



Debt callability and investment incentives



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ARTICLE INFO

Article history:

Received 19 August 2015

Received in revised form 8 August 2016

Accepted 10 August 2016

Available online 15 August 2016

JEL classification:

G32

Keywords:

Financing policy

Debt call option

Firm value

Investment incentives

ABSTRACT

Contrary to existing theory, even in perfect markets (with symmetric information, no taxes, and competitive, transaction costless capital markets) callable debt can induce investment incentives that are inferior (as well as superior) to those induced by non-callable debt, the outcome depending on cash flow and interest rate distributions. We derive necessary conditions for callable debt to induce inferior investment decisions, and define the “Call-Default Condition” as the cash flow distortion where calling prevents default that would have occurred with non-callable debt. These results complicate the argument that investment incentives explain the presence of the call provision in debt contracts.

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1. Introduction

Prevailing financial theory holds that, at least in markets that are perfect (with symmetric information, no taxes, and competitive, transaction costless capital markets), the use of a call provision in a firm's debt can improve, but cannot impair, the firm's investment decisions. In the present paper we show that a call provision can induce inefficient (lower NPV) investment, and we explore the conditions under which callable debt, and non-callable debt, are preferred from an investment perspective. We therefore provide an important update to the foundational work of Bodie and Taggart (1978), who conclude on page 1200 that “in an efficient market the shareholders will not be worse off with callable than with noncallable debt.” Our result (that shareholders can be worse off with callable debt) is consistent with empirical evidence that the use of callable debt has declined markedly since the publication of Bodie and Taggart's work, e.g. Fig. 1 of Güntay et al. (2004) and their Table 1 which reports that while 76.5% of (nonconvertible, fixed-rate, non-financial, non-service) bonds issued were callable in the period from 1981 to 1988, this decreased to just 29.6% callable in the period 1987–1997.

It is well known that debt can induce suboptimal investment if it is prohibitively costly to institute offsetting optimizing mechanisms, such as contracts that force the firm to apply a particular capital budgeting criterion, outside takeover of the firm, or retirement of firm debt whenever investment affects debt-holders (on this, see, for example, Stiglitz, 1972; Galai and Masulis, 1976; Myers, 1977; Fama, 1978; Aivazian and Callen, 1980). The firm value loss due to debt-induced suboptimal firm behavior is absorbed by shareholders because the behavior is anticipated by creditors at the time the loan is made.

Myers (1977) points out that reducing the term of the debt will mitigate the debt-induced underinvestment problem. This notion is supported by the findings of Guedes and Opler (1996), Stohs and Mauer (1996), Barclay and Smith (1995), and Johnson

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(2003). Callability is another mechanism that has been suggested as a means to address the suboptimalities created by debt financing. 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). This perception has even found its way to a leading finance textbook (Ross et al., 2008) and an authoritative finance reference source (Narayanan, 1992), both of which refer to the Bodie and Taggart findings.

Our model's time line differs from that of Bodie and Taggart (1978) who assume that the firm's callable debt can be called only at the moment at which the investment decision is made. The analysis in the present paper assumes that the callable debt can remain outstanding and be called after, as well as on or before, the date of the investment decision, an appropriate assumption for firms that make investment decisions in the presence of outstanding long-term callable debt. When the time sequence allows for investment followed by call decision followed by terminal cash flows in this way, with incremental information available at each stage, it introduces into the model a new type of incremental cash flow distortion with the potential to modify shareholder incentives: Call may occur after investing (with the call decision based on new information not available at the time of investment) while sufficient uncertainty still remains so that *calling prevents default that would have occurred* with non-callable debt. While the incremental cash flow distortions due to default are well known and apply to any variety of debt, the *avoidance* of default due to previous call is unique to callable debt and we show that this can lead to inferiority of callable debt in our examples.

We refer to this cash flow distortion (where calling prevents default that would have occurred with non-callable debt) as the "Call-Default Condition."

Throughout, we assume "perfect markets" with homogeneous expectations (no information asymmetries), a shareholder-wealth-maximization firm objective, no mechanism to compel the firm to follow a particular investment policy (such as to accept only positive NPV projects), no taxes or financial distress costs, and competitive and transaction costless capital markets. We show that it is possible for callable debt to elicit investment decisions inferior to those induced by non-callable debt, depending on the pattern of investment cash flows and interest rates. Thus, for example, in deciding whether to adopt a particular investment project, callable debt can cause the firm to adopt a negative net present value investment even though non-callable debt would lead to the higher net present value decision. The circumstances producing this outcome have some identifiable characteristics. These results complicate the argument that investment incentives explain the presence of the call provision in debt contracts because our results introduce the possibility that firms might, in some cases, issue non-callable debt in order to improve investment incentives. Also, given that a common starting point in developing financial theories is the assumption of perfect capital markets, the results provided here can offer a useful base case to which can be added market frictions, asymmetries, taxes and other complicating factors.

The paper is organized as follows. Section 2 provides two examples of cash flow distributions for which callable debt can induce suboptimal investment while non-callable debt (with the same market value) induces the optimal investment choice. The example of Section 2.1 uses a specific discrete distribution represented by a tree of time-states, for which it is straightforward to visualize the entire model, and for which the suboptimality of callable debt cannot be remedied simply by changing the call price while retaining positive probability of call (nor can it be remedied by making the promised payments identical for callable and non-callable debt, thereby establishing that it is the call provision, and not merely the higher coupon of the callable debt, that leads to its suboptimality). A more general continuous distribution for cash flows, using the lognormal distribution, is presented in the example of Section 2.2, for which we characterize how the optimality of the investment decision depends on risk levels and information available at the time of the call decision (which is informed by a conditional forecast of future cash flows). Section 3 provides a set of necessary conditions for callable debt to elicit suboptimal investment relative to non-callable debt. The model assumptions, notation, and framework are presented in Section 3.1, while Section 3.2 presents the necessary conditions and defines the Call-Default Condition that is instrumental in identifying differential cash flows to equity that result in these investment incentives. Section 4 presents a summary and conclusions. Appendix A provides details on the continuous lognormal model used in Section 2.2, while Appendix B presents proofs of the necessary conditions of Section 3.2.

2. Examples of suboptimality of callable debt

This section provides two examples of cash flow distributions for which callable debt induces suboptimal investment while non-callable debt (with the same market value¹) induces the optimal investment choice. Both examples contain the Call-Default Condition (where calling prevents default that would have occurred with non-callable debt) that introduces a cash flow distortion for which default fails to occur despite low firm cash flow, but only for the callable debt. It is clear that, in order for two types of debt to induce different investment incentives, shareholders must perceive different incremental (due to investment) cash flows across the debt types. We will show that, using the equilibrium coupon rate for each debt type, absent (current or previous)

¹ This assumption can be relaxed: We also show that our results continue to hold in the discrete example when cash flows are identical for callable and non-callable debt, establishing that it is callability and not merely differential coupon rates that are responsible for the suboptimal behavior with callable debt.

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