The Information Externality of Corporate Financial Information in the Secondary State-Bond Market

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ABSTRACT

This study provides the first evidence on the role of corporate financial information in the secondary state-bond market that is often characterized by informational opacity. In particular, I investigate the informational role of statewide aggregate earnings and find that corporate-earnings changes that are aggregated at the state level are positively associated with state-bond returns. This finding suggests that statewide aggregate earnings provide bondholders with real-time signals about regional economic performance. In cross-sectional analyses, I show that the effect is especially pronounced when bondholders face greater agency costs, higher credit exposure, and greater information opacity, and when corporate earnings are ex-ante more relevant to states' economic performance. Furthermore, the effect is stronger when corporate managers and business media disseminate earnings news more extensively. Taken together, the evidence is suggestive of a positive externality of corporate financial information that extends beyond the corporate sector to the state-bond market.

Keywords: Information Externalities, Information Transfer, Secondary State-Bond Market, Aggregate Earnings, Regional Economic Signals, Agency Costs, Media Coverage

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1. INTRODUCTION

State bonds have attracted considerable negative attention in the popular press recently. In May of 2017, Puerto Rico filed for bankruptcy relief in federal court. In June of 2017, Illinois was downgraded to a near-junk credit rating by Standard & Poor's and Moody's. Despite these negative events, municipal bonds continue to play a vital role in financing local public services throughout the U.S. (SEC 2012).[1] In fact, recent years have seen a substantial growth in local government debt issuance—from $182.9 billion in 1996 to $445.8 billion in 2016. As of 2017, the secondary market comprises $3.8 trillion in outstanding bonds.[2] However, this market remains highly opaque relative to the corporate sector, primarily because the Tower Amendment limits the Securities and Exchange Commission's (SEC's) and the Municipal Securities Rulemaking Board's (MSRB's) authority over the issuers (SEC 2012). Between 2014 and 2016, the SEC found that 96 percent of the municipal underwriting market had failed to ensure that the issuers provide continuing disclosure in the secondary market (SEC 2016a).

In light of this opacity, I investigate whether state-bond investors in the secondary market turn to other publicly available sources of financial information to assess states' financial strength. I contend that publicly-listed firms' financial information has the potential to yield informational benefits to state-bond investors by providing timely signals about regional economic conditions. That is, corporate financial information could have an information-spillover effect in the opaque secondary state-bond market. I investigate this question by studying the relevance of aggregate state-level corporate-earnings changes to state-bond returns.

[1] Municipal bonds refer to securities issued by states, counties, cities, and other governmental entities (SEC 2012).
[2] By comparison, the corporate-bond market consists of $8.5 trillion in outstanding bonds. Data are from the Securities Industry and Financial Markets Association (www.sifma.org).

I expect corporate financial information to yield a positive externality to state-bond investors, as rational state-bond investors facing an opaque information environment have incentives to seek alternative sources of relevant and timely information to address their informational needs. I argue that corporate earnings are timelier than other economic signals (e.g., Konchitchki and Patatoukas 2014), and accounting earnings reported on the accrual basis under GAAP should better predict future aggregate cash flows (e.g., Dechow, Kothari, and Watts 1998).[3] Corporate earnings can hence provide timely signals of the statewide economic conditions and help state bondholders infer the state's financial strength. That is, state bondholders update their expectations of the state's debt-servicing capacity based on corporate earnings. Accordingly, I expect statewide corporate-earnings changes to be positively associated with state-bond returns. However, the secondary state-bond market is an illiquid over-the-counter market concentrated with retail investors, so it is also possible that corporate earnings may not be associated with state-bond returns.

My empirical strategy involves aggregating earnings at a regional level. Specifically, I construct a monthly index of statewide corporate-earnings changes by aggregating quarterly earnings announcements made during the month by public firms headquartered in a particular state. In the regression analyses, I use time fixed effects to control for market-wide events. I also include bond fixed effects to address concerns over potential omitted variable biases due to either issuer-level or bond-level time-invariant characteristics. As predicted, I find that the statewide corporate-earnings changes are positively associated with state-bond returns after controlling for other regional economic signals.

Next, I conduct cross-sectional analyses that exploit variations in the demand for and the

[3] Konchitchki and Patatoukas (2014) find that nationwide aggregate accounting-earnings growth is a significant leading indicator of growth in nominal Gross Domestic Product (GDP), indicating that aggregate-accounting earnings are timely signals of macroeconomic conditions.

supply of corporate financial information. On the demand side, I explore the cross-sectional variations in the relevance of information signals in addressing state bondholders' informational needs. Specifically, I investigate three (non-mutually exclusive) types of informational needs induced by agency costs, credit exposure, and information opacity.

In particular, agency costs arise from an acute agency problem confronted by state bondholders.[4] On one hand, state bondholders (e.g., pension funds, insurance companies, and retail investors) often have long-term investment horizons, and thus emphasize states' long-term prospects. On the other hand, elected officials, owing to the relatively short-term nature of their appointments, are more concerned with their states' short-term objectives. To win the favor of current residents in the next election, officials have an incentive to avoid tax increases on current residents and defer payments for capital-improvement projects and other budgeted expenditures to future residents by issuing bonds with long maturities (e.g., Kido, Petacchi, and Weber 2012). Such tax-shifting behavior, however, is risky to existing bondholders—an increase in states' debt reduces future residents' ability to repay the principal amount due at maturity and increases the default risks and thereby the agency costs borne by bondholders. When bearing higher agency costs, state bondholders should be especially concerned about the underlying regional economic conditions that reflect the state's ultimate ability to service its debt in the future, and hence, corporate earnings should be particularly relevant to bondholders.

Similarly, bondholders should be more concerned about the financial performance of the state when they face higher exposure of the state's credit risk. Accordingly, the relevance of corporate earnings should be higher when bondholders have greater exposure to the state's credit risk. Finally, greater information asymmetry between the bond-issuing state and bondholders

[4] This municipal agency problem is similar to the asset-substitution behavior discussed by Jensen and Meckling (1976).

implies that bondholders have stronger incentives to make use of corporate earnings.

Based on the above discussion, I expect and find that the association between state-bond returns and corporate-earnings changes is more pronounced when bondholders face greater agency costs, higher credit exposure, and greater information opacity. Making use of substantial differences in issuer-level and bond-level characteristics, I identify multiple attributes of agency costs with gubernatorial election competition and investors' investment horizons, and measure credit exposure using bonds' credit-enhancement features and states' credit ratings. Further utilizing a broad set of disclosure variables in governmental audits, I assess states' disclosure opacity with the first principal component of seven disclosure-opacity variables.[5]

On the supply side, I investigate how the main effect varies by the relevance of information signals from public firms. I expect and find that the effect is stronger when corporate earnings more precisely reflect the underlying regional economic conditions. First, I employ a new data set of public and private firms' aggregate tax-return information to construct the extensiveness of public firms' presence in a state, capturing the extent of relevant and publicly available information that is observable to state bondholders similar to the approach employed by Badertscher, Shroff, and White (2013). Next, I use the extent to which public firms' operations are concentrated in their headquarter states to measure the noise level contained in public firms' information when served as regional economic signals (Garcia and Norli 2012). Collectively, the cross-sectional results on the demand and the supply sides suggest that statewide aggregate earnings provide state bondholders with useful information on regional economic development in real time.

I further investigate information-dissemination channels through which state bondholders

[5] The disclosure-opacity variables include reporting lags, auditor independence, audit opinions, internal control weaknesses, auditor-assessed risks, Government Finance Officers Association (GFOA) best practices awards, and voluntary disclosures.

learn about corporate earnings. I find that the effect of corporate earnings on state bonds is more pronounced when corporate managers provide more earnings guidance and when public firms have greater media coverage on earnings. The results indicate that both corporate managers' information provision and media coverage facilitate the diffusion of corporate financial information from public firms to state bondholders. In additional analyses, I show that income-tax and sales-tax collections are mechanisms that strengthen the information link between corporate earnings and state bonds. Moreover, to provide more insight about potential benefits of public firms' information, I investigate the impact of corporate financial information on information asymmetry among participants in the secondary market; the evidence indicates that public firms offer timely information that helps mitigate the information asymmetry between state-bond dealers and retail investors.

This study makes several contributions. Foremost, my findings provide potentially relevant insights to securities regulators in both the corporate sector and the state-bond sector. The paper documents a positive externality of corporate financial reporting, and thus offers useful insights to the SEC in evaluating the overall costs and benefits of corporate reporting regulation (Leuz and Wysocki 2016). Importantly, the Dodd-Frank Act of 2010 has authorized a review of the Tower Amendment (SEC 2012) and triggered a discussion about a potential regulatory reform to improve securities regulators' oversight of municipal-bond issuers. My findings thus contribute to this ongoing discussion by informing the SEC and the MSRB about agency and informational problems faced by state bondholders and their partial alleviation by corporate financial reports.

Furthermore, this study contributes to and connects three streams of literature. First, it is the first paper to show that state-bond investors are beneficiaries of externalities provided by

corporate financial information. The study thus contributes to the literature on externalities—an important yet under-researched area in accounting (Leuz and Wysocki 2016). Second, my article provides new insights into the overall municipal-bond market, which is relatively under-researched in accounting and finance despite its economic significance. My findings are relevant for understanding bondholders' information-discovery process in the secondary market. Lastly, this research contributes to the aggregate accounting literature by introducing the aggregate-earnings concept to a regional level and extending the scope of the analysis beyond the corporate to the municipal-bond sector. Ball and Sadka (2015) suggest that aggregate earnings provide different information content from firm-level earnings and encourage researchers to study the informational role of aggregate earnings. While prior studies mainly involve investigation of the time-series variation of the nationwide aggregate earnings, I examine the cross-sectional variation of statewide aggregate earnings.[6]

2. INSTITUTIONAL BACKGROUND AND RELATED LITERATURE

Bonds issued by states, other local governments (e.g., cities and counties), and governmental entities are collectively referred to as municipal bonds (SEC 2012). The secondary market of these bonds, known as the municipal-bond market, is an over-the-counter market with a high concentration of retail investors. This market is characterized by information opacity relative to the corporate equity and bond markets, mainly due to two institutional factors.

First, reporting regulations for municipal-bond issuers are less stringent than those for publicly traded companies because municipal-bond issuers are exempt from most federal

[6] Prior literature documents that the aggregate-level association between earnings and returns is different from firm-level relations because aggregate earnings are correlated with discount-rate news (Kothari, Lewellen, and Warner 2006; Shivakumar 2007; Ball, Sadka, and Sadka 2009; Cready and Gurun 2010; Patatoukas and Yan 2010; Gkougkousi 2014; Patatoukas 2014).

securities laws, including the registration and reporting requirements of the Securities Act and the Exchange Act (SIFMA 2012, 225). Since the passage of the Dodd-Frank Act in 2010, the SEC and the MSRB have intensified their monitoring of municipal-bond dealers, underwriters, and advisors. However, provisions in the Tower Amendment continue to severely limit the SEC's and the MSRB's authority over the issuers (SEC 2012).[7] Investor protection efforts are achieved mostly through the enforcement of anti-fraud rules on issuers (i.e., S17(a) of the Securities Act and S10(b) of the Exchange Act) and indirectly through the enforcement on other market participants, such as broker-dealers, advisors, and underwriters (SEC 2012).[8] Consequently, unlike public companies, which are required by the SEC to issue quarterly financial information within 40 to 45 days and audited annual financial information within 60 to 90 days, municipal-bond issuers only provide annual financial statements in accordance with the underwriter agreements.[9] Even with this low reporting frequency, reports are often issued with a substantial lag with an average reporting lag of 10 months in my sample. Further, continuous reporting is often highly aggregated and lacks sufficient detail. Detailed financial statements are often only released when the issuers float new bonds, as many issuers are only bound by underwriters to provide audited financial information to investors at the time of bond issuance. Failures to provide continuous disclosures do not constitute technical default by these issuers

[7] The SEC started a voluntary self-reporting program, the Municipalities Continuing Disclosure Cooperation (MCDC) Initiative, targeting municipal-bond issuers and underwriters for their material misstatements and omissions in municipal-bond-offering documents in 2014 (SEC 2016a; SEC 2016b).

[8] Historically, the enactment of federal securities laws in 1975 put brokers and dealers under the jurisdiction of MSRB to oversee their activities related to municipal securities. In addition, the SEC Rule 15c2-12 adopted in 1989 imposed express disclosure-document review and distribution requirements on underwriters, and it was amended in 1994 to add an additional requirement for underwriters as a condition to accept municipal-bond underwritings—municipal-bond issuers must provide continuing disclosure (SIFMA 2012, 225). The Dodd-Frank Act of 2010 significantly increased the powers of the MSRB and the SEC's oversight, requiring municipal advisors to register with the SEC for the first time (SIFMA 2012, 226).

[9] Under the final reporting requirements approved by the SEC in 2005, accelerated (i.e., both large and regular accelerated filers) and non-accelerated filers are required to file 10-Qs within 40 and 45 days, respectively. Large accelerated, regular accelerated, and non-accelerated filers need to file 10-Ks within 60, 75, and 90 days, respectively.

(Cuny 2016).

Second, municipal-bond issuers face much weaker market discipline than public companies do. Specifically, public companies are subject to the monitoring by the public equity, private debt, and public debt markets, whereas municipal-bond issuers are only subject to the monitoring by the relatively less liquid municipal-bond market.[10] Moreover, auditors bear lower litigation risks in municipal audits than in public firm audits. Further, defaults are far more common among corporations than governments, and thus auditors are much more likely to be sued by corporate investors than by municipal-bond investors. As such, the audit quality for municipal-bond issuers is likely lower than that of public firms. Due to the preceding arguments, the information quality of municipal information is likely to be poor, especially in comparison to that of the corporate sector.

Moreover, the opaque information environment for municipal-bond issuers also finds support in prior literature. While comprehensive evidence on the value relevance of corporate financial information exists in corporate equity and bond markets (e.g., Lev and Sougiannis1996; Aboody and Lev 1998; Hung 2000), the empirical evidence on the relevance of accounting information in the secondary municipal-bond market is rather dated and mixed. In general, accounting information from municipal-bond issuers does not predict municipal bonds' credit ratings (Michel 1977; Wescott 1984; Copeland and Ingram 1982) and is not associated with municipal bonds' yield premiums (Ingram 1983).[11] Further, credit ratings largely preempt the

[10] Residents are also likely to be interested in local governments' debt levels and thus discipline them through votes, but such an effect is not in the scope of this study.

[11] Raman (1981) finds that accounting ratios are associated with credit-rating revisions; however, Copeland and Ingram (1982) show that financial ratios only seem to reflect credit ratings ex post rather than predicting credit-rating changes ex ante, suggesting that bond issuers provide less timely financial information than do credit-rating agencies. In addition, general state-mandated accounting and audit requirements (e.g., statewide uniform accounting principles and independent audit requirements) are associated with municipal bonds' yield premiums and credit ratings (Ingram and Copeland 1982), but a set of more specific accounting practices and accounting ratios are not associated with yield premiums (Ingram 1983).

information provided by infrequent and delayed annual reports issued by governments (Copeland and Ingram 1982; Ingram, Brooks, and Copeland 1983; Ingram, Raman, and Wilson 1989; Ingram 1983). Reck and Wilson (2006) find that there is no significant market reaction to the SEC's revised Rule 15c2-12 about continuing disclosures and new issues during the 1996 to 1998 period.[12] In summary, the information environment for municipal-bond issuers is opaque relative to public companies, making the municipal-bond market a useful setting to examine information externalities.

3. HYPOTHESES DEVELOPMENT

Traditionally, state governments issue bonds to finance various public projects that provide residents with essential public services such as roads, university buildings, power-generating facilities, and affordable-housing developments.[13] The usage of bonds follows a "pay-as-you-use" approach in which public services are paid for by all beneficiaries over time (i.e., by both current and future residents), as opposed to a "pay-as-you-go" approach, in which they are paid for immediately with cash (i.e., only by current residents). Hence, through the issuance of bonds, state government officials are responsible for the intertemporal allocation of payments for public services between current and future residents (Costello, Petacchi, and Weber 2017).

An agency problem, similar to the asset-substitution problem discussed in Jensen and

[12] Unlike the non-compliance with continuing disclosure requirement in the secondary market, issuers provide financial information to investors in the primary market through underwriters. There exists some evidence on the relevance of accounting numbers and accounting quality to issuers' cost of debt in the *primary* market. Particularly, issuers' accounting numbers (e.g., general fund deficit and total revenues) and auditing variables (e.g., Big-N auditors and auditors' qualified opinions) are associated with net interest costs and credit ratings in a sample of Florida municipalities in 1974 (Wallace 1981; Wilson and Howard 1981). Governments' spending rates are also associated with net interest costs in Minnesota municipalities (Apostolou, Giroux, and Welker 1985). The cost of debt is lower in states where GAAP is mandated (Baber and Gore 2008) and higher after restatement disclosures (Baber et al. 2013).

[13] The issuance of state bonds is authorized under state laws, which can impose restrictions on the size and financial structure of a debt. Most state bonds are exempt from federal income taxes, and depending on the state, they may also be exempt from state income taxes.

Meckling (1976), can arise due to a potential misalignment of interests between government officials' self-interested short-term focus and state bondholders' long-term investment horizon. On one hand, the term of office for elected officials is rather short—ranging from two to four years for state senators and representatives. Therefore, to gain votes from current residents in the upcoming elections, officials have an incentive to finance their capital and operating budgets by issuing bonds, and hence avoid raising taxes during their tenure in office. This practice leads to a de facto transfer of wealth between current and future taxpayers. These incentives and practices have led to rapid growth of government debt issuance in the past few decades—from $182.9 billion in 1996 to $445.8 billion in 2016.[14] Prior studies also reveal that state officials exhibit strong incentives to gain favorable election outcomes and to meet legislative requirements (Kido, Petacchi, and Weber 2012; Costello, Petacchi, and Weber 2017).

On the other hand, because the principal amount is repaid to bondholders at maturity (which could be 15 to 30 years), a significant portion of the state debt is delayed far into the future. Thus, state bondholders face the risk that future residents cannot fully repay the principal amount. Although bonds issued by local governments are traditionally considered safe investments, the past decade has witnessed numerous local government defaults and bankruptcies, suggesting that investors could incur significant losses. Many states and U.S. territories continue to suffer from severe financial distress (e.g., California, New York, and Puerto Rico). Their public pension plans further add to the ever-growing government debt (e.g., Illinois) and cast serious doubts about their financial sustainability.[15] Since 2010, nine local governments have filed for Chapter-9 bankruptcies. In such instances, bondholders have recovered only a portion of their investments (e.g., 41 percent for Detroit's bankruptcy). States

[14] Data from the Securities Industry and Financial Markets Association (www.sifma.org).
[15] Illinois's pension liability has grown to a record high of $111 billion in 2015; the state is still struggling with settling its debt (Campbell 2016).

traditionally cannot file for Chapter-9 bankruptcies, but investors could still be concerned about a significant loss given default due to the political uncertainty of whether and how a bailout by the federal government would take place.[16] For instance, the U.S. Congress addressed Puerto Rico's financial crisis by passing the Puerto Rico Oversight, Management, and Economic Stability Act (PROMESA) to grant the territory access to bankruptcy-like processes; Puerto Rico officially declared bankruptcy under Title III of PROMESA in 2017, indicating significant losses likely to be absorbed by the bondholders.[17] Consequently, investors should be particularly concerned that officials may defer too many current payments into the future through the issuance of bonds.

Due to the agency problem discussed above, state bondholders are interested in gauging the fundamental economic conditions of the state. I argue that public firms' earnings announcements can provide timely signals of statewide economic conditions, similar to the way nationwide aggregate accounting earnings provide timely signals of macroeconomic conditions (Konchitchki and Patatoukas 2014). Specifically, corporate earnings convey information about the collective revenue-generating ability of businesses in a state. Higher corporate earnings could imply greater debt-servicing capacity of the state due to two underlying mechanisms. First, when businesses based in a state are more profitable, corporate and personal income-tax collection by the state is likely to be higher. Higher corporate profits could also be indicative of greater and better economic activity in the state and could imply higher activity-based revenue to the state (e.g., sales taxes and usage charges for public services such as toll roads). Furthermore, more

[16] Traditionally, states cannot file bankruptcy in court due to the contracts clause of the U.S. Constitution, which prohibits state legislatures from passing any laws to relieve either private debt or the state government's debt. Currently, the federal bankruptcy code does not allow state governments to declare bankruptcy.

[17] Partly due to a contracting economy in 2006, the Commonwealth of Puerto Rico started to issue government bonds to cover its budget deficits in 2008. Puerto Rico's public debt has grown from $53 billion in 2008 to $72 billion in 2015 (*New York Times* 2016). Since 2015, Puerto Rico has defaulted on a large swath of its debts, totaling nearly $69 billion. The severity of the issue at stake led President Obama to comment on Puerto Rico's financial crisis: "the only way out for the territory [Puerto Rico] is to make it eligible for a bankruptcy-like process to shed some of its debts" (Coy 2016).

profitable business activity can potentially trickle down to wage increases and could thus allow states greater wiggle-room for raising taxes without adversely impacting the level of residents' disposable incomes. Hence, higher corporate earnings indicate a lower expected probability of default and a higher expected recoverable amount in the event of a default, leading to an upward revision in bondholders' expectations about future coupon and principal payments. Accordingly, I expect statewide corporate-earnings changes to be positively associated with state-bond returns.[18] I state my first hypothesis (in alternative form) as follows:

H1: Corporate-earnings changes are positively associated with state-bond returns.

Nonetheless, it is possible that corporate earnings are *not* associated with state-bond returns, either because the secondary state-bond market is an illiquid over-the-counter market, or because investors ignore fundamental economic news based on the belief that the federal government will always bail out the state governments.

Accordingly, I examine the cross-sectional variation in the relevance of information signals to bondholders with my second hypothesis. Specifically, I examine bondholders' informational needs induced by agency costs, credit exposure, and information opacity. When facing greater agency costs, higher exposure to states' credit risks, and greater information opacity, bondholders should be more concerned about the states' ultimate repayment ability in the future; thus, corporate earnings are more relevant. Further, the acquisition and processing of information, especially regarding a large set of firms, can be a costly exercise. As such, bondholders should only be willing to incur such costs to the extent that corporate earnings are

[18] Information diffuses along the supply chain from key customers to their suppliers in the corporate sector (Hertzel et al. 2008; Pandit, Wasley, and Zach 2011). Local businesses and residents are the customers of services provided by a state. The implicit contract between the state and the local businesses and residents resembles a supplier-customer relation, in which corporate earnings provide a signal about the expected future revenues to the state. In other words, when corporate earnings increase, future revenues (e.g., taxes and fees) are expected to be higher.

relevant to their informational needs. Thus, I state my hypothesis in alternative form, as follows:

> **H2:** The association between corporate-earnings changes and state-bond returns is stronger when corporate earnings are *ex-ante* more relevant to **bondholders' informational needs**.

Next, I explore the cross-sectional variation in the relevance of signals from public firms as measured by the extent and the accuracy to which corporate earnings reflect underlying regional economic conditions. Specifically, I assess the relevance of signals to states' economic conditions, using the extent of publicly available information that is observable to the investors in a state (e.g., Badertscher, Shroff, and White 2013) and the degree to which the public firms' operations are concentrated in the headquarter state (e.g., Garcia and Norli 2012). In a Bayesian world, investors assign a higher weight to information that exhibits higher relevance or quality, all else being equal (e.g., Collins and Kothari 1989; Sloan 1996; Conrad, Cornell, and Landsman 2002). Therefore, I expect that the effect of statewide aggregate earnings on state-bond returns is greater when corporate earnings more accurately reflect the underlying economic conditions. I state the hypothesis in the alternative form, as follows:

> **H3:** The association between corporate-earnings changes and state-bond returns is stronger when corporate earnings are *ex-ante* more relevant to **states' economic performance**.

Finally, I investigate the information-dissemination channels through which corporate-earnings information is incorporated into the secondary state-bond market. First, when public firms provide more earnings guidance, more earnings news is distributed to the capital market; thus, the association is expected to be stronger. Second, I expect media coverage on public firms

to be an important dissemination channel, as approximately 46 percent of state bonds are held by retail investors who are likely influenced by media (Kumar and Lee 2006; Fang and Peress 2009).[19] The information-acquisition cost associated with popular business media (e.g., the financial press and television channels such as CNBC) is also lower than that for other channels (e.g., private information gathering). Hence, I state my last hypothesis in alternative form:

> **H4:** The association between corporate-earnings changes and state-bond returns is stronger when corporate managers and business media **disseminate** more earnings-related news.

4. RESEARCH DESIGN

To examine the association between corporate-earnings changes and state-bond returns (H1), I regress monthly state-bond returns on a monthly index of corporate-earnings changes.[20] I use OLS regressions with bond fixed effects to address concerns over time-invariant and bond-variant omitted variables, such as bond-level and issuer-level characteristics. I also include year-quarter fixed effects to alleviate time-variant and bond-invariant omitted-variable biases due to common macroeconomic factors or market-wide events. I cluster the standard errors at the bond level and winsorize all continuous variables at the 1st and the 99th percentiles. I estimate the effect of corporate-earnings changes using the following regression specification:

$$Ret_{i,t} = \alpha_i + \lambda_t + \beta_0 \, \Delta Corporate\ Earnings_{g,t} + \gamma \, X_{i,t} + \varepsilon_{i,t}, \qquad (3)$$

where i indexes bonds, t indexes time, g indexes states, α denotes the bond fixed effects, and

[19] Data are from the Securities Industry and Financial Markets Association (www.sifma.org).
[20] I use firms' earnings rather than stock returns for two reasons. First, I do not restrict state bondholders to interpret and react to corporate earnings in the same way as equity investors. Second, stock returns incorporate other information besides earnings announcements, but this paper focuses on the role of corporate earnings information.

λ denotes the time fixed effects. $Ret_{i,t}$ are the state-bond returns, and $\Delta Corporate\ Earnings_{g,t}$ are the scaled seasonally-adjusted corporate earnings aggregated by public firms' headquarter states and earnings-announcement months (see Appendix A for measurement details). X is a vector of time-varying control variables that could explain variations in state-bond returns. I control for the average trade size, issuers' S&P credit ratings, changes in credit ratings, issuers' most recently released financial information (i.e., *Size*, Δ*Current Ratio*, Δ*Leverage*, *Revenue Growth*, and *ΔNet Assets)*, and statewide economic factors (i.e., *Gross State Product Growth* and *Unemployment Rate Growth*; see Appendix B for definitions). β_0 estimates the association between corporate-earnings changes and state-bond returns; H1 predicts β_0 to be positive.

Notably, empirical studies on nationwide aggregate earnings report a negative or insignificant association between aggregate-earnings changes and equity-market returns (Kothari, Lewellen, and Warner 2006; Cready and Gurun 2010). This is due to the fact that aggregate earnings move more with discount rates than cash-flow news, as unexpected earnings changes are positively associated with discount-rate news (Kothari, Lewellen, and Warner 2006) and negatively related to expected returns (Ball, Sadka, and Sadka 2009).[21] Unlike prior studies where earnings are aggregated into one observation every year, I aggregate earnings by states, and thus, derive a panel data set that allows me to explore the cross-sectional variation in aggregate earnings. Also, I am able to control for market-wide discount-rate news with time fixed effects. In other words, prior studies focus on the time-series variation in aggregate earnings, whereas I focus on the cross-sectional variation.

Next, I examine the cross-sectional variations in the relevance of the information signals

[21] The negative association between aggregate earnings and returns can also be explained by the monetary policy news in aggregate earnings (Gallo, Hann, and Li 2016). Research also reports a more nuanced relation—aggregate-earnings changes are negatively related to investment-grade corporate bond market returns and positively related to high-yield corporate bond market returns in the corporate bond market (Gkougkousi 2014).

to bondholders' informational needs (H2). I identify three types of informational needs—agency costs, exposure of states' credit risks, and states' information opacity. First, I analyze agency costs in two ways, using the gubernatorial election competition and bondholders' investment horizons. More intense political competition in gubernatorial elections incentivizes state officials to avoid raising taxes through debt issuance. Furthermore, given state officials' incentives to increase debt, as bondholders' investment horizons increase, the risk of the issuer becoming overly leveraged is expected to be higher. Hence, bondholders face higher nonpayment risks and greater agency costs.

Second, I assess bondholders' exposure to states' credit risks with bonds' credit-enhancement features and states' credit ratings. Bondholders investing in a bond without credit enhancements are likely to be less concerned about the bond-issuing state's credit risk than those who invest in a bond with credit enhancements, because the credit risk of the bond shifts from the issuer to the third-party credit-enhancement provider such as a monoline insurance company and a guaranteeing bank.[22] As such, corporate earnings are likely to be more relevant for a bond without credit enhancements than otherwise. Moreover, for states that are rated with higher credit risks, bondholders should be more concerned about the states' underlying economic conditions, and thus find corporate earnings more relevant.

Third, when the information and disclosures from the bond-issuing states are more opaque, bondholders are subject to higher information asymmetry, and thus have stronger incentives to gather and utilize alternative relevant information to reduce such information asymmetry. I estimate the differential effects of the relevance of corporate earnings to

[22] Credit enhancements include bond insurance, bank letters of credit and other facilities, state intercept guarantees, and credit programs of federal or state governments. For example, bond insurance is a legal commitment by an insurance company (often a monoline) to make interest and principal payments when the issuer defaults. It is a commonly used product to enhance the issuer's credit rating with a more highly-rated third-party provider, in which case the credit rating of the bond assumes the rating of the monoline insurance company rather than the issuer.

bondholders' various informational needs, using the following regression specification:

$$Ret_{i,t} = \alpha_i + \lambda_t + \beta_0\, \Delta Corporate\ Earnings_{g,t} + \beta_1\, \Delta Corporate\ Earnings_{g,t} \times Info\ Need_{g,t} + \beta_2\, Info\ Need_{g,t} + \gamma\, X_{i,t} + \varepsilon_{i,t}, \quad (4)$$

where $Info\ Need_{g,t}$ is one of the five variables—*Election Competition*, *Long Horizon*, *No Enhancement*, *Credit Risk*, and *Disclosure Opacity*. *Election Competition* is an indicator variable that equals one if a state's average percentage margin of victory in the upcoming gubernatorial election is below the median in a given year, and zero otherwise; the percentage margin of victory is the difference in the percentage of all votes cast between the winner and the second-place candidate. *Long Horizon* is an indicator that equals one if a bond's remaining term to maturity is above the median in a given year, and zero otherwise. *No Enhancement* is an indicator variable that equals one if a bond does not have a credit-enhancement feature, and zero otherwise. *Credit Risk* is an indicator variable that equals one if an issuer's credit rating is below the median in a given year, and zero otherwise. *Disclosure Opacity* is an indicator variable that equals one if the first principal component of several proxies for states' disclosure-opacity is above the median in the year, and zero otherwise; the disclosure-quality variables include states' reporting lags, auditor independence, audit opinions, internal control weaknesses, auditor-assessed risks, Government Finance Officers Association (GFOA) best practices awards, and voluntary disclosures. H2 posits that β_1 is positive.

H3 investigates the effect of the relevance of information signals to states' underlying economic conditions on the main effect. I assess two dimensions of relevance—public firms' presence and local concentration. I first define public firms' presence as the relative presence of public firms to both public and private firms in a state, and thus capture the market transparency,

or the extent of publicly available information that is observable to the investors in a state (Badertscher, Shroff, and White 2013). The more information is observed by state bondholders, the less noise is associated with the corporate earnings. Thus, public firms' presence is a proxy for the precision of corporate earnings to reflect the unobserved underlying regional economic development (or in other words, the quality of information). Second, local concentration refers to the degree to which the public firms' operations are based in the headquarter state and, hence, reflects the degree of the noisiness that is associated with aggregate-corporate earnings (Garcia and Norli 2012). Higher corporate local concentration indicates less noise associated with corporate earnings, or higher information quality. I estimate the effect of information quality using the following regression:

$$Ret_{i,t} = \alpha_i + \lambda_t + \beta_0 \, \Delta Corporate\ Earnings_{g,t} + \beta_1 \, \Delta Corporate\ Earnings_{g,t} \times Info\ Quality_{g,t} + \beta_2 \, Info\ Quality_{g,t} + \gamma \, X_{i,t} + \varepsilon_{i,t}, \quad (5)$$

where $Info\ Quality_{i,t}$ is one of the two variables—*Public Firms' Presence* and *Local Concentration*. *Public Firms' Presence* is an indicator variable that equals one if the percentage of the aggregate total assets for public firms headquartered in a state over the aggregate total assets for all firms that file state tax returns is above the median in a given year, and zero otherwise. *Local Concentration* is an indicator variable that equals one if the weighted average of public firms' percentage of business operations carried out in their headquarter states, weighted by market value, is above the median in a given year, and zero otherwise. The locations of a public firm's business operations are measured using firms' disclosures of material subsidiaries in 10-K Exhibit 21 (Dyreng and Lindsey 2009). H3 predicts that β_1 is positive.

To investigate the information-dissemination process (H4), I use management guidance

and news coverage to proxy for earnings dissemination by corporate managers and media, respectively. I estimate their effects with the following regression:

$$Ret_{i,t} = \alpha_i + \lambda_t + \beta_0 \, \Delta Corporate\ Earnings_{g,t} + \beta_1 \, \Delta Corporate\ Earnings_{g,t} \times Info\ Dissem_{g,t} + \beta_2 \, Info\ Dissem_{g,t} + \gamma \, X_{i,t} + \varepsilon_{i,t}, \quad (6)$$

where $Info\ Dissem_{g,t}$ is one of the two variables—*Mgt Guidance* and *News Coverage*. *Mgt Guidance* is an indicator variable that equals one if the weighted-average number of management guidance provided by public firms that are headquartered in a given state, weighted by market value, is above the median in a given year, and zero otherwise. *News Coverage* is an indicator variable that equals one if the weighted news coverage is above the median in a given year, and zero otherwise; the weighted news coverage is the weighted-average number of news articles referring to earnings of public firms that are headquartered in a given state (i.e., identified as the "earnings" group by RavenPack), weighted by market value. News articles include press releases, news flashes, and full articles that are disseminated either online or in print. β_1 estimates the effect of earnings dissemination, and H4 predicts β_1 to be positive.

5. SAMPLE AND DESCRIPTIVE STATISTICS

My sample consists of trading transactions of both general obligation and revenue bonds issued by U.S. states and territories from January 2005 to June 2015.[23,24] I focus on state bonds

[23] My sample period begins in 2005 because the MSRB trading data start in 2005.

[24] Early studies use quoted prices provided by financial institutions to proxy the actual municipal-bond trading prices (e.g., Ingram and Copeland 1982; Ingram 1983; Ingram, Raman and Wilson 1989). For example, Ingram and Copeland (1982) and Ingram (1983) use price quotes provided by the Blue List Publishing Company, a division of Standard and Poor's Corporation; Ingram, Raman and Wilson (1989) obtain the price quotes from Interactive Data Services Inc., New York; Reck and Wilson (2006) use the quotes from Evaluation Services Inc. They all provide caveats for using quoted prices, rather than the actual prices. Since the mandatory disclosure requirement became effective in 1998, a few researchers have purchased a part or all of the MSRB secondary market trading data to examine the properties of the municipal-bond market (e.g., Downing and Zhang 2004; Green, Li, and Schurhoff

because earnings aggregation is likely to be less noisy at the state level than at a more granular level, and state bonds are more liquid than other more locally issued government bonds. The final sample consists of 81,929 monthly bond-return observations.[25] I obtain the trading data from MSRB, including trading dates, transaction prices, volumes, and types.[26] I collect bond characteristics, underwriters and legal advisors' locations, and financial information of states' government funds from Bloomberg, and states' disclosure-opacity measures from the Single Audit Clearinghouse Census Bureau and the Electronic Municipal Market Access (EMMA).[27,28] In addition, I obtain public companies' financial information and their headquarter states from Compustat, states' quarterly gross domestic product (GSP) and unemployment rate (UR) data from the Bureau of Economic Analysis (BEA), states' Standard and Poor's (S&P's) credit ratings from The Pew Charitable Trusts, and gubernatorial election data from CQ Press (http://library.cqpress.com/elections). I supplement missing observations with hand-collected data from various sources such as state governments' websites. To construct measures of public firms' presence and corporate local concentration, I obtain statewide aggregate tax-return data starting in 2007 from Powerlytics and firms' subsidiaries data from Scott Dyreng. Finally, I collect media data from RavenPack and earnings guidance data from the First Call database.[29]

Table 1 presents descriptive statistics. The means of state bonds' monthly returns and

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2010; Schultz 2012; Cuny 2017; Schwert 2017; Ang, Green, Longstaff, and Xing 2017).

[25] I exclude bonds with variable rates as a small number of such bonds exist in my sample; I further exclude inter-dealer transactions as I am mainly interested in the effect on investors.

[26] The transaction type indicates parties involved in the transaction, including customer purchases, customer sales, and inter-dealer trades.

[27] A state presents multiple funds (e.g., the education fund, the transportation fund) in its financial statements. I control for the financial information in the government fund (i.e., the consolidation of all funds) because it reflects the overall financial health of the state government.

[28] The Single Audit is an organization-wide audit required for entities that receive more than $750,000 in federal assistance. The Single Audit includes a compliance engagement, which examines the fund recipient's usage of federal assistance, operations, and compliance with laws and regulations.

[29] I use the geographic dispersion data from Scott Dyreng rather than those from Garcia and Norli (2012) because the sample period of the latter ends in 2008. Geographic dispersion data from Scott Dyreng are used in several papers (e.g., Dyreng and Lindsey 2009). Inferences are robust to using the data from Garcia and Norli (2012).

corporate-earnings changes (the latter as a percentage of the market value of public firms) are 0.21% and 0.004%, respectively. The log of the average size of trades is 11.01, or $60,476. The means of the issuers' log of total assets, revenue growth (per capita), and annual changes in current ratios, leverage ratios, net assets (per capita), and S&P credit ratings are 10.32 ($30,333 million), 3.4%, -3%, 26%, -71.05, and 0.0036 (0.36% of one notch in credit rating), respectively. Also, the averages of quarterly GSP and unemployment-rate growth are 0.06% and 0.24%, respectively. Notably, the descriptive statistics show that the average year-over-year change in states' leverage ratio is large relative to other financial information. Table 2 presents Pearson correlations among test and control variables. State-bond returns are positively correlated with corporate-earnings changes, states' size, and gross state product (GSP) growth, while they are negatively associated with states' revenue and unemployment-rate growth.

6. EMPIRICAL RESULTS

Table 3 presents the results of regression analyses used to examine the association between corporate-earnings changes and state-bond returns (H1). Column (1) presents the base model with issuer and time fixed effects. Column (2) further controls for *Trade Size*, the state's *Size*, Δ*Current Ratio*, Δ*Leverage*, *Revenue Growth*, *ΔNet Assets*, and *ΔCredit Rating*, as well as regional economic factors, *Gross State Product Growth* and *Unemployment Rate Growth*. Column (3) employs bond and time fixed effects and includes all control variables. In columns (1) - (3), the coefficients on $\Delta Corporate\ Earnings_t$ are positive (3.2124, 3.3083, and 3.5240, respectively) and statistically significant at the 1% level (using two-sided tests), suggesting that corporate-earnings changes are positively associated with state-bond returns after controlling for bond-level characteristics, regional economic factors, and government financial information, thus

providing support for H1. In terms of the economic significance of corporate-earnings, a one-percent increase in corporate-earnings changes, on average, is associated with a 17-percent increase in the monthly return of the corresponding state bond.[30] In addition, bond returns are positively associated with the issuer's profitability and changes in current ratios, while they are negatively associated with the issuer's size, revenue growth, and unemployment-rate growth.

I present the results for the cross-sectional analyses of bondholders' informational needs for corporate financial information induced by agency costs, credit exposure, and information opacity in Table 4. The coefficients on $\Delta Corporate\ Earnings_{g,t} \times Info\ Need_{g,t}$ in columns (1) - (5) are positive (0.8960, 2.5978, 0.9811, 2.1959, and 3.0738 respectively) and statistically significant at the 5% level or better (using two-sided tests), implying that corporate-earnings changes have a more pronounced association with returns when bondholders' informational needs are higher—for states with more competitive gubernatorial elections, for bonds with longer terms to maturity, for bonds without credit-enhancement features, for issuers with lower credit ratings, and for issuers with more opaque disclosures.[31] In terms of economic significance, a one-percent increase in corporate-earnings changes is associated with higher increases in the monthly returns of 4 percent, 12 percent, 5 percent, 10 percent, and 14 percent for bonds issued by states with more competitive gubernatorial elections, for bonds with longer terms to maturity, for bonds without credit enhancement features, for issuers with lower credit ratings, and for issuers with more opaque disclosure than otherwise, respectively. Overall, the results support H2 and highlight the role of corporate earnings in alleviating bondholders' informational problems.

Table 5 shows the results for cross-sectional analyses of information quality. The

[30] The average monthly treasury-adjusted state-bond return is 0.211%, or an annualized rate of 2.56%. A one-percent increase in corporate changes is associated with a 0.03524-percent increase in the monthly return, or an annualized rate of 0.4237%, representing approximately 16.55 % of the monthly state-bond month return in my sample.

[31] Bond fixed effects subsume the effect due to $Info\ Need_{g,t}$ in all cases, except for the terms to maturity, either because the variable is a bond or issuer level characteristic or because the variable is sticky over time.

coefficients on $\Delta Corporate\ Earnings_{g,t} \times Public\ Firms'\ Presence_{g,t}$ in columns (1) and (2) are positive (1.7011 and 1.7127, respectively) and statistically significant at the 1% level, indicating that higher public firms' presence in a state, or higher geographic market transparency, strengthens the association between corporate-earnings changes and state-bond returns. Furthermore, the coefficients on $\Delta Corporate\ Earnings_{g,t} \times Local\ Concentration_{g,t}$ in columns (3) and (4) are positive (0.8117 and 0.7485, respectively) and significant at the 10% level or better (using two-sided tests), suggesting that corporate earnings are particularly useful to investors in the state-bond market when public firms have more local operations. Collectively, the results from this table support the effect of information quality posited in H3.

Next, I provide the empirical results for the information-dissemination process (H4) in Table 6. In columns (1) - (2), the coefficients on $\Delta Corporate\ Earnings_{g,t} \times Mgt\ Guidance_{g,t}$ are positive (2.2358 and 2.4205, respectively) and statistically significant at the 1% level, indicating that earnings guidance is an important information-dissemination channel. The coefficients on $\Delta Corporate\ Earnings_{g,t} \times News\ Coverage_{g,t}$ in columns (3) - (4) are positive (3.3429 and 3.6709, respectively) and statistically significant at the 1% level, suggesting that media coverage also facilitates the diffusion of corporate financial information to state bondholders. The results indicate that both corporate managers' information provision and media coverage facilitate the dissemination of earnings announcements to state bondholders.

7. ROBUSTNESS TESTS AND ADDITIONAL ANALYSES

7.1 Alternative Measures

My inferences are robust to alternative measures of corporate-earnings changes and cross-sectional variables, and to different methods of weighting returns. Kothari, Lewellen, and

Warner (2006) adopt three approaches to construct the numerator of nationwide aggregate-earnings changes (i.e., aggregate, equal-weighted, and value-weighted) and three denominators to scale the numerator (i.e., lagged aggregate book value, total earnings, and market value). Gkougkousi (2014) adopts a fourth scaling variable (i.e., total assets).[32] The main empirical measure in this paper relies on the aggregate approach to constructing the numerator and uses market value for scaling, so I provide robustness checks using the alternative measures. Furthermore, I calculate value-weighted returns when multiple trades exist on the day to constructing returns in the main analyses; hence, I provide a robustness check using equal-weighted returns. Table 7 provides these results. In both panels A and B, the coefficients on $\Delta Corporate\ Earnings_t$ are positive and statistically significant at the 5% level or better for 11 out of 12 specifications. The only exceptions are in column (10), where the statistical significance is just below conventional levels. The magnitude of the coefficient depends on the scaling variable.

Next, I perform a robustness check of several market-value-weighted cross-sectional variables, using total revenues and total assets as alternative weights for H3 and H4, respectively. Panel C provides these results; no inferences are affected. Inferences are also robust to the use of income before extraordinary items and discontinued operations rather than pre-tax incomes (untabulated). Moreover, I rely on Scott Dyreng's subsidiaries data to construct corporate local concentration in the main analyses. In an untabulated test, I utilize an alternative dataset from Garcia and Norli (2012) for firms' geographic dispersion, which is estimated by the percentage of word counts for the local state relative to other states mentioned in the public firm's annual

[32] The aggregate approach sums up firms' pre-tax incomes first and then subtracts the total lagged pre-tax income of the firms for the corresponding quarter in the previous year. The equal-weighted approach first subtracts the lagged pre-tax income of the firm and then sums up the adjusted income for all firms. The value-weighted approach first calculates each firm' scaled seasonally adjusted income as a ratio and then assigns lagged market value as weights to construct value-weighted aggregate earnings.

Form 10K. Collectively, I find the inferences unchanged using these alternative measures.

7.2 Alternative Design Choices

The inferences are robust to several research-design choices (untabulated), including setting the return-calculation window to a period within five days before and after the beginning and ending month dates, controlling for lagged returns (resulting in a smaller sample size), and using year-month fixed effects. Also, the conclusions remain unchanged if I include bonds with fewer than two observations or inter-dealer transactions in my sample. The inferences are further robust to controlling for equity returns and regional inflation changes.[33] To ensure that my findings are not driven by one particular state or territory (e.g., Puerto Rico's extensive media coverage, and California's voter-approval requirements for tax increases), I exclude Puerto Rico or California from the sample and find that conclusions remain unchanged.

Moreover, the use of the contemporaneous returns in the main analyses assumes that earnings news is distributed to the market on a continuous basis (i.e., earnings announcements are not clustered at the end of the month) and that the state-bond market reflects new information. The violation of either assumption results in a noisy return measure. First, I validate the distribution of earnings announcements; earnings announcements are rather evenly distributed throughout the month with daily average distribution of 3.2% and with lightly higher distribution in the middle of the month (i.e., 7.7% and 5.2% on the 14th and 15th day of the month, respectively). Second, I use monthly returns rather than longer-return windows to reduce such concerns. Third, I assess the association between corporate-earnings changes and next month's state-bond returns, and find that the association is positive and significant albeit with a

[33] Shivakumar and Urcan (2017) find that aggregate earnings growth predicts future investment and producer price index forecast errors.

smaller magnitude. The result indicates that the effect becomes weaker as time elapses and new information about corporate-earnings changes becomes available to state bondholders.

7.3 What are the Mechanisms behind the Information Link?

I provide additional evidence on H1 by investigating the underlying mechanisms—(corporate and personal) income taxes, sales taxes, and regional economic development—that link corporate earnings to state bonds. Panel A of Table 8 provides the results of the income-tax and sales-tax mechanisms. I find that states' tax-revenue structure affects the relevance of corporate earnings. In particular, the main effect is stronger for states that rely relatively more on income-tax or sales-tax revenues, indicating that both income-tax and sales-tax collections strengthen the information link between corporate earnings and state bonds. I further investigate whether statewide aggregate earnings predict future economic development. Panel B shows that statewide aggregate earnings are positively associated with states' future economic development for the next five quarters.

7.4 Who Find Corporate Financial Information Useful?

I investigate who among the investors derive the most benefit from the information externality. I expect and find that out-of-state investors find corporate earnings most useful, as it is more challenging for them to directly observe the regional economic development through other local signals and thus they face greater information constraints.[34] Moreover, prior studies suggest that municipal-bond dealers have an informational advantage over retail investors (e.g., Harris and Piwowar 2006; Green, Hollifield, and Schurhoff 2007; Green, Li, and Schurhoff

[34] I estimate out-of-state bondholders using a principal-component analysis based on two indicator variables—local underwriters and local legal advisors—because the bondholders are more likely be out-of-state investors if the issuer uses a national underwriting firm and a national law firm to distribute the bond in the initial offering, as opposed to a regional underwriter and a local law firm.

2010; Schultz 2012). Hence, I expect and find that publicly available corporate financial information is most useful to retail investors, who have the least information endowment. Table 9 presents the results. Consistent with H4, the results suggest that retail investors and out-of-state investors find corporate earnings more useful than institutional investors and local investors.

7.5 Does Bad News Matter More Than Good News?

Bondholders have a non-linear payoff function (Easton, Monahan, and Vasvari 2009). Thus, I expect state bondholders to be more sensitive to bad news than to good news. I define good news and bad news in two ways—relative to the monthly median of aggregate-earnings changes, and relative to zero (i.e., no change).[35] Table 10 shows that the effect of statewide aggregate earnings on state-bond returns for bad news is approximately 6 to 10 times of that for good news, indicating that the nonlinear payoff structure of bond securities affects the informational role of statewide aggregate earnings in the state-bond market.

7.6 Other Cross-Sectional Tests

I provide two additional cross-sectional analyses that exploit variations in bond liquidity and bond types (untabulated). I find that the association between corporate-earnings changes and state-bond returns is greater for bonds that are more liquid, indicating that liquidity improves the bondholders' information-discovery process. This finding is consistent with prior literature and further supports H1. Further, I find that the association is stronger for general obligation (GO) bonds than for revenue (RV) bonds. This evidence is consistent with H2 in that the association is stronger when bondholders' informational needs for corporate earnings are stronger.[36]

[35] I use ex-post measures as the aggregate statewide earnings expectation is difficult to measure ex-ante.
[36] GO bonds are issued for a variety of purposes, such as financing public-purpose projects, and are backed by full faith, credit, and taxing power of the government. They are repaid by the taxes levied on residents living in the state,

7.7 Is General Corporate News Relevant to State-Bond Investors?

Extending beyond corporate earnings, I examine whether state bondholders make use of broadly available news on public firms in the business press. Table 11 shows the empirical results of the association between corporate news and state-bond returns. Columns (1) and (2) use *ΔCorporate Sentiment* that measures the changes in the information content of all news reported on public firms headquartered in a given state. Columns (3) and (4) use *ΔEarnings Sentiment*, which proxies for the changes in the information content of public firms' news containing financial information that is relevant to the assessment of earnings.[37] These findings support H4 and further confirm that media coverage is an important dissemination channel of corporate financial information in the retail-investor concentrated state-bond market.

7.8 Does Public Firms' Information Affect Information Asymmetry between State-Bond Dealers and Retail Investors in the Secondary Market?

While this paper focuses on the effect of corporate financial information on information asymmetry between issuers and all participants in the secondary market, I provide further evidence on its effect on information asymmetry among various groups within this market. In light of state-bond dealers' informational advantage over retail investors (e.g., Harris and Piwowar 2006), I examine whether public firms' information reduces information asymmetry between dealers and retail investors. Following Schultz (2012) and Cuny (2017), I use trading

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and in case of default, the issuer needs to raise additional taxes to repay the investors. RV bonds are used to finance the construction of revenue-generating plants and facilities (e.g., toll bridges). They are repaid using the revenues earned from these facilities and are not backed by the government's taxing power. Comparing these two types of bonds, money raised from GO bonds can be used for a number of purposes, while that for RV bonds is restricted to its purpose. Thus, the risk of the overly aggressive use of GO bonds is higher than that for RV bonds, leading to higher asset substitution-type agency costs faced by GO bondholders than RV bondholders. Hence, GO bondholders should be more concerned with a state's economic condition than RV bondholders.

[37] The news sentiments are estimated and provided by RavenPack analytics.

costs to proxy for information asymmetry, measured as markups (as opposed to markdowns) generated from dealer's sales to (as opposed to dealers' purchases from) investors, and estimate the effects for institutional trades and for retail trades using trade size.[38] I assess public firms' information with public firms' presence in a state.

Table 11 contains the empirical results. In columns (1) and (2), the coefficients on $Small\ Retail \times Public\ Firms' Presence_{i,t}$ and $Large\ Retail \times Public\ Firms' Presence_{i,t}$ are both negative.[39] The results suggest that while dealers earn higher markups from retail investors, the presence of public firms reduces their informational advantage and thus the markups earned from small and large retail investors by 5.23 and 3.85 basis points, respectively.[40,41] The results illustrate that retail investors derive the greatest benefit from public firms' information relative to institutional investors and dealers.

8. CONCLUSION

This paper provides evidence on the informational role of corporate financial information, and in particular quarterly corporate-earnings announcements, in the secondary

[38] I use markups from investors' purchases rather than markdowns from investors' sales to proxy for information asymmetry because investors' sales are more likely to be informative trades than liquidity trades. Municipal bondholders are mostly buy-and-hold investors, who often sell for liquidity reasons, which makes them less likely to conduct research on corporate financial information before sales, and even if they do, it can be difficult to bargain with dealers to reduce the transaction cost. When buying from dealers, investors can choose from a set of dealers and bond issuers, and even for the same issuer, investors can choose among different bonds to purchase. As such, investors are more likely to engage in informative trades, and when they do, they exhibit more pricing power over the dealers due to the existence of these purchase choices. I report the results using markdowns for completeness.

[39] The effect of large institutional investors is captured by the coefficient on $Public\ Firms' Presence_{g,t}$.

[40] In columns (1) and (2), the coefficients on $Small\ Retail$, $Large\ Retail$, and $Small\ Institutional$ are positive, indicating that a dealer, when selling a bond to a small retail investor, a large retail investor, or a small institutional investor, earns a markup by 33.00, 28.32, or 16.87 basis points higher than when selling to a large institutional investor. Furthermore, the coefficients on $Small\ Institutional \times Public\ Firms' Presence_{g,t}$ as well as $Public\ Firms' Presence_{g,t}$ are weaker or statistically insignificant likely due to the fact that institutional investors already process private information on the regional economic condition.

[41] Schultz (2012) suggests that while dealers possess an informational advantage over retail investors, large institutional investors may even have an informational advantage over dealers. Columns (3) and (4) indicate that when dealers purchase bonds from investors, corporate financial information increases or does not affect the dealers' profits, or markdowns.

state-bond market. I find evidence suggesting that state bondholders utilize public firms' financial information to gauge real-time regional economic performance and accordingly the debt-servicing capacity of state governments based on corporate earnings. The effect is stronger when corporate earnings are ex-ante more relevant to bondholders' informational needs, when corporate financial information more precisely reflects the underlying regional economic conditions, and when corporate managers and media disseminate more earnings news. The findings contribute to our understanding of the overall costs and benefits of corporate reporting requirements. Importantly, this study provides empirical evidence on informational problems (e.g., agency problems and information opacity) as well as the information-discovery process faced by state bondholders; these issues have previously not received extensive attention in the accounting literature. The results indicate that state bondholders who generally face an opaque information environment can utilize corporate-earnings information to address their informational needs. Hence, both the SEC and the MSRB could take the existence of alternative information sources, such as corporate financial information, into consideration when formulating new reporting rules to supplement state bondholders' existing information set.

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APPENDIX A: Measurement of Corporate-Earnings Changes and Returns

Statewide corporate-earnings changes constitute a monthly index of public firms' quarterly earnings changes by states. Similar to the construction of nationwide aggregate-earnings changes (see, e.g., Kothari, Lewellen, and Warner 2006; Gkougkousi 2014), I measure statewide earnings changes as aggregate-earnings changes of all public firms in a state, scaled by their lagged aggregate market value (for the same quarter) in the previous year. Aggregate-earnings changes are the sum of the seasonally adjusted quarterly earnings. Then, I aggregate public firms' quarterly earnings by their announcement months and by their headquarter states to construct a monthly index. I provide the numerical expression for statewide corporate-earnings changes as follows:

$$\Delta\, Corporate\ Earnings_{g,t} = \frac{\sum_{j\in g} E_{j,q} - \sum_{j\in g} E_{j,q-4}}{\sum_{j\in g} MV_{j,q-4}}, \quad (1)$$

where g denotes the state g, t denotes the month t, j denotes the firm j, and q denotes the quarterly announcement q. The numerator $(\sum_{j\in g} E_{j,q} - \sum_{j\in g} E_{j,q-4})$ represents the seasonally adjusted aggregate pre-tax earnings for all public firms (j) located in state g and reported quarterly earnings (q) in month t. The denominator scales aggregate-earnings changes to be ratios. Specifically, $\sum_{j\in g} E_{j,q}$ are aggregate pre-tax earnings for public firms that are headquartered in state g and announce earnings in month t, and $\sum_{j\in g} E_{j,q-4}$ and $\sum_{j\in g} MV_{j,q-4}$ are aggregate pre-tax earnings and aggregate market value of these same firms for the same fiscal quarter of the previous year, respectively.

State-bond returns are treasury-adjusted monthly buy-and-hold returns constructed for each state bond. Similar to Easton, Monahan, and Vasvari's (2009) approach to constructing quarterly corporate-bond returns, I require bonds to have at least one trade within ten days before or after the ending (calendar) month dates. I use the trading price on the day that is the closest to the ending month date to proxy for the ending price of the month. When multiple trades exist on that day, I assign the prices with value-based weights to construct the value-weighted prices. Raw returns are calculated as the percentage change in price from the previous ending-month date to the current ending-month date; prices are adjusted for the accrued interest. Final returns are the

raw returns adjusted for the corresponding treasury index returns with similar maturity terms. I present the numerical expression for returns as follows:

$$Ret_{b,t} = [\frac{(P_{b,t}+C_{b,t}-P_{b,t-1})}{P_{b,t-1}} - \prod_{\tau=t-1}^{t} TR_{\tau}] \times 100, \qquad (2)$$

where b indexes bonds, and t indexes calendar month-ends. $Ret_{b,t}$ is the monthly return of the bond b in month t. $P_{b,t}$ and $P_{b,t-1}$are the reported transaction prices, adjusted for accrued interest, on the previous ending-month date $(t-1)$ and the current ending-month date (t), respectively. If the bond has no trades on day $t-1$ or day t, $P_{b,t}$ and $P_{b,t-1}$ are the reported transaction prices on the closet day to day $t-1$ or day t, in a period from 10 days before to 10 days after day $t-1$ or day t. Returns are converted to monthly returns based on the number of days elapsed. If multiple trades occur on a single day, $P_{b,t}$ and $P_{b,t-1}$are set to be the value-weighted prices. $C_{b,t}$ is the coupon payment between day $t-1$ to day t. $\prod_{\tau=t-1}^{t} TR_{\tau}$ is the corresponding treasury-index return cumulated from day $t-1$ to day t; treasury returns are matched to state bonds with similar maturity terms.

The markup (markdown) is the state-bond dealer' profit on an investor purchase (sale). Following prior literature (Schultz 2012; Cuny 2017), I measure the markup (markdown) as the basis point difference between the investor's purchase (sale) price and the average price at which dealers transact with one another on the same day for the same bond, as follows:

$$Markup\ (Markdown)_{b,t} = TradeSign_{b,t} \times 10{,}000 \times ln\left(\frac{Investor\ Price_{b,t}}{AvgInterdealerPrice_{bt}}\right), \qquad (13)$$

where $TradeSign_{b,t}$ is a discrete variable that equals one if the trade is an investor purchase, negative one if the trade is an investor sale, and zero if the trade is an inter-dealer transaction; $Investor\ Price_{b,t}$ is the investor's purchase price of bond b; $AvgInterdealerPrice_{bt}$is the average price of all inter-dealer transactions for bond b on day t.

APPENDIX B: Variable Definitions

Panel A: Dependent variable and main test variables

ΔCorporate Earnings	The monthly index of statewide corporate-earnings changes, measured as aggregate-earnings changes of all public firms in a state, scaled by the lagged aggregate market value (for the same quarter) in the previous year; aggregate-earnings changes are the sum of the seasonally adjusted quarterly earnings; earnings are aggregated by announcement months and by headquarter states reported in Compustat (see Appendix A for details), as follows:

$$\Delta\, Corporate\ Earnings_{g,t} = \frac{\sum_{j\in g} E_{j,q} - \sum_{j\in g} E_{j,q-4}}{\sum_{j\in g} MV_{j,q-4}}, \qquad (1)$$

where g denotes the state g, t denotes the month t, j denotes the firm j, and q denotes the quarterly announcement q; $\sum_{j\in g} E_{j,q}$ are aggregate pre-tax earnings for public firms that announce earnings in the state g and in the month t; $\sum_{j\in g} E_{j,q-4}$ and $\sum_{j\in g} MV_{j,q-4}$ are aggregate pre-tax earnings and aggregate market value of these same firms for the same fiscal quarter of the previous year, respectively

Ret (Value-weighted)	The monthly state-bond returns, measured as the value-weighted returns for each state bond following a similar approach to Easton, Monahan, and Vasvari's (2009) method to constructing quarterly corporate-bond returns (see Appendix A for details), as follows:

$$Ret_{b,t} = [\frac{(P_{b,t}+C_{b,t}-P_{b,t-1})}{P_{b,t-1}} - \prod_{\tau=t-1}^{t} TR_{\tau}] \times 100, \qquad (2)$$

where b indexes bonds, and t indexes calendar month-ends; $Ret_{b,t}$ is the monthly return of bond b on date t; $P_{b,t}$ and $P_{b,t-1}$are the reported transaction prices, adjusted for the accrued interest, on the previous ending month date $(t-1)$ and the current ending month date (t), respectively. If the bond has no trades on day $\mathrm{t}-1$ or day t, $\mathrm{P_{b,t}}$ and $\mathrm{P_{b,t-1}}$ are the reported transaction prices on the closet day to day $\mathrm{t}-1$ or day t, in the periods from 10 days before to 10 days after those days. Returns, which are calculated using the price on the closet day, are converted to monthly returns based on the number of days elapsed. If multiple trades occur on a single day, $\mathrm{P_{b,t}}$ and $\mathrm{P_{b,t-1}}$are set to be the value-weighted prices. $\mathrm{C_{b,t}}$ is the coupon payment between day $\mathrm{t}-1$ to day t. $\prod_{\tau=t-1}^{t} \mathrm{TR}_{\tau}$ is the corresponding treasury-index return cumulated from day $\mathrm{t}-1$ to day t; treasury returns are matched to state bonds with similar maturity terms. Value-weighted returns are used in the main analyses; equal-weighted returns are used as a robustness check

Panel B: Cross-sectional test variables

Info Need	The informational need of bondholders, including agency costs proxied by Election Competition and Long Horizon, credit exposure measured by No Enhancement and Credit Risk, and information opacity proxied by Disclosure Opacity
Election Competition	An indicator variable that equals one if a state's average percentage margin of victory in the upcoming gubernatorial election is below the median in a given year, and zero otherwise
Long Horizon	An indicator variable that equals one if a bond has a remaining term to maturity that is longer than the median in the year, and zero otherwise
No Enhancement	An indicator variable that equals one if a bond does not have a credit enhancement feature, such as bond insurance, bank letters of credit and other facilities, state intercept guarantees, and credit programs of federal or state governments, and zero otherwise
Credit Risk	An indicator variable that equals one if an issuing state's credit rating is below the median in a given year, and zero otherwise
Disclosure Opacity	An indicator variable that equals one if the first principal component of several variables for a state's disclosure-opacity is above the median in the year, and zero otherwise; the disclosure-opacity variables include states' reporting lags, auditor independence, audit opinions, internal control weaknesses, auditor-assessed risks, Government Finance Officers Association (GFOA) best practices awards, and voluntary disclosures
Info Quality	The accuracy of corporate earnings to reflect a state's underlying economic conditions, proxied by Public Firms' Presence and Local Concentration
Public Firms' Presence	An indicator variable that equals one if the percentage of total assets from all public firms to total assets reported on firms' corporate tax returns in a state is above the median in the year, and zero otherwise (Badertscher, Shroff, and White 2013); the alternative measure in robustness tests is defined based on the percentage of total revenues rather than total assets
Local Concentration	An indicator variable that equals one if the weighted average of public firms' percentages of business operations carried out in the headquarter state, weighted by market value, is above the median in the year, and zero otherwise; the locations of business operations for a given firm are estimated using Scott Dyreng's subsidiaries data based on firms' disclosures of material subsidiaries as required by the SEC in 10-K Exhibit 21 (Dyreng and Lindsey 2009); the alternative measure in robustness tests is defined using total revenues as weights rather than market value
Info Dissemination	The information dissemination of corporate financial information, proxied by Mgt Guidance and News Coverage

Panel B (continued):

Mgt Guidance	The indicator variable that equals one if the weighted-average number of management guidance in a month for a state, weighted by market value, is greater than the median in the year, and zero otherwise; the alternative measure in robustness tests is defined using total assets as weights rather than market value
News Coverage	The indicator variable that equals one if the weighted-average number of news articles referring to public firms' earnings (i.e., identified as the "earnings" group by RavenPack) in a month for a state, weighted by market value, is greater than the median in the year, and zero otherwise; the alternative measure in robustness tests is defined using total assets as weights rather than market value

Panel C: Control variables

Trade Size	The size of the trade, measured as the natural logarithm of the average size of all trades used to calculate the monthly return of a bond
Credit Rating	The credit rating of a bond-issuing state, measured as the state's S&P credit rating in the year
Size	The size of a bond-issuing state, measured as the natural logarithm of the state's total assets
ΔCurrent Ratio	The change in current ratios, measured as changes in the ratio of total current assets to total current liabilities of a state from the previous year
ΔLeverage	The change in leverage ratios, measured as changes in the ratio of total liabilities to ending net assets of a state from the previous year
Rev Growth (PerCap)	The revenue growth, measured as percentage changes in the ratio of total revenues to the total number of residents in a state from the previous year
ΔNet Assets (PerCap)	The change in the net assets per capita, measured as changes in net assets from the previous year scaled by the total number of residents in a state
Gross-State-Product Growth	The gross state product (GSP) growth, measured as percentage changes in a state's GSP in a given quarter from the previous quarter
Unemployment-Rate Growth	The unemployment rate growth, measured as percentage changes in a state's unemployment rate in a given quarter from the previous quarter
ΔCredit Rating	The credit rating changes of a bond-issuing state, measured as changes in the state's S&P credit rating from the previous year

Panel D: Variables for robustness tests and additional analyses

ΔCorporate Earnings - Alt. 1-4

The *first* set of alternative measures of corporate-earnings changes, measured as aggregate-earnings changes of all public firms in a state, scaled by the lagged aggregate *market value*, *book value*, *total earnings*, or *total assets* for the same quarter in the previous year; aggregate-earnings changes are the sum of the seasonally adjusted quarterly earnings; earnings are aggregated by announcement months and by headquarter states reported in Compustat, as follows:

$$\Delta\, Corporate\ Earnings_{g,t} = \frac{\sum_{j\in g} E_{j,q} - \sum_{j\in g} E_{j,q-4}}{\sum_{j\in g} S_{j,q-4}}, \qquad (1)$$

where g denotes the state g, t denotes the month t, j denotes the firm j, and q denotes the quarterly announcement q; $\sum_{j\in g} E_{j,q}$ are aggregate pre-tax earnings for public firms that announce earnings in the state g and in the month t; $\sum_{j\in g} E_{j,q-4}$ are aggregate pre-tax earnings of these same firms for the same fiscal quarter of the previous year; $\sum_{j\in g} S_{j,q-4}$ are aggregate *market value*, *book value*, *pre-tax earnings*, or *total assets* of these same firms for the same fiscal quarter of the previous year, respectively

ΔCorporate Earnings - Alt. 2-8

The *second* set of alternative measures of corporate-earnings changes, measured as aggregate-earnings changes in a state, scaled by the lagged aggregate *market value*, *book value*, *pre-tax earnings*, or *total assets* for the same quarter in the previous year; aggregate-earnings changes are the sum of the seasonally adjusted earnings of all firms in a state; a firms' seasonally adjusted earnings are earnings in a given fiscal quarter less its earnings in the corresponding quarter of the previous year; earnings are aggregated by announcement months and by headquarter states reported in Compustat, as follows:

$$\Delta\, Corporate\ Earnings_{g,t} = \frac{\sum_{j\in g}(E_{j,q} - E_{j,q-4})}{\sum_{j\in g} S_{j,q-4}},$$

where g denotes the state g, t denotes the month t, j denotes the firm j, and q denotes the quarterly announcement q; $E_{j,q} - E_{j,q-4}$ are the seasonally adjusted pre-tax earnings of firm j; $\sum_{j\in g} S_{j,q-4}$ are the aggregate *market value*, *book value*, *pre-tax earnings*, or *total assets* of all firms in state g for the same quarter in the previous year, respectively

Panel D (continued):

ΔCorporate Earnings - Alt. 9-12	The *third* set of alternative measures of corporate-earnings changes, measured as the value-weighted average of public firms' earnings changes weighted by the lagged market value; a firm's earnings changes are changes in its pre-tax earnings from the same quarter of the previous year, scaled by its *market value*, *book value*, *pre-tax earnings*, or *total assets*; earnings are aggregated by announcement months and by headquarter states reported in Compustat, as follows: $$\Delta\, Corporate\ Earnings_{g,t} = \frac{\sum_{j\in g}[\frac{E_{j,t}-E_{j,q-4}}{S_{j,q-4}}\times MV_{j,q-4}]}{\sum_{j\in g} MV_{j,q-4}},$$ where g denotes the state g, t denotes the month t, j denotes the firm j, and q denotes the quarterly announcement q; $E_{j,t}-E_{j,t-4}$ are the seasonally adjusted pre-tax earnings of firm j; $MV_{j,t-4}$ is the market value of firm j for the same quarter in the previous year; $S_{j,t-4}$ are the *market value*, *book value*, *pre-tax earnings*, or *total assets* of firm j for the same quarter in the previous year, respectively
Ret (Equal-weighted)	The alternative measure of monthly state-bond returns, measured as the *equal-weighted* returns for each state bond following a similar approach to Easton, Monahan, and Vasvari's (2009) method to constructing quarterly corporate-bond returns, as follows: $$Ret_{b,t} = [\frac{(P_{b,t}+C_{b,t}-P_{b,t-1})}{P_{b,t-1}} - \prod_{\tau=t-1}^{t} TR_{\tau}] \times 100, \qquad (2)$$ where b indexes bonds, and t indexes calendar month-ends; $Ret_{b,t}$ is the monthly return of bond b on date t; $P_{b,t}$ and $P_{b,t-1}$are the reported transaction prices, adjusted for the accrued interest, on the previous ending month date $(t-1)$ and the current ending month date (t), respectively. If the bond has no trades on day $t-1$ or day t, $P_{b,t}$ and $P_{b,t-1}$ are the reported transaction prices on the closet day to day $t-1$ or day t, in a period from 10 days before to 10 days after those days. Returns, which are calculated using the price on the closet day, are converted to monthly returns based on the number of days elapsed. If multiple trades occur on a single day, $P_{b,t}$ and $P_{b,t-1}$are set to be the *equal-weighted* prices. $C_{b,t}$ is the coupon payment between day $t-1$ to day t. $\prod_{\tau=t-1}^{t} TR_{\tau}$ is the corresponding treasury-index return cumulated from day $t-1$ to day t; treasury returns are matched to state bonds with similar maturity terms
Income Tax	The indicator variable that equals one if the ratio of a state's income-tax revenues over its total revenues is above the median in a given year, and zero otherwise

Panel D (continued):

Sales Tax	The indicator variable that equals one if the ratio of a state's sales-tax revenues over its total revenues is above the median in a given year, and zero otherwise
ΔEconomic Development	The quarterly changes in a state's economic development, measured as quarterly changes in the state's coincidence index following Khan and Ozel (2016)
Retail Investor	The indicator variable that equals one if Trade Size (as defined earlier) is below the median, and zero otherwise
Out-of-State Investor	The indicator variable that equals one if a bond is estimated to have a significant number of out-of-state investors, using the principal component analysis based on two indicator variables—local underwriters and local legal advisors, and zero otherwise
ΔGood News	The monthly statewide aggregate-earnings changes if such news is good, and zero otherwise; good news is defined in two ways—when corporate-earnings changes is above the median in the month and when corporate-earnings changes is above zero
ΔBad News	The monthly statewide aggregate-earnings changes if such news is bad, and zero otherwise; bad news is defined in two ways—when corporate-earnings changes is below the median in the month and when corporate-earnings changes is below zero
ΔCorporate Sentiment	The corporate-sentiment changes, measured as percentage changes of the average event-sentiment score in a month from the previous month
ΔEarnings Sentiment	The earnings-sentiment changes, measured as percentage changes of the average earnings-sentiment score in a month from the previous month
Markup (Markdown)	The dealer's profit on a sale (purchase) transaction to (from) an investor, measured as the basis point difference between the investor's purchase (sale) price and the average price at which dealers transact with one another on the same day for the same bond (Schultz 2012; Cuny 2017), as follows: $$\text{Markup (Markdown)}_{b,t} = \text{TradeSign}_{b,t} \times 10{,}000 \times \ln\left(\frac{\text{Investor Price}_{b,t}}{\text{AvgInterdealerPrice}_{bt}}\right), \quad (13)$$ where $\text{TradeSign}_{b,t}$ is the discrete variable that equals one if the trade is an investor purchase, negative one if the trade is an investor sale, and zero if the trade is an inter-dealer transaction; $\text{Investor Price}_{b,t}$ is the investor's purchase (sale) price of bond b; $\text{AvgInterdealerPrice}_{bt}$ is the average price of all inter-dealer transactions for bond b on day t

Panel D (continued):	
Trade Size Category	The type of the trade to proxy small retail trades (Small Retail), large retail trades (Large Retail), small institutional trades (Small Institutional), and large institutional trades (Schultz 2012; Cuny 2017)
Small Retail	The indicator variable that equals one if the trade size of an investor's sale or purchase is below $25,000, and zero otherwise
Large Retail	The indicator variable that equals one if the trade size of an investor's sale or purchase is between $25,000 and $100,000, and zero otherwise
Small Institutional	The indicator variable that equals one if the trade size of an investor's sale or purchase is between $100,000 and $250,000, and zero otherwise

Table 1: Descriptive Statistics

This table presents the summary statistics of bond returns, corporate-earnings changes, issuers' information, and regional economic variables. All variables are defined in the Appendix B.

	Ret	ΔCorporate Earnings	Trade Size	Size	ΔCurrent Ratio	ΔLeverage	Revenue Growth	ΔNet Assets	Gross State Product Growth	Unemployment Rate Growth	ΔCredit Rating
N	81,929	81, 929	81, 929	81, 929	81, 929	81, 929	81, 929	81, 929	81, 929	81, 929	81, 929
Mean	0.2110	0.0040	11.010	10.320	-0.0299	0.2600	0.0343	-71.050	0.0006	0.0024	0.0036
Median	0.1450	0.0016	10.770	10.410	-0.0453	0.0288	0.0310	-10.310	0.0018	-0.0135	0.0000
Std Dev	3.1160	0.0605	1.4110	0.5620	0.3470	11.260	0.0514	678.10	0.0116	0.0622	0.2940

Table 2: Correlation Table

This table presents the association of bond returns, corporate-earnings changes, issuers' information, and regional economic variables. All variables are defined in the Appendix B; t statistics are in parentheses. * $p < 0.05$ (two-sided tests).

	Ret	ΔCorporate Earnings	Trade Size	Credit Rating	Size	ΔCurrent Ratio	ΔLeverage	Revenue Growth	ΔNet Assets	Gross State Product Growth	Unemployment Rate Growth
ΔCorporate Earnings	0.0361*										
Trade Size	-0.0056	-0.005									
Credit Rating	0.0039	-0.0420*	0.1314*								
Size	0.0275*	-0.0026	0.0469*	0.4327*							
ΔCurrent Ratio	-0.0007	0.0033	-0.0156*	0.0376*	0.1222*						
ΔLeverage	0.0066	0.1276*	0.0062	0.0068	-0.002	-0.0543*					
Revenue Growth	-0.0381*	-0.0236*	0.0038	-0.0140*	-0.0406*	0.1204*	0.0260*				
ΔNet Assets	-0.0044	-0.0456*	-0.0005	0.3721*	0.2776*	0.1442*	-0.1046*	0.1092*			
Gross State Product Growth	0.0174*	0.0619*	0.0103*	0.1829*	0.1380*	0.0617*	0.0374*	-0.0026	0.0444*		
Unemployment Rate Growth	-0.0320*	-0.1369*	0.0206*	0.005	-0.0395*	0.0349*	-0.0917*	0.1132*	0.1238*	-0.3521*	
ΔCredit Rating	0.0001	0.0465*	0.0001	0.0791*	-0.0133*	-0.0317*	0.0072*	0.0801*	0.1287*	0.0372*	0.0437*

Table 3: Corporate-Earnings Changes and State-Bond Returns

$$Ret_{i,t} = \alpha_i + \lambda_t + \beta_0 \, \Delta Corporate\ Earnings_{g,t} + \gamma \, X_{i,t} + \varepsilon_{i,t}. \quad (3)$$

This table presents the results of the association between corporate-earnings changes and state-bond returns (H1). Column (1) presents the base model with the issuer and time fixed effects. Column (2) further includes the control variables. Column (3) uses the bond and time fixed effects. All variables are defined in the Appendix B; t statistics are in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01 (two-sided tests).

	(1) Ret $_t$	(2) Ret $_t$	(3) Ret $_t$
ΔCorporate Earnings $_t$	**3.2124*** (14.61)**	**3.3083*** (14.65)**	**3.5240*** (14.95)**
Trade Size		0.0033 (0.43)	0.0042 (0.51)
Credit Rating		-0.0926*** (-3.24)	-0.0239 (-0.68)
Size		-1.5215*** (-7.50)	-1.7740*** (-7.45)
ΔCurrent Ratio		0.0738*** (2.91)	0.1492*** (5.33)
ΔLeverage		0.0015 (1.53)	0.0010 (1.03)
Rev Growth		-0.7540*** (-3.15)	-0.3802 (-1.48)
ΔNet Assets		0.0002*** (5.08)	0.0002*** (4.89)
Gross State Product Growth		-0.3103 (-0.29)	-0.2836 (-0.25)
Unemployment Rate Growth		-1.5166*** (-4.38)	-1.7743*** (-4.71)
ΔCredit Rating		0.0457 (1.30)	0.0671* (1.77)
Year-Quarter FE	Y	Y	Y
Issuer FE	Y	Y	N
Bond FE	N	N	Y
No. of Obs.	81,929	81,929	81,929
Adjusted R^2	0.117	0.118	0.128

Table 4: The Relevance of Corporate Earnings to Bondholders' Informational Needs

$$Ret_{i,t} = \alpha_i + \lambda_t + \beta_0\, \Delta Corporate\ Earnings_{g,t} + \beta_1\, \Delta Corporate\ Earnings_{g,t} \times Info\ Need_{g,t} + \beta_2\, Info\ Need_{g,t} + \gamma\, X_{i,t} + \varepsilon_{i,t}. \quad (4)$$

This table presents the results of the cross-sectional analysis on the relevance of corporate earnings to bondholders' informational needs (H2). $Info\ Need_{g,t}$ is proxied by states' gubernatorial election competition, bonds' term to maturity, bonds' credit-enhancement features, issuers' credit risks, and issuers' disclosure opacity in column (1) - (5), respectively. All variables are defined in the Appendix B; t statistics are in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01 (two-sided tests).

	Informational Needs				
	Agency Costs		Credit Exposure		Information Opacity
	(1)	(2)	(3)	(4)	(5)
	Ret_t	Ret_t	Ret_t	Ret_t	Ret_t
ΔCorporate Earnings $_t$	1.3145***	2.2938***	2.8336***	2.4686***	0.2444
	(5.09)	(9.81)	(6.79)	(9.75)	(0.73)
ΔCorporate Earnings $_t$ × Election Competition	**0.8960****				
	(2.28)				
ΔCorporate Earnings $_t$ × Long Horizon		**2.5978*****			
		(5.99)			
Long Horizon		-0.0141			
		(-0.34)			
ΔCorporate Earnings $_t$ × No Enhancement			**0.9811****		
			(2.06)		
ΔCorporate Earnings $_t$ × Credit Risk				**2.1959*****	
				(4.84)	
ΔCorporate Earnings $_t$ × Disclosure Opacity					**3.0738*****
					(7.11)
Controls	Y	Y	Y	Y	Y
Year-Quarter FE	Y	Y	Y	Y	Y
Bond FE	Y	Y	Y	Y	Y
No. of Obs.	74,358	74,704	81,929	81,929	67,948
Adjusted R^2	0.140	0.100	0.128	0.128	0.140

Table 5: The Relevance of Corporate Financial Information to States' Economic Conditions

$$Ret_{i,t} = \alpha_i + \lambda_t + \beta_0\, \Delta Corporate\ Earnings_{g,t} + \beta_1\, \Delta Corporate\ Earnings_{g,t} \times Info\ Quality_{g,t} + \beta_2\, Info\ Quality_{g,t} + \gamma\, X_{i,t} + \varepsilon_{i,t}. \quad (5)$$

This table presents the results of the cross-sectional analysis on the relevance of corporate earnings to states' economic conditions (H3). $Info\ Quality_{i,t}$ is proxied by $Public\ Firms'Presence_{i,t}$ in columns (1) - (2) and by $Local\ Exposure_{i,t}$ in columns (3) - (4). All variables are defined in the Appendix B; t statistics are in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01 (two-sided tests).

	Information Quality			
	Public Firms' Presence		Local Concentration	
	(1)	(2)	(3)	(4)
	Ret_t	Ret_t	Ret_t	Ret_t
ΔCorporate Earnings $_t$	0.8414***	0.8450***	1.2818***	1.3090***
	(3.36)	(3.35)	(4.32)	(4.35)
ΔCorporate Earnings $_t$	**1.7011*** **	**1.7127*** **		
× Public Firms' Presence	**(4.48)**	**(4.42)**		
Public Firms' Presence	0.2210***	0.2020***		
	(4.14)	(3.74)		
ΔCorporate Earnings $_t$			**0.8117****	**0.7485***
× Local Concentration			**(2.01)**	**(1.82)**
Local Concentration			-0.0611	-0.0417
			(-1.63)	(-1.10)
Controls	Y	Y	Y	Y
Year-Quarter FE	Y	Y	Y	Y
Bond FE	Y	Y	Y	Y
No. of Obs.	70,086	70,086	70,354	70,354
Adjusted R^2	0.139	0.140	0.142	0.1425

Table 6: The Dissemination of Corporate Financial Information

$$Ret_{i,t} = \alpha_i + \lambda_t + \beta_0\, \Delta Corporate\ Earnings_{g,t} + \beta_1\, \Delta Corporate\ Earnings_{g,t} \times Info\ Dissem_{g,t} + \beta_2\, Info\ Dissem_{g,t} + \gamma\, X_{i,t} + \varepsilon_{i,t}. \quad (6)$$

This table presents the results of the cross-sectional analysis on the information-dissemination process (H4). $Info\ Dissem_{g,t}$ is proxied by *Mgt Guidance* in columns (1) - (2) and *News Coverage* in columns (3) - (4). All variables are defined in the Appendix B; t statistics are in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01 (two-sided tests).

	Information Dissemination			
	Provision by Managers		Coverage by Media	
	(1)	(2)	(3)	(4)
	Ret_t	Ret_t	Ret_t	Ret_t
ΔCorporate Earnings $_t$	1.3292***	1.3207***	0.1786	-0.1366
	(3.34)	(3.26)	(0.51)	(-0.39)
ΔCorporate Earnings $_t$	**2.2358*** **	**2.4205*** **		
× Mgt Guidance	**(4.15)**	**(4.46)**		
Mgt Guidance	0.2414***	0.2636***		
	(5.90)	(6.45)		
ΔCorporate Earnings $_t$			**3.3429*** **	**3.6709*** **
× News Coverage			**(7.76)**	**(8.45)**
News Coverage			0.1658***	0.1769***
			(6.05)	(6.45)
Controls	Y	Y	Y	Y
Year-Quarter FE	Y	Y	Y	Y
Bond FE	Y	Y	Y	Y
No. of Obs.	40,262	40,262	65,997	65,997
Adjusted R^2	0.128	0.131	0.132	0.138

Table 7: Robustness Tests: Alternative Measures

Panel A - Alternative Measures of Corporate-Earnings Changes

$$Ret_{i,t} = \alpha_i + \lambda_t + \beta_0 \, \Delta Corporate\ Earnings_{g,t} + \gamma \, X_{i,t} + \varepsilon_{i,t}. \quad (3)$$

This table presents the results of the robustness test, using alternative measures of corporate-earnings changes. Columns (1) - (4) use the aggregate-earnings measures. Columns (5) - (8) use the equal-weighted earnings measures, and columns (9) - (12) use the value-weighted earnings measures. All variables are defined in the Appendix B; t statistics are in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01 (two-sided tests).

Ret_t	**Value**-Weighted Returns											
ΔCorporate Earnings	Aggregate Earnings				Equal-Weighted Earnings				Value-Weighted Earnings			
Scaled by	Market Value	Book Value	Total Earnings	Total Assets	Market Value	Book Value	Total Earnings	Total Assets	Market Value	Book Value	Total Earnings	Total Assets
Alternative Measure#	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7	Alt. 8	Alt. 9	Alt. 10	Alt. 11	Alt. 12
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
ΔCorporate Earnings $_t$	**3.5240 *** **	**1.1576 *** **	**0.0076 ** **	**8.6473 *** **	**2.8501 *** **	**1.1374 *** **	**0.0290 *** **	**9.4231 *** **	**3.0827 *** **	**0.0771 ** **	**0.0456 *** **	**0.3045 *** **
	(14.95)	**(8.80)**	**(2.48)**	**(14.99)**	**(12.11)**	**(7.61)**	**(6.25)**	**(13.89)**	**(10.65)**	**(1.63)**	**(8.83)**	**(4.05)**
Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Year-Quarter FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Bond FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
No. of Obs.	81,929	81,923	81,925	81,929	81,929	81,923	81,925	81,929	81,929	81,923	81,929	81,929
Adjusted R^2	0.128	0.125	0.124	0.127	0.126	0.124	0.124	0.127	0.125	0.124	0.125	0.124

Panel B - Alternative Measures of State-Bond Returns

$$Ret_{i,t} = \alpha_i + \lambda_t + \beta_0 \, \Delta Corporate\ Earnings_{g,t} + \gamma \, X_{i,t} + \varepsilon_{i,t}. \quad (3)$$

This table presents the results of the robustness test, using alternative measures of state-bond returns (i.e., equal-weighted returns). Columns (1) - (4) use the aggregate-earnings measures. Columns (5) - (8) use the equal-weighted earnings measures, and columns (9) - (12) use the value-weighted earnings measures. All variables are defined in the Appendix B; t statistics are in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01 (two-sided tests).

Ret_t	**Equal**-Weighted Returns											
ΔCorporate Earnings	Aggregate Earnings				Equal-Weighted Earnings				Value-Weighted Earnings			
Scaled by	Market Value	Book Value	Total Earnings	Total Assets	Market Value	Book Value	Total Earnings	Total Assets	Market Value	Book Value	Total Earnings	Total Assets
Alternative Measure#	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7	Alt. 8	Alt. 9	Alt. 10	Alt. 11	Alt. 12
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
ΔCorporate Earnings $_t$	**3.5177 *** **	**1.1470 *** **	**0.0078 ** **	**8.5706 *** **	**2.8567 *** **	**1.1256 *** **	**0.0289 *** **	**9.3381 *** **	**3.0813 *** **	**0.0727** **	**0.0456 *** **	**0.3115 *** **
	(15.03)	**(8.78)**	**(2.54)**	**(15.00)**	**(12.21)**	**(7.59)**	**(6.24)**	**(13.90)**	**(10.72)**	**(1.54)**	**(8.83)**	**(4.18)**
Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Year-Quarter FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Bond FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
No. of Obs.	81,929	81,923	81,925	81,929	81,929	81,923	81,925	81,929	81,929	81,923	81,929	81,929
Adjusted R^2	0.128	0.125	0.124	0.128	0.127	0.125	0.125	0.127	0.126	0.124	0.126	0.125

Panel C - Alternative Measures of Cross-sectional Variables

$$Ret_{i,t} = \alpha_i + \lambda_t + \beta_0 \Delta Corporate\ Earnings_{g,t} + \beta_1 \Delta Corporate\ Earnings_{g,t} \times CX_{g,t} + \beta_2 CX_{g,t} + \gamma X_{i,t} + \varepsilon_{i,t}. \quad (7)$$

This table presents the results of the robustness test, using alternative measures of cross-sectional variables in H3 and H4. Columns (1) - (4) use the value-weighted returns, and columns (5) - (8) use the equal-weighted returns. All variables are defined in the Appendix B; t statistics are in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01 (two-sided tests).

	Value-Weighted Returns				**Equal**-Weighted Returns			
	H3 - Info Quality		**H4** - Info Dissemination		**H3** - Info Quality		**H4** - Info Dissemination	
	Public Firms' Presence	Public Firms' Local Concentration	Mgt Guidance	News Coverage	Public Firms' Presence	Public Firms' Local Concentration	Mgt Guidance	News Coverage
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ΔCorporate Earnings $_t$	0.5578**	1.3416***	1.3207***	0.1525	0.5790**	1.3621***	1.3445***	0.1898
	(2.27)	(4.76)	(3.26)	(0.44)	(2.36)	(4.85)	(3.34)	(0.56)
ΔCorporate Earnings $_t$	**2.3281*** **				**2.3144*** **			
× Public Firms' Presence	**(5.87)**				**(5.87)**			
ΔCorporate Earnings $_t$		**0.7382***				**0.7257***		
× Local Concentration		**(1.84)**				**(1.81)**		
ΔCorporate Earnings $_t$			**2.4205*** **				**2.3751*** **	
× Mgt Guidance			**(4.46)**				**(4.40)**	
ΔCorporate Earnings $_t$				**3.3395*** **				**3.2944*** **
× News Coverage				**(7.70)**				**(7.63)**
Controls	Y	Y	Y	Y	Y	Y	Y	Y
Year-Quarter FE	Y	Y	Y	Y	Y	Y	Y	Y
Bond FE	Y	Y	Y	Y	Y	Y	Y	Y
No. of Obs.	70,086	70,211	40,262	65,997	70,086	70,211	40,262	65,997
Adjusted R^2	0.140	0.142	0.131	0.137	0.140	0.142	0.132	0.138

Table 8: Additional Analyses: Mechanisms

Panel A - The Tax Mechanisms

$$Ret_{i,t} = \alpha_i + \lambda_t + \beta_0\, \Delta Corporate\ Earnings_{g,t} + \beta_1\, \Delta Corporate\ Earnings_{g,t} \times Tax\ Stream_g + \gamma\, X_{i,t} + \varepsilon_{i,t}. \quad (8)$$

This table presents the results of the additional analysis of tax mechanisms, providing additional support of H1. All variables are defined in the Appendix B; t statistics are in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01 (two-sided tests).

	Tax Mechanisms			
	Income Taxes		Sales Taxes	
	(1)	(2)	(3)	(4)
	Ret_t	Ret_t	Ret_t	Ret_t
ΔCorporate Earnings $_t$	1.3568***	1.4287***	1.7061***	1.7699***
	(5.22)	(5.42)	(5.49)	(5.58)
ΔCorporate Earnings $_t$ × Income Tax	**4.3040*** (10.62)**	**4.4070*** (10.53)**		
ΔCorporate Earnings $_t$ × Sales Tax			**2.8020*** (6.53)**	**2.8202*** (6.48)**
Controls	Y	Y	Y	Y
Year-Quarter FE	Y	Y	Y	Y
Bond FE	Y	Y	Y	Y
No. of Obs.	77,835	77,835	81,176	81,176
Adjusted R^2	0.129	0.130	0.127	0.129

Panel B - The Economic Development Mechanism

$$\Delta Economic\ Development_{i,t} = \alpha_i + \lambda_t + \beta_0\ \Delta Corporate\ Earnings_{g,t-n} + \varepsilon_{i,t}. \quad (9)$$

This table presents the results of the association between *quarterly* statewide aggregate-earnings changes and quarterly changes in future economic development, providing additional support of H1. All variables are defined in the Appendix B; t statistics are in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01 (two-sided tests).

	(1) ΔEconomic Development $_t$	(2) ΔEconomic Development $_t$	(3) ΔEconomic Development $_t$	(4) ΔEconomic Development $_t$	(5) ΔEconomic Development $_t$	(6) ΔEconomic Development $_t$	(7) ΔEconomic Development $_t$	(8) ΔEconomic Development $_t$
ΔCorporate Earnings $_t$	**0.0467*** **							0.0488***
	(4.56)							(4.58)
ΔCorporate Earnings $_{t-1}$		**0.0428*** **						0.0307***
		(4.84)						(3.26)
ΔCorporate Earnings $_{t-2}$			**0.0389*** **					0.0315***
			(5.13)					(3.72)
ΔCorporate Earnings $_{t-3}$				**0.0360*** **				0.0190**
				(5.23)				(2.46)
ΔCorporate Earnings $_{t-4}$					**0.0207*** **			0.0264***
					(3.57)			(3.42)
ΔCorporate Earnings $_{t-5}$						**0.0108* **		0.0157**
						(1.93)		(2.37)
ΔCorporate Earnings $_{t-6}$							0.0094	0.0209***
							(1.48)	(2.94)
Year-Quarter FE	Y	Y	Y	Y	Y	Y	Y	Y
Bond FE	Y	Y	Y	Y	Y	Y	Y	Y
Observations	1,999	1,999	1,999	1,999	1,999	1,999	1,999	1,993
Adjusted R^2	0.038	0.034	0.030	0.028	0.019	0.016	0.015	0.082

Table 9: Additional Analyses: Investor Bases

$$Ret_{i,t} = \alpha_i + \lambda_t + \beta_0\, \Delta Corporate\ Earnings_{g,t} + \beta_1\, \Delta Corporate\ Earnings_{g,t} \times\ Investor\ Base_g + \gamma\, X_{i,t}\ + \varepsilon_{i,t}. \quad (10)$$

This table presents the results of the cross-sectional analysis of bonds' investor bases, providing more insight on who among the investors derive the most benefit from public firms' financial information. $Investor\ Base_{g,t}$ is measured as out-of-state investors in columns (1) and (2) and retail investors as in columns (3) and (4). All variables are defined in the Appendix B; t statistics are in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01 (two-sided tests).

	Investor Bases			
	Out-of-state Investors		Retail Investors	
	(1)	(2)	(3)	(4)
	Ret_t	Ret_t	Ret_t	Ret_t
ΔCorporate Earnings $_t$	2.9278***	3.0199***	2.8329***	2.9110***
	(13.53)	(13.60)	(10.39)	(10.59)
ΔCorporate Earnings $_t$	**1.7630*** **	**1.7716*** **		
× Retail Investor	**(7.15)**	**(7.11)**		
ΔCorporate Earnings $_t$			**1.1442*** **	**1.1501*** **
× Out-of-State Investor			**(2.88)**	**(2.90)**
Controls	Y	Y	Y	Y
Year-Quarter FE	Y	Y	Y	Y
Bond FE	Y	Y	Y	Y
No. of Obs.	81,929	81,929	81,929	81,929
Adjusted R^2	0.127	0.129	0.127	0.128

Table 10: Additional Analyses: Informational Roles of Good News and Bad News

$$Ret_{i,t} = \alpha_i + \lambda_t + \beta_1 \Delta Goodnews_{g,t} + \beta_2 \Delta Badnews_{g,t} + \gamma X_{i,t} + \varepsilon_{i,t}. \qquad (11)$$

This table presents the results of the additional analysis of the informational roles of good and bad news, providing more insight on the non-linear payoff function of state bondholders. $Good\ News_{g,t}$ and $Bad\ News_{g,t}$ are defined relative to the monthly median in columns (1) and (2), and relative to zero in columns (3) and (4). All variables are defined in the Appendix B; t statistics are in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01 (two-sided tests).

	Good vs. Bad News			
	Defined Relative to the Median		Defined Relative to Zero	
	(1)	(2)	(3)	(4)
	Ret_t	Ret_t	Ret_t	Ret_t
ΔGood News $_t$	0.9636***	1.0756***	0.5378*	0.6484**
	(3.54)	(3.82)	(1.93)	(2.25)
ΔBad News $_t$	**6.6085*** **	**6.6039*** **	**7.1232*** **	**7.1109*** **
	(17.91)	**(17.93)**	**(18.89)**	**(18.91)**
$\beta_1 - \beta_2 =$	-5.6449***	-5.5283***	-6.5854***	-6.4625***
$Prob(\beta_1 - \beta_2 \neq 0)$	<0.0001	<0.0001	<0.0001	<0.0001
Controls	Y	Y	Y	Y
Year-Quarter FE	Y	Y	Y	Y
Bond FE	Y	Y	Y	Y
No. of Obs.	81,929	81,929	81,929	81,929
Adjusted R^2	0.129	0.130	0.129	0.130

Table 11: Additional Analyses: Informational Roles of Corporate News in the Media

$$Ret_{i,t} = \alpha_i + \lambda_t + \beta_0 \, \Delta Sentiment_{g,t} + \gamma \, X_{i,t} + \varepsilon_{i,t}. \qquad (12)$$

This table presents the results of the association between corporate news and state-bond returns, lending support of H4 to show that media coverage is an important information-dissemination channel in the retail-investor-concentrated state-bond market. $\Delta Sentiment_{g,t}$is measured as corporate-sentiment changes in columns (1) - (2) and as earnings-sentiment changes in columns (3) - (4). All variables are defined in the Appendix B; t statistics are in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01 (two-sided tests).

	Informational Role of Corporate News in the Media			
	Corporate Sentiment		Earnings Sentiment	
	(1)	(2)	(3)	(4)
	Ret_t	Ret_t	Ret_t	Ret_t
ΔCorporate Sentiment $_t$	**0.8076*** **	**0.7128*** **		
	(6.98)	**(6.21)**		
ΔEarnings Sentiment $_t$			**2.4213*** **	**2.0922*** **
			(7.05)	**(6.30)**
Controls	Y	Y	Y	Y
Year-Quarter FE	Y	Y	Y	Y
Bond FE	Y	Y	Y	Y
No. of Obs.	65,116	65,116	65,561	65,561
Adjusted R^2	0.131	0.136	0.130	0.135

Table 12: Additional Analyses: Information Asymmetry between Dealers and Retail Investors

$$Markup\ (Markdown)_{b,t} = \alpha_0 + \sum \beta_0 Trade\ Size\ Category_{b,t} + \sum \beta_1 Trade\ Size\ Category_{b,t} \times Public\ Firms'Presence_{g,t} + \beta_2 Public\ Firms'Presence_{g,t} + \gamma_k Controls_{b,t} + \sum Quarter + \sum Bond + \varepsilon_{b,t}. \quad (13)$$

This table presents the results of the effect of the extensiveness of public firms' presence in a state on the information asymmetry between state-bond dealers and retail investors. In equation (13), b denotes bond transaction, and t denotes trading day. Markup (Markdown) $_{b,t}$ is the state-bond dealer's profit on an investor's purchase (sale) as discussed in Appendix A. Public Firms′Presence$_{g,t}$ and Trade Size Category$_{b,t}$ proxy for public firms' information and trade-size fixed-effects, respectively. Columns (1) and (2) present the results for dealers' sales to investors, and columns (3) and (4) show the results for dealers' purchases from investors. Public firms' presence is defined based on firms' total assets in columns (1) and (3) and firms' total revenues in columns (2) and (4). All variables are defined in the Appendix B; t statistics are in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01 (two-sided tests).

	Dealers' Sales (Markup)		Dealers' Purchases (Markdown)	
	Public Firms' Presence (Main Measure)	Public Firms' Presence (Alternative Measure)	Public Firms' Presence (Main Measure)	Public Firms' Presence (Alternative Measure)
	(1)	(2)	(3)	(4)
Small Retail	**-5.2293*** **	**-4.6350*** **	2.1621	0.0488
× Public Firms' Presence	**(-3.19)**	**(-2.79)**	(1.45)	(0.03)
Large Retail	**-3.8501*** **	**-2.9526** **	2.9368**	0.2046
× Public Firms' Presence	**(-2.88)**	**(-2.19)**	(2.13)	(0.15)
Small Institutional	-2.1902*	-1.8065	0.9339	0.3240
× Public Firms' Presence	(-1.82)	(-1.50)	(0.71)	(0.25)
Small Retail	33.0025***	32.7869***	24.8963***	25.8644***
	(28.72)	(28.04)	(31.10)	(30.65)
Large Retail	28.3247***	27.9639***	9.8518***	11.1074***
	(31.52)	(30.56)	(15.62)	(17.58)
Small Institute	16.8737***	16.7420***	4.6866***	4.9337***
	(21.57)	(21.09)	(7.39)	(7.54)
Year-Month FE	Y	Y	Y	Y
Bond FE	Y	Y	Y	Y
Observations	393,358	393,358	138,002	138,002
Adjusted R^2	0.460	0.460	0.174	0.174