Similarity in the Restrictiveness of Bond Covenants*

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July, 2019

* We have benefited from the comments and suggestions of Gerald Lobo (editor), two anonymous reviewers, Phil Berger, Doug Diamond, Doug Skinner, Igor Goncharov (discussant), Haiyan Zhou (discussant), and seminar participants at Bocconi University, Boston College, European Accounting Association annual congress 2015, HEC Paris, London Business School, Soochow University (ARA Symposium), Tel-Aviv University, the University of Chicago, the University of Mannheim, the University of Miami, the University of Minnesota, the University of Southern California and the University of Toronto. We gratefully acknowledge the financial support of The Initiative on Global Markets at the University of Chicago Booth School of Business, Rotman School of Management, the University of Toronto, Carlson School of Management, University of Minnesota, the University of Southern California, the AXA Research Fund, and the Social Sciences and Humanities Research Council of Canada.

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Abstract

We examine the economic determinants and consequences associated with the inclusion of covenants with similar levels of restrictiveness in bond contracts. Using a unique Moody's bond covenant dataset, we develop measures that capture similarity in the restrictiveness of bond covenants relative to previously issued peer bonds. We document that the demand for similarity by issuers, their advisors and bond investors follows the predictions of sociological and economic theories. Further, consistent with similarity in covenants reducing bond investors' information acquisition and processing costs, we show that bonds with more similar covenant restrictiveness receive lower yields at issuance. These bonds are also more likely to be held by long-term bond investors, such as insurance companies, and are characterized by greater liquidity in the secondary market, providing a partial explanation for the lower bond yields. Our results highlight the benefits of covenant similarity and suggest that the use of covenants with similar restrictiveness levels brings information acquisition and processing cost savings that may be larger than the monitoring benefits provided by covenants with more tailored features.

JEL classifications: G12, G14, G32, M49
Keywords: Bond Covenants, Covenant Restrictiveness, Similarity, Primary Bond Prices, Secondary Bond Liquidity.

1. Introduction

Bondholders demand mainly event risk covenants (or "incurrence-based" covenants) that restrict aggressive investments, asset sales, additional borrowings, excessive payments of dividends, stock repurchases or distributions to junior debtholders. Although the corporate law literature provides anecdotal evidence that covenants display a high degree of similarity (e.g., Kahan and Klausner 1993; Bratton 2006; Choi and Triantis 2012), bond covenant similarity has not been empirically explored. In this study, we examine the determinants of similarity in the restrictiveness (strength) of bond covenant terms and whether this similarity in restrictiveness results in costs or benefits to the borrowing firm and its bondholders. This analysis is particularly relevant given that covenants are the primary contractual mechanism employed by bondholders to protect the value of their claims over the duration of the bond contract.

We hypothesize that bond issuers and bond investors prefer the restrictiveness of a bond's covenants to be similar to that of previously issued peer bonds. First, sociological and economic theories suggest that imitating the restrictiveness of covenants in previously issued bonds is a consequence of the general economic uncertainty associated with deviating from prior market practice, given the large number of combinations of covenants and covenant specifications that can be included in a bond contract (Lieberman and Asaba, 2006; DiMaggio and Powell, 1983). Imitation can also stem from the need to emulate previously successfully-issued bond contracts of peer firms to signal the same bond quality and gain legitimacy (e.g., DiMaggio and Powell 1983) or the need to decrease search costs associated with reducing the uncertainty in how to design a covenant specification, such as which threshold to use (e.g., Cyert and March 1963). Based on these theories, we expect firms with similar economic characteristics to have similar levels of covenant restrictiveness.

Second, theories of networks (e.g., Gulati, Nohria, and Zaheer 2000; Gallani 2016) argue that imitation is facilitated by network ties as greater ties lead firms to possess more information about each other. In our setting, networks that include legal counsels and underwriters are likely to share more information about the details of bond contracts, such as the level of covenant restrictiveness. Third, external investor pressure can lead borrowing firms to issue bonds with covenant restrictiveness that is similar to the covenant restrictiveness of peer bonds. By facilitating comparisons with other bond issues, the use of similar levels of restrictiveness reduces the information acquisition and processing costs (i.e., time and effort required to review and analyze covenant structure) incurred by bond investors (e.g., Kahan and Klausner, 1997). Thus, we predict that more similar levels of covenant restrictiveness lead to benefits to the issuing firm, which in turn are potentially reflected in lower bond yields at issuance.

Nonetheless, similar levels of restrictiveness may not result in efficient outcomes. Firms can be subject to normative pressures in which stakeholders believe certain levels of restrictiveness are desirable without any rational reason (e.g., DiMaggio and Powell, 1983). Further, herding might reflect a sub-optimal weighting in which bond issuers place too much weight on peers' bond covenants and not enough, if any, weight on their own independent thinking that could more effectively deal with their specific agency issues. Thus, bond investors may simply prefer a set of bond covenants with levels of restrictiveness tailored to the borrowers' financial and operating conditions, which could offer better credit protection. Last, if a covenant's similar level of restrictiveness can be accomplished in vastly different ways, by different combinations of word structures, then investors will not recognize any savings in their information acquisition and processing costs. These reasons all lead to the reduced power of our tests.

An important feature of our study is that we take advantage of a quantitative measure of

bond covenant restrictiveness developed by Moody's that is available through the Moody's Covenant Assessment database. Our approach to measure similarity using Moody's scores differs from another common approach that compares word choice across textual documents and almost always ignores numbers. In doing so, we avoid the critique that while the words of the covenants are the same, the parameters indicating restrictiveness are different. For example, even if two identically worded covenants restrict the issuance of new debt unless the times interest earned ratio is above a threshold, if one threshold is 2.00x while the other threshold is 5.00x, then the latter is much more restrictive than the former even though a text-based comparison would indicate that the covenants are equally restrictive. Furthermore, textual similarity has mostly been limited to a bag of words comparison in which the order of the words is ignored and comparisons are made based on a similar frequency of words.

When Moody's determines restrictiveness, their analysts carefully read each covenant. The typical specification of each bond covenant begins with a *prohibitory* section that establishes the scope of the restrictions. This section is followed by a provision, labeled *proviso*, which allows for exceptions to the restrictions in the prohibitory section, usually subject to conditions such as a financial ratio test. The last section in the covenant specification presents the *carve-outs*, which are additional exceptions to the prohibitory paragraph that are not required to satisfy the proviso's conditions. The proviso and the carve-out terms may significantly dilute a covenant's ability to protect bondholders. In addition to these three sections, the bond contract also defines each term used in the covenant specification, including the financial accounting terms and the ratios used; these terms vary across issues and sometimes across different covenants in the same bond contract. Moody's analysts use their market experience to assess a bond covenant's restrictiveness based on the comprehensiveness of the restrictions in the *prohibitory* section, the strictness of contractual

terms' definitions (e.g., whether the financial ratio definitions provide scope for managerial discretion), the flexibility in the financial ratios in the *proviso* section, and the extent to which covenants provide both qualitative and quantitative carve-outs. Based on this analysis, the analysts summarize with a score the principal strengths and structural gaps in the protection provided by individual bond covenants. In sum, the analysts combine the structure of the words with the parameters and then compare the restrictiveness of the covenant to internal established benchmarks to quantitatively score the level of restrictiveness. At the same time, they are taking into account relevant bond features as well as the financial condition of the borrower.

To measure covenant similarity, we compare the restrictiveness of a bond's covenants, as assessed by Moody's analysts, to the restrictiveness of the respective covenants of bonds issued by peer firms in the previous 12 months. A firm is considered a peer if it is in the same sector and has similar credit risk (i.e., investment or speculative grade rating category) as the firm under consideration. Because the covenant restrictiveness measure captures the strength of protection provided by each individual covenant, variation in this measure allows us to more precisely capture the similarity in covenant restrictiveness than would a comparison between the existence of a covenant in a bond contract and the existence of a covenant in a peer firm's bond. Our sample consists of 996 bonds for which we can estimate the relative similarity of bond covenant restrictiveness using the Moody's database. These bonds are issued by U.S. firms over the period from 2000 to 2009.

We start by investigating the determinants of similarity in bond covenant restrictiveness. We find that firms with more comparable characteristics, such as size and asset tangibility, have more similar covenants, consistent with the notion that firms that face related agency problems have more similar covenant structures. Although these findings are in line with sociological and

economic theories (e.g., Lieberman and Asaba, 2006; DiMaggio and Powell, 1983), as a caveat, we acknowledge that we cannot distinguish which one of them is more prominent in explaining the results. We also document that covenant similarity is greater when a firm uses the same legal counsel as its peer companies, consistent with the theories of social networks (Lieberman and Asaba 2006; Gulati, Nohria, and Zaheer 2000). In terms of economic significance, two bonds that are issued by the same legal counsel have covenant similarity scores that are greater by approximately a one-third standard deviation than the covenant similarity scores across two bonds that do not share the legal counsel. We test but do not find evidence that covenant similarity is greater if bonds share the same underwriter with their peers, suggesting that, in our sample of bonds, underwriters influence the covenant terms to a lesser degree relative to legal advisers. We find modest evidence that bonds that were previously held by insurance companies also result in greater covenant similarity, consistent with investors creating demand for similar covenants in order to reduce the costs of comparing the covenants. Relative to other bondholders, insurance companies bear higher costs to analyze covenant packages because they need to assess the covenant protection on a very large set of bonds with different characteristics despite the fact that their main activity is not asset management.

We next show that similarity in covenant restrictiveness is associated with significantly lower bond yields at issuance. A one-standard-deviation increase in the similarity of bond covenant restrictiveness to that of peer bonds is associated with a reduction in bond spreads of 11 basis points (or 4.7% of the mean spread in our sample). Given the average principal value and maturity of our sample bonds, this effect translates into approximately $4 million in interest savings for the borrowing firm over the life of the bond issue. As a robustness test, we show that the change in covenant similarity is related to the change in yields. To help us distinguish which of our three

theories is more important in explaining this result, we regress yields on the portion of covenant similarity predicted by the variables that proxy for each theory. We find that the theory of external investor pressure has a greater effect on bond yields than the other two sets of theories. This finding is reasonable as ultimately it is investor demand that drives the price of the bond.[1]

In supplemental tests that aim to better understand the consequences of similarity in covenant restrictiveness, we first investigate the bond purchasing behavior of insurance companies, which, despite being the largest investors in the bond market, are likely to bear higher information acquisition and processing costs given that their main activity is not asset management. We find that bonds with more similar covenant restrictiveness have a higher level of insurance company ownership in the quarter following the bond's issuance. A one-standard-deviation increase in similarity increases the share of the bonds purchased by the investment portfolios of insurance companies by 2.80% (or 5.2% of the sample average of 53.9%). Increased demand from such large investors should result in lower spreads, providing a partial explanation for why bonds with more similar covenants receive lower yields. Second, we investigate whether similarity in covenant restrictiveness terms is associated with greater bond liquidity in the secondary market during the period immediately following a bond's issuance. We find modest evidence that bonds with more similar covenant restrictiveness relative to peers are indeed traded more often and to a greater extent. In terms of economic significance, a one-standard-deviation increase in the similarity of covenant restrictiveness is associated with a 5.2% increase in the mean

[1] One alternative to our story is that the relation between bond yields and covenant restrictiveness is non-linear, and the bottom of this potential "u-shape" relation coincides with higher similarity in restrictiveness. This u-shape occurs because the lowest restrictiveness bonds permit further debt issuance without conditions, allowing the issuing firm to behave opportunistically, while the highest restrictiveness bonds deprive management the flexibility to pursue value increasing investment projects. To control for this alternative story, we include both the level of restrictiveness as well as the square of this variable in our tests. Our results are robust to these controls. The negative association between covenant similarity and bond yields at issuance is also robust to the use of an instrumental variable approach that accounts for the potential endogeneity of covenant terms with respect to bond yields.

bond trading volume and a 17% increase in the mean number of transactions in our sample. These bond trading results suggest that higher bond covenant similarity is associated with a decrease in investors' information acquisition and processing costs in the secondary bond market.

Our study contributes to the literature on covenant structure in debt contracts. First, the extant prior literature has explored covenant structure primarily by investigating the determinants of specific covenants, the number of covenants included in debt agreements, or the tightness of covenants in private loan contracts (e.g., Dichev and Skinner, 2002; Bradley and Roberts, 2004; Christensen and Nikolaev 2012; Chava and Roberts, 2008; Drucker and Puri, 2009; Demerjian, 2011; Chava, Kumar and Warga 2010; Murfin 2012; Li et al. 2016). In addition, Bozanic, Loumioti and Vasvari (2017) document that Collateralized Loan Obligations prefer standardized financial loan covenants to mitigate their information processing costs associated with screening and monitoring activities. Our study differs from and complements this other work by demonstrating that similarity in covenant restrictiveness brings significant economic benefits to the issuing firms, such as lower bond yields, greater interest from long-term investors such as insurance companies, and greater secondary bond market liquidity. The analysis of insurance companies' bond ownership is relatively unique given that there is very limited evidence on how bond contract characteristics affect the investor base of bond securities at the time of their issuance. Second, the prior literature motivates the presence of bond covenants and their characteristics primarily from the agency theory perspective (e.g., Jensen and Meckling 1976; Myers 1977; Smith and Warner 1979; Masulis 1980; Dichev and Skinner 2002). To the best of our knowledge, our paper is the first to include non-agency-based explanations (i.e., the effect of networks and the cost savings

from reduced information acquisition and processing cost) for the bond covenant structure.[2] Last, to the best of our knowledge, our study is also the first to describe the detailed specification of bond covenants and to consider the strictness and comprehensiveness of covenant terms when measuring the strength of bond covenant protection.[3]

2. Background and Hypotheses Development

2.1. Background on Bond Covenants

Bond issuances typically involve a large number of investors with limited incentives to monitor the borrower on a continuous basis (Diamond 1984; Ramakrishnan and Thakor 1984). This investor dispersion leads to high coordination costs and free riding incentives that make renegotiations with borrowers in default extremely difficult and costly (Gertner and Scharfstein 1991; Bolton and Scharfstein 1996). Consequently, bond investors prefer to use relatively easy-to-monitor "incurrence-based" ("negative") covenants that restrict specific investment and financing activities of the bond issuers (e.g., restrictions on issuing more debt, distributing cash to shareholders, selling assets, engaging in mergers and acquisitions, lending to subsidiaries). Issuers only have to comply with these covenants if they proactively intend to take an action that might break them. In contrast to bank lenders, bondholders do not typically include "maintenance" (financial) covenants, which require the issuer to comply with specified financial ratios on a

[2] Although incomplete contracting theory provides additional explanations for the determinants of covenant structure (e.g., Grossman and Hart 1986; Hart and Moore 1988; Aghion and Bolton 1992), it relates primarily to the financial covenants used in private debt agreements (e.g., Christensen et al. 2016).

[3] Prior studies focused on the inclusion of individual covenants in bond contracts or indices that count the number of bond covenants (Malitz 1986; Begley 1994; Kahan and Yermack 1998; Nash, Netter and Poulsen 2003; Billett, King and Mauer 2007; Chava, Kumar and Warga 2010). Although prior literature has advanced in exploring the specific terms of covenant structure in private loan agreements (e.g., Beatty et al. 2008; Li 2012; Li et al. 2016), there is little evidence on how covenants are structured in public bond indentures. We document the multifaceted structure of bond covenants and highlight that the inclusion of individual covenants or the covenant count measures employed by prior studies may not appropriately capture the strength of bond covenant protection, given that covenants may include a weak prohibitory section or allow significant exceptions to the restrictions they impose.

regular basis.[4] The online appendix 1 provides additional background on bond covenants.

The specification of each covenant in the bond contract almost always begins with a *prohibitory* section that establishes the scope of the restrictions demanded by bondholders. For example, the covenant might state that the issuer will not incur any additional indebtedness. The prohibitory paragraph is typically followed by a provision section, labeled *proviso*, which allows for an exception to the restriction in the prohibitory paragraph if certain conditions are met, such as passing a financial ratio test. The proviso, for example, could state that the issuer can incur additional indebtedness if the consolidated fixed charge coverage ratio (CFCCR) computed after the additional debt is taken remains above a specific threshold, such as 2:1. The last section in the specification of the bond covenant presents a set of *carve-outs*, which are exceptions to the prohibitory paragraph in addition to the financial ratio exception set out in the proviso. For instance, a typical carve-out for the covenant above is to allow the firm to issue bank debt. Another common carve-out is to allow the firm to issue public debt with a face value that is lower than a certain percentage of its consolidated tangible assets. The proviso and the carve-outs have the potential to significantly dilute a covenant's ability to protect bondholders from wealth expropriation by equity holders or lenders with more senior claims to bondholders.

The descriptions of bond covenant terms and conditions are extensive and, based on our reading of bond indentures, often span more than 20 pages. We measure the restrictiveness of the covenant terms by relying on the views of Moody's credit analysts. Moody's analysts critically review covenant terms and summarize the principal protections and structural gaps of each

[4] Covenant packages in loan agreements include both maintenance and incurrence-based covenants. The relatively small number of lenders in bank syndicates, high individual bank exposure, and the fact that these lenders operate under reputational constraints facilitate renegotiations of the loan agreements. Thus, bank lenders set maintenance covenants tightly, triggering violations that allow ongoing loan renegotiations (Dichev and Skinner 2002; Chava and Roberts 2008; Roberts and Sufi 2009; Nini, Smith and Sufi 2009, 2012; Roberts 2014).

covenant in a bond contract (Moody's 2010). For instance, to gauge the level of protection offered by a covenant that limits additional debt issuance for a particular bond, the analysts evaluate a variety of qualitative and quantitative factors, such as current credit market conditions, the financial condition of the borrower and the actual specification of the covenant's terms.

When assessing the terms of a covenant that sets limits on additional borrowings, Moody's analysts first pay attention to the definition of the financial ratios in the proviso. As such, they negatively view covenants whose EBITDA definition allows add-backs of non-cash charges and other items that give management the discretion to adjust the ratio in order to issue more debt.[5] Second, the analysts consider the headroom of the financial ratio in the proviso (the difference between the ratio's threshold and the ratio at the time of bond issuance). Third, the analysts evaluate whether the carve-outs attached to the covenant are limited or extensive. (See the online appendix 1 for detailed examples of the headroom estimation and carve-out assessments.)

The measurement of covenant restrictiveness in public debt contracts and the extent to which certain levels of covenant restrictiveness are common across firms have not yet received much attention in the literature, mainly because of the difficulty in assessing the terms of incurrence-based bond covenants. Prior empirical work has measured covenant restrictiveness by mostly relying on the total number of covenants or the presence of specific individual covenants (Billett, King and Mauer 2007; Chava, Kumar and Warga 2010). However, an index that counts the number or the presence of a covenant does not fully capture the true level of the covenant protection provided to bond investors. Bond contracts may include poorly specified covenants or covenants with substantial exceptions that render them ineffective. Hence, an evaluation of bond

[5] For example, the assessment of the quality of the debt incurrence covenant in the bond indenture of Atlas Pipeline Partners from February 2009 emphasizes that "certain undefined terms such as 'non-recurring items' and 'non-cash items' give discretion to the issuer in determining the presumptive cash flow under the covenant."

covenant restrictiveness or a comparative analysis of covenant structures across different bonds requires a detailed examination of covenant specifications.[6]

2.2. Demand for Similarity in Bond Covenant Restrictiveness

We argue that borrowing firms prefer bonds with covenant restrictiveness that is similar to the covenant restrictiveness of bonds previously issued by peer firms. This idea is supported by several sociological and economic theories. First, studies such as Lieberman and Asaba (2006), and DiMaggio and Powell (1983) argue that imitation is a natural response to decisions made under conditions of uncertainty. In our setting, bond issuers face significant uncertainty in the design of the bond contract not only due to the uncertainty in determining future financial performance, but also due to the many complex contractual features that need to be determined simultaneously and that must incorporate expectations about future performance (e.g., the yield-to-maturity, amount, maturity, seniority, security, callability, payment frequency, covenants), often under significant time pressure. In particular, the number of potential combinations of covenants that can be included in a bond contract and the variety of covenant specifications that can be attached to each covenant are quite large. Accordingly, the borrower's management and advisors are unlikely to know exactly how to specify optimal parameters in the contract, in particular the number of covenants and the level of restrictiveness for each covenant.

Second, from an economic perspective, when setting the bond contract terms, the issuer is unlikely to rely only on its own priors and internal information. The issuer can also learn from the

[6] A number of studies examine the covenant restrictiveness of syndicated loans by assessing the slack in financial covenants (Dichev and Skinner 2002; Beatty and Weber 2006; Chava and Roberts 2008; Drucker and Puri 2009; Demiroglu and James 2010; Murfin 2012). However, the slack can only be estimated with significant measurement error due to the fact that lenders often make substantial adjustments to GAAP numbers when defining covenant thresholds (Leftwich 1983; Dichev and Skinner 2002; Beatty et al. 2008; Li 2012). These adjustments also vary across both different covenants in the same loan contract and different loan contracts. Further complicating the slack estimation, financial covenant thresholds frequently change over the life of the loan (Li, Vasvari and Wittenberg-Moerman 2016).

bond contracts of other firms. If the question for a borrowing firm is how to design a bond contract so that it attracts investors' interest, then it makes sense to write a contract that is similar to that of peer firms that successfully issued bonds. This firm behavior is consistent with the theory of Lieberman and Asaba (2006) who argue that imitation of superior products and processes is a fundamental part of the competitive process. Also, by emulating a previously successfully-issued bond contract from a peer firm, the borrowing firm is sending a signal that its bond issue has the same quality. This type of rationale draws parallels to sociological studies showing that imitative behavior provides a source of legitimacy (e.g., DiMaggio and Powell 1983).

Third, by imitating peer firms, a firm can decrease the search costs associated with reducing the uncertainty in how to design the contract (e.g., Cyert and March 1963). In our setting, even if the borrowing firm could independently conceive an optimal level of covenant restrictiveness, time and effort is still needed to design such a contract. This could slow the process of drawing up the bond contract and increase the costs associated with the issuance of the bond.

Based on these theories, we expect firms with similar economic characteristics to have a similar level of covenant restrictiveness. For example, firms with similar business models are likely to have similar agency problems and similar solutions to address these problems. We measure the economic similarity of two firms by whether they are in the same industry and have the same level of credit riskiness. Similarity in other firm characteristics, such as size, asset tangibility, leverage and interest coverage, also captures the economic similarity across firms.

In addition to similarity in covenant restrictiveness being driven by the issuer's considerations and characteristics, firms' advisors, such as legal counsels and underwriters, can play an important role in promulgating covenant similarity. Theories of social networks put forward the idea that imitation is facilitated by network ties (Lieberman and Asaba 2006; Gulati,

Nohria, and Zaheer 2000; Gallani 2016). In these conditions, greater network ties lead firms to possess more information about each other. In our setting, networks include borrowing firms hiring similar legal counsels and underwriters, who share information about the details of bond contracts, such as their respective levels of covenant restrictiveness, among their clients. As a practical matter, advisors face the same pressures as their clients to increase similarity among the bond contracts. For example, advisors also face economic uncertainty, are highly motivated to help with a successful placement of the bond issue, and prefer to avoid the time and effort required to review, discuss and approve any new terms of the bond contract. Given these reasons, we expect that similarity in bond covenant restrictiveness is higher if a borrower's bond and the bond issued by a peer share the same legal counsel or underwriter.

2.3. Consequences of Similarity in Bond Covenant Restrictiveness

The pricing of bonds is likely affected by the similarity in covenant restrictiveness.[7] If the restrictiveness of covenant terms of a new bond issue is closer to common covenant specifications, it may significantly enhance bond investors' ability to understand the bond contract and compare it with other bonds in the market. In other words, when assessing bond covenants with restrictiveness similar to that of its peers, investors are likely to be more assured about the effectiveness of this covenant structure because peer bonds have been already placed on a market and vetted by investors as providing an appropriate credit risk protection. In this case, investors are likely to spend less time and effort understanding the implications of the covenant structure for the bond's riskiness. In contrast, when evaluating a dissimilar covenant restrictiveness, investors will need to collect more information and process it diligently to understand the risks associated with it. Therefore, valuing bond with covenant restrictiveness that differs from that of its peers will

[7] De Franco, Kothari, and Verdi (2011) argue that the availability of comparable information lowers investors' cost of acquiring information and increases the overall quantity and quality of available information.

require investors to spend more time and effort reviewing and analyzing covenant structure before reaching an investment decision (Kahan and Klausner, 1997).[8] Familiar levels of covenant restrictiveness in the bond offering prospectus potentially allow bond investors to more quickly assess the risks relative to other bond investments and decide whether and how much to invest in the new bond issue. As a result, we predict that these cost savings are reflected, at least partially, in lower bond yields at issuance. This prediction is also motivated by the fact that more bond investors are likely to be attracted to bonds with familiar terms. The competition generated by this larger set of investors will increase the demand for these bonds and lower the bond yield expectations (e.g., Ivashina and Sun, 2011).

We note, however, that our empirical prediction regarding the impact of similarity in the restrictiveness of bond covenants on yields is not straightforward. First, increased covenant similarity might not affect the bond yields if bond investors' savings from information collection and analysis are not significant. For example, if a covenant's similar level of restrictiveness can be accomplished in vastly different ways, by different combinations of word structures parameters, then investors will not recognize any savings in their information acquisition and processing costs. Second, it is possible that higher benefits to borrowing firms as a result of increased similarity in covenant restrictiveness, such as the decrease in uncertainty regarding the covenant structure and lower managers' time and effort required to review and design covenants, increase these firms' willingness to pay higher interest rates. Third, as many of the theories discussed above would suggest, imitation does not necessarily result in efficient outcomes. DiMaggio and Powell (1983) argue that firms can be subject to normative pressures in which all the stakeholders believe certain

[8] Benmelech and Dlugosz (2009) provide support for this idea in a different setting. They study the collateralized loan obligation (CLO) market and observe significant uniformity in CLO structures as demanded by investors. They suggest that uniformity reduces the amount of time investors must spend analyzing new CLO deals.

contract features are desirable without any rational reason. Further, theories of herding (e.g., Lieberman and Asaba 2006) reflect a sub-optimal weighting in which borrowing firms may place too much weight on peers' bond contract choices and not enough, if any, weight on their own independent thinking that could more effectively deal with borrower specific agency issues.

In our setting, bond investors might prefer that a new bond issue include restrictive covenants tailored to the borrower's financial and operating condition. For instance, if the firm is operating in a volatile environment, a more idiosyncratically loose covenant package can help preserve operating flexibility and avoid inefficient and bond-value-destroying defaults that may be triggered by similar restrictiveness covenants which place less weight on firms' conditions. This view is supported by theoretical work (e.g., Aghion and Bolton 1992) that starts with the premise that debt contracts are generally incomplete. In addition, when designing a tailored covenant, bondholders are likely to choose the best signal of the underlying risk faced by an individual borrower on which they intend to contract, therefore increasing the covenant's ability to flag the risk early. For instance, the debt contracting usefulness of an accounting variable depends on its informativeness about the underlying risk that bondholders want to manage. If the informativeness is sufficiently high (i.e., forward looking credit information is captured reliably), this variable is more likely to be included in the measurement of the covenant improving its effectiveness.

In sum, these arguments suggest that more similar covenant restrictiveness terms could lead to higher bond yields if bondholders are concerned that similar covenants may provide less effective protection against firm-specific agency problems.

3. Measurement of Similarity in Covenant Restrictiveness

In this section, we discuss how we measure the restrictiveness of covenant terms and how we validate this measurement process. We then describe our measure of similarity in covenant

restrictiveness, our primary variable of interest.

3.1. Covenant Restrictiveness

We capture the restrictiveness of bond covenants using a novel dataset of individual bond covenant assessments by Moody's covenant analysts. Moody's Covenant Quality Assessment (CQA) service evaluates the covenant restrictiveness of each new bond issue, with the aim of helping institutional investors make better investment decisions. Moody's covenant analysts assess several key bond covenants that fit into the three covenant groups. In the group that restricts distributions to shareholders, Moody's includes restrictions on payments to shareholders and other parties (*Restricted Payments*). In the group that limits additional borrowing and the issuance of certain types of debt, Moody's includes: restrictions on debt issuance, reclassifications or retirement through asset sales (*Debt Incurrence*), reclassifications or retirement by any subsidiaries (*Subsidiary Debt Incurrence*) and restrictions on the issuance of pledges to secure other subordinated debt (*Liens*). Finally, in the group that restricts risky investment activities, Moody's includes: restrictions on the sale of assets (*Asset Sales*), restrictions on sale and leaseback transactions (*Sale/Leaseback*), restrictions on mergers or asset conveyance (*Mergers*) and restrictions on changes in the ownership of the issuer (*Change of Control*). In the online appendix 2, we define these covenants and provide a discussion of how Moody's assesses the quality of each. Moody's rates individual covenants based on the level of protection provided using one of the following four categories: (1) "none", (2) "minimal protection", (3) "moderate protection", and (4) "strong protection." We convert these covenant ratings into a numerical scale that ranges from 0 (none) to 3 (strong protection).

Since the measurement of covenant restrictiveness for bond contracts is a complex exercise that involves subjective judgments, it is important to establish the validity of Moody's CQA

scores.[9] First, to help establish internal validity, in untabulated analyses we document a strong correlation between carve-outs (an objective numerical measure) and CQA scores for a subsample of covenants assessed by Moody's for which we have both covenant quality scores and quantitative information on carve-outs (i.e., the ratio of the carve-out amounts to total assets). This test is conducted at both the individual covenant level and a combined level across the three covenants in which there are significant carve-outs. The pairwise Pearson correlation coefficients between the CQA scores and carve-outs for payment restrictions, debt restrictions, investment restrictions, and at the combined level are -0.39, -0.58, -0.33 and -0.49, respectively (all are significant at the 1% level). This negative correlation indicates that, as expected, greater carve-out amounts lead to weaker covenant protection scores.

Second, to help establish external validity, in untabulated analyses we compare Moody's CQA scores to similar covenant quality scores provided by Xtract Research LLC that also assesses covenant quality for speculative grade bonds. We match 328 bonds from these two datasets and observe a strong positive relation between the covenant quality assessments provided by these two independent firms. As Xtract has only two categories, weak and normal, we convert the Moody's CQA scores to a binary score, using the median value of *Covenant Restrictiveness* by rating category. We find that the scores of Moody's and Xtract correspond to each other in 79.6 % of cases (i.e., either both scores are weak or both scores are normal).

Finally, we establish additional construct validity by regressing *Covenant Restrictiveness* on firm characteristics that prior research suggests are associated with debt covenants (e.g., Costello and Wittenberg-Moerman 2011; Christensen and Nikolaev 2012). Not surprisingly, we

[9] Moody's initiated the CQA database in 2006. Moody's evaluated the covenant restrictiveness of bond securities issued prior to 2006 and still outstanding as well as of those issued after 2006. Because the majority of bonds in our research sample are issued *prior* to the initiation of CQA, it is unlikely that the covenant restrictiveness terms are set in order to meet Moody's covenant strictness standards.

find that covenant restrictiveness increases with firm credit riskiness: financial leverage is positively related to covenant restrictiveness, while firm size and asset tangibility are negatively related to covenant restrictiveness (untabulated). Further imparting construct validity to the measure, we find that covenant restrictiveness is lower (higher) for bonds that are rated in the investment grade (high yield) category.

3.2. Measurement of Covenant Similarity

To measure the similarity of covenant restrictiveness, we compare the restrictiveness of a firm's bond covenants with the restrictiveness of a peer firm's bond covenants. Relative to the simple comparison of the existence of a covenant for a firm's bond with the existence of a covenant for its peer firm's bonds, our more granular approach of comparing covenant restrictiveness, should better capture the underlying construct of similarity in covenant terms.

We measure the similarity in covenant restrictiveness first at the firm *i* – peer *j* pair of bonds level as follows. We consider a bond issue as a peer bond if it was issued over the past 12 months by another firm in the same sector and the same rating category (i.e., investment grade or high yield) as those of the issuing firm. The choice of peer is based on the idea that firms with similar economic characteristics should have similar covenant structures. Bonds with no peer issues are excluded from the analysis. For each of the eight covenants in the database, we take the absolute difference of firm *i*'s and peer *j*'s bond covenant scores. For example, if both firm *i*'s bond and its peer's bond have identical covenant scores, the absolute difference is 0. If the firm's bond has a covenant score of 3 and the peer's bond score is 1 (or vice versa) then the absolute difference is 2. This difference is calculated for each of the eight covenants and then the eight differences are added up to create an aggregate absolute difference. Last, we multiply the aggregated difference by -1, so that higher values represent greater covenant similarity. Second,

we create a single firm *i*-level covenant similarity measure by taking the mean of the scores across the firm *i*'s – peer *j*'s bonds for all peer issues of firm *i*. This firm *i*-level variable, *Covenant Similarity*, is the primary measure used in our analysis of the determinants of covenant similarity as well as the effects of covenant similarity on bond spreads.

The Moody's CQA database covers 3,075 bonds issued during the 2000 – 2009 period. After conditioning the sample on bonds issued by U.S. borrowers and those that require the availability of the bond- and firm-level control variables used in our tests, we obtain an underlying sample of 1,727 bond issues. Using these bond issues, we create the *Covenant Similarity* values for a sample of 996 bond *i* observations for which we can obtain a peer that meets the criteria discussed above.

4. Main Results

4.1. Descriptive Statistics

We provide descriptive statistics for the main variables used in our tests in the online appendix 3. The overall covenant similarity score indicates an on-average dissimilarity of 0.36 per covenant (= -2.881 total/8 covenants) for a bond and its cross-sectional peers. In other words, the average dissimilarity per covenant is approximately $1/10^{th}$ of the theoretical maximum possible dissimilarity of 3 (i.e., an extreme situation where a bond has been assigned a covenant restrictiveness of 3 by Moody's, whereas its peers have been assigned a score of zero, or vice versa). We also notice that 12% and 15% of the bonds are issued by the same legal counsel and underwriter, respectively. On average, 78% of firms' previous bonds were held by insurance company investors.

At the bond issue level, the average bond has about five covenants, a maturity of 13 years, and an offering amount of $587 million. The average yield spread is 2.2%. Sample firms have a mean leverage ratio of 28% and asset tangibility ratio of 74%. The aggregate level of covenant

restrictiveness is 11.6. Its largest components include the level of covenant restrictiveness for asset sales (3.0), mergers (2.9), liens (2.4) and leasebacks (1.7). In terms of similarity in covenants, we notice that leaseback, change of control covenants, and liens are relatively more dissimilar compared with the other covenants. For instance, in 30% of observations the leaseback covenant restrictiveness is identical to that of its peers. In contrast, for asset sales, mergers, payment, and debt restrictions, in over 80% of observations the firm's covenant restrictiveness is identical to that of its peers. The fact that a large proportion of the covenants have the same level of restrictiveness as the covenants of previously issued bonds is consistent with our central idea that firms, intermediaries and investors benefit from similarity. Last, we note that firms are distributed evenly across many industries, with no industry representing more than 20% of the sample.

4.2. Determinants of Similarity in Covenant Restrictiveness

4.2.1. Tests. We start our analysis by examining the determinants of the covenant restrictiveness similarity with respect to firm's peers. We estimate the following regression:

$$\begin{aligned} \textit{Covenant Similarity} = {} & \beta_0 + \beta_1 \textit{Similar Firm Characteristics} + \beta_2 \textit{Similar Legal Counsel} \\ & + \beta_3 \textit{Similar Underwriter} + \beta_4 \textit{Previous High Cost Investors} \\ & + \textit{Controls} + \eta. \end{aligned} \tag{1}$$

We include variables that proxy for economic similarity along the dimensions of similar firm size, tangibility, leverage, and interest coverage. These differences are calculated between each firm *i*-peer *j* pair of companies, and then we take the mean of these absolute differences and multiply by -1, so that these measures capture similarity in firm fundamentals. We expect all these similarity variables to obtain a positive coefficient, consistent with more similarity across firm characteristics being positively associated with a higher similarity in covenant restrictiveness.

The next two independent variables capture the effect of external advisers on the similarity in covenant restrictiveness. A positive coefficient on either variable is consistent with our

prediction that firms' advisors play an important role in promulgating similarity. *Similar Legal Counsel* is first measured at the bond *i*-peer *j* level. It is an indicator variable that captures whether the firm's bond and its peers' bonds are advised by the same legal counsel, zero otherwise. To create the firm *i*-level variable, we take the mean of the indicator variables across the firm *i*-peer *j* bonds for all peers of firm *i*. The variable *Similar Underwriter* is created analogously.

Our last variable of interest is *Previous High Cost Investors*, which is an ex ante proxy for investor demand for similar covenants. This variable equals one if the firms' previous bonds were held by insurance company investors. We expect that insurance companies demand greater similarity in covenants to save on information acquisition and processing costs. Given that their main activity is not asset management, insurance companies bear higher costs to analyze covenant packages relative to other bondholders. Insurers need to assess the covenant protection on a very large set of bonds with different characteristics that are issued by many borrowers active in a wide variety of industries. Further, they typically hold the bonds until maturity with limited portfolio rebalancing, which makes the existing set of covenants important to counter long-horizon, difficult-to-predict events. If a firm had insurance investors for its previous bond and insurance investors demand higher covenant similarity with peers, then firms would experience more external pressure by these insurance investors to have similar covenants to peers in its current bond issue. Hence, we interpret a positive coefficient on this variable as evidence in support of our arguments that external investor pressure leads to grater covenant similarity.[10]

We control for firm and bond characteristics associated with a borrower's credit riskiness and agency costs of debt. We do not have specific predictions for their relations, given that our

[10] Note that unlike our measures of *Similar Legal Counsel* or *Similar Underwriter*, we do not know in advance which investors will purchase the bond so we cannot create an analogous measure to these variables, such as sharing the same investors.

variable of interest is the similarity in covenant restrictiveness. Firm characteristics include the firm's size, tangibility, leverage and interest coverage. Our bond characteristics include the time to maturity, the principal amount of the bond offering, the number of covenants and whether the debt is rated investment grade by at least one of the three major credit rating agencies. We control for *Lender Power*, which is an indicator variable for the years of tight credit supply as proxied by the financial crisis period. During periods of a tight credit supply, bond investors are likely to have stronger bargaining power and can therefore influence covenant structure to a greater extent.

Last, we include a number of variables throughout our analyses (in this test and other tests discussed below), to address a variety of alternative explanations. First, larger industries likely have a greater number of peers and less idiosyncratic business risks, which leads to greater covenant similarity. These industries may also be related to our outcome variables, like bond yields and insurance ownership. To control for these effects, we include three industry-level variables. *Industry Size* is calculated as the sum of sales for each firm in the industry. Larger values represent larger industries. *Number of Peers* is the number of peer bonds used to calculate the covenant similarity score. *Industry Homogeneity* is measured at the industry level, and calculated as the sum of market share for each firm in the industry. Smaller values represent more homogenous industries. Second, we include *Covenant Restrictiveness* (and its square) in our tests because covenant similarity could be related to the level of covenant restrictiveness. By construction, the covenant similarity simply captures the level of proximity of a firm's bond covenant score to the average score of the peer issues, suggesting a potential U-shape relation between covenant restrictiveness and covenant similarity (or bond yields, liquidity, and institutional ownership which we investigate in the next section).[11] For a more detailed description of these and other variables

[11] We thank an anonymous referee for highlighting this issue.

used in our tests see Appendix A. For all our tests, we cluster the standard errors at the firm level.

4.2.2. Results. We present the analysis of determinants of the similarity in bond covenant restrictiveness in Table 1. Column 1 presents the results of estimating equation 1. We start by examining the effect of similarity in firm characteristics on covenant similarity. We provide evidence that similar fundamentals (and hence potentially similar debt agency conflicts) lead to similar covenant restrictiveness. The coefficients on *Similar Size* and *Similar Tangibility* are both positive and statistically significant. In terms of economic significance, a one standard deviation increase in *Similar Size* (*Similar Tangibility*) is associated with 0.17 (0.11) standard deviations increase in *Covenant Similarity*.[12] We next focus on the influence of debt market agents—legal counsel and underwriters—on covenant similarity. The coefficient on *Similar Legal Counsel* is 0.91 and is statistically significant (*t*-statistic = 2.03), consistent with firms that share the same legal advisers having more similar covenant structures. In terms of economic significance, two bonds that are issued by the same legal counsel have covenant similarity scores that are approximately one-third standard deviation greater than covenant similarity scores across two bonds that do not share the same legal counsel. We do not, however, find evidence that covenant structures are more similar for two firms sharing the same lead underwriter. This evidence suggests that underwriters influence the covenant terms to a lesser degree relative to legal advisers. Further, we do not find evidence in this specification of higher covenant similarity when a higher proportion of insurance companies had purchased a firm's previous bond.

For the control variables, we observe that covenant restrictiveness is less similar for bonds with larger offering amounts. We surmise that since large bonds have a higher credit risk and face more significant agency conflicts, bondholders are more likely to demand idiosyncratic protection

[12] Inferences are similar after the inclusion of additional controls for similarity in firm fundamentals such as ROA and sales growth.

features, decreasing the similarity of the covenant restrictiveness terms. Further, large bond issues are likely to be purchased by a more diverse group of investors, each with different protection needs and levels of exposure that potentially contribute to more dissimilarity in the restrictiveness of the covenant structures. Also, if the costs of adjusting the covenants are mainly fixed, then these costs may be relatively less economically important for larger offering amounts. We also find that covenant structures are more similar for firms with investment grade bonds. These bonds tend to have lower levels of covenant restrictiveness in general and hence less opportunity to differ between bonds. Investment grade bonds are also less risky, which may further decrease bondholders' demand for idiosyncratic protection terms.

As an alternative test, in column 2, we estimate the same specification but instead of at the firm *i* level with one observation per bond, we estimate the specification at the bond *i*-peer *j* level, with one observation for each bond *i*-peer *j* pair of bond issues. This increases the total number of observations in the test to 7,308. (We continue to cluster the standard errors at the firm level.[13]) The advantage of this specification is that we maximize the variation in the measurement of our similarity variables, as opposed to the specification in column 1 where we average the similarity scores for each bond issue. Inferences from this specification for the most part mirror those in column 1. Similarity in firm size, tangibility and leverage is positively related to covenant similarity. The coefficient on *Similar Legal Counsel* is positive and statistically significant, consistent with firms who share the same legal adviser having similar covenant structures. In particular, we do find evidence in this specification of higher covenant similarity when a higher proportion of insurance companies had purchased a firm's previous bond. The coefficient on *Previous High Cost Investors* is positive and statistically significant. As in column one, bonds with

[13] The results are robust if we instead cluster the standard errors at the bond level or the bond pair level.

larger offering amounts have less similar and investment grade bonds have more similar covenant restrictiveness. Overall, we find evidence for all three of our sociological and economic theories—covenant similarity is greater when firms have similar agency conflicts, share networks of advisors, and experience external investor pressure.

4.3. Covenant Similarity Consequences: Yield Spread

4.3.1. Tests. To determine whether similarity in covenant restrictiveness has significant economic consequences, we examine the implications of covenant similarity for the pricing of the bonds in the primary market. We estimate the following regression:

$$Spread = \beta_0 + \beta_1 Covenant\ Similarity + \beta_2 Market\ Spread + Controls + \eta. \quad (2)$$

Spread is the difference between offering yield of the bond issue and the yield on the Treasury bill with the closest maturity, obtained from Mergent FISD. The average yield spread is 2.2%. This relatively tight spread is indicative of the predominance of investment grade bonds in our sample. Our variable of interest is *Covenant Similarity*. We expect that greater covenant similarity should be negatively associated with bond spreads if more similar covenant restrictiveness reduces the information acquisition and processing costs incurred by investors and these savings are passed, at least partially, by bondholders to the borrowing firm. *Market Spread* is the mean spread by rating category for the particular quarter when the bond was issued, where the rating spectrum is divided into four broad rating categories (i.e., AAA to Aaa2, Aa3 to A2, A3 to Baa2, and Baa3 to D). It controls for market-wide fluctuations in spreads driven by macroeconomic factors as well as differences in spreads that capture credit risk premiums across rating categories. Our control variables are similar to the previous test.

We estimate model 2 in two ways. Our first estimation uses OLS. We acknowledge the difficulties in isolating the effect of similarity in covenant restrictiveness on yields due to the

potential endogeneity in the relation between covenant terms and bond pricing (e.g., Smith and Warner 1979; Bradley and Roberts 2004; Costello and Wittenberg-Moerman 2011). To address this concern, we employ an instrumental variable (IV) approach. This approach is based on the simultaneous estimation of the covenant similarity determinants' model (equation 1) and the model of covenant similarity consequences (equation 2). To instrument covenant similarity, we rely on *Similar Legal Counsel*, which reflects whether the bond and its peer bonds are issued by the same legal advisor. In terms of strength and validity of the first stage, we find that Shea's Adjusted Partial R^2 for the first stage is relatively high at 29.82%. Further, we find that the Cragg and Donald (1993) minimum eigenvalue statistic of 52.46 exceeds the most conservative Stock and Yogo (2005) 5%-relative-bias critical value of 20.25, thereby rejecting the null hypothesis of a weak instrument. As we report in column 1 of Table 1, this variable is a significant determinant of covenant similarity. We do not expect this variable to be directly related to bond yields, as there is no obvious economic reason to expect a strong association between the bond yield and the fact that the legal advisor of the bond issue is the same as the advisor of the bonds of the peer firms.

4.3.2. Results. Table 2 presents the results of estimating equation 2. Column 1 presents the OLS results. Consistent with our predictions, we find that covenant similarity is negatively related to bond spreads. The coefficient on *Covenant Similarity* is -0.038 with a *t*-statistic of -2.31. A one-standard-deviation increase in the similarity of covenant restrictiveness is associated with a 11 basis points reduction in the spreads (or 4.8% of the mean spread in our sample).[14] Given that the average bond issue in our sample has a principal value of $412 million and an average maturity of 8.27 years, the effect translates into savings for the borrower of approximately $4 million over the

[14] A one standard-deviation increase in *Covenant Similarity* of 2.802 × *Covenant Similarity* coefficient of -0.038 = 10.648 basis points. The 4.8% reduction in the mean spread equals these 10.648 basis points divided by the *Covenant Similarity* mean spread of 2.235.

life of the bond issue. This result indicates that similarity in covenant restrictiveness leads to positive economic consequences for firms in terms of a reduced cost of debt. In column 2, we present the 2SLS results, which are consistent with the OLS results (the sample decreases due to additional data requirements). The variables that load in the OLS specification have comparable coefficients and magnitudes of statistical significance in the 2SLS specification. In particular, the coefficient on *Covenant Similarity* is -0.051 with a *t*-statistic of -1.68, indicating a negative relation between covenant restrictiveness similarity and bond spreads.

In terms of control variables, as expected, *Market Spread* is positively correlated with *Spread*. We also observe that spreads are negatively related to asset tangibility and interest coverage, but positively related to the bond's maturity. These results are generally consistent with prior research on debt pricing (e.g., Booth 1992; Beatty et al. 2002; Bharath et al. 2008; Zhang 2008). Two other control variables in this specification, the level of covenant restrictiveness and its square, are also important.[15] One alternative explanation for our predicted relation between covenant similarity and yield is that the relation between bond yields and covenant restrictiveness is non-linear, and the bottom of this potential "u-shape" relation coincides with higher similarity in restrictiveness. This u-shape occurs because the lowest restrictiveness bonds permit further debt issuance without conditions, allowing the issuing firm to behave opportunistically, while the highest restrictiveness bonds deprive management the flexibility to pursue value increasing investment projects. The negative coefficient on *Covenant Restrictiveness* coupled with the positive coefficient on *Covenant Restrictiveness Squared* is consistent with such a relation. Note

[15] Although we would expect stronger covenant protection to reduce debt pricing, empirical studies typically find an insignificant coefficient on the variable reflecting the number of covenants or covenant restrictiveness in the debt pricing regressions (e.g., Bradley and Roberts, 2004) An insignificant coefficient on these covenant measures is likely to be attributed to the endogenous relationship between debt pricing and the strength of covenant protection (Costello and Wittenberg-Moerman 2011).

that we do not find a significant relation between the yield and some other firm-level characteristics. This is due to our control for market spread by rating category, which subsumes the effect of firm characteristics on spread to the extent that these characteristics are reflected in the rating.[16]

4.3.3. Additional Analysis. We perform a series of robustness tests on the main results that are presented in the online appendix 4. Our inferences are unaffected if: (1) We include an additional covariate to capture the similarity in the number of covenants, which is calculated in a manner similar to *Covenant Similarity* except that we use covenant inclusion indicators from the Mergent FISD database. (2) We re-calculate the aggregate covenant similarity by weighing each covenant based on the covenant importance suggested by Moody's (2013) and by our discussions with Moody's analysts (see column 4). (3) We estimate annual regressions of total covenant quality scores on firm characteristics (size, tangibility, leverage, interest coverage ratio), rating category (investment grade status), and two digit SIC membership fixed effects and then compute an alternative measure of *Covenant Similarity* as the absolute value of residuals from the annual regressions, multiplied by minus one. (4) We ensure our results are robust to additional controls for sales growth, financial stress, term spread and bond seniority. (5) We regress change in yield on the change in *Covenant Similarity* and changes in the firm and bond control variables.

Last, to help us distinguish which of our three theories is more important in explaining this result, in the online appendix 4, we regress yields on the portion of covenant similarity predicted by the variables that proxy for each theory. The coefficient on the portion of *Similar Covenants* predicted by *Previous High Cost Investors* is negative and statistically significant, while the

[16] Our inferences are similar when we control for similarity in firm performance by including ROA and sales growth. As further controls for systemic performance declines, we note that the results of these analyses are robust if we delete the crisis years of 2007 to 2009.

coefficients on the other predicted portions of *Covenant Similarity* are not significant. This result suggests that our theory of external investor pressure to have similar covenant restrictiveness has a greater effect on yields than the other two theories. This finding is reasonable as ultimately it is investor demand that drives the price of the bond.

4.3.4. Tests by Individual Covenant. Our findings suggest that, ceteris paribus, bond investors accept lower yields because they benefit from more similar covenant restrictiveness terms that decrease information acquisition and processing costs. In the online appendix 5, we also provide evidence that the similarity across the covenants restricting payments to shareholders, borrowings, and transactions involving the firm's assets are driving the bond yield results. Given that these covenants are the most elaborate and complex in the bond contracts, they also provide the greatest opportunity for the reduction in information acquisition and processing costs when covenant restrictiveness is more similar. Hence, these covenant-specific results provide additional support for our inference that bondholders reward borrowing firms with lower interest rates when covenant restrictiveness is more similar.

5. Additional Consequences of Covenant Similarity

In this section, we provide complementary analyses of how similarity in covenant restrictiveness could lead to reduced bond yields at issuance. In particular, we predict that this similarity manifests in the holdings of insurance companies and secondary trading.

5.1. Insurance Company Holdings

We analyze whether the presence of covenants with similar terms is associated with higher bond ownership by insurance companies. [17] We expect that increased demand from such long-term

[17] Insurance companies are important investors in the corporate bond market. Schultz (2001) estimates that insurance companies collectively hold up to 40% of U.S. investment grade corporate bonds. Becker and Ivashina (2014) also show that insurance companies are the largest institutional holder of corporate and foreign bonds, with bond holdings that in 2010 were $2.3 trillion more than those of mutual and pension funds combined.

investors should result in lower spreads, which would then represent a partial explanation for why bonds with more similar covenants are issued with lower yields.

We expect insurance companies to bear higher costs to analyze covenant packages relative to other bondholders for several reasons. First, they need to assess the covenant protection on a very large set of bonds with different characteristics that are issued by many borrowers active in a wide variety of industries. Regulatory constraints limit the ability of insurance companies to invest in other securities (e.g., equities); therefore, to diversify the risk, they need to invest in more bond securities than other institutional investors in the bond market. Second, while insurance companies are the largest bond investors, bond investing is not their main activity, in contrast to institutional asset managers that hire buy side analysts to manage bond portfolios. For most insurance companies the holding of bonds represents a more-passive investment in which they create portfolios of bonds to match the expected future inflows to the expected future outflows of insurance claims. Thus, we argue that insurance companies aim to save investment costs given that they need to allocate resources to write insurance contracts and assess insurance claims. Third, due to regulatory pressure, insurance companies typically hold bonds until maturity with limited portfolio rebalancing unless the bonds are downgraded below investment grade (see Ellul, Jotikasthira and Lundblad, 2011), which makes the existing set of covenants important to counter long-horizon, difficult-to-predict events. Consequently, to save on information acquisition and processing costs, insurance companies are likely to prefer bonds with similar levels of restrictiveness.[18]

To test this prediction, we use our peer-based sample to estimate the following regression:

[18] Data availability is another reason why we focus on insurance companies. We are only able to obtain information on insurance company investment portfolios because insurance companies are regulated and have to disclose their investment holdings in detail.

$$Insurance\ Holdings = \beta_0 + \beta_1\, Covenant\ Similarity + \beta_2\, Market\ Insurance\ Holdings + Controls + \eta. \quad (3)$$

Insurance Holdings is the ratio of the par value of a bond held by insurance companies to the total par value held by institutional investors in the quarter following the issuance of the bond. We focus on the first quarter after bond issuance because as a bond becomes more seasoned, it becomes less liquid as inactive investors progressively absorb the original bond issue in their portfolio and trading becomes thinner (Warga 1992). Untabulated analyses show that our results are robust to the use of horizons of up to 12 months. *Market Insurance Holdings* is measured analogously to the market-wide control variables in equation 2. We use control variables similar to those in previous tests.

We obtain bond ownership information from the National Association of Insurance Commissioners (NAIC) starting from 2001 and match this data with bond specific data in the Mergent Fixed Income Securities Database (Mergent FISD). NAIC provides detailed information on every bond holding for each insurer at the end of each year and every bond transaction that occurred in that year for each insurer. This dataset allows us to compute the percentage of ownership by insurance firms in a particular bond following its issuance. More than half of the par value of the bond is typically owned by insurance companies during the quarter immediately after the issuance (see the descriptive statistics in the online appendix 3).

Column 1 of Table 3 presents the results of estimating equation 3 using OLS. The *Covenant Similarity* coefficient is 0.010 and is statistically significant (*t*-statistic = 2.96). The results are economically significant; a one-standard-deviation increase in similarity increases the share of the bonds absorbed by insurance companies by 2.80% (or 5.2% of the sample average of 53.9%). This result supports our prediction that insurance companies prefer to invest in bonds with covenant restrictiveness that is more easily comparable to the covenant restrictiveness of peer bonds. This

evidence is consistent with lower information acquisition and processing costs incurred by insurance companies when investing in bonds with similar covenant restrictiveness terms. With respect to the control variables, in addition to the market-based variable of insurance holdings, which loads positively, insurance holdings are negatively related to firm size, the number of covenants and the offering amount, and positively related to interest coverage and time to maturity. Column 2 of Table 3 provides the 2SLS results, which are very similar to the column 1 OLS results and produce comparable inferences.

Overall, the evidence indicates that when covenant restrictiveness is more similar to the covenant restrictiveness in peer firms' bonds, investors such as insurance firms that face high information acquisition and processing costs are more likely to invest in bonds with these covenants. This finding also provides a partial explanation for our results that bond issuance yields are lower for bonds with more similar covenants, as higher demand by long-term investors should lead to lower spreads.

5.2. Trading

Next we investigate directly the association between similarity in covenant restrictiveness and investors' information processing costs. We predict that covenant restrictiveness similarity is positively associated with the extent of bond trading and secondary market liquidity. Evidence consistent with this prediction provides a further partial explanation for lower spreads because greater liquidity should decrease expected illiquidity premiums and lead to lower yields at issuance (e.g., Chen, Lesmond, and Wei 2006; Mahanti et al. 2008).

To test this idea, we use our peer-based sample to estimate the following regression:

$$Trading = \beta_0 + \beta_1 Covenant\ Similarity + \beta_2 Market\ Trading + Controls + \eta. \quad (4)$$

Trading consists of two variables, *Volume* and *Transactions*, measured using bond trading data

provided by the Trade Reporting and Compliance Engine (TRACE) and NAIC.[19] *Volume* is the logarithm of the trading volume in the 30 days following the bond issuance, while *Transactions* is the logarithm of the number of transactions over this period. We focus on a 30-day period because the bonds are absorbed promptly into the portfolios of buy-and-hold large institutional investors (e.g., insurance companies and pension funds) and do not trade following this period (Warga 1992).[20] The average total volume traded during the 30-day period immediately after the issuance of a bond in our sample is high; it reaches $263 million, which represents approximately 173 transactions. We expect that increased covenant similarity is positively associated with our bond trading measures. *Market Trading* is measured analogously to the market-wide control variables in equation 2. When the dependent variable is *Volume, Market Trading* is the mean trading volume by rating category for a particular quarter, and it controls for market-wide fluctuations in trading volume as well as differences in volume across rating categories. When the dependent variable is *Transactions, Market Trading* is defined analogously but by using trading transactions instead of volume. Our control variables remain the same as in previous tests.

We present the results in Table 4. The first two columns present the results when *Volume* is the dependent variable, and the last two columns provide results when the dependent variable is *Transactions*. The statistical significance of the results for the relation between *Covenant Similarity* and *Trading* are modest. In the first and third columns, which present OLS results, the coefficients on *Covenant Similarity* are only significant if we use a one-sided test, while the second and fourth columns, which show results based on 2SLS, are significant using a two-sided test in

[19] TRACE did not cover all bonds trading in the secondary market until February 2005. As a result, we add bond transaction data from NAIC, which is provided by the Mergent FISD database. If on a certain day, a bond issue does not have any trades reported in TRACE but Mergent FISD indicates that a trade occurred, we include the Mergent FISD trade information in our tests.

[20] Our results are robust to shorter periods, such as 14 days.

the fourth column. In terms of economic significance, a one-standard-deviation increase in similarity is associated with an increase in *Volume* of 0.675 (or 5.2% of the average *volume* in our sample). Economic significance is much higher when trading is measured as the number of transactions, with a one-standard-deviation increase in similarity being associated with an increase in *Transactions* that is 17% of the mean. *Market Trading* is a very important determinant of firm-level trading. In terms of other control variables, bond trading is greater for the bonds of firms that are larger and have lower leverage and those of larger amounts, consistent with findings in the prior literature on bond liquidity (Chen, Lesmond, and Wei 2006; Mahanti et al. 2008).

In sum, these results provide modest evidence that more similar bonds are associated with higher trading activity immediately after issuance, suggesting that covenant similarity is associated with lower information acquisition and processing costs. Consistent with bond investors pricing secondary market liquidity, this increased liquidity provides a partial explanation for our results that bonds with more similar covenants have lower bond yields at issuance.

6. Conclusion

We investigate the factors affecting similarity in the level of covenant restrictiveness across bond issues and examine whether it is priced in the bonds' yields to maturity at issuance. Using a measure of covenant restrictiveness developed by Moody's, which highlights the principal strengths and structural gaps in the protection provided by individual bond covenants, we show that firms with similar economic features and business models have similar covenant structures. We also show that covenant similarity is greater when bond issuers share the same legal counsel and have insurance companies as investors. Further, we document that similarity in covenant restrictiveness is associated with significantly lower bond yields at issuance, suggesting that bond investors view more similar covenant terms positively, as such terms potentially lower information

acquisition and processing costs across different bonds. Additional tests show that bonds with similar covenant restrictiveness terms are characterized by a higher level of bond ownership by long-term bond investors, such as insurance companies, and that for these bonds the secondary market bond liquidity is greater following the bond's issuance. This evidence reinforces the effect of the similarity in covenant restrictiveness on bond pricing.

Our findings add to the literature on the covenant structure in debt contracts. We highlight the important role of the similarity of covenant restrictiveness terms across different bond issues. We show that similarity in covenant restrictiveness has significant economic consequences for borrowing firms, such as lower bond yields, greater interest at the time of issuance from long-term investors and greater secondary bond market liquidity. We also emphasize sociological and economic theory-based as opposed to agency-based explanations for bond covenant structure. In particular, we show that the information acquisition and processing costs associated with dissimilar levels of covenant restrictiveness may exceed the credit risk protection benefits that more tailored covenants provide. Finally, we offer new evidence on the multifaceted structure of bond covenants and the comprehensiveness of the protection they offer.

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APPENDIX A: Variable Definitions

Variable		Definition
Similarity Variables		
Covenant Similarity	=	For each bond issue, the sum of the individual covenant similarity scores. For each of the eight covenants, covenant similarity is computed as follows. For bond issue-level tests, the average of the pairwise absolute differences between the specific covenant strictness score assigned to a particular bond issue by Moody's and its peer cross-sectional bonds. The covenant strictness scores score range from 0 to 3, with higher values indicating better covenant protection. A peer bond is defined as a bond within the same sector and broad rating category (investment grade or high yield) issued within the calendar year prior to the issuance of a bond under consideration. The similarity scores are multiplied by -1, so that higher values indicate higher similarity.
Firm/Bond level Variables (in alphabetical order)		
Covenant Restrictiveness	=	Sum of the bond-level covenant restrictiveness scores provided by Moody's (i.e., the sum of covenant strictness scores pertaining to payment restrictions, merger restrictions, change of control, asset sales, sale-leaseback, debt, subsidiary debt, and liens. The individual scores range from 0 to 3, with higher values indicating better covenant protection.
Covenant Restrictiveness Squared		The square of *Covenant Restrictiveness*.
Industry Size	=	Natural logarithm of the sum of total assets of sample firms in a 2-digit SIC industry.
Industry Homogeneity	=	Sum of squared share of total assets of sample firms in a 2-digit SIC industry.
Insurance Holdings	=	Proportion of the dollar par value of the bond held by insurance companies at the quarter end after the bond issuance quarter.
Interest Coverage	=	Interest coverage ratio from the quarter preceding the bond issuance, calculated as EBITDA over interest expense.
Investment Grade	=	Indicator variable that takes a value of one if the issue is rated investment grade by at least one of the three major credit rating agencies, zero otherwise.
Lender Power	=	Indicator variable that takes a value of one if the bond is issued during the recent financial crisis from 2007 to 2009.
Leverage	=	Long-term debt to total assets ratio, from the quarter preceding the bond issuance.
Market Insurance Holdings	=	Mean Insurance Holdings for a particular quarter and rating category to which the bond belongs at issuance. The four rating categories are as follows: AAA to Aaa2, Aa3 to A2, A3 to Baa2, and Baa3 to D.
Market Spread	=	Mean Spread for a particular quarter and rating category to which the bond belongs at issuance. The four rating categories are as follows: AAA to Aaa2, Aa3 to A2, A3 to Baa2, and Baa3 to D.
Market Transactions	=	Mean Transactions for a particular quarter and rating category to which the bond belongs at issuance. The four rating categories are as follows: AAA to Aaa2, Aa3 to A2, A3 to Baa2, and Baa3 to D.
Market Volume	=	Mean Volume for a particular quarter and rating category to which the bond belongs at issuance. The four rating categories are as follows: AAA to Aaa2, Aa3 to A2, A3 to Baa2, and Baa3 to D.

Maturity	=	Logarithm of time to maturity, in number of years.
Number Covenants	=	Total number of bond covenants, as identified in the Mergent FISD database.
Number of Peers	=	The number of peer bonds used to compute the covenant similarity score as described in the definition of Covenant Similarity.
Offering Amount	=	Logarithm of principal amount of the bond offering.
Previous High Cost Investors	=	Indicator variable that equals one if the firms' previous bonds were held by insurance company investors, zero otherwise
Size	=	Logarithm of the firm's total assets, from the quarter preceding the bond issuance.
Spread	=	Initial yield to maturity at the time of bond issuance, minus the yield to maturity of a treasury-bill with the closest maturity.
Volume	=	Logarithm of total trading volume of a bond during 30 days immediately after issuance.
Tangibility	=	Ratio of fixed assets to total assets, from the quarter preceding the bond issuance.
Transactions	=	Logarithm of total number of trading transactions of a bond during 30 days immediately after issuance.

TABLE 1
Determinants of Covenant Similarity

This table investigates the determinants of similarity in covenant restrictiveness. We regress *Covenant Similarity* on variables that measure similarity in firm characteristics, similarity in intermediaries, as well as the level of firm characteristics and bond characteristics. Similar firm size, tangibility, leverage, and interest coverage are calculated between each firm i-peer j pair of companies, and then we take the mean of these absolute differences and multiply by -1, so that these measures capture similarity in firm fundamentals. In column 1, *Covenant Similarity* is measured at the firm *i* level, in which we take the mean of the covenant similarity scores across each firm *i* – peer *j* bond pair for all *j* peers of firm *i*. In column 2, *Covenant Similarity* is the individual similarity scores across each firm *i* – peer *j* pair. We estimate OLS regressions as a panel and cluster the standard errors at the firm level. Robust *t*-statistics are in brackets. ***, **, and * denote significance at the 1%, 5% and 10% levels, respectively, using two-tailed tests. Variables are defined in Appendix A.

	Firm *i* level (1)	Firm *i*-Peer *j* bond level (2)
Similar Size	0.801***	0.422***
	[2.84]	[2.96]
Similar Tangibility	1.865***	1.866***
	[2.60]	[3.11]
Similar Leverage	0.529	2.986*
	[0.60]	[1.81]
Similar Interest Coverage	-0.000	-0.005
	[-0.06]	[-0.96]
Similar Legal Counsel	0.910**	1.112***
	[2.03]	[4.61]
Similar Underwriter	0.084	0.203
	[0.23]	[1.56]
Previous High Cost Investors	0.022	0.457**
	[0.09]	[2.45]
Size	0.041	-0.158
	[0.28]	[-1.30]
Tangibility	0.373	-0.177
	[0.94]	[-0.45]
Leverage	-0.206	-1.249
	[-0.17]	[-1.14]
Interest Coverage	0.005	-0.009
	[0.40]	[-0.96]
Number Covenants	-0.002	-0.110**
	[-0.03]	[-2.05]
Offering Amount	-0.295***	-0.135*
	[-2.77]	[-1.77]
Maturity	0.099	-0.016
	[1.03]	[-0.23]
Investment Grade	4.753***	4.491***
	[6.11]	[5.25]
Lender Power	-0.304	-0.257
	[-1.20]	[-1.61]
Number of Peers	0.010	-0.016
	[0.67]	[-1.59]
Covenant Restrictiveness	0.116	-0.138
	[0.55]	[-0.84]
Covenant Restrictiveness Squared	-0.003	0.004
	[-0.36]	[0.57]

Industry Size	0.000 [0.03]	0.000 [0.20]

TABLE 1 (Continued)
Determinants of Covenant Similarity

Industry Homogeneity	0.226 [0.51]	-0.215 [-0.28]
Constant	-4.434* [-1.80]	-0.369 [-0.20]
Observations	943	7,308
Adj. R^2 (%)	45.3%	31.1%

TABLE 2
Consequences of Covenant Similarity: Yield Spread

This table investigates the yield spread consequences of similarity in covenant restrictiveness. We regress the bond's offering yield on *Covenant Similarity*, controlling for market-wide spread, firm characteristics, and bond characteristics. We estimate both OLS and 2SLS regressions. *Covenant Similarity* is measured at the firm *i* level, in which we take the mean of the covenant similarity scores across each firm *i* – peer *j* pair for all peers of firm *i*. We estimate each regression as a panel and cluster the standard errors at the firm level. Robust *t*-statistics are in brackets. ***, **, and * denote significance at the 1%, 5% and 10% levels, respectively, using two-tailed tests. Variables are defined in Appendix A.

	OLS (1)	2SLS (2)
Covenant Similarity	-0.038**	-0.051*
	[-2.31]	[-1.68]
Market Spread	0.981***	0.966***
	[20.69]	[19.38]
Size	-0.010	-0.009
	[-0.28]	[-0.24]
Tangibility	-0.314***	-0.320***
	[-3.02]	[-2.88]
Leverage	-0.606	-0.629
	[-1.54]	[-1.59]
Interest Coverage	-0.011***	-0.011**
	[-2.73]	[-2.49]
Number Covenants	0.001	0.009
	[0.05]	[0.43]
Offering Amount	0.032	0.017
	[0.86]	[0.45]
Maturity	0.287***	0.279***
	[5.23]	[4.79]
Number of Peers	0.010**	0.011**
	[2.14]	[2.18]
Covenant Restrictiveness	-0.091*	-0.083
	[-1.75]	[-1.44]
Covenant Restrictiveness Squared	0.004*	0.003
	[1.68]	[1.26]
Industry Size	-0.000	-0.000
	[-0.55]	[-0.33]
Industry Homogeneity	0.128	0.127
	[0.85]	[0.79]
Constant	-1.972**	-1.792**
	[-2.46]	[-2.12]
Observations	996	943
Adj. R^2 (%)	67.6%	66.3%

TABLE 3
Consequences of Covenant Similarity: Insurance Company Holdings

This table investigates the consequences for insurance company holdings of similarity in covenant restrictiveness relative to the covenants of peer companies. We regress the holdings of insurance companies on *Covenant Similarity*, controlling for market-wide insurance holdings, firm characteristics, and bond characteristics. We estimate each regression as a panel and cluster the standard errors at the firm level. Robust *t*-statistics are in brackets. ***, **, and * denote significance at the 1%, 5% and 10% levels, respectively, using two-tailed tests. Variables are defined in Appendix A.

	OLS (1)	2SLS (2)
Covenant Similarity	0.010***	0.016**
	[2.96]	[2.43]
Market Insurance Holdings	0.881***	0.883***
	[22.06]	[20.34]
Size	-0.025***	-0.032***
	[-2.74]	[-3.32]
Tangibility	-0.002	0.001
	[-0.06]	[0.06]
Leverage	-0.035	-0.017
	[-0.54]	[-0.24]
Interest Coverage	0.003***	0.003***
	[3.32]	[3.10]
Number Covenants	-0.006	-0.008*
	[-1.58]	[-1.83]
Offering Amount	-0.049***	-0.039***
	[-4.50]	[-3.41]
Maturity	0.053***	0.049***
	[4.59]	[4.08]
Number of Peers	0.000	0.000
	[0.16]	[0.19]
Covenant Restrictiveness	0.015	0.011
	[1.57]	[1.03]
Covenant Restrictiveness Squared	-0.001*	-0.000
	[-1.78]	[-1.03]
Industry Size	-0.000**	-0.000***
	[-2.53]	[-2.81]
Industry Homogeneity	-0.198	-0.190
	[-1.31]	[-1.16]
Constant	0.577***	0.579***
	[3.00]	[2.89]
Observations	877	825
Adj. R^2 (%)	67.9%	67.8%

TABLE 4
Consequences of Covenant Similarity: Trading

This table investigates the trading consequences of similarity in covenant restrictiveness relative to the covenants of peer companies. We regress the bond's trading volume and number of transactions on *Covenant Similarity*, controlling for market-wide trading, firm characteristics, and bond characteristics. We estimate each regression as a panel and cluster the standard errors at the firm level. Robust *t*-statistics are in brackets. ***, **, and * denote significance at the 1%, 5% and 10% levels, respectively, using two-tailed tests. Variables are defined in Appendix A.

	Dependent Variable = *Volume*		Dependent Variable = *Transactions*	
	OLS	2SLS	OLS	2SLS
	(1)	(2)	(3)	(4)
Covenant Similarity	0.241	0.633	0.106	0.291*
	[1.52]	[1.54]	[1.54]	[1.67]
Market Volume	0.805***	0.855***		
	[13.77]	[13.78]		
Market Transactions			0.823***	0.860***
			[13.34]	[13.09]
Size	1.659***	1.531***	0.899***	0.845***
	[3.38]	[2.86]	[4.18]	[3.64]
Tangibility	0.527	0.994	0.386	0.594
	[0.44]	[0.78]	[0.73]	[1.06]
Leverage	-19.602***	-19.509***	-8.221***	-8.212***
	[-4.61]	[-4.14]	[-4.60]	[-4.10]
Interest Coverage	-0.049	-0.056	-0.029	-0.034
	[-0.92]	[-1.02]	[-1.16]	[-1.32]
Number Covenants	0.306	0.307	0.139	0.148
	[1.31]	[1.20]	[1.36]	[1.32]
Offering Amount	0.698	0.907*	0.547***	0.652***
	[1.58]	[1.76]	[2.81]	[2.92]
Maturity	-0.233	-0.409	-0.273	-0.343
	[-0.50]	[-0.83]	[-1.37]	[-1.61]
Number of Peers	0.082	0.068	0.028	0.022
	[1.27]	[1.05]	[1.00]	[0.77]
Covenant Restrictiveness	0.146	-0.016	0.031	-0.048
	[0.28]	[-0.03]	[0.13]	[-0.20]
Covenant Restrictiveness Squared	-0.011	-0.001	-0.003	0.002
	[-0.54]	[-0.03]	[-0.30]	[0.20]
Industry Size	-0.000	-0.000	-0.000	-0.000
	[-0.58]	[-0.53]	[-0.99]	[-0.93]
Industry Homogeneity	2.710	2.414	1.130	1.052
	[1.62]	[1.34]	[1.58]	[1.37]
Constant	-21.886**	-21.444**	-13.821***	-13.512***
	[-2.23]	[-2.11]	[-3.27]	[-3.09]
Observations	996	943	996	943
Adj. R^2 (%)	28.0%	24.9%	35.0%	32.4%

List of Online Appendices