

NBER WORKING PAPER SERIES

THE BENEFITS AND COSTS OF SECURED DEBT

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Working Paper 32353

<http://www.nber.org/papers/w32353>

NATIONAL BUREAU OF ECONOMIC RESEARCH

1050 Massachusetts Avenue

Cambridge, MA 02138

April 2024

This paper has been prepared for The Annual Review of Financial Economics and is based on my long-term collaborative work with Nittai Bergman as well as my collaborations on collateral and secured debt with Jennifer Dlugosz, Mark Garmaise, Victoria Ivashina, Nitish Kumar, Tobias Moskowitz, Raghuram Rajan, and Christopher Rigsby. I am indebted to Patrick Bolton for suggesting that I write this survey. The views expressed herein are those of the author and do not necessarily reflect the views of the National Bureau of Economic Research.

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The Benefits and Costs of Secured Debt
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NBER Working Paper No. 32353
April 2024
JEL No. G12,G32,G33

ABSTRACT

Secured debt—a debt contract that offers security to creditors in the form of collateralized assets—has been a cornerstone of credit markets in most societies since antiquity. The ability to seize and sell collateral reduces the creditor’s expected losses when the debtor defaults on a promised payment. Moreover, when a firm borrows from multiple creditors with different seniorities, debt secured by assets has higher priority relative to other creditors and is first in line for payment if the firm is bankrupt. While the benefits of secured debt have been shown in both the theoretical and empirical literature, less is known about the costs associated with secured borrowing. This paper surveys the burgeoning empirical literature on secured debt and provides an assessment of the costs and benefits of secured debt.

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1. INTRODUCTION

The use of collateral—property pledged by a borrower to secure the interests of the lender—has been a cornerstone of credit markets in almost all societies since antiquity. Although financial systems have evolved and developed over the past 4,000 years, collateral and secured debt still play a major role in today’s credit markets. From the ancient collateralized debt contracts imprinted on clay tablets in Ur to the collateralized debt obligations (CDOs) that became infamous during the Global Financial Crisis of 2008, secured debt has been central in the evolution of credit markets throughout history.¹

Collateral allows the creditor to recover, at least partially, a loan made to a debtor. Security or collateral consists of assets that are typically not subject to asymmetric valuations in markets and that the borrower cannot alter easily. Lenders may have greater confidence in such assets than in uncertain, unverifiable, and mutable corporate cash flows. The ability to seize and sell collateral reduces the creditor’s expected losses when the debtor defaults on its promised payment. All else being equal, therefore, if a firm pledges collateral when issuing bonds or taking loans, the price at which it obtains credit should be lower.

The importance of secured debt in corporate finance is reflected in an extensive theoretical literature, showing that collateral can be used to alleviate financial frictions stemming from moral hazard and adverse selection effects (Aghion & Bolton 1992; Hart 1995; Hart & Moore 1994, 1998; Stulz and Johnston 1985). As a result, firms with higher default risk will have to pledge collateral in order to increase pledgeable income (Berger & Udell 1990; Eisfeldt & Rampini 2009; Rampini & Viswanathan 2010; Tirole 2005). Moreover, debt secured by collateral has a clear priority over not only equity but also all other forms of debt, which gives the lender a measure of bargaining power. Further, the lender’s confidence that its claim is protected allows it to act forcefully to deter strategic default by the borrower (Baird & Jackson 1984; Baird & Rasmussen 2002, 2010; Bolton & Scharfstein 1996; DeMarzo 2019; Mann 1997). Consequently, all else being equal, firms that pledge collateral find it easier to obtain credit and at a reduced interest rate.

The benefits of secured debt are straightforward: collateral and secured debt enable borrowers to overcome financial frictions, obtain access to credit, and borrow at lower rates. Collateral thus holds the key to accessing credit markets. But whereas the benefits of secured

¹ For a detailed account of the performance of CDOs during the Great Financial Crisis, see Benmelech & Dlugosz (2009).

debt have been shown in both theoretical and empirical research, less is known about the costs associated with secured borrowing.

Securing debt clearly has transaction costs. For example, the borrower must register and perfect the security at a collateral registry. But such costs are fixed in most cases, and as such they are significant only if the amount borrowed is small, raising the costs of secured debt for small borrowers. Nevertheless, despite the potential costs of registering and perfecting collateral, small businesses and households rely heavily on secured debt. According to the Survey of Small Businesses Finances (SSBF), for example, the share of secured debt in the total indebtedness of US small businesses in 2003 was 0.65 as compared to only 0.10 for large publicly traded companies.²

Empirical evidence shows that creditors require firms with poor repayment histories or firms with higher default risk to secure their borrowings with collateral (Benmelech, Kumar, and Rajan 2023; Berger & Udell 1995; Jimenez, Salas, & Saurina 2006). Among large publicly traded firms, those with low credit rating are more likely to use secured debt. Figure 1 displays the distribution of secured debt, defined as the ratio of secured debt to total debt across firm-level credit rating. As Figure 1 illustrates, the mean ratio of secured debt to total debt is 0.063 and 0.093 for firms that are rated AAA and AA+, respectively. For firms with an investment grade rating (BBB– or better), the mean ratio of secured debt to total debt is between 0.063 and 0.135. In contrast, the mean ratio of secured debt to total debt is 0.268 for firms rated BB+ and 0.453 for firms rated B–. The fact that high credit risk firms use secured debt while low risk firms refrain from using secured borrowing is perhaps the most important empirical regularity regarding secured debt.

Whereas judicious creditors should demand collateral from risky borrowers, it is less clear why safe borrowers refrain from using secured borrowing. After all, security protects creditors and should reduce the cost of borrowing for safe creditors as well. Why would borrowers leave their debt unsecured up front? Would they not want to lower interest rates by offering lenders all the security they have?

Moreover, in a world with asymmetric information, secured debt is higher on the pecking order than unsecured debt. If so, following Myers & Majluf (1984), firms should exhaust their secured debt capacity before turning to more junior claims. But that is not how firms use secured debt in practice.

² See Benmelech, Kumar, & Rajan (2023) for a detailed calculation of the share of secured debt.

Perhaps a potential explanation lies in a dynamic version of Myers & Majluf (1984). Acharya, Almeida, & Campello (2007), Bjerre (1999), Rampini & Viswanathan (2010, 2013), and Schwarcz (1997), argue that firms may leave some financial slack to finance future investments. In particular, Rampini & Viswanathan (2010, 2013) argue that unused collateral is a form of slack or insurance that investment-grade firms like to preserve if they can issue other forms of debt. Keeping some assets unencumbered will become useful when unexpected adverse shocks hit. Following this line of argument, investment-grade firms may not issue much secured debt because of the high value they attach to preserving collateral slack and its associated financial flexibility.

The role of untapped collateral in providing firms with financial flexibility is an important factor in some credit rating models. For example, according to Moody's (2018):

The amount of a commercial real estate firm's unencumbered assets relative to gross assets is important because properties that are free and clear of mortgages are sources of alternative liquidity via the issuance of property-specific mortgage debt, or even sales. The larger the ratio of unencumbered assets to gross assets, the more flexibility a given commercial real estate firm generally has in repaying its unsecured debt at maturity, and the more likely that a higher recovery can be realized in the event of default. (p. 14)

The notion that security slack is used to preserve financial flexibility is evident not only in the cross-section of credit risk but also in the time-series. Recent empirical studies show that issuance of secured debt is countercyclical, suggesting that firms preserve collateral capacity that can be used during economic downturns. For example, Benmelech, Kumar, & Rajan (2023) find that secured bond issuance was countercyclical both in the early twentieth century and in the past sixty years.³

To summarize, the main empirical regularity that emerges from the data is that large publicly traded firms in the United States leave their assets unencumbered and hold back on using secured debt if they can. It seems that firms are preserving collateral slack as a form of insurance or untapped liquidity that is saved for bad times. The main cost of secured debt is the

³ In a similar vein, Nini, Smith, & Sufi (2012) show that lenders demand collateral when a debtor violates covenants and that, to the extent that covenants violations are countercyclical, this would create countercyclical in the level of outstanding secured debt. Luk & Zheng (2022) develop a macroeconomic model with debt heterogeneity that generates procyclical unsecured debt. Similarly, Azariadis, Kaas, & Wen (2016) show that unsecured debt is procyclical.

opportunity cost of its security. And the dynamic management of financial flexibility is likely a key consideration in the decision to use secured debt.

The rest of this paper proceeds as follows. Section 2 discusses the key features of secured debt: security and priority. Section 3 surveys the literature on the benefits of secured debt. Section 4 discusses the costs associated with secured debt. Section 5 describes the contingent use of secured debt, and Section 6 concludes.

2. WHAT MAKES SECURED DEBT SPECIAL?

Secured debt provides security in the form of collateralized assets as well as priority in the event of liquidation. This section discusses the roles of security and priority in protecting secured creditors.

2.1. Assets and Secured Debt

Securing debt with assets provides assurance to creditors. The value of an asset may be easier to establish than the expected value of uncertain cash flows. Furthermore, tangible assets—which are durable in nature—are expected to retain their value even if the firm’s business plan fails. In addition, as Hart & Moore (1994) argue, the ability to seize hard assets in case of default and the threat of repossession enable the lender to extract repayment even when cash flows are not verifiable. If a specific asset is not registered as collateral, it can be sold for cash that can be paid out to corporate insiders and shareholders. So, unless the lender has an explicit claim against the asset, they will have little control over its disposal. That is, the lender’s security interests prevent the assets from being sold and gives the lender the legal right to recover the asset if it is sold.

Another advantage of assets pledged as collateral is that the secured creditor does not have to go to court to reach the collateral in the event of nonpayment. If the firm did not file for bankruptcy protection, the creditor can take possession as long as it can do so without a breach of the peace. As a result, the ability to secure even a portion of the firm’s debt can have positive spillovers for all creditors and, more generally, can enhance the firm’s debt capacity (Diamond, Hu, & Rajan 2022; Park 2000).

2.2. Secured Debt and Priority

Although assets affect the firm’s ability to carry debt, the right to seize assets is not reserved only for secured creditors. An unsecured creditor has the right to seize assets in the event of default as long as there are no other creditors with higher-priority claims (Rampini &

Viswanathan 2022). Secured debt has the highest priority and is paid first in the case of liquidation. As such, secured debt plays an important role in enforcing payment priority among different creditors.

When a firm has multiple creditors with different priorities or maturities, debt secured by assets has higher priority relative to all other creditors. Jackson & Kronman (1979) argue that providing priority to secured creditors is efficient if lenders with a high cost of monitoring obtain a security interest. Protected by collateral, they will not need to monitor frequently or carefully, while unsecured creditors will take on the burden of monitoring and will get compensated for it. Relatedly, a number of authors argue that differentiation of priority of different lenders can enhance a firm's debt capacity (e.g., Bolton & Scharfstein 1996; Diamond 1991; Jackson & Kronman 1979; Park 2000; Rajan 1992; Welch 1997). Using a debt structure with secured debt is one way to achieve such differentiation in priority.

3. THE BENEFITS OF SECURED DEBT

This section reviews the three main benefits of secured debt: (i) access to credit; (ii) lower cost of credit; and (iii) higher debt capacity.

3.1. Secured Debt and Access to Credit

3.1.1. Small businesses and secured debt. The primary role of secured debt is to provide security to creditors. This added security enables smaller, riskier, and financially constrained firms to access credit markets and raise debt capital to finance their operation. Indeed, most of the borrowing of smaller firms in the United States is secured by assets. For example, using data from the Survey of Small Business Finances (SSBF), Benmelech, Kumar, & Rajan (2023) show that secured debt accounts comprise the majority—65 percent—of the total indebtedness of small businesses in the United States. Similarly, according to Leeth & Scott (1989), and based on the National Federation of Independent Business, about 60 percent of firms with commercial bank loans post collateral as security for their loans. Indeed, secured debt is often the only means available for smaller firms to obtain external financing. In contrast large, publicly traded U.S firms use mostly unsecured debt.

3.1.2. Financial distress, economic conditions, and secured debt. Rampini & Viswanathan (2010) argue that in contrast to unconstrained firms that preserve unencumbered assets as a reserve to draw on only when needed, financially constrained firms tend to use all the collateral

they have, since their marginal returns to investment are high. Consistent with Rampini & Viswanathan's model, in the cross-section, firms that are more financially distressed tend to use secured debt. Benmelech, Kumar, & Rajan (2023) show that large publicly traded firms with a low credit rating are more likely to use secured debt. In their regression analysis, Benmelech, Kumar, & Rajan (2023) find that the effect of credit rating on secured debt is sizeable. In the cross-section, a change of 5 notches in ratings (say, from BBB+ to BB-) is associated with an increase of 14 percentage points in the ratio of secured debt to total debt, representing an increase of 42 percent relative to the mean. Moving from cross-sectional to time-series variation, firms make greater use of secured debt as their credit quality deteriorates. That is, as firms' financials deteriorate, they seek recourse in secured debt. And although secured debt might be the last resort for low-rated firms, it still enables those firms to access credit markets.

While total external finance is procyclical, both debt and equity issuance need not be procyclical because of substitution between these two forms of financing. For example, Covas & Haan (2011) find that both debt and equity issuance are procyclical. In the context of secured debt, Benmelech, Kumar, & Rajan (2023) find that secured bond issuance was countercyclical in both the early decades of the twentieth century and the past sixty years. More specifically, Benmelech, Kumar, & Rajan (2022) find that secured bond issuance is countercyclical for below-investment-grade firms. Interestingly, they show that investment-grade firms' issuance choices do not seem to be influenced by business conditions. In summary, firms tend to use secured debt when in financial distress and during business cycle downturns—that is, when the economy is doing badly. Securing credit enables distressed firms to tap credit markets even during economic downturns.

3.1.3. A lifeline in extremis. Firms in severe financial distress often lose access to credit markets, especially after they breach their credit facilities covenants or default on scheduled debt payments. In such circumstances, firms will find it difficult to attract new capital unless that capital takes the form of secured debt. However, at those distressed periods, distressed companies' assets are typically fully pledged to secure their existing debts. That is, in extremis firms have no unencumbered assets to offer as security.

The US Bankruptcy Code under Chapter 11 of Title 11 of the United States Code (the Bankruptcy Code) offers a solution to the inability of distressed firms to obtain fresh funding.

The solution is called debtor in possession financing (DIP financing).⁴ The main idea of DIP financing is to enable firms to obtain credit while operating under bankruptcy. In order to incentivize lenders to provide new or “post-petition” credit, the Bankruptcy Code offers DIP financing special protection. DIP financing can take the form of either unsecured or secured debt.

To encourage new lenders to extend unsecured credit financing, the Bankruptcy Code assigns to DIP financing higher priority over all other pre-petition unsecured claims. However, in many cases bankrupt firms are unable to obtain unsecured financing. In such cases, bankruptcy court can authorize secured DIP financing. Under section 364(c) of the Bankruptcy Code, the bankruptcy court can grant super-priority along with security interest in any unencumbered assets. Furthermore, if the debtor is still unable to obtain financing secured by remaining unencumbered assets, the debtor can obtain financing under section 364(d), which allows the debtor to offer a priming lien to the DIP lender. In a priming lien, the debtor offers a lien on collateral that has previously been encumbered, making it senior to any existing, pre-petition lien on these assets. The ability to offer a priming lien on already encumbered assets is a key feature of Chapter 11 and exemplifies how secured debt can be used as a lifeline in extremis such as bankruptcy.

3.2. Secured Debt and Credit Spreads

3.2.1. Collateral values and the cost of debt. Although in theory secured debt protects the creditor and should lead to a lower borrowing cost, estimating the effect of security on credit spreads has proven to be empirically challenging. The selection effect, in which riskier firms are more likely to resort to secured borrowing, makes it difficult to analyze the effect of security on the cost of debt across firms. Moreover, there is also a within-firm selection problem in the timing of secured debt borrowing, since firms tend to use secured debt in times of financial distress. Indeed, several studies find a positive relation between loan rates and the existence of collateral, consistent with a moral-hazard-induced selection effect in which collateral is required of firms at high risk of default (Berger & Udell 1990; John, Lynch, & Puri 2003).

To illustrate the selection problem that is inherent in secured debt rates, Figure 2 displays the median credit spread at origination of secured and unsecured loans by year of

⁴ This subsection draws heavily from Chung & Kaplan (2020), who provide an excellent legal review of DIP financing.

origination. As Figure 2 demonstrates, the credit spread of secured loans is between 150 and 200 basis points *higher* than that of unsecured loans. The observed higher credit spread of secured debt is driven by selection both across and within firms. As a result, a comparison of secured and unsecured loan rates is masked by the selection of riskier borrowers into secured debt.

Several authors have used different identification strategies to uncover the effect of collateral or security on borrowing rates. Instead of studying the extensive margin of collateral use—that is, whether or not a loan has collateral—Benmelech & Bergman (2009) study the effect of collateral on loan rates by examining the intensive margin of collateral use—that is, variation in the value of collateral to lenders. They argue that a selection bias along the intensive margin, in which firms at higher risk of default are required to pledge collateral of greater redeployability, is not supported by the data.⁵

Increased liquidation value lowers the cost of liquidation. As a result, in equilibrium, lenders charge lower interest rates on bonds and loans secured by assets with higher liquidation value, leading to the following prediction:

Prediction 1: The promised debt yield decreases in asset liquidation value, controlling for the debt level.⁶

Using a novel data set of secured debt tranches issued by US airlines, Benmelech & Bergman (2009) construct measures of collateral redeployability as a proxy for creditors' expected value of collateral on default. They test Prediction 1 and show that asset redeployability is negatively related to credit spreads and positively related to credit ratings. By focusing on a particular industry and examining the intensive, rather than extensive, margin of collateral values, the authors find that after controlling for tranche and airline characteristics and both year and airline fixed effects, an increase from the 25th percentile to the 75th percentile in their redeployability measures is associated with a decrease in the spread that is between 58.0 and 64.2 basis points, representing a decrease of between 29.2 and 32.3 percentage points relative

⁵ Moreover, such selection bias would work against finding support for the hypothesis that more redeployable collateral is associated with lower credit spreads.

⁶ Unconditionally, an increase in the liquidation value of the asset raises the optimal debt level but also provides a greater payment to creditors. The net effect on promised debt yields is analytically ambiguous, but in numerical results Harris & Raviv (1990) show that firms with higher liquidation values consistently have higher debt yields. Controlling for the debt level of the firm, by contrast, higher liquidation values should be associated with lower promised yields, since creditors can expect a higher payment in the case of default.

to the mean spread.⁷ Furthermore, Benmelech & Bergman (2009) show that more redeployable collateral is associated with higher credit rating. They find that the probability that a tranche will be rated AAA by S&P or Aaa by Moody's is consistently positively related to its collateral redeployability. Similarly, using data on commercial real estate loans, Benmelech, Garmaise, & Moskowitz (2005) find that, controlling for the property's characteristics, greater redeployability is associated with lower loan rates.

Cerquero, Ongena, & Roszbach (2016) use a legal change to identify the value of secured debt. Using data from Sweden, where in 2004 the authorities introduced legal changes that reduced the value of floating liens, they find that lenders increased rates on loans, suggesting that strong collateral enforcement is associated with lower loan rates.

3.2.2 The secured debt premium. To address the selection problem of secured debt, Berger, Frame, & Ioannidou (2016) and Benmelech, Kumar, & Rajan (2022) use an identification strategy that attempts to compare spreads on secured and unsecured credit of the same firm and at the same point in time. This subsection follows the approach of Benmelech, Kumar, & Rajan (2022). They estimate the following regression specification:

$$spread_{i,j,t} = \beta * secured_{i,j,t} + \theta X_{i,j,t} + \delta_{j,t} + \varepsilon_{i,j,t}, \quad (1)$$

where $spread_{i,j,t}$ is the credit spread for debt i of firm j at time t . The variable $secured_{i,j,t}$ is a dummy that equals one if debt i is secured, and zero otherwise. The main coefficient of interest is β , or the *secured premium*, which measures the extent to which securing credit reduces the yield spread. The vector $X_{i,j,t}$ controls for debt characteristics, and $\delta_{j,t}$ represents firm $\times$ time fixed effects. The main idea behind Equation (1) is that it is necessary to include firm $\times$ time fixed effects in order for β to capture the difference between secured and unsecured loans of the same firm at the same point in time. Table 1 reports the results from estimating Regression (1) with DealScan loan data using specifications with different sets of fixed effects.

An examination of Table 1 illustrates the nature of the selection bias in measuring the secured credit premium. The first column of Table 1 reports the results from a specification that includes year $\times$ month fixed effects to control for time-varying effects and facility-type fixed effects to control for differences across loan facility types.⁸ Starting with the main variable of interest, β , the coefficient on *Secured* implies that the credit spread on secured loans is higher by 100 basis points compared to an unsecured loan. The positive coefficient on the

⁷ Gavazza (2010) examines the effect of aircraft liquidity on operating lease rates and find similar results.

⁸ There are four facility types: credit lines, bank term loans, institutional term loans, and others.

secured dummy illustrates the selection problem of secured debt: riskier borrowers are more likely to resort to secured borrowing than safer borrowers (Benmelech & Bergman 2009; Berger & Udell 1990; Strahan 1999). The addition of firm fixed effects in column (2) does reduce the coefficient from 100.8 to 57.9, suggesting that some of the selection problem is indeed cross-sectional in nature and driven potentially by differences in risk across firms. However, even though the coefficient on *Secured* is smaller when firm fixed effects are added to the regression, it remains positive and statistically significant, suggesting that there is also within-firm selection in the timing of secured debt origination.

To address the joint selection problem—that the firms that use secured debt are possibly riskier and that they also recourse to secured debt under adverse financial circumstances—the specification in column (3) includes firm $\times$ year fixed effects. The inclusion of firm $\times$ year in addition to year $\times$ month fixed effects facilitates the comparison of loan facilities issued by the same firm within a year, correcting for overall conditions in the month of issuance. Indeed, as column (3) of Table 1 shows, when firm $\times$ year fixed effects are included, the coefficient on *Secured* is negative and statistically significant. The point estimate suggests that the credit spread on secured loans is, on average, 40.6 basis points lower than that on unsecured loans, controlling for loan characteristics.

Finally, column (4) reports the strictest specification that includes package fixed effects. In essence, the estimates in this specification compare spreads on secured and unsecured loan facilities that are part of the same loan deal. Since the price of all facilities of the loan are negotiated and finalized at almost the same time, the spread difference across facilities is not driven by changing firm quality. Similar to the results in column (3), the coefficient on *Secured* is negative and statistically significant. The point estimate on the secured dummy suggests that the spread on a secured loan is 72 basis points lower compared to unsecured loans within the same credit facility. The fact that the secured premium is larger in this specification compared to column (3) suggests that even within a firm-year, there is selection in the timing of secured debt issuance.

Similarly, Luck & Santos (2023) examine the valuation of collateral by comparing spreads on loans by the same bank to the same borrower at the same origination date, but backed by different types of collateral. They find that pledging collateral reduces borrowing costs by 23 basis points on average and that marketable securities, real estate, account receivables and inventory are more valuable than fixed assets and blanket lien on assets in reducing borrowing rates.

3.3. Secured Debt Capacity

This subsection reviews the empirical literature on the effect of collateral and security on debt capacity.

3.3.1. Collateral values and debt capacity. The value of the creditor's option to liquidate the project assets affects both its willingness to provide financing and the terms on which financing is extended. The concept of liquidation value used in Bolton & Scharfstein (1996), Harris & Raviv (1990), and Hart & Moore (1994, 1998) is fairly general: an asset's liquidation value is the amount that creditors can expect to receive if they seize the asset from managers and sell it on the open market. In these models, debt financing is highly influenced by the value of the collateral in the creditor's hands. A general prediction that emerges from these types of models appears below:

Prediction 2: Debt capacity increases in asset liquidation value.

Prediction 2 emerges from Harris & Raviv (1990), Hart & Moore (1994), Shleifer & Vishny (1992), and Williamson (1988). Debt triggers liquidation in some states of the world in all these models, and the benefits of debt are tied to the efficiency of liquidation. This prediction applies to the total debt capacity the lender is willing to supply. And although empirically the equilibrium debt level that is typically observed also reflects the firm's demand for debt, all else being equal, the equilibrium level of debt is increasing in debt capacity, which in turn is increasing the asset liquidation value.

Mounting empirical evidence supports Prediction 2. Benmelech, Garmaise, & Moskowitz (2005) examine the relation between leverage and the liquidation value of the asset used as security for the loan. They use a large sample of commercial real estate transactions drawn from across the United States between 1992 and 1999. In their analysis they construct a measure of liquidation values that is based on the value of the property in its best next use. Specifically, they argue that a broader set of buyers can potentially raise the liquidation value of an asset and use zoning regulations to determine the set of uses of a property. Properties with more allowable uses should have a greater number of potential buyers, all else being equal, and therefore a higher value in the event of liquidation. A property's zoning designation is thus used as a measure of its redeployability in the sense of Williamson (1988). They find that, controlling for the property's price, earnings-to-price ratio, type, general zoning, year, and census tract, greater redeployability is associated with larger loans. Moving from the least to

the most zoning flexibility increases the loan's size relative to the value of the property by 4.1 percentage points. In addition, Benmelech, Garmaise, & Moskowitz (2005) show that their redeployability measure has a significantly larger impact on loan contracts in US states in which foreclosure is relatively easy, suggesting that it is the effect of zoning on the asset's liquidation value that is driving their results, since only collateral value is relevant in foreclosure.

Benmelech & Bergman (2009) study the effect of collateral on debt capacity using data on secured debt in the airline industry. They argue that the airline industry is a natural candidate for analyzing the relation between collateral and debt financing. Airlines in the United States issue tranches of asset-backed securities known as enhanced equipment trust certificates (EETCs). Pledging aircraft from an airline's fleet as collateral, these debt instruments served as the main source of external financing for US airlines during the period 1994–2005. The authors argue that, given the scale and publicity of publicly traded airlines that issue EETCs, concerns about asymmetric information and adverse selection are not likely to play a major role. They construct measures of collateral redeployability as a proxy for creditors' expected value of collateral on default. Their approach to measuring redeployability is motivated by the industry equilibrium model of Shleifer & Vishny (1992) and is similar to the empirical approach developed in Benmelech (2009) for nineteenth-century American railroads.

In order to reduce costs associated with operating different aircraft types, airlines tend to operate a limited number of aircraft models. Therefore, potential secondary-market buyers of any given type of aircraft are prone to be airlines already operating the same type of aircraft. Benmelech & Bergman (2009) begin by constructing redeployability measures at the yearly level for each aircraft type. To do so, they compute for every sample-year: (i) the number of aircraft per type; (ii) the number of aircraft operators per type; and (iii) the number of aircraft operators who operate at least five aircraft per type. This process yields three redeployability measures for each aircraft-type and each sample-year. To construct the redeployability measures for a portfolio of aircraft serving as collateral for a particular airline bond tranche, the authors simply aggregate the aircraft-type redeployability measures across all aircraft in the portfolio. They define the redeployability of the collateral-portfolio to be the weighted average of the redeployability index corresponding to each of the aircraft in the portfolio.

Benmelech & Bergman (2009) test Prediction 2, which states that more redeployable collateral supports higher debt capacity using loan-to-value ratio as a dependent variable. They find a robust positive relation between loan-to-value ratios and collateral redeployability. Collateral pools with higher asset redeployability are associated with higher debt capacity.

Moving from the 25th to the 75th percentile of the redeployability measures increases loan-to-value ratios by between 14 percent and 21 percent of the mean tranche loan-to-value ratio.

Campello & Giambona (2013) add to the empirical literature on the supply of credit. They analyze the effects of real asset values on capital structure by exploiting variation in the salability of corporate assets. To establish this link, they distinguish across different assets in firms' balance sheets (machinery, land, and buildings). They find that asset redeployability is an important driver of leverage when credit frictions are high. Based on their instrumental variables specifications they conclude that out of all asset categories, *Land and Building* appears as the most important determinant of leverage, while *Machinery and Equipment* is far less relevant. In their regressions, which use a leverage ratio based on book values as their dependent variable, they find that moving from the 25th to the 75th percentile of their redeployability measure increases leverage by 19.9 percent. In a related paper, Cvijanovic (2014) shows that shocks to asset values are associated with increases in leverage. In particular, she examines the effect of real estate prices on firm capital structure and finds that for a typical US listed company, a one standard deviation increase in predicted value for firm pledgeable real estate collateral translates into a 3 percentage point increase in leverage.

Similarly, Berkowitz and White (2004) study the effect of personal bankruptcy law on small firm's access to credit. The debts of an unincorporated firm are the personal liabilities of the firm's owner and if the firm fails, its owner has an incentive to file for personal bankruptcy to discharge the firm's debt. They show that small firms that are located in states with unlimited homestead exemptions are more likely to be denied credit, and when loans are made, they are smaller (consistent with Prediction 2) and with higher interest rates (consistent with Prediction 1).

It is important to note that although Berkowitz and White (2004), Campello & Giambona (2013) and Cvijanovic (2014) show that increases in liquidation values are associated with higher debt capacity, their leverage measures are constructed using total debt rather than secured debt. And although their evidence points to the importance of collateralized assets, they do not provide direct evidence on the benefits of secured debt. Relatedly, Rampini & Viswanathan (2022) distinguish between collateral and secured debt. In their framework, secured debt is explicitly collateralized, with a lien on specific assets, which facilitates enforcement of payment. On the other hand, unsecured debt is a claim against unencumbered assets and thus is implicitly collateralized. According to Rampini & Viswanathan (2022), assets can serve as collateral for both secured and unsecured debt, and thus firm assets determine the debt capacity of secured debt as well.

4. THE COSTS OF SECURED DEBT

This section discusses three costs of secured debt. These are: (i) giving secured lenders excessive powers; (ii) the loss of operational flexibility; and (iii) the loss of financial flexibility.

4.1. Excessive Secured Lender Power

Firms may be reluctant to post substantial collateral if it strengthens lenders' bargaining power and makes lenders more intransigent in bankruptcy negotiations.⁹ In such cases, a default could allow lenders to extract substantial rents. The legal literature emphasizes such problems associated with secured creditors (see, e.g., Baird & Jackson 1984; Baird & Rasmussen 2010; Jackson & Kronman 1979). Since healthy firms incur costs in pledging collateral, and because collateral helps lenders only when firms are closer to financial distress, borrowers will be more inclined to issue secured debt only as the probability of distress, and creditor demand for collateral, is high.

Empirical evidence suggests that secured creditors possess strong bargaining power over distressed firms. Ayotte & Morrison (2009) find that Chapter 11 bankruptcies are more likely to end in sale or liquidation when secured creditors have strong bargaining power. In a study of corporate reorganizations in Finland, Bergstrom, Eisenberg, & Sundgren (2002) find that secured creditors oppose reorganization and push for liquidation. Ma, Tong, & Wang (2019) show that bankrupt firms are likely to sell their core patents rather than their peripheral patents. In contrast, non-distressed firms tend to sell peripheral patents. Interestingly, they find that the selling of core patents is driven almost entirely by firms with a high share of secured debt. They find that a collateralized patent is seven times more likely to be sold by a firm in bankruptcy than by a non-distressed firm and that core patents are more likely to be pledged as collateral. Ma, Tong, & Wang (2019) also find that firms selling their core patents underperform when they emerge from bankruptcy.

Vig (2013) analyzes the effect of a secured law reform in India on firms' capital structure. He exploits the passage of the Securitization and Reconstruction of Financial Assets and Enforcement of Security Interest Act of 2002 (SARFAESI) on debt financing by Indian firms. SARFAESI strengthened the rights of secured creditors by allowing them to bypass a lengthy judicial process and seize and liquidate assets. He shows theoretically, but perhaps more importantly empirically, that such a strengthening of creditor rights leads firms to use

⁹ See Bolton & Scharfstein (1996) for a model in which lenders become strategically intransigent.

less, not more, debt. The main intuition in Vig (2013) is that by strengthening creditor rights, lenders will be more willing to extend credit. However, the demand for credit by firms may decline if enhanced creditor rights leads to excessively premature liquidation in the event of default. He shows that firms with a high level of tangible assets—that likely would lose value in a liquidation—use less debt following the passage of SARFAESI.

Taken together, these findings suggest that when creditors have control over key assets, they may prefer to liquidate them to make themselves whole rather than leave the assets inside the firm as part of the going concern. As a result, firms remain wary of using secured debt and instead leave their assets unencumbered.

4.2. Loss of Operational Flexibility

Firms might want to avoid issuing secured debt to maintain operational flexibility. When pledging collateral, a firm is limiting its flexibility to sell or redeploy assets (see Mello & Ruckes 2017). Although presumably creditors might be willing to accept contractual modifications to permit value-enhancing redeployment, the process of making such modifications might take time, and creditors may extract rents from the borrower in return for flexibility. The cost of foregone operational flexibility is probably larger in good times when there is a lot of asset churn (Eisfeldt & Rampini 2006, 2009). As a result, firms for which operational flexibility is important will prefer to borrow unsecured. Indeed, according to Moody's (2018), they view secured debt and encumbered properties as limiting operational flexibility:

Mortgaged assets can be more difficult to sell due to restrictions or penalties related to transfer. Also, a mortgage agreement can restrict the ability of an owner to make changes to a property, or can delay the implementation of changes, making the repositioning of problem properties even more challenging. Recasting a first mortgage to raise the loan-to-value (LTV) ratio can be difficult, if not impossible, and the same applies to obtaining a second mortgage. As a result, much of the value of a mortgaged asset can effectively be sequestered and cannot be used as a source of alternative liquidity. In some mortgage structures, even determining the proper administrative party (e.g., special servicer or master servicer) with whom to discuss an issue can be difficult. (p. 16)

Conklin, Diop, & Qiu (2018) provide evidence on the trade-off between secured debt and operational flexibility. They use a large sample of commercial real estate transactions of real estate investment trusts (REITs) and find that REITs are less likely to use secured debt to finance the acquisition of properties in their primary markets. Using unsecured debt to finance the acquisition of real estate properties is intriguing since those properties are natural candidates for secured financing through commercial mortgages.

The authors argue that since location is one of the most important valued attributes of real estate properties, REITs try to keep their prime properties unencumbered to preserve operational flexibility. In addition to providing statistical analysis, Conklin, Diop, & Qiu (2018) quote an asset manager in a REIT in their sample who states that “[our] company avoids property-level debt so that changes in individual tenant space demands (e.g., expansion, contraction and relocation) could be met within the firm’s portfolio of properties without getting approval from a particular secured debt lender” (p. 122). They add that mortgage financing “may also limit the ability of managers to redevelop or even sell the mortgages properties particularly in the presence of a defeasance clause” (p. 122).

4.3. Loss of Financial Flexibility

From the firm’s perspective, pledging assets up front is costly. Borrowers may be interested in having more financial flexibility by preserving collateral capacity, giving it up only when necessary to unlock access to further borrowing.

Several authors have argued that repaying debt with cash or issuing secured debt can reduce a firm’s financial flexibility and leave it less prepared to take full advantage of its growth opportunities.¹⁰ For instance, if investments tend to emerge when cash flows are low, and if debt markets are closed at that point, it would have made sense for the firm to hoard cash at an earlier date rather than pay down debt then. If lending dries up, hoarded cash enables the firm to invest, whereas paid-down debt does not.

Unpledged collateral is a form of financial slack. By preserving collateral capacity and giving it up only when necessary to unlock access to further borrowing, the firm may be able to undertake investments that it would not have been able to if it had been more liberal in collateralizing its borrowing in the past. Unpledged collateral (or cash) then is a form of financial slack, as in Myers & Majluf (1984), that can be used in a state-contingent way,

¹⁰ See, e.g., Acharya, Almeida, & Campello (2007), Bjerre (1999), Donaldson, Gromb, & Piacentino (2020), Li, Whited, & Wu (2016), Rampini & Viswanathan (2013), and Schwarcz (1997).

preserving borrowing capacity for states where it is truly needed rather than giving it up ex ante. Because access to finance is typically easier when a firm is doing well, unpledged collateral will become beneficial when a firm needs funds in bad times for either new positive net present value (NPV) investment projects or in order to avoid a negative NPV liquidation (see Holmstrom & Tirole 1997).

The notion that untapped collateral capacity, as a form of financial flexibility, is an important factor in the dynamic management of secured debt is reflected in some credit rating models. For example, according to Moody's (2018):

The amount of a commercial real estate firm's unencumbered assets relative to gross assets is important because properties that are free and clear of mortgages are sources of alternative liquidity via the issuance of property-specific mortgage debt, or even sales. The larger the ratio of unencumbered assets to gross assets, the more flexibility a given commercial real estate firm generally has in repaying its unsecured debt at maturity, and the more likely that a higher recovery can be realized in the event of default. (p. 14)

In addition, as part of its analysis of leverage, Moody's (2018) assigns a lower credit score to firms with higher ratios of secured debt to gross assets, asserting that

the ratio of secured debt to gross assets is an important indicator of financial flexibility. Companies with low levels of secured debt typically have greater financial flexibility. In periods of stress, the existence of a pool of unencumbered assets (particularly a pool of larger, more diverse and higher-quality assets) can help maintain market access, because the commercial real estate firm may be able to issue secured debt even if market conditions preclude the issuance of unsecured debt. (p. 16)

5. THE CONTINGENT USE OF SECURED DEBT

In the early twentieth century, most debt was secured. Over time, however, as accounting standards, governance, and bankruptcy laws improved, the share of secured bonds declined. Benmelech, Kumar, & Rajan (2023) document a steady decline in the share of secured debt issued (as a fraction of total debt) in the United States over the twentieth century. They show that in 1900, 98.5 percent of total bond issuance in the United States was secured, trending

down to 66.0 percent by 1943 and 56.2 percent in 1970. By 2000, the share of secured bonds declined to 7.5 percent and remained low throughout the first twenty years of the twenty-first century. While the share of secured debt in the capital structure of publicly traded firms has decline during the twentieth century, leveraged transactions – in particular, leveraged buyouts – rely on secured loans as part of their deal structure (Kaplan & Stromberg, 2009).

Benmelech, Kumar, & Rajan (2023) assert that the cost of foregone financial flexibility is likely an important reason in explaining why large firms refrain from issuing secured debt unless they run out of financing options (see also Rauh & Sufi 2010). Modern US firms offer collateral on a more contingent basis—as they near financial distress—thus allowing firms to retain financial and operational flexibility in normal times while reassuring creditors that their priority will be respected.

Interestingly, the contingent nature of secured debt is also reflected in its pricing. Benmelech, Kumar, & Rajan (2022) estimate the secured premium—the difference at a point in time between the yield of unsecured debt issued by a firm and the yield of its secured debt—both across firms and over time for large data sets of bonds and loans issued by large US firms.¹¹ They show that, across firms, the secured premium is lower when firms are large, they have low leverage, and tangible assets are a substantial portion of their assets. The idea is that lenders will not give up much interest rate spread for the protection offered by collateral in bankruptcy if they are confident that bankruptcy is a low-probability event. Relatedly, the authors also find that for investment-grade firms, creditors will pay little for the added protection afforded by security, whereas for below-investment-grade firms, they will pay a lot. Yields on bonds issued by investment-grade firms (those with an S&P rating of BBB– or better) are only about 2 basis points lower when secured, whereas this secured premium jumps to 55 basis points for a firm that has a below-investment-grade rating. Similarly, implied yields from bond trades in the secondary market suggest that investors are willing to give up almost 129 basis points in spread for the added protection of security for below-investment-grade issuers, whereas securing debt lowers the traded spreads by insignificant amounts in the case of investment-grade issuers.

Benmelech, Kumar, & Rajan (2022) also show that the secured premium increases as a firm’s credit quality deteriorates. A transition from a rating category of A to a rating category of BBB does not change the yield differential between an unsecured and a secured bond economically or statistically. However, transitioning from BBB to BB, from BB to B, and from

¹¹ See the discussion in Section 3.2.2.

B to CCC increases the secured premium by an additional 92 basis points, 21 basis points, and 131 basis points, respectively, highlighting the contingent importance of security. The evidence suggests that the benefit of secured debt seems to be higher when firms near financial distress, reinforcing the importance of keeping assets unencumbered and preserving financial flexibility in the form of untapped security.

Conclusion

Moral-hazard-based theories of secured debt argue that firms with greater default risk pledge collateral as a mechanism to increase pledgeable income. Consistent with these theories, the empirical evidence shows that creditors require firms with higher default risk to secure their borrowing. The selection outcome, in which riskier firms are more likely to use secured debt, makes it difficult to analyze the impact of security on debt contracts. The burgeoning empirical literature on secured debt—facilitated by the use of contract-level data and innovative empirical approaches—has made excellent progress uncovering the relation between collateral and the different facets of debt.

The benefits of debt in lowering the cost of borrowing, and in particular in enhancing debt capacity and access to credit, are now well documented in studies spanning different industries, countries, and time periods. But if securing debt is so beneficial, why might borrowers leave their debt unsecured up front? The reluctance to use secured debt by firms with a lower risk of default suggests a dark side of secured debt—one that borrowers try to avoid whenever possible. This side of secured debt stems from secured lenders' excess bargaining power and the desire to maintain operational and financial flexibility. The cost of foregone financial flexibility is likely the main reason why large firms refrain from issuing secured debt and use it only in adverse contingencies. Understanding the dark side of secured debt is an important and promising avenue for future research.

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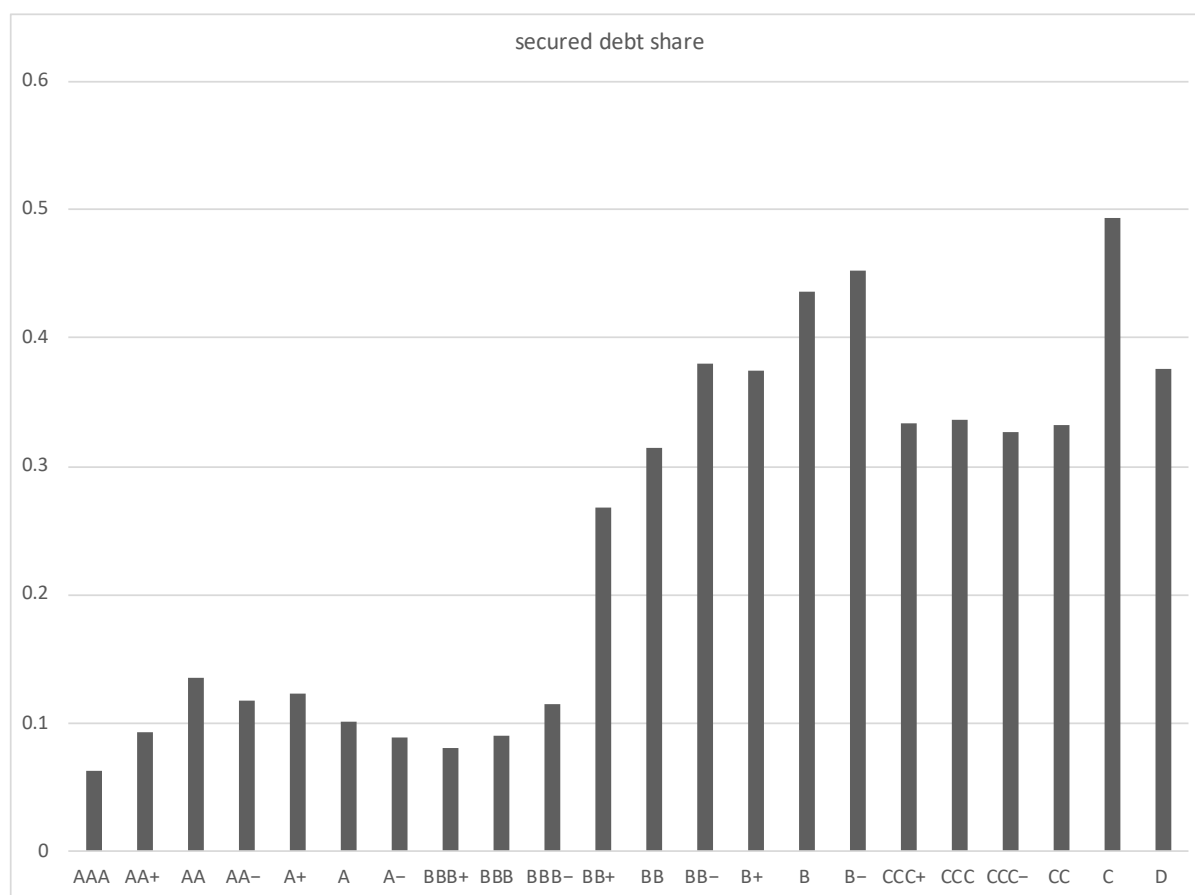


Figure 1

Secured debt share: secured debt/total debt stratified by S&P firm-level credit rating.

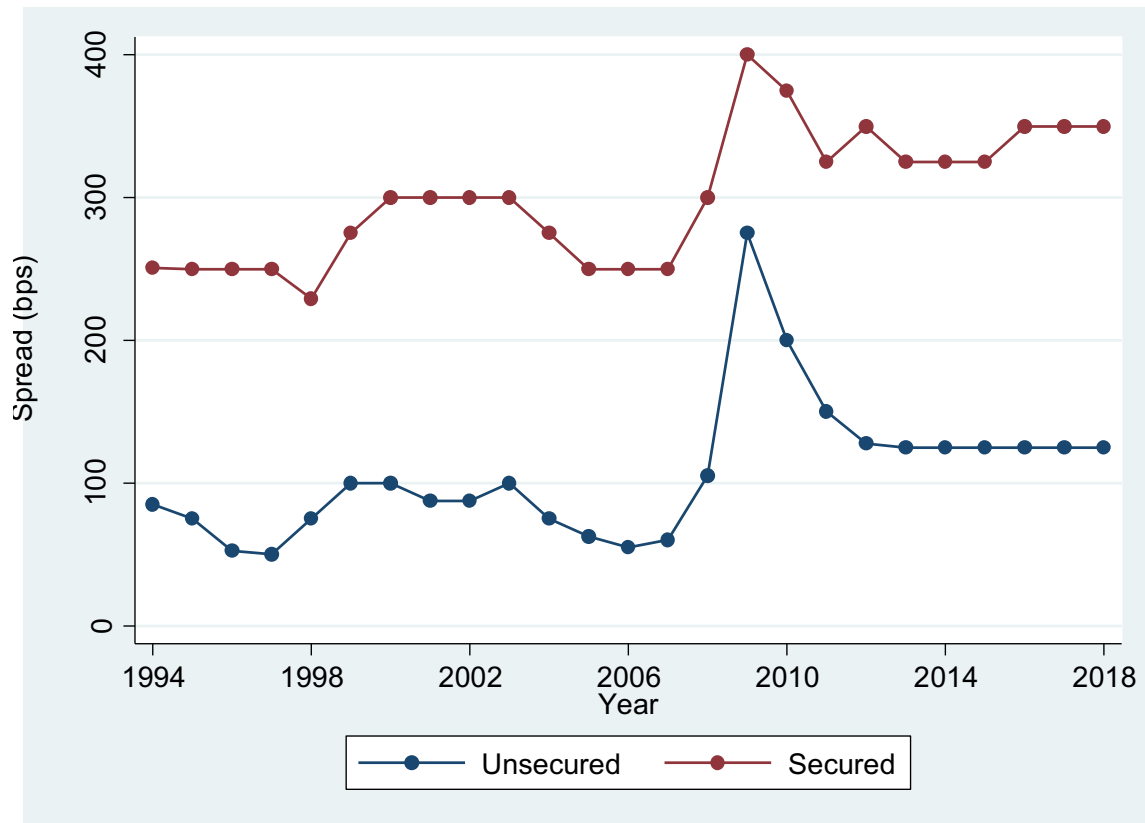


Figure 2

Loan spread: secured versus unsecured. This figure displays the median spread over LIBOR at issuance for secured and unsecured loans by year of issuance. Source: DealScan.

Table 1 The secured credit premium

	(1)	(2)	(3)	(4)
Secured	100.764*** (41.44)	57.892*** (18.14)	-40.556*** (-4.31)	-72.239*** (-4.44)
Senior	-201.672*** (-7.21)	-194.091*** (-6.74)	-198.106*** (-7.22)	-150.266*** (-3.19)
Maturity	-4.748** (-2.40)	-3.232 (-1.55)	25.662*** (11.34)	36.182*** (8.74)
Amount	-26.231*** (-35.34)	-15.121*** (-19.28)	-10.206*** (-12.48)	-10.441*** (-11.99)
Covenant	-38.103*** (-18.80)	-24.894*** (-10.83)	-15.544*** (-2.87)	
			year × month, firm	
	year × month, facility type	year × month, firm, facility type	× year, facility type	Package, facility type
Fixed effects				
Observations	50,614	48,187	34,700	30,905
Adj. R-squared	0.469	0.628	0.671	0.689

This table reports the results of regressions relating loan spreads to the presence of secured interest in the loan over the period 1994–2018. The dependent variable is the spread over LIBOR paid at issuance of a loan facility. *Secured* is a dummy that takes the value of one if a loan facility is secured, and zero otherwise. The regressions also control for seniority, maturity, issuance amount, and the presence of a covenant. Column (4) uses package fixed effects and hence absorbs all variations across packages. All regressions are estimated with heteroscedasticity robust standard errors that are clustered by firm, and *t*-statistics are reported below the coefficients in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.