Bank of Israel   **Research Department**

The Effects of a Regulatory Intervention in Debt Contracts—Evidence from Corporate Bonds in Israel

Ana Sasi-Brodesky[1,2]

חטיבת המחקר, בנק ישראל ת"ד 780 ירושלים 91007
Research Department, Bank of Israel. POB 780, 91007 Jerusalem, Israel

The Effects of a Regulatory Intervention in Debt Contracts—Evidence from Corporate Bonds in Israel

Ana Sasi-Brodesky

Abstract

This paper analyzes a regulatory intervention that ordered the inclusion of performance-based contractual terms (financial covenants) in public bonds purchased by institutional investors, with the aim of improving corporate governance exerted by creditors. Financial contracting theory suggests that debtors and creditors agree to incorporate restrictions in debt contracts when the costs to the firm stemming from lost flexibility are offset by a reduction in debt financing costs. A necessary condition, though, for these restrictions to have an effect on financing costs is that creditors are able and willing to monitor a borrower's compliance and to act upon violation. I provide evidence that the exogenously imposed contractual structure introduced by regulation resulted in the use of covenants that are designed in an unbinding manner and are seldom violated. I conjecture that this is because of high monitoring and engagement costs faced by institutional investors, which discourage them from frequently renegotiating debt contract terms outside of bankruptcy.

ההשפעות של התערבות רגולטורית בחוזי חוב - עדויות מאג"ח חברות בישראל

אנה ססי-ברודסקי

תקציר

מאמר זה מנתח התערבות רגולטורית שהורתה לכלול תנאים חוזיים מבוססי ביצועים (התניות פיננסיות) באגרות חוב ציבוריות שנרכשות על ידי משקיעים מוסדיים, במטרה לשפר את הממשל התאגידי המופעל על ידי הנושים. תיאוריית ההתקשרות הפיננסית (financial contract theory) טוענת כי לווים ונושים מסכימים לשלב הגבלות בחוזי חוב כאשר העלויות לחברה המנפיקה הנובעות מאובדן הגמישות, מקוזזות על ידי הפחתה בעלויות מימון החוב. עם זאת, תנאי הכרחי להשפעה של המגבלות על עלויות מימון החוב הוא כי הנושים מסוגלים ומוכנים לפקח על הלווה כדי לוודא שהוא מציית להגבלות, ולפעול מולו בעת הפרה. המחקר מספק הוכחה לכך שהמבנה החוזי שנכפה באופן אקסוגני ע"י רגולציה הביא לשימוש בהתניות פיננסיות רופפות המופרות לעיתים רחוקות. החוקרת משערת שהסיבה לכך היא עלויות פיקוח והתקשרות גבוהות שעומדות בפני משקיעים מוסדיים, אשר מרתיעות אותם מלנהל משא ומתן מחדש על תנאי חוזה החוב לעתים קרובות, מחוץ לפשיטת רגל.

1. Introduction

Institutional investors managing long-term savings, such as pension funds, tend to be closely regulated. With regard to their investment policies, regulation tends to set rules such as investment limits in certain asset classes and the prohibition of activities that may involve conflict of interest. In this paper, I analyze a unique regulation applied to long term savings managers in Israel that forced them to include covenants—contractual terms restricting borrower behavior and specifying sanctions in case the borrower deviates from certain financial measures of performance—in corporate bond indentures. This regulation is exceptional because it involves a direct, exogenous, interference in the contractual terms used by private savings managers in their debt contracts with corporate borrowers.

The motivation for the regulatory intervention was the desire to induce institutional investors to exert influence on borrowers before the onset of financial distress and restrict the borrowers' risk-taking behavior. It was implemented after the Great Financial Crisis (GFC) and a following default crisis in the local corporate bond market, where institutional investors were major creditors. The justification for an intervention was based on the argument that bond contracts were favorable to borrowers due to: a) institutional investors being at a disadvantage compared to borrowers at the underwriting stage due to coordination problems; b) high demand for corporate bonds, which seemed to exceed the supply, and c) inexperience of institutional investors and their lack of familiarity with better contracting practices. Thus, the regulation was supposed to fix this market failure/externality by "leveling the playing field" and requiring all institutional investors to incorporate covenants.

The use of covenants in debt contracts has been documented in private debt markets and in corporate bonds in the US and elsewhere. However, the theoretical and empirical literature suggests that covenant design and purpose greatly depend on borrower and creditor characteristics. The value of a covenant, much like any contractual term, depends on the expectations of borrowers and creditors for what will happen upon violation. If both sides to the contract expect that no significant sanction or intervention will follow, then the covenant will be worthless.

When strong monitoring incentives are in place and the ability to renegotiate the debt's contractual terms is high, such as in private debt, it has been documented that covenant violations are used as "trip wires" to allow frequent engagement of creditors with borrowers, used by creditors to influence borrowers' behavior. *A priori*, in publicly traded debt, it is less obvious that creditors will be able, or willing, to engage with borrowers and renegotiate bond contract terms often. Indeed, empirical evidence suggests that covenant design in public debt differs from private debt and invokes considerably fewer violations. The dispersion of claims among many creditors suggest that there will be serious coordination problems that will hamper any attempt for a quick and efficient renegotiation of the bond contract terms. In particular, creditors that are institutional investors might be particularly reluctant to engage with borrowers often; similar to the arguments in Bebchuk et al. (2017) with regard to mutual funds, the compensation arrangement of long term savings funds managers in Israel and their tendency to hold only small fractions of individual bonds' outstanding par, imply that managers will capture only a small fraction of the benefits that result from monitoring or engagement while bearing their full cost. In addition, in a concentrated borrowing market, another characteristic relevant to Israel, investment managers may be further influenced by private incentives, or conflicts of interest, such as their interest in obtaining business from corporations, and will act in an accommodating way toward borrowers.

In this study, I explore whether the exogenous intervention by the regulator in debt contract design was able to affect the nature of monitoring and engagement taking place in the traded corporate debt market. To assess the impact of the regulation, I examine the design of covenants after it was introduced, the frequency of violation, and the effect of covenant inclusion on the price of debt. The analysis shows that financial covenants included in indentures following the regulation are based on loose thresholds, with much lower violation probability than previously documented for covenants used in private debt contracts. Actual covenant violations occur infrequently and no serious consequences, which would induce borrowers to renegotiate the debt contract, follow initial violations. Furthermore, the estimation of the price impact of covenants suggests that their incorporation has no significant effect on debt financing costs. I infer that the regulation

did not achieve its purpose with regard to prompting tighter monitoring of borrowers in the tradable bond market.

The rest of the paper is organized as follows. Section 2 presents the theoretical and empirical background with regard to the use of covenants in private and public debt. Section 3 describes the regulation that was implemented in Israel. Section 4 describes the data and explores the "tightness" of financial covenants and their violation frequency. Section 5 estimates the price impact of such covenants. Section 6 concludes.

2. Background

2.1. Theoretical rationale and empirical evidence on the use of covenants

The use of covenants in debt contracts is rationalized by two strands of the literature. The first views covenants as a mechanism to minimize agency costs resulting from asymmetric information and conflicts of interest among the firm's various stakeholders (Coase, 1937; Jensen and Meckling, 1976). The second strand is based on the optimal contracting literature (Aghion and Bolton, 1992; Hart and Moore, 1988), which views covenants as a mechanism for the allocation of state-contingent control rights designed to address the inherent incompleteness of contractual arrangements. Both perspectives imply that the optimal covenant design involves trading off two conflicting forces. The first is an ex-ante benefit of lowering debt financing costs. Consistent with the agency costs perspective, debt will be less expensive because lenders will economize on monitoring costs, the interests of shareholders and managers will be better aligned with those of lenders by proscribing actions that generally increase the likelihood of distress, and the inclusion of covenants will mitigate adverse selection. The optimal contracting perspective would suggest that debt financing costs would be reduced because the debt contract will instruct the allocation of decision rights to creditors in certain states of the world. The offsetting effect of covenants is that the attendant loss of operational and financial flexibility may increase default risk ex post (Smith & Warner, 1979) or adversely impact value maximization efforts of the firm. Importantly, the optimal contracting hypothesis implies that, in equilibrium, we would expect to see the presence of covenants for which the ex-ante benefits in reducing debt financing costs are no less than the costs to the firm due to the imposed restrictions.

Covenants can be broadly divided into two categories—performance-based and restrictive. Performance-based covenants specify acceptable ranges of accounting ratios based on the borrower's disclosed information. Performance-based covenants are usually conditioned on easily observable accounting variables that are likely to be imperfectly correlated with the availability of good future projects. Restrictive covenants directly impose restrictions or limitations on the borrower's financial and investment activities—such as restrictions on dividend payout ratios, equity and debt issuance, capital expenditures, and mergers. While firms may violate performance-based covenants owing to stochastic earnings or stock valuation shocks, they typically violate restrictive covenants through deliberate actions (such as paying dividends in excess of the permissible payout ratio, accepting highly leveraged takeover bids, or issuing senior debt). As a consequence, in practice, performance-based covenants are easier to renegotiate when the firm's financial conditions change. Restrictive covenants, in contrast, have less need to be renegotiated.

The significant differences in the monitoring incentives and renegotiation ability between lenders in private loans and owners of publicly traded bonds have been suggested as the reason for an observed distinction between covenant design in private loans and public debt in terms of the types of covenants included, their tightness, and their renegotiation flexibility. Public debt in the US includes mostly restrictive covenants and few performance-based covenants (Begley and Freedman, 2004; Begley and Chamberlain, 2005; Chava, Kumar and Warga, 2010; and Çelik et al., 2015). Even with regard to restrictive covenants, private debt contains far more covenants than public debt (Bradley and Roberts, 2015). Consistent with this, it has been demonstrated in several studies for the US that covenant violations occur almost exclusively in private debt and that such violations are used by lenders to exert influence on the firm. Gopalakrishnan and Parkash (1995) find that violations are used to renegotiate loan terms and usually occur outside financial distress. Nini, Smith and Sufi (2012) examine the effect of covenant violations in private credit agreements between banks and public firms on firms' investment policy; they find that violations lead banks to restrict borrowers' capital expenditures.

The role of covenants in public debt remains debated. Some view covenants in public bond contracts as standard boilerplates that serve little purpose. Empirically, public debt

covenants are seldom violated; Sweeny (1994) finds for a sample of public firms that have reported a covenant violation to the SEC in the years 1980–89 that the large majority of firms (98 percent) report violations of covenants in private lending agreements. In particular, 90 percent of the sample firms report violations of covenants in bank-lending agreements. Only three firms out of 130 report violations of covenants in public debt agreements. Chen and Wei (1993) also find that firms seldom violate covenants in public debt. The low violation frequency of covenants in public debt is consistent with the observations that public debt only includes restrictive covenants, and these require a deliberate action on the part of the firm to be violated.

Several empirical studies have found that the incorporation of restrictive covenants in public debt follows the predictions of the agency theory and that covenants carry economic value. Consistent with the prediction that firms with a more severe asymmetric-information and agency problem have more to gain from covenant inclusion, Malitz (1986) finds that in a sample of 252 public debentures, the presence of covenants is negatively related to the size of the firm and positively related to the firm's existing leverage ratio. Nash et al. (2003) argue that companies with growth opportunities have more options embedded in their investment decisions, and that these firms will value flexibility more highly than firms with fewer options will. They examine 496 public bond issues in 1989 and 1996 and report a negative relation between the incidence of covenants and growth opportunities. These findings provide support for the claim that covenants in public bonds limit firms' actions, and that in certain situations their restrictions are too expensive for borrowers. It was also documented for the US that despite renegotiations being more complicated in public debt, firms can and do change the covenants of their public debt indentures through consent solicitations (Kahan and Tuckman, 1993). Finally, yet importantly, Reisel (2014) finds benefits in terms of reduction in the cost of debt associated with covenants in public bonds. The value of covenants in public debt may thus be attributed to their role in mitigating adverse selection, restricting risk-taking behavior of borrowers and helping creditors to get control when the firm experiences financial distress. Covenant structure in public debt, however, does not appear to be a means for frequent engagement of creditors with borrowers, and does depend on close monitoring.

2.2. Background on the regulation that was imposed on Israeli institutional investors

The Israeli public corporate bond market underwent a default crisis that began in 2009. This happened after a continuous period in which the market expanded rapidly as a result of structural reforms carried out in the early 2000s. The debt reorganizations that followed proved disadvantageous to bond creditors, with late entrance into negotiations, low ownership turnover and significant debt forgiveness (Sasi-Brodesky, 2021b).

Local institutional investors managing long-term savings (pension funds, insurance companies and provident funds) were major holders of public corporate bonds at the time of the crisis and principal investors in the primary bond market. Given their central role in the market, they were publicly criticized for not overseeing borrowers, and for allowing debt issuance too easily. As a group, institutional investors were holding significant ratios of corporate bond debt, but individual entities tend to hold only small stakes in each issue. Regulation restricts managers to holding no more than 25% of the value of a single bond issue. In practice, the median percentage of ownership of individual bonds by a single institutional asset manager is much smaller than the regulatory boundary and amounts to few percentage points at most (Sasi-Brodesky, 2021a).

To strengthen their position during the negotiations on debt reorganizations, institutional creditors have been given permission to form a representation to negotiate with the owners (Sasi-Brodesky, 2021a, Appendix B). Prior to reorganization, institutional investors may be subject to antitrust criticism and are limited in their ability to coordinate strategies.

Bond reorganizations were overseen by the court. Some rulings had an important impact on creditors' stance -- a court decision in 2013 allowed bond creditors to force a company into bankruptcy as they were able to prove the firm was insolvent. This ruling particularly affected companies that had issued bonds without covenants. Hamdani et al (2022) find that the market expected this court ruling to benefit creditors: bond (equity) prices of companies affected by the new rule responded positively (negatively). They observe a pronounced increase in the reported net worth of the firms affected by the new rule.

The trustee of the bondholders, whose statutory job is to take care of the rights of the holders, is appointed by the issuing company at the time of the issue and receives her salary from the company. Despite having some important powers and tools to act against the firm, this way of appointment creates a conflict of interest. The fear of a conflict of interest is exacerbated in the face of the centralization of control in corporations and in the trustees' industry, which means that trustees and controlling shareholders of companies have a long-term relationship. The activity of vulture funds and hedge funds in Israel in the context of distressed public debt is less significant than in the US. Thus, there might not be effective external mechanisms that would help institutional creditors overcome coordination problems.

Against this background, the "Committee to Determine Parameters for Consideration by Institutional Investors that Provide Credit through the Purchase of Non-Government Bonds" (known as the "Hodak" committee after the name of its Chairman) was established in 2009. The Committee argued that local institutional investors lacked experience and, in addition, do not exert influence on the terms of bond contracts because too many institutional investors compete for every bond issue in the primary market without an ability to coordinate their positions.

Following the Committee's recommendations, the regulator of long-term and medium-term savings—The Capital Markets, Insurance, and Savings Division (CMISD)—introduced a new regulation aimed at "improving market transparency, conduct, and the corporate governance of institutional investors".[1] The part of the regulation that is most pertinent for the present study instructed institutional investors to formulate an investment policy in corporate bonds that would address the presence of restrictive and performance-based covenants in bond indentures. Largely, this document is the one that determines the terms and circumstances under which the trustee or creditors will be entitled to claim immediate repayment of the amount due, or to exercise collateral. Some restrictive covenants were referred to by the regulation as "mandatory". Financial covenants were suggested as "best practice": Section 9A2 of the regulation states, "An institutional body shall establish an investment policy in relation to the purchase of bonds, which shall be

---

[1] https://www.gov.il/BlobFolder/dynamiccollectorresultitem/regulation-1771/he/regulation_2010-9-03.pdf (in Hebrew)

documented and reasoned as follows: ... An institutional body shall establish an investment policy regarding financial covenants that will be included in bonds it purchases, while weighing the financial covenants listed in Appendix J, and additional covenants, as applicable. Appendix J lists accepted financial covenants, which in general should be included in a bond purchased by an institutional body. Determining an (investment) policy that ignores the groups of covenants listed in Appendix J will be justified."

The accepted financial covenants were divided into four groups of financial ratios: leverage, profitability ratios, liquidity ratios, and operational efficiency ratios.[2] In 2012, the State Comptroller's Office reprimanded the CMISD for not criticizing institutional investors that set low standards for financial covenants in their investment policies. It thus might be that the voluntary nature of the regulation was subsequently given a tougher interpretation .[3]

The regulator's requirement for institutional investors to step up their monitoring implies that credit-generating costs have increased. Some trends prevailing in the corporate credit market are in line with this assessment—overall, the presence of institutional investors as creditors in the Israeli corporate bond sector has diminished, giving way to higher holdings by mutual funds (Sasi-Brodesky, 2021a), which are not subject to this investment regulation. In parallel, there have been many mergers in recent years in the pension and insurance industry in Israel, resulting in fewer active long-term asset managers. Finally, Kedmi and Lakan (2021) show that institutional investors increased direct lending to corporations at the expense of bond debt following the regulation implementation.

---

[2] There are more articles to the regulation, including instructions with regard to the type of information required before investing in corporate bonds, the internal analysis process, special rules regarding the investment in bonds of private bond companies (firms that issue bonds but their equity is not traded) and more. These other parts of the regulation affect the investment policies of institutional investors in a substantive manner, but their analysis is beyond the scope of the current paper.

[3] Supervision of Investors' Money in Nongovernment Bonds, State Comptroller's Office, Annual Report 64a, 2013 https://www.mevaker.gov.il/he/Reports/Report_113/cc84e095-154d-465d-9481-6b238415e069/102-agach.pdf?AspxAutoDetectCookieSupport=1 (Report in Hebrew).

3. Data and descriptive statistics

In order to assess the consequences of the introduced regulation, data for this paper were collected manually by reviewing the prospectuses of local corporate bond issues in the period 2007 to 2015, i.e., before and after the regulation went into effect in October 2010. Each bond indenture was classified into one or more of ten covenant categories. The ten covenant categories include six restrictive covenants (detailed descriptions appear in Appendix A) and four performance-based covenants. The covenant categories are the most frequently used and the most similar to covenants discussed in the existing empirical literature.

I find that performance-based covenants are either based directly on accounting measures or tied to the bond's rating. As the methodology of rating agencies is mainly based on assessing capital and financial ratios, setting a restriction tied to a rating downgrade is similar to a restriction based on the value of a specific accounting ratio. Furthermore, the established practice prescribes two possible implications following a covenant violation—either the firm incurs an automatic interest rate increase, or is required to immediately repay the bond. Thus, I define four categories for financial covenants that are based on the four possible combinations of being conditioned directly on accounting measures or on rating, and triggering interest rate increase or immediate repayment.

Table 1. Descriptive Statistics for Bonds Issued on the Israeli Bond Market between 2007 and 2015

Descriptive statistics for firms and bond issues. The sample consists of Israeli traded corporate bonds issued between 2007 and the end of 2015 by nonfinancial firms. *Issue value* is the total NIS face value issued in the primary bond market (not including issuances abroad or future expansions of the bond series). *Covenants* is the total amount of covenants out of 10 possible categories that appear in the bond contract. *Performance-based covenant* is a dummy which takes the value one if any of the four financial covenants appears in the bond contract. *Years to maturity* is the time to maturity from the bond's issuance date. *Annual coupon rate* is the coupon payed by the bond in percent. *Investment grade* is a dummy which takes the value one if the rating of the bond (by either one of the rating agencies operating in Israel) is higher than BBB on the local scale. *Secured* is a dummy which takes the value one if the bond is secured by a tangible or intangible first or second order collateral. *Assets* are the total assets of the issuing firm, in consolidated form, in NIS millions. *Leverage* is the book value of total debt (loans, bonds and convertible bonds) divided by total assets.

Statistic	N	Mean	Median	Min	Max
Issue value (million NIS)	503	190.3	120.6	23.4	1,329.3
Covenants	503	4.8	5	0	10
Performance-based covenant (dummy)	503	0.6	1	0	1
Years to maturity	503	7.7	7.1	1.0	16.0
Annual coupon rate (%)	503	5.4	5.4	0.0	9.4
Investment grade (dummy)	503	0.6	1	0	1
Secured (dummy)	503	0.3	0	0	1
Assets (million NIS)	503	6,556.8	1,861.6	0.001	131,177
Leverage	503	0.4	0.5	0	1

Table 1 presents basic summary statistics for the sample of bonds for which data on covenants are available. This sample consists of Israeli traded corporate bonds issued between 2007 and 2015 by nonfinancial firms and covers the majority of all issued corporate traded bonds during this period. Figure 1 depicts the frequency of covenants in bond indentures, distinguishing between bonds issued before and after the regulatory intervention. The figure clearly shows that the use of covenants increased significantly between the period before the regulation and the period after it came into force. In Appendix B, in which the annual frequency of each of the six restrictive covenants is shown in a separate figure, it can also be seen that this increase in frequency was monotonous between the end of 2010 and 2011. In 2012, the trend stabilized at a new level in which all indentures included covenants and most included several types of covenants. A similar trend also occurred in financial covenants as can be seen later in Figure 3. Despite the regulation affecting only part of the investors in the bond market (mutual funds and retail investors, who are also active investors in the corporate bond market, are not subject to

it) and the fact that regulated institutions were allowed to diverge from the investment policy they themselves had formulated, the impact of the regulation was comprehensive. The bond market adopted both restrictive and performance-based covenants on a large scale. For some of the categories, the post-regulation frequency is close to 100 percent.

Figure 1. Covenants Intensity in Bond Issues

This figure illustrates incidence of covenants in indentures of new corporate bonds issued before and after the regulation was implemented.
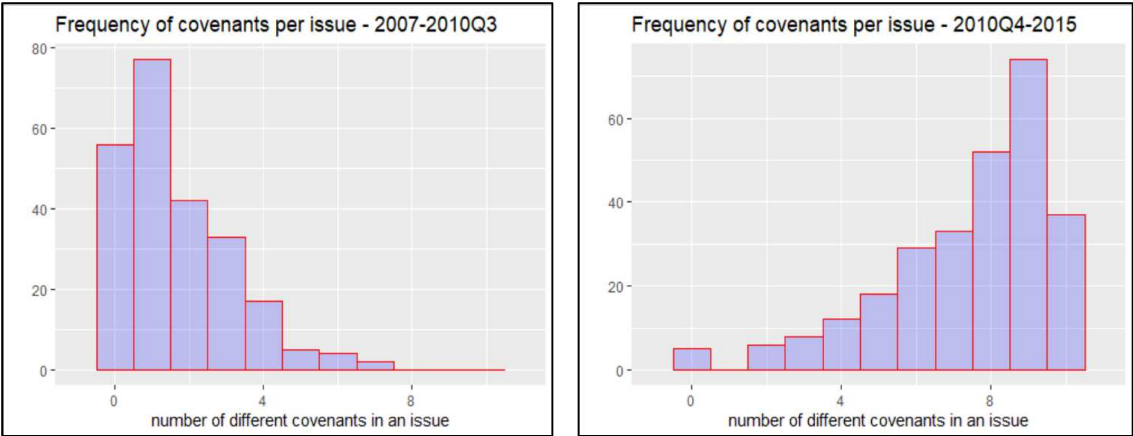

Table 2 summarizes the changes to the frequency with which specific covenants were incorporated in indentures before and after the intervention in comparison to several papers that analyze US public corporate bonds. Two of the papers do not report a category of performance-based covenants, because, as mentioned previously, public bonds in the US do not typically include such covenants. Çelik et al. (2015) confirm this feature directly; from 2000 to 2013, the period covered by their sample, rating and net worth triggers show zero frequency in the majority of years. The highest annual prevalence found for this category is in 2001, with 3 percent of the bond issues having such covenants.

Table 2 also compares the use of collateral in Israel and the US. The use of collateral is often rationalized as a way to mitigate asymmetric information and in practice, pledging collateral is not very different from agreeing to a covenant. Some types of collateral may require monitoring, especially if the collateral is not a physical asset, or if its value changes considerably throughout the life of the bond. Pledging a collateral restricts a firm's actions, as does a covenant, and it serves the purpose of overcoming asymmetric information problems. Benmelech et al. (2020) suggest that covenants and collateral are substitutes:

"Creditors may have become increasingly willing in recent years to use covenants rather than upfront collateral to strengthen their creditor rights and control over borrowers". The comparison with respect to the use of collateral in Israel and in the US offers additional information on the use of restrictions in bond contracts in Israel, even though the use of collateral did not receive direct instructions within the framework of the regulation.

Table 2. The Frequency of Specific Covenants in Israel and in the US

US public debt information comes from previous empirical studies (column label in parentheses). Nash et al. (2003) (Nash) examine 365 US public bonds issued in either 1989 or 1996. Reisel (2014) examines 4267 US public corporate bonds issued during the period from 1989 through the first quarter of 2006. Çelik et al (2015) examine 1305 publicly traded US bonds in 2012. Israeli covenant data, assembled at the Bank of Israel for this research, covers Israeli traded corporate bonds issued between 2007 and end of 2015 by nonfinancial firms.

	US			Israel	
Paper	Nash et al. (2003)	Reisel (2014)	Çelik et al. (2015)	Before intervention	After intervention
Period of sample	1989	1989–2006	2012	2007–2010:Q3	2010:Q4–2015
Secured by collateral	14%	3%		26%	36%
Type of covenants					
Dividend restriction	26%	6%	13%	24%	89%
Negative pledge	55%	83%	50%	5%	55%
Additional debt	25%	25%	25%	25%	78%
Financial ratios-based covenant that invokes repayment				11%	88%
Rating-based covenant that invokes repayment			0% (Rating and net worth triggers)	15%	75%
Financial ratio-based covenant that invokes interest compensation				3%	41%
Rating-based covenant that invokes interest compensation				11%	66%

Both Figure 1 and Table 2 illustrate the extensive effect of the regulation, at least at a formal level. Interestingly, the summary statistics also show that not all covenant categories were missing from the local bond market before the regulation. In fact, dividend and additional debt covenants had been used before the regulation at a frequency similar to that found in the US. Importantly, since the Global Financial Crisis,

and in contrast to the increase in the use of covenants in Israel, in the US (and apparently in the EU as well) there has been a decline in the frequency of covenants in publicly offered bonds (Çelik et al. 2019).

The use of collateral was, before the regulation and it remained after its implementation, much more frequent in the Israeli market than the frequency reported in the US. In fact, the use of collateral in the US has only declined after the Global Financial Crisis as evident in a recent study by Benmelech et al. (2020); the authors report that for publicly offered US bonds issued after 2008, the fraction of secured bonds ranged between 16.7 percent in 2011 and 8.8 percent in 2017, making the current gap between Israel and US even greater.

The presence of several types of restrictive covenants as well as the use of collateral in Israel with frequencies similar to US bonds before the regulatory intervention imply that incorporating covenants and other protections in indentures was a practice familiar to market participants, and undermines the claim that inexperience of market participants was behind the absence of other types of covenants. In fact, it has been documented that covenant structure differs from one market to another; Miller and Reisel (2011) examine 1,500 Yankee bonds issued in the US by foreign companies from 1989 through the first quarter of 2006. They find bond contacts are more likely to include restrictive covenants when issued by firms from countries with weak creditor rights. Consistent with their finding and according to their methodology, the Israeli legal system is characterized by strong creditor rights; Israel was assigned a score of 3^4 in the creditor rights index in Djankov et al. (2007), the same index that was used by Miller and Reisel (2011) to account for country-level measure of creditor protection. It is thus possible that some covenants were not used, or were less frequently used, before 2010 because they were unnecessary or at least not cost-effective in the view of market participants. The common use of collateral can offer an additional explanation for the reduced use of covenants, especially if there is a substitution between them, as suggested in Benmelech et al. (2020).

The fact that the regulatory intervention resulted in almost all indentures including many of the same types of covenants undermines in a way the separating effect that covenants

---

[4] The index varies from 0 (poor creditor rights) to 4 (strong creditor rights).

offer; when all indentures have similar covenants, then this information cannot be readily used to distinguish between bond contracts indicating differing risk profiles. The analyses in Çelik et al. (2019) and in Çelik et al. (2015) demonstrate that covenants are much more frequently employed in non-investment grade US bonds than in investment grade, indicating that the economic value of covenants is greater in risky debt.

In the next section, I delve into the design of the performance-based covenants that have become customary in Israel following the regulation.

4. Covenant tightness

According to Coase (1937), borrowers and creditors can achieve an efficient debt agreement on their own in a well-functioning and efficient market. However, the Israeli regulator's perspective was that the market power of borrowers impeded market-efficient bond contracts and thus regulatory intervention was justified. The question then remains whether the newly imposed regulation addressed the market failure. The ability and willingness of creditors to monitor borrowers and uphold violations is a necessary condition for covenants to have economic value. Diffused ownership structure on the creditors' side creates free riding problems in monitoring. In addition, it increases the costs of contract renegotiation. The appointment of the trustee is not necessarily sufficient to resolve these issues, as the role of the trustee is itself in conflict of interest, as was noted earlier.

Hypothesis: Given the market characteristics of public debt in Israel, I expect that institutional investors would attempt to employ covenants that do not require intense monitoring following the regulatory requirement. On top of that, verification of monitoring by the regulator might be difficult: the mere presence of covenants in bond deeds might not be very informative, because they can be loosely designed, and it would seem very costly for the regulator to keep track of the frequency of bond contract renegotiations.

4.1. Initial tightness

For financial ratio-based covenants, I further classify the specific financial measure or ratio that is at the basis of the covenant and the numeric value threshold that leads to violation.[5] This sample of bonds does not include bonds issued before the regulation went into effect because such covenants were rarely used then. I consider only numerical thresholds that render creditors the right to demand immediate repayment of the bond, and not thresholds that lead to an interest-rate increase as these invoke more serious consequences.

The precise accounting definitions differ from one indenture to another. With regard to the net worth covenant, which is by far the most common covenant in use, I distinguish between two distinct accounting definitions—net worth and adjusted net worth (see Table 3). An indenture may only include one or the other, and their cumulative frequency in indentures is 76%. The second most common covenant is the ratio of net worth to total assets which was also coded into two separate categories either using net worth or adjusted net worth.[6] Indentures occasionally include various leverage or cash-flow based ratios restrictions. The standardization of these covenants is more complicated because firms use different measures for "debt" and "earnings", thus the comparison is not straightforward. Two such covenants are displayed, but measurement error due to differences in accounting definitions might be present. For comparison, in Chava and Roberts (2008), common covenant conditions are based on firm net worth, working capital, leverage, interest coverage, and cash flow.

---

[5] Theoretically, it is also possible to assess the tightness of covenants based on rating categories, but this will not be comparable with existing literature. An additional complexity lies in evaluating the probability of violation, which requires estimating the unique rating distribution of the underlying bond, which is impossible for newly issued bonds. Thus, only average transition probabilities between rating categories can be employed.

[6] Financial covenants may be based on accounting information displayed in consolidated form or on a solo basis (excluding the effect of subsidiaries). As I only have information on filings of public firms in consolidated form I do not code financial covenants that are based on solo filings. Thus, frequency of specific type of covenants might be higher in reality than what appears in Table 3.

Table 3. Definitions and Frequency of Financial Ratio-Based Covenants

This table presents definitions of the six most common underlying financial ratios that appear in financial ratio-based covenants in Israeli traded corporate non-financial bonds issued after regulation implementation. "*Frequency*" reports the percentage frequency of this covenant among bonds that have a financial ratio-based covenant that renders the right to demand immediate repayment.

Covenant	Definition	Frequency
Min. Net worth	Stockholders' equity	57%
Min. Adj. Net worth	Stockholders' equity + loans from owners	19%
Min. Net worth-to-assets	Stockholders' equity divided by total assets	30%
Min. Adj. Net worth-to-assets	Stockholders' equity + loans from owners divided by total assets	14%
Max. net fin. Debt-to-CAP	Net fin. Debt (=Long and short term loans, bonds and convertible bonds minus cash and cash equivalents) divided by CAP (=net fin. debt + net worth)	14%
Max. net fin. Debt-to-EBITDA	Net fin. Debt divided by EBITDA	12%

I define covenant slack in percent as the difference between the realized value of the financial measure in the first available yearly financial statement submitted by the firm after the bond was issued, and the covenant threshold in the indenture; this difference is then divided by the realized value. I also compute covenant slack adjusted for volatility by dividing the difference between the realized accounting variable and the threshold by the standard deviation of the underlying financial measure realizations over the eight preceding annual reports. The results of the initial tightness assessment are presented in table 4.

Table 4. Initial Distance to Violation of Financial Covenants

This table presents the tightness assessment for the six most common underlying financial ratios that appear in financial ratio-based covenants in Israeli traded corporate non-financial bonds issued after the regulation implementation. *Covenant slack in %* is the difference between the realized value of the financial measure in the first available annual financial statement submitted by the firm after the bond was issued, and the covenant threshold, divided by the realized value. *Covenant slack in SD* is the difference between the realized accounting variable and the threshold by the standard deviation of the underlying financial measure realizations over the eight preceding annual reports.

Covenant	Obs.	Covenant slack in % Mean[median]	Covenant slack in SD Mean[median]
Min. Net worth	144	45%[46%]	2.1[1.9]
Min. Adj. Net worth	47	42%[41%]	2.5[2.2]
Min. Net worth-to-assets	77	20%[25%]	1.2[1.0]
Min. Adj. Net worth-to-assets	36	-13%[31%]	1.4[1.8]
Max. net fin. Debt-to-CAP	35	59%[29%]	1.5[0.7]
Max. net fin. Debt-to-EBITDA	15	101%[55%]	1[0.4]

The summary statistics indicate that thresholds are set quite far from realized values, and the distance to violation in terms of standard deviation is around two for the net worth covenants and around one and a half for the other covenant types. The distance to violation distribution for the net worth covenant is depicted in Figure 2, which illustrates that for the majority of bonds, thresholds are set close to the average.

This distance is much farther than what has been reported for private debt in the US; Chava and Roberts (2008) find that, relative to the firm-specific standard deviation of the underlying accounting variable, the net worth threshold is set 0.7 (0.6) standard deviations below the value at the start of the loan on average (median). Demerjian and Owens (2016) assess the probability of violating a net worth covenant in private loans originated between 1987 and 2004. Assuming that accounting values follow a normal distribution, the probability of violating the covenant is around 29 percent. This probability corresponds to a mean covenant slack of 0.6 standard deviations. Anecdotal evidence suggests that firms that issue bonds on the Israeli bond market and also have bank debt set the covenant thresholds for covenants based on the same financial measures much tighter in the terms of the bank loan, compared with the bond indenture. Actual violation probability is even lower than implied by the distance to thresholds in Table 4 because in most bond indentures only persistent violation of the threshold (consistently lasting for several quarters) allows the demanding of immediate repayment of the bond.

This figure presents the frequency distribution of the covenant slack in percent for a net worth covenant, which is the difference between the realized value of the financial measure in the first available annual financial statement submitted by the firm after the bond was issued, and the covenant threshold, divided by the realized value.
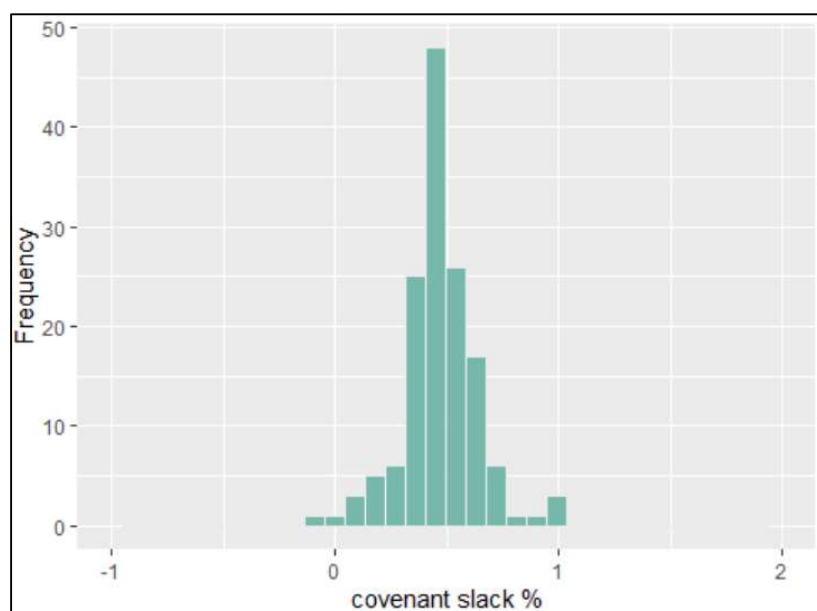
It might be difficult for a supervisor to verify the tightness of covenants and their violation probability. This is one of the inherent weaknesses, in my view, of the way the regulation that is at the focus of this research was formulated—there is no direct and simple way to make sure that its implementation is carried out in accordance with the intention of the regulator.

4.2. Violation frequency

To measure the realized violation frequency, I exploit the design of performance-based covenants that invoke an interest rate increase. If a firm violates such a covenant, whether the covenant is tied to an accounting ratio or to rating, then the annual coupon the bond pays adjusts automatically upon disclosure of violation. The frequency with which firms violate performance-based covenants that invoke an interest rate increase is higher than that of violations of performance-based covenants that render creditors the right to demand immediate repayment. This is due to two reasons; first, because these covenants are constructed in a graded manner; the threshold that allows creditors to demand immediate repayment is set farther then the threshold that invokes an interest rate

19

increase. Only after the exhaustion of the interest compensation mechanism, which usually includes several phases of financial deterioration and parallel coupon adjustments, the firm may find itself in violation of the threshold that renders creditors the right to demand immediate repayment. Second, when a firm discloses that it has breached a threshold that leads to an interest rate increase, the coupon is adjusted automatically. Creditors are not required to act. In contrast, in order for early redemption to take place when the repayment threshold is violated, creditors have to agree, with the help of the trustee, to demand a repayment or to force the firm into formal bankruptcy procedures.

I carry out two inquiries into the frequency of violation of covenants. The first inquiry follows the sample used in Table 1 throughout the life of the bonds. The second inquiry is performed on a cross section of traded bonds during the first year of the COVID-19 crisis (March 2020 through March 2021). The purpose of both inquiries is to assess how often covenant violations occur; and what the economic consequence of these violations is to the borrowers.

I use information received from Tel Aviv Stock Exchange (TASE) on the annual coupon rate of each bond. This information is updated immediately whenever the annual coupon rate changes. An incidence of violation is accounted for if at some point along the analyzed period the coupon rate was one or more "notches" higher than at inception (interest rate increases due to covenant-imposed compensation usually takes place in discrete steps or jumps, of 0.25 percent or 0.5 percent per annum). It is possible that the same bond experienced more than one episode of violation that led to a higher coupon rate, but this would be counted only once at the first violation incidence.

First, I track the bonds from the sample in Table 1 from their issue date until the end of 2020 to see how often the interest compensation mechanism kicks in.[7] I observe an incidence of interest rate increase for 17 percent of the issues that have an interest compensation covenant. For companies that were in violation—the annual coupon rate

---

[7] From the 503 bonds in Table 1, 99 bonds are removed as they have not yet reached maturity in the end of 2020 and keeping them would create a possible bias due to truncation. Another 243 are removed because they do not have a covenant with an interest compensation mechanism. Another 16 bonds are removed because I exclude from the sample all issues that have variable interest rates and may experience a change in their annual coupon rate due to reasons other than a covenant violation trigger. I am left with 145 bonds in total.

rose to 6.2 percent on average, compared to an average annual coupon rate on the issue date of 5.6 percent.

For the second inquiry, the time span of the analysis is set between March 1st, 2020, and March 1st, 2021. I use an alternative data source that contains a dummy variable indicating if the bond indenture includes a performance-based covenant, without distinguishing between rating- and financial ratio-based trigger. This data source is provided by the Bank of Israel. At the beginning of the period, out of a total of 508 traded corporate bonds that have a fixed annual coupon rate and non-missing information about interest compensation covenants, 456 bonds have an interest compensation covenant. I identify 42 bonds (9 percent of the potential bonds to experience an increase) that incurred an increase in their annual coupon rate since March 1st, 2020, and during the year that followed. The coupon rate increased by 22 percent on average (and 12 percent median), for those bonds that incurred an increase. In comparison, the market yield of bonds that experienced a coupon increase following covenant violation increased by 216 percent on average (134 percent median) between the beginning of the period and the point when the annual coupon rate was reset to its maximum level.

Similar to the analysis of initial covenants' tightness, realized violation frequency in Israeli bonds compared to private debt in US in much lower; Chava and Roberts (2008) report that 37 percent of private loans in their data experience current ratio violations and 31 percent experience net worth violations. The median covenant violation occurs at the end of the first third of the life of the loan, which translates to only one year from its inception.

Did the increase in annual coupon rate precede or follow other measures that indicate the firm was approaching default? Forty-nine issues that have an interest rate compensation covenant received an "attention notice" from the auditor during the first nine months of the COVID-19 crisis that was absent previously (based on financial reports for 2019:Q4, 2020:Q1, 2020:Q2 and 2020:Q3). Only 15 of these bonds also incurred an increase in coupon rate during this time. What this means is that many firms experienced a deterioration in their financial status but despite having a performance-based covenant, there was no violation.

In the previous section, I assessed the initial tightness of thresholds that invoke immediate repayment. In this section, I focus on thresholds that invoke interest rate resetting and their violation precedes the violation of the thresholds that invoke immediate repayment. Both analyses point to the fact that thresholds are loose and violations are infrequent.

Lack of monitoring might be contributing to the observed low frequency of covenant violations. Firms are expected to disclose their compliance with covenants. For financial ratio-based covenants, unless bondholders perform their own monitoring, they rely on the integrity of the firm to announce a violation. As covenants often employ different accounting definitions, the task of monitoring and verification may require some effort. The enforcement of financial ratio-based covenants by dispersed bond creditors is likely to suffer from a free rider problem which impedes effective monitoring.[8] Indeed, there is evidence that financial ratio-based covenants are not monitored properly in the Israeli bond market and that information disclosure with regard to violation of covenants based on such ratios is partial and biased.[9] In addition, firms might try to manipulate reporting to avoid violation; Hamdani et al. (2022) show that Israeli firms changed their accounting practices following a court ruling that introduced an implicit covenant to the contract between bondholders and issuers. As a result of these accounting changes, their analysis documents a decline in the informativeness of financial reports.

A related question in assessing the effectiveness of covenants in restricting firm risk-taking behavior is how dissuasive the penalty following a violation is (in other words, how expensive is the "new" annual coupon rate after the violation)? Will the violation, or the fear of it, encourage companies to negotiate a new bond contract with creditors, thus allowing creditors to increase their involvement in what the company is doing? The comparison of the increase in the yield spread experienced by firms that violated a covenant during the COVID-19 period against the increase in coupon payment they

---

[8] Rating-based covenants might suffer from a problem of rating-shopping that leads to late rating downgrades. Bakalyar and Galil (2014) test for the existence of rating shopping in the Israeli corporate bond market and find evidence in support of its existence.

[9] Consolidated findings report on the issue of commitment to comply with financial covenants vis-à-vis holders of tradable bonds, Israel Securities Authority, October 2021. https://www.isa.gov.il/%D7%92%D7%95%D7%A4%D7%99%D7%9D%20%D7%9E%D7%A4%D7%95%D7%A7%D7%97%D7%99%D7%9D/Corporations/Report/Documents/Report121021.pdf (report in Hebrew).
Defence score: On the effectiveness of financial covenants for debt financers, (Globes, June 11, 2019). https://www.globes.co.il/news/article.aspx?did=1001288971 (article in Hebrew).

experienced as a result of the covenant's violation indicates that the "fine" was quite cheap and that it was better for companies that violated to pay rather than renegotiate the terms of their bonds. If creditors were given the opportunity to renegotiate contract terms at this point in time, they would have insisted on repricing the loan so that its new price fully reflects the market yield.

5. Covenant pricing

Although not verified directly, the analysis in the previous section suggests that the loose threshold set in performance-based covenants did not prompt creditors to engage often with borrowers outside of bankruptcy or engage in intense monitoring. However, restrictions related to financial performance and capital structure may still lower the costs of debt contracting ex ante by mitigating adverse selection so that firms planning to take on very risky strategies that would likely lead to violation stay out of the market, or by deterring borrowers from certain risky behaviors. In addition, the stipulation that repayment is possible when financial predefined thresholds are violated might contribute to lowering transaction costs associated with the reallocation of control rights when the financial prospect of the firm deteriorates substantially (e.g., Aghion and Bolton, 1992). These costs might be especially high in the Israeli bond market, where previous analysis of debt reorganizations demonstrated that bond creditors are at a disadvantage compared with firm owners, being unable to force firms into formal bankruptcy or suggesting their own reorganization proposals (Sasi-Brodesky, 2021b) and negotiations over reorganization commence late.[10] To assess the magnitude of these potential benefits of covenants for creditors, I perform an analysis of the price impact of covenant inclusion on bond spreads.

5.1. Hypotheses

As discussed in Section 2, covenants impose restrictions on firms and limit their flexibility and thus may hurt firm value. The optimal contracting hypothesis implies that only firms finding net positive benefit include covenants in bond contracts. Accordingly, in a market

---

[10] https://www.gov.il/BlobFolder/unit/debt-regularization-committee/he/Vaadot_ahchud_DebtRegularizationCommittee_DebtRegularizationCommittee_Makanot_Report.pdf Appendix 3. (Report in Hebrew)

where parties are free to set their contract design, we expect to find a positive price effect of covenants (equivalent to a negative relation between covenant inclusion and bond spread), substantial enough as to offset the costs of the lost flexibility. However, in the case before us, institutional investors were compelled to incorporate covenants. Thus, the presence of covenants in indentures after the regulation was set in place does not necessarily indicate that they add net positive benefit or that they reduce funding costs—they may negatively affect pricing if, for example, the imposed limitations result in a large ex-post effect that leads to increased default risk. Alternatively, they may carry no or very small positive price impact if thresholds are so unbinding that they serve no deterring or adverse selection purpose, or if covenants are incorporated in bonds of very solid firms that have little to gain from an agency mitigating mechanism in the first place. In addition, the ability and willingness of creditors to monitor borrowers and uphold violations is material to the economic value of covenants.

Finding a significant positive effect of covenant inclusion on debt financing costs would be surprising because it would be unclear why these covenants were not employed in the market before the intervention; even if institutional investors suffer from a coordination problem at the underwriting stage or are unfamiliar with contracting practices, as the committee that was behind this regulation suggested, *borrowers* would have wanted to incorporate covenants if they are cost-effective. Finding a positive price impact would then imply that the incorporated covenants after the regulation are effective in mitigating agency concerns and/or lowering default risk and thus lower funding costs, but at the same time, they are not cost-effective to the firm and have negative implications for firm value.

I anticipate that covenants employed following the regulatory intervention in the Israeli bond market carry no or a very small positive effect on debt financing costs. This is because the revealed preference of the market participants before the regulation was introduced had been to avoid using them, and because, as the previous section has demonstrated, covenants are set in a non-binding manner.

5.2. Data and methodology

I estimate the effect of covenants on bond prices for performance-based covenants and not for restrictive covenants. This is due to several reasons; first, because they have been at the focus of the analysis in the previous section. Second, because the incorporation of financial covenants is exceptional in public debt. Third, because such covenants are usually the ones that invoke renegotiation and control rights reallocation. And finally, the high rate of incorporating restrictive covenants in bonds as of 2012 makes it impossible to assess their price impact using cross-section comparison.

Estimating the effect of covenant inclusion on the market price of bonds by regressing bond spreads on covenant dummies using OLS may produce biased estimates, as the decision to include a covenant and the price of the bond are determined simultaneously and can influence each other. To overcome this problem, I use a self-selectivity model (treatment effects model). The analysis presented next follows largely the methodology of Reisel (2014) and Bradley and Roberts (2015).

The first stage of the analysis includes estimating a reduced form Probit model of the covenant selection equation:

$$(1) \quad CVN = \alpha_0 + \alpha_1 X' + \alpha_2 C + \varepsilon'$$

C are costs associated with the inclusion of the covenant, CVN. I assume that these costs can be represented as a function of the issuer's characteristics. X' captures benefits associated with the covenant, which are related to the expected reduction in bond spread. Estimating the choice to include a certain type of covenant is, on its own, informative and may provide insights on whether this decision follows the theoretical predictions discussed in Section 2.1.

From this first-stage estimation, I obtain the inverse Mills' ratios for bonds with and without covenants $[((\phi(\hat{\psi})/(1 - \Phi(\hat{\psi}))$ when covenants are not included and $-\phi(\hat{\psi})/\Phi(\hat{\psi})$ when covenants are included]. ϕ is the standard normal density function, Φ is the standard normal cumulative distribution function and $\hat{\psi}$ is the estimated linear predictor from the reduced form Probit estimation (equation (1)). Next, I estimate the

pricing equation using OLS and incorporating the appropriate inverse Mills' ratio and a dummy variable for the existence of the covenant.

$$(2) \quad Y = \beta_0 + IMR + \beta_1 X + CVN + \varepsilon$$

Y represents the market yield spread of the bond; X are determinants of the bond spread. This procedure corrects the pricing estimation for sample selection bias: If selection bias is present in the data, the selectivity variable, IMR, will be significant.

The set of explanatory variables I employ for the estimation of both equations is similar to those used in empirical papers that assessed the selection and pricing of covenants in US public and private debt markets—Nash et al. (2003), Reisel (2014), and Bradley and Roberts (2015). These include bond-pricing proxies as well as covenant cost proxies.

The bond pricing equation and the covenant selection equation contain the same set of explanatory variables, except for the inverse Mills' ratio and the covenant dummy that appear only in the bond pricing estimation. This is because the costs of covenants, C, are argued to be related to firm characteristics, such as its growth opportunities and the volatility of assets. However, these characteristics might also be important to bond pricing. It is important to note that it is possible to estimate the treatment effect model even though covariates are identical in both equations because of the non-linearity of the Probit model (see, for example, Willis and Rosen, 1979).

In the first step, the Probit equation is estimated for each covenant type. The dependent variable is equal to one for bonds that include the particular covenant in their indenture.

The dependent variable in the second equation is the average bond spread measured during the first 30 days that the bond has been trading on the secondary market after issuance.

For the explanatory variables, I use the market-to-book value of assets to measure growth opportunities. Other firm characteristics include firm size, leverage, cash flow volatility and asset tangibility. These variables are related to firm credit risk and severity of shareholder–bondholder conflicts. Merton (1974) predicts that a firm with more volatile and lower return on its assets is more likely to default. I therefore include the mean and standard deviation of daily returns of the firm's equity as additional control variables for

risk. I also use macroeconomic factors since bond spreads behave countercyclically (Gilchrist and Zakrajšek, 2012). These are the one-year treasury rate, differences between the ten and two-year treasury rates (term spread), and year dummy variables. I *exclude* bond characteristics (such as time to maturity, whether bond is secured by collateral, bond's rating) as these characteristics may be endogenous to covenant selection.

I use quarterly filings of financial statement data for most firm characteristics. In addition, I use daily trading information from the TASE for equity market value, average daily return on equity, and the standard deviation of daily return on equity and for average bond spreads. For each bond, I have information on the month it was issued to the primary market. The financial statement is of the closest quarter preceding that month. Equity return and their standard deviation are based on daily closing prices of the equity of the issuing firm during 180 days prior to the issuance of the bond.

Macroeconomic variables are from the month the bond was issued.

The estimation is restricted to the period from October 2010 until the end of 2015, meaning for bonds issued after the regulation went into effect. Restricting the sample to firms with non-missing financial, equity and bond spread data results in 217 bonds issues. Table 5 presents the summary statistics for the sample of bond issues with complete data for the estimation.

The frequencies with which performance-based covenants appear in indentures over time are depicted in Figure 3 (frequencies of restrictive covenants appear in Appendix B). The implementation of the rules set in the regulation with regard to covenants was gradual. Institutional investors did not formulate an investment policy in accordance with the new requirements immediately after it was announced, but over time.[11] As described in Section 4, bonds with performance-based covenants that invoke an interest compensation are a sub-set of bonds with the same type of performance-based covenants

---

[11] In its yearly report for 2012, the State Comptroller's office claimed, after reviewing CMISD's work, that many long-term saving institutions still did not formulate an investment policy with respect to covenants as the Hodak regulation required them to do. The State Comptroller's office criticized CMISD for not tracking the use and quality of covenants in bond indentures since the Hodak regulation was published and not reprimanding institutions that have yet to set an investment policy in accordance with this regulation. https://www.mevaker.gov.il/(X(1)S(eefnyx204svh33fz5owhgswc))/he/Reports/Pages/113.aspx?AspxAuto DetectCookieSupport=1# (Report in Hebrew).

that invoke immediate repayment. I exclude financial ratio-based covenants that render creditors the right to demand immediate repayment from the price effect estimation because there is not enough variation in the data for this covenant category.

Table 5. Descriptive Statistics for Bond Issuers and Issues Post-Regulation (2010:Q4–2015)

The table presents descriptive statistics for firm and bond issue characteristics. The sample consists of Israeli traded corporate bonds issued between the fourth quarter of 2010 and end of 2015 by nonfinancial firms with complete data. *Issue value* is the total NIS face value issued in the primary bond market (not including issuances abroad or future expansions of the bond series). *Investment grade* is a dummy that takes the value one if the rating of the bond (by either one of the rating agencies operating in Israel) is higher than BBB on the local scale. *Secured* is a dummy which takes the value one if the bond is secured by a tangible or intangible first or second order collateral. *Market value of equity* corresponds to the market value of equity averaged over the month the bond was issued on the primary market. *Equity return mean (%)* is the mean of daily stock return calculated over 180 days before the issuing month. *Equity return standard deviation (%)* is the standard deviation of daily equity returns estimated over 180 days. *Market-to-book* is equal to book value of assets minus the book value of equity plus market value of equity to the book value of assets. *Assets* are the total assets of the issuing firm in million NIS. *Leverage* is the book value of total debt (loans, bonds and convertible bonds) divided by total assets. *Tangibility* is the ratio of property, plant and equipment to total assets. *R&D/assets* is the ratio of research and development expenses to assets. *Interest coverage ratio* is equal to EBITD divided by interest expense. *Cash flow volatility* is the standard deviation of the ratio of EBITD to total assets and is computed using 2 years of historical data. Financial statement data are from the quarter preceding the issue of the bond. *Duration* is the average bond duration measured during the first 30 trade days on the secondary market. *Spread* is the average bond spread measured during the first 30 trade days on the secondary market after issuance

Statistic	N	Mean	Median	Min	Max
Issue characteristics					
Issue value (million NIS)	217	185.5	112.3	23.4	1,329.3
Years to maturity	217	8.1	7.6	2.3	16.0
Annual coupon rate (%)	217	5.1	5.1	0.7	9.4
Investment grade (dummy)	217	0.7	1	0	1
Secured (dummy)	217	0.3	0	0	1
Firm characteristics					
Market value of equity (million NIS)	217	1,679.7	519.1	21.5	24,468.1
Equity return standard deviation (%)	217	2.2	1.7	0.3	58.0
Equity return mean (%)	217	0.1	0.1	-0.6	5.8
Market-to-book	217	1.1	1.0	0.7	2.6
Assets (million NIS)	217	6,290.7	2,405.2	34.3	131,177.0
Cash flow volatility (%)	217	1.2	0.9	0.03	5.9
Leverage	217	0.5	0.5	0.0	0.8
Tangibility	217	0.1	0.01	0.0	0.9
Interest coverage ratio	217	4.8	2.3	-35.3	158.4
R&D/assets	217	0	0	0	0
Issue first month trade characteristics					
Duration (years)	217	5.1	4.9	1.2	9.7
Spread (%)	217	3.9	3.8	1.0	8.7

Figure 3. The Frequency of Performance-Based Covenants

These figures present the frequency of incorporating different types of covenants in indentures of newly issued bonds.
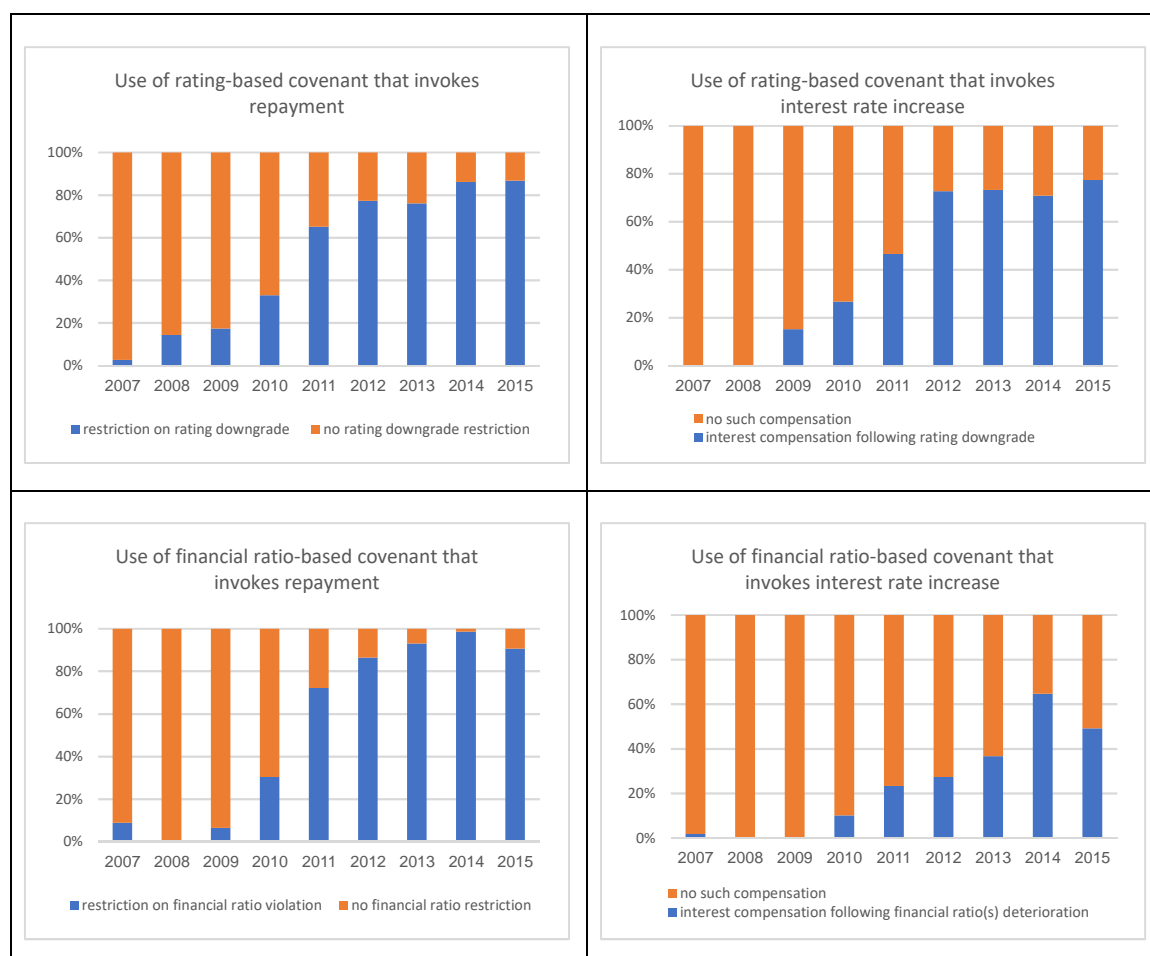
It is worth mentioning that the growth in popularity of rating-based covenants occurred in parallel to a decline in the issuance of unrated bonds (Figure 4). It is possible that investors shifted demand away from unrated bonds, and found rating a convenient measure to contract on because it was transparent and did not require them to perform their own monitoring, while still adhering to the regulation. Alternatively, it could be that the requirement to incorporate financial covenants and allowing them to be based on ratings was the driver of the reduced demand for unrated bonds. Either way, the dependence of the market on rating agencies has become greater, perhaps in contrast to the intention of the regulator who tried to induce institutional investors to perform their own monitoring.

The figure displays the rating (on a local scale) at issuance of corporate bonds issued for the first time between 2007 and 2015 by nonfinancial firms.
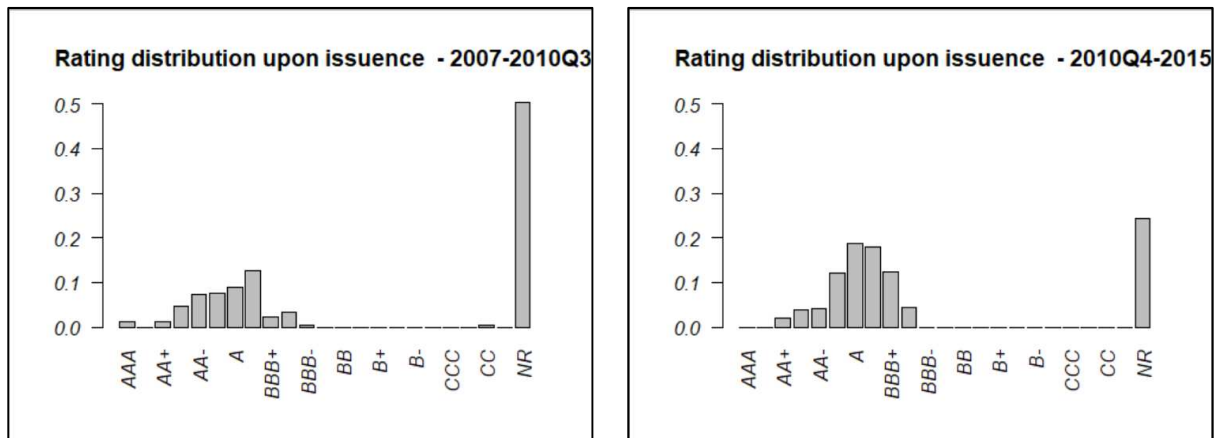
While I examine each covenant separately, covenants display dependency. Figure 5 displays the pairwise correlation among the three financial covenants that are at the focus of the pricing analysis as well as the negative pledge clause and whether the bond is backed by collateral.

Previous studies have usually found positive correlations among covenants. This is because firms with more severe agency problem are the ones that incorporate covenants and may benefit, in terms of reducing debt financing cost, from additional imposed restrictions. Consistent with this rationale, Bradley and Roberts (2015) found that secured debt is positively correlated with restrictions on financial ratios. In contrast, according to Figure 4, in the Israeli data, collateral and covenants are used as substitutes rather than complements. Financial ratio-based covenants are uncorrelated with any of the other covenants or with collateral. When the use of covenants is imposed by regulation, a wide range of unexpected dependencies can result. Overall, this result raises doubt that financial covenants are viewed by the market as effective in mitigating agency problems.

Figure 5. Correlations among Covenants and Other Bond Characteristics

This figure illustrates the correlation among types of covenants and the use of collateral in bond indentures. Positive correlations are displayed in blue and negative correlations in red. Color intensity and the size of the circle are proportional to the correlation coefficients. Correlations with p-value > 0.05 were left blank. Negative pledge is a dummy which takes the value one if the bond indenture includes a negative pledge clause; Rating_R is a dummy which takes the value one if the bond indenture includes a rating-based covenant that invokes repayment; Rating_IC is a dummy which takes the value one if the bond indenture a rating-based covenant that invokes coupon increase; Accounting_ratio_IC is a dummy which takes the value one if the bond indenture includes a financial ratio-based covenant that invokes repayment. Secured is a dummy which takes the value one if the bond is secured by a tangible or intangible first or second order collateral.
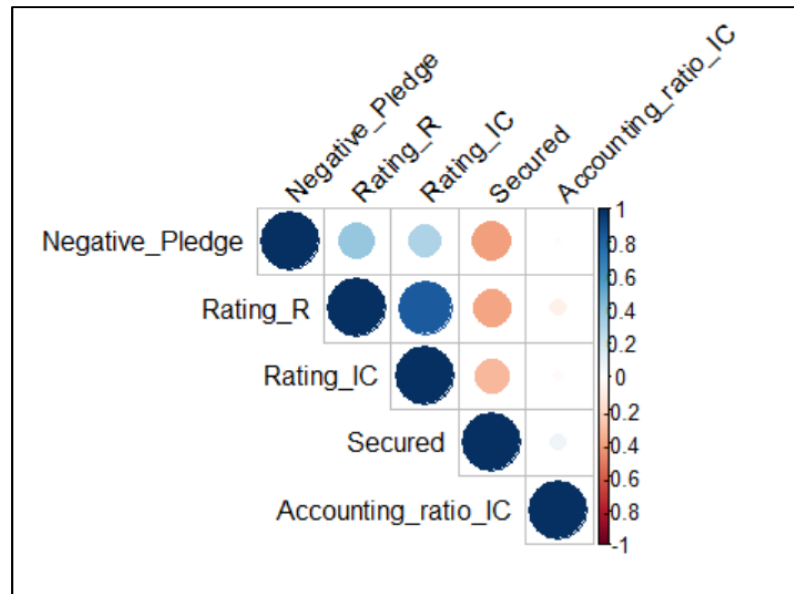
Table 6 provides univariate analysis of possible determinants of covenants' inclusion. The majority of bonds that have a rating-based covenant (either only a restrictive convent, or a restrictive covenant and an interest rate compensation mechanism that precedes it) is rated investment grade; issues that have a rating-based covenant are larger, have longer time to maturity and are issued by larger firms. The presence of a rating-based covenant is negatively related to the market yield spread of bonds. This stands in contrast to Bradley and Roberts (2015) who find that in each covenant category, the promised yield is significantly higher for issues that include a covenant than for those that do not. Nash et al. (2003) also find yield spreads are higher for firms that include restrictive covenants for most of the covenant categories in their analysis compared with bonds that exclude the covenants. Such a relation is consistent with the prediction that riskier firms have more to benefit from incorporating covenants.

Table 6. Summary Statistics of Issues and Issuers by the Presence of Individual Covenants (2010:Q4–2015)

The table shows descriptive statistics for firm and bond issue characteristics separated by the inclusion of a specific covenant. The sample consists of Israeli traded corporate bonds issued between the fourth quarter of 2010 and end of 2015 by non-bank and insurance firms with complete data. Issue value is the total NIS face value that was sold to investors in the primary Israeli bond market (not including issuance abroad or future possible expansions of the bond series). Equity market cap corresponds to the market value of equity averaged over one month. Equity return mean (%) is the mean of daily stock return calculated over 180 days. Equity return standard deviation (%) is the standard deviation of daily equity retunes estimated over 180 days. Assets are the total assets of a firm. Leverage is the book value of total debt (loans, bonds and convertible bonds) divided by the sum of total assets. Tangibility is property, plant and equipment to total assets. R&D/assets is the ratio of research and development expenses to assets. Interest coverage ratio is equal to EBITD divided by interest expense. Cash flow volatility is the standard deviation of the ratio of EBITD to total assets and is computed using 2 years of historical data. Market-to-book is equal to book value of assets minus the book value of equity plus market value of equity to the book value of assets. Investment grade is a dummy equal to 1 if the cumulative rating of the bond (by either one of the rating agencies operation in Israel) is higher than BBB rating on the local scale. Secured is a dummy which takes the value one if the bond is secured by a tangible or intangible first or second order collateral. Spread is the bond spread relative to government bonds with similar maturity.

	Rating restrictive (with /without)		Rating interest compensation (with/without)		Accounting ratios interest compensation (with/without)	
N	160	57	145	72	91	126
Issue value (NIS million)	212.3	110.1***	203.7	146.9**	125	229.2***
Market value of equity (NIS million)	2,089.4	529.6***	1612.4	1815.2	598.660	2,460.4***
Equity daily return standard deviation (%)	2.1	2.5	2.1	2.4	2.0	2.4
Equity daily return mean (%)	0.1	0.1	0.1	0.1	0.1	0.1
Assets (million NIS)	7,294.3	3,473.6**	7,244.8	4,369.3	2,801.5	8,810.6***
Leverage	0.5	0.4	0.5	0.4	0.4	0.5*
Tangibility	0.1	0.1	0.1	0.1	0.1	0.1
R&D/Assets	0	0	0	0	0	0
Interest coverage ratio	5.3	3.7	4.7	5.1	3.8	5.6
Cash flow volatility (%)	1.1	1.5*	1.1	1.4*	1.2	1.2
Market-to-book	1.1	1.1	1.0	1.1*	1.0	1.1**
Duration (Years)	5.4	4.1***	5.4	4.4***	4.6	5.4***
Spread (%)	3.4	5.3***	3.4	4.9***	4.2	3.7**
Annual coupon rate (%)	4.7	6.2***	4.7	5.9***	5.4	4.9**
Investment grade (dummy)	1.0	0.1***	1.0	0.3***	0.7	0.8*
Secured (dummy)	0.2	0.7***	0.2	0.6***	0.4	0.3
Years to maturity	8.9	6.0***	8.9	6.6***	7.3	8.7***
Note:	*p**p***p<0.01		*Note:*	*p**p***p<0.01		*Note:*

For the second type of performance-based covenant, namely those that are tied to financial measures, bonds that have such a covenant are smaller with shorter maturity, belong to smaller firms, though with lower leverage, and are less likely to be rated in the investment grade category (or at all) compared with firms that don't have this covenant. For financial ratio-based covenants, market yield spreads are higher, in accordance with previous studies.

Table 6 also demonstrates that firms with higher growth opportunities are less likely to include financial ratio/rating-based covenants as predicted by theoretical literature and confirmed in previous studies. This finding is supportive of the covenants imposing costs that might be especially high for high growth firms.

In conclusion, firms that choose rating-based covenants are quite different from firms that choose financial ratio-based covenant. It seems that the "less risky" firms choose rating-based covenants. Of course issues that are not rated cannot incorporate a covenant based on rating in their indentures. Thus, the choice of a rating-based covenant is intertwined with the choice of being rated. In contrast, riskier firms that presumably would get a low rating if rated, are more likely to include a financial ratio-based covenant.

5.3. Estimation results

The results of the covenant selection equations are reported in Table 7. The results confirm the differences in the characteristics between firms that incorporate rating-based covenants and firms with financial ratio-based covenants. The selection estimation of a financial ratio-based covenant seems compatible with the literature: larger firms and firms with high market-to-book values are less likely to include such a covenant. These findings are consistent with Kahan and Yermack (1998) Nash et al. (2003) and Reisel (2014) and with the claim that the costs of covenants are high for fast-growing firms. While the choice of financial ratio-based covenant is in line with previous empirical studies, the results of the rating-based covenant selection estimations are in contradiction with initial intuition. Firm size is positively associated with choosing these covenants, more than any other characteristics. This is in contrast to existing empirical evidence and in contrast to the prediction of agency theory as large firms usually suffer less from a problem of asymmetric information.

Importantly, the ratio of correctly predicted incidents of covenant inclusion is high for the rating-based covenants but rather low for the financial ratio-based covenant. This means that there are further unobservable firm characteristics that might be material to the decision to include this type of covenant. This also implies that the correction for selectivity in the next section might not be sufficient for financial ratio-based covenant.

Table 7. Covenant Selection Regressions

This table presents the results of Probit regressions explaining the inclusion of covenants based on financial ratios or rating of the firm. The dependent variable equals one if the indicated covenant is included in bond indenture. The sample consists of Israeli tradable corporate bonds issued between the fourth quarter of 2010 and the end of 2015 by nonfinancial firms with financial data available for at least two years and traded equity. Rating-based covenant invoking repayment allows for immediate repayment if rating is downgraded below a certain category; A Rating-based covenant invoking interest increase indicates an automatic increase in the firm's annual coupon rate when the rating gets below the threshold; Financial ratio-based covenant invoking interest increase indicates an automatic increase in the firm's annual coupon rate when accounting ratios deteriorate below threshold. The variables are described in Table 6. Regressions also include constant, time period and industry dummies. Standard errors are in parenthesis. ***, **, * indicate significance at 1%, 5%, and 10%, respectively.

	Rating-based covenant invoking repayment	Rating-based covenant invoking interest increase	Financial ratio-based covenant invoking interest increase
Log(assets)	0.52*** (0.10)	0.33*** (0.08)	-0.35*** (0.08)
leverage	-0.30 (0.79)	-0.30 (0.72)	-0.16 (0.70)
Tangibility	-0.98 (0.78)	0.16 (0.69)	1.03 (0.68)
Cash flow volatility (%)	0.02 (0.11)	-0.02 (0.10)	-0.07 (0.10)
1 year treasury rate (%)	0.07 (0.47)	-0.15 (0.42)	0.19 (0.41)
10-year-2-year Treasury (%)	-0.26 (0.57)	-0.41 (0.49)	-0.11 (0.47)
Market to book	0.82 (0.58)	-0.58 (0.43)	-1.78*** (0.58)
Equity return standard deviation (%)	-0.01 (0.06)	-0.02 (0.05)	-0.02 (0.06)
Equity return mean (%)	0.34 (0.51)	0.29 (0.47)	-0.40 (0.45)
Year dummies	Y	Y	Y
Industry dummies	Y	Y	Y
Constant	-9.95*** (2.53)	-4.60** (1.98)	6.37*** (2.05)
Correctly predicted	0.94%	0.92%	0.64%
Observations	217	217	217
Log Likelihood	-83.32	-107.76	-116.90
Akaike Inf. Crit.	202.64	251.51	269.79
Note:	*p**p***p<0.01		

I now proceed to analyzing the price effect of covenants. The pricing results are reported in Table 8. The dependent variable is the bond yield relative to government bonds with similar maturity, averaged during the first 30 days after bond began trading on the secondary market. Standard errors are clustered at the firm level. The selectivity variable

is insignificant for all covenants. This implies that there is no consistent bias between the type of firms that are likely to use the covenant and their bond spread. A positive bias would be consistent with the assumption that firms that face high financing cost due to asymmetric information benefit more from the inclusion of covenants.

Table 8. Covenant Pricing Regressions

Treatment effects regressions assessing the price effect of accounting ratio and rating-based covenants. The sample consists of Israeli tradable corporate bonds issued for the first time between fourth quarter of 2010 and the end of 2015 by nonfinancial firms with financial data available for at least two years and traded equity. The dependent variable is the average bond spread relative to government bonds with similar maturity, in the first month after the bond started trading on the secondary market, expressed in percentage points. A rating restrictive covenant allows for immediate repayment if the rating is downgraded below a certain category; A rating interest rate compensation covenant indicates an automatic increase in the firm's annual coupon rate each time its rating is downgraded further; accounting ratios interest compensation covenant indicates an automatic increase in the firm's annual coupon rate each time one of the accounting ratios deteriorate. The rest of the variables are described in Table 6. Standard errors are clustered at the firm level. ***, **, * indicate significance at 1%, 5%, and 10%, respectively. Clustered standard errors are in parenthesis.

	Rating-based covenant invoking repayment	Rating-based covenant invoking interest increase	Financial ratio-based covenant invoking interest increase
Selectivity variable	-0.11 (0.21)	-0.28 (0.24)	0.086 (0.25)
Price effect of covenant	-1.4*** (0.25)	-1.3*** (0.22)	0.13 (0.23)
Log(assets)	-0.44*** (0.081)	-0.48*** (0.084)	-0.57*** (0.091)
Leverage	2.2*** (0.6)	2.2*** (0.63)	2.3*** (0.7)
Tangibility	1.4* (0.7)	1.6** (0.7)	1.5* (0.81)
Cash flow volatility (%)	0.27*** (0.073)	0.26*** (0.077)	0.27*** (0.088)
1 year treasury rate (%)	0.14 (0.36)	0.1 (0.37)	0.083 (0.41)
10-year-2-year Treasury (%)	-1.0*** (0.37)	-1.0*** (0.37)	-0.85** (0.39)
Market-to-book	-1.0** (0.41)	-1.3*** (0.48)	-1.0** (0.5)
Equity return standard deviation (%)	0.18*** (0.038)	0.19*** (0.038)	0.2*** (0.049)
Equity return mean (%)	-1.5*** (0.32)	-1.6*** (0.31)	-1.7*** (0.41)
Year dummies	Y	Y	Y
Industry dummies	Y	Y	Y
Constant	11.5***(1.5)	12.7*** (1.7)	13.1*** (1.8)
Observations	217	217	231
R^2	0.59	0.58	0.50
Adjusted R^2	0.55	0.54	0.45
Note:	*p**p***p<0.01		

The price effect for rating-based covenants is negative, significant and economically important. The coefficient of the price effect of the rating-based covenant rendering creditors the right to immediate repayment is 140 basis points. The inclusion of a rating-

based covenant invoking interest rate increase lowers the spread by 130 basis points. These effects are economically significant—the average (median) yield spread for the sample is 391 (377) basis points. Since only a small group of bonds has only the immediate repayment covenant and not the interest increase covenant, it is more reasonable to interpret the covenant price effect coefficients in the first two regressions as their cumulative effect. The price effect of the financial ratios-based covenant is, however, insignificant. All control variables have the expected sign and most are significant and important economically.

The considerable overlap between being rated and having a covenant based on rating gives rise to a possible misspecification problem; the price effect visible in the regression analysis could be driven by the fact that the bond is rated, and not by the inclusion of a covenant. A different methodological issue arises with regard to the pricing of a financial ratio-based covenant, namely the poor ability of the selection estimation to separate between issues with and without the covenant. Both these concerns are addressed in the next section. The solution I apply is to estimate the price effect of covenants for more balanced subsamples.

5.4. Additional tests

Table 6 demonstrated that firms that include financial ratio/rating-based covenants are very different from firms that avoid the same covenant. In this section, I present the same two-stage analysis as in the previous section, but for more homogeneous subsamples. I expect the selection estimation in such a setting to be more sensitive to what really drives the choice of covenant inclusion and not to other differences. For the rating-based covenant I *exclude* from the sample *all unrated issues* (Panel A). For the financial ratio-based covenant I use the complementary sample and *exclude all issues that were rated* upon issuance (Panel B). In panel A, I am left with 161 observations which leaves a small panel B of 56 observations. In panel A, the frequency of employing rating-based covenant that invokes repayment is very high (143 indentures include this covenant compared with 18 indentures that do not). In contrast, panel B, although small, is more balanced—30 indentures include a financial ratio-based covenant that invokes interest increase, compared with 26 that do not. I avoid performing an analysis for the rating-based covenant that invokes repayment as there is not enough variation of the data in the sub-

sample. Table 9 presents the estimation of the price effect of rating and financial ratio-based covenants that trigger interest increase for subsamples. As before, standard errors are clustered at the firm level.

Table 9. Covenant Pricing Regressions for Subsamples

Treatment effects regressions assessing the bond price effect of covenants based on accounting ratios or rating of the firm. The sample consists of Israeli tradable corporate bonds issued for the first time between the fourth quarter of 2010 and the end of 2015 by nonfinancial firms with financial data available for at least two years and traded equity. The sample is divided between panel A - issues that were rated upon issuance and panel B – issues that were not rated upon issuance. The dependent variable is the average bond spread relative to government bonds with similar maturity, in the first month after the bond started trading on the secondary market expressed in percentage points. A rating interest rate compensation covenant indicates an automatic increase in the firm's annual coupon rate each time its rating is downgraded further; accounting ratios interest compensation covenant indicates an automatic increase in the firm's annual coupon rate each time one of the accounting ratios deteriorates. The rest of the variables are described in Table 6. Standard errors are clustered at the firm level. ***, **, * indicate significance at 1%, 5%, and 10%, respectively.

	Rating-based covenant invoking interest increase (panel A)	Financial ratios-based covenant invoking interest increase (panel B)
Selectivity variable	-0.13 (0.26)	0.76 (0.58)
Price effect of covenant	-0.23 (0.37)	-0.17 (0.39)
Log(assets)	-0.35*** (0.1)	-0.13 (0.22)
Leverage	2.2*** (0.71)	0.3 (1.5)
Tangibility	0.61 (0.73)	0.18 (1.8)
Cash flow volatility (%)	0.21** (0.094)	0.11 (0.15)
1 year treasury rate (%)	0.046 (0.1)	0.21 (0.28)
Market-to-book	-1.7*** (0.35)	0.3 (1.3)
Equity return standard deviation (%)	0.2*** (0.045)	0.42*** (0.092)
Equity return mean (%)	-1.7*** (0.41)	-1.6** (0.72)
Constant	9*** (1.4)	5.2 (3.9)
Observations	161	56
R^2	0.39	0.31
Adjusted R^2	0.35	0.16
Note:	*p**p***p<0.01	

The results of the first stage Probit estimation are not reported for brevity, but it is important to mention that the success of the selection estimation to separate between bonds with and without the covenant is high for both subsamples—99 percent and 80 percent for rating and financial ratios-based covenants, respectively. Since the samples are smaller, and to avoid overidentification, I reduce the number of explanatory variables—industry dummies for both selection and pricing estimations in addition to year dummies and a few other explanatory variables in the pricing estimations were removed.

Both covenants show no significant effect of their inclusion on the bond price for the subsample analysis. Their insignificance is strong and persists for different specifications of the estimation regressions. This test confirms both concerns from previous full sample estimation. First, it demonstrates that the negative relation between rating-based covenants and bond spreads is most likely associated with being rated and not with having the covenant; Table 9 shows that among rated issues, the inclusion of a covenant based on rating does not offer any additional benefit in terms of lower debt financing cost. The estimation in panel B restates the no-effect result from the full sample estimation, this time following an improved selection identification. This confirms that the inclusion of a financial ratio-based covenant that invokes interest increase is not associated with lower bond spread.

Combining the selection and price effect estimation results for the full sample and for the subsamples indicates that neither rating nor financial ratio-based covenants are associated with lowering bond spreads. Covenants based on rating do not carry any additional price benefit other than what already follows from being rated. This probably implies that the rating based covenants are also based on loose thresholds, although a direct inspection of this was not performed. I find that rating itself is associated with lower bond spreads which means rating is considered an effective monitoring tool or has a role in mitigating asymmetric information. I suggested that perhaps one indirect effect of the regulation was increased demand for rated bonds, which means that in a way, the regulation succeeded in having more monitoring in the bond market, just not by institutional investors directly. But this seems an awkward way to set a regulation that leads to more bonds being subject to rating.

As for the financial ratio-based covenant, it is more complicated to explain the combined result of the selection and pricing estimations. The selection estimation results are in line with previous literature and the choice of covenant inclusion does not seem to be arbitrary. Yet in contrast, the estimation of the price effect does not indicate any significant consequences from the covenant's inclusion. I offer several possible explanations to settle this; first, the penalty of the interest compensation is too light to have an effect on the bond spread. If, instead, I assessed the price effect of covenants that render creditors the right to demand immediate repayment, then the effect would be

larger. That is, however, impossible because almost all indentures include a financial ratio-based covenant that invokes repayment so there is no control group in the data. Second, the costs imposed by covenants ex post are exactly matched by their ex-ante benefits which leads to neutral overall price effect. A final explanation is that the selection of covenants stems from the rules set in the investment policy of institutional investors following regulation implementation. These rules specify the inclusion of covenants in debt issued by riskier firms, and in particular, unrated and/or growth firms. However, due to high costs entailed in monitoring and renegotiation of contracts that were unresolved by regulation, the resulting covenants are designed in an unbinding manner.

6. Summary and concluding remarks

Institutional investors in Israel were forced to include restrictive and financial covenants in public bond indentures with the aim of improving corporate governance exerted by creditors. The justification for a regulatory intervention was based on the argument that institutional investors were at a disadvantage compared with borrowers due to coordination problems in the underwriting stage, coupled with high demand for corporate bonds and lack of experience. This study empirically examines the effects of the regulation on the use of covenants, their design, and their effect on the price of bonds. The efficacy of the covenants is assessed against their use to monitor borrowers. The analysis indicates that the exogenously imposed performance-based covenants proved ineffective with regard to monitoring of borrowers and creditors engaging with borrowers outside of bankruptcy—although frequently incorporated across all bonds after the intervention, covenants are designed in a nonbinding manner, violations occur infrequently, and no serious consequences for debtors follow initial violations. The assignment of covenants to bonds largely does not settle with financial theory and undermines the claim that they serve as agency mitigating tools. The preference of institutional investors to reduce their participation in the bond market and increase private lending, was probably due to other provisions of the regulation or other changes that occurred in parallel in the bond market.

Covenants might nonetheless be valuable as a control-shifting mechanism when firms are approaching default. This can be assessed in future research. There is evidence that timing of default and commencement of negotiation with bond creditors over reorganizations

were taking place "too late" for Israeli firms before the regulation at the focus of this paper was enacted. The inclusion of covenants might have improved the stance of bond creditors and encouraged the firm to reorganize while it was still in a better financial condition.

Two main conclusions follow from this analysis. First, regulation can turn out to be ineffective when it is not based on clear, verifiable and measurable outcomes. Second, differences between private and public lenders are not confined to the problem of coordination in the underwriting stage; dispersed creditors, and institutional investors in particular, are uninterested in imposing restrictions on borrowers, as the costs of monitoring to verify borrowers' compliance and of contract renegotiations are too expensive for them compared with the benefits of reduced default risk or better alignment of interests. Trying to exogenously force dispersed creditors to act like banks is an unsuitable solution to reducing risk-taking by borrowers in the traded bond market.

Private and public lending to corporations may look like substitutes (certainly there is competition between them), but the example of the distinctions in covenants' design and utilization illustrates that they employ different solutions to asymmetric information problems and agency concerns. While banks hold large stakes in a single loan and often engage with borrowers, creditors in public tradable bonds prefer diversification. The differences in contract design and creditor incentives have a consequence on the accessibility of potential borrowers to each market.

7. References

Aghion, P., & Bolton, P. (1992). "An Incomplete Contracts Approach to Financial Contracting", The Review of Economic Studies, 59(3), 473-494.

Armstrong, C. S., Guay, W. R., & Weber, J. P. (2010). "The Role of Information and Financial Reporting in Corporate Governance and Debt Contracting", Journal of Accounting and Economics, 50(2-3), 179-234.

Bebchuk, L. A., Cohen, A., & Hirst, S. (2017). "The Agency Problems of Institutional Investors", Journal of Economic Perspectives, 31(3), 89-102.

Begley, J., & Chamberlain, S. (2005). "The Use of Debt Covenants in Public Debt: The Role of Accounting Quality and Reputation", SSRN Electronic Journal.

Begley J, Freedman R. (2004). "The Changing Role of Accounting Numbers in Public Lending Agreements", Accounting Horizon 18:81–96

Beneish, M. D., & Press, E. (1995a). "Interrelation among Events of Default", Contemporary Accounting Research, 12(1), 57-84.

Beneish, M. D., & Press, E. (1995b). "The Resolution of Technical Default", Accounting Review, 337-353.

Benmelech, E., Kumar, N., & Rajan, R. (2020). "The Decline of Secured Debt" (No. w26637), National Bureau of Economic Research.

Bradley, M., & Roberts, M. R. (2015). "The Structure and Pricing of Corporate Debt Covenants", The Quarterly Journal of Finance, 5(02), 1550001.

Çelik, S., G. Demirtaş and M. Isaksson (2015). "Corporate Bonds, Bondholders and Corporate Governance", OECD Corporate Governance Working Papers, No. 16, OECD Publishing, Paris, https://doi.org/10.1787/5js69lj4hvnw-en.

Çelik, S., G. Demirtaş and M. Isaksson (2019). "Corporate Bond Markets in a Time of Unconventional Monetary Policy", OECD Capital Market Series, Paris, www.oecd.org/corporate/Corporate-Bond-Markets-in-a-Time-of-Unconventional-Monetary-Policy.htm.

Chava, S., Kumar, P., & Warga, A. (2010). "Managerial Agency and Bond Covenants", The Review of Financial Studies, 23(3), 1120-1148.

Chava, S., & Roberts, M. R. (2008). How Does Financing Impact Investment? The Role of Debt Covenants", The Journal of Finance, 63(5), 2085-2121.

Chen, K. C., & Wei, K. J. (1993). "Creditors' Decisions to Waive Violations of Accounting-Based Debt Covenants", Accounting Review, 218-232.

Coase, R. H. (1937). "The Nature of the Firm", Economica, 4(16), 386-405.

Demerjian, P. R., & Owens, E. L. (2016). Measuring the Probability of Financial Covenant Violation in Private Debt Contracts", Journal of Accounting and Economics, 61(2-3), 433-447.

Dichev, I. D., & Skinner, D. J. (2002). "Large–sample Evidence on the Debt Covenant Hypothesis", Journal of Accounting Research, 40(4), 1091-1123.

Djankov, S., McLiesh, C., & Shleifer, A. (2007). "Private Credit in 129 Countries", Journal of Financial Economics, 84(2), 299-329.

Garleanu, N., & Zwiebel, J. (2009). "Design and Renegotiation of Debt Covenants", The Review of Financial Studies, 22(2), 749-781.

Gilchrist, S., & Zakrajšek, E. (2012). "Credit Spreads and Business Cycle Fluctuations", American Economic Review, 102(4), 1692-1720.

Gopalakrishnan, V., & Parkash, M. (1995). "Borrower and Lender Perceptions of Accounting Information", in Accounting Horizons, 9(1), 13.

Hamdani, A., Kandel, E., Mugerman, Y., & Yafeh, Y. (2017). "Incentive Fees and Competition in Pension Funds: Evidence from a Regulatory Experiment", Journal of Law, 2, 49-86.

Hamdani, A., Mugerman, Y., Rooz, R., Steinberg, N., & Yafeh, Y. (2022). "Creditor Rights, Implicit Covenants, and the Quality of Accounting Information", European Corporate Governance Institute–Finance Working Paper, (901).

Hart, O., & Moore, J. (1988). "Incomplete Contracts and Renegotiation", Econometrica: Journal of the Econometric Society, 755-785.

Jensen, M. C., & Meckling, W. H. (1976). "Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure", Journal of Financial Economics, 3(4), 305-360.

Kahan, M., & Tuckman, B. (1993). "Do Bondholders Lose from Junk Bond Covenant Changes?", Journal of Business, 499-516.

Kahan, M., & Yermack, D. (1998). "Investment Opportunities and the Design of Debt Securities", Journal of Law, Economics, & Organization, 136-151.

Kedmi, I., & Lakan, G. (2021). "Monitoring Costs of Public Debt: Evidence from a Natural Experiment in Israel", Discussion Paper 2021.18, Bank of Israel.

Malitz, I. (1986). "On Financial Contracting: The Determinants of Bond Covenants", Financial Management, 18-25.

Merton, R. C. (1974). "On the Pricing of Corporate Debt: The Risk Structure of Interest Rates", The Journal of Finance, 29(2), 449-470.

Miller DP, Reisel N. (2011). "Do Country-level Investor Protections Impact Security-level Contract Design? Evidence from Foreign Bond Covenants", Review of Financial Studies 63:2085–121.

Myers, S. C. (1977). "Determinants of Corporate Borrowing", Journal of Financial Economics, 5(2), 147-175.

Nash, R. C., Netter, J. M., & Poulsen, A. B. (2003). "Determinants of Contractual Relations between Shareholders and Bondholders: Investment Opportunities and Restrictive Covenants", Journal of Corporate Finance, 9(2), 201-232.

Nini, G., Smith, D. C., & Sufi, A. (2012). "Creditor Control Rights, Corporate Governance, and Firm Value", The Review of Financial Studies, 25(6), 1713-1761.

Reisel, N. (2014). "On the Value of Restrictive Covenants: Empirical Investigation of Public Bond Issues", Journal of Corporate Finance, 27, 251-268.

Sasi-Brodesky, A. (2021a). "The Contribution of Pension System Reform to Local Bond Market Development—Lessons from Israel". Unpublished dissertation work.

Sasi-Brodesky, A. (2021b). "The Impact of Concentrated Ownership on Distress Resolution of Public Firms", Unpublished dissertation work.

Simpson, D. B. (1973). "The Drafting of Loan Agreements: A Borrower's Viewpoint", The Business Lawyer, 1161-1196.

Smith, M. (1996). "Shareholder Activism by Institutional Investors: Evidence from CalPERS", Journal of Finance 51:227–52.

Smith Jr, C. W., & Warner, J. B. (1979). "On Financial Contracting: An Analysis of Bond Covenants", Journal of Financial Economics, 7(2), 117-161.

Sweeney, A. P. (1994). "Debt-Covenant Violations and Managers' Accounting Responses", Journal of Accounting and Economics, 17(3), 281-308.

Willis, R. J., & Rosen, S. (1979). "Education and Self-selection", Journal of Political Economy, 87(5, Part 2), S7-S36.

1. Appendix A: Covenant description

Data categorization was based on nine categories of covenants, of which five are restrictive covenants and four are performance-based covenants. This was supplemented with information on the presence of a negative pledge clause[12] available from another data source[13] which makes up the tenth covenant category. The restrictive covenants group includes dividend restrictions (restrict the ability of the firm to distribute cash to its stockholders, also in the form of equity buyback, if certain conditions are not met), cross default (bond is up for immediate repayment if another one of its bonds is in default), mergers and/or change of main business (the firm is not allowed to change its main business and/or may not merge unless a special approval of the bondholders is granted), transfer of ownership (the main owner may not transfer its controlling stake to a different owner unless a special approval of the bondholders is granted), and issuance of additional debt (the firm may issue additional debt, usually public, up to a certain amount. This covenant is different from the condition that usually accompanies secured bonds where the firm may not increase the bond outstanding amount unless more collateral is provided). A breach of these covenants grants the creditors the right to demand immediate repayment of the bond.

---

[12] A covenant preventing the company from creating, incurring, assuming, or permitting to exist any mortgage, pledge, lien, encumbrance, or charge on any property or asset of the company superseding the claim of the bondholders. This covenant is stated in the negative, i.e., the company will not permit any of the above unless the bond issue is secured equally and ratably with the mortgage or encumbrance.
[13] The BOI purchases information on collateral from a third party for traded corporate bonds that covers the period from 2004 and onwards. In addition, this data base includes dummy variables indicating whether bond has a negative pledge clause and an interest compensation mechanism in place.

2. Appendix B: Frequency of Covenants in New Issues, by Year of Issue

Use of negative pledge covenant in indentures

Legend: include negative pledge, no negative pledge

Use of dividend restriction covenant in indentures

Legend: include dividend restriction, no dividend restriction

Use of additional debt restriction covenant in indentures

Legend: additional debt limitations, no limitations

Use of restriction agaidts ownership transfer

Legend: ownership transfer limitation, no limitations

Use of cross-default with other bond issue

Legend: cross default, no cross default

Restriction against merger or change of main type of activity

Legend: limits on mergers and change of main activity type, no limits