**Covenants in convertible bonds: Boon or boilerplate?**

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**Abstract**

This paper examines the role of restrictive covenants in convertible bonds. After controlling for standard covenant intensity determinants, an average convertible bond offering has 3.21 fewer covenants than an average straight bond offering. While covenants negatively affect straight bond yields, there is no negative association between covenants and convertible bond yields. Moreover, contrary to straight bond covenants, convertible bond covenants are set largely independently of issuer characteristics. Overall, our findings suggest that the conversion option and certain covenants are substitutes for addressing debt-related financing costs. The few covenants included in convertibles represent irrelevant boilerplate clauses.

**Keywords**: convertible bonds, straight bonds, restrictive covenants, agency costs, yields

JEL classification: G30; G32

1. **Introduction**

Restrictive bond covenants are heterogeneous provisions attached to individual securities, limiting the firm from engaging in specified actions after the bonds have been sold (Smith and Warner, 1979; Miller and Reisel, 2012). Academic studies on bond covenants typically focus on straight, non-convertible bond offerings and exclude bonds convertible into common stock (Qi and Wald, 2008; Qi et al., 2011; Miller and Reisel, 2012; Reisel, 2014; Zhang and Zhou, 2018).[[2]](#footnote-2) This omission is unfortunate because convertible bonds represent an important source of financing for companies, both in absolute terms and relative to seasoned equity and straight bond offerings (Gomes and Phillips, 2012; Dutordoir et al., 2014; Lyandres and Zhdanov, 2014). In 2020 alone, global convertible bond issuance amounted to a record $158.7 billion (Calamos, 2020). Recent convertible bond issuers include Airbnb, Ford, Spotify, Twitter, and Shake Shack (Driebusch, 2022).

Our paper complements previous literature on bond covenants by focusing on the frequency and role of covenants in convertible bonds. Theory on the role of covenants predicts that these restrictions can address various debt-related financing costs, including asset substitution, underinvestment, claim dilution, and financial distress costs (Smith and Warner, 1979; Malitz, 1986). Theory on the role of convertible bonds, in turn, argues that firms can include a conversion option in their bond offerings to address these same debt-related costs (Green, 1984; Brennan and Kraus, 1987; Brennan and Schwartz, 1988; Stein, 1992; Mayers, 1998; Lyandres and Zhdanov, 2014). Drawing from these two strands of literature, we hypothesize that firms use a conversion option and covenants as substitute mechanisms to mitigate costs associated with straight bond financing.[[3]](#footnote-3) This substitution rationale yields two testable predictions. Firstly, it implies that we should observe a lower covenant intensity for convertible bonds than for straight bonds (*P1*). Secondly, it implies that covenants should have a stronger negative impact on straight bond yields than on convertible bond yields (*P2*). The rationale for *P2* is that, in the case of convertible bonds, investor concerns about debt-related financing costs should already be (partly) mitigated by the conversion option, thereby reducing covenants’ incremental advantages in reducing required yields.

We empirically examine these two predictions using a data set of 2,097 convertible and 9,011 straight bond offerings made by U.S. non-utility, non-financial firms between 1989 and 2020. We obtain bond offering and covenant information from the Mergent Fixed Investment Securities Database (henceforth, Mergent FISD). Employing a covenant intensity index (*CI index*) resembling that in Billett et al. (2007), we find that convertible bonds have significantly fewer covenants than straight bonds. The difference remains significant after we impose a ‘like-for-like’ condition by controlling for standard covenant intensity determinants and for firms’ self-selection into issuing convertibles instead of straight bonds. Our regression results indicate that, all else equal, the *CI index* of convertible bonds is 0.214 lower than that of straight bonds, translating into 3.21 fewer covenants for the average convertible compared with the average straight bond offering.

However, the overall discrepancy in covenant intensity between convertibles and straight bonds hides differences across individual covenant types. While convertibles include fewer covenants restricting payout and financing activity, the frequency of investment-restricting covenants is not significantly different between convertible and straight bonds after imposing the like-for-like condition, and convertibles have a higher frequency of event-driven covenants than straight bonds. We thus find partial evidence for *P1*.

Consistent with *P2*, we find that while the *CI index* and dummy variables capturing individual types of covenants negatively impact at-issue straight bond yields, this does not hold for convertible bond offerings. The difference in the impact of *CI index* on straight and convertible bond yields is statistically significant.

Our results for *P1* and *P2* are robust to alternative methodological specifications and hold in subsamples of (convertible) bonds with different placement methods, credit ratings, and equity component sizes. In additional tests, we document that covenant intensity determinants suggested by previous, straight bond-focused studies on covenants (Nash et al., 2003; Miller and Reisel, 2012; Reisel, 2014) tend to have only a weakly significant or insignificant impact on convertible bond covenant intensity. This finding further cements the interpretation that convertible bond covenants mostly act as irrelevant boilerplate clauses. We further show that our main findings continue to hold for subsamples of straight (convertible) bond issuers that have already issued convertible (straight) bonds, alleviating concerns that unobservable differences in issuer characteristics drive our results.

Overall, our results complement the debt contracting literature by showing that previous findings on the role of covenants in straight bonds do not readily transfer to convertible bonds. A few previous studies document univariate findings suggesting a lower incidence of convertible covenants than straight bond covenants (Kahan and Yermack, 1998; Anderson, 1999; Nash et al., 2003; Billett et al., 2007; Chan and Chen, 2007; Cook et al., 2014). However, unlike our paper, these studies do not systematically control for differences between convertible and straight bond samples, therefore not allowing a like-for-like comparison of covenant intensity across these two bond types. In addition, consistent with our findings, some empirical studies report a negative impact of covenants on straight bond yields, suggesting that these provisions reduce financing costs associated with incremental debt issuance (Miller and Reisel, 2012; Reisel, 2014; Simpson and Grossman, 2017). However, none of these studies examine the impact of covenants on convertible bond yields, as we do in our paper. Our results indicate that, unlike straight bond covenants, convertible bond covenants seem to have no discernible benefit (or boon, to refer to our paper’s title) in offering yield reductions.

The remainder of this paper is structured as follows. Section 2 develops testable predictions on the role of covenants for convertibles. Section 3 describes the sample construction, measurement of covenant intensity, and explanatory variables. Section 4 describes our findings on the difference in covenant intensity between convertibles and straight bonds (*P1*). Section 5 describes our findings on the effect of covenants on convertible and straight bond yields (*P2*). Section 6 presents relevant additional tests that further substantiate our main results. Section 7 summarizes our key results and discusses the practical implications of our study for a range of stakeholders.

1. **Testable predictions on the role of covenants for convertible bonds**

Our testable predictions build on theories on the role of covenants on the one hand and theories on the role of convertible bonds on the other hand. We first outline these theories and then develop our predictions.

*2.1. The role of covenants*

The ‘costly contracting’ viewpoint on covenants holds that individual covenant types can address specific debt-related financing costs. Investment-restricting covenants may reduce bondholders’ vulnerability to shareholders’ risk-shifting actions (Smith and Warner, 1979; Nash et al., 2003; Chava et al., 2019) and thereby alleviate asset substitution costs (Jensen and Meckling, 1976). Covenants limiting dividends and other payouts to shareholders, in turn, effectively force the firm to invest because a binding payout covenant prevents the distribution of free cash to shareholders (Kalay, 1982; Berkovitch and Kim, 1990). Thus, payout-restricting covenants can help reduce debt-related underinvestment costs (Myers, 1977; Smith and Warner, 1979; Malitz, 1986; Nash et al., 2003). Covenants restricting financing activities, consisting of limitations on additional borrowing and the issuance of secured debt, can protect the bondholder against claim dilution costs (Fama and Miller, 1972; Smith and Warner, 1979; Masulis, 1980). Finally, event-driven covenants address the risk associated with specified, typically rare corporate events, such as an attempted takeover of the bond issuer (Nanda and Yun, 1996).

Consistent with the costly contracting viewpoint, several empirical studies find evidence of a positive relation between covenant usage and issuer-specific debt-related financing costs (Malitz, 1986; Nash et al., 2003; Billet et al., 2007; Qi and Wald, 2008; Chava et al., 2010; Cook et al., 2014; Zhang and Zhou, 2018). Conversely, there is only scant evidence on the ‘irrelevance’ or ‘neutral mutation’ viewpoint that covenants do not help tackle debt-related financing costs and represent nothing more than boilerplate statements (Simpson, 1973). We note that these empirical studies focus on straight debt contracts, not on convertibles.

*2.2. The role of convertible bonds*

Convertible bond rationales predict that these hybrid instruments can address various debt-related financing costs. Green’s (1984) rationale argues that convertibles can curb harmful shareholder risk-shifting behavior. Shareholders will have to share any cash flows resulting from high-risk strategies with convertible bondholders, thereby reducing shareholders’ incentives to engage in such investment strategies in the first place. Lyandres and Zhdanov’s (2014) rationale predicts that convertibles are an effective tool to mitigate or even eliminate underinvestment problems resulting from risky debt. While the debt-like features of a convertible debt contract create underinvestment incentives, the presence of the conversion option provides shareholders with an opposite incentive to speed up the exercise of an investment opportunity. Finally, following Stein’s (1992) rationale, convertibles can mitigate financial distress costs because firms can force these securities to be converted into equity in bad states of the world by exercising their call option. Several empirical studies document evidence consistent with an agency- or financial distress-costs-reducing role for convertibles (Lewis et al., 1999; 2003; Krishnaswami and Yaman, 2008; Dorion et al., 2014), but other studies find that convertibles do not seem to be used for mitigating these problems (Graham and Harvey, 2001; Dong et al., 2018).

*2.3. The role of covenants for convertible bonds*

To summarize, theory predicts that convertibility and covenants can address asset substitution and underinvestment costs, as well as financial distress costs.[[4]](#footnote-4) As such, firms could use convertibles and covenants as substitutive or complementary devices to alleviate these costs (Kahan and Yermack, 1998). We predict that a substitute relationship is theoretically more likely for the following reason. According to microeconomic theory, a substitute good, in contrast to a complementary good, is a product with a positive cross-elasticity of demand. This means that the demand for the good increases when the price of another good increases and decreases when the price of another good decreases (Nicholson and Snyder, 2012). Consistent with this definition, the attractiveness of a conversion option increases under conditions where the cost (‘price’) of covenants increases. More particularly, the main cost of covenants lies in curbing a firm’s financial flexibility (Nash et al., 2003). Studies on covenants argue that the need for financial flexibility tends to be higher in the presence of valuable investment opportunities (Kahan and Yermack, 1998; Reisel, 2014). Convertible bond rationales, in turn, argue that convertibles are particularly useful in the presence of valuable investment opportunities. For instance, Mayers’ (1998) sequential-financing model predicts that convertibles can serve as flexible instruments for financing real options. In addition, Brennan and Kraus’ (1987) and Brennan and Schwartz’ (1988) risk uncertainty models predict that convertibles’ hybrid nature facilitates financing in conditions with uncertainty about firm risk, which may be associated with the presence of substantial investment opportunities. Thus, while theory predicts that covenants and convertibles share similar debt-related costs-reducing benefits, convertibles do not share covenants’ cost of curbing a firm’s financial flexibility and are, in fact, particularly suitable in conditions with a higher need for financial flexibility. Of course, covenants have advantages over convertibles too. Adding a conversion option, with its associated equity-related adverse selection and dilution costs, may be deemed too blunt and drastic a measure. Covenants may offer the potential for more subtle, tailored restrictions. Kahan and Yermack (1998: p.138) corroborate this intuition by stating that firms might consider a convertible bond offering an *“unwieldy and overly powerful weapon” (…) for mitigating (…) agency problems (…) that might be addressed more efficiently by narrowly drawn covenants.”* In conclusion, since a conversion option and covenants each have costs making the other instrument relatively more attractive, we obtain the main hypothesis of a substitute use of these bond design features.

*2.4. Testable predictions*

The hypothesis that convertibility and covenants are used as substitutes generates two testable predictions. Firstly, it implies that adding a conversion option reduces the need for covenants, resulting in a lower covenant frequency (or ‘covenant intensity’, to use the terminology adopted in most reference papers) for convertibles than for straight bonds. Thus:

*P1: Convertible bonds have a lower covenant intensity than straight bonds.*

Our second testable prediction relates to bond yields. If covenants and convertibles both help reduce agency and financial distress costs, we expect a smaller negative impact of covenant inclusion on convertible bond yields. The reason is that covenants have smaller incremental benefits for convertibles than for straight bonds. Therefore:

*P2: Covenants impact convertible bond yields less negatively than straight bond yields.*

1. **Sample and variables**

This section describes our sample of convertible and straight bonds. It also outlines our measure of covenant intensity and the control variables used throughout our tests.

* 1. *Sample construction*

Our raw data set consists of all bonds issued by U.S. companies between January 1, 1989 and September 30, 2020, retrieved from Mergent FISD. We start in 1989 because the quality of covenant data in Mergent FISD is lower before that year (Reisel, 2014). We obtain a raw data set of 37,013 bond offerings, consisting of 3,673 convertible bond and 33,340 straight bond offerings. We apply standard sample screening criteria summarized in Table 1, Panel A (Billett et al., 2007; Miller and Reisel, 2012; Reisel, 2014).

<< Please insert Table 1 here >>

We exclude privately placed bonds because these tend to be substantially different from public bond offerings. We retain Rule 144a private offerings because previous research argues that these are comparable to public offerings (Rauh and Sufi, 2010; Gomes and Phillips, 2012).[[5]](#footnote-5) We also exclude medium-term notes (MTNs).[[6]](#footnote-6) Since our study focuses on corporate bonds, we remove preferred stock. We furthermore exclude all bonds with special features, such as mortgage- or asset-backed, pass-through, or payment-in-kind (PIK) bonds. Finally, we remove bonds with missing data on issue date and convertible status.

We then intersect the resulting data set with Compustat and the Centre for Research in Security Prices (CRSP) using six-digit CUSIP codes and remove observations without the required data for calculating the firm and security characteristics used in our empirical tests. We also exclude bonds issued by utility (primary SIC code between 4400 and 4999) or financial (primary SIC code starting with 6) companies. In a final step, we remove bonds for which Mergent FISD does not record any covenant information. In line with Billett et al. (2007), we verify whether Mergent FISD has recorded the ‘subsequent data’ field with ‘Yes’. The subsequent data flag indicates whether data from a prospectus, pricing supplement, or other more detailed document or source are available for a particular bond issue. We assume that bonds with a ‘Yes’ on this data field have their covenants (if any) checked and recorded by Mergent FISD, while bonds with a ‘No’ on his data field and no covenants recorded should be removed, as they are not covered by Mergent FISD’s covenant recording. Our final data set consists of 2,097 convertible and 9,011 straight bond offerings. Table 1, Panel B provides the distribution of convertible and straight bond offerings at five-year intervals. Convertible bond issues are peaking from 2001–2005, while straight bond offerings are most frequent toward the end of the research window.

* 1. *Measuring covenant intensity*

We adopt Billett et al.’s (2007) covenant categorization framework, consisting of 15 covenant categories falling into four main covenant groups. The first group places restrictions on firms’ investment policies. It includes three covenant categories limiting the use of asset sales proceeds and placing constraints on mergers with other entities. The second group places limitations on payouts to shareholders or other entities. It includes covenants restricting dividend payouts, both by the issuer and its subsidiaries, as well as covenants restricting share repurchases. The third group places restrictions on financing activities. It includes additional debt issuance restrictions for the issuer and its subsidiaries, as well as accounting-based maximum total debt and minimum earnings stipulations commonly referred to as ‘total leverage tests’. It also incorporates a sale-leaseback covenant restricting the issuer and its subsidiaries from selling and then leasing back assets, and a restriction on additional stock issuance. The fourth group of covenants consists of three covenant categories relating to specific events, i.e., a drop in issuer credit ratings, an issuer default, or a significant change in control of the issuer. Table 2, Panel A, documents the frequency of each of the 15 covenant categories for convertibles and straight bonds.

<< Please insert Table 2 here >>

We find a significantly lower incidence of covenants for convertibles than for straight bonds for 14 of the 15 covenant categories. The only exception is the poison put provision allowing bondholders to sell their bonds back to the issuer upon a change of control in the issuer. Consistent with Nanda and Yun (1996), we find that this covenant type is included in significantly more convertibles than straight bonds. The covenant percentages for our straight bond sample resemble those in a straight bond-focused covenant study by Reisel (2014).

Following Billet et al. (2007) and Helwege et al. (2017), we subsequently construct an overall covenant intensity index (*CI index*), providing an umbrella measure of the covenants included in a bond offering. For each of the 15 covenant categories, we create a dummy variable equal to one if the (convertible) bond has at least one covenant in that category and zero otherwise. We then add these dummy variables and divide their sum by 15. Our index thus gives equal weight to the 15 categories, making it easy to construct and interpret (Chava et al., 2010; Bradley and Roberts, 2015). The resulting *CI index* ranges from zero, implying no covenant protection at all, to one, implying complete covenant protection. As documented in Table 2, Panel A, we find an average value of the overall *CI index* of 0.1645 for convertibles, significantly lower than the average index value of 0.3058 for straight bonds. We also construct subindices of covenant protection for each of the four main groups, following a similar approach. The subindices capturing investment, payout, and financing covenant intensities are significantly lower for convertibles than for straight bonds, while the subindex capturing event-driven restrictions is higher for convertibles due to their higher frequency of poison put provisions. Overall, we conclude that Panel A indicates a lower prevalence of covenants for convertibles than for straight bonds, consistent with *P1*.

Table 2, Panel B shows correlations between the subindices for the four covenant groups. Unsurprisingly and consistent with Reisel (2014), we find significantly positive pairwise Pearson correlations between the four main groups, with correlation coefficients ranging from 0.07 to 0.58.

* 1. *Explanatory variables*

This section justifies and describes the control variables used in the covenant intensity analyses. The Appendix provides detailed definitions of all variables and their sources.

Issuer characteristics

We measure all issuer characteristics at the fiscal year-end preceding the bond’s issue date (obtained from Mergent FISD), unless noted differently in the Appendix. Theory predicts a positive impact of debt-related financing costs proxies on covenant intensity. Consistent with previous empirical studies on covenant intensity determinants (Chava et al., 2010; Qi et al., 2011; Cook et al., 2014; Reisel, 2014; Helwege et al., 2017; Zhang and Zhou, 2018; Chava et al., 2019; Mansi et al., 2021), we use the issuer’s debt ratio (*Leverage*) and cash flow volatility (*Volatility*) as direct proxies for bondholder-shareholder agency and financial distress costs. We furthermore use profitability (*ROA*), tangible assets (*PPE*), interest coverage (*Interest coverage*), firm size (*Ln(Total assets)*), and a dummy variable capturing whether the issuer has an investment grade credit rating (*Investment grade*) as inverse proxies for these costs.[[7]](#footnote-7),[[8]](#footnote-8) Also consistent with previous covenant intensity studies, we control for the issuer’s investment opportunities. On the one hand, by accepting covenant restrictions in their bond contracts, firms reduce their flexibility to respond to any future profitable investment opportunities. This would be costlier in the high investment opportunity firms (Nash et al., 2003; Reisel, 2014). On the other hand, high investment opportunity firms may have more uncertainty regarding their future investment set and, therefore, higher asset substitution and underinvestment agency costs that they may wish to curb with covenants (Billett et al., 2007; Bradley and Roberts, 2015). We employ the market to book ratio (*MB*), capital expenditure (*Capex*), and research and development (R&D) expenditure (*RD*) as proxies for the issuer’s investment opportunities.

In addition, we control for the *CI index* of the issuers’ outstanding loans (*CIloans*) and outstanding bonds (*CIbonds*) in the covenant intensity analysis. Covenants on incremental bond issues could act as substitutes or complements of existing covenants (Beatty et al., 2012; Maet al., 2019; Lou and Otto, 2020), so we have no clear prediction on the impact of these measures on *CI index*.

Table 3, Panel A, provides a univariate comparison of the issuer characteristics for the convertible and straight bond samples. As noted in Section 2, theory predicts similar motives for covenants and convertible bonds. Therefore, we expect a positive impact of debt-related financing costs and investment opportunities on firms’ likelihood of substituting convertible for straight bonds (Green, 1984; Mayers, 1998). The univariate results are largely consistent with these predictions. Convertible bond issuers have higher values on all debt-related agency and financial distress cost proxies except for *Leverage* and *Interest coverage*, and higher values on all three investment opportunity proxies than straight bond issuers.

<< Please insert Table 3 here >>

Macroeconomic characteristics

We also control for relevant macroeconomic characteristics as in other studies on covenant intensity (Bradley and Roberts, 2015; Helwege et al., 2017). *TB yield* and *Credit spread* capture higher economy-wide debt-related financing costs, while *Market runup* captures lower economy-wide equity-related financing costs (Choe et al., 1993). We expect covenant intensity to be higher in periods with high *TB yield* and *Credit spread* because investors may wish for more protection against financial distress during these periods. We predict a negative impact of *Market runup* on covenant intensity to the extent that higher market returns capture economy-wide growth opportunities, leading to a wish for more flexibility in bond contract terms. Given the more equity-like nature of convertibles in comparison with straight bonds, we expect a positive impact of economy-wide debt-related financing costs and of *Market runup* on firms’ likelihood of substituting convertible for straight bonds (Lewis et al., 2003). Univariate differences between the macroeconomic characteristics for convertible and straight bond issues presented in Table 3, Panel B, are in line with these predictions, except that *Credit spread* is higher for straight than for convertible bonds.

Security design characteristics

We consider standard security design characteristics in some of our empirical tests. Because the total benefits of negotiated covenants might increase with the size of the offering while the costs are largely fixed, we expect a positive impact of offering *Proceeds* on covenant intensity (Qi and Wald, 2008). Bodie and Taggart (1978) argue that call and put features may reduce bondholder-shareholder agency problems and act as a substitute for bond covenants. We, therefore, predict a negative relation between *Callable* and *Putable* dummy variables and covenant intensity. Similarly, bonds with *Secured* or *Senior* status may have fewer covenants since bondholders already feel protected by these other debt characteristics (Billett et al., 2007; Qi and Wald, 2008). Finally, we expect a positive relation between *Maturity* and covenants because longer-maturity bonds create more opportunities for bondholder-shareholder agency conflicts (Nash et al., 2003). The summary statistics presented in Table 3, Panel C show that convertibles tend to have larger *Proceeds* than straight bond offerings. Consistent with the literature, we find a higher percentage of *Putable* bonds and fewer *Secured* and *Senior* bonds in the convertible than in the straight bond sample (Nanda and Yun, 1996; Chemmanur and Simonyan, 2010). Furthermore, the straight bond sample has a higher percentage of *Callable* bonds and a slightly larger *Maturity*. Convertibles have a lower at-issue *Yield* than straight bonds, consistent with the fact that the former securities embed a call option allowing the investor to convert the bonds into stocks (Brennan and Schwartz, 1988).

Period and industry effects

In addition, we include period effects dummy variables capturing distinct intervals in terms of convertible bond investor characteristics (Duca et al., 2012).[[9]](#footnote-9) The *Traditional investor* *period* (January 1989–December 1999) represents an era in which convertibles were typically bought by long-only investors.[[10]](#footnote-10) The *Arbitrage* *period* (January 2000–September 15th 2008) captures a time during which convertible bond arbitrageurs became important players as convertible bond investors. These investors try to profit from buying underpriced convertibles while short-selling the underlying stock. The *Global financial crisis (GFC) period* started after the fall of Lehman Brothers on September 15th 2008 and witnessed short-selling restrictions and a drop in convertible arbitrage fund flows (September 16th 2008–December 2009). We label the remaining sample period *Post-crisis period* (January 2010–September 2020).[[11]](#footnote-11) In addition, we include industry fixed effects (*Industry FE*) based on the Fama-French 12 industries.

1. **Do convertibles have fewer covenants than straight bonds?**

In this section, we examine whether convertibles have fewer covenants than straight bonds, ceteris paribus, as per *P1*. Our initial test consists of an Ordinary Least Squares (OLS) regression modeling *CI index* as a function of a *Convertible* dummy variable that equals one for convertible bond offerings and zero for straight bond offerings, and other potential observable determinants of covenant intensity described in the previous section:

$$CI index\_{i,t}= α\_{0}+ α'\_{1} Convertible\_{i,t}+α'\_{2}X\_{i,t}+ε\_{i,t} \left(1\right)$$

Our observation unit is a (convertible) bond offering by firm *i* at time *t*. $X\_{i,t}$ is a set of covenant intensity determinants and $ε\_{i,t}$ an error term. Table 4, Panel A provides the regression results. We base our statistical inferences on standard errors corrected for heteroscedasticity and clustered by issuers, consistent with previous covenant intensity studies (Miller and Reisel, 2012; Zhang and Zhou, 2018).

<< Please insert Table 4 here >>

Results in column (1) show that *Convertible* has a significantly negative association with *CI index*, consistent with the univariate results. In column (2), we estimate the regression displayed in Equation (1). Most importantly, we find that *Convertible* continues to have a significantly negative coefficient after adding other observable covenant intensity determinants embedded in vector *X*. For the debt-related costs proxies, we find negative impacts of *Ln(Total assets)* and *Investment grade*, consistent with expectations. The investment opportunity proxies *MB* and *RD*, which had ambiguous predicted signs, have a negative impact, while *Capex* has a nonsignificant coefficient. *CIbonds* has a positive impact, but *CIloans* has no significant impact. For the macroeconomic control variables, we find a positive impact of *TB yield* and a negative impact of *Market runup*, consistent with predictions. We find a lower covenant intensity during the *Arbitrage* *period* and the *GFC period* than during the *Traditional investor* period.

Our next set of regression specifications considers the non-random nature of firms’ selection of convertibles or straight bonds. We use an endogenous treatment effects model suggested by Heckman (1976, 1977) and adopted by several other corporate finance studies (e.g., Campa and Kedia, 2002; Reisel, 2014). We assume a firm’s decision to issue convertibles instead of straight bonds is determined by:

 $Convertible\_{i,t}^{\*}$ = $β\_{0}+$$β'\_{1}Z\_{i,t}+$ $μ\_{i,t} $ (2)

 $ Convertible\_{i.t}^{} =1$ if $Convertible\_{i,t}^{\*}$ $>0$

$ Convertible\_{i.t}^{} =0$ if $Convertible\_{i, t}^{\*}\leq 0$

where $Convertible\_{i,t}^{\*}$ is an unobserved latent variable representing the net benefits associated with issuing convertibles instead of straight bonds, $Z\_{i,t}$ a set of observable characteristics affecting the decision to issue convertibles over straight bonds, and $μ\_{i,t} $ an error term. We then estimate an augmented version of Equation (1) as follows:

$$CI index\_{i,t}= α\_{0}+α\_{1}'Convertible\_{i,t}+α\_{2}'X\_{i,t}+α\_{3}' Lambda\_{i,t}+ε\_{i,t} (3)$$

where $ Lambda\_{i,t}$is an endogenous binary treatment variable calculated with estimated values from the choice model expressed in Equation (2). The security choice modeled in Equation (2) implicitly assumes the following nested financing decision structure. Conditional on a decision to raise external financing with a bond offering, the firm ends up with a choice between (public or Rule 144a) convertible and straight bonds, having ruled out other options in prior stages of the decision process. Focusing on this ‘ultimate branch’ in a firm’s decision tree is acceptable from an empirical point of view if there is stronger substitutability between the two options in this final branch than between these two options and any other ruled out option (McFadden, 1981; MacKie-Mason, 1990). We believe this substitutability assumption is credible for our empirical design. More particularly, it is reasonable to assume that the issuer has ruled out private forms of financing in a previous step of her decision process, given the documented substantial differences between private financing on the one hand and public/Rule 144a financing on the other hand (Denis and Mihov, 2003; Billett et al., 2007; Gomes and Phillips, 2012). It is also reasonable to assume that the issuer has ruled out (seasoned) equity in a previous step of her decision process. Several convertible bond issuance theories consider convertibles a direct alternative to straight bonds, thereby either implicitly or explicitly assuming the firm has already eliminated equity (Green, 1984; Brennan and Kraus, 1987; Brennan and Schwartz, 1988; Mayers, 1998).

While we could technically achieve identification of the system of equations through non-linearities in the self-selection correction term *Lambda*$ $(Li and Prabhala, 2007), we should ideally augment $Z\_{i,t}$ with at least one exclusion variable that does not affect covenant intensity. We use the issuer’s pre-issuance stock return (*Stock runup*) and a measure for aggregate convertible bond offerings over the year before the bond issuance date (*Convertible market*) for this purpose. Because of the adverse selection problem associated with raising equity financing (Myers and Majluf, 1984), firms tend to wait for any undervaluation to vanish before issuing equity (Lucas and McDonald, 1990). Therefore, equity or equity-related security offerings will typically follow a positive stock runup, whilst there is no such prediction for a straight bond offering. In our empirical setting, this implies a positive predicted impact of *Stock runup* on a firm’s likelihood of issuing convertible instead of straight bonds. Furthermore, firms are more likely to substitute convertibles for straight bonds in hot convertible bond markets due to lower convertible bond-related financing costs or irrational herding behavior (Dutordoir and Van de Gucht, 2007). This yields the prediction of a positive impact of *Convertible market* on a firm’s likelihood of issuing convertible over straight bonds. In contrast, theory does not predict a significant impact of pre-issuance stock returns or aggregate convertible bond offerings on covenant intensity, making *Stock runup* and *Convertible market* suitable exclusion variables for the self-selection model. In an unreported test, we indeed find that these variablesdo not significantly affect *CI index*.

We simultaneously estimate Equations (2) and (3) with Full Maximum Likelihood (Maddala, 1983). Table 4, column (3) provides the estimates for the first-stage security choice model. Except for the negative coefficient on *Leverage*, all significant coefficients align with our predictions. Column (4) gives the selectivity-adjusted second-stage *CI index* model estimates. We find that *Convertible* retains its highly significant and negative effect on *CI index*. In terms of economic significance, the coefficient on *Convertible* implies that an average convertible bond offering has 3.21 fewer covenants than an average straight bond offering. Findings for the control variables resemble those in column (2). The coefficient on *Lambda* is significantly positive, suggesting that unobservable variables associated with firms’ self-selection into issuing convertibles affect *CI index*. We label the regression in column (4) the baseline covenant intensity regression in the remainder of the paper.

The remaining columns of Table 4, Panel A, provide robustness tests of this baseline regression. The first-stage probit results are similar across the different specifications, and therefore not reported. Because security design characteristics may be simultaneously determined with covenants, covenant intensity studies tend to omit these from their baseline regression models, and then add them to subsequent robustness tests (Miller and Reisel, 2012; Reisel, 2014). In line with this approach, we replicate the baseline covenant intensity analysis adding security design features.[[12]](#footnote-12) As column (5) shows, this leaves our results virtually unaltered. Most importantly, *Convertible* again negatively impacts *CI index*, with the size and significance of its coefficient not materially changed. *Proceeds*, *Senior*, and *Secured* have significant coefficients with the predicted signs, whereas *Ln(Maturity)* and *Callable* have significant coefficients with signs inconsistent with predictions, and *Putable* has no significant impact.

A relatively novel substream in the literature documents the impact of supply-side characteristics on covenant intensity (Murfin, 2012; Kang and Zhuang, 2019; Becker and Ivashina, 2022). For example, Becker and Ivashina (2022) find that changes in the investor base for loans have been a key driver for the popularity of ‘cov-lite’ loans. The period dummy variables included in our baseline regression already capture changes in convertible bond investor characteristics over time. In a final test reported in column (6), we further account for convertible bond supply characteristics by controlling for flows into convertible arbitrage funds (*CAflow*, defined as outlined in the Appendix). Higher values of these fund flows capture periods with a stronger presence of convertible bond arbitrageurs as convertible bond investors (Duca et al., 2012). As sophisticated investors, convertible bond arbitrageurs may have other tools at their disposal to mitigate the debt-related financing costs covered by covenants, therefore requiring fewer covenants in their debt contracts (Kang and Zhuang, 2019). To test this assumption, we augment the endogenous treatment effects regression with *CAflow* and an interaction term between this variable and the *Convertible* dummy. As predicted, we find a negatively significant coefficient for the *CAflow × Convertible* interaction term. However, the main effect of *Convertible* remains unaffected, suggesting that the lower covenant intensity of convertibles does not rely on a strong presence of convertible bond arbitrageurs among convertible bond investors.

<< Please insert Table 4 here >>

Table 4, Panel B, repeats the baseline covenant intensity regression for relevant subsamples as an additional robustness test. A sizeable percentage of the convertibles (37.48%) and straight bonds (16.51%) are Rule 144a offerings. Results in columns (1) and (2) show that the negative association between the conversion option and covenant intensity holds both for Rule 144a and public bonds. However, the association is weaker for the former. A substantial portion of the convertible and straight bond offerings is shelf-registered (26.70% and 50.99%, respectively). Results in columns (3) and (4) illustrate that the negative relationship between the conversion option and covenant intensity holds for shelf and non-shelf offerings but is more pronounced for the former group.[[13]](#footnote-13) Convertibles differ in the magnitude of their equity components (Lewis et al., 1998). Regressions in columns (5) and (6) show a negative coefficient on *Convertible* for subsamples of debt-like and equity-like convertibles, suggesting that the lower covenant intensity of convertibles holds across the spectrum of equity component sizes. However, the coefficient is larger for debt-like convertibles, consistent with evidence that debt-like convertibles are typically used by firms that wish to address debt-related agency costs (Green, 1984; Lewis et al., 1998). Finally, findings in columns (7) and (8) show that the baseline results hold equally strongly for investment-grade and non-investment-grade issuers.

Table 5 reports the baseline covenant intensity regression separately for the four groups of covenants. We use a *Covenant dummy* equal to one if the bond issue has at least one covenant of the group under consideration as the dependent variable and estimate one probit regression for each of the four covenant groups, consistent with previous studies (Chava et al., 2010; Cook et al., 2014; Reisel, 2014; Simpson and Grossman, 2017). We find that the coefficient on *Convertible* is significantly negative in the regressions for payout- and financing-restricting covenants. However, we find no significant differences in the investment-restricting covenants of convertibles and straight bonds after controlling for covenant intensity determinants. One possible explanation for this non-significant result lies in the difficulty of monitoring overly risky investments. While corporate payout and debt issuance decisions are easily observable and therefore straightforward to cover with covenants, this is not the case for corporate capital expenditure and R&D investment decisions. It might be difficult for outsiders to disentangle ‘too risky’ value-reducing investments from value-creating investments. As such, firms at high risk of asset substitution behavior may want to put double protection in place, by including both a conversion option and covenants in their bond offering, leading to weakened findings of a substitutive relation between convertibility and covenants. Finally, we find a positive coefficient on *Convertible* for event-driven covenants. By construction, event-driven covenants only deal with extreme situations, notably defaults and takeovers. These covenants therefore impose fewer limitations on firms’ day-to-day operations than the other three covenant types (Nanda and Yun, 1996). As such, the popularity of event-driven covenants for convertibles could result from a trade-off whereby convertible bond issuers only accept a degree of constraints for extreme situations.

In conclusion, the like-for-like comparison of individual covenant groups across convertibles and straight bonds provides a more nuanced image than the overall covenant intensity analysis, with the substitution effect only holding for payout- and financing-restricting covenants.

<< Please insert Table 5 here >>

1. **Do covenants reduce convertible bond yields?**

To test *P2*, we examine the yield impact of restrictive covenants for a pooled sample of convertibles and straight bonds.[[14]](#footnote-14) The model we estimate to examine the yield impact of the *CI index* is:

$Yield\_{i,t} = δ\_{0}+ δ'\_{1} CI index\_{i,t}\_{}+δ'\_{2}Convertible\_{i,t}+δ'\_{3} CI index\_{i,t}×Convertible\_{i,t} \_{}+ δ'\_{4}W\_{i,t}\_{}+ η\_{i,t} $ (4)

where $Yield\_{i,t}$ is the difference between the at-issue yield-to-maturity (YTM) of the bond and the YTM of a matched Treasury bond with the closest maturity. $W\_{i,t}$is a vector of control variables and $η\_{i,t}$ an error term. We expect a negative impact of *Convertible*, since convertible bonds typically have a lower yield than straight bonds due to the inclusion of the convertibility option (Brennan and Schwartz, 1988). Our key variable of interest is the interaction term of *CI index* with *Convertible*. Under *P2*, we predict a weaker negative impact of covenant intensity on convertible bond yields, relative to straight bond yields. This translates to a prediction of a negative main effect of *CI index*, and a positive effect of the *CI index × Convertible* interaction term on *Yield*. We use the issuer, macroeconomic, and period effects proxies described in Section 3 as components of $ W\_{i,t}$. We predict a higher yield for bonds issued by firms with higher debt-related agency and financial distress costs, and for bonds issued during macroeconomic conditions with higher debt-related financing costs. We furthermore predict a positive impact of investment opportunity measures on *Yield* because such opportunities could be associated with higher risk uncertainty. Since the various control variables may affect convertible and straight bond yields differently, we also interact each of these variables with *Convertible*, but do not report the detailed coefficients on these interaction terms in the interest of space.

When estimating the model, we need to account for the potential endogeneity of covenant intensity. *CI index* is a continuous variable, making a treatment effects model inappropriate for our design. We instead use a two-stage least squares (2SLS) instrumental variable approach. The first stage regresses *CI index* on the covenant intensity determinants included in the baseline covenant intensity regression. The second stage uses the instrumented value of the *CI index* obtained from the first stage to estimate the yield model in Equation (4). The instruments we use are *CIloans* and *CIbonds*. While these variables significantly affect the covenant intensities of new convertible and straight bond issues, as demonstrated in Table 4, we do not expect them to have a first-order impact on yields of new convertible and straight bond issues. In addition to considering the yield impact of the overall *CI index*, we separately study the impact of the four groups of covenants by estimating the model below:

$ Yield\_{i,t} = δ\_{0} + δ'\_{1}Covenant dummy\_{i,t}\_{}+ δ'\_{2}Convertible\_{i,t} + δ'\_{3}Covenant dummy\_{i,t}× Convertible\_{i,t}+\_{}δ'\_{4}W\_{i,t}\_{}+ δ'\_{5}Lambda\_{i,t}+ η\_{i,t} $ (5)

Since the covenant dummies are binary variables, we can use a treatment effects model to account for endogeneity. We thus estimate the model in Equation (5) as the second stage of a treatment effects regression, with the selectivity correction term *Lambda* obtained from a first-stage probit regression in which we regress the respective *Covenant dummy* on the covenant intensity determinants included in the baseline covenant intensity regression. The first and second stages of the treatment effects regression are estimated simultaneously with Full Maximum Likelihood estimation. We repeat this process for each of the four covenant dummies in each of the four covenant categories. We do not report the first-stage regressions for parsimony since they are virtually identical to the baseline first-stage regression results.

For the *CI index* and each of the four covenant types, we estimate a regression without security design features and a regression with security design features added, with the caveat that the latter are endogenously determined. We predict higher yields for security design features that impose a higher risk or less flexibility on bondholders, suggesting a positive yield impact of *Proceeds*, *Maturity,* and *Callable*, and a negative impact of *Putable*, *Senior,* and *Secured*.

Table 6 provides the results of the yield analysis. The coefficient on the *Covenant intensity* variable captures the yield impact of covenants for straight bonds (i.e., bonds with a *Convertible* value of zero). Consistent with previous empirical studies on the association between covenants and straight bond yields (Miller and Reisel, 2012; Reisel, 2014), we find a significant negative coefficient on this variable in all but one of the regressions. Results in column (1) indicate that a one-standard deviation increase in the *CI index* leads to a reduction in straight bond yields of 0.204%, equivalent to 10.72% of the average yields in our straight bond sample – an economic magnitude in line with straight bonds results obtained by Miller and Reisel (2012). Significant coefficients on the control variables are largely in line with predictions and therefore not discussed in detail here. Most importantly, consistent with *P2*, we find a significantly positive coefficient on the *Covenant intensity × Convertible* interaction term for the overall *CI index* and for all individual covenant types, except for payout and financing covenants. The total yield effect of *Covenant intensity* for convertible bonds is captured by the sum of the coefficients on *Covenant intensity* and *Covenant intensity × Convertible*. As reported in Table 6, we find that this impact is significantly positive for the overall *CI index*, as well as for investment and event covenants, whilst it is insignificant for payout and financing covenants. We note that the frequencies of payout and financing covenants for convertible bonds are extremely low, i.e., 1.54% and 0.94% respectively, as per the univariate findings in Table 2. These low occurrence rates may weaken the power of the yield analyses pertaining to payout and financing covenant types.

Overall, the results in Table 6 provide strong evidence that covenants do not reduce convertible bond yields, but negatively impact straight bond yields. This pattern is consistent with *P2*.

<< Please insert Table 6 here >>

1. **Additional tests**

We conduct two further sets of empirical tests to sharpen the interpretation of our main findings. First, to obtain more insight into differences in the drivers of covenant intensities of convertible and straight bonds, we estimate the baseline *CI index* regression in Table 4, column (4) separately for these two bond types. To address firms’ self-selection of bond type, we adopt a switching regression approach. The first-stage selection model results are virtually identical to those provided in Table 4, column (3), and therefore not reported for brevity. The second-stage covenant intensity regression results are provided in columns (1) and (2) of Table 7. An interesting pattern emerges. For the straight bond regression in column (2), we detect several significant issuer-specific covenant intensity determinants, with most findings suggesting that higher debt-related agency and financial distress costs and fewer investment opportunities are associated with higher covenant intensity values.[[15]](#footnote-15) By contrast, issuer-specific covenant intensity determinants have a weaker impact on the *CI index* in the regression for convertibles in column (1). A *Chi*2-test confirms that the joint significance of issuer-specific variables in explaining the *CI index* is lower for convertibles than for straight bonds (*p*-value = 0.02). The absence of a strong relationship between covenant usage in convertibles and the extent of issuer-specific debt-related financing costs is consistent with our earlier finding that covenants embedded in convertibles do not result in lower yields. It suggests that convertible bond covenants are boilerplate inclusions, largely untailored to issuer characteristics. We obtain similar findings on the differential impact of issuer characteristics when we re-estimate the regressions adding security design features, in columns (3) and (4). A *Chi*2-test indicates that security design features also have a lower joint significance for explaining the convertible *CI index*, in comparison with the straight bond *CI index* (*p*-value = 0.005).[[16]](#footnote-16)

<< Please include Table 7 here >>

Our first-stage selection model in the analysis of covenant intensities and yields rests on the assumption that firms can substitute convertibles for straight bonds, and vice versa. This assumption may be overly strong. For example, convertible bond issuers’ debt-related financing costs may be too high for them to be able to tap straight bond markets. In a final set of robustness tests, we impose stronger comparability between the two security offering samples than in our baseline analysis, by requiring that a given bond issuer has previously issued a bond of the other type. Table 8 reports the results of these robustness tests. Panel A focuses on the association between convertibility and covenant intensity, and Panel B addresses the yield impact of covenant intensity. In each panel, we limit our dataset to convertible (straight) bond issuers that have issued straight bonds (convertibles) during a specified window *before* their current offering. More specifically, for each bond *i*, if there is a prior bond *k* issued by the same issuer at any time during the sample period (column (1)), within five years (column (2)), within three years (column (3)), or within one year (column (4)) before the issuance date of bond *i*, and bond *i* and bond *k* are of different types (i.e., one is a convertible and the other is a straight bond), we keep both bond *i* and bond *k* in the sample. Panel A adopts treatment effects and Panel B adopts 2SLS models, as in our baseline tests in Tables 4 and 6, respectively.

Reassuringly, the results in Panel A confirm a negative impact of *Convertible* on *CI index*, consistent with *P1*. The results in column (4) are not statistically significant, which can be attributed to the substantial drop in sample size in that analysis. Moreover, consistent with *P2*, the results in Panel B again show a significantly positive impact of the *CI index × Convertible* interaction term on *Yield*, suggesting that convertible bond covenants are less able to attenuate bond financing costs, compared with straight bond covenants. In unreported further tests, we obtain virtually identical results when we add security design features or firm fixed effects to the subsample analyses or limit these analyses to firms that still have the previous bond of the alternative type outstanding.[[17]](#footnote-17)

<< Please include Table 8 here >>

1. **Summary and discussion**

Convertible bonds have been largely overlooked in the literature on restrictive covenants. This is an important omission because convertibles represent billions of U.S. dollars in annual issuance volume. Drawing from theories on covenants and theories on convertible bond issuance, we formulate and test predictions on the frequency and role of covenants in convertible bond offerings, thereby complementing previous studies on straight bond covenants.

Anecdotal evidence suggests that investors and advisors work under the assumption that convertibles are covenant-light. Illustrative quotes include *“Convertible notes generally do not include any significant operating or financial covenants”* (Gibson Dunn, 2019) and *“Convertibles are also typically unsecured obligations and have no covenants”* (Oaktree Insights, 2020). However, to the best of our knowledge, no academic study has substantiated this assumption under like-for-like conditions. After controlling for relevant covenant intensity determinants, we find that, while being less covenant heavy than straight bonds, convertibles are not covenant free. In fact, convertibles have a frequency of investment-restricting covenants not statistically different from that of straight bonds, and a frequency of event-driven covenants significantly higher than that of straight bonds.

Our subsequent evidence on the yield effect and determinants of convertible bond covenants suggests that convertible bond covenants cannot alleviate concerns about debt-related financing costs and are set largely independently of issuer characteristics. These ‘non-results’ contrast with established findings for straight bond covenants. In response to our paper’s title, we conclude that convertible bond covenants are largely boilerplate in nature.

Our paper has practical implications for a range of stakeholders. We hope that our results make (potential) convertible bond investors aware that those few covenants included in convertibles tend to be mostly disconnected from issuer-specific characteristics and have no incremental benefits in terms of yield reduction. This result could also be useful for companies and investment banks involved in negotiating the contract terms for convertible bonds. Since the start of the COVID-19 pandemic, we have witnessed record numbers of convertible bond offerings, many of which are by first-time issuers who may be particularly open to reflect about appropriate convertible debt covenants (Calamos, 2020; Driebusch, 2022). While our paper does not cast judgment on whether the current ‘non-role’ of convertible bond covenants is optimal, these parties may at least wish to reflect more critically on appropriate covenants for convertibles rather than blithely including boilerplate statements.

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| **Table 1: Sample selection and distribution by year**  |
| Panel A: Sample selection procedure | *N* |
|  | All bonds | Convertible | Straight |
| All bonds issued by U.S.-domiciled companies with an issue date between Jan. 1989 and Sept. 2020 obtained from Mergent FISD. | 37,013 | 3,673 | 33,340 |
| Exclude private (non-Rule 144a) placements, medium term notes (MTNs) and preferred stock. Exclude bonds defined as government, municipal or foreign. Exclude mortgage-backed securities, asset-backed securities and bonds with special features such as pay-in-kind or insured. | 28,665 | 3,358 | 25,407 |
| Merge with Compustat/CRSP by CUSIP. | 16,598 | 2,715 | 13,883 |
| Remove bonds with missing data on issuer or security design variables used in regressions. | 14,378 | 2,622 | 11,756 |
| Remove bonds issued by financial or utility firms. | 12,094 | 2,383 | 9,711 |
| Remove bonds without covenant information in Mergent FISD. | 11,108 | 2,097 | 9,011 |
| (Number of issuers) | (1,907) | (681) | (1,226) |
|  |  |  |  |
| Panel B: Issues by year |
|  |  | All bonds |  | Convertible |  | Straight |
|  |  | *N* | Percentage |  | *N* | Percentage |  | *N* | Percentage |
| 1989–1995 |  | 1,206 | 10.86 |  | 177 | 8.44 |  | 1,029 | 11.42 |
| 1996–2000 |  | 1,778 | 16.01 |  | 292 | 13.92 |  | 1,486 | 16.49 |
| 2001–2005 |  | 2,280 | 20.53 |  | 696 | 33.19 |  | 1,584 | 17.58 |
| 2006–2010 |  | 1,792 | 16.13 |  | 368 | 17.55 |  | 1,424 | 15.80 |
| 2011–2015 |  | 2,072 | 18.65 |  | 307 | 14.64 |  | 1,765 | 19.59 |
| 2016–2020 |  | 1,980 | 17.82 |  | 257 | 12.26 |  | 1,723 | 19.12 |
| Total |  | 11,108 | 100 |  | 2,097 | 100 |  | 9,011 | 100 |
| Notes: This table presents the sample selection procedure (Panel A) and the total, convertible and straight bond sample distributions by year (Panel B). *N* denotes the number of observations. |

**Table 2: Covenant characteristics**

Panel A: Covenant intensity per covenant category

|  |  |  |
| --- | --- | --- |
| Classification | Mergent FISD covenant description | Covenant intensity |
| Convertible | Straight |
| **Investment restrictions = (I1+I2+I3)/3** |  | **36.88%** | **52.23%\*\*\*** |
| I1 Asset sale clause |  | 54.98% | 77.52%\*\*\* |
| *Asset\_sale\_clause* | Requires issuer to use net proceeds from the sale of certain assets to redeem the bonds at par or a premium.  |  |  |
| *Sale\_assets* | Restricts issuer’s ability to sell assets or use the proceeds from the sale of assets. Such restrictions may require the issuer to apply some or all the sales proceeds to repurchase debt through a tender offer or call. |  |  |
| *Sale\_xfer\_assets\_unrestricted* | Requires issuer to use proceeds from selling subsidiaries’ assets (either certain asset sales or all asset sales over some threshold) to reduce debt. |  |  |
| I2 Investment policy restrictions |  | 0.43% | 1.66%\*\*\* |
| *Investments* | Restricts issuer’s investment policy to prevent risky investments. |  |  |
| *Investments\_unrestricted\_subs* | Restricts subsidiaries’ investments. |  |  |
| I3 Merger restrictions |  | 55.22% | 77.67%\*\*\* |
| *Consolidation\_merger* | Restricts a consolidation or merger of the issuer with another entity. |  |  |
|  |  |  |  |
| **Payout restrictions = (P1+P2)/2** |  | **1.54%** | **16.45%\*\*\*** |
| P1 Dividend payment restrictions |  | 1.86% | 15.79%\*\*\* |
| *Dividends\_related\_payments (issuer)* | Limits payments made to shareholders or other entities to a certain net income percentage or other ratio. |  |  |
| *Dividends\_related\_payments (subsidiary)* | Limits subsidiary payments made to shareholders or other entities to a certain net income percentage or other ratio. |  |  |
| P2 Share repurchase restrictions |  | 1.24% | 17.11%\*\*\* |
| *Restricted\_payments* | Restricts issuer’s freedom to make payments (other than dividend-related payments) to shareholders and others. |  |  |
|  |  |  |  |
| **Financing restrictions = (F1+F2+F3+F4+F4+F6+F7)/7** |  | **0.94%** | **22.27%\*\*\*** |
| F1 Funded debt restrictions |  | 0.04% | 1.74%\*\*\* |
| *Funded\_debt (issuer)* | Restricts issuer from issuing additional funded debt. Funded debt is any debt with an initial maturity of one year or longer. |  |  |
| *Funded\_debt (subsidiary)* | Restricts issuer’s subsidiaries from issuing additional funded debt.  |  |  |
| F2 Subordinated debt restrictions |  | 0.24% | 3.10%\*\*\* |
| *Subordinated\_debt\_issuance* | Restricts issuance of junior or subordinated debt. |  |  |

**Table 2: continued**

|  |  |  |
| --- | --- | --- |
| Classification | Mergent FISD covenant description | Covenant intensity |
|  |  | Convertible | Straight |
| F3 Senior debt restrictions |  | 0.10% | 0.57%\*\*\* |
| *Senior\_debt\_issuance* | Restricts issuer to the amount of senior debt it may issue in the future. |  |  |
|  |  |  |  |
| F4 Secured debt restrictions |  | 3.20% | 66.20%\*\*\* |
| *Negative\_pledge\_covenant* | Issuer cannot issue secured debt unless it secures the current issue on a pari passu basis. |  |  |
| F5 Total leverage tests |  | 0.57% | 13.85%\*\*\* |
| *Leverage\_test (issuer)* | Restricts issuer’s total indebtedness. |  |  |
| *Leverage\_test (subsidiary)* | Restricts issuer’s subsidiaries’ total indebtedness.  |  |  |
| *Net\_earnings\_test\_issuance* | Requires issuer to have achieved or maintained certain profitability levels to raise additional debt. This test is a variation of the (more common) fixed coverage tests. |  |  |
| *Maintenance\_net\_worth* | Requires issuer to maintain a minimum specified net worth. |  |  |
| *Fixed\_charge\_coverage (issuer)* | Requires issuer to have a ratio of earnings available for fixed charges, of at least a minimum specified level of earnings. |  |  |
| *Fixed\_charge\_coverage (subsidiary)* | Requires issuer’s subsidiaries to maintain a minimum net income to fixed charges ratio. |  |  |
|  |  |  |  |
| F6 Sale-leaseback |  | 1.72% | 58.27%\*\*\* |
| *Sales\_leaseback (issuer)* | Restricts issuer to the type or amount of property used in a sale leaseback transaction and may restrict its use of the proceeds of the sale.  |  |  |
| *Sales\_leaseback (subsidiary* | Restricts issuer’s subsidiaries from selling then leasing back assets that provide security for the debtholder.  |  |  |
|  |  |  |  |
| F7 Stock issue restrictions |  | 0.76% | 12.19%\*\*\* |
| *Stock\_issuance\_issuer* | Restricts issuer from issuing additional common stock. |  |  |
| *Stock\_issuance*  | Restricts issuer from issuing additional common stock in restricted subsidiaries. Restricted subsidiaries are those which are consolidated for financial test purposes. |  |  |
| *Preferred\_stock\_issuance* | Restricts issuer’s subsidiaries’ ability to issue preferred stock. |  |  |
|  |  |  |  |
| **Event-driven restrictions = (E1+E2+E3)/3** |  | **42.12%** | **37.76%\*\*\*** |
| E1 Rating and net worth triggers |  | 0.72% | 1.48%\* |
| *Rating\_decline\_trigger\_put* | A decline in the issuer's credit rating (or issue) triggers a bondholder put provision. |  |  |
| *Declining\_net\_worth* | Certain bond provisions are triggered if the issuer's net worth (as defined) falls below a minimum level. |  |  |

**Table 2: continued**

|  |  |  |
| --- | --- | --- |
| Classification | Mergent FISD covenant description | Covenant intensity |
|  |  | Convertible | Straight |
| E2 Cross-default provisions |  | 58.27% | 64.87%\*\*\* |
| *Cross\_default* | Activates an event of default in their issue if an event of default has occurred under any other debt of the company. |  |  |
| *Cross\_acceleration* | Allows the bondholder to accelerate their debt if any other debt of the organization has been accelerated due to an event of default. |  |  |
|  |  |  |  |
| E3 Poison put |  | 67.38% | 46.94%\*\*\* |
| *Change\_control\_put\_provisions* | With a change of control in the issuer, bondholders can sell the issue back to the issuer.  |  |  |
|  |  |  |  |
| **CI index = (I1+I2+I3+P1+P2+F1+F2+F3+F4+F4+F6+F7+E1+E2+E3)/15**  | **16.45%** | **30.58%\*\*\*** |

|  |
| --- |
| **Table 2: continued**Panel B: Correlation matrix of covenant groups |
|  | Investment-restricting | Payout-restricting | Financing-restricting | Event-driven |
| Investment-restricting covenants |  | 0.1005\*\*\* | 0.1410\*\*\* | 0.4777\*\*\* |
| Payout-restricting covenants | 0.2682\*\*\* |  | 0.3861\*\*\* | 0.0715\*\*\* |
| Financing-restricting covenants | 0.5814\*\*\* | 0.3032\*\*\* |  | 0.1222\*\*\* |
| Event-driven covenants | 0.4019\*\*\* | 0.4561\*\*\* | 0.4144\*\*\* |  |

Notes: Panel A presents univariate tests for differences in covenant frequencies between convertible and straight bonds. The names in italics are the covenant names obtained from Mergent FISD. \*, \*\*, \*\*\*denote that the covenant frequencies for the two samples are significantly different at the 10%, 5% and 1% levels, respectively (two-tailed), based on a *Chi*2-test. Panel B presents Pearson correlations between the intensities of covenants for individual covenant groups. Correlations for the convertible (straight) bond sample are reported above (below) the diagonal. \*, \*\*, \*\*\*denote significance at the 10%, 5% percent and 1% levels, respectively (two-tailed).

|  |
| --- |
| **Table 3: Summary statistics** |
|  | Convertible (*N* = 2,097) |  | Straight (*N* = 9,011) |
|  | Mean | Median | Std. Dev. |  | Mean | Median | Std. Dev. |
| Panel A: Issuer characteristics |
| *Leverage* | 0.251 | 0.231 | 0.215 |  | 0.293\*\*\* | 0.269\*\*\* | 0.169 |
| *Volatility* | 0.034 | 0.030 | 0.016 |  | 0.023\*\*\* | 0.019\*\*\* | 0.012 |
| *ROA* | -0.040 | 0.018 | 0.169 |  | 0.048\*\*\* | 0.053\*\*\* | 0.079 |
| *PPE* | 0.227 | 0.147 | 0.219 |  | 0.363\*\*\* | 0.296\*\*\* | 0.261 |
| *Interest coverage* | 15.545 | 4.250 | 37.394 |  | 13.486\* | 7.839\*\*\* | 22.459 |
| *Total assets ($million)* | 2,739 | 785 | 8,444 |  | 23,082\*\*\* | 7,592\*\*\* | 41,149 |
| *Investment grade (%)* | 11.87 | 0 | 32.36 |  | 64.10\*\*\* | 100\*\*\* | 47.97 |
| *MB* | 3.813 | 2.597 | 7.281 |  | 3.437\* | 2.429\*\* | 6.061 |
| *Capex* | 0.442 | 0.282 | 0.464 |  | 0.258\*\*\* | 0.188\*\*\* | 0.271 |
| *RD* | 0.073 | 0.037 | 0.093 |  | 0.017\*\*\* | 0.000\*\*\* | 0.034 |
| *CIloans* | 0.186 | 0.077 | 0.221 |  | 0.222\*\*\* | 0.179\*\*\* | 0.180 |
| *CIbonds* | 0.078 | 0.000 | 0.110 |  | 0.211\*\*\* | 0.238\*\*\* | 0.138 |
|  |  |  |  |  |  |  |  |
| Panel B: Macroeconomic characteristics |
| *TB yield* | 0.024 | 0.018 | 0.021 |  | 0.023\*\* | 0.016\*\*\* | 0.022 |
| *Credit spread* | 0.940 | 0.880 | 0.325 |  | 0.970\*\*\* | 0.890\*\*\* | 0.384 |
| *Market runup* | 0.054 | 0.039 | 0.111 |  | 0.039\*\*\* | 0.025\*\*\* | 0.106 |
|  |  |  |  |  |  |  |  |
| Panel C: Security design characteristics |
| *Proceeds* | 0.244 | 0.170 | 0.742 |  | 0.196\*\* | 0.052\*\*\* | 0.562 |
| *Callable (%)*  | 60.70 | 100 | 48.85 |  | 80.10\*\*\* | 100\*\*\* | 39.90 |
| *Putable (%)* | 28.42 | 0 | 45.10 |  | 1.92\*\*\* | 0\*\*\* | 13.80 |
| *Secured (%)* | 0.47 | 0 | 6.89 |  | 3.65\*\*\* | 0\*\*\* | 18.76 |
| *Senior (%)* | 55.51 | 100 | 49.71 |  | 90.52\*\*\* | 100\*\*\* | 29.30 |
| *Maturity (months)* | 131.40 | 84 | 94 |  | 137.22\* | 118\*\*\* | 119 |
| *Yield (%)* | 0.677 | 0 | 1.365 |  | 2.138\*\*\* | 1.495\*\*\* | 1.788 |
| Notes: Panel A presents univariate tests for differences in issuer characteristics between convertible and straight bond offerings. Panel B presents univariate tests for differences in macroeconomic characteristics between convertible and straight bond offerings. Panel C presents univariate tests for differences in security design characteristics between convertible and straight bond offerings. Continuous variables are winsorized at the 1st and 99th percentiles. The Appendix presents the definition and sources of all variables. *N* denotes the number of observations. \*, \*\*, \*\*\*denote that the means (*t*-test) and the medians (Wilcoxon rank-sum test) for the comparing samples are significantly different at the 10%, 5% and 1% levels, respectively (two-tailed). |

**Table 4: Association between convertibility and overall covenant intensity**

Panel A: Full sample results

|  |  |  |  |
| --- | --- | --- | --- |
|  | *OLS* |  | *Treatment effects* |
|  | *CI index* | *CI index* |  | *Convertible* | *CI index* | *CI index* | *CI index* |
|  | (1) | (2) |  | (3)1st stage | (4)2nd stage | (5)2nd stage | (6)2nd stage |
| *Convertible* | -0.141\*\*\* | -0.118\*\*\* |  |  | -0.214\*\*\* | -0.197\*\*\* | -0.222\*\*\* |
|  | (-32.17) | (-25.36) |  |  | (-15.59) | (-13.88) | (-15.96) |
| *Leverage* |  | -0.010 |  | -1.227\*\*\* | -0.039\*\*\* | -0.044\*\*\* | -0.031\*\*\* |
|  |  | (-1.08) |  | (-11.44) | (-4.03) | (-4.69) | (-3.34) |
| *Volatility* |  | -0.003 |  | 0.963\*\* | 0.033 | 0.029 | 0.030 |
|  |  | (-0.08) |  | (2.27) | (0.91) | (0.81) | (0.82) |
| *ROA* |  | 0.023 |  | -0.892\*\*\* | -0.002 | 0.001 | -0.001 |
|  |  | (1.35) |  | (-4.60) | (-0.15) | (0.04) | (-0.06) |
| *PPE* |  | -0.011 |  | -0.449\*\*\* | -0.017\*\* | -0.015\*\* | -0.018\*\* |
|  |  | (-1.30) |  | (-4.68) | (-2.32) | (-2.10) | (-2.44) |
| *Interest coverage* |  | 0.000 |  | -0.000 | 0.000 | 0.000 | 0.000 |
|  |  | (1.28) |  | (-0.09) | (1.25) | (0.57) | (1.13) |
| *Ln(Total assets)* |  | -0.021\*\*\* |  | -0.287\*\*\* | -0.026\*\*\* | -0.021\*\*\* | -0.026\*\*\* |
|  |  | (-14.83) |  | (-18.36) | (-19.00) | (-15.02) | (-19.06) |
| *Investment grade* |  | -0.055\*\*\* |  | -0.788\*\*\* | -0.070\*\*\* | -0.059\*\*\* | -0.070\*\*\* |
|  |  | (-11.13) |  | (-15.60) | (-15.82) | (-13.19) | (-15.77) |
| *MB* |  | -0.000\* |  | 0.003 | -0.000 | -0.000 | -0.000 |
|  |  | (-1.88) |  | (0.96) | (-1.35) | (-1.48) | (-1.47) |
| *Capex* |  | 0.007 |  | 0.030 | 0.009\*\* | 0.006 | 0.008 |
|  |  | (1.50) |  | (0.57) | (1.96) | (1.34) | (1.64) |
| *RD* |  | -0.174\*\*\* |  | 3.793\*\*\* | -0.070\* | -0.044 | -0.084\*\* |
|  |  | (-4.83) |  | (8.75) | (-1.84) | (-1.18) | (-2.22) |
| *CIloans*  |  | -0.009 |  |  | -0.016\*\* | -0.040\*\*\* | -0.031\*\*\* |
|  |  | (-1.09) |  |  | (-2.08) | (-4.83) | (-3.73) |
| *CIbonds* |  | 0.624\*\*\* |  |  | 0.621\*\*\* | 0.601\*\*\* | 0.594\*\*\* |
|  |  | (36.51) |  |  | (58.24) | (52.19) | (51.28) |
| *Stock runup* |  |  |  | 0.003\*\*\* |  |  |  |
|  |  |  |  | (2.85) |  |  |  |
| *TB yield* |  | 0.210\* |  | 5.327\*\*\* | 0.291\*\* | 0.336\*\*\* | 0.314\*\* |
|  |  | (1.80) |  | (3.33) | (2.31) | (2.70) | (2.50) |
| *Credit spread* |  | 0.001 |  | 0.144\* | 0.002 | -0.000 | 0.003 |
|  |  | (0.16) |  | (1.92) | (0.38) | (-0.02) | (0.57) |
| *Market runup* |  | -0.029\*\* |  | 0.678\*\*\* | -0.023\* | -0.025\* | -0.011 |
|  |  | (-1.97) |  | (3.62) | (-1.69) | (-1.78) | (-0.77) |
| *Convertible market* |  |  |  | 3.763\*\*\* |  |  |  |
|  |  |  |  | (5.78) |  |  |  |
| *Arbitrage period* |  | -0.029\*\*\* |  | 0.115 | -0.018\*\*\* | -0.024\*\*\* | -0.021\*\*\* |
|  |  | (-5.49) |  | (1.17) | (-3.48) | (-4.46) | (-4.06) |
| *GFC period* |  | -0.036\*\*\* |  | 0.161 | -0.030\*\* | -0.033\*\*\* | -0.016 |
|  |  | (-2.98) |  | (1.01) | (-2.56) | (-2.79) | (-1.32) |
| *Post-crisis period* |  | 0.006 |  | 0.308\*\*\* | 0.013\* | 0.009 | 0.014\* |
|  |  | (0.86) |  | (3.21) | (1.85) | (1.23) | (1.92) |
| *Proceeds* |  |  |  |  |  | 0.041\*\*\* |  |
|  |  |  |  |  |  | (7.89) |  |
| *Callable* |  |  |  |  |  | 0.038\*\*\* |  |
|  |  |  |  |  |  | (10.62) |  |
| *Putable* |  |  |  |  |  | -0.005 |  |
|  |  |  |  |  |  | (-0.75) |  |
| *Secured* |  |  |  |  |  | -0.044\*\*\* |  |
|  |  |  |  |  |  | (-5.50) |  |
| *Senior* |  |  |  |  |  | -0.020\*\*\* |  |
|  |  |  |  |  |  | (-4.52) |  |
| *Ln(Maturity)* |  |  |  |  |  | -0.009\*\*\* |  |
|  |  |  |  |  |  | (-3.98) |  |
|  |  |  |  |  |  |  |  |
| **Table 4: continued** |
|  | *OLS* |  | *Treatment effects* |
|  | *CI index* | *CI index* |  | *Convertible* | *CI index* | *CI index* | *CI index* |
|  | (1) | (2) |  | (3)1st stage | (4)2nd stage | (5)2nd stage | (6)2nd stage |
| *CA flow* |  |  |  |  |  |  | 0.010\*\*\* |
|  |  |  |  |  |  |  | (5.73) |
| *CAflow × Convertible* |  |  |  |  |  |  | -0.014\*\*\* |
|  |  |  |  |  |  |  | (-3.76) |
| *Lambda* |  |  |  |  | 0.057\*\*\* | 0.053\*\*\* | 0.057\*\*\* |
|  |  |  |  |  | (7.39) | (6.87) | (7.28) |
| *Intercept* | 0.306\*\*\* | 0.402\*\*\* |  | 0.526\*\*\* | 0.467\*\*\* | 0.457\*\*\* | 0.476\*\*\* |
|  | (86.77) | (27.19) |  | (2.82) | (29.12) | (22.89) | (28.90) |
| *Industry FE* | No | Yes |  | Yes | Yes | Yes | Yes |
| *N* | 11,108 | 11,108 |  | 11,108 | 11,108 | 11,108 | 11,108 |
| Adj. *R*2 | 0.106 | 0.360 |  |  |  |  |  |
| *F*-statistic | 1,035.18\*\*\* | 191.34\*\*\* |  |  |  |  |  |
| Wald *Chi*2 |  |  |  |  | 7,894\*\*\* | 8,548\*\*\* | 8,178\*\*\* |
| % Correctly classified |  |  |  | 88.90% |  |  |  |

**Table 4: continued**

Panel B: Results for relevant subsamples

|  |  |
| --- | --- |
|  | Dependent variable = *CI index* |
|  | (1)Rule 144a | (2)Non-Rule 144a |  | (3)Shelf | (4)Non-shelf |  | (5)Debt-like convertibles | (6)Equity-like convertibles |  | (7)Investment grade issuers | (8)Non-investment grade issuers |
| *Convertible* | -0.070\*\*\* | -0.292\*\*\* |  | -0.184\*\*\* | -0.219\*\*\* |  | -0.236\*\*\* | -0.178\*\*\* |  | -0.051\*\* | -0.239\*\*\* |
|  | (-2.77) | (-24.71) |  | (-16.13) | (-9.12) |  | (-15.46) | (-11.28) |  | (-2.38) | (-7.51) |
| *p*-value for difference in *Convertible* coefficients between subsamples | 0.025 |  | 0.004 |  | 0.000 |  | 0.368 |
| *Lambda* | 0.031\*\* | 0.063\*\*\* |  | 0.043\*\*\* | 0.052\*\*\* |  | 0.062\*\*\* | 0.040\*\*\* |  | 0.001 | 0.064\*\*\* |
|  | (2.14) | (9.51) |  | (6.72) | (3.80) |  | (7.38) | (4.54) |  | (0.09) | (3.50) |
|  |  |  |  |  |  |  |  |  |  |  |  |
| *Baseline control variables* | Yes | Yes |  | Yes | Yes |  | Yes | Yes |  | Yes | Yes |
| *Industry FE* | Yes | Yes |  | Yes | Yes |  | Yes | Yes |  | Yes | Yes |
| *N* | 2,274 | 8,834 |  | 5,155 | 5,953 |  | 10,076 | 10,077 |  | 6,025 | 5,083 |
| Wald *Chi*2 | 2,775\*\*\* | 6,922\*\*\* |  | 4,593\*\*\* | 4,927\*\*\* |  | 6,619\*\*\* | 6,342\*\*\* |  | 4,532\*\*\* | 4,008\*\*\* |
| Notes: This table presents the results of the association of convertibility, captured by the *Convertible* dummy, with covenant intensity for the full sample (Panel A) and relevant subsamples (Panel B). Panel B includes the same issuer-specific, macroeconomic, and period-specific control variables to those in Panel A, column (4). All tests in Panel B adopt treatment effects models. Rule 144a bonds are bonds issued through SEC Rule 144a. Shelf bonds are bonds issued under SEC Rule 415. Debt (Equity)-like convertibles are convertibles with a *Conversion premium* larger than (smaller than or equal to) the sample median. Investment-grade issuers are issuers with credit rating BBB and above. The *p*-value for the difference in *Convertible* coefficients between subsamples in Panel B is based on a Wald *Chi*2-test. *z*-statistics reported in parentheses are based on standard errors corrected for heteroskedasticity, and clustered by firm. Continuous variables are winsorized at the 1st and 99th percentiles. The Appendix presents the definition and sources of all variables. *N* denotes the number of observations. We use \*, \*\*, \*\*\* to denote significance at the 10%, 5% and 1% levels, respectively (two-tailed). |

**Table 5: Association between convertibility and the four covenant groups**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | (1) | (2) | (3) | (4) |
|  | *Investment covenant dummy* | *Payout covenant dummy* | *Financing covenant dummy* | *Event covenant dummy* |
| *Convertible* | -0.030 | -0.784\*\*\* | -0.563\*\*\* | 0.162\*\*\* |
|  | (-0.78) | (-26.83) | (-16.85) | (4.30) |
| *Leverage* | -0.084\*\*\* | -0.007 | -0.042\* | 0.029 |
|  | (-3.26) | (-0.36) | (-1.91) | (1.14) |
| *Volatility* | 0.220\*\* | 0.029 | 0.051 | -0.131 |
|  | (2.18) | (0.36) | (0.59) | (-1.34) |
| *ROA* | 0.038 | -0.197\*\*\* | 0.028 | 0.091\*\* |
|  | (0.84) | (-5.33) | (0.71) | (2.06) |
| *PPE* | -0.028 | -0.013 | -0.050\*\*\* | -0.007 |
|  | (-1.39) | (-0.82) | (-2.92) | (-0.35) |
| *Interest coverage* | 0.000 | 0.000 | -0.000 | 0.001\*\*\* |
|  | (0.41) | (1.49) | (-0.26) | (4.74) |
| *Ln(Total assets)* | -0.005 | -0.065\*\*\* | -0.015\*\*\* | -0.050\*\*\* |
|  | (-1.37) | (-21.47) | (-4.69) | (-13.57) |
| *Investment grade* | 0.004 | -0.418\*\*\* | 0.086\*\*\* | -0.062\*\*\* |
|  | (0.35) | (-42.45) | (8.18) | (-5.24) |
| *MB* | 0.000 | -0.001 | -0.000 | -0.000 |
|  | (0.65) | (-1.52) | (-0.73) | (-0.55) |
| *Capex* | -0.013 | 0.023\*\* | -0.028\*\* | 0.052\*\*\* |
|  | (-1.01) | (2.25) | (-2.56) | (4.23) |
| *RD* | -0.214\*\* | -0.146\* | 0.088 | -0.350\*\*\* |
|  | (-2.06) | (-1.73) | (0.98) | (-3.46) |
| *CIloans*  | -0.114\*\*\* | -0.072\*\*\* | -0.078\*\*\* | -0.052\*\* |
|  | (-4.98) | (-3.87) | (-3.94) | (-2.33) |
| *CIbonds* | 1.482\*\*\* | 0.365\*\*\* | 1.314\*\*\* | 1.312\*\*\* |
|  | (46.27) | (14.05) | (47.54) | (42.16) |
| *TB yield* | 1.390\*\*\* | -0.014 | -0.375 | 3.089\*\*\* |
|  | (4.01) | (-0.05) | (-1.25) | (9.17) |
| *Credit spread* | 0.050\*\*\* | -0.000 | -0.022\* | 0.018 |
|  | (3.48) | (-0.01) | (-1.76) | (1.26) |
| *Market runup* | -0.115\*\*\* | 0.047 | 0.023 | -0.218\*\*\* |
|  | (-3.00) | (1.49) | (0.69) | (-5.86) |
| *Arbitrage period* | -0.080\*\*\* | -0.002 | -0.107\*\*\* | 0.043\*\*\* |
|  | (-5.63) | (-0.21) | (-8.66) | (3.08) |
| *GFC period* | -0.247\*\*\* | -0.065\*\* | -0.109\*\*\* | 0.270\*\*\* |
|  | (-7.67) | (-2.46) | (-3.93) | (8.66) |
| *Post-crisis period* | -0.139\*\*\* | -0.040\*\* | -0.100\*\*\* | 0.409\*\*\* |
|  | (-6.97) | (-2.47) | (-5.83) | (21.13) |
| *Lambda* | -0.013 | 0.267\*\*\* | 0.028 | -0.018 |
|  | (-0.59) | (16.53) | (1.46) | (-0.83) |
| *Intercept* | 0.582\*\*\* | 1.004\*\*\* | 0.765\*\*\* | 0.620\*\*\* |
|  | (12.74) | (27.66) | (19.43) | (13.97) |
|  |  |  |  |  |
| *Industry FE* | Yes | Yes | Yes | Yes |
| *N* | 11,108 | 11,108 | 11,108 | 11,108 |
| Wald *Chi*2 | 6,222\*\*\* | 7,806\*\*\* | 12,721\*\*\* | 7,286\*\*\* |
| Notes: This table presents results of probit models examining the association between the conversion option, captured by the *Convertible* dummy, and the choice of individual covenant groups. *z*-statistics reported in parentheses are based on standard errors corrected for heteroskedasticity, and clustered by firm. Continuous variables are winsorized at the 1st and 99th percentiles. The Appendix presents the definition and sources of all variables. *N* denotes the number of observations. \*, \*\*, \*\*\* denote significance at the 10%, 5% and 1% levels, respectively (two-tailed). |

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| **Table 6: Impact of covenant intensity on bond yields** |
|  | Dependent variable = *Yield* |
| *Covenant intensity measure:* | *CI index* | *Investment covenant dummy* | *Payout covenant dummy* | *Financing covenant dummy* | *Event covenant dummy* |
|  | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| *Covenant intensity*  | -1.261\*\*\* | -0.958\*\*\* | -0.592\*\*\* | -0.471\*\*\* | -0.271 | -0.474\*\*\* | -0.568\*\*\* | -0.457\*\*\* | -0.464\*\*\* | -0.348\*\*\* |
|  | (-6.21) | (-5.12) | (-6.96) | (-5.83) | (-1.53) | (-2.92) | (-6.21) | (-5.31) | (-5.22) | (-4.22) |
| *Convertible* | -3.403\*\*\* | 0.835 | -3.166\*\*\* | 0.983 | -2.826\*\*\* | 1.405\*\* | -3.001\*\*\* | 1.275\*\* | -3.106\*\*\* | 1.064\* |
|  | (-8.28) | (1.34) | (-8.27) | (1.62) | (-7.43) | (2.17) | (-8.15) | (1.97) | (-8.25) | (1.77) |
| *Covenant intensity × Convertible* | 4.051\*\*\* | 3.057\*\*\* | 1.505\*\*\* | 1.162\*\*\* | 0.466 | 0.784 | 0.227 | -0.145 | 0.920\*\*\* | 0.747\*\*\* |
|  | (3.46) | (2.83) | (4.00) | (3.35) | (0.73) | (1.35) | (0.28) | (-0.18) | (4.10) | (3.62) |
| *Leverage* | 1.094\*\*\* | 0.705\*\*\* | 1.047\*\*\* | 0.676\*\*\* | 1.097\*\*\* | 0.735\*\*\* | 1.108\*\*\* | 0.725\*\*\* | 1.108\*\*\* | 0.714\*\*\* |
|  | (5.66) | (3.96) | (5.46) | (3.82) | (5.67) | (4.15) | (5.71) | (4.05) | (5.75) | (4.02) |
| *Volatility* | 2.730\*\*\* | 2.242\*\*\* | 2.875\*\*\* | 2.352\*\*\* | 2.819\*\*\* | 2.279\*\*\* | 2.559\*\*\* | 2.098\*\*\* | 2.497\*\*\* | 2.061\*\*\* |
|  | (3.45) | (3.17) | (3.67) | (3.33) | (3.56) | (3.17) | (3.26) | (2.97) | (3.17) | (2.90) |
| *ROA* | -3.350\*\*\* | -2.525\*\*\* | -3.351\*\*\* | -2.527\*\*\* | -3.481\*\*\* | -2.600\*\*\* | -3.286\*\*\* | -2.474\*\*\* | -3.439\*\*\* | -2.581\*\*\* |
|  | (-8.04) | (-6.78) | (-8.18) | (-6.82) | (-8.46) | (-7.00) | (-7.98) | (-6.66) | (-8.45) | (-7.04) |
| *PPE* | 0.162 | 0.101 | 0.159 | 0.095 | 0.216\* | 0.138 | 0.136 | 0.077 | 0.201\* | 0.128 |
|  | (1.40) | (0.93) | (1.39) | (0.88) | (1.84) | (1.26) | (1.21) | (0.72) | (1.74) | (1.18) |
| *Interest coverage* | -0.001 | -0.002\* | -0.001 | -0.002\* | -0.000 | -0.001 | -0.001 | -0.002\* | -0.000 | -0.001 |
|  | (-0.65) | (-1.79) | (-0.75) | (-1.84) | (-0.22) | (-1.48) | (-0.81) | (-1.89) | (-0.14) | (-1.37) |
| *Ln(Total assets)* | -0.257\*\*\* | -0.171\*\*\* | -0.228\*\*\* | -0.151\*\*\* | -0.255\*\*\* | -0.171\*\*\* | -0.238\*\*\* | -0.158\*\*\* | -0.262\*\*\* | -0.175\*\*\* |
|  | (-10.51) | (-7.26) | (-9.86) | (-6.67) | (-10.74) | (-7.46) | (-10.06) | (-6.88) | (-10.84) | (-7.50) |
| *Investment grade* | -1.788\*\*\* | -1.588\*\*\* | -1.721\*\*\* | -1.542\*\*\* | -1.888\*\*\* | -1.734\*\*\* | -1.673\*\*\* | -1.502\*\*\* | -1.784\*\*\* | -1.585\*\*\* |
|  | (-17.24) | (-15.17) | (-16.47) | (-14.67) | (-15.05) | (-13.96) | (-15.52) | (-13.95) | (-17.32) | (-15.26) |
| *MB* | -0.014\*\*\* | -0.011\*\*\* | -0.013\*\*\* | -0.010\*\*\* | -0.014\*\*\* | -0.011\*\*\* | -0.013\*\*\* | -0.010\*\*\* | -0.014\*\*\* | -0.011\*\*\* |
|  | (-3.39) | (-3.10) | (-3.23) | (-2.94) | (-3.40) | (-3.16) | (-3.24) | (-2.96) | (-3.40) | (-3.10) |
| *Capex* | 0.169 | 0.226\*\* | 0.147 | 0.208\*\* | 0.183\* | 0.241\*\* | 0.142 | 0.204\*\* | 0.206\* | 0.255\*\* |
|  | (1.61) | (2.26) | (1.42) | (2.10) | (1.72) | (2.37) | (1.36) | (2.04) | (1.95) | (2.53) |
| *RD* | -2.503\*\*\* | -2.429\*\*\* | -2.271\*\* | -2.274\*\*\* | -2.545\*\*\* | -2.527\*\*\* | -2.390\*\* | -2.364\*\*\* | -2.431\*\* | -2.392\*\*\* |
|  | (-2.61) | (-2.97) | (-2.40) | (-2.81) | (-2.64) | (-3.06) | (-2.50) | (-2.89) | (-2.56) | (-2.94) |
| *TB yield* | -0.033 | 0.640 | 0.104 | 0.697 | 0.111 | 0.752 | -0.035 | 0.588 | 1.364 | 1.664 |
|  | (-0.02) | (0.44) | (0.07) | (0.48) | (0.07) | (0.52) | (-0.02) | (0.41) | (0.87) | (1.14) |
| *Credit spread* | 1.152\*\*\* | 1.161\*\*\* | 1.187\*\*\* | 1.188\*\*\* | 1.160\*\*\* | 1.166\*\*\* | 1.143\*\*\* | 1.154\*\*\* | 1.160\*\*\* | 1.167\*\*\* |
|  | (16.45) | (17.16) | (17.08) | (17.67) | (16.70) | (17.34) | (16.24) | (16.91) | (16.46) | (17.15) |
| *Market runup* | -1.093\*\*\* | -1.051\*\*\* | -1.131\*\*\* | -1.085\*\*\* | -1.079\*\*\* | -1.020\*\*\* | -1.043\*\*\* | -1.012\*\*\* | -1.181\*\*\* | -1.123\*\*\* |
|  | (-5.99) | (-5.91) | (-6.27) | (-6.15) | (-5.93) | (-5.76) | (-5.78) | (-5.74) | (-6.55) | (-6.37) |
| *Arbitrage period* | 0.291\*\*\* | 1.001\*\*\* | 0.259\*\*\* | 0.131\* | 0.371\*\*\* | 0.190\*\* | 0.251\*\*\* | 0.119\* | 0.386\*\*\* | 0.233\*\*\* |
|  | (4.38) | (9.99) | (3.99) | (1.84) | (5.50) | (2.55) | (3.83) | (1.66) | (5.88) | (3.28) |
|  |  |  |  |  |  |  |  |  |  |  |
| **Table 6: continued** |
|  | Dependent variable = *Yield* |
| *Covenant intensity measure:* | *CI index* | *Investment covenant dummy* | *Payout covenant dummy* | *Financing covenant dummy* | *Event covenant dummy* |
|  | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| *GFC period* | 1.024\*\*\* | 0.365\*\*\* | 0.886\*\*\* | 0.636\*\*\* | 1.039\*\*\* | 0.738\*\*\* | 1.007\*\*\* | 0.726\*\*\* | 1.218\*\*\* | 0.893\*\*\* |
|  | (6.70) | (6.04) | (5.91) | (4.13) | (6.92) | (4.83) | (6.74) | (4.73) | (7.80) | (5.61) |
| *Post-crisis period* | 0.673\*\*\* | -1.192\*\*\* | 0.565\*\*\* | 0.344\*\*\* | 0.615\*\*\* | 0.372\*\*\* | 0.594\*\*\* | 0.361\*\*\* | 0.882\*\*\* | 0.586\*\*\* |
|  | (7.54) | (-8.27) | (6.65) | (3.85) | (7.17) | (4.14) | (6.94) | (4.02) | (8.28) | (5.53) |
| *Proceeds* |  | 1.087\*\*\* |  | 0.982\*\*\* |  | 1.054\*\*\* |  | 0.980\*\*\* |  | 1.005\*\*\* |
|  |  | (5.70) |  | (9.83) |  | (10.28) |  | (9.82) |  | (10.00) |
| *Callable* |  | 0.068 |  | 0.340\*\*\* |  | 0.339\*\*\* |  | 0.349\*\*\* |  | 0.341\*\*\* |
|  |  | (0.74) |  | (5.84) |  | (5.86) |  | (5.97) |  | (5.84) |
| *Putable* |  | 0.139\*\*\* |  | -1.164\*\*\* |  | -1.166\*\*\* |  | -1.178\*\*\* |  | -1.147\*\*\* |
|  |  | (6.35) |  | (-8.18) |  | (-8.21) |  | (-8.11) |  | (-8.15) |
| *Secured* |  | 0.150\*\* |  | 1.103\*\*\* |  | 1.076\*\*\* |  | 1.106\*\*\* |  | 1.117\*\*\* |
|  |  | (2.06) |  | (5.67) |  | (5.28) |  | (5.70) |  | (5.82) |
| *Senior* |  | 0.735\*\*\* |  | 0.092 |  | 0.083 |  | 0.095 |  | 0.068 |
|  |  | (4.71) |  | (1.00) |  | (0.89) |  | (1.03) |  | (0.74) |
| *Ln(Maturity)* |  | 0.417\*\*\* |  | 0.144\*\*\* |  | 0.146\*\*\* |  | 0.143\*\*\* |  | 0.140\*\*\* |
|  |  | (4.55) |  | (6.69) |  | (6.81) |  | (6.65) |  | (6.42) |
| *Lambda* |  |  | 0.273\*\*\* | 0.213\*\*\* | 0.391\*\*\* | 0.462\*\*\* | 0.275\*\*\* | 0.217\*\*\* | 0.177\*\*\* | 0.116\*\* |
|  |  |  | (5.03) | (4.14) | (3.54) | (4.47) | (4.56) | (3.91) | (3.22) | (2.25) |
| *Intercept* | 4.188\*\*\* | 2.259\*\*\* | 4.023\*\*\* | 2.138\*\*\* | 3.893\*\*\* | 2.089\*\*\* | 4.086\*\*\* | 2.191\*\*\* | 4.020\*\*\* | 2.134\*\*\* |
|  | (18.77) | (9.09) | (18.85) | (8.86) | (17.67) | (8.32) | (18.67) | (8.94) | (18.78) | (8.79) |
| *Control variables × Convertible* | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| *Industry FE* | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| *N* | 8,154 | 8,154 | 8,154 | 8,154 | 8,154 | 8,154 | 8,154 | 8,154 | 8,154 | 8,154 |
| Adj.*R*2 | 0.632 | 0.676 |  |  |  |  |  |  |  |  |
| *Covenant intensity* + *Covenant intensity × Convertible* | 2.790\*\* | 2.100\* | 0.913\*\* | 0.691\*\* | 0.195 | 0.310 | -0.340 | -0.602 | 0.456\*\* | 0.399\*\* |
|  | (2.40) | (1.95) | (2.47) | (2.02) | (0.32) | (0.56) | (-0.42) | (-075) | (2.21) | (2.08) |
| Notes: This table presents the results of the impact of covenant intensity on at-issue yields for convertibles and straight bonds. Regressions based on overall covenant intensity (columns (1) and (2)) adopt 2SLS and regressions based on individual covenant group dummies (columns (3)-(10)) adopt treatment effects models. For brevity, only the second-stage regression results are reported. *z*-statistics reported in parentheses are based on standard errors corrected for heteroskedasticity, and clustered by firm. Continuous variables are winsorized at the 1st and 99th percentiles. The Appendix presents the definition and sources of all variables. *N* denotes the number of observations. \*, \*\*, \*\*\* denote significance at the 10%, 5%, and 1% levels, respectively (two-tailed). |

**Table 7: Determinants of covenant intensity: Split-sample analysis for convertible and straight bonds**

|  |  |
| --- | --- |
| Variables | Dependent variable = *CI index* |
| Convertible | Straight  | Convertible | Straight  |
| (1) | (2) | (3) | (4) |
| *Leverage* | 0.016 | -0.029\*\* | 0.013 | -0.046\*\*\* |
|  | (1.05) | (-2.25) | (1.02) | (-3.55) |
| *Volatility* | 0.015 | 0.014 | 0.017 | 0.027 |
|  | (0.42) | (0.24) | (0.50) | (0.47) |
| *ROA* | -0.016 | 0.021 | -0.002 | 0.019 |
|  | (-0.80) | (0.79) | (-0.13) | (0.74) |
| *PPE* | 0.020 | -0.010 | 0.013 | -0.008 |
|  | (1.46) | (-1.00) | (1.10) | (-0.78) |
| *Interest coverage* | 0.000 | 0.000 | 0.000 | -0.000 |
|  | (1.30) | (0.44) | (1.48) | (-0.28) |
| *Ln(Total assets)* | -0.005\* | -0.024\*\*\* | -0.005\* | -0.020\*\*\* |
|  | (-1.69) | (-14.66) | (-1.96) | (-11.63) |
| *Investment grade* | 0.001 | -0.065\*\*\* | 0.000 | -0.056\*\*\* |
|  | (0.11) | (-11.27) | (0.03) | (-9.53) |
| *MB* | -0.000 | -0.000 | -0.000 | -0.000 |
|  | (-0.71) | (-1.39) | (-0.56) | (-1.27) |
| *Capex* | 0.005 | 0.012 | 0.004 | 0.011 |
|  | (1.04) | (1.63) | (0.78) | (1.41) |
| *RD* | -0.095\*\* | -0.231\*\*\* | -0.067\*\* | -0.172\*\* |
|  | (-2.47) | (-3.25) | (-1.98) | (-2.52) |
| *CIloans*  | -0.016 | -0.020\* | -0.016 | -0.032\*\*\* |
|  | (-1.54) | (-1.84) | (-1.57) | (-3.02) |
| *CIbonds* | 0.380\*\*\* | 0.657\*\*\* | 0.372\*\*\* | 0.661\*\*\* |
|  | (13.27) | (34.94) | (13.75) | (35.39) |
| *TB yield* | 1.444\*\*\* | -0.137 | 1.490\*\*\* | -0.057 |
|  | (9.02) | (-0.97) | (8.81) | (-0.41) |
| *Credit spread* | 0.036\*\*\* | -0.006 | 0.035\*\*\* | -0.007 |
|  | (3.64) | (-0.98) | (3.62) | (-1.13) |
| *Market runup* | -0.055\*\* | -0.030\* | -0.057\*\* | -0.023 |
|  | (-2.44) | (-1.73) | (-2.53) | (-1.37) |
| *Arbitrage period* | -0.036\*\*\* | -0.031\*\*\* | -0.024\*\* | -0.039\*\*\* |
|  | (-3.92) | (-5.13) | (-2.40) | (-6.04) |
| *GFS period* | -0.025 | -0.038\*\*\* | -0.005 | -0.046\*\*\* |
|  | (-1.13) | (-2.73) | (-0.21) | (-3.32) |
| *Post-crisis period* | -0.013 | 0.007 | 0.005 | -0.001 |
|  | (-1.21) | (0.80) | (0.33) | (-0.14) |
| *Proceeds* |  |  | 0.018\* | 0.040\*\*\* |
|  |  |  | (1.66) | (4.71) |
| *Callable* |  |  | 0.040\*\*\* | 0.029\*\*\* |
|  |  |  | (4.25) | (6.10) |
| *Putable* |  |  | -0.004 | -0.028\*\*\* |
|  |  |  | (-0.34) | (-3.22) |
| *Secured* |  |  | -0.012 | -0.046\*\*\* |
|  |  |  | (-0.59) | (-4.10) |
| *Senior* |  |  | 0.010 | -0.032\*\*\* |
|  |  |  | (1.53) | (-4.64) |
| *Ln(Maturity)* |  |  | -0.016\*\* | -0.009\*\*\* |
|  |  |  | (-2.52) | (-4.96) |
| *Lambda* | -0.009 | 0.004\*\*\* | -0.006 | 0.015\*\*\* |
|  | (-0.63) | (2.70) | (-0.60) | (7.12) |
| *Intercept* | 0.146\*\*\* | 0.449\*\*\* | 0.165\*\*\* | 0.465\*\*\* |
|  | (6.38) | (24.56) | (4.92) | (21.83) |
| *Industry FE* | Yes | Yes | Yes | Yes |
| *N* | 2,097 | 9,011 | 2,097 | 9,011 |
| Adj.*R*2/Pseudo *R*2 | 0.236 | 0.310 | 0.260 | 0.326 |
| *F*-statistic | 24.95\*\*\* | 150.68\*\*\* | 21.95\*\*\* | 133.21\*\*\* |
| Notes: This table presents separate regression results of the determinants of covenant intensity for convertibles and straight bonds, respectively. We estimate a switching regression model using simultaneous maximum likelihood, and only report the second-stage results. For brevity, the first-stage results modelling the choice between convertibles and straight bonds are not reported. *z*-statistics reported in parentheses are based on standard errors corrected for heteroskedasticity, and clustered by firm. Continuous variables are winsorized at the 1st and 99th percentiles. The Appendix presents the definition and sources of all variables. *N* denotes the number of observations. \*, \*\*, \*\*\* denote significance at the 10%, 5%, and 1% levels, respectively (two-tailed). |

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| **Table 8: Convertible bond (straight bond) issuers that have previously issued a straight bond (convertible bond)**Panel A: Association between convertibility and covenant intensity |
|  | Dependent variable = *CI index* |
|  | Prior issue of other bond type since start of sample period | Prior issue of other bond type within five years | Prior issue of other bond type within three years | Prior issue of other bond type within one year |
|  | (1) | (2) | (3) | (4) |
| *Convertible* | -0.192\*\*\* | -0.366\*\*\* | -0.413\*\*\* | -0.158 |
|  | (-6.15) | (-4.22) | (-3.03) | (-1.57) |
| *Lambda* | 0.054\*\*\* | 0.156\*\*\* | 0.188\*\*\* | 0.036 |
|  | (2.96) | (3.02) | (2.28) | (0.58) |
| *Baseline control variables* | Yes | Yes | Yes | Yes |
| *Industry FE* | Yes | Yes | Yes | Yes |
| *N* | 4,116 | 2,244 | 1,613 | 789 |
| Wald *Chi*2 | 3,172\*\*\* | 1,588\*\*\* | 1,089\*\*\* | 687\*\*\* |
| Panel B: Impact of covenant intensity on bond yields |
|  | Dependent variable = *Yield* |
|  | Prior issue of other bond type since start of sample period | Prior issue of other bond type within five years | Prior issue of other bond type within three years | Prior issue of other bond type within one year |
|  | (1) | (2) | (3) | (4) |
| *CI index* | -1.490\*\*\* | -1.607\*\*\* | -1.593\*\*\* | -1.602\*\* |
|  | (-5.18) | (-4.32) | (-3.23) | (-2.08) |
| *Convertible* | -3.329\*\*\* | -3.431\*\*\* | -3.299\*\*\* | -3.941\*\* |
|  | (-5.76) | (-4.39) | (-3.42) | (-2.32) |
| *CI index × Convertible* | 4.432\*\*\* | 4.350\*\*\* | 4.870\*\*\* | 3.186\* |
|  | (3.97) | (3.48) | (3.30) | (1.93) |
| *Baseline control variables* | Yes | Yes | Yes | Yes |
| *Baseline control variables × Convertible* | Yes | Yes | Yes | Yes |
| *Industry FE* | Yes | Yes | Yes | Yes |
| *N* | 2,965 | 1,499 | 1,057 | 506 |
| Adj. R2 | 0.654 | 0.689 | 0.690 | 0.722 |
| Notes: This table performs robustness tests on the association between convertibility and covenant intensity (Panel A) and the impact of covenant intensity on bond yields (Panel B) for convertible (straight) bond issuers that have issued a straight bond (convertible) during a specified window *before* their current offering. For each bond *i*, if there is a prior bond *k* issued by the same issuer at any time during the sample period/ within five years/ within three years/ within one year before the issuance date of bond *i*, and bond *i* and bond *k* are of different types (i.e., one is a convertible and the other is a straight bond), we keep both bond *i* and bond *k* in the sample. Panel A adopts treatment effects and Panel B adopts 2SLS models. For brevity, only the second-stage results are reported. All tests include the same issuer-specific, macroeconomic, and period-specific control variables to those in the baseline test in column (4) of Panel A, Table 4. *z*-statistics reported in parentheses are based on standard errors corrected for heteroskedasticity, and clustered by firm. Continuous variables are winsorized at the 1st and 99th percentiles. The Appendix presents the definition and sources of all variables. *N* denotes the number of observations. \*, \*\*, \*\*\*denote significance at the 10%, 5% and 1% levels, respectively (two-tailed). |

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| **Appendix A: Variable definitions and sources** |
| Variable | Definition and measurement | Data source |
| **Covenant intensity variables** |
| *CI index* | Measure of the overall intensity of covenants associated with a bond. We calculate it as the sum of 15 covenant category dummy variables, following the classification in Billett et al. (2007). The index is scaled by 15 so that it ranges from zero to one. | Mergent FISD |
| *Event covenant* | Measure of the intensity of event-driven covenants. We calculate it as the sum of three covenant category dummy variables, following the classification in Billett et al. (2007). The index is scaled by three so that it ranges from zero to one. | Mergent FISD |
| *Event covenant dummy* | Dummy variable equal to one if the bond offering includes an event-driven covenant and zero otherwise. | Mergent FISD |
| *Financing covenant* | Measure of the intensity of covenants that restrict the issuer’s financing activities. We calculate it as the sum of seven covenant dummy variables, following the classification in Billett et al. (2007). The index is scaled by seven so that it ranges from zero to one. | Mergent FISD |
| *Financing covenant dummy* | Dummy variable equal to one if the bond offering includes a financing covenant and zero otherwise. | Mergent FISD |
| *Investment covenant* | Measure of the intensity of covenants that restrict the issuer’s investment activities. We calculate it as the sum of three covenant dummy variables, following the classification in Billett et al. (2007). The index is scaled by three so that it ranges from zero to one. | Mergent FISD |
| *Investment covenant dummy* | Dummy variable equal to one if the bond offering includes an investment covenant and zero otherwise. | Mergent FISD |
| *Payout covenant* | Measure of the intensity of covenants that restrict the issuer’s payout activities. We calculate it as the sum of two covenant dummy variables, following the classification in Billett et al. (2007). The index is scaled by two so that it ranges from zero to one. | Mergent FISD |
| *Payout covenant dummy* | Dummy variable equal to one if the issue includes a payout covenant and zero otherwise. | Mergent FISD |
| *CIloans*  | The average covenant intensity of the firms’ outstanding loans. | DealScan |
| *CIbonds* | The average covenant intensity of the firms’ outstanding bonds. | Mergent FISD |
|  |  |  |
| **Other variables** |
| *Arbitrage period* | Dummy variable equal to one if the bond is issued between January 2000 and September 15th 2008 and zero otherwise. | Mergent FISD |
| *Callable* | Dummy variable equal to one for bonds that have an embedded call option and zero otherwise. | Mergent FISD |
| *Capex* | Capital expenditures (#CAPX) divided by the prior year’s net property, plant, and equipment (#PPENT) (as in Adam, 2009; Kaplan and Zingales, 1997) | Compustat |
| *CAflow* | The average value of monthly fund flows in year *t*, where fund flows are calculated using the following formula NAVtn/NAVtn-1 – (1+rtn), with *NAVtn* representing the assets of convertible bond arbitrage funds in year *t* month *n*, and *rtn* the asset return in year *t* month *n*.  | TASS |
| *Convertible* | Dummy variable equal to one if the bond is convertible and zero otherwise. | Mergent FISD |
| *Convertible market* | The number of convertible bond offerings over the past 12 months divided by the total number of convertible and straight bond offerings over the past 12 months. | Mergent FISD |
| *Conversion premium* | Percentage difference between the conversion price and the issuer’s stock price as of the convertible bond’s issuance date. | Mergent FISD |
| *Credit spread* | Difference in yields between Moody’s BAA- and AAA-rated corporate bonds, measured in the month before the bond’s issuance date. | Datastream |
| *Interest coverage* | Interest coverage rate, measured by the ratio of operating income (#OIBDP - #DP) to interest expense (#XINT). | Compustat |

|  |  |  |
| --- | --- | --- |
| **Appendix A: continued** |  |  |
| Variable | Definition and measurement | Data source |
| *Investment grade* | Dummy variable equal to one if the issuer’s credit rating (#SPLTICRM) is BBB and above and zero otherwise. We set the value of this variable to zero if an issuer is unrated (i.e., the rating is NA or N.M.) | Compustat |
| *Lambda* | Self-selection correction term from the treatment effects model. |  |
| *Leverage* | Long term debt (#DLTT) divided by total assets (#AT). | Compustat |
| *Market runup* | Average market return on the S&P 500 index over the window −76 to −2 before the issuance date, minus the average return over the CRSP equally-weighted market index over that same window. This variable is multiplied by 100 for expositional convenience. | CRSP |
| *Maturity* | Bond maturity in months. We use the natural logarithm of this variable, *Ln(Maturity)*, in regressions. | Mergent FISD |
| *MB* | Market to book ratio, calculated as the market value of equity (#PRCC × #CSHO) divided by book value of equity (#CEQ). | Compustat |
| *Post-crisis period* | Dummy variable equal to one if the bond is issued after January 2010 and zero otherwise. | Mergent FISD |
| *GFC period* | Dummy variable equal to one if the bond is issued between September 16th 2008 and December 2009 and zero otherwise. | Mergent FISD |
| *PPE* | Net property, plant, and equipment (#PPENT) divided by total assets (#AT). | Compustat |
| *Proceeds* | Bond offering amount divided by the issuer’s market value of equity (#PRCC × #CSHO). | Compustat and FISD |
| *Putable* | Dummy variable equal to one for bonds with an embedded put option and zero otherwise. | Mergent FISD |
| *RD* | Research and development expenditures (#XRD) divided by total assets (#AT). Following prior literature (Hirschey et al., 2012; Hirshleifer et al., 2013; Zhong, 2018), we set the missing values of this variable to zero. | Compustat |
| *ROA* | Earnings before extraordinary items (#IB) divided by total assets (#AT). | Compustat |
| *Secured* | Dummy variable equal to one if the bond is secured and zero otherwise. | Mergent FISD |
| *Senior* | Dummy variable equal to one if the bond is one of the following: senior secured, senior, or senior subordinate and zero otherwise. | Mergent FISD |
| *Stock runup* | Average daily stock return over the window −76 to −2 before the issuance date, minus the average return over the CRSP equally weighted market index over that same window. This variable is multiplied by 100 for expositional convenience. | CRSP |
| *TB yield* | Three-month Treasury Bill yield, measured in the month before the bond’s issuance date. | Datastream |
| *Total assets* | Book value of total assets (#AT). We use the natural logarithm of this variable, *LN (TA)*, in regressions. | Compustat |
| *Traditional investor period* | Dummy variable equal to one if the bond is issued between January 1989 and December 1999 and zero otherwise. | Mergent FISD |
| *Volatility* | Cash flow volatility, estimated as the standard deviation of cash flow from operations (#OANCF) divided by total assets (#AT) using data from the last five years before the bond’s issuance date, with a minimum of cash flow data for three pre-issuance years required. | Compustat |
| *Yield* | Difference between the at-issue YTM of the bond and the YTM of a matched Treasury bond with the closest maturity.  | Mergent FISD |
| Notes: This table presents the definition, measurement, and data source of all variables. Issuer-specific variables are measured at the fiscal year-end preceding the bond’s issuance date unless specified in the table. Security design characteristics are measured at the bond’s issuance date. The timing of the measurement of the other variables is mentioned along with their definition in the table.  |

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2. Some bond covenant studies mention explicitly that they do not include convertible bonds *“because* (their) *convertible option makes them less comparable* (to straight bonds)*”* (Qi and Wald, 2008; Zhang and Zhou, 2018). Bradley and Roberts (2015) include convertibles in their corporate debt sample, but do not distinguish between convertibles and straight bonds in their empirical tests. [↑](#footnote-ref-2)
3. As we will explain in more detail in Section 2, complementary use is theoretically possible but less likely a priori than substitution. [↑](#footnote-ref-3)
4. Since convertibles act as straight bonds until conversion, we do not expect these securities to be more capable of addressing claim dilution problems than similar-seniority straight bonds. [↑](#footnote-ref-4)
5. A Mergent FISD representative confirmed to us that Rule 144a offerings’ covenants are in principle covered in their database. However, the representative also told us these offerings might not always have a prospectus with covenant information available. We separately examine Rule 144a and public bond offerings in robustness tests. [↑](#footnote-ref-5)
6. MTNs are Rule 415 shelf-registered securities. Unfortunately, the Mergent FISD database does not report their covenants (Billett et al., 2007). [↑](#footnote-ref-6)
7. Bondholder-shareholder agency costs and financial distress costs are hard to disentangle empirically and therefore typically captured with the same firm characteristics (Dutordoir et al., 2014). [↑](#footnote-ref-7)
8. We use company credit ratings instead of bond credit ratings since bond ratings might be affected by the presence of covenants (Reisel, 2014). [↑](#footnote-ref-8)
9. Several other corporate finance studies use period dummies, e.g., Billett and Xu (2007), Nanda and Rhodes-Kropf (2013), Reisel (2014), and Andrén and Jankensgård (2015). Our findings remain similar when we use year instead of period dummy variables. Results of all unreported tests can be obtained from the corresponding author. [↑](#footnote-ref-9)
10. We treat the *Traditional investor period* as the base period and omit this dummy variable from the regressions. [↑](#footnote-ref-10)
11. Bond offerings from March 2020 onwards may be influenced by the effects of the COVID-19 crisis. In unreported tests, we therefore replicate all our analyses with a sample running until February 2020. This yields virtually similar results to those reported in the paper. [↑](#footnote-ref-11)
12. We also add security design features to the first-stage security choice model in this specification. [↑](#footnote-ref-12)
13. Following guidelines regarding control variables in Whited et al. (2022), we do not control for *Rule 144a* and *Shelf* status in the baseline regression analyses. The reason is that these placement methods are likely to be determined simultaneously with security type and covenant choice. Theory does not predict a direct impact of these placement methods on covenant intensity. [↑](#footnote-ref-13)
14. We obtain similar findings if we conduct a split-sample analysis of the impact of covenant intensity measures on convertible and straight bond yields. [↑](#footnote-ref-14)
15. An exception is the negative impact of *Leverage* on the *CI index* for straight bonds. One possible explanation for this finding is that, after controlling for other debt-related financing costs proxies, *Leverage* captures the ability of a firm to service debt, therefore resulting in a negative relation with covenant intensity. This interpretation would also be consistent with the significant negative impact of *Leverage* in the security choice model in Table 4, column (3). [↑](#footnote-ref-15)
16. The joint impact of macroeconomic variables on covenant intensity does not differ significantly across convertibles and straight bonds. [↑](#footnote-ref-16)
17. Further alleviating concerns on omitting variable bias, we also find that our full-sample main results in Tables 4 and 6 continue to hold if we control for firm fixed effects. [↑](#footnote-ref-17)