



Why firms issue callable bonds: Hedging investment uncertainty

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Abstract

This paper analyzes a firm's dynamic decisions: i) whether to issue a callable or non-callable bond; ii) when to call the callable bond; and iii) whether to refund it when it is called. We argue that a firm uses a callable bond to reduce the risk-shifting problem in case its investment opportunities become poor. Our empirical findings support this argument. We find that a firm facing poorer future investment opportunities is more likely to issue a callable bond than a firm facing better investment opportunities. In addition, a firm with a higher leverage ratio and higher investment risk is more likely to issue a callable bond. Finally, after a callable bond is issued, a firm with a poor performance and a low investment activity tends to call back a bond without refunding; a firm with the best performance and highest investment activity tends to call back a bond and refund its call; and a firm with mediocre performance and investment activity tends to not call its bonds.

Introduction

When a firm issues a bond, it must decide whether to issue a callable bond or a non-callable bond. A callable bond includes a call provision, which gives the issuer an option to buy back the bond at a predetermined price during a predetermined time period. Callable bonds are commonly used by U.S. corporations in the public debt market. For example, in the Fixed Investment Securities Database (FISD), 42% of fixed rate U.S. corporate bonds issued between 1970 and 2000 are callable.

Why does a firm issue a callable bond? The most common explanation is to hedge interest rate risk (e.g., Pye, 1966). The argument is that once the interest rate goes down, the issuing firm can refund the bond at a lower interest rate.² This argument, however, has difficulty explaining the empirical finding that most firms do not refund their bonds when they call them back. For example, King and Mauer (2000) report that 77% of bonds being called in their sample are not refunded. How can a firm benefit from lower interest rates without refunding? In other words, if a firm is willing to borrow at a higher interest

rate, say 8%, when it issues a bond, why isn't it willing to borrow at a lower interest rate, say 6%, when it calls back the bond? Other explanations for why a firm would issue a callable bond do not explain the refunding decision of the firm. Explaining refunding decisions calls for a new theory on why a firm would issue a callable bond in the first place.

In the first part of the paper, we develop a theory on a firm's ex ante choice between issuing a callable or non-callable bond, its ex post decisions whether to call back a callable bond, and whether to refund it. On the one hand, our theory explains the existing empirical findings in the current literature, such as the lack of refunding of called bonds. On the other hand, it produces a variety of novel testable hypotheses, which we examine empirically in the second part of the paper.

In our model, an equity-value-maximizing firm needs to raise money to invest in a current project and possibly a future project. The current project has a positive NPV but it is uncertain whether the future project has a positive NPV. The firm decides whether to issue a callable bond or a non-callable bond to competitive investors. After the current project generates a cash flow, the firm and the investors observe more information about the future project. Based on the new information, the firm then decides whether or not to invest the cash in the future project. Because the firm tries to maximize its equity value, the investment decision may not be efficient if the bond is non-callable. More specifically, the firm may want to invest in a negative NPV but risky future project. This is because although investing in the project will lower the firm's value, it will lower the bond value even more and equity holders can capture the difference. Anticipating that situation, investors would pay a lower price (or equivalently demand a higher yield) for the firm's bond when it is issued than they would if the firm could commit to an efficient investment decision. This is the well-known risk-shifting problem first studied by Jensen and Meckling (1976).

Issuing a callable bond may alleviate this risk-shifting problem. The key point is that a callable bond gives the issuing firm an option to reduce its debt obligation if it finds out that the future project has a negative NPV. If the firm's bond is non-callable, as discussed above, the firm may still want to invest in the project. Instead, if the firm has an option to buy back the bond at a lower price than its value, the firm may have an incentive to not invest in the negative NPV project but pay out cash by calling back the bond. The reason is that now the debt obligation is reduced so that the firm can keep a larger portion of its value, most of which would go to the bond holders if it is a non-callable bond. In other words, a callable bond essentially enables the bond holders to bribe the firm into making an efficient investment decision.

There is, however, a cost associated with issuing a callable bond. When the future project turns out to be good, the firm would invest in the project. If the project is better than good, the firm then would want to call back the bond and refund it at a lower cost. In this case, however, the firm incurs a refunding cost.³ Therefore, the firm faces the following trade-off when it decides whether to issue a callable bond or a non-callable bond. The benefit of issuing a callable bond is that it would reduce the agency cost of debt if the investment opportunities turn out to be bad. The cost is that the firm would incur the refunding cost if the investment opportunities turn out to be good. This implies that a firm expecting better investment opportunities would issue a non-callable bond while it would issue a callable bond if it is expecting poorer investment opportunities.

Our model also characterizes the firm's behavior after it issues a callable bond. First, if the firm finds out that its future project is bad, it would not invest in the project but call back the bond without refunding it. We thus provide an explanation to the observed lack of refunding of called bonds discussed above.

Secondly, if the firm finds out that the future project is good, it would invest in the project, call back the bond, and refund it at a lower cost. Finally, if the firm finds out that its future project is mediocre, it would choose to invest in the project without calling back the bond. This is because i) the project has a positive NPV so it is worth continuing; and ii) the benefit from refunding the bond is not high enough to offset the refunding cost.

Our analysis yields a variety of testable hypotheses that differentiate our theory from the alternative theories in the existing literature. In the second part of the paper, we test those hypotheses empirically. In the ex ante (at issue) study, we examine the relation between a firm's decision of issuing a callable bond versus a non-callable bond and its expected future investment opportunities, leverage ratio, and investment risk. In the ex post (at call) study, we examine the relation between a firm's current investment performance and its decision whether or not to call back the bond, along with whether or not to refund it. We find strong empirical support for our theory. We find that a firm expecting worse future investment opportunities and/or with higher leverage ratio and investment risk is more likely to issue a callable bond. As a firm calls back its bond, the firm with the poorest performance and the lowest investment activity is not likely to refund a call. In contrast, a firm with the best performance and the highest investment activity is likely to refund it. A firm with mediocre performance and investment activity tends to not call their bonds. Our findings are also economically significant. We estimate, for example, that an increase of one standard deviation in the market/book ratio (proxy for future investment opportunities) corresponds to a 36% decrease in the firm's probability to issue a callable bond versus a non-callable one. In addition, we find that, as a firm calls back a bond, a non-refunding call is associated with poorer performance and lower investment activity. A decrease of one standard deviation in its ROA corresponds to a 15% decrease in the firm's probability of refunding its called bond. Our findings are robust to various model specifications and different measures of key variables.

The rest of the paper is organized as follows. Section 2 is a review of the relevant literature. In Section 3, we use a numerical example to develop the theoretical argument that a firm can use callable bonds to reduce the risk-shifting problem. Empirical hypotheses are also derived. A formal model is available upon request. Section 4 describes our data, sample, and variables. In Section 5, we examine the hypotheses concerning the likelihood of issuing callable versus non-callable bonds. In Section 6, we test the hypotheses concerning the likelihood to call with refund, call without refund, and not call. Section 7 concludes.

Section snippets

Literature review

The literature offers five theories explaining why a firm issues a callable bond. The first is the “hedging interest rate risk theory” in which a callable bond provides a firm with the opportunity to refund at a lower interest rate (Pye, 1966). The second is the “signaling theory” in which a callable bond allows a higher quality firm to reduce the cost associated with asymmetric information (Robbins and Schatzberg, 1986, Robbins and Schatzberg, 1988). The reason is that even though a higher...

Our model

For simplicity, we use a numerical example to demonstrate the main trade-off in our model. The formal analysis is available upon request. Consider a firm at the beginning of the first period in a two-period risk-neutral economy. The sequence of events is depicted in Fig. 1 and numerical analysis is presented in Table 1. The firm has a profitable investment project to undertake immediately at Date 0. If undertaken, the firm has to invest \$50 and the project will generate a fixed cash flow of \$55 ...

Our sample of bonds

To investigate a firm's decision of issuing callable versus non-callable bonds, we obtain data on 13,784 nonconvertible fixed rate U.S. corporate bonds issued between January 1980 and December 2003 from the Fixed Investment Securities Database (FISD). The FISD database (which is provided by LDS Global Information Services, Inc., currently owned by Mergent) contains issue- and issuer-specific information, such as coupon rate, maturity, and credit rating, on all U.S. corporate bonds maturing in...

Choices of issuing a callable bond

Table 2 reports descriptive statistics for our final bond sample.¹⁶ Panel A presents sample distribution in each one-digit SIC coded industry; Panel B presents sample distribution over time; Panel C offers summary statistics on the variables used in the analysis. The bond sample contains about 29% callable bonds;¹⁷ 15% are...

Firms' choices of call with refund, call without refund, and not call

In addition to the implications on a firm's choice of whether to issue a callable or a non-callable bond, our model also provides explicit empirical implications on a firm's choice whether to call the bond, as well as whether to refund the call. To test those implications, we first explore that, conditional on the call events, how a firm's performance and investment activity are related to the decision on whether or not to refund the call. Second, we examine the impact of firm performance and...

Conclusion

If a firm issues a non-callable bond, even when the firm's investment opportunity turns out to be poor, it may still have incentives to invest because of the well-known risk-shifting problem. In this paper, we propose a theory that a firm could issue a callable bond to reduce the risk-shifting problem. Because the call option enables the firm to reduce its debt obligation when its investment opportunity turns out to be poor, this makes it more attractive for equity holders to forgo the negative ...

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...Bodie and Taggart (1978) provide the foundational work on the investment incentives of callable debt by proving, under certain assumptions, that callable debt can elicit better, but never worse, investment decisions than non-callable debt, assuming symmetric information and no taxes or transaction (e.g., debt issuance) costs. Sometimes with reference to the Bodie and Taggart results, numerous authors have alluded to the potential investment incentive benefits arising from callability (see, e.g., Aivazian and Callen, 1980; Barnea et al., 1980; Brick and Palmon, 1993; Thatcher, 1985; Narayanan, 1992; Robbins and Schatzberg, 1986; Mitchell, 1991; Mayers, 1998; Korkeamaki and Moore, 2004; Chen et al., 2010). The view that callability produces a positive effect on investment behavior has been generally accepted in the literature, with no mention of the potential negative investment incentive effects (even assuming, as is done here, that there are no information asymmetries, transaction costs or taxes)....

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...We further hypothesize that firms with higher leverage have a higher call spread, all else equal. According to the risk-shifting hypothesis, first introduced by Jensen and Meckling (1976) and later developed by Barnea et al. (1980) and Chen et al. (2010), shareholders have an incentive to expropriate bondholders' wealth. Accordingly, we further

assume that holders of callable bonds will require a higher call spread for highly leveraged firms to compensate them for the risk of wealth expropriation....

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