Putable Bonds, Risk Shifting Problems, and Information Asymmetry

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Abstract

This study presents an empirical examination of issuers' motives to issue putable bonds using a comprehensive sample of putable and straight debt issues from 1976 to 2019. We focus on the regular putable bonds that are not tied to specific event risks, non-convertible, and non-callable. We find that putable bond issues span over the past four decades and across industry groups. These bonds are smaller in offer size, longer in maturity, and have fewer covenants than straight debt. Using Probit and Tobit regressions, we find that firms with greater risk-shifting incentives measured by market to book ratio and WW Index are more likely to issue putable bonds. We also find that issuers with a high level of information asymmetry are more likely to issue putables. Our findings suggest the put option can be viewed as an effective contracting term that helps attract bondholder interests and alleviate borrowing costs for issuers. Finally, we consider the simultaneity of the decisions on putable, covenants, and leverage, and find further confirmation for the risk-shifting and information asymmetry hypothesis for putable issuances.

1. Introduction

Over the past several decades, bondholders experience turbulent credit markets driven by corporate events, unfavorable economic conditions, and the financial meltdown. As a result, bondholders are keenly aware of the severity of credit risk, interest rate, and financial crisis and demand protection against these risks. Credit risk refers to the risk associated with a significant decline in the bond's rating, deterioration in firm performance, and corporate events such as leveraged buyouts (LBOs) and mergers and acquisitions (M&As). The severe impacts on bondholders due to the credit and liquidity crunch in the financial crisis signify how important protection is against such catastrophic events. Putable bonds give bondholders a right to redeem the bond at a pre-determined put price, and therefore can help protect against these risks. Putable bonds have been issued in the corporate debt market since the 1960s. Given the long history of putable bond issues, it is surprising that there has been relatively limited literature on these securities. Current literature on putable bonds mainly focuses on the special kind of putable bonds, i.e., bonds with poison puts or event risk covenants with protection against certain corporate events (for example, see Bae and Klein (1997), Bae, Klein, and Padmaraj (1994), Bae, Klein, and Padmanraj (1997), Cook and Easterwood (1994), Crabbe (1991), Roth and McDonald (1999), and Torabzadeh and Roufagalas, and Woodruff (2000)). Chatfield and Moyer (1986) are one of the first empirical studies on the putable bonds that are not associated with event triggers. They examine 90 putable bonds issued between 1974 and 1984 and show that the put provisions reduce investor-required yields by 89 basis points. Crabbe and Nikoulis (1997) provide an overall look at the structure, past performance, and trading strategies associated with these securities. David (2001) develops a theoretical model to price the strategic value of putable securities in liquidity crises. Elkamhi, Ericsson, and Wang (2008) document that the values of the embedded put options

are related to default probability, term structure, and illiquidity risk. Koziol (2010) develops a model to analyze how firm value increases when a put feature in debt contracts rather than renegotiation is used.

Another line of literature examines putable convertibles, which are convertible securities that contain a put option. For example, Chemmanur and Simonyan (2010) study issuers' rationale for issuing putable convertible bonds relative to regular convertibles. They find support for the asymmetric information and tax savings hypotheses, but not for the risk-shifting hypothesis. Other studies examine callable and putable bonds with various focuses. Kalotay and Abreao (1999) explore the intermarket arbitrage and other strategies using the putable, callable, and reset bonds. Tewari and Ramanlal (2010) find firms issuing callable-putable bonds underperform the market, and the presence of put option provides protection to the bondholders and helps improve equity returns. They suggest that put option can mitigate agency problems between shareholders and bondholders.

As discussed above, there have been very few studies on putable bonds that are noncovertible, noncallable, and not tied to specific event triggers. These securities are unique as they are a straightforward combination of a straight debt component and a European (or Bermudian) put option. In this study, we use a comprehensive sample of putable bonds in the U.S. corporate debt from 1976 to 2019 to empirically examine the following research questions. We first document the issuance activities and bond structure across industry groups and over the past four decades. Second, we explore the main motives of firms to issue bonds with an embedded put. Based on prior literature, we propose that risk-shifting problems and information asymmetry are main explanations for the issuance of putable bonds. Using several proxies for the risk-shifting incentives, we examine if an issuer's decision to include a put option in a bond contract is explained

by the agency problem of risk-shifting. We further explore whether the impact of the risk-shifting incentives on the issuance of a putable bond is more pronounced for firms with a higher likelihood of financial distress or greater financial constraints as these firms are expected to face more severe risk-shifting problems. Firms with a high level of information asymmetry may have limited access to the public debt market may need to include a putable option in their bond contracts to attract investors and increase the chance of a successful issuance. We use various proxies for firm opaqueness to test whether an issuer's decision to issue putable bonds can be explained by information asymmetry.

We find that putable bonds have been issued since the 1970s, with 1990s being the most active period of issuances. Among industry groups, industrial firms account for 55% of the putable bond issues, while financial and utility firms account for 30% and 15%, respectively. These bonds generally have a smaller offer size, longer years to maturity, and a smaller number of covenants than straight debt issues. These statistics vary across industry groups and over time periods. In addition, putable issuers have a smaller firm size, lower leverage, higher asset volatility, higher R&D ratio, and lower profitability than straight debt issuers. We use Probit and Tobit regressions to examine issuers' motives to issue putable bonds. We find evidence that is consistent with the risk-shifting and information asymmetry explanations. In particular, issuers with a high market-to-book ratio or WW index are more likely to issue putables. Cash holdings have a negative impact on the likelihood of issuing putables. In addition, we find that the effect of risk-shifting on putable issuance is stronger for firms with a greater likelihood of financial distress. We further test the information asymmetry argument of putable issuance. We find that a higher level of information asymmetry motivates firms to include a putable option in their bond contracts to attract investors. In particular, firms with less analyst coverage, greater forecast dispersion, or a larger average

forecast error are more likely to issue a putable bond. Our findings support that information asymmetry serves as an important factor for firms' decisions to issue putable bonds.

Finally, we use the 2-equation and 3-equation simultaneous systems to examine the issuers' decisions on putable, covenants, and leverage. By considering the simultaneity of these components, we explore the relation and interactions among putable, leverage, and covenants. The simultaneous system results confirm the risk-shifting and information asymmetry explanations for the issuance of putable bonds.

This study fills the important gap in the literature by providing a comprehensive examination of the regular putable bonds and contributes to the literature in the following ways. First, based on a comprehensive sample of putable bonds in terms of sample size and time period compared to prior studies, we find interesting cross-sectional variation in issuers and time series trend in issuance behavior over the last four decades. Specifically, the issuance of putable bonds varies significantly across industries and is more often adopted by smaller and less profitable firms with a riskier investment portfolio. The time series impacts of the systematic factors on the firm's decision to issue a putable bond are soundly supported by our findings. Second, we provide empirical results on the unique set of factors that motivate the probability of including a put option. The results are consistent with the risk-shifting and information asymmetry explanations. Third, in addition to the traditional univariate and Probit/Tobit regressions, we use multiple-equation simultaneous systems to explore the corporate decisions on putable bond issuance, inclusion of covenants, and leverage.

The rest of the paper is structured as follows. Section 2 presents the literature review and hypothesis development. Section 3 describes the data sample and presents the descriptive statistics.

In Section 4, we present the multivariate tests for the issuers' motives to issue putable bonds. Section 5 reports the simultaneous equation regression results. Section 6 concludes.

2. Literature Review and Hypothesis Development

2.1 Literature Review

Many bonds issued in the market have embedded option features such as callable, convertible, extendable, puttable, and other covenants. Previous literature on these options and covenants sheds light on the theoretical explanations and empirical analysis of corporate bonds. For example, Gompers and Lerner (1996) document that the cost of contracting and supply and demand conditions are important in determining the number and the type of covenants in venture capital partnership contracts. Smith and Warner (1979) provide a comprehensive study of the covenant structure. They examine ways in which debt contracts are written to control the agency conflicts between bondholders and stockholders. Chava, Kumar, and Warga (2009) document that managerial entrenchment and the risk of managerial fraud significantly influence the use of covenants. Cook, Fu, and Tang (2014) argue that firm liquidity has a negative impact on the inclusion of all categories and sub-categories of restrictive bond covenants. Zhang and Zhou (2018) document a significant positive relation between institutional block ownership and the number of bond covenants.

Among these bond covenants, the put option gives bondholders a right to redeem the bond at a pre-determined price. Even though putable bonds have been in the corporate bond market for over half a century, there have been a limited number of studies examining putable debt. On the pricing of put options, Driessen (2005) provides an empirical decomposition of the default, liquidity, and tax factors that determine expected corporate bond returns. Lim, Li, and Linetsky

(2012) provides an efficient method to evaluate callable and putable bonds. Elkamhi, Ericsson, and Wang (2011) develop a model to disentangle the reduction in yield spread of putable bonds due to default risk and interest rate risk. David (2001) suggests that putable securities have a strategic value larger than the intrinsic value because the holders have a claim on the firm's liquid assets and may threaten to force solvent issuers to bear the costs of financial distress. This strategic value depends on the issuer's size, potential distress costs, and the distribution of put ownership relative to the firm's liquidity position. He shows that the strategic value is an important determinant of the payouts received by bondholders in the case of liquidity crises.

Instead of the regular putable bond, most of the studies on putable bonds focus on bonds with a poison put, which is a special type of bonds designed to guard the bondholders against event risk. Event risk refers to the risk associated with events such as a significant decline in the bond's rating, deterioration in firm performance, leveraged buyouts (LBOs), and mergers and acquisitions (M&As). Poison put gives bondholders a right to redeem a bond contingent upon pre-specified triggers. One of the reasons why firms issue poison puts is the reduction in borrowing costs. Crabbe (1991) studies the investment-grade industrial bonds issued between November 1988 and December 1989. He shows that the holders of the investment-grade industrial bonds experience sizable losses after these bonds are downgraded to speculative grades due to leveraged restructuring. Importantly, he finds that the bonds containing event risk covenants help lower the financing costs by roughly 20 to 30 basis points. He notes that this cost reduction effect seems to have declined along with the general decline in corporate restructuring activities. On the other hand, Fields, Kidwell, and Klein (1994) analyze the yield effects of poison puts versus coupon reset options in debt contracts. They find that the protection from poison put covenants is not valued by investors whereas coupon reset provisions reduce the yield spread of newly issued

industrial bonds by 32 basis points. Torabzadeh, Roufagalas, and Woodruff (2000) show that a poison put provision lowers the yield by 58 to 78 basis points. However, the conversion of a simple poison put to a super poison put does not reduce the yield further.

Bae, Klein, and Padmaraj (1994) show that the higher abnormal returns associated with the issuance of poison put bonds are due to the higher level of agency cost of debt for these issuers. They propose that not all firms benefit from issuing the poison put bonds. Firms with greater agency costs of debt and a smaller size benefit most from this type of debt issuance. In a follow-up study, Bae, Klein, and Padmaraj (1997) examine the relation between firm characteristics and the likelihood of event risk covenants in bond indentures. They suggest that the likelihood of event risk covenants in bond indentures is related to the agency costs of debt and the potential for takeover. However, their results do not support the financial distress costs hypothesis. Cheng and King (2009) find that poor bond market performance and favorable equity market performance motivate the issuances of poison put debt. Roth and McDonald (1999) find that firms with higher free cash flows are more likely to issue debt containing poison puts. They also find support for a negative relation between the management ownership and the probability of issuing debt with event risk covenants.

Another special type of putable bond that has been examined in the literature is the putable convertible bonds. Putable convertible bonds allow bondholders to sell the bonds back to the issuer at a prespecified price on prespecified dates and allow the bondholders to convert their bond to common stock. The putable convertibles become popular in the 1990s since they provide bondholders the option to enjoy not only the upside potential of stock price appreciation but also the downside protection associated with the put option. Chemmaur and Simonyan (2010) document that putable convertible issuers are larger and less risky firms with higher cash flows,

smaller growth opportunities, and lower bankruptcy risk compared to those issuing convertible bonds without a put. Their results support the view that firms issue putable convertible bonds due to asymmetric information and tax savings.

To sum up, the scope of prior studies on putable bonds is mostly focused on the special types of putable bonds, namely, the poison put and putable convertible bonds. Research on the regular putable issues is rather limited. The literature on poison put bonds provides some support for the agency and information asymmetry theory, while the studies on putable convertible bonds indicate that information asymmetry and tax considerations are the main drivers. It is important to explore whether any of the aforementioned motives for issuing poison put and putable convertible bonds applies to bonds with a simple put option. In this paper, we study a large sample of regular putable bonds issued by U.S. corporations to explore the determinants of the issuance of putable bonds.

2.2 Hypothesis Development

2.2.1 Agency problem hypothesis

In the setting of incomplete contracting and financial distress, equity holders have the incentives to engage in risk-shifting activities (Jensen and Meckling, 1976). Literature has shown that bond covenants are a possible solution to the risk-shifting problem. For example, Green (1984) shows that convertible bonds can mitigate the loss in value associated with the risk-shifting or underinvestment problem. Tewari and Ramanlala (2010) suggest that putable bonds can also reduce these incentive distortions as putable bonds give bondholders a right to exercise the put option during the life of the bond, allowing bondholders to redeem their bonds at par if they expect a value loss due to interest rate and/or credit risk. The downside protection for putable bondholders

usually leads to a lower yield on these bonds. In other words, firms incur a lower borrowing cost when issuing a putable bond (Chatfield and Moyer,1986). In addition, putable bonds help reduce the value loss associated with the overinvestment or risk-shifting problems, especially for firms that are close to financial distress. Koziol (2010) suggests that firm value is higher when a put feature is included in the debt contracts than when a renegotiation is used at the time of distress. To reduce the agency cost of debt, firms with greater risk-shifting problems have stronger incentives to issue a putable bond. As the incentives to engage in risk-shifting behavior increase in the probability of financial distress, we expect the impact of risk-shifting incentives on the likelihood of issuing a putable bond is stronger for firms that are closer to financial distress. Based on the above discussion, we form the following two testable hypotheses:

Hypothesis 1: Firms with more risk-shifting problems are more likely to issue a putable bond.

Hypothesis 2: Risk-shifting incentives have a stronger impact on the likelihood of issuing a putable bond for firms with a higher probability of financial distress.

2.2.2 Information asymmetry hypothesis

Literature suggests a strong link between information asymmetry and the cost of debt capital. Sengupta (1995) uses corporate disclosure quality as the measure of information asymmetry and investigates its impact on the cost of debt. He finds that firms with high disclosure quality ratings enjoy a lower interest cost of issuing debt. Yu (2005) focuses on the credit spreads and finds that firms with higher disclosure ratings have lower credit spreads. Mansi, Maxwell, and Miller (2005) suggest that analyst activity reduces bond yield spreads. Khalil, Mansi, Mazboudi,

and Zhang (2019) report that bondholders react negatively to a late filing announcement. Goswami, Noe, and Rebello (1995) provide the optimal design of debt maturity, coupon payments, and dividend payout restrictions under asymmetric information. They find that if the information asymmetry is concentrated around near-term cash flows with refinancing risk, issuers prefer long-term debt with no dividend restriction. Duffie and Lando (2001) and Cetin, Jarrow, Protter, and Yildirim (2004) also provide theoretical support that increasing information risk and worsening information asymmetry lead to higher credit spreads. In practice, it is difficult for bond investors to observe a firm's assets directly. With imperfect information, the credit spread of a bond increases with the level of information asymmetry, indicating that bondholders demand a higher yield due to asymmetric information. From the perspectives of corporate issuers, there are two main motivations for them to consider putable bonds when external debt financing is needed. First, opaque firms would be required by the market participants to pay a premium to compensate for the high level of information asymmetry. One possible way to alleviate the high borrowing cost is to issue a putable bond. Second, firms with severe information asymmetry problems in general have limited access or face significant challenges in raising capital from the public bond markets due to their opacity. To increase the likelihood of successful bond issuance, these firms choose to issue bonds with a put option to attract bondholders to consider investing in their bonds. Based on the above discussion on the link between information asymmetry and putable bond issuance, we form the following testable hypothesis:

Hypothesis 3: Firms with a higher level of information asymmetry are more likely to issue a putable bond.

3. Putable Bond Sample and Descriptive Statistics

3.1 Putable Bond Sample

In this study, we obtain the sample of bonds from the Fixed Income Securities Database (FISD). FISD is the most comprehensive and publicly available collection of bond data on publicly offered U.S. Treasury, agency, and corporate bonds. FISD reports detailed information on debt issue characteristics, documents over 50 different types of covenants, and includes over 150,000 public issues from 1894 to 2019. From FISD, we collect a sample of putable bonds that contains all U.S. domestic non-convertible, non-callable corporate bonds with at least one year to maturity and an issue date between January 1976 and December 2019, resulting in a sample of 2,874 regular putable bonds. Note that these putable bonds do not contain a poison put covenant and are straight debt with a simple put option embedded. Using the same sample period, we construct a control sample for the purpose of a direct comparison to the putable bond sample. The control sample contains 490,072 straight debt issues that are non-convertible, non-callable, and non-putable (poison or regular put). We exclude money market instruments such as commercial papers. For both the putable and straight debt samples, we collect information on the issue and issuer, including offering yield and price, coupon, maturity, credit rating, put price schedule (if putable), industry codes, and covenant information.[1] The sample collection process yields a sample of 624 regular putable bonds and 16,059 straight bonds.

Table 1 presents the descriptive statistics of the putable debt characteristics. We show the main characteristics including offering amount, original maturity, coupon, years to next put price, put price, offering yield, Treasury spread, and the number of covenants. We follow Billett, King,

[1] We use information from the Moody's Annual Bond Record to fill in any missing put prices and dates. In addition, we use Datastream, SDC, and Bloomberg to fill in missing offering price and coupon rate.

and Mauer (2007) to categorize the covenants into 15 categories.[2] Panel A shows the results for the full sample of 624 putable issues. We find that putable bonds on average have an issue size of $149.65 million, an original maturity of 19.77 years, and a coupon rate of 6.66%. It is interesting to note that the time to the first put price has an average of 8.46 years. In addition, the put price is par value for most of the bonds. The offering yield is consistent with the coupon rate, indicating that the bonds are generally issued close to par. Putable bonds have a relatively small number of covenants with an average number of covenants of 1.19. Out of 15 covenant categories, putable securities have a maximum of 5 covenants and a minimum of 0 covenant. Panel B presents the sample the descriptive statistics for the investment grade and speculative grade bonds, respectively. Consistent with our expectation, coupon and offering yield are higher for speculative than for investment grade bonds. Investment grade bonds are generally larger in issue size than speculative bonds. We do not find a significant difference in put price or the number of covenants between these two groups.[3] Maturity is similar between the two groups as well, averaging around 20 years. Lastly, we examine the putable bond sample by industry and present the results in Panel C. We note a few interesting observations. Of the three industry groups, industrial bonds represent the largest group, accounting for 54.97% (=343/624) of the sample. Financial and utility bonds account for 30.29% (=189/624) and 14.74% (=92/624) of the sample, respectively. In terms of the offering amount, industrial bonds have the largest offering size while utility bonds have the smallest size. Financial bonds have the shortest maturity and time to first put. Industrial bonds have the greatest number of covenants while utility bonds have the smallest number of covenants.

[2] See Billett, King, and Mauer (2007) for the methodology.

[3] Treasury spread is significantly lower for speculative grade debt because many of these issues are issued in the late 1970s and the 1980s, during which the spreads are low. In addition, note that Treasury spread does not consider the coupon rates on the putable and Treasury securities.

3.2 Issuer and Bond Characteristics: Putable and Straight Debt Sample

For the sample of putable and straight debt issues, we obtain financial information from Compustat, and equity returns from CRSP. Data on analyst forecast is collected from I/B/E/S and information on institutional ownership is obtained from Thomson 13F. By requiring the putable and straight debt issues to have valid Compustat, CRSP, I/B/E/S, and Thomson 13F data, we arrive at 239 regular putable issues and 2,242 straight debt issues in our final sample. Table 2 presents the firm characteristics of putable issuers and straight debt issuers. All variables are measured at the fiscal year end prior to the debt issuance, except otherwise indicated.

The market to book ratio is the ratio of the market value of the firm to total assets, where the market value of the firm equals the sum of total assets and the market value of equity minus the book value of equity. The market value of equity is the product of the number of shares outstanding and the price per share. We follow Whited and Wu (2006) to calculate the WW index. WW index is the measure of financial constraints that is measured as the projection of the shadow price of raising equity capital onto the following variables: cash flow to asset, a dummy capturing whether the firm pays a dividend, long-term debt to total assets, size, sales growth, and industry sales growth. Total assets are presented in millions of dollars, and we use the natural log of sales and total assets in the multivariate regressions reported in later sections. Leverage is long-term debt plus debt in current liabilities divided by the market value of the firm, shown in percent. Asset volatility is equity volatility multiplied by (1 - leverage) where equity volatility is the standard deviation of equity returns over the 24-month period prior to debt issuance. Asset volatility is presented in percent. We also examine several firm policy variables including Research and Development (R&D), fixed assets, free cash flow, cash holdings, and profitability. R&D is R&D expense divided by total assets and shown in percent. Fixed assets are net Property, Plant, and

Equipment (PP&E) over total assets in percent. Free cash flow is defined as [Operating Income Before Depreciation - Total Income Tax + (Deferred Taxes and Investment Tax Credit - Lagged Deferred Taxes and Investment Tax Credit) - Interest Expense - Common Dividends - Preferred Dividends]/Total Assets. Cash is cash and cash equivalents divided by total assets. Both free cash flow and cash are shown in percent. Profitability is Operating Income Before Depreciation over Sales presented in percent.

For measures of information asymmetry, we first use analysis coverage which is the number of analysts that follow the firm for that year. Forecast dispersion is the standard deviation of the forecast EPS. The average forecast error is the average of the difference between announced EPS and forecast EPS. For bond characteristics, offering amount is presented in $ million, offering yield is shown in percent, and investment grade dummy equals 1 if the bond is investment grade and 0 otherwise.

Generally, putable debt issuers and straight debt issuers are similar in firm size and leverage. We find that the market to book ratio of putable issuers is 1.48, which is higher than 1.32 of the straight debt issuers. More strikingly, putable issuers have a higher WW Index than straight debt issuers. Importantly, putable issuers have higher asset volatility but lower fixed assets ratio, profitability, and cash ratio than straight debt ones. These characteristics suggest that putable issuers are likely firms exhibiting greater risk-shifting tendency as reflected its growth and volatility measures. In addition, these issuers have less profitable and maintain a lower cash ratio, indicating a potentially greater need for external financing compared to straight debt issuers.

Consistent with the information asymmetry argument, the average ratio of R&D expense of putable issuers is much higher than straight debt issuers. Moreover, the level of information asymmetry is higher for putable issuers based on analysis coverage, forecast dispersion, and

average forecast error. For bond characteristics, putable bonds are smaller in size with an average offering amount of $137.33 million, compared to an average of $267.03 million in the straight debt sample. The average maturity of 19.77 years for putable bonds is almost double that for straight debt issues (10.96 years). As put option gives bondholder a solid protection against interest and credit risk, the need to additional restrictive covenants is likely to be less compared to straight debt. As a result, it is not surprising to observe that putable bonds have fewer number of covenants compare to straight bonds. The offering yield and percentage of investment grade bonds do not differ significantly between the two groups. Table 3 presents the Pearson correlation of the firm characteristics using the full sample consisting of the putable and straight debt samples.

4. Multivariate Tests: Issuers' Motives to Issue Putable Bonds

In this section, we study the issuers' motives to issue putable bonds using multivariate regression models. In particular, we use the sample of putable, and straight bonds described in Table 2 to examine the risk-shifting and information asymmetry hypothesis for inclusion of a put option in corporate bonds. Using the probit and tobit models, we run regressions in which the dependent variable is the putable dummy variable that equals 1 if the bond is a putable bond and 0 otherwise. We adopt various measures for the risk-shifting incentives and information asymmetry as main explanatory variables to examine issuers' motivation to issue putable bonds. We also include a set of firm and bond control variables suggested by the theoretical and empirical literature on bonds with embedded options.

4.1 Risk Shifting Hypothesis

We use two measures to the potential for risk-shifting problems. The first measure is the market to book ratio, which is the proxy for the risk-shifting incentives following Mclaughlin, Safieddine, and Vasudevan (1998). Firms with a higher market to book ratio are likely to have more growth opportunities, resulting a greater propensity for risk-shifting behaviors. We expect a positive relation between the market to book ratio and the likelihood of issuing putable bonds. In addition, we follow Whited and Wu (2006) to use the WW index to proxy for the risk-shifting incentives. They consider that risk shifting behavior is more likely to happen for financially constrained firms. Compared to the text-based index from Hadlock and Pierce (2010) and Kaplan and Zingales (1997), Whited and Wu (2006) follow a different approach to develop the WW Index based on the coefficients obtained from a structural model containing various firm characteristics. Farre-Mensa and Ljungqvist (2012) examine different measures of risk-shifting tendency and find that the WW Index performs somewhat better than the KZ and HP Index. We expect a positive relation between the WW index and the likelihood to issue a putable bond.

Table 4 reports the results for the probit and tobit regressions. Models 1 and 2 show probit regression results, models 3 and 4 present tobit regression results. Several important results emerge. We find that market to book ratio has a positive effect on the likelihood of issuing a putable bond. The coefficient on market to book ratio is positive in both models 1 and 3, which is significant at the 5% level. This is consistent with the notion that firms with higher risk-shifting incentives are more likely to issue putable bonds. In model 2 and 4, we also find a positive relation between the WW index and putable issuance. Firms with a higher WW Index are more financially constrained and are likely to have more severe risk-shifting problems. The results are consistent with our first hypothesis that the agency problem of risk-shifting serves as a main driver for putable issuance. Furthermore, we find strong evidence to support a substitution effect between covenants

and puts. The number of covenants has a negative impact on putable issuance. We also find results to suggest a strong negative relation between cash holdings and putable bond issuance which indicates that firms with higher liquidity are less likely to issue putable bonds.

4.2 Risk Shifting Incentives and Financial Distress

As the incentives to engage in risk-shifting behavior increase in the probability of financial distress, we expect the impact of risk-shifting incentives on putable bond issuance is more prominent for firms that are closer to financial distress. To test this hypothesis, we rerun the regressions for various sets of subgroups based on the level of financial distress. We adopt five proxies for financial distress: leverage, Z-score, distance to default, secured debt, and regulated industry. For the continuous measures of financial distress including leverage, Z-score, and distance to default, the sample is divided into quartiles. The Z-score is defined as 1.2 × (current assets - current liabilities)/total assets + 1.4 × (retained earnings/total assets) + 3.3 × (pretax income/total assets) + 0.6 × (stock price at the end of fiscal year × share outstanding/total liabilities) + 0.9 × (sales/total assets). We follow Bharath and Shumway (2008) to define the distance to default (DD) as $DD=[\ln[(E+F)/F] +r-0.5\sigma 2]/\sigma$. For the dichotomous variables including the secured debt and regulated industry dummy variables, the sample is divided into two groups: one group in which the dummy variable equals 1 and the other group where the dummy variable equals 0. The variable secured debt equals 1 if the firm holds secured debt for the given year and 0 otherwise. The regulated industry dummy variable equals 1 if the firm belongs to public utilities (SIC code 49), airlines and railroads (SIC codes 40–47), and financial institutions (SIC codes 60–69). Table 5 presents the regressions based on the continuous measures of financial distress for the top and bottom quartile groups, respectively. Panel A presents the probit and tobit regressions of the putable dummy variable on risk-shifting measures and control variables for the

top and bottom leverage groups. In the top quartile group, the results suggest that the WW Index has a significant impact on putable issuance. However, for the lowest quartile group, neither the market to book ratio nor the WW Index shows a strong impact on likelihood of issuing a putable bond. Panel B shows results using Z-score as a measure for financial distress. Note that a lower Z-score indicates a higher financial distress level. Consistent with our prediction, the WW index has a significant impact on putable issuance in the bottom quartile group with the highest level of financial distress. The sample is divided based on the distance to default in Panel C. A shorter distance to default indicates a higher probability of financial distress. The WW Index continues shows a significantly positive impact on putable issuance in the bottom quartile group with the highest default probability. In Table 6, the sample is separated based on the dichotomous variables of secured debt and regulated industry. Smith and Warner (1979) argue that secured debt limits the ability to engage in asset substitution, thus alleviating the risk-shifting problems. Therefore, risk shifting incentives should have a stronger effect on putable issuance for firms without secured debt. Our result in Panel A of Table 6 is consistent with our expectation. In the subgroup without secured debt, both risk shifting measures have a significant and positive impact on putable issuance. We also divide the sample into two groups based on whether firms are in the regulated industry. Following Hermalin and Weisbach (1988), we define public utilities (SIC code of 49), airlines and railroads (SIC code of 40–47), and financial institutions (SIC code of 60–69) as regulated industries. Dasgupta and Nanda (1993) and Spiegel and Spulber (1994) suggest that regulated firms tend to have a higher leverage ratio and need frequent access to the public debt markets. As a result, these issuers are monitored regularly by the credit markets and are more sensitive to default risk. Therefore, for regulated firms, risk shifting incentives should have a stronger effect on putable issuance. The results in Panel B of Table 6 confirm our expectation:

both market to book ratio and WW index have a significant positive impact on the likelihood of issuing a putable bond for the regulated firms but not for the non-regulated firms. To sum up, we find strong evidence to support that the impact of risk shifting incentives on putable issuance is more pronounced for firms with a higher level of financial distress.

4.3 Information Asymmetry Hypothesis

Another important factor that affects the decision of issuing putable bonds is information asymmetry. As the borrowing cost increasing with the level of information asymmetry, bondholders require a higher return because of the imperfect information. Therefore, firms with a higher level of information asymmetry are likely to issue a putable bond to reduce the borrowing cost. Moreover, issuers with less information exposure would need to provide a valuable covenant to attract bondholder attention and increase the probability of a successful issue. A put option that provides bondholders valuable downside protection against credit and interest rate risk is a suitable solution. Based on these arguments, we hypothesis that firms with a higher level of information asymmetry are more likely to issue putable bonds. Table 7 report the probit and tobit regressions of putable dummy variable on various measures of information asymmetry and control variables. In particular, we use three proxies for information asymmetry: analyst coverage, forecast dispersion, and average forecast error. Models 1 to 3 present the results of the probit model while models 4 to 6 show the results of the Tobit model. We find that firms with lower analyst coverage, greater forecast dispersion, or higher forecast error are more likely to issue putable bonds to alleviate borrowing costs and attract investors. In other words, firms with a higher level of information asymmetry have a greater propensity to issue a putable bond. Our findings suggest

that information asymmetry is an important motive for corporate issuers to consider the issuance of a putable bond.

To examine the risk shifting and information asymmetry hypotheses together, we include the measures for risk-shifting incentives and information asymmetry in the regressions and present the results in Table 8. Panel A presents the probit regression results and Panel B shows the tobit regression results. The results suggest significant impacts of risk-shifting measures and information asymmetry proxies on the probability of putable issuance. Our findings indicate strong empirical support that risk shifting, and information asymmetry are main motivations for why firms issue putable bonds.

5. Simultaneous Equation Model Analysis

5.1 Simultaneous Equation Model: The Two-Equation System

We conjecture that the decisions on various components in the debt contracts are made simultaneously. We first consider that the decision on the number and types of restrictive covenants and whether to include a put option are determined at the same time. We use a two-equation system to consider these two decisions simultaneously. In this system, the choice of covenants is reflected in one equation and the decision to include an embedded put is in the other equation. Table 9 reports the results for the two-equation system. We focus on the putable equation for the implications of results. We find that risk-shifting incentives measured by the market to book ratio have a positive impact on putable issuance, which is consistent with the single equation results shown in the Probit and Tobit regressions. The positive and significant coefficient of average forecast error is also consistent with our previous findings. Lastly, we find that cash is negatively related to putable issuance and the number of covenants. Firms with high cash holdings

are likely to have great liquidity and ample internal funds, indicating less need for stringent covenants or a put option to reduce the agency cost of debt. In the second system, we consider the decision on leverage in one equation and the decision on putable in the other equation. We follow Billett, King, and Mauer (2007) to select the appropriate explanatory variables for the covenants and leverage equations. Similarly, we focus on the putable equation for interpretation of results. The results associated with the system of leverage and putable equations provide further confirmation for the risk-shifting and information asymmetry explanations. Interestingly, we find that larger or more profitable firms are more likely to issue putable bonds.

5.2 Simultaneous Equation Model: The Three-Equation System

To follow the methodologies used in recent empirical studies on leverage, covenants, and debt maturity, we expand the two-equation simultaneous system to the three-equation system that consists of three capital structure decisions: covenant, putable, and leverage. In this system, we assume corporations make decisions on leverage ratio and the components within their debt contracts (i.e., covenants and embedded options) simultaneously. Table 10 presents the results for the three-equation system. First, the results for the covenant and leverage equations are generally consistent with findings in prior literature. We focus our interpretation of the results associated with the putable equation. In particular, we find that market to book ratio has a positive impact on putable issuance, which is consistent with the risk-shifting explanation. Average forecast error has a significantly positive impact on putable issuance, which is consistent with the information asymmetry hypothesis. For robustness checks, we use an alternative measure of risk-shifting incentives (the WW Index) and the other information asymmetry measures (analyst coverage and forecast dispersion) in the system and find consistent results.

6. Conclusion

Using a comprehensive sample of putable and straight debt issues from 1976 to 2019, we empirically examine issuers' motivation to issue putable bonds. We examine factors associated with agency problem of risk-shifting and information asymmetry explanations. We focus on the regular putable bonds that are not tied to specific event risks, non-convertible, and non-callable. These unique securities have received little attention in the literature. We find evidence that is consistent with the risk-shifting and information asymmetry explanations for putable issuance. Further, we find that the impact of risk-shifting incentives is more pronounced for firms with a higher level of financial distress. We find strong empirical support that firms with greater information asymmetry are more inclined to issue putable bonds.

Our findings imply that the put option is an effective contracting term that can help protect the bondholders and reduce borrowing costs for the issuers. Finally, we consider the simultaneity of the decisions on putable, covenants, and leverage by employing the two-equation and three-equation simultaneous systems to examine the relation and interaction among agency problems, information asymmetry, and putable issuance.

Appendix: Variable Definition

Firm Characteristics	
Market to Book Ratio	The ratio of the market value of the firm to total assets, where the market value of the firm equals the sum of total assets and market value of equity minus the book value of equity. The market value of equity is the product of the number of shares outstanding and price per share.
WW Index	following Whited and Wu (2006) and Hennessy and Whited (2007) as −0.091[(ib + dp)/at] − 0.062(indicator set to one if dvc + dvp is positive, and zero otherwise) + 0.021(dltt/at) − 0.044[log(at)] + 0.102(average industry sales growth, estimated separately for each three-digit SIC industry and each year) − 0.035(sales growth),
Total Assets ($M)	Total assets.
Total Asset Growth	The percentage of growth in total assets from year -1 to 0, where year 0 is the year in which debt is issued.
Leverage (%)	Long term debt plus debt in current liabilities divided by book value of firm, shown in percent.
Asset Volatility (%)	The equity volatility multiplied by (1 - leverage), presented in percent.
R&D (%)	R&D expense divided by total assets and shown in percent.
Fixed Assets (%)	Net total Property, Plant and Equipment (PP&E) over total assets in percent.
Free Cash Flow (%)	Defined as [Operating Income Before Depreciation - Total Income Tax + (Deferred Taxes and Investment Tax Credit - Lagged Deferred Taxes and Investment Tax Credit) - Interest Expense - Common Dividends - Preferred Dividends]/Total Assets.
Cash (%)	Cash and cash equivalents divided by total assets.
Profitability (%)	Operating Income Before Depreciation over Sales
Z-score	1.2 × (current assets - current liabilities)/total assets + 1.4 × (retained earnings/total assets) + 3.3 × (pretax income/total assets) + 0.6 × (stock price at the end of fiscal year × share outstanding/total liabilities) + 0.9 × (sales/total assets)
Distance to Default	Following Bharath and Shumway (2008), distance to default (DD) over the next year is defined as DD=[ln[(E+F)/F]+r−0.5σ2]/σ, where E equals CRSP items |prc| × shrout /103, F equals Compustat items dlc + 0.5dltt, r is the firm's annual stock return computed by cumulating monthly returns (CRSP item ret) over the previous 12 months, and σ2 captures the volatility of the firm's total value (debt and equity). σ is approximated as (E/(E+F)) ×σE+(F/(E+F)) ×(0.05+0.25σE).

Appendix (continued)

Secured Debt	Dummy that equals one if the firm hold secured debt for the given year and 0 otherwise.
Regulated industry	Following Hermalin and Weisbach (1988), the dummy that equals 1 if the firm belongs to public utilities (SIC code 49), airlines and railroads (SIC codes 40–47), and financial institutions (SIC codes 60–69).
Analysis Coverage	The number of analysts that have issued a forecast for the current fiscal year, in the last month of that fiscal year.
Forecast Dispersion	The standard deviation of the EPS forecast.
Average Forecast Error	The average of the difference between actual EPS and forecast EPS.
Interest Rate Controls	
Interest Rate Level	1-year Treasury Constant Maturity Rate.
Interest Rate Slop	The difference between the 10-year Treasury Constant Maturity Rate and the 1-year Constant Maturity Rate.
Interest Rate Volatility	The standard deviation of the 10-year Treasury Constant Maturity Rate over the 12-month period prior to the issue date.
Bond Characteristics	
Putable	Dummy that equals one if the bond is a putable bond and zero otherwise.
Years to Maturity	Years to the date that the issue's principal is due for repayment.
Number of Covenants	Following Billett, King, and Mauer (2007) to categorize covenants into 15 major categories. The number of covenants is the count of covenant categories that range from 0 to 15.
Offering Yield (%)	Yield to maturity at the time of issuance, based on the coupon and any discount or premium to par value at the time of sale.
Investment Grade	The dummy variable equals 1 if the bond is rated above Baa at issuance.
Offering Amount ($M)	The par value of debt initially issued.
Coupon (%)	The current applicable annual interest rate that the bond's issuer is obligated to pay the bondholders.
Years to Next Put	Years to the next date upon which a bondholder can put back his bond.
Next Put Price (% of Par)	The price the issuer will pay the bondholder who exercises the put option on the next put date as the percent of the par value.

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Table 1 Putable Bonds

The table describes simple statistics for 624 putable bonds issued from 1976 to 2019. Descriptive statistics of offering amount in $ million, original maturity in years, coupon rate in percent, years to first put price, the first put price in percent of par value, offering yield in percent, spread above comparable Treasury in basis points, and the number of covenants. We follow Billett, King and Mauer (2007) to categorize covenants into 15 major categories. All variables are winsorized at the 5% and 95% percentiles of their distributions.

Panel A. Full Sample (n = 624)

Variable	Mean	Median	Std. Dev.	Min	Max
Offering Amount ($M)	149.65	100.00	133.86	10.00	500.00
Years to Maturity	19.77	16.00	12.13	3.00	40.00
Coupon (%)	6.66	7.00	2.86	0.00	11.75
Years to Next Put	8.46	7.00	5.78	2.00	22.00
Next Put Price (% of Par)	99.99	100.00	0.06	99.75	100.00
Yield (%)	7.17	7.08	2.24	2.17	11.87
Treasury Spread (basis points)	28.26	11.50	136.57	-334.81	361.00
Number of Covenants	1.19	0.00	1.80	0.00	5.00

Panel B. By Credit Rating

	Investment Grade (n = 232)					Speculative Grade (n = 392)				
Variable	**Mean**	**Median**	**Std. Dev.**	**Min**	**Max**	**Mean**	**Median**	**Std. Dev.**	**Min**	**Max**
Offering Amount ($M)	170.89	112.50	150.68	10.00	500.00	137.07	100.00	121.28	10.00	500.00
Years to Maturity	19.81	20.00	12.05	3.00	40.00	19.74	15.00	12.19	3.00	40.00
Coupon (%)	6.50	6.96	2.63	0.00	11.75	6.76	7.00	2.99	0.00	11.75
Years to Next Put	8.63	7.00	6.03	2.00	22.00	8.36	7.00	5.62	2.00	22.00
Next Put Price (% of Par)	99.99	100.00	0.05	99.75	100.00	99.98	100.00	0.06	99.75	100.00
Yield (%)	6.93	6.99	1.94	2.17	11.87	7.31	7.21	2.39	2.17	11.87
Treasury Spread (basis points)	39.36	28.50	138.40	-334.81	361.00	21.69	3.50	135.22	-334.81	361.00
Number of Covenants	1.43	0.00	1.78	0.00	5.00	1.05	0.00	1.80	0.00	5.00

Table 1 Putable Bonds, continued

Panel C. By Industry

	Industrial Firms (n = 343)					Financial Firms (n = 189)				
Variable	**Mean**	**Median**	**Std. Dev.**	**Min**	**Max**	**Mean**	**Median**	**Std. Dev.**	**Min**	**Max**
Offering Amount ($M)	170.68	125.00	142.10	10.00	500.00	137.22	100.00	119.36	10.00	500.00
Years to Maturity	23.01	30.00	12.38	3.00	40.00	12.73	10.00	9.28	3.00	40.00
Coupon (%)	6.53	6.95	2.80	0.00	11.75	6.64	7.50	3.40	0.00	11.75
Years to Next Put	10.05	9.46	6.20	2.00	22.00	5.87	4.73	4.71	2.00	22.00
Next Put Price (% of Par)	99.98	100.00	0.06	99.75	100.00	99.99	100.00	0.04	99.75	100.00
Yield (%)	6.94	7.02	2.45	2.17	11.87	7.48	7.60	2.18	2.17	11.87
Treasury Spread (basis points)	16.88	14.00	157.65	-334.81	361.00	30.41	0.38	100.39	-334.81	361.00
Number of Covenants	1.35	0.00	1.97	0.00	5.00	1.04	0.00	1.55	0.00	5.00

	Utility Firms (n = 92)				
Variable	**Mean**	**Median**	**Std. Dev.**	**Min**	**Max**
Offering Amount ($M)	96.76	52.50	111.96	10.00	500.00
Years to Maturity	22.12	30.00	10.24	3.00	40.00
Coupon (%)	7.20	6.88	1.55	0.00	10.00
Years to Next Put	7.89	7.00	3.78	2.00	22.00
Next Put Price (% of Par)	99.98	100.00	0.07	99.75	100.00
Yield (%)	7.39	6.91	1.17	5.33	11.35
Treasury Spread (basis points)	66.27	30.50	107.26	-38.00	361.00
Number of Covenants	0.88	0.00	1.56	0.00	5.00

Table 2. Putable and Straight Debt Issues

The table presents descriptive statistics of issuer and issue characteristics for 239 putable bonds and 2,242 straight bonds issued from 1976 to 2019. We report the results of the difference in mean and median tests for putable bond and straight bond sample variables. All variables are winsorized at the 5% and 95% percentiles of their distributions.

	Putable Debt Issues (n = 239)					Straight Debt Issues (n = 2,242)				
Firm Characteristics	**Mean**	**Median**	**Std. Dev.**	**Min**	**Max**	**Mean**	**Median**	**Std. Dev.**	**Min**	**Max**
Market to Book Ratio	1.48	1.36	0.56	0.66	2.92	1.32	1.14	0.58	0.66	2.92
WW Index	0.02	-0.01	1.30	-5.26	7.68	-0.15	-0.06	1.43	-9.11	8.24
Total Assets ($M)	45.80	17.18	71.85	1.25	244.44	46.31	15.94	73.06	1.28	259.17
Leverage (%)	36.75	36.84	13.65	6.86	91.82	38.18	34.74	21.96	6.86	91.82
Asset Volatility (%)	4.17	4.16	2.71	0.00	12.58	3.62	3.82	3.08	0.00	14.54
R&D (%)	1.09	0.00	1.83	0.00	5.80	0.80	0.00	1.63	0.00	5.80
Fixed Assets (%)	37.68	34.48	27.15	0.00	86.91	39.94	36.66	30.38	0.00	86.91
Free Cash Flow (%)	4.94	6.10	5.22	-7.97	14.09	4.67	5.59	5.89	-7.97	14.09
Cash (%)	2.22	1.29	2.82	0.00	14.31	3.30	1.51	4.22	0.00	14.66
Profitability (%)	25.22	20.71	16.54	5.52	94.78	29.56	19.81	25.60	5.47	94.78
Information Asymmetry										
Analysis Coverage	1.72	0.00	4.75	0.00	20.00	2.93	0.00	5.91	0.00	20.00
Forecast Dispersion	2.01	2.30	0.73	0.01	2.30	1.73	2.30	0.96	0.01	2.30
Average Forecast Error	3.74	4.36	1.49	0.01	4.36	3.23	4.36	1.88	0.01	4.36
Bond Characteristics										
Offering Amount ($M)	137.33	100.00	129.40	7.50	830.00	267.03	200.00	255.26	4.20	1000.00
Offering Yield (%)	6.77	6.90	2.42	1.04	16.73	6.69	7.09	2.98	0.00	17.00
Years to Maturity (years)	19.77	16.00	12.13	3.00	40.00	10.96	10.00	9.85	1.00	100.00
Number of Covenants	1.82	0.00	2.15	0.00	6.00	2.67	3.00	2.15	0.00	6.00
Investment Grade	0.38	0.00	0.49	0.00	1.00	0.34	0.00	0.47	0.00	1.00

Table 3. Correlation Matrix

The table presents the correlation between main variables for 239 putable bonds and 2,242 straight bonds issued from 1976 to 2019. All variables are defined in Appendix and winsorized at the 5% and 95% percentiles of their distributions.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) Market to Book Ratio	1.000	-0.059	0.139	-0.112	-0.106	-0.190	-0.179	0.651	0.406	-0.037	0.505	0.317	-0.229
(2) WW Index	-0.059	1.000	-0.030	0.020	0.018	-0.031	-0.064	-0.060	-0.046	0.017	-0.021	0.014	-0.079
(3) Coverage	0.139	-0.030	1.000	-0.813	-0.810	0.095	-0.030	0.129	0.101	-0.053	0.058	0.039	-0.054
(4) Forecast Dispersion	-0.112	0.020	-0.813	1.000	0.975	-0.098	0.033	-0.109	-0.098	0.087	-0.043	-0.027	0.045
(5) Average Forecast Error	-0.106	0.018	-0.810	0.975	1.000	-0.094	0.025	-0.112	-0.088	0.087	-0.033	-0.030	0.048
(6) Log (Total Assets)	-0.190	-0.031	0.095	-0.098	-0.094	1.000	0.351	-0.409	-0.073	-0.465	-0.530	-0.194	0.472
(7) Leverage	-0.179	-0.064	-0.030	0.033	0.025	0.351	1.000	-0.360	-0.244	-0.118	-0.400	-0.180	0.644
(8) Asset Volatility	0.651	-0.060	0.129	-0.109	-0.112	-0.409	-0.360	1.000	0.360	0.076	0.559	0.420	-0.440
(9) R&D	0.406	-0.046	0.101	-0.098	-0.088	-0.073	-0.244	0.360	1.000	-0.148	0.325	0.316	-0.224
(10) Fixed Assets	-0.037	0.017	-0.053	0.087	0.087	-0.465	-0.118	0.076	-0.148	1.000	0.448	0.031	-0.088
(11) Free Cash Flow	0.505	-0.021	0.058	-0.043	-0.033	-0.530	-0.400	0.559	0.325	0.448	1.000	0.292	-0.392
(12) Cash	0.317	0.014	0.039	-0.027	-0.030	-0.194	-0.180	0.420	0.316	0.031	0.292	1.000	-0.263
(13) Profitability	-0.229	-0.079	-0.054	0.045	0.048	0.472	0.644	-0.440	-0.224	-0.088	-0.392	-0.263	1.000

Table 4. Risk Shifting Hypothesis and Issuance of Putable Bonds

The table presents the risk shifting regression results of putable bonds and straight bonds issued from 1976 to 2019. Column (1) and (2) are Probit regression results and Column (3) and (4) are Tobit regression results. All variables are winsorized at the 5% and 95% percentiles of their distributions. Z-statistics (in parentheses) are computed using robust standard errors corrected for clustering of observations at the firm level. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Probit (1)	Probit (2)	Tobit (3)	Tobit (4)
Market to Book Ratio	0.306**		0.421**	
	(2.398)		(2.420)	
WW Index		0.058*		0.081*
		(1.892)		(1.790)
Log (Total Assets)	0.029	0.048	0.044	0.067
	(0.387)	(0.641)	(0.425)	(0.651)
Leverage	0.002	0.000	0.003	0.001
	(0.392)	(0.045)	(0.456)	(0.085)
Asset Volatility	0.031	0.068**	0.040	0.089**
	(1.011)	(2.332)	(0.968)	(2.311)
R&D	0.016	0.025	0.013	0.025
	(0.419)	(0.691)	(0.255)	(0.505)
Fixed Assets	-0.002	-0.003	-0.003	-0.005
	(-0.755)	(-1.268)	(-0.813)	(-1.317)
Free Cash Flow	-0.010	0.006	-0.014	0.008
	(-0.658)	(0.365)	(-0.627)	(0.372)
Cash	-0.087***	-0.097***	-0.120***	-0.132***
	(-5.234)	(-5.783)	(-5.350)	(-5.824)
Profitability	-0.005	-0.003	-0.007	-0.004
	(-1.072)	(-0.656)	(-1.129)	(-0.689)
Log (Years to Maturity)	0.736***	0.762***	1.013***	1.041***
	(5.526)	(5.628)	(7.060)	(7.227)
Number of Covenants	-0.159***	-0.165***	-0.216***	-0.222***
	(-3.934)	(-4.215)	(-4.511)	(-4.854)
Offering Yield	0.004	-0.013	0.013	-0.011
	(0.210)	(-0.641)	(0.421)	(-0.399)
Investment Grade	0.134	0.120	0.206	0.182
	(1.052)	(0.926)	(1.139)	(1.007)
Sigma			1.477***	1.467***
			(16.196)	(16.135)
Year Fixed effect	Yes	Yes	Yes	Yes
Observations	2481	2481	2481	2481
Adjusted R-square	0.043	0.045	0.062	0.066

Table 5. Risk Shifting Hypothesis and Issuance of Putable Bonds by Financial Distress

The table presents the risk shifting regression results of putable bonds and straight bonds issued from 1976 to 2019 for different financial distress groups. Column (1) and (2) are Probit regression results and Column (3) and (4) are Tobit regression results. All variables are winsorized at the 5% and 95% percentiles of their distributions. Z-statistics (in parentheses) are computed using robust standard errors corrected for clustering of observations at the firm level. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Leverage				
Top Quartile	Probit	Probit	Tobit	Tobit
	(1)	(2)	(3)	(4)
Market to Book Ratio	0.397		0.686	
	(0.586)		(0.603)	
WW Index		0.118***		0.194***
		(3.698)		(3.931)
Sigma			1.736***	1.672***
			(6.191)	(5.901)
Firm Controls	Yes	Yes	Yes	Yes
Bond Controls	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes
Adjusted R-square	0.183	0.221	0.154	0.186
Bottom Quartile	Probit	Probit	Tobit	Tobit
	(1)	(2)	(3)	(4)
Market to Book Ratio	-0.135		-0.136	
	(-0.723)		(-0.640)	
WW Index		0.049		0.073
		(0.806)		(1.117)
Sigma			1.218***	1.210***
			(8.543)	(8.345)
Firm Controls	Yes	Yes	Yes	Yes
Bond Controls	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes
Adjusted R-square	0.37	0.372	0.28	0.283

Table 5. Risk Shifting Hypothesis and Issuance of Putable Bonds by Financial Distress, continued

Panel B: Z-score				
Top Quartile	Probit (1)	Probit (2)	Tobit (3)	Tobit (4)
Market to Book Ratio	-0.018		-0.029	
	(-0.086)		(-0.119)	
WW Index		0.07		0.1
		(1.121)		(1.508)
Sigma			1.220***	1.214***
			(8.08)	(8.067)
Firm Controls	Yes	Yes	Yes	Yes
Bond Controls	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes
Adjusted R-square	0.377	0.379	0.288	0.291
Bottom Quartile	Probit (1)	Probit (2)	Tobit (3)	Tobit (4)
Market to Book Ratio	0.672		1.236	
	(1.313)		(1.418)	
WW Index		0.192***		0.324***
		(5.517)		(5.052)
Sigma			1.818***	1.728***
			(6.125)	(5.964)
Firm Controls	Yes	Yes	Yes	Yes
Bond Controls	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes
Adjusted R-square	0.126	0.175	0.106	0.146

Table 5. Risk Shifting Hypothesis and Issuance of Putable Bonds by Financial Distress, continued

Panel C: Distance to Default				
Top Quartile	Probit	Probit	Tobit	Tobit
	(1)	(2)	(3)	(4)
Market to Book Ratio	0.202		0.173	
	(0.767)		(0.724)	
WW Index		-0.093		-0.086
		(-0.843)		(-0.830)
Sigma			1.014***	1.015***
			(6.489)	(6.632)
Firm Controls	Yes	Yes	Yes	Yes
Bond Controls	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes
Adjusted R-square	0.493	0.493	0.378	0.379
Bottom Quartile	Probit	Probit	Tobit	Tobit
	(1)	(2)	(3)	(4)
Market to Book Ratio	0.094		0.179	
	(0.206)		(0.360)	
WW Index		0.289**		0.349*
		(2.221)		(1.927)
Sigma			1.257***	1.209***
			(4.531)	(4.775)
Firm Controls	Yes	Yes	Yes	Yes
Bond Controls	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes
Adjusted R-square	0.399	0.433	0.321	0.351

Table 6. Risk Shifting Hypothesis and Issuance of Putable Bonds by Secured Debt and Regulated Industry

The table presents the risk shifting regression results of putable bonds and straight bonds issued from 1976 to 2019 for firms that have secured debt or regulated. Column (1) and (2) are Probit regression results and Column (3) and (4) are Tobit regression results. All variables are winsorized at the 5% and 95% percentiles of their distributions. Z-statistics (in parentheses) are computed using robust standard errors corrected for clustering of observations at the firm level. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Firms with Secured Debt				
With Secured Debt	Probit	Probit	Tobit	Tobit
	(1)	(2)	(3)	(4)
Market to Book Ratio	0.250		0.225	
	(0.331)		(0.258)	
WW Index	(1.456)	(1.274)	(1.542)	(1.335)
		-0.023		-0.009
Sigma		(-0.107)		(-0.042)
			1.187***	1.116***
Firm Controls	Yes	Yes	Yes	Yes
Bond Controls	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes
Observations	276	274	276	274
Adjusted R-square	0.447	0.495	0.359	0.401
Without Secured Debt	Probit	Probit	Tobit	Tobit
	(1)	(2)	(3)	(4)
Market to Book Ratio	0.359***		0.485***	
	(2.908)		(2.893)	
WW Index		0.062**		0.088**
		(2.140)		(2.060)
Sigma			1.460***	1.455***
			(15.947)	(15.925)
Firm Controls	Yes	Yes	Yes	Yes
Bond Controls	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes
Observations	2205	2205	2205	2205
Adjusted R-square	0.215	0.219	0.166	0.169

Table 6. Risk Shifting Hypothesis and Issuance of Putable Bonds by Secured Debt and Regulated Industry, continued

Panel B: Regulated Industry				
Regulated Firms	Probit (1)	Probit (2)	Tobit (3)	Tobit (4)
Market to Book Ratio	1.481***		2.298***	
	(2.666)		(2.711)	
WW Index		0.122***		0.197***
		(4.124)		(3.911)
Sigma			1.645***	1.676***
			(12.100)	(13.095)
Firm Controls	Yes	Yes	Yes	Yes
Bond Controls	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes
Observations	740	740	740	740
Adjusted R-square	0.124	0.104	0.099	0.083
Non-Regulated Firms	Probit (1)	Probit (2)	Tobit (3)	Tobit (4)
Market to Book Ratio	0.161		0.199	
	(1.125)		(1.169)	
WW Index		-0.003		-0.005
		(-0.067)		(-0.088)
Sigma			1.313***	1.286***
			(15.334)	(14.792)
Firm Controls	Yes	Yes	Yes	Yes
Bond Controls	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes
Observations	1744	1744	1744	1744
Adjusted R-square	0.308	0.329	0.241	0.256

Table 7. Information Asymmetry and Issuance of Putable Bonds

The table presents the information asymmetry regression results of putable bonds and straight bonds issued from 1976 to 2019. Column (1), (2), and (3) are Probit regression results, and Column (4), (5), and (6) are Tobit regression results. All variables are winsorized at the 5% and 95% percentiles of their distributions. Z-statistics (in parentheses) are computed using robust standard errors corrected for clustering of observations at the firm level. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Probit	Probit	Probit	Tobit	Tobit	Tobit
	(1)	(2)	(3)	(4)	(5)	(6)
Analyst Coverage	-0.023**			-0.032**		
	(-2.145)			(-2.026)		
Forecast Dispersion		0.203***			0.284***	
		(3.276)			(3.090)	
Average Forecast Error			0.098***			0.137***
			(3.117)			(2.918)
Log (Total Assets)	0.045	0.040	0.038	0.063	0.055	0.053
	(0.600)	(0.538)	(0.510)	(0.601)	(0.538)	(0.511)
Leverage	0.003	0.003	0.003	0.004	0.004	0.004
	(0.572)	(0.557)	(0.587)	(0.602)	(0.596)	(0.627)
Asset Volatility	0.066**	0.066**	0.068**	0.089**	0.088**	0.090**
	(2.352)	(2.335)	(2.401)	(2.331)	(2.305)	(2.378)
R&D	0.027	0.030	0.028	0.029	0.033	0.031
	(0.754)	(0.825)	(0.786)	(0.592)	(0.676)	(0.638)
Fixed Assets	-0.002	-0.003	-0.003	-0.004	-0.004	-0.004
	(-1.000)	(-1.070)	(-1.040)	(-1.056)	(-1.120)	(-1.090)
Free Cash Flow	-0.000	0.000	-0.001	-0.000	0.001	-0.001
	(-0.024)	(0.023)	(-0.073)	(-0.011)	(0.039)	(-0.063)
Cash	-0.087***	-0.088***	-0.088***	-0.120***	-0.121***	-0.121***
	(-5.206)	(-5.238)	(-5.260)	(-5.288)	(-5.323)	(-5.342)
Profitability	-0.004	-0.004	-0.004	-0.006	-0.006	-0.006
	(-0.978)	(-0.937)	(-0.981)	(-1.001)	(-0.973)	(-1.019)
Log (Years to Maturity)	0.742***	0.738***	0.740***	1.025***	1.012***	1.015***
	(5.550)	(5.538)	(5.542)	(7.042)	(6.952)	(6.966)
Number of Covenants	-0.152***	-0.153***	-0.153***	-0.207***	-0.205***	-0.207***
	(-3.913)	(-3.918)	(-3.925)	(-4.387)	(-4.382)	(-4.395)
Offering Yield	-0.002	-0.001	-0.001	0.004	0.005	0.004
	(-0.078)	(-0.038)	(-0.069)	(0.124)	(0.157)	(0.126)
Investment Grade	0.117	0.127	0.138	0.180	0.191	0.208
	(0.927)	(1.007)	(1.074)	(1.011)	(1.079)	(1.150)
Sigma				1.477***	1.468***	1.470***
				(16.583)	(16.754)	(16.870)
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2482	2482	2482	2482	2482	2482
Adjusted R-square	0.212	0.218	0.217	0.164	0.170	0.169

Table 8. Information Asymmetry, Risk Shifting, and Issuance of Putable Bonds

The table presents the information asymmetry regression results of putable bonds and straight bonds issued from 1976 to 2019. All variables are winsorized at the 5% and 95% percentiles of their distributions. T-statistics (in parentheses) are computed using robust standard errors corrected for clustering of observations at the firm level. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Probit Model

	(1)	(2)	(3)	(4)	(5)	(6)
Analyst Coverage	-0.023**			-0.022**		
	(-2.187)			(-1.993)		
Forecast Dispersion		0.205***			0.197***	
		(3.297)			(3.113)	
Average Forecast Error			0.098***			0.094***
			(3.125)			(2.924)
Market to Book Ratio	0.315**	0.314**	0.311**			
	(2.537)	(2.509)	(2.479)			
WW Index				0.056*	0.057*	0.056*
				(1.831)	(1.832)	(1.823)
Log (Total Assets)	0.038	0.033	0.031	0.057	0.052	0.050
	(0.515)	(0.449)	(0.418)	(0.751)	(0.687)	(0.660)
Leverage	0.002	0.002	0.002	0.000	0.000	0.000
	(0.424)	(0.410)	(0.442)	(0.076)	(0.066)	(0.095)
Asset Volatility	0.034	0.034	0.036	0.073**	0.073**	0.074***
	(1.135)	(1.131)	(1.191)	(2.525)	(2.519)	(2.593)
R&D	0.018	0.020	0.019	0.027	0.030	0.028
	(0.483)	(0.542)	(0.510)	(0.755)	(0.813)	(0.777)
Fixed Assets	-0.002	-0.002	-0.002	-0.003	-0.003	-0.003
	(-0.681)	(-0.757)	(-0.729)	(-1.214)	(-1.290)	(-1.258)
Free Cash Flow	-0.010	-0.009	-0.010	0.006	0.007	0.005
	(-0.613)	(-0.560)	(-0.649)	(0.385)	(0.441)	(0.332)
Cash	-0.088***	-0.089***	-0.089***	-0.097***	-0.099***	-0.098***
	(-5.220)	(-5.261)	(-5.281)	(-5.731)	(-5.755)	(-5.788)
Profitability	-0.005	-0.005	-0.005	-0.003	-0.003	-0.003
	(-1.087)	(-1.043)	(-1.083)	(-0.668)	(-0.621)	(-0.670)
Log (Years to Maturity)	0.729***	0.725***	0.727***	0.755***	0.750***	0.752***
	(5.499)	(5.492)	(5.497)	(5.592)	(5.578)	(5.581)
Number of Covenants	-0.160***	-0.160***	-0.161***	-0.165***	-0.166***	-0.166***
	(-4.002)	(-4.009)	(-4.013)	(-4.277)	(-4.290)	(-4.289)
Offering Yield	0.006	0.007	0.006	-0.011	-0.010	-0.011
	(0.307)	(0.338)	(0.301)	(-0.552)	(-0.500)	(-0.534)
Investment Grade	0.127	0.137	0.148	0.113	0.123	0.134
	(0.994)	(1.073)	(1.141)	(0.880)	(0.952)	(1.018)
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2481	2481	2481	2481	2481	2481
Adjusted R-square	0.218	0.224	0.223	0.225	0.232	0.230

Table 8. Information Asymmetry, Risk Shifting, and Issuance of Putable Bonds, continued

Panel B: Tobit Model

	(1)	(2)	(3)	(4)	(5)	(6)
Analyst Coverage	-0.032**			-0.029*		
	(-2.055)			(-1.880)		
Forecast Dispersion		0.284***			0.271***	
		(3.100)			(2.938)	
Average Forecast Error			0.136***			0.129***
			(2.915)			(2.737)
Market to Book Ratio	0.429**	0.424**	0.420**			
	(2.555)	(2.536)	(2.504)			
WW Index				0.078*	0.078*	0.078*
				(1.743)	(1.745)	(1.734)
Log (Total Assets)	0.055	0.048	0.045	0.078	0.070	0.068
	(0.539)	(0.473)	(0.444)	(0.749)	(0.684)	(0.659)
Leverage	0.003	0.003	0.003	0.001	0.001	0.001
	(0.484)	(0.480)	(0.512)	(0.109)	(0.111)	(0.140)
Asset Volatility	0.044	0.043	0.046	0.095**	0.094**	0.097**
	(1.082)	(1.076)	(1.145)	(2.481)	(2.464)	(2.541)
R&D	0.015	0.019	0.017	0.027	0.030	0.028
	(0.305)	(0.378)	(0.347)	(0.555)	(0.624)	(0.590)
Fixed Assets	-0.002	-0.003	-0.003	-0.004	-0.005	-0.005
	(-0.741)	(-0.809)	(-0.781)	(-1.266)	(-1.336)	(-1.305)
Free Cash Flow	-0.013	-0.011	-0.014	0.009	0.010	0.008
	(-0.576)	(-0.521)	(-0.613)	(0.402)	(0.460)	(0.346)
Cash	-0.120***	-0.121***	-0.121***	-0.131***	-0.132***	-0.132***
	(-5.317)	(-5.364)	(-5.381)	(-5.759)	(-5.777)	(-5.806)
Profitability	-0.007	-0.007	-0.007	-0.004	-0.004	-0.004
	(-1.132)	(-1.102)	(-1.145)	(-0.687)	(-0.654)	(-0.706)
Log (Years to Maturity)	0.997***	0.985***	0.989***	1.025***	1.012***	1.015***
	(6.892)	(6.817)	(6.831)	(7.042)	(6.945)	(6.958)
Number of Covenants	-0.214***	-0.213***	-0.215***	-0.220***	-0.219***	-0.220***
	(-4.515)	(-4.513)	(-4.522)	(-4.838)	(-4.836)	(-4.839)
Offering yield	0.015	0.016	0.015	-0.009	-0.008	-0.008
	(0.521)	(0.542)	(0.505)	(-0.307)	(-0.266)	(-0.299)
Investment grade	0.195	0.206	0.223	0.174	0.184	0.200
	(1.093)	(1.161)	(1.229)	(0.973)	(1.033)	(1.101)
Sigma	1.467***	1.457***	1.460***	1.458***	1.448***	1.451***
	(16.447)	(16.604)	(16.713)	(16.362)	(16.536)	(16.644)
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2481	2481	2481	2481	2481	2481
Adjusted R-square	0.169	0.174	0.173	0.175	0.180	0.179

Table 9. Two-Equation Simultaneous System of Putable Issuance, Covenants, and Leverage

The table presents the 2-equation system for the decision on covenant and putable, and the decision on leverage and putable. The sample has putable bonds and straight bonds issued from 1976 to 2016. All variables are winsorized at the 5% and 95% percentiles of their distributions. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Putable Equation	**Covenant Equation**		**Putable Equation**	**Leverage Equation**
Putable		-1.166	*Putable*		-31.374***
		(-0.50)			(-2.86)
Number of Covenants	-0.054***		*Number of Covenants*	-0.022***	-1.196***
	(-3.65)			(-5.90)	(-3.61)
Market to Book Ratio	0.101***	1.098***	*Market to Book Ratio*	0.080***	3.932***
	(5.11)	(6.59)		(4.86)	(3.11)
Average Forecast Error	0.017***	0.049	*Average Forecast Error*	0.015***	0.286
	(4.64)	(1.18)		(4.43)	(1.09)
R&D	0.005		*R&D*	0.006	
	(0.95)			(1.32)	
Total Asset Growth	-0.000		*Total Asset Growth*	-0.000	
	(-0.07)			(-0.74)	
Cash	-0.015***	-0.085***	*Cash*	-0.009***	
	(-6.53)	(-3.22)		(-5.12)	
Leverage	-0.000	-0.004	*Leverage*	-0.004***	
	(-0.10)	(-1.05)		(-4.04)	
Log (Total Assets)	0.013***	0.160***	*Log (Total Assets)*	0.015***	2.247***
	(3.19)	(7.76)		(4.10)	(11.20)
Profitability	-0.001**	-0.003	*Profitability*	0.001**	0.533***
	(-2.50)	(-0.65)		(2.03)	(25.12)
Interest Rate Controls	Yes	Yes	*Interest Rate Controls*	Yes	Yes

Table 10. Three-Equation Simultaneous System of Putable Issuance, Covenants, and Leverage

The table presents the 3-equation system for the decision on covenant, putable, and leverage. The sample has putable bonds and straight bonds issued from 1976 to 2016. All variables are winsorized at the 5% and 95% percentiles of their distributions. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Putable Equation	**Covenant Equation**	***Leverage Equation***
Leverage	-0.004***	0.003	
	(-4.40)	(0.35)	
Number of Covenants	-0.047***		0.980
	(-3.23)		(0.82)
Putable		0.403	-55.268***
		(0.15)	(-3.46)
Average Forecast error	0.016***	0.039	-0.004***
	(4.61)	(0.87)	(-4.40)
Fixed Asset			-0.031*
			(-1.67)
Log (Total Assets)	0.019***	0.136***	1.954***
	(4.61)	(5.10)	(7.22)
R&D	0.004		
	(1.16)		
Total Assets Growth	-0.000		
	(-0.29)		
Market to Book Ratio	0.100***	1.004***	3.589**
	(4.97)	(5.54)	(2.29)
Cash	-0.012***	-0.061**	
	(-5.75)	(-2.24)	
Profitability	0.001**	-0.006	0.507***
	(1.97)	(-1.01)	(18.72)
Interest Rate Controls	Yes	Yes	Yes