature on the economic development of tribal nations. Research has focused on the regulatory factors that impact the income of Native Americans, including incomplete property rights and legal uncertainty (Anderson and Lueck 1992; Anderson and Parker 2008; Akee 2009; Dippel 2014; Brown et al. 2017a, b; Leonard et al. 2020). We complement emerging research on obstacles that Native Americans experience accessing capital at the individual level (Brown et al. 2019) by highlighting the higher borrowing costs that limit Native Americans' access to capital at the governmental level. Given that access to capital is well established as critical for economic growth (Cestau et al. 2019), our findings underscore the challenges that Native Americans face in financial markets.

2. Municipal Borrowing and Tribal Governments

2.1. Tribal Governments and Access to Municipal Bond Markets

Tribal nations are located within the United States and are each recognized as sovereign (self-governing) entities. Through a process of treaties, judicial rulings, and legislative, administrative, and Presidential acts, 574 nations have been formally acknowledged by the U.S. federal government as

sovereign nations (NCAI 2020).² Tribal nations are located within 35 states and control approximately 100 million acres of land; they collectively manage more land than all but three state governments (NCAI 2020). According to the 2020 census, tribal nations represent over 9.7 million citizens (U.S. Census Bureau 2021b); collectively they encompass more citizens than 40 state governments (U.S. Census Bureau 2021c). The entities that govern these nations, tribal governments, are responsible for a broad range of government activities, including “... law enforcement, judicial systems, health care, environmental protection, natural resource management, and the development and maintenance of basic infrastructure such as housing, roads, bridges, sewers, public buildings, telecommunications, broadband and electrical services, and solid waste treatment and disposal” (NCAI 2020, pp. 23).

Tribal governments report unmet capital needs, estimated at upward of \$44 billion annually (Clarkson 2007, Way 2016). Many of these unmet capital needs manifest in infrastructure needs, including the need for greater investment in medical care, housing, roads, water, electricity, and internet access. For example, about one-third of the residents of the Navajo Nation lack running water, and Native Americans are 19 times more likely than white households to lack full plumbing and 10 times more likely than the national average to lack electricity (Carlyle 2016, Flaccus et al. 2021, Fonesca 2021). The life expectancy for Native Americans is over five years lower than for other Americans, and Native Americans experience significantly greater mortality from chronic illnesses, such as diabetes and liver and kidney disease (IHS 2019). Like state and local governments, tribal governments can raise capital for critical infrastructure and other projects by issuing municipal bonds (Cestau et al. 2019).

While tribal governments can issue tax-exempt municipal bonds, they face restrictions that are not imposed on state and local governments. I.R.C. § 7871 (a) establishes that tribal governments should be treated as states, but I.R.C. § 7871 (c) (1) restricts tribal governments to issuing tax-exempt municipal bonds for “essential government functions.” The term “essential government function” is defined in

² State governments also recognize sovereign tribal nations, and some tribal nations are recognized by state but not federal governments. Our study focuses on federally recognized tribal nations due to their ability to issue municipal bonds under I.R.C. § 7871.

I.R.C. § 7871 (e) to exclude “any function which is not customarily performed by State and local governments with general taxing powers.” Further, I.R.C. § 7871 (c) (2) and I.R.C. § 7871 (c) (3) restricts tribal governments from issuing private activity bonds (conduit bonds issued by state and local governments for qualified projects including airports, hospitals, and rental housing).

This lack of tax parity impacts tribal governments’ borrowing, as the current restrictions in the tax code prevent tribal governments from obtaining tax-exempt financing for many capital projects, resulting in greater use of taxable municipal bonds by tribal governments. In contrast, state and local governments face no such restrictions, which increases their ability to use tax-exempt borrowing, relative to tribal governments.

Tribal nations have asked the Treasury Department to remove restrictions on private activity bonds and replace use-of-fund restrictions with “the state or local government standard for issuing tax-exempt obligations” (NCAI 2021, pp. 2). In addition, tribal governments have collectively formed the NCAI Intertribal Tax Initiative to advocate for tax parity. In 2011, the Treasury Department published a study analyzing the tax treatment of tribal bonds, which included recommendations to repeal the essential governmental function restriction for tribal governments’ tax-exempt debt and allow tribal governments to issue private activity bonds for the same sorts of projects and activities that are permitted for state and local governments (U.S. Department of the Treasury 2011).

Anecdotal evidence has documented that tribal governments have limited access to the municipal bond market (Fogarty 2013). For instance, Gregg (2021) examines tax-exempt municipal bond issuances from 2014 to 2020 and documents a 559-fold difference in issuances between state governments and tribal governments (with annual issuances of approximately \$47 *billion* by state governments and \$84 *million* by tribal governments). Research by the U.S. Department of the Treasury likewise shows that only 17 percent of tribal governments issued tax-exempt municipal bonds between 1987 and 2010 (Brashares and O’Keefe 2013).

Even when tax-exempt municipal bonds may be issued under the tax code, tribal governments may experience higher borrowing costs, due to lenders’ concerns about whether a “... tribal bond

qualifies with the IRS as tax-exempt financing” (Reynolds 2006, p. 1). Indeed, on May 23, 2006, the U.S. Senate Committee on Finance held a hearing to discuss tribal governments’ restrictions in accessing municipal bond capital, including testimony that tribal governments experienced significantly higher audit rates for their tax-exempt municipal bond issues than state and local governments (Reynolds 2006, Clarkson 2007). Several tribal governments were forced to retire their tax-exempt bonds, including the Seminole Tribe of Florida’s \$750 million bond retirement, as the result of IRS audits, and many lawmakers have argued that the IRS’s language concerning the restrictions is ambiguous (Melmer 2005, *The Bond Buyer* 2007). In April 2022, testimony before the U.S. House Select Committee on Economic Disparity and Fairness in Growth reiterated the challenges tribal governments experience due to their lack of tax parity.

Policymakers are debating two legislative acts aimed at increasing tribal governments’ access to municipal capital, the Build Back Better Act and the Tribal Tax and Investment Reform Act of 2021.^{3,4} Both acts seek to increase tribal governments’ ability to issue municipal bonds. However, policymakers lack evidence on tribal governments’ market-based obstacles to accessing capital via municipal bonds, which potentially arise in the form of higher borrowing costs, relative to state and local municipalities.

3. Do tribes pay higher yields on their municipal bonds than state and local governments?

3.1. Data and Sample Selection

We use the Federal Register of January 29, 2021, to identify 574 federally recognized tribal governments.⁵ To identify bonds issued by these governments, we search the list of issuer names from Mergent’s Municipal Bond Securities Database for 621 keywords, including unique tribal nation identifiers (e.g., “Curyung” in place of “Curyung Tribal Council”) and words commonly associated with

³ The Build Back Better Act was passed by the House on November 19, 2021, but did not have the necessary support in the Senate. There are ongoing discussions on reintroducing this act (Bolton 2022; Wasson et al. 2022).

⁴ The Tribal Tax and Investment Reform Act of 2021 resembles the Tribal Tax and Investment Reform Acts of 2016 and 2019 and the Tribal Government Tax-Exempt Bond Parity Act of 2007, among others, none of which have been passed.

⁵ The Federal Register of January 29, 2021, lists 576 tribes, but two tribes listed are duplicate records: (1) Pribilof Islands Aleut Communities of St. Paul & St. George Islands is a duplicate of Saint George Island and Saint Paul Island, and (2) Native Village of Venetie Tribal Government is a duplicate of Arctic Village and Village of Venetie.

tribal nations (i.e., “nation/s,” “band/s,” and “reservation/s”).⁶ We also exclude geographic words that are commonly associated with state and local (but not tribal) government names and several large nontribal municipalities with tribal-related names (i.e., Sioux Falls, SD).⁷ We hand-inspect all identified issuances to eliminate issuances by nontribal nations. We further restrict our sample to issuances after 1982 to reflect the passage of the Indian Tribal Government Tax Status Act of 1982, which allowed tribal governments to issue tax-exempt debt.

Our final sample consists of 362 bonds issued by 56 tribal nations.^{8,9} Figure 1 shows the location of all tribal governments and those with bond issuances included in our sample. Table 1 shows the distribution of bond issuances by tribal governments by year, totaling \$4.9 billion in municipal bond issuances by 56 unique tribal governments.¹⁰ On average, tribal governments issue \$167 million in municipal debt each year, and issuances peaked in 2007. The number of tribal governments issuing municipal debt has declined since 2009, which coincided with the Great Recession.

Data availability restricts our sample. Univariate analyses require nonmissing bond yields; thus our sample for univariate tests includes 277 bonds issued by 42 unique tribal nations. Multivariate tests require nonmissing control variables; thus our sample used in multivariate tests includes 185 tribal bonds

⁶ The keywords used in the search are listed in Table A of the online appendix.

⁷ Specifically, we exclude any issuance that references any of the following words or phrases: Indian Springs, Indian Hill/s, Indian Lake, Indian River, Indian Trail, Indian Valley, Indian Wells, Indian Creek, Indian Prairie, Indian Head, Sioux Center Iowa, Sioux Falls SD, Rancho Cordova, Lake Winnebago MO, Klamath Falls OR, North Tonawanda NY, North Carolina Mun Pwr Agy. In addition, we exclude issuers including the following words in their name: Sch Dist, Cmnty College, Tech College, Indian Riv Cen Sch Dist, and United Nations Dev Corp.

⁸ An research study uses proprietary data collected from the Internal Revenue Service to identify 547 bonds issued by tribal governments (Brashares and O’Keefe 2013). This data is compiled from a list of issuances that file Form 8038-G, which is required to issue tax-exempt governmental debt. The discrepancy between their data and ours may arise because not all municipal bonds issued by tribal governments are offered to public buyers (and hence included in Mergent). For example, tribal governments can issue tax-exempt bonds for purchase by the U.S. Department of Agriculture Rural Development Program (NAIHC 2020), and these issuances would require tribal governments to file Form 8038-G. Thus the tribal bonds listed in our sample are those available to public buyers rather than bonds that may be sold to, for example, the U.S. Department of Agriculture. In addition, our sample includes taxable tribal bonds in addition to tax-exempt bonds, whereas the sample in Brashares and O’Keefe (2013) only covers tax-exempt bonds.

⁹ Our unit of observation is the bond level. For example, the Agua Caliente Band of Cahuilla Indians issued bonds in 2003 and 2006. The 2003 issuance included four bonds of varying maturities—these four bonds are included as four observations in our sample. The 2006 issuance 2006 included one bond, which is included in our sample.

¹⁰ See Table B of the online appendix for a complete listing of the 56 tribal issuers of these 362 bonds.

issued by 30 unique tribal governments. Table C Panel A in the online appendix provides additional sample selection information.

We compare bond issuances by tribal governments with those by U.S. state and local governments 1) in the same states and years as tribal government issuances; 2) with similar capital purpose, tax status, offering type, and security type as tribal government issuances; and 3) with nonmissing yields. This results in 939,773 issuances. Requiring nonmissing control variables limits this sample to 925,854 nontribal bonds for multivariate tests. Table C Panel B in the online appendix further details our nontribal government bond sample selection.

3.2. Descriptive Statistics and Univariate Evidence

Table 2 presents descriptive statistics for bonds issued by tribal and nontribal governments, and variables are defined in the appendix. Importantly, univariate evidence shows that tribal governments pay an average of 577 basis points for their municipal debt, whereas nontribal governments pay an average of 288 basis points. This univariate evidence suggests a premium for tribal governments of 289 basis points. The premium is substantial—more than 100% of the average borrowing cost of nontribal governments. Given that the average tribal loan amount is for \$12.4 million, this difference in yield corresponds to approximately \$357,000 in higher annual interest payments for tribal governments.

Descriptive results highlight several differences between issuances by tribal and nontribal governments—tribal governments' issuances differ from state and local government issuances on many dimensions. Tribal governments' issuances are larger with longer maturities than those of nontribal governments. Tribal governments also issue more taxable debt, consistent with the notion that they face higher regulatory obstacles for issuances of tax-exempt debt than nontribal governments (27% and 7% taxable issuances by tribal and nontribal governments, respectively). Bonds issued by tribal governments are less likely to be rated (73% and 40% unrated for bonds issued by tribal and nontribal governments, respectively). When rated, bonds issued by tribal governments have lower average credit ratings. Also, tribal governments' bonds are less likely to be insured or to have an associated financial advisor. Tribal bonds are more likely to have a sinking fund and less likely to be bank qualified. These findings highlight

the importance of controlling for these variables in subsequent analyses. More detailed descriptive statistics on the sample are provided in Table D of the online appendix, and correlations are provided in Table E of the online appendix.

3.3. Regression Results

Next we conduct multivariate analyses to investigate potential differences in borrowing costs for tribal and nontribal governments. Specifically, we estimate the following model.

$$Yield = \alpha_1 + \beta_1(Tribal) + \beta_2(Control\ Variables) + \beta_3(State \times Year\ Fixed\ Effects) + \beta_4(Rating\ Fixed\ Effects) + \varepsilon. \quad (1)$$

Our dependent variable is the initial offering yield, measured in basis points. The coefficient of interest is *Tribal*, an indicator variable that equals one if the bond is issued by a tribal government. A positive sign on the *Tribal* coefficient, β_1 , is consistent with tribal governments paying higher yields than nontribal governments. We control for a variety of bond characteristics, including the loan amount, the maturity of the loan, the bond's credit rating (only included in specifications that omit rating fixed effects), and variables indicating whether the bond is insured, taxable at the federal level, callable, a competitive offering, a revenue bond, a new issuance (versus refinancing), taxable at the state level, puttable, bank qualified, or includes a sinking fund. We also include state-by-year and rating fixed effects and cluster standard errors at the issuer and issuance-year month levels.¹¹

Table 3 presents results. Column 1 echoes the univariate results from the previous section, showing that the yield of tribal government issuances is 289 basis points higher than that of nontribal governments. Columns 2 and 3 add state-by-year fixed effects and rating fixed effects. The *Tribal* coefficient remains positive and significant in both specifications, corresponding to higher borrowing costs for tribal governments of 186 and 171 basis points, respectively. Column 4 adds in the full suite of control variables with no fixed effects. Column 5 incorporates state-by-year fixed effects. And Column 6

¹¹ Results are robust to alternative fixed effects specifications, including a specification inspired by Baker et al. (2021) with fixed effects for 1) maturity-by-rating-by-issuance year-month, 2) bond size decile, 3) issue size decile, 4) use of proceeds, and 5) state. Results are presented in Table G of the online appendix.

further includes rating fixed effects. Again the *Tribal* coefficient remains positive and significant in all multivariate specifications, corresponding to higher borrowing costs for tribal governments of 251, 160, and 154 basis points, respectively, which translates to approximately \$190,000 to \$310,000 in higher annual interest payments for the average tribal issuer.

For robustness, we next estimate Equation 1 on several subsamples. Table 4 presents these results with the full suite of control variables and state-by-year and rating fixed effects.¹² First, to investigate the potential concern that tribal governments' credit risk is higher than that of state and local governments, we analyze a subsample of bonds issued by tribal governments that are rated by either Fitch, Moody's, or S&P. Our descriptive evidence indicates that only 27% of municipal bonds issued by tribal governments receive credit ratings (versus 60% of nontribal bonds), so this analysis substantially limits our sample. Despite the small sample, we continue to observe that rated issuances by tribal governments pay higher yields (Column 1: 64 basis points), relative to state and local governments, which translates to approximately \$79,000 in higher annual interest payments for the average tribal issuer.

Second, consistent with the regulatory hurdles tribal governments face in issuing tax-exempt debt, our descriptive evidence shows that tribal governments are more likely to issue taxable municipal debt (27% versus 7% for non-tribal governments). Focusing on a subsample of only tax-exempt bonds, we continue to find a penalty for tribal governments in the form of higher yields (Column 2: 146 basis points).

Further, higher borrowing costs for tribal governments are also observed in subsamples of insured bonds (Column 3: 90 basis points), bonds without call options (Column 4: 168 basis points), bonds of \$1 million or more (Column 5: 152 basis points), and fixed-rate bonds (Column 6: 148 basis points). All specifications indicate that tribal governments pay more to borrow than do state and local governments with comparable issuances.

3.4. Matched Sample Results

¹² Results are robust to controlling for the credit rating in place of rating fixed effects. See Table F in the online appendix.

Given the significant differences in bond characteristics between tribes and state and local governments, we present results from a matched sample design that further addresses the differences between our samples. We use propensity-score matching with replacement, matching exactly on state, year, month, *Insured*, *Taxable*, and *Revenue Bond*.^{13,14} We successfully match 92 tribal bonds with 62 nontribal bonds. Panel A of Table 5 presents descriptive statistics for the tribal bonds and matched nontribal bonds. In this univariate comparison, the tribal yield premium is estimated at 203 basis points. While the match is improved, relative to our initial sample presented in Table 2, significant differences remain between tribal and nontribal governments. In this matched sample, tribal issuances have lower credit ratings, are more likely to be for new financing (versus refinancing) and negotiated sales (versus competitive offerings), and are less likely to have a financial advisor and a put option.

Panel B of Table 5 presents our regression results from this matched sample. Column 1 replicates the univariate results from panel A, showing that the yield of tribal government issuances is 203 basis points higher than that of nontribal governments. Columns 2 and 3 add state-by-year fixed effects and rating fixed effects. The *Tribal* coefficient remains positive and significant in both specifications, corresponding to higher borrowing costs for tribal governments of 243 and 251 basis points, respectively. Column 4 adds the full suite of control variables with no fixed effects, and the tribal premium is estimated at 158 basis points. Column 5 incorporates state-by-year fixed effects, and Column 6 further includes rating fixed effects. Again the *Tribal* coefficient remains positive and significant in both multivariate specifications, corresponding to higher borrowing costs for tribal governments of 163 and 174 basis points, respectively.

Overall the results of this section indicate that Native American tribal governments pay higher yields when issuing similar bonds to those of state and local governments.

4. Conclusion

¹³ Results are robust to entropy balancing (Hainmueller 2012), presented in Table H of the online appendix.

¹⁴ Results are robust to a nearest-neighbor propensity-score match without replacement. See Table I in the online appendix.

This paper documents higher municipal borrowing costs for tribal governments, relative to state and local governments. Our results inform policymakers by showing that, in addition to regulatory obstacles, tribal governments also face market-based obstacles for bond issuances in the form of substantial yield premiums. Our study offers timely, comprehensive, and independent evidence of tribal governments' municipal borrowing costs that can inform current policy proposals to increase tribal governments' access to capital.

The potential limitations of our study point to possibilities for future research in this area. For example, future research might investigate cross-sectional variation in municipal bond yields for tribal governments to begin to address the question of why these governments have higher borrowing costs. While tribal issuances have often been excluded from municipal bond research, this research setting is rich in governance and disclosure variation and worthy of independent investigation. In addition, there are unique governance aspects of tribal nations that may impact borrowing costs. That said, our study provides a foundation for future investigation of tribal governments' borrowing costs by showing that tribal issuers pay significantly higher yields than do nontribal governments.

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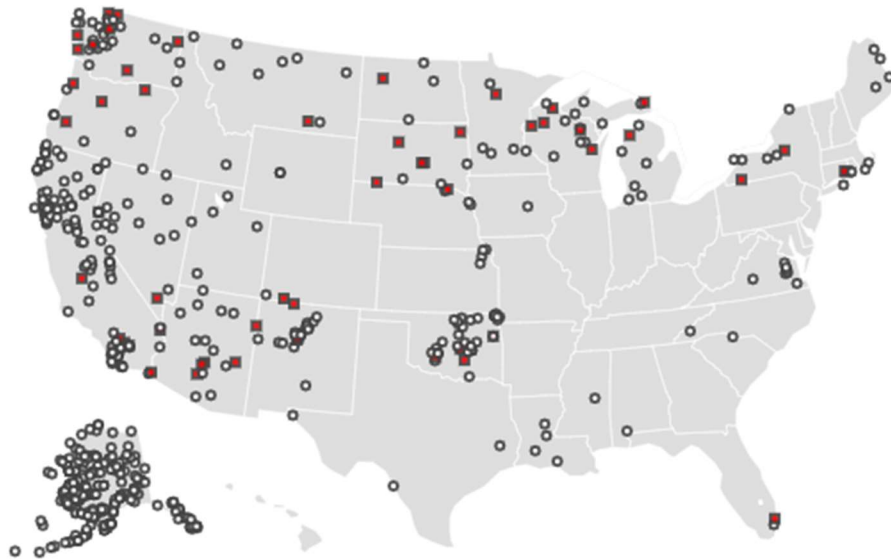
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Appendix. Variable Definitions

Variable	Definition	Source & Variable Construction
<i>Tribal</i>	An indicator variable that takes the value of one for Native American tribal issuers.	Intersection of Tribes from Federal Register and Mergent database.
<i>Yield</i>	Yield to maturity at the time of issuance, multiplied by 100 to be measured in basis points.	Mergent (offering_yield_f)
<i>Price</i>	The price, expressed as a percentage of par, at which the maturity was originally sold to investors.	Mergent (offering_price_f)
<i>Advisor</i>	An indicator variable that takes the value of one if the issuer had a financial advisor.	Mergent (if agent_role_c = FNAD1 or FNAD2)
<i>Amount</i>	The principal amount of the maturity's original offering, in millions of dollars.	Mergent (total_maturity_offering_amt_f)
<i>Bank Qualified</i>	An indicator variable that takes the value of one if the bond is designated as bank-qualified (i.e., tax-advantaged bonds for banks, per IRC Section 265(b)). Issues under \$10 million sold after August 6, 1986, may be designated as Bank Qualified by the issuer, where banks may deduct the interest expense for these obligations.	Mergent (bank_qualified_i)
<i>Callable</i>	An indicator variable that takes the value of one if the bond is callable.	Mergent (if optional_call_flag_i = "Y")
<i>Competitive</i>	An indicator variable that takes the value of one if the bond is purchased through a competitive sale and takes the value of zero if purchased through a negotiated sale.	Mergent (if offering_type_c = "COMP")
<i>General Obligation</i>	An indicator variable that takes the value of one if the bond is a general obligation bond.	Mergent (if source_of_repayment_i=D)
<i>Insured</i>	An indicator variable that takes the value of one if the bond is insured.	Mergent (if bond_insurance_code_c is nonmissing)
<i>Maturity</i>	The number of years between the issue date and the maturity date.	Mergent (dated_date_d or delivery_date_d less maturity_date_d or settlement_date_d)
<i>New Money</i>	An indicator variable that takes the value of one if the bond is for new financing and takes the value of zero if the bond is issued to refinance existing debt.	Mergent (reoffered_i is nonmissing or capital_purpose_c = "NEW")
<i>Puttable</i>	An indicator variable that takes the value of one if the bond is puttable.	Mergent (if put_flag_i = "Y")

Variable	Definition	Source & Variable Construction
<i>Rating</i>	The highest rating of the long-term ratings assigned by Fitch, Moody's, and S&P at issuance, with ratings converted to a numerical scale from 1 (highest rated) to 22 (lowest rated). If a bond is unrated by all three credit rating agencies, it takes the value of 22.	Mergent
<i>AAA Rated</i>	An indicator variable that takes the value of one if the highest rating for the bond is AAA (Rating=1)	Mergent
<i>AA Rated</i>	An indicator variable that takes the value of one if the highest rating for the bond is AA (Rating=2 or 3)	Mergent
<i>Below AA</i>	An indicator variable that takes the value of one if the highest rating for the bond is below AA (Rating>3)	Mergent
<i>Unrated</i>	An indicator variable that takes the value of one if the issuer was not rated by a credit rating agency.	Mergent
<i>Revenue Bond</i>	An indicator variable that takes the value of one if the bond is a revenue bond (e.g., backed by a specific revenue course).	Mergent (if source_of_repayment_i=G or security_code_i=G)
<i>Sinking Fund</i>	An indicator variable that takes the value of one if the bond has a sinking fund.	Mergent (if sink_fund_type_i is nonmissing)
<i>State Taxable</i>	An indicator variable that takes the value of one if the bond is taxable at the state level.	Mergent (if state_tax_i is nonmissing)
<i>Taxable</i>	An indicator variable that takes the value of one if the bond is taxable, and takes the value of zero if the bond is tax-exempt.	Mergent (if tax_code_c = "TAX")

Figure 1. (Color online) Geographic Dispersion of Federally Recognized Tribes and Tribal Municipal Issuers



Notes: This figure maps the locations of the 574 federally recognized tribes, according to their latitude and longitude coordinates of the tribal government headquarters reported in the Bureau of Indian Affairs Tribal Leaders Directory (<https://www.bia.gov/service/tribal-leaders-directory/tld-csvexcel-dataset>). Tribes with at least one identifiable municipal bond issuance, per the Mergent Municipal Bond Securities Database, over the period 1992-2021 are marked with a red square, and tribes with no identifiable municipal bond issuances are marked with a white circle.

Table 1. Tribal Bond Issuances by Year

Year	Number of Tribal Bonds Issued	Number of Tribal Issuers	Total Amount Issued
1992	9	1	\$ 7,315,000
1993	11	1	\$ 3,015,000
1995	1	1	\$ 3,850,000
1996	21	1	\$ 215,800,000
1997	17	3	\$ 526,050,000
1998	17	5	\$ 251,515,000
1999	46	9	\$ 135,592,352
2000	5	2	\$ 61,585,000
2001	8	4	\$ 159,080,000
2002	16	5	\$ 133,003,000
2003	47	11	\$ 330,265,000
2004	18	7	\$ 265,502,232
2005	10	2	\$ 105,320,000
2006	40	11	\$ 361,505,000
2007	20	11	\$ 850,330,000
2008	16	7	\$ 249,023,190
2009	5	2	\$ 77,210,000
2010	3	3	\$ 149,720,000
2011	4	3	\$ 58,805,000
2012	3	2	\$ 55,685,000
2013	1	1	\$ 304,454,961
2014	5	3	\$ 58,685,000
2015	14	2	\$ 237,221,000
2016	2	2	\$ 14,435,440
2017	3	3	\$ 34,636,000
2018	6	2	\$ 115,395,000
2019	12	1	\$ 41,550,000
2020	1	1	\$ 14,090,000
2021	1	1	\$ 26,225,000
Total	362	56	\$ 4,846,863,175

Notes: This table reports the annual number of tribal bonds issued, along with the number of unique tribal issuers and the total aggregate amount issued by year. The total number of tribal issuers is equal to the number of unique tribal issuers over this time period rather than the sum of the number of unique tribal issuers by year.

Table 2. Bond Issuance Descriptive Statistics

Variable	Tribal Governments			Non-Tribal Governments			Difference in Means	
	N	Mean	SD	N	Mean	SD	Tribal - Non-Tribal	t-stat
<i>Yield</i>	277	577.369	183.502	939,773	287.898	165.192	289.471***	(29.16)
<i>Price</i>	277	98.380	11.010	939,671	103.353	10.950	-4.978***	(-7.56)
<i>Advisor</i>	277	0.134	0.341	939,773	0.706	0.455	-0.573***	(-20.94)
<i>Amount</i>	275	12.354	31.527	928,185	3.561	27.744	8.793***	(5.25)
<i>Bank Qualified</i>	277	0.181	0.385	938,986	0.368	0.482	-0.188***	(-6.48)
<i>Callable</i>	277	0.386	0.488	939,773	0.427	0.495	-0.041	(-1.38)
<i>Competitive</i>	186	0.048	0.215	939,773	0.502	0.500	-0.453***	(-12.36)
<i>General Obligation</i>	277	0.079	0.271	939,773	0.437	0.496	-0.357***	(-11.99)
<i>Insured</i>	277	0.108	0.311	939,773	0.295	0.456	-0.187***	(-6.82)
<i>Maturity</i>	277	10.520	7.129	939,773	9.564	6.691	0.951*	(2.36)
<i>New Money</i>	277	0.798	0.402	939,773	0.546	0.498	0.252***	(8.42)
<i>Puttable</i>	277	0.000	0.000	937,851	0.002	0.041	-0.002	(-0.68)
<i>Rating</i>	277	18.760	6.109	939,773	10.900	9.191	7.861***	(14.23)
<i>Rating (if rated)</i>	75	10.030	5.766	563,968	3.499	1.969	6.528***	(28.69)
<i>AAA Rated</i>	75	0.053	0.226	563,968	0.202	0.402	-0.149**	(-3.21)
<i>AA Rated</i>	75	0.027	0.162	563,968	0.339	0.473	-0.312***	(-5.72)
<i>Below AA</i>	75	0.920	0.273	563,968	0.458	0.498	0.462***	(8.02)
<i>Unrated</i>	277	0.729	0.445	939,773	0.400	0.490	0.329***	(11.19)
<i>Revenue Bond</i>	277	0.697	0.460	939,773	0.317	0.465	0.379***	(13.56)
<i>Sinking Fund</i>	277	0.332	0.472	939,773	0.078	0.268	0.254***	(15.80)
<i>State Taxable</i>	277	0.079	0.271	939,314	0.095	0.293	-0.0153	(-0.87)
<i>Taxable</i>	277	0.274	0.447	939,773	0.071	0.257	0.203***	(13.18)

Notes: This table reports descriptive statistics separately for our sample of tribal and non-tribal bond issuances. Variables are defined in the Appendix. The differences in the average between samples is calculated using a standard two-sided t-test. Levels of significance are presented as follows: p<0.1*; p<0.05**; p<0.01***.

Table 3. Determinants of Initial Bond Yield

	(1) Yield	(2) Yield	(3) Yield	(4) Yield	(5) Yield	(6) Yield
Tribe	289.471*** (13.16)	185.733*** (7.56)	171.159*** (7.32)	251.464*** (9.37)	160.281*** (6.84)	153.787*** (6.82)
Ln(Amount)				-7.947*** (-7.01)	-4.211*** (-9.62)	-3.938*** (-9.11)
Ln(Maturity)				76.122*** (33.89)	70.254*** (32.42)	69.843*** (32.27)
Insured				71.975*** (18.58)	0.034 (0.02)	-0.622 (-0.39)
Taxable				55.062*** (7.92)	94.185*** (21.52)	94.014*** (21.60)
Callable				22.302*** (14.41)	32.966*** (24.41)	32.952*** (24.81)
Competitive				-7.297** (-2.32)	-17.049*** (-14.80)	-15.866*** (-14.36)
Sinking Fund				43.180*** (17.64)	37.129*** (18.85)	34.488*** (18.63)
Revenue Bond				8.426*** (2.65)	11.619*** (8.68)	9.935*** (7.99)
Advisor				-45.660*** (-12.41)	-10.059*** (-6.69)	-9.788*** (-6.84)
Rating				-0.805** (-2.09)	1.150*** (8.78)	
New Money				29.385*** (13.49)	10.760*** (10.66)	11.168*** (11.11)
State Taxable				-16.684*** (-4.84)	-27.639** (-2.45)	-27.301** (-2.43)
Puttable				-11.380 (-0.45)	-36.097* (-1.75)	-35.014* (-1.69)
Bank Qualified				-15.333*** (-5.72)	-11.393*** (-8.54)	-12.069*** (-9.37)
<i>State-by-Year Fixed Effects</i>	No	Yes	Yes	No	Yes	Yes
<i>Rating Fixed Effects</i>	No	No	Yes	No	No	Yes
N	940,050	940,050	940,050	926,039	926,039	926,039
R-sq	0.00	0.39	0.40	0.35	0.63	0.63

Notes: This table reports estimates of regressions of initial bond yields on issue characteristics, along with alternate fixed effect specifications. Columns 1 through 3 include no control variables with no fixed effects (Column 1), state-by-year fixed effects (Column 2), and state-by-year and rating fixed effects (Column 3). Columns 4 through 6 include the full suite of control variables with no fixed effects (Column 4), state-by-year fixed effects (Column 5), and state-by-year and rating fixed effects sans the *Rating* control variable (Column 6). Regression t-statistics are in parentheses, and standard errors are robust to heteroskedasticity and are double-clustered by issuer and issuance year-month. Variables are defined in the Appendix. Levels of significance are presented as follows: p<0.1*; p<0.05**; p<0.01***.

Table 4. Determinants of Initial Bond Yield: Subsample Analysis

	(1) Yield	(2) Yield	(3) Yield	(4) Yield	(5) Yield	(6) Yield
	Rated Bonds	Tax-Exempt Bonds	Insured Bonds	Bonds without Call Options	Loan amounts of \$1M or more	Fixed Rate Bonds
<i>Tribe</i>	64.442** (2.37)	146.042*** (5.48)	89.972** (2.13)	168.373*** (6.02)	151.714*** (5.91)	147.614*** (6.41)
<i>Ln(Amount)</i>	-3.429*** (-9.85)	-3.634*** (-8.55)	-4.237*** (-3.63)	-4.093*** (-8.26)	-0.794 (-1.51)	-3.359*** (-7.80)
<i>Ln(Maturity)</i>	82.210*** (32.48)	69.251*** (32.84)	72.633*** (25.73)	65.266*** (29.00)	70.692*** (28.70)	65.258*** (33.61)
<i>Insured</i>	3.145** (2.10)	-0.212 (-0.13)		0.081 (0.05)	-0.206 (-0.11)	-3.285** (-2.20)
<i>Taxable</i>	93.620*** (25.88)		108.779*** (25.33)	93.053*** (18.06)	89.355*** (24.33)	94.445*** (21.42)
<i>Callable</i>	27.034*** (11.06)	33.568*** (23.67)	17.811*** (8.53)		34.457*** (20.68)	38.873*** (32.59)
<i>Competitive</i>	-13.926*** (-13.78)	-15.328*** (-13.43)	-12.142*** (-5.34)	-17.029*** (-13.35)	-12.097*** (-9.23)	-13.512*** (-12.74)
<i>Sinking Fund</i>	22.071*** (10.94)	29.467*** (17.73)	8.513*** (7.74)	53.518*** (15.32)	41.499*** (15.87)	36.201*** (19.67)
<i>Revenue Bond</i>	6.387*** (5.85)	9.060*** (8.18)	-1.516 (-0.94)	11.039*** (8.41)	6.838*** (5.02)	13.291*** (10.19)
<i>Advisor</i>	-2.199** (-2.21)	-8.615*** (-6.91)	-3.860 (-1.51)	-8.734*** (-5.16)	-13.032*** (-7.42)	-9.890*** (-6.82)
<i>New Money</i>	11.205*** (13.45)	9.025*** (10.15)	5.710*** (2.90)	11.135*** (8.89)	16.286*** (14.16)	8.934*** (9.26)
<i>State Taxable</i>	2.945 (1.12)	-25.874** (-2.32)	2.565 (0.72)	-32.562* (-1.95)	-22.140*** (-3.01)	-26.514** (-2.38)
<i>Puttable</i>	-87.391*** (-4.69)	-43.204** (-2.44)	-46.635*** (-2.84)	-66.215*** (-4.55)	-53.831*** (-2.99)	-44.486*** (-3.04)

	(1) Yield	(2) Yield	(3) Yield	(4) Yield	(5) Yield	(6) Yield
	Rated Bonds	Tax-Exempt Bonds	Insured Bonds	Bonds without Call Options	Loan amounts of \$1M or more	Fixed-Rate Bonds
<i>Bank Qualified</i>	-14.171*** (-15.29)	-11.443*** (-8.75)	-13.920*** (-5.63)	-5.839*** (-4.18)	-8.463*** (-4.86)	-12.536*** (-10.00)
State-by-Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Rating Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
N	558,026	860,298	271,077	530,410	352,559	907,750
R-sq	0.80	0.68	0.52	0.57	0.7	0.64

Notes: This table reports estimates of regressions of initial bond yields on issue characteristics, along with state-by-year and rating fixed effects. Column 1 restricts the sample to only rated issuances. Column 2 restricts the sample to only tax-exempt bonds and excludes the *Taxable* control variable. Column 3 restricts the sample to only insured bonds and excludes the *Insured* control variable. Column 4 restricts the sample to only non-callable bonds and excludes the *Callable* control variable. Column 5 restricts the sample to only loan amounts of \$1 million or more. Column 6 restricts the sample to fixed rate bonds, when Mergent's coupon_code_c is FXD, ODF, OID, OIP. Regression t-statistics are in parentheses, standard errors are robust to heteroskedasticity and are double-clustered by issuer and issuance year-month. Variables are defined in the Appendix. Levels of significance are presented as follows: p<0.1*; p<0.05**; p<0.01***.

Table 5. Determinants of Initial Bond Yield: Matched Sample

Panel A Matched Sample Comparison

Variable	Tribal Governments			Non-Tribal Governments			Difference in Means	
	N	Mean	SD	N	Mean	SD	Tribal - Non-Tribal	t-stat
<i>Yield</i>	92	597.582	186.819	62	394.681	200.403	202.9***	(6.42)
<i>Price</i>	92	99.775	1.066	62	101.608	4.887	-1.833***	(-3.48)
<i>Advisor</i>	92	0.120	0.326	62	0.355	0.482	-0.235***	(-3.61)
<i>Amount</i>	92	21.461	37.178	62	21.390	39.718	0.0712	(0.01)
<i>Bank Qualified</i>	92	0.065	0.248	62	0.145	0.355	-0.0799	(-1.64)
<i>Callable</i>	92	0.587	0.495	62	0.581	0.497	0.00631	(0.08)
<i>Competitive</i>	92	0.043	0.205	62	0.161	0.371	-0.118*	(-2.53)
<i>General Obligation</i>	92	0.185	0.390	62	0.145	0.355	0.0396	(0.64)
<i>Insured</i>	92	0.054	0.228	62	0.032	0.178	0.0221	(0.64)
<i>Maturity</i>	92	12.327	7.324	62	14.108	11.051	-1.781	(-1.20)
<i>New Money</i>	92	0.783	0.415	62	0.581	0.497	0.202**	(2.73)
<i>Puttable</i>	92	0.000	0.000	62	0.048	0.216	-0.0484*	(-2.15)
<i>Rating</i>	92	19.174	5.230	62	16.016	8.373	3.158**	(2.88)
<i>Rating (if rated)</i>	25	11.600	4.655	22	5.136	3.385	6.464***	(5.38)
<i>AAA Rated</i>	25	0.000	0.000	22	0.182	0.395	-0.182*	(-2.31)
<i>AA Rated</i>	25	0.000	0.000	22	0.182	0.395	-0.182*	(-2.31)
<i>Below AA</i>	25	1.000	0.000	22	0.636	0.492	0.364***	(3.70)
<i>Unrated</i>	92	0.728	0.447	62	0.645	0.482	0.0831	(1.10)
<i>Revenue Bond</i>	92	0.750	0.435	62	0.758	0.432	-0.00806	(-0.11)
<i>Sinking Fund</i>	92	0.402	0.493	62	0.387	0.491	0.0151	(0.19)
<i>State Taxable</i>	92	0.174	0.381	62	0.113	0.319	0.0610	(1.04)
<i>Taxable</i>	92	0.054	0.228	62	0.081	0.275	-0.0263	(-0.65)

Panel B Determinants of Initial Bond Yield: Regression Results for Matched Sample

	(1)	(2)	(3)	(4)	(5)	(6)
	Yield	Yield	Yield	Yield	Yield	Yield
Tribe	202.901*** (5.41)	242.614*** (5.40)	251.361*** (4.57)	157.874*** (4.05)	163.072*** (3.12)	174.477*** (3.15)
Ln(Amount)				-5.310 (-0.55)	-4.013 (-0.26)	9.780 (0.51)
Ln(Maturity)				91.760*** (3.37)	98.987*** (3.25)	83.571*** (3.27)
Insured				-83.231** (-2.56)		
Taxable				184.765** (2.44)	181.295** (2.09)	207.417* (1.71)
Callable				-5.882 (-0.16)	-1.073 (-0.02)	10.115 (0.19)
Competitive				-61.546 (-1.40)	-31.962 (-0.33)	-46.515 (-0.52)
Sinking Fund				34.441 (0.99)	-41.326 (-0.93)	-16.871 (-0.39)
Revenue Bond				19.443 (0.58)	-110.339** (-2.38)	-142.847* (-1.82)
Advisor				-25.338 (-0.76)	-27.212 (-0.54)	-14.376 (-0.23)
Rating				2.750 (1.36)	7.463* (1.79)	
New Money				31.100 (1.02)	-24.798 (-0.40)	-88.922 (-1.40)
State Taxable				-3.920 (-0.14)	-105.174 (-1.12)	-160.982* (-1.91)
Puttable				-303.134*** (-3.43)	-384.015*** (-5.34)	-517.183*** (-4.11)
Bank Qualified				64.913 (1.12)	-30.265 (-0.42)	-18.401 (-0.20)
<i>State-by-Year Fixed Effects</i>	No	Yes	Yes	No	Yes	Yes
<i>Rating Fixed Effects</i>	No	No	Yes	No	No	Yes
N	154	154	154	154	154	154
R-sq	0.21	0.58	0.66	0.52	0.76	0.84

Notes: Panel A reports descriptive statistics separately for our tribal bonds and a matched sample of non-tribal bonds. Variables are defined in the Appendix. The differences in the average between samples is calculated using a standard two-sided t-test. Panel B reports estimates of regressions of initial bond yields on issue characteristics, along with different fixed effect specifications. Columns 1 through 3 include no control variables with no fixed

effects (Column 1), state-by-year fixed effects (Column 2), and state-by-year and rating fixed effects (Column 3). Columns 4 through 6 include the full suite of control variables with no fixed effects (Column 4), state-by-year fixed effects (Column 5), and state-by-year and rating fixed effects sans the *Rating* control variable (Column 6). Note that the *Insured* control variable is subsumed by the state-by-year fixed effects and is omitted from Columns 5 and 6. Regression t-statistics are in parentheses, and standard errors are robust to heteroskedasticity and are double-clustered by issuer and issuance year-month. Levels of significance are presented as follows: $p < 0.1^*$; $p < 0.05^{**}$; $p < 0.01^{***}$.