

What Drives the Issuance of Puttable Convertibles: Risk-Shifting or Asymmetric Information?

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Abstract

Puttable convertibles, which are convertible bonds that allow bondholders to “put” or sell the bonds to the issuer at pre-specified prices on pre-specified dates, have become an increasingly popular means of raising capital in recent years. This paper presents the first theoretical as well as the first empirical analysis of firms’ rationale for issuing puttable convertibles in the literature. Using a sample of firms choosing to issue either puttable or ordinary convertibles, we distinguish between two possible rationales for the issuance of puttable convertibles: the risk-shifting hypothesis and the asymmetric information (or undervaluation) hypothesis. We make use of two simple theoretical models to demonstrate how puttable convertibles can help a firm resolve the problems associated with risk-shifting and asymmetric information, respectively, and develop testable hypotheses regarding the firm’s choice between puttable and ordinary convertibles, which we test in our empirical analysis. The results of our empirical analysis can be summarized as follows. First, firms that issue puttable convertibles are larger, less risky firms, having larger cash flows, smaller growth opportunities, and lower bankruptcy probability compared to those issuing ordinary convertibles. Second, puttable convertible issuers have lower pre-issue market valuation, less negative announcement effects, and better post-issue operating performance compared to ordinary convertible issuers. Third, puttable convertible issuers have better post-issue long-run stock return performance compared to ordinary convertible issuers. Overall, the results of our univariate as well as multivariate analyses support the asymmetric information hypothesis but reject the risk-shifting hypothesis.

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1. Introduction

The objective of this paper is to study putable convertibles, which are convertible bonds that allow bondholders to “put” or sell the bonds to the issuer at pre-specified prices on pre-specified dates. Starting from small beginnings in the eighties and early nineties, putable convertibles have become the most successful financial innovation in the convertible bond market in the last five to ten years.¹ Thus, according to the Securities Data Corporation (SDC) database, while the total amount of capital raised by issuing putable convertibles was only \$6.1 billion in the 1980s, it grew to \$25.6 billion in the 1990s, and skyrocketed to \$122 billion in the 2000s (from 2000 to 2003). Thus, in the 2000s, more money was raised by issuing putable convertibles compared to ordinary (non-putable) convertibles: only \$109 billion was raised by issuing ordinary convertibles, so that putable convertibles constituted 52.71 percent of the total amount raised in the convertibles market (see Figure 1).^{2, 3}

Putable convertibles fall into two broad categories: zero coupon putable convertibles (about 36 percent of our sample) and those paying a coupon (about 64 percent of our sample). It is useful to illustrate various features of putable convertibles using two examples of these issues. The first example is the issue of \$281.26 million worth of zero coupon putable convertibles by Motorola Inc on September 27, 1993. Each bond (with a face value of \$1,000) was issued at \$639.23 and had a maturity date of September 27, 2013 (twenty year maturity), and was convertible to 5.589 shares of Motorola common stock at any time prior to maturity. In addition, however, the bonds were putable by investors to the company on September 27, 1998

¹ The other successful financial innovation in the convertibles market over the last two decades is mandatory convertibles. However, the amounts raised through putable convertibles have by far outstripped the amounts raised through mandatory convertibles. See Chemmanur, Nandy, and Yan (2003) for a study of mandatory convertibles.

² In 2004-2005 there were 160 putable convertible issues, raising a total of \$38.5 billion. In comparison, there were 214 ordinary convertible issues, which raised a total of \$24.0 billion in new capital.

³ While the focus of this study is on U.S. firms issuing putable convertible bonds in the U.S., a number of firms from the U.K. and other European countries have also issued putable convertibles in the Eurobond market. Examples of European issuers are the U.K. firms: Consolidated Gold Fields, BET, Lonrho, Next; the Austrian firm Bank Austria; and the Polish Telecom Company Elektrim.

(i.e., five years from the issue date) at \$714.90; and also five years and ten years after that at prices of \$799.52 and \$894.16, respectively. Consider now a second example, illustrating a coupon paying puttable convertible issue. On May 1, 2001, Adelphia Communications Corp issued \$500 million worth of puttable convertibles paying 3.25 percent coupon and maturing on May 1, 2021. The bonds were issued at par, and were convertible to 22.853 shares each of Adelphia common stock at any time prior to maturity. The bonds were puttable to the firm at par (plus accrued and unpaid interest) on the following dates: May 1, 2003 (two years from the issue date); May 1, 2005; May 1, 2007; May 1, 2011; and May 1, 2016.⁴ A key feature worth noting about puttable convertibles is that, unlike ordinary convertible holders (who have no recourse but to wait for the stock price to rise above the strike price), puttable convertible holders can earn a fair return simply by putting the bond back to the issuer. In other words, unless the stock price rises to a significant premium over the conversion price, investors may be better off exercising the put option rather than waiting to convert to equity.⁵

Puttable convertibles came under intense scrutiny and attack in the financial press in late 2001 and 2002, after a number of companies (e.g., Calpine Inc, Marriott International Inc, Stillwell Financial Inc, and Household International Inc) were forced to raise additional financing in the equity or debt market to repurchase the puttable convertible bonds issued by them (either partially or fully) when investors exercised their put option. Many analysts commented that the firms that issued these securities were wrongly advised by investment banks that these were the sources of unusually cheap financing, without emphasizing the significant probability of the put options in these convertible bonds being exercised. To quote: “These deals are turning out to be much more expensive and troublesome for companies than expected, as some were advised that the likelihood of a put was extremely low... CFOs of these firms were not expecting these deals

⁴ Like most other convertible bonds, both bonds were callable as well: the Motorola issue was callable starting five years after the issue, while the Adelphia Communications issue was callable starting four years after the issue.

⁵ It is important to distinguish between puttable convertibles and “poison put” convertibles, which are convertible bonds which become puttable *only* in the event of certain corporate events, such as a change in control of the firm following a takeover. In contrast, the puttable convertibles in our sample become puttable on pre-specified dates according to a pre-specified put schedule (though some of them may also have additional put provisions in the event of some specified corporate events). We exclude pure “poison put” convertibles from our sample, since the factors driving the issuance of these seem to be quite different from those driving the issuance of puttable convertibles: see, e.g., Nanda and Yun (1996) for a study of poison put convertibles. While there were a number of issues of poison put convertibles during the late eighties and early nineties, the issues of such poison put convertibles have been reduced to a trickle in recent years.

to be put back to them in a year” (“The Convert Boomerang,” *Investment Dealers’ Digest*, March 2002). It was also argued that a company’s outstanding putable convertible issue was contributing to a downward spiral in both its stock price and credit quality.⁶ On the other hand, many putable convertible issuers defended the security, saying that the cheap financing they obtained made the risk of the put being exercised well worth taking, and mentioning that they had either the cash on hand to honor a possible put, or were able to raise such cash on favorable terms at short notice.

The above debate among practitioners about the desirability of issuing putable convertibles raises several interesting questions. First, what is the true rationale behind firms issuing putable convertibles? After all, we know that, in a Modigliani-Miller setting, issuers should be indifferent between issuing putable and ordinary convertibles. Second, is it indeed the case that putable convertible issues are received particularly negatively by the stock market compared to the issues of convertible debt without such a put provision attached? Third, how do firms issuing putable convertibles compare with those issuing ordinary convertibles in terms of long-run operating and stock return performance subsequent to the issuance of these securities? Unfortunately, there has been no academic literature on putable convertibles so far to enable us to answer the above questions. The objective of this paper is to answer these and other related questions by developing the first theoretical as well as empirical study of putable convertibles.

Our primary goal is to identify the factors driving the issuance of putable convertibles. We analyze two alternative rationales, namely, risk-shifting or asymmetric information, that may drive the issuance of putable convertibles. We develop two simple theoretical models and make use of numerical examples to demonstrate how the issuance of putable convertibles can resolve problems associated with risk-shifting and asymmetric information, respectively. We develop the testable implications of each of the above models and then test these implications in our empirical analysis. Given that the primary difference between putable and ordinary convertibles is the put option enabling investors to sell the convertible bond back to the issuer according to a pre-specified put schedule, the natural research design to accomplish this task is to compare the various characteristics of putable and ordinary convertible issuers, as well as the stock return and operating

⁶ See, “Headed for a Fall,” (*Fortune Magazine*, November 26, 2001) and “Convertible Bonds,” (*The Economist*, November 14, 2002) for similar comments.

performance of these firms before and after the convertible issue.⁷ We therefore adopt such a research design to distinguish between the risk-shifting and asymmetric information hypotheses and test the implications of the above two hypotheses for the issuance of puttable versus ordinary convertibles.

We now briefly discuss the risk-shifting and asymmetric information rationales for the issuance of puttable versus ordinary convertibles (we analyze these in detail in section 2). These rationales are suggested by the existing theoretical literature as well as the two simple theoretical models we analyze here. The “risk-shifting” or “asset substitution” hypothesis is based on the argument that in a setting of incomplete contracting and where a firm has a significant probability of financial distress, stockholders have an incentive to take on excessively risky projects in an attempt to transfer wealth from bondholders to themselves. Ordinary convertibles have the ability to mitigate these distortions in stockholder incentives by allowing convertible holders to convert to equity when the stock price is high, thus sharing in some of the “upside” generated by the risky investment strategy adopted by the firm; they cannot, however, eliminate such incentives (see, e.g., Green (1984)) We extend the above literature and use a simple model along with a numerical example to demonstrate that puttable convertibles can further reduce such incentive distortions by allowing puttable convertible holders to obtain their money back if they observe the firm engaging in suboptimal investment policies. The testable implication here is that puttable convertibles are more likely to be issued by firms which have more growth opportunities, and those which are smaller and riskier, with a greater probability of financial distress overall. The “asymmetric information” or “undervaluation” hypothesis postulates that puttable convertibles are issued by firms with favorable private information (currently undervalued in the stock market), who therefore assess a lower probability of their put option being exercised compared to overvalued firms (whose insiders have less favorable private information about their firm value). Again, we use a simple model along with a numerical example to demonstrate that firms with more favorable

⁷ In principle, one can compare the characteristics of puttable convertible issuers to those of not only ordinary convertible issuers, but also issuers of other securities like straight debt and common stock (as well as other innovative securities). However, there may be a number of market imperfections that may affect a firm’s choice of equity versus debt (as well as other securities) and given that there is no consensus in either the theoretical or the empirical literature regarding the specific imperfections driving the above choice, it is impossible to include all of these imperfections in our empirical analysis. The approach we have taken here, therefore, is to compare puttable convertibles with the closest “standard” securities issued by firms, which are clearly ordinary convertibles. Given the above empirical research design, the two theoretical models we develop have specifically analyzed the situation of a firm choosing between puttable and ordinary convertibles in order to resolve the problems associated with risk-shifting and asymmetric information, respectively.

private information (undervalued firms) will issue puttable convertibles while those with less favorable private information will issue ordinary convertibles. This has the testable implications that, in addition to being undervalued, firms issuing puttable convertibles will have more favorable announcement effects and better post-issue operating performance compared to a matched sample of ordinary convertible issuers.

Our results can be summarized as follows. First, firms that issue puttable convertibles are larger, less risky firms with larger cash flows, smaller growth opportunities, and a lower overall probability of bankruptcy compared to those issuing ordinary convertibles. Thus, our results contradict the risk-shifting hypothesis. Second, puttable convertible issuers have lower pre-issue market valuations compared to ordinary convertible issuers. Third, they also experience less negative abnormal stock returns upon the announcement of an issue compared to a matched sample of ordinary convertible issuers. Fourth, puttable convertible issuers exhibit better long-run operating performance (relative to matched non-issuers) subsequent to issue compared to firms issuing ordinary convertibles. The last three results support the predictions of the asymmetric information hypothesis. Finally, puttable convertible issuers exhibit better long-run stock return performance (relative to matched non-issuers) in the years after the issue compared to ordinary convertible issuers. Overall, our empirical analysis provides support for the asymmetric information or undervaluation hypothesis and rejects the risk-shifting hypothesis.

As discussed before, there has been very little empirical or theoretical research so far on puttable convertibles. Nanda and Yun (1996) study “poison put” convertibles, which are, however, not the focus of this paper (see footnote 5 for the distinction between puttable and poison put convertibles). The two literatures closest to our paper are therefore on straight (non-convertible) puttable bonds and on ordinary convertibles. There is a small theoretical and empirical literature on straight puttable bonds: see, e.g., David (2001) for a theoretical analysis of the strategic value of straight puttable bonds in liquidity crises and Cook and Easterwood (1994) for an empirical analysis of straight poison put bonds. The theoretical literature on ordinary convertibles includes Green (1984), Brennan and Kraus (1987), Constantinides and Grundy (1989), Mayers (1998), and Stein (1992). The large empirical literature on ordinary convertibles (see, e.g., Dann and

Mikkelson (1984), Spiess and Affleck-Graves (1999), Lewis, Rogalski, and Seward (1999, 2001)) is also related to this paper.

The rest of this paper is organized as follows. Section 2 develops two simple theoretical models, one illustrating the risk-shifting rationale for the issuance of puttable versus ordinary convertibles, the other illustrating the asymmetric information rationale; this section also develops testable hypotheses based on these two models. Section 3 describes our data and sample selection procedures. Section 4 presents our empirical tests and results on the two alternative rationales for issuing puttable convertibles and the stock return performance of puttable convertible issuers subsequent to the issue. Section 5 discusses alternative explanations for the issuance of puttable convertibles. Section 6 concludes with a brief discussion of our results.

2. Theory and Hypotheses

2.1. Risk-Shifting or Asset Substitution Hypothesis

It is well known that, when a firm has a significant probability of financial distress, debt outstanding can distort the incentives of equity holders in a setting of incomplete contracting about investment policy, motivating them to engage in risk-shifting (Jensen and Meckling (1976)) or underinvestment (Myers (1977)). Green (1984) has shown that ordinary convertible debt can mitigate the above loss in value due to the risk-shifting incentives of stockholders. Since convertible debt holders have the ability to convert this debt to equity when equity value is high (so that equity holders will have to share any increased equity value arising from risk-shifting with these convertible debt holders) equity holders' incentives to engage in risk-shifting in the first place is reduced when ordinary convertibles are issued rather than straight debt. However, as Green (1984) noted, ordinary convertibles can only mitigate the incentives of equity holders to engage in risk-shifting and the pursuit of other suboptimal investment policies: they cannot eliminate such investment distortions. In this situation, puttable convertibles can further reduce the above distortions in stockholder incentives. By allowing puttable convertible holders to demand their money back (on the next available put date) if they observe the firm engaging in risk-shifting or other suboptimal investment policies, puttable

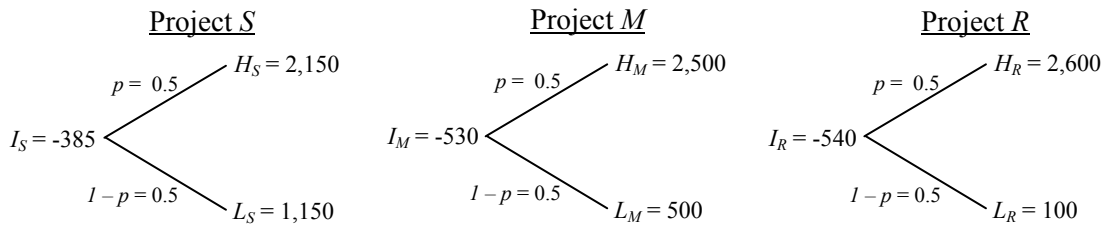
convertibles further reduce the incentives of equity holders to engage in such distortionary investment policies. In contrast, since such a put provision is absent, the only recourse of ordinary convertible debt holders is to wait till the equity value increases to the point where it is optimal for them to convert to equity, thus sharing in any value gains created by the firm's investment policies (a recourse also available to puttable convertible holders). In summary, puttable convertibles are able to control distortions in stockholder incentives more effectively than ordinary convertibles. On the cost side, however, the put option embedded in puttable convertibles means that stockholders' ability to pursue genuinely value increasing long-term investment strategies may be circumscribed by the fact that convertible holders may put the bonds back to the firm if its stock price were to go down, even due to factors outside the stockholders' (managers') control. Thus, under the mitigation of risk-shifting hypothesis, puttable convertibles will be issued by those firms whose benefits from controlling distortions in the firm's investment policies outweigh any costs of issuing these securities.

2.1.1. How Puttable Convertibles Can Control Risk-Shifting: A Simple Model

The following is a simple model demonstrating how puttable convertibles resolve the problem of risk-shifting better than ordinary convertibles by forcing puttable convertible issuers to undertake the project with the highest NPV. This is a two period model with risk-neutral investors. At time $t = 0$ a firm must choose one of three available investment projects: S (safe), M (medium), or R (risky), and simultaneously raise financing by issuing either straight debt, ordinary (non-puttable) convertible debt, or puttable convertible debt. Each of the available investment projects requires an initial investment at time $t = 0$ and pays off in two periods at time $t = 2$. There are two possible states of economy at $t = 2$, high (H) and low (L), occurring with probabilities p and $1 - p$, respectively, which determine the payoff structure of the investment projects (see below). Debt, either straight or convertible, has a face value of F and must return $F \times (1 + r)^2$ to debt holders at $t = 2$, where r is the risk-free rate of return. If convertible debt is used, convertible debt holders have an option to convert to equity at $t = 2$ at a fixed conversion factor of γ (in other words, convertible debt holders will

receive a fraction γ of the project's payoff upon conversion).⁸ If puttable convertible debt is issued, puttable convertible debt holders have an option to sell the debt back to the firm at $t = 1$ at a price of $F \times (1 + y)$, in addition to the conversion option.⁹

The safe project S requires an initial investment $I_S = 385$ at $t = 0$ and pays off $H_S = 2,150$ in the high state and $L_S = 1,150$ in the low state at time $t = 2$. Similarly, the initial investments and payoffs of projects M and R are as follows: $I_M = 530$, $H_M = 2,500$, $L_M = 500$; and $I_R = 540$, $H_R = 2,600$, $L_R = 100$. Project S has the highest NPV and is the safest (in terms of the spread between the payoffs in the high and low states) and project R has the lowest NPV and is the most risky. The following summarizes the payoffs of the three investment projects.



We also assume the following parameter values: $p = 0.5$, $F = 1,000$, $r = 0.1$, $y = 0.05$, and $\gamma = 0.5$. With these parameter values, the net present value of project S is $NPV_S = -315 + (0.5 \times 2,150 + 0.5 \times 1,150) / (1.10)^2 = 978.64$. Similarly, $NPV_M = 709.67$ and $NPV_R = 575.70$. The firm will benefit the most by accepting project S as it has the highest net present value.

First, we consider the case when straight debt is issued to finance an investment project and show that in such a case equity holders will implement the riskiest project R with the lowest NPV. Next, we consider the case when ordinary convertible debt is issued and demonstrate that in such a case ordinary convertible debt only partially resolves the problem of risk-shifting, depending on the portfolio of projects available to the firm. If the firm's choice is between projects S and M , then the firm chooses the highest NPV project S . If, however, the firm has a riskier portfolio of projects, so that it has available to it a risky project R as well (so that the firm's choice is between S and R , M and R , or S , M , and R) then we can show that it will choose the

⁸ We assume that, for reasons of corporate control, the firm cannot issue convertible debt with γ exceeding a maximum value, denoted by $\hat{\gamma}$. In the numerical illustration we have here, we assume $\hat{\gamma} = 0.55$.

⁹ For example, if the put price exceeds the face value of debt by 5 percent, $y = 0.05$. Similarly, if the puttable convertible debt is puttable at face value, then $y = 0$.

lowest NPV project R , so that the risk-shifting incentive is not eliminated in this case. Finally, we consider the case when puttable convertible debt is issued and demonstrate that in such a case a firm always chooses the highest NPV project S , regardless of the portfolio of projects available to it.

A. Straight Debt

Consider the case where the firm issues debt with a face value $F = 1,000$, and promises to return $F \times (1 + r)^2 = 1,210$ at time $t = 2$. In the high state all three projects return more than $F \times (1 + r)^2$ so that straight debt holders are paid off in full. However, in the low state all three projects return less than $F \times (1 + r)^2$ so that the firm defaults and straight debt holders receive the project payoff L . The firm can issue straight debt at time $t = 0$ at a price

$$D_{Straight} = \frac{p \times F \times (1 + r)^2 + (1 - p) \times L}{(1 + r)^2}. \quad (1)$$

If project S is chosen then $D^S_{Straight} = (0.5 \times 1,210 + 0.5 \times 1,150) / 1.10^2 = 975.21$. Similarly, if project M is chosen then $D^M_{Straight} = 706.61$ and for project R the value of straight debt is $D^R_{Straight} = 541.32$.

We assume that, if the proceeds of the debt issue are more than the required initial outlay of an investment project, the extra amount raised will be returned to equity holders at $t = 1$ as a dividend. In addition to that, at $t = 2$ equity holders will receive the difference between the project's payoff and the payment to debt holders in the high state (i.e., the residual cash flow) and nothing in the low state (since they default on the firm's debt in this state). So the value of equity at time $t = 0$ is

$$E_{Straight} = \frac{D_{Straight} - I}{1 + r} + \frac{p \times [H - F \times (1 + r)^2] + (1 - p) \times 0}{(1 + r)^2}. \quad (2)$$

We will demonstrate later that, in equilibrium, project R will be chosen so that outside investors will only pay $D^R_{Straight} = 541.32$ when the firm announces a straight debt issue. Therefore, if project S is chosen then the

equity value will be $E^S_{Straight} = \frac{541.32 - 385}{1.10} + \frac{0.5 \times [2,150 - 1,210] + 0.5 \times 0}{1.10^2} = 530.54$. Similarly $E^M_{Straight} =$

543.35 and $E^R_{Straight} = 575.58$. Since $E^R_{Straight} > E^M_{Straight} > E^S_{Straight}$, equity holders accept project R when straight debt is issued, although it has the lowest NPV.

B. Ordinary Convertible Debt

When convertible debt is issued, its value at $t = 0$ depends on whether debt holders will convert to equity at $t = 2$ or not. With a conversion factor $\gamma = 0.5$, convertible debt holders will convert only in the high states of projects M and R as conversion values are greater than the payoff from debt: $\gamma H_M > F \times (1 + r)^2$ and $\gamma H_R > F \times (1 + r)^2$. In numbers, $0.5 \times 2,500 = 1,250 > 1,210$ and $0.5 \times 2,600 = 1,300 > 1,210$, respectively. Convertible debt holders will not convert in the low states of all three projects S , M , and R , since by not converting they will receive full payoffs of these projects in the low states (the firm defaults on its debt in the low states), whereas conversion provides only a fraction of those payoffs: $\gamma L < L$. Convertible debt holders will not convert in the high state of project S as well, as the conversion value $0.5 \times 2,150 = 1,075$ is less than the debt value $F \times (1 + r)^2 = 1,210$. Thus, the price that equity holders can get for ordinary convertible debt issued at $t = 0$ if project S is chosen is the same as that of straight debt determined by equation (1) and equals $D_{Ordinary}^S = 975.21$. If project M or R is chosen, the price of ordinary convertible debt at $t = 0$ is

$$D_{Ordinary} = \frac{p \times \gamma \times H + (1 - p) \times L}{(1 + r)^2}. \quad (3)$$

Therefore, if project M is chosen the price of ordinary convertible debt is $D_{Ordinary}^M = (0.5 \times 1,250 + 0.5 \times 500) / 1.10^2 = 723.14$ and if project R is chosen the price is $D_{Ordinary}^R = (0.5 \times 1,300 + 0.5 \times 100) / 1.10^2 = 578.51$.

Similar to the case of straight debt, we assume that, if the proceeds of ordinary convertible debt issue are more than the required initial outlay of an investment project, the extra amount raised will be returned to equity holders at $t = 1$ as a dividend. In addition to that, if conversion is not optimal at $t = 2$, equity holders will receive the difference between the project's payoff and the payment to debt holders in the high state and nothing in the low state (since the firm defaults on its debt in this state). However, if conversion is optimal at $t = 2$, equity holders will receive $(1 - \gamma)H$ in the high state and nothing in the low state (since the firm defaults on its debt in this state).

Here we need to consider three cases: a choice between project S and project M , a choice between project S and project R , and a choice between project M and project R . Consider now a firm which has only projects S and M available to it. In this case we will demonstrate that project S will be chosen in equilibrium,

so that when the firm announces the issuance of convertible debt, outside investors will pay $D_{Ordinary}^S = 975.21$ for such convertibles. If project S is chosen, then equity holders' value is determined similar to that in equation (2) and equals $E_{Ordinary}^S = 924.98$. If project M is chosen then equity holders' value is

$$E_{Ordinary} = \frac{D_{Ordinary} - I}{1 + r} + \frac{p \times (1 - \gamma) \times H + (1 - p) \times 0}{(1 + r)^2}, \quad (4)$$

so that $E_{Ordinary}^M = 921.27$. Thus $E_{Ordinary}^S > E_{Ordinary}^M$ and equity holders will choose project S as they realize a greater value compared to project M . In such a case convertible debt does resolve the problem of risk-shifting as the firm accepts the higher NPV project.

Consider now a firm which has only projects S and R available to it. In this case, we will demonstrate that project R will be chosen in equilibrium, so that outside investors will pay $D_{Ordinary}^R = 578.51$ for ordinary convertible debt when the firm announces its issuance. If project S is chosen then equity holders' value is determined similar to that in equation (2) and equals $E_{Ordinary}^S = 564.35$. If project R is chosen then equity holders' value is determined as in equation (4) and equals $E_{Ordinary}^R = 572.20$. Since $E_{Ordinary}^R > E_{Ordinary}^S$, equity holders will choose project R as they realize a greater value compared to the case when the firm undertakes project S . In this case convertible debt is not capable of resolving the problem of risk-shifting as the firm accepts the lowest NPV project.

Finally, consider a firm which has only projects M and R available to it. In this case, we will demonstrate that again project R will be chosen in equilibrium and outside investors will pay $D_{Ordinary}^R = 578.51$ for ordinary convertible debt when the firm announces its issuance. If project M is chosen then equity holders' value is determined by equation (4) and equals $E_{Ordinary}^M = 560.63$. However, if project R is chosen then equity holders' value is again determined by equation (4) and equals $E_{Ordinary}^R = 572.20$. Since $E_{Ordinary}^R > E_{Ordinary}^M$, equity holders again choose project R . Hence, ordinary convertible debt does not fully resolve the problem of risk-shifting, since the firm accepts the lowest NPV project in this case as well.¹⁰ In summary, we have demonstrated above that ordinary convertible debt is able to resolve the risk-shifting problem only if the portfolio of projects available to the firm is less risky: i.e., the riskiest project R is not available to the firm.

¹⁰ It can also be shown that, if the firm has all three projects (i.e., S , M , and R) available to it, it will choose R if ordinary convertible debt is issued to finance the project.

C. Putable Convertible Debt

Consider now a firm which has all three projects S , M , and R available to it. The price of putable convertible debt at $t = 0$ depends not only on whether putable convertible debt holders will convert at $t = 2$, but also on whether they will put the debt back to the firm at $t = 1$. The optimal conversion policy of putable convertible debt is the same as that of ordinary convertible debt. Further, putable convertible debt will be put back to the firm at $t = 1$ at a price of $F \times (1 + y) = 1,050$ if the expected payoff from holding the debt until $t = 2$ is less than 1,050. If project S is chosen, the expected payoff of putable convertible debt holders at $t = 1$ from waiting until $t = 2$ is $[p \times F \times (1 + r)^2 + (1 - p) \times L_S] / (1 + r) = 1,072.73$. If project M is chosen, the expected payoff of putable convertible debt holders at $t = 1$ from waiting until $t = 2$ is $[p \times \gamma \times H_M + (1 - p) \times L_M] / (1 + r) = 795.45$. If project R is chosen, the expected payoff of putable convertible debt holders at $t = 1$ from waiting until $t = 2$ is $[p \times \gamma \times H_R + (1 - p) \times L_R] / (1 + r) = 636.36$. Thus putable convertible debt will be put back to the firm at $t = 1$ only if either project M or project R is chosen. Therefore, if project S is chosen, the price of putable convertible debt issued at $t = 0$ is the same as that of straight debt or ordinary convertible debt as determined by equation (1) and equals $D_{Putable}^S = 975.21$. For projects M and R the price of putable convertible debt at $t = 0$ is

$$D_{Putable} = \frac{F \times (1 + y)}{(1 + r)}, \quad (5)$$

which is 954.55.

Similar to the case of straight debt and ordinary convertible debt, we assume that, if the proceeds of putable convertible debt issue are more than the required initial outlay of an investment project, the extra amount raised will be returned to equity holders at $t = 1$ as a dividend. However, if debt holders decide to put the debt back to the firm at $t = 1$, the firm needs to use this extra amount (which is less than $F \times (1 + y)$) in addition to some borrowing from a bank at a rate of r_1 to buy the debt back as promised.¹¹ Thus the firm needs to borrow $[F \times (1 + y) - (D_{Putable} - I)]$ from a bank at $t = 1$ if the put is exercised. At $t = 2$, in the high state, the firm will pay the bank back the amount borrowed with interest $[F \times (1 + y) - (D_{Putable} - I)] \times (1 + r_1)$;

¹¹ We use the word “bank” to stand for any outside source of financing that the firm may rely upon to raise additional funds to honor the put.

however in the low state the firm will default on the loan, and the bank will receive L . For the bank to break-even in this lending transaction it has to set the borrowing rate r_1 high enough so that the following holds:

$$F \times (1 + y) - (D_{Putable} - I) = \frac{p \times [F \times (1 + y) - (D_{Putable} - I)] \times (1 + r_1) + (1 - p) \times L}{1 + r}. \quad (6)$$

Solving for r_1 we have

$$r_1 = \frac{[F \times (1 + y) - (D_{Putable} - I)] \times (1 + r) - (1 - p) \times L}{p \times [F \times (1 + y) - (D_{Putable} - I)]} - 1. \quad (7)$$

We will demonstrate later that, in equilibrium, project S will be chosen, so that when a firm announces a putable convertible debt issue, outside investors will pay $D_{Putable}^S = 975.21$ for such debt. However, if the firm chooses to accept project M , the bank will charge $r_1^M = 0.3733$ for the firm to borrow at $t = 1$, and if the firm chooses to accept project R , the bank will charge $r_1^R = 1.0373$. With these borrowing rates at $t = 2$, the firm must pay back to the bank $[1,000 \times (1 + 0.05) - (975.21 - 530)] \times 1.3733 = 830.56$ if project M is chosen and $[1,000 \times (1 + 0.05) - (975.21 - 540)] \times 2.0373 = 1,252.55$ if project R is chosen. The firm will have enough in the high states to pay off these amounts; however it will default in the low states.

If project S is chosen, neither conversion nor putting is optimal, so that the equity holders' value at $t = 0$ is determined by equation (2) and equals $E_{Putable}^S = 924.98$. If project M or project R is chosen and put option is exercised at $t = 1$, the equity holders' value is

$$E_{Putable} = \frac{p \times [H - (F \times (1 + y) - (D_{Putable} - I)) \times (1 + r_1)] + (1 - p) \times 0}{(1 + r)^2}. \quad (8)$$

Thus, if project M is chosen, $E_{Putable}^M = [0.5 \times (2,500 - 830.56) + 0.5 \times 0] / 1.10^2 = 689.86$ and, if project R is chosen, $E_{Putable}^R = [0.5 \times (2,600 - 1,252.55) + 0.5 \times 0] / 1.10^2 = 556.80$. Since $E_{Putable}^S > E_{Putable}^M > E_{Putable}^R$, project S will be implemented in equilibrium. Thus issuing putable convertible debt fully resolves the problem of risk-shifting as equity holders accept the highest NPV project S , even when the risky project R is available to the firm. It can be also demonstrated that, if the firm's choice is only between projects M and R , the issuance of putable convertible debt forces the firm to accept the higher NPV project M (unlike in the case with ordinary convertible debt).

2.1.2. Testable Hypotheses

The risk-shifting hypothesis leads to the following testable implications. First, since the possibility of asset substitution is greater for firms with more growth opportunities (which tend to be riskier firms), this hypothesis predicts that such firms are more likely to issue putable convertibles rather than ordinary convertibles (**H1**). Second, the greater the probability of bankruptcy, the greater the incentives of stockholders to engage in risk-shifting. Thus smaller and riskier firms, with lower credit ratings, or those with higher existing financial leverage (those with a greater probability of financial distress overall) are more likely to issue putable rather than ordinary convertibles under this hypothesis (**H2**).

2.2. The Asymmetric Information or Undervaluation Hypothesis

Consider a situation where insiders have information superior to outsiders about the future earnings and cash flows of their firm (and therefore about the intrinsic value of its equity). In this situation, we will demonstrate below that insiders of a firm whose equity is currently undervalued relative to its intrinsic value are more likely to bundle a put option when issuing convertible debt compared to insiders of a firm that is overvalued. This is because insiders of a firm with favorable private information about future cash flows are aware that, once their private information is public, their firm's equity value will reflect this, so that the put option bundled with its convertible debt issue is less likely to be exercised. In contrast, it would be costly for insiders of a firm with less favorable private information to mimic the above strategy, since their stock price is more likely to fall when their private information becomes public, increasing the probability that any put options bundled with their convertible debt issue will be exercised. This, in turn, implies that rational investors will infer that any firm issuing a putable convertible is an undervalued (rather than an overvalued) firm.¹²

¹² One way to think of the put option in a convertible issue is as something akin to a "money-back guarantee" or a warranty in the product market. Clearly, the manufacturers of superior quality products (akin to undervalued firms in our setting) are more likely to offer such money-back guarantees compared to manufacturers of lower quality products (akin to overvalued firms in our setting), since the former are aware that consumers are less likely to use their guarantee. See Grossman (1981) for a formal model of how warranties can signal quality in the product market and Gibson and Singh (2002) for a theoretical model of how put options attached to equity can signal insiders' favorable private information about their firm's intrinsic value to outsiders.

2.2.1. Issuing Putable Convertibles under Asymmetric Information: A Simple Model

The following simple model demonstrates that firms with favorable private information will issue putable convertible debt in equilibrium to separate themselves from firms with unfavorable private information, which will issue ordinary convertible debt in equilibrium. Similar to the risk-shifting model, consider a two-period model with risk-neutral investors. There are two types of firms: good (G), with favorable private information, and bad (B), with unfavorable private information. Both types of firms have assets in place (about which insiders have private information) and an investment project (about which there is no private information: the nature of this project is the same for type G and type B firms). At $t = 0$ a firm must issue either ordinary convertible or putable convertible debt to finance the investment project. For type G firms, the value of assets in place will be low (A_L) with probability p_G and it will be high (A_H) with the complimentary probability $1 - p_G$ at $t = 2$. Similarly, type B firms will realize the low cash flow A_L from assets in place with probability p_B and the high cash flow A_H with probability $1 - p_B$ (where $p_B > p_G$). Information on whether the value of assets in place is going to be high or low at $t = 2$ will be revealed to outsiders at $t = 1$. Insiders of both types of firms know the above probabilities at $t = 0$ (at which point this information is private). In equilibrium, outside investors will be able to infer these probabilities from the type of convertible debt a firm decides to issue. The investment project requires an initial investment of I and has either a high payoff (H) at $t = 2$ with probability q or a low payoff (L) with the complimentary probability $1 - q$. Thus there are four possible states in which a firm can end up at $t = 2$ summarized as follows.

State	Probability	Firm value at $t = 2$
Low-high	$p \times (1 - q)$	$A_L + H$
Low-low	$p \times q$	$A_L + L$
High-high	$(1 - p) \times (1 - q)$	$A_H + H$
High-low	$(1 - p) \times q$	$A_H + L$

Firms issue either ordinary or putable convertible debt with a face value of F , and promise to pay back at $t = 2$ an amount of $F \times (1 + r)^2$, where r is the risk-free rate of return. Convertible debt holders have an option to convert to equity at $t = 2$ at a fixed conversion factor of γ (in other words, convertible debt holders may choose to receive a fraction γ of the firm value as indicated above at $t = 2$ instead of $F \times (1 + r)^2$). If putable convertible debt is issued, putable convertible debt holders have an option to sell the debt back to the

firm at $t = 1$ at a price of $F \times (1 + y)$, in addition to the conversion option. Figure 2 depicts the sequence of events in this model.

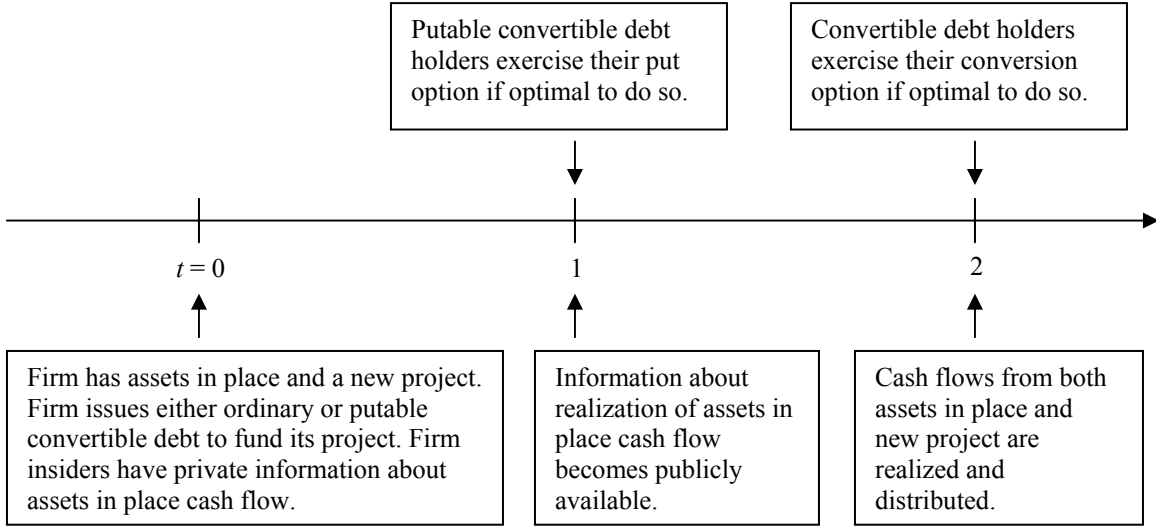


Figure 2. Sequence of events in the asymmetric information model.

We assume the following parameter values: $p_G = 0.4$, $p_B = 0.6$, $A_L = 100$, $A_H = 1,200$, $L = 300$, $H = 1,400$, $I = 700$, $q = 0.5$, $F = 1,000$, $r = 0.1$, $\gamma = 0.5$, and $y = 0.05$. With these parameter values, it is optimal to convert convertible debt (either ordinary or putable) to equity at $t = 2$ only in the high-high state since the conversion value $\gamma \times (A_H + H) = 1,300$ is greater than the payoff from the debt $F \times (1 + r)^2 = 1,210$. In the high-low and low-high states conversion is not optimal as conversion values $\gamma \times (A_H + L) = 750$ and $\gamma \times (A_L + H) = 750$ are less than $F \times (1 + r)^2 = 1,210$. In the low-low state conversion is not optimal as well, since a firm will default in this state ($A_L + L < F \times (1 + r)^2$) and convertible bond holders will get $A_L + L$ if they don't convert and only $\gamma \times (A_L + L)$ if they do.

First we consider the case where the firm issues ordinary convertible debt. The value of ordinary convertible debt at $t = 0$ is the expected value of the payoff convertible debt holders will realize at $t = 2$:

$$D_{\text{Ordinary}} = p \times \left[\frac{(1 - q) \times F \times (1 + r)^2 + q \times (A_L + L)}{(1 + r)^2} \right] + (1 - p) \times \left[\frac{(1 - q) \times \gamma \times (A_H + H) + q \times F \times (1 + r)^2}{(1 + r)^2} \right]. \quad (9)$$

The only difference between the value of ordinary convertible debt issued by type G and type B firms is the probability p of the assets in place realizing a low value (p_G for type G and p_B for type B) and thus $D^G_{\text{Ordinary}} = 888.43$ and $D^B_{\text{Ordinary}} = 814.05$.

Similar to the risk-shifting model, we assume that, if the proceeds of convertible debt issue are more than the required initial outlay of the investment project, the extra amount raised will be returned to equity holders at $t = 1$ as a dividend. In addition to the above cash flow at $t = 1$, at $t = 2$ equity holders will receive a cash flow of $(1 - \gamma) \times (A_H + H)$ in the high-high state (when convertible debt holders convert to equity), $A_H + L - F \times (1 + r)^2$ in the high-low state and $A_L + H - F \times (1 + r)^2$ in the low-high state (recall that conversion is not optimal in these two states and equity holders have enough cash to pay off convertible debt holders), and nothing in the low-low state (since the firm defaults on its debt in this state). The value of equity at $t = 0$ is thus:

$$E_{\text{Ordinary}} = \frac{D_{\text{Ordinary}} - I}{1 + r} + p \times \left[\frac{(1 - q) \times (A_L + H - F \times (1 + r)^2) + q \times 0}{(1 + r)^2} \right] + (1 - p) \left[\frac{(1 - q) \times (1 - \gamma) \times (A_H + H) + q \times (A_H + L - F \times (1 + r)^2)}{(1 + r)^2} \right]. \quad (10)$$

The only difference between the value of equity for type G and type B firms is the probability p of the assets in place realizing a low value (p_G for type G and p_B for type B) and thus $E^G_{\text{Ordinary}} = 613.45$ and $E^B_{\text{Ordinary}} = 438.39$.

Next we consider the case where the firm issues puttable convertible debt. Now, in addition to the conversion option, puttable convertible debt holders have an option to sell the debt back to the firm at $t = 1$ at a price of $F \times (1 + y)$. At $t = 1$ puttable convertible debt holders will know whether the value of the assets in place is going to be high or low at $t = 2$ and will exercise the put option optimally (as we will demonstrate below) if they receive information that the value of the assets in place is going to be low. In this case, they will get $F \times (1 + y) = 1,050$ if they exercise the put option, which is more than the value of waiting until $t = 2$, which is $[(1 - q) \times F \times (1 + r)^2 + q \times (A_L + L)] / (1 + r) = 731.82$. However, if at $t = 1$ convertible debt holders receive information that the value of the assets in place is going to be high at $t = 2$, then the put option will not be exercised: by exercising the put option they will get $F \times (1 + y) = 1,050$, which is less than the value of

waiting until $t = 2$, which is $[(1 - q) \times \gamma \times (A_H + H) + q \times F \times (1 + r)^2] / (1 + r) = 1,140.91$. Thus the price at which putable convertible debt can be issued at $t = 0$ is

$$D_{Putable} = p \times \frac{F \times (1 + y)}{1 + r} + (1 - p) \times \left[\frac{(1 - q) \times \gamma \times (A_H + H) + q \times F \times (1 + r)^2}{(1 + r)^2} \right]. \quad (11)$$

The only difference between the price of putable convertible debt for type G and type B firms is the probability p of the assets in place realizing low value (p_G for type G and p_B for type B) and thus $D^G_{Putable} = 1,004.13$ and $D^B_{Putable} = 987.60$.

If the put option is exercised, the firm needs to borrow from a bank at $t = 1$ an amount equal to $F \times (1 + y) - (D_{Putable} - I)$ for one period at an interest rate of r_1 (the firm does not need to borrow the full amount of $F \times (1 + y)$ as it also has the extra amount left from the issuance of putable convertible debt after investing in the initial outlay of the investment project). At $t = 2$, if the project pays H , the firm will have enough money to repay the borrowed amount with interest; however, if the project pays L , the firm will default on its loan to the bank. For the bank to break-even in this lending transaction it has to set the lending rate r_1 high enough so that the following holds:

$$F \times (1 + y) - (D_{Putable} - I) = \frac{(1 - q) \times [F \times (1 + y) - (D_{Putable} - I)] \times (1 + r_1) + q \times (A_L + L)}{1 + r}. \quad (12)$$

Solving for r_1 we have

$$r_1 = \frac{[F \times (1 + y) - (D_{Putable} - I)] \times (1 + r) - q \times (A_L + L)}{(1 - q) \times [F \times (1 + y) - (D_{Putable} - I)]} - 1. \quad (13)$$

Thus, if putable convertible debt is issued by a type G firm, $r^G_1 = 0.6637$, and if putable convertible debt is issued by a type B firm, $r^B_1 = 0.6753$. Therefore at $t = 2$, a type G firm needs to repay $[1,050 - (1,004.13 - 700)] \times 1.6637 = 1,240.91$ and a type B firm needs to repay $[1,050 - (987.60 - 700)] \times 1.6753 = 1,277.27$. Clearly, both types will have enough cash to repay these amounts if the project pays H at $t = 2$, since $A_L + H = 1,500$, and both types will default on the bank loan if the project pays L at $t = 2$, since $A_L + L = 400$ (we will demonstrate later, however, that only a type G firm will issue putable convertibles in equilibrium).

Equity holders' value at $t = 0$ is as follows:

$$\begin{aligned}
E_{Putable} = & p \times \left[\frac{(1-q) \times (A_L + H - [F \times (1+y) - (D_{Putable} - I)] \times (1+r_1)) + q \times 0}{(1+r)^2} \right] + \\
& + (1-p) \times \left[\frac{D_{Putable} - I}{1+r} + \frac{(1-q) \times (1-\gamma) \times (A_H + H) + q \times (A_H + L - F \times (1+r)^2)}{(1+r)^2} \right].
\end{aligned} \tag{14}$$

In (14), the value of the assets in place is low with probability p and the put option is exercised, so that equity holders will borrow from a bank at $t = 1$ (to honor the put) and are left with $A_L + H - [F \times (1+y) - (D_{Putable} - I)] \times (1+r_1)$ at $t = 2$ in the low-high state after paying the bank back with interest; they are left with nothing in the low-low state at $t = 2$, since they default to the bank in this state. The value of the assets in place is high with probability $1 - p$ and the put option is not exercised, so that at $t = 1$ equity holders receive the amount left from putable convertible debt issuance after paying for the initial investment of the project, and at $t = 2$ they are left with $(1 - \gamma) \times (A_H + H)$ when putable convertible debt holders convert to equity in the high-high state; they are left with $A_H + L - F \times (1+r)^2$ in the high-low state, since in this state conversion is not optimal and debt holders are paid off. The only difference between the value of equity for type G and type B firms is the probability p of the assets in place realizing a low value (p_G for type G and p_B for type B) and thus $E_{Putable}^G = 602.93$ and $E_{Putable}^B = 422.61$.

We will demonstrate below that, in equilibrium, type G firms will issue putable convertible debt and type B firms will issue ordinary convertible debt. Thus, if outside investors observe a firm issuing putable convertible debt, they will infer that it is a type G firm, and price its debt accordingly using equation (11), so that $D_{Putable} = D_{Putable}^G$.¹³ Setting this debt value in equation (14), the firm's equity will then be priced at $E_{Putable}^G = 602.93$. On the other hand, if outsiders observe a firm issuing ordinary convertible debt, they will infer that it is a type B firm and will price its debt at $D_{Ordinary} = D_{Ordinary}^B$, using equation (9). Setting this value in equation (10), the firm's equity will then be priced at $E_{Ordinary}^B = 438.39$.

Note that, if a type B firm tries to mimic a type G firm by issuing putable convertible debt, its equity holders' value will be determined by equation (14) with $D_{Putable} = D_{Putable}^G$, since outside investors in this case will pay the price of putable convertible debt issued by a type G firm, while firm insiders' private information

¹³ Thus, the beliefs supporting the above equilibrium are such that if a firm issues putable convertible debt, outsiders infer it to be of type G with probability 1, and if it issues ordinary convertible debt, outsiders believe it to be of type B with probability 1.

is that $p = p_B$. This mimicking value $E^B_{Putable-Mimicking} = 437.64$ is less than the value a type B firm realizes by issuing ordinary convertibles, $E^B_{Ordinary} = 438.39$, so that a type B firm will issue ordinary convertible debt in equilibrium. On the other hand, if a type G firm attempts to mimic a type B firm and issues ordinary convertible debt, its equity holders' value will be determined by equation (10) with $D_{Ordinary} = D^B_{Ordinary}$, since outside investors in this case will infer that the firm is of type B and will pay the price of ordinary convertible debt issued by a type B firm, while firm insiders' private information is that $p = p_G$. This mimicking value $E^G_{Ordinary-Mimicking} = 545.83$ is less than the value a type G firm realizes by issuing putable convertibles, $E^G_{Putable} = 602.93$, so that a type G firm will issue putable convertible debt in equilibrium.¹⁴

2.2.2. Testable Hypotheses

The above theory has several implications for issuers' choice between putable and ordinary convertibles. First, the above theory predicts that the announcement effects in the equity market to firms issuing putable convertibles will be more favorable (less negative) than those of a matched set of firms issuing ordinary convertibles (**H3**). Second, the post-issue operating performance of firms issuing putable convertibles will be better than that of a matched set of firms issuing ordinary convertibles, since the favorable private information of putable convertible issuers about their firms' future cash flows is realized over time (**H4**). Third, the average market valuation of putable convertible issuers *prior* to the convertible issue (as measured by the ratio of price to intrinsic value) will be lower than the average market valuation of ordinary convertible issuers (**H5**), since firms issuing putable convertibles will be undervalued while those issuing ordinary convertibles will be overvalued.

The private information or undervaluation hypothesis does not predict any differences in the long-run stock return performance of putable and ordinary convertible issuers if outside investors are fully rational and the stock market is completely efficient. This is because such investors will fully infer the insiders' private information from their decision to issue putable rather than ordinary convertibles, so that this inference will be fully reflected in stock price on the day of the announcement: in other words, there will be no differences

¹⁴ Note that, we have thus demonstrated that the incentive compatibility conditions hold for the type G as well as the type B firms, supporting this fully separating equilibrium.

in the long-run (one, two, or three years) returns measured subsequent to the announcement date. If, however, investors are only boundedly rational, so that the insiders' private information is not fully reflected in the stock price on the announcement day but is incorporated only over a longer period, then one would expect superior long-run performance from putable convertible issuers compared to a matched sample of ordinary convertible issuers. In any case, long-run stock returns often go hand-in-hand with operating performance, so that it is worth comparing the long-run stock return performance of putable and ordinary convertible issuers, at least as a robustness check. This is therefore the sixth hypothesis (**H6**) that we test here.^{15, 16}

3. Data and Sample Selection

The data used in this study came from several different databases. The list of convertible debt offerings was obtained from SDC/Platinum Global New Issues Database. Since the first putable convertible debt offering was made in 1982, we restricted ourselves to a sample of firms that issued convertible debt between 1982 and 2003. After eliminating firms with no CRSP/Compustat data available, foreign issuers, issues with poison put provisions, mandatory convertible issues, exchangeable issues, and convertible preferred stock offerings, we were left with 2,036 issues. Out of these issues 365 were putable convertible offerings and remaining 1,671 were ordinary (non-putable) convertible offerings. Further, out of 365 putable convertible offerings 132 were zero coupon bonds and 233 were coupon bearing bonds, while out of 1,671 ordinary convertible offerings only 42 were zero coupon bonds and 1,629 were coupon bearing bonds.¹⁷

¹⁵ Of course, if the stock market reflects insiders' private information only over a longer period of time, the difference in abnormal returns on the announcement day between putable and ordinary convertible debt issuers will be correspondingly reduced.

¹⁶ Note that all long-run stock return studies around corporate events require the assumption of bounded rationality or limited market efficiency, similar to the one we make here. One may consider this to be a strong assumption, but, given the large empirical literature documenting the post-event drift following earnings announcements and many other corporate events (see, e.g., Foster *et al.* (1984), Bernard and Thomas (1989)), one has to at least consider the possibility that the information revealed by many corporate actions is not always instantaneously reflected in the stock price. Further, given the large existing empirical literature studying the long-run post-issue stock return performance of firms issuing equity, ordinary convertibles, and straight debt (see, e.g., Loughran and Ritter (1995), Spiess and Affleck-Graves (1995, 1999)), it is independently interesting to study the long-run post-issue stock return performance of putable convertible issuers and to compare it to the corresponding stock return performance of ordinary convertible issuers.

¹⁷ Many zero coupon putable convertibles are LYONs (Liquid Yield Option Notes), which are zero coupon, putable convertible bonds which are also callable, created by Merrill Lynch White Weld Capital Markets Group in 1985. See McConnell and Schwartz (1992) for a description and history of this security. However, some zero coupon putable convertibles in our sample are not callable, and therefore do not fall into the category of LYONs.

We eliminated the following issues as they are irrelevant to the objectives of our study: poison put issues become putable only in cases of some specific corporate events (e.g. change in the composition of board of directors, takeovers, and others); mandatory convertibles are mandatorily convertible and can be considered as deferred equity; exchangeable convertibles are convertible to equity of companies other than the issuer or convertible to securities other than the equity of the issuer.

Information on stock prices and returns necessary to analyze announcement effects, firm valuation, and stock return performance was obtained from CRSP, while the accounting information necessary to study firms' operating performance, valuation, and to calculate various financial ratios was obtained from Compustat. Information on treasury security yields was obtained from Federal Reserve Bank Reports. Finally, convertible issue announcement dates were obtained by searching the Factiva database maintained by the Dow Jones and Reuters Company.

4. Empirical Tests and Results

In this section we discuss the empirical methodology used to test our hypotheses and report results. In section 4.1 we present the summary statistics and results of our univariate tests comparing firm and issue characteristics of putable and ordinary convertibles issuers. In section 4.2 we report our results on the announcement effects of putable and ordinary convertible issues. In section 4.3 we compare the long-run operating performance of putable convertible issuers to that of ordinary convertible issuers. In section 4.4 we report the results of our valuation analysis. In section 4.5 we report the results of our study of the long-run stock return performance of putable and ordinary convertible issuers. Finally, in section 4.6 we present the results of logit regressions explaining the firms' choice between putable and ordinary convertible issues.

4.1. Summary Statistics and Univariate Tests

In this section we present the summary statistics of firm and issue characteristics of putable and ordinary convertible issuers in the context of the hypotheses we test and report the results of univariate tests of differences in those variables between the two groups.

Hypothesis **H1** predicts that firms with greater growth opportunities are more likely to issue putable convertibles as the possibility of engaging in risk-shifting activities is higher for such firms. Table 1, which reports the summary statistics of the entire sample of convertible offerings split by putable and ordinary convertible offerings, shows that putable convertible issuers have lower levels of capital expenditures and R&D expenses as a proportion of their total assets in the fiscal year prior to issue compared to ordinary convertible issuers. Putable convertible issuers' average capital expenditures over assets is 6.65 percent and average R&D expenses over assets is 2.85 percent, while the same ratios for ordinary convertible issuers are significantly more at 9.44 and 6.26 percent, respectively. Putable convertible issuers also have significantly lower Q ratios measured at the end of the fiscal year prior to issue. Q ratio (ratio of the market value of firm's assets to the book value of assets) is used extensively in the literature as a measure of investment opportunities (see Smith and Watts (1992)) and higher values of the Q ratio indicate greater investment opportunities. The average Q ratio of putable convertible issuers (1.95) is significantly lower than the Q ratio of ordinary convertible issuers (2.68). Thus, we do not find support for hypothesis **H1**, since our univariate tests indicate that putable convertible issuers have smaller investment opportunities.

Hypothesis **H2** predicts that firms that are smaller, riskier, with lower credit ratings and higher leverage, and higher bankruptcy probability overall are more likely to issue putable convertibles (to minimize the opportunity for risk-shifting by equity holders). First, Table 1 shows that putable convertible issuers are significantly larger: the mean and median book values of their assets are approximately nine times larger than those of ordinary convertible issuers. Also the mean and median market values of equity of putable convertible issuers are approximately six times larger than those of ordinary convertible issuers. Second, putable convertible issuers are less risky firms: putable convertible issuers have significantly lower pre-issue values of cash flow volatility, stock return volatility, and idiosyncratic risk. Third, the credit rating of putable convertible issues is significantly higher. We calculate cardinalized bond ratings based on S&P bond rating by assigning an AAA rated bond a code of 1, an AA rated bond a code of 2, ..., a C rated bond a code of 9, with unrated issues receiving a code of 10. The average cardinalized bond rating of putable convertible issues is 6.50 compared to ordinary convertible issues' rating of 8.12. Fourth, putable convertible issuers have

higher levels of leverage measured by the ratio of long-term debt to the assets before the issue. However, since the ratio of total proceeds to total assets was significantly less for putable convertible issuers, the leverage of these firms was lower after the issue: thus, at the end of the fiscal year of the issue the median putable convertible issuer had a 29.04 percent leverage ratio while the median ordinary convertible issuer had 34.26 percent leverage ratio with the difference being significant at the 1 percent level. Finally, putable convertible issuers have a lower overall bankruptcy probability. We estimate the bankruptcy probability by constructing a bankruptcy probability measure using the modified model of market and accounting variables suggested by Shumway (2001). In addition to accounting ratios such as those used by Altman (1968) and Zmijewski (1984), this model also uses market driven variables such as prior market adjusted stock return and idiosyncratic risk to predict bankruptcy.¹⁸ This measure which we call Shumway bankruptcy measure (*SBM*) is calculated in the following way:

$$SBM = -1.982 \times \frac{NI}{TA} + 3.593 \times \frac{TL}{TA} - 0.467 \times Relative\ size - 1.809 \times (r_{it-1} - r_{mt-1}) + 5.791 \times Sigma,$$

where *NI* is net income (Compustat item 172), *TA* is book value of total assets (item 6), *TL* is total liabilities (item 181), *Relative size* is natural logarithm of the ratio of a firm's market value of equity (item 199 times item 25) to the total market value of equity of all Compustat firms, $r_{it-1} - r_{mt-1}$ is one year prior market adjusted cumulative return computed by cumulating daily market adjusted returns for a period of 255 trading days prior to issue date, and *Sigma* is idiosyncratic risk calculated as the residual standard deviation of the market model estimated for 255 trading days ending 46 days before the issue date. All the accounting variables are for the end of the fiscal year prior to issue. Higher values of *SBM* indicate a higher probability of bankruptcy. Table 1 shows that both mean and median *SBM* values of putable convertible issuers are significantly lower than those of ordinary convertible issuers.

Given the above results, the evidence is against hypothesis **H2** as well. To summarize the findings of our univariate tests, we do not find support for the hypotheses that put provisions are included in convertible

¹⁸ Shumway (2001) shows that the models with market driven variables predict bankruptcy probability better than those with the Altman (1968) and Zmijewski (1984) variables. A model with market driven variables places 75 percent of bankrupt firms in the highest bankruptcy decile, while models with the Altman (1968) and Zmijewski (1984) variables place only 42 percent and 54 percent of bankrupt firms in the highest bankruptcy decile, respectively.

issues to mitigate potential risk-shifting or asset substitution. Hypotheses **H3** through **H6** are tested in the next four subsections.

4.2. The Announcement Effect of Putable and Ordinary Convertible Issues

In this section we study the announcement effect of convertible debt issues and empirically test hypothesis **H3** which predicts that the announcement effect of putable convertible issues on the issuers' equity will be more favorable (less negative) compared to that of matching ordinary convertible issues.

Panel A of Table 2 presents the announcement effects of the overall sample of putable and ordinary convertible issues. For public issues the announcement date was taken to be the earliest of the filing date or the day of the first news article regarding the issue in the news media. For private placements the announcement date was taken to be the earliest of the first news article regarding the issue in the news media or the issue date. The announcement effect for each firm was computed as the cumulative abnormal return (CAR) for a particular event window around the announcement date. Daily abnormal returns were computed using the market model (with value- and equally-weighted CRSP indices). Market model parameters were estimated over 255 trading days ending 46 trading days before the offering announcement with at least 100 daily returns in the estimation period. Announcement effects were calculated for six different event windows for each market index ranging from three days before to three days after the announcement date. Panel A of Table 2 shows that in the case of a comparison of the overall sample of putable convertible issues with ordinary convertibles issues, the former have a more negative announcement effect on average, with the difference being highly significant for the windows of -1 to $+1$ days and 0 to $+1$ days around the announcement date.

These results could be driven by the differences in the types of firms issuing putable and ordinary convertible debt (recall that, from the summary statistics, putable convertible issuers are much larger firms with better performance). Another determinant that could have an impact on the announcement effect is the

type of issue (public offering or private placement).¹⁹ In order to account for such differences, we now compare the announcement effects of putable convertible issues with a matched sample of ordinary convertible issues. In our context, it is difficult to implement a standard matching algorithm (e.g., see Loughran and Ritter (1997)) and directly match each putable convertible issue to an ordinary convertible issue by firm size, prior performance, industry, type of issue, and year of issue, since it is impossible to find such a match within a reasonable size range. We therefore use the propensity score matching technique to find a match for each putable convertible issue. This technique has a number of advantages. First, no constraints need to be imposed on matching variables. Second, a large number of matching variables can be used. Third, this technique produces accurate estimates in a setting where the event group significantly differs from the population of potential matches (see Dehejia and Wahba (2002)).²⁰

We use a modified version of the “nearest-match” propensity score matching algorithm similar to the one used by Hillion and Vermaelen (2004). Let $X_{i,j}$ be a vector of independent characteristics observed for firm i (putable convertible issuers as well as ordinary convertible issuers) in fiscal year j prior to the issue. The set of the factors $X_{i,j}$ for firm i in year j consists of the following: (Operating Income Before Depreciation (OIBD) + Interest Income (Compustat item 13 + item 62))/Assets (item 6), profit margin (net income (item 172)/sales (item 12)), return on assets (net income/assets), (OIBD + Interest Income)/Sales, (Capital Expenditures + R&D (item 128 + item 46))/Assets, market-to-book ((shares (item 54) times price (item 199))/book value of equity (item 60)), assets, and a set of two-digit SIC code industry dummies. Let $D_{i,j}$ be a dummy that is equal to 1 for putable convertible issuers and 0 for ordinary convertible issuers. We estimate the propensity score logit function as $P_{i,j} = P(D_{i,j} = 1|X_{i,j})$ for all issues from 1982 to 2003. With the estimated propensity scores $P_{i,j}$, we match each putable convertible issuer to a single ordinary convertible issuer with the closest $P_{i,j}$ score within the same year of issue and within the same type of issue (public vs. 144A private

¹⁹ See, e.g., Hertz and Smith (1993) who document positive announcement effects for private equity placements and Asquith and Mullins (1986), Masulis and Korwar (1986), and Mikkelson and Partch (1986) who document negative announcement effects for public equity offerings.

²⁰ The propensity score matching method has already been used in the finance literature to pair-match companies based on a given set of characteristics. In particular, Villalonga (2004) uses the propensity score matching method in her study of the diversification discount to find appropriate benchmark companies for diversifying firms. Hillion and Vermaelen (2004) apply propensity score matching in their study of the operating performance of companies issuing floating-priced convertibles.

placements). If we do not find a match within the year of issue we search for a potential match in the two years prior to the issue year.

The announcement effects of putable convertible issues and matching ordinary convertible issues are presented in Panel B of Table 2. The results are now opposite to those reported in Panel A: the putable convertible issues have less negative announcement effects in all event windows with the differences being highly significant for the windows of -3 to $+3$ days and 0 to $+3$ days around the announcement date. These results support hypothesis **H3**. This finding is consistent with putable convertible issuers having favorable private information regarding their firms' future performance.

4.3. The Long-Term Operating Performance of Putable and Ordinary Convertible Issuers

In this section we study the long-run operating performance of putable and ordinary convertible issuers after the issue and test hypothesis **H4**, which predicts that the post-issue operating performance of putable convertible issuers will be better than that of a matched sample of ordinary convertible issuers.

A direct comparison of putable convertible issuers to ordinary convertible issuers is problematic due to the differences in size and pre-issue performance of the two groups as documented in our summary statistics. One solution would be to match each putable convertible issuer with an ordinary convertible issuer in the same industry and similar in size and performance. However, as discussed in the previous section, it is impossible to find a proper match for each putable convertible issuer among ordinary convertible issuers within the year of issue and in the same industry within a reasonable size range. We therefore follow Loughran and Ritter (1997) and select a matching non-issuing firm for each convertible issuer. We then compare the relative performance of putable convertible issuers with respect to their non-issuing matching firms with the corresponding relative performance of ordinary convertible issuers with respect to their matching non-issuing firms.²¹ The matching algorithm used is as follows. Each issuing firm is matched with potential matching firms that have not issued convertible debt during the five years prior to the issue date.

²¹ This “difference in difference” methodology yields closer matches than the propensity score methodology used in our study of announcement effects in the previous section. Clearly, we could not implement this methodology for our comparison of the announcement effects of putable and ordinary convertible issues, since such a comparison can be implemented only across samples of issuing firms.

These matching non-issuers have to be in the same industry (using 2-digit SIC codes) with asset size at the end of the fiscal year prior to issue between 25 to 200 percent of the issuing firm. The non-issuer with the closest operating income before depreciation (OIBD) relative to assets is then chosen as the unique matching firm. If no non-issuer meets these criteria, then the industry requirement is dropped and a matching firm is chosen with asset size within 90 to 100 percent of the issuing firm and with the closest, but higher, OIBD/Assets ratio. If a matching firm does not have accounting data for a particular year of study, we replace it with the next closest match. We use three measures of operating performance: OIBD/Assets, ROA, and OIBD/Sales, where OIBD is the operating income before depreciation plus interest income (Compustat items 13 + 15), Assets are book value of total assets (item 6), ROA is the return on assets (net income (item 172)/assets), and Sales are the total sales (item 12).

Panel A of Table 3 presents the median operating performance ratios of putable convertible issuers, their matching non-issuers, and median differences between the performance ratios of putable convertible issuers and non-issuing matching firms. The performance of putable convertible issuers is very similar to that of their respective matches both before and after the issue except for OIBD/Sales ratio which is consistently higher for putable convertible issuers for all years (we present results for four years before and four years after the issue). Panel B of Table 3 presents the median operating performance ratios of ordinary convertible issuers, their matching non-issuers, and median differences. The performance of ordinary convertible issuers is again very similar to that of their respective matches though ordinary convertible issuers tend to underperform their respective matches according to OIBD/Assets and ROA ratios and overperform according to OIBD/Sales ratio. Panel C of Table 3 presents *z*-statistics testing whether the yearly distribution of the differences in operating performance ratios from non-issuing matching firms are equal for putable and ordinary convertible issuers using the Wilcoxon two-sample rank-sum test. For the year of the issue and the following four years the *z*-statistics are positive for OIBD/Assets and ROA, indicating that the performance of putable convertible issuers (relative to their matching non-issuers) is better than the performance of ordinary convertible issuers (relative to their matching non-issuers). The results are significant for the OIBD/Assets measure for years 0 and +2, and for the ROA measure for years 0, +1, and +2. For the OIBD/Sales measure of

performance, the z -statistics are negative but insignificant. These results indicate that compared to their respective matching non-issuer firms, putable convertible issuers perform better than do ordinary convertible issuers in the years after the issue, which is consistent with the hypothesis **H4**, further indicating that putable convertible issuers have favorable private information about their firms' future performance.²²

4.4. Valuation of Putable and Ordinary Convertible Issuers

In this section we study the equity valuation of putable and ordinary convertible issuers and test hypothesis **H5**. This hypothesis predicts that the pre-issue market valuation of putable convertibles issuers will be lower than the market valuation of ordinary convertible issuers.

We study valuation using the comparable firm approach similar to that implemented by Purnanandam and Swaminathan (2004). Thus, we value putable and ordinary convertible issuers on the day prior to the announcement day of the issue using the price multiples of matched non-issuing peer firms from the same industry. To ensure the robustness of our results, we select non-issuing industry peers using two matching algorithms. For the first matching algorithm we follow Purnanandam and Swaminathan (2004), where non-issuing industry peers are selected from the entire Compustat universe after eliminating the firms that had issued convertible debt in the previous three years, foreign firms, REITs, and closed-end funds. Then potential matching non-issuers are grouped into 48 industries which are constructed based on various categorizations of four-digit industry codes using the industry classifications in Fama and French (1997). For each year we divide each industry portfolio into three portfolios based on sales, and we split each sales portfolio into three portfolios based on OIBD sales margin (OIBD (Compustat item 13)/Sales (item 12)). This procedure gives us nine portfolios for each industry-year. We insist, however, that at least 3 firms should be in each portfolio and if the number of firms in the industry does not allow us to form 9 portfolios we limit ourselves to 3×2 , 2×2 , or even 1 portfolio. Each convertible issuer is then placed into an appropriate year-

²² As a robustness check we also study the long-run operating performance of putable and ordinary convertible issuers relative to propensity score matched non-issuers (matching performed similar to the one described in the announcement effects section of this paper). The results of our long-run operating performance study of putable and ordinary convertible issuers relative to a propensity score matched sample of non-issuers were very similar to our results based on the matching algorithm of Loughran and Ritter (1997) that are presented here. For the sake of brevity we do not present these results.

industry-sales-OIBD margin portfolio based on the convertible issuer's sales and OIBD margin in the fiscal year prior to the announcement of the issue. Within the portfolio we select matching industry peers to be the ones that have the closest sales to the convertible issuers. The second matching algorithm that we use is the propensity score matching algorithm described earlier (in section 4.2).

The pre-announcement date price to intrinsic value ratio for each putable and ordinary convertible issuer (P/V) is calculated by dividing the pre-announcement date price multiple by the matched non-issuing firm multiple. We use four price multiples for this analysis: price-to-sales, price-to-OIBD, price-to-earnings, and price-to-book value, where earnings is the income before extraordinary items (Compustat item 18) and book value is the book value of equity (Compustat item 60). The pre-announcement date price multiples for putable and ordinary convertible issuers are computed as follows (only positive values of OIBD, earnings, and book value of equity are used for these calculations):

$$\left(\frac{P}{S}\right)_{Issuer} = \frac{\text{Issuer pre - announcement date price} \times \text{Issuer CRSP shares outstanding}}{\text{Issuer prior fiscal year sales}},$$

$$\left(\frac{P}{OIBD}\right)_{Issuer} = \frac{\text{Issuer pre - announcement date price} \times \text{Issuer CRSP shares outstanding}}{\text{Issuer prior fiscal year OIBD}},$$

$$\left(\frac{P}{E}\right)_{Issuer} = \frac{\text{Issuer pre - announcement date price} \times \text{Issuer CRSP shares outstanding}}{\text{Issuer prior fiscal year earnings}},$$

$$\left(\frac{P}{B}\right)_{Issuer} = \frac{\text{Issuer pre - announcement date price} \times \text{Issuer CRSP shares outstanding}}{\text{Issuer prior fiscal year book value of equity}}.$$

The price multiples of matched firms are computed as follows:

$$\left(\frac{P}{S}\right)_{Match} = \frac{\text{Match pre - announcement date price} \times \text{Match CRSP shares outstanding}}{\text{Match prior fiscal year sales}},$$

$$\left(\frac{P}{OIBD}\right)_{Match} = \frac{\text{Match pre - announcement date price} \times \text{Match CRSP shares outstanding}}{\text{Match prior fiscal year OIBD}},$$

$$\left(\frac{P}{E}\right)_{Match} = \frac{\text{Match pre - announcement date price} \times \text{Match CRSP shares outstanding}}{\text{Match prior fiscal year earnings}},$$

$$\left(\frac{P}{B}\right)_{Match} = \frac{\text{Match pre - announcement date price} \times \text{Match CRSP shares outstanding}}{\text{Match prior fiscal year book value of equity}}.$$

In the above, *pre-announcement date price* is the share price and *CRSP shares outstanding* is the number of shares outstanding of convertible issuers and respective matched non-issuers on the day prior to the announcement of convertible issues as reported by CRSP. P/V ratios for each convertible issuer based on various multiples are computed as follows:

$$\left(\frac{P}{V}\right)_{Sales} = \frac{(P/S)_{Issuer}}{(P/S)_{Match}},$$

$$\left(\frac{P}{V}\right)_{OIBD} = \frac{(P/OIBD)_{Issuer}}{(P/OIBD)_{Match}},$$

$$\left(\frac{P}{V}\right)_{Earnings} = \frac{(P/E)_{Issuer}}{(P/E)_{Match}},$$

$$\left(\frac{P}{V}\right)_{Book\ value} = \frac{(P/B)_{Issuer}}{(P/B)_{Match}}.$$

Table 4 reports the results of our valuation analysis. Panel A of Table 4 reports P/V ratios for puttable and ordinary convertible issuers calculated based on the Purnanandam and Swaminathan (2004) matching algorithm. Panel B of Table 4 reports P/V ratios based on our propensity score matching algorithm. Both puttable and ordinary convertible issuers are overvalued compared to industry peers according to both panels. The median puttable convertible issuer is overvalued relative to its matched non-issuing industry peer by 15 to 33 percent depending on the price multiple used. The median ordinary convertible issuer is overvalued relative to its matched non-issuing industry peer by 32 to 62 percent depending on the price multiple used. Though overvalued relative to matched non-issuers, puttable convertible issuers are less overvalued compared to ordinary convertible issuers based on all price multiples (the *z*-statistics testing the equality of distributions of P/V ratios for puttable and ordinary convertible issuers are negative for all price multiples). For example, the median P/V ratios for puttable convertible issuers based on sales are 1.29 and 1.33, respectively, depending on the matching algorithm used, while the same median ratios for ordinary convertible issuers are 1.61 and 1.62, respectively; these differences are significant at the 5 percent level. The median P/V ratios for puttable convertible issuers based on book value are 1.17 and 1.21, respectively, depending on the matching algorithm used, while the same median ratios for ordinary convertible issuers are 1.21 and 1.45, respectively;

these differences are significant at the 1 and 5 percent levels. Thus, our valuation analysis supports hypothesis **H5**, since it indicates that putable convertible issuers are valued lower than ordinary convertible issuers.

4.5. *The Long-Run Stock Return Performance of Putable and Ordinary Convertible Issuers*

In this section we study the long-run stock return performance of putable and ordinary convertible issuers and thus test hypothesis **H6**. This hypothesis predicts that putable convertible issuers will have better long-run stock return performance compared to a matched sample of ordinary convertible issuers.

We study the long-run stock return performance of putable and ordinary convertible issuers relative to two benchmarks: matched non-issuers and the CRSP value-weighted index in each of five years after the issue. Matched non-issuers are selected using the Loughran and Ritter (1997) matching algorithm described in section 4.3. For each of the five years after the issue we calculate the average holding period return for six portfolios: a portfolio of putable convertible issuers and two corresponding benchmark portfolios (a portfolio of matched non-issuers and a portfolio of the CRSP value-weighted index returns); and, similarly, a portfolio of ordinary convertible issuers and two corresponding benchmark portfolios (a portfolio of matched non-issuers and a portfolio of the CRSP value-weighted index returns). Holding period returns for each firm and the corresponding index in an event window are calculated as $[\prod_{t=1}^{T_i} (1 + R_{it}) - 1] \times 100\%$, where R_{it} is the return on stock or market index i on the t -th day of the event window and T_i is the number of trading days in the event window. For firms that were delisted before the end of the event window, the holding period return is calculated until the delisting date, and the corresponding matched firm's or index's return is calculated over the same truncated period. If the matched firm is delisted, the next closest matched firm's return is used. For each category of firms in each event window the average holding period returns are calculated as the average over the number of firms in that window. Abnormal average returns are then calculated as the difference between the holding period returns of issuers and matched non-issuers or the CRSP value-weighted index.²³

²³ We study long-run stock return performance using holding period abnormal returns instead of cumulative abnormal returns since Barber and Lyon (1997) show that short-term abnormal returns cumulated over long periods are biased predictors of long-run holding period returns. They therefore favor the use of holding period abnormal returns in tests designed to detect long-run abnormal stock returns.

Panels A and B of Table 5 present the long-run stock return performance of putable convertible issuers relative to matched non-issuers and relative to the CRSP value-weighted index, respectively. Only in the first year after the issue do putable convertible issuers significantly underperform their respective matched non-issuers and the CRSP value-weighted index: the abnormal return in year one with respect to matched non-issuers is -9.53 percent and significantly different from zero at the 1 percent level and the abnormal return with respect to the CRSP value-weighted index is -3.31 percent and significantly different from zero at the 10 percent level. In the following four years there is no significant difference in the stock return performance of putable convertible issuers with respect to either matched non-issuers or the CRSP value-weighted index. Though putable convertible issuers underperform their respective matched non-issuers in the years two, three, and four after the issue, that underperformance is not statistically significant.

Panels C and D of Table 5 present the long-run stock return performance of ordinary convertible issuers relative to matched non-issuers and relative to the CRSP value-weighted index, respectively. Ordinary convertible issuers significantly underperform both matched non-issuers and the CRSP value-weighted index in each of the three years after the issue. The abnormal returns of ordinary convertible issuers with respect to matched non-issuers are -6.83, -9.50, and -5.16 percent in years one, two, and three, respectively, and are significantly different from zero at the 1 and 5 percent levels. The abnormal returns of ordinary convertible issuers with respect to the CRSP value-weighted index are -2.92, -2.31, and -3.09 percent in years one, two, and three, respectively, and are significantly different from zero at the 1 and 5 percent levels. Also, the average annual abnormal returns of putable convertible issuers over the five years after the issue are -3.92 percent and +0.78 percent with respect to matched non-issuers and the CRSP value-weighted index, respectively. The average annual abnormal returns of ordinary convertible issuers over the five years after the issue are -4.59 percent and -3.31 percent with respect to matched non-issuers and the CRSP value-weighted index, respectively. These results indicate that in the five years after the issue the stock return performance of putable convertible issuers is better than that of ordinary convertible issuers.

As a robustness test, we also study the long-run stock return performance by creating calendar-time portfolios of putable and ordinary convertible issuer returns using the Fama and French (1993) three-factor

model. We present results estimated using OLS and WLS regressions for both equally- and value-weighted portfolio returns. Panel A of Table 6 presents results for putable convertible issuers and Panel B presents results for ordinary convertible issuers. In the case where the portfolio returns are equally-weighted, the intercepts from the Fama and French (1993) three-factor model for putable convertible issuers are less negative compared to those of ordinary convertible issuers. In the case of equally-weighted return portfolios and equally weighted calendar periods, the above intercept for putable convertible issuers is negative 0.22 percent and not significantly different from zero, while the intercept for ordinary convertible issuers is negative 0.75 percent and significantly different from zero at the 1 percent level. In the case of equally-weighted return portfolios and event-weighted calendar periods the intercept for putable convertible issuers is negative 0.33 percent and not significantly different from zero, while the intercept for ordinary convertible issuers is negative 0.61 percent and significantly different from zero at the 1 percent level. These results indicate that ordinary convertible issuers tend to have significantly negative abnormal returns in five year period after the issue, while the abnormal returns of putable convertible issuers for the same period are not distinguishable from zero. In the case where portfolio returns are value-weighted, the magnitudes of both the above intercepts and their respective statistical significances are similar for putable and ordinary convertible issuers.

To summarize, we find support for hypothesis **H6** as the results of our long-run stock return performance analysis (both the holding period return and Fama and French (1993) three-factor model analyses) of putable and ordinary convertible issuers indicate that putable convertible issuers tend to perform better in the five years after the issue compared to ordinary convertible issuers.

4.6. The Choice between Putable and Ordinary Convertible Issues

In this section we study the choice between putable and ordinary convertible issues in a multivariate setting. We run a set of logit regressions with the dependent variable equal to 1 if the convertible issue is putable and 0 if the convertible issue is ordinary. The independent variables relate to our two hypotheses: five independent variables relate to the risk-shifting hypothesis (Shumway bankruptcy measure (*SBM*), long-term

debt over assets, capital expenditures over assets, stock return volatility, and firm size), one independent variable relates to our asymmetric information hypothesis (price-to-intrinsic value (P/V) ratio based on price over book value multiple using Purnanandam and Swaminathan (2004) matching algorithm). We use three other independent variables as control variables: Cash Flow/Assets is used to control for operating performance prior to issue; income taxes in the fiscal year prior to issue over sales and Investor Sentiment Index are used to control for two alternative explanations for the issuance of puttable convertibles, namely, the “tax savings” and “issuer optimism” hypotheses, respectively, as described in the next section.

We construct a monthly series of the Investor Sentiment Index after Baker and Wurgler (2006).²⁴ The greater the value of the index the more optimistic investors are and vice versa. Since one of the definitions of investor sentiment that Baker and Wurgler (2006) use in their work is “... optimism or pessimism about stocks in general,” this index is a good proxy to measure the degree of outside investors’ optimism or pessimism regarding future economic activity, the stock market in general, and the future stock return performance of issuing firms. The index is constructed using a number of proxies suggested in the literature to measure investor sentiment; it is a composite index based on the first principal component of those proxies. The underlying proxies of investor sentiment are: the closed-end fund discount, NYSE share turnover, the number and average first-day returns on IPOs, the equity share in new issues, and the dividend premium. These sentiment proxies are measured monthly for the sample period. While the Investor Sentiment Index we construct is a monthly series as opposed to the annual series constructed by Baker and Wurgler (2006), we follow Baker and Wurgler (2006) closely in constructing the above index, making use of monthly data. Due to space limitations, we will not describe the details of the above construction here.²⁵ We have verified that our monthly series closely follows the annual series constructed by Baker and Wurgler (2006) and has properties similar to their annual series, while having the advantage of capturing intra-year variations in investor sentiment (which is clearly not possible with an annual series).

²⁴ Baker and Wurgler (2006) construct an annual series of the investor sentiment index and use it to test how the cross-section of subsequent stock returns varies with beginning-of-period sentiment. They show that when beginning-of-period investor sentiment is low (investors are pessimistic), subsequent returns are relatively high for small, young, high volatility, unprofitable, non-dividend-paying, extreme growth, and distressed stocks. When sentiment is high (investors are optimistic), on the other hand, these categories of stock earn relatively low subsequent returns.

²⁵ Additional details of the construction of the above index and data sources are available to interested readers from the authors upon request.

We expect all the independent variables that relate to the risk-shifting hypothesis (except firm size) to have positive coefficients (we expect a negative coefficient for the firm size) if putable convertibles are issued to mitigate potential risk-shifting. We expect the asymmetric information hypothesis variable to have a negative coefficient since this hypothesis predicts that putable convertible issuers have lower market valuation compared to that of ordinary convertible issuers. Further, we expect the Investor Sentiment Index to have a negative coefficient if, as suggested by “issuer optimism” hypothesis in the next section, putable convertibles are issued in periods when investors’ outlook regarding future economic activity and the stock market is more pessimistic. Finally, we expect the income tax variable to have a positive coefficient if putable convertibles are issued for tax saving purposes as described in the next section. The results of various specifications of our logit regressions are presented in Table 7.

The coefficients of the first four variables (which relate to the risk-shifting hypothesis) are all negative (except for the long-term debt over assets variable) and statistically significant at the 1 percent level in most specifications. Firms that have a lower bankruptcy probability, that are less risky (as measured by stock return volatility), and those that spend less on capital expenditures, are more likely to issue putable rather than ordinary convertible debt. Further, larger firms are more likely to issue putable rather than ordinary convertible debt. These findings imply that putable convertible issuers are less subject to risk-shifting or asset substitution compared to ordinary convertible issuers, and thus reject hypotheses **H1** and **H2**. Next, the asymmetric information variable has a negative coefficient in all specifications indicating that relatively undervalued firms (or firms that have favorable private information regarding their future performance) are more likely to issue putable convertible debt instead of ordinary convertible debt. This supports the asymmetric information hypothesis **H4**.

The Investor Sentiment Index has a negative coefficient significant at the 1 percent level in all specifications, which indicates that putable convertibles are more likely to be issued at times when investors’ outlook about future economic activity and the stock market is more pessimistic. This supports the “issuer optimism” as an alternative explanation for the issuance of putable convertibles, as described in the next

section. Finally, the income tax variable has a positive coefficient in all specifications, which supports tax savings as yet another alternative explanation for the issuance of putable convertibles (see next section).²⁶

To summarize, the results of our logit regressions reject the risk-shifting hypothesis and provide support for the asymmetric information hypothesis. Thus, our logit regression results are consistent with the results of our univariate tests, and broadly consistent with our results from sections 4.2, 4.3, and 4.4.²⁷

5. Alternative Explanations

In this section we discuss two possible alternative explanations suggested by practitioners for the issuance of putable convertibles. The first such explanation is the tax savings hypothesis, which argues that putable convertible issuers may be partially motivated by their desire to save on income taxes. A significant proportion of putable convertibles are zero coupon bonds (36 percent in our sample), and the present value of deductions from taxable income is greater for such bonds, since the “contingent debt” feature of the tax code allows the original issue discount of zero coupon bonds to be deducted yearly (similar to coupon payments in the case of coupon bearing bonds), even though the issuing firm does not make any cash payments to investors till the maturity date. However, a disadvantage of zero coupon putable convertibles to investors is that no cash flows are paid to them until the maturity date, so that the effective maturity of the bond is longer (relative to a comparable coupon-bearing bond). Thus, under the tax savings hypothesis, issuers who want to reduce taxes by issuing zero coupon bonds may include a put provision in these bonds as a “sweetener” for investors (which reduces the effective maturity back to acceptable levels by allowing investors to obtain their money back earlier if they so desire). We control for the above argument in our multivariate analysis by including the income tax obligations of firms in our regression equations. This hypothesis predicts that firms which have greater income tax obligations are more likely to issue putable rather ordinary convertibles.²⁸

²⁶ We normalize income taxes by sales rather than assets, since income taxes are directly related to the level of sales and to a lesser degree to the level of assets.

²⁷ We also estimated the regressions in this section by running cluster regressions where the clusters were determined by two-digit SIC industry codes; our results were unchanged.

²⁸ Of course, the tax savings hypothesis cannot provide a stand-alone explanation for the choice of firms between putable and ordinary convertibles, since 64 percent of the putable convertibles in our sample are coupon-bearing bonds. However, the fact that 36 percent of putable convertibles are zero coupon bonds, while only 2.5 percent of ordinary

The second explanation for the issuance of puttable convertibles suggested by practitioners is that these securities are issued by CFOs who are overly optimistic about the future prospects of their own firm, and who therefore believe that the put option in their convertibles is less likely to be in the money compared to outsiders' beliefs about the same event. This, in turn, implies that issuers' valuation (conditional on their own personal probability distribution) of the put option embedded in puttable convertibles will be lower than the price outsiders are willing to pay for this put option (based on outsiders' own more pessimistic probability distribution of the firm's future stock price), thus creating gains from trade between the two parties.

The above "issuer optimism" hypothesis implies that firms will be more likely to issue puttable (rather than ordinary) convertibles during periods when the difference in beliefs between issuers and outsiders is greater (with the issuers being more optimistic than outsiders). While it is difficult to measure differences in beliefs across issuers and outsiders directly, this hypothesis generates a testable prediction if we make the additional assumption that the beliefs of issuers about their firm's future prospects are less likely to fluctuate over time compared to those of outside investors (see, e.g., Landier and Thesmar (2003)).²⁹ Given this, we get the testable prediction that puttable convertibles are more likely to be issued by firms during periods when outside investors' outlook about future economic activity and the stock market (and therefore the issuing firm's future stock price) is more pessimistic (thereby increasing the difference in the extent of optimism between issuers and outsiders). We control for the above argument in our multivariate analysis by including the Investor Sentiment Index in our regression equations.

It can be seen that, even after controlling for both of the above alternative explanations, our empirical analysis strongly rejects the risk-shifting hypothesis and supports the asymmetric information hypothesis.

convertibles are zero coupon bonds, indicates that one has to consider tax savings as one of the possible contributing factors for the issuance of puttable convertibles.

²⁹ Landier and Thesmar (2003) document that insiders (such as entrepreneurs) tend to be much more optimistic than professional investors about the future prospects of their firm, do not change their beliefs easily, and tend to believe that financial markets underestimate the future prospects of their firm.

6. Discussion of Results and Conclusion

This paper presents the first theoretical as well as the first empirical analysis of firms' rationale for issuing puttable convertibles in the literature. We used a sample of puttable and ordinary convertible debt offerings to explore two possible rationales for issuing puttable convertible debt, namely, the risk-shifting hypothesis and the asymmetric information hypothesis. We developed two simple theoretical models to demonstrate how puttable convertibles can resolve the problems associated with risk-shifting and asymmetric information, respectively, and derived testable hypotheses regarding a firm's choice between puttable and ordinary convertibles. We then tested these hypotheses in our empirical analysis.

Our empirical findings regarding the two alternative rationales for issuing puttable convertibles are as follows. First, firms that issue puttable convertibles are larger, less risky firms with larger cash flows, smaller growth opportunities and a lower overall bankruptcy probability compared to those issuing ordinary convertibles. Thus, our results contradict the risk-shifting hypothesis. Second, puttable convertible issuers have lower pre-issue market valuations compared to ordinary convertible issuers. Third, they also experience less negative abnormal stock returns upon the announcement of an issue compared to a matched sample of ordinary convertible issuers. Fourth, puttable convertible issuers exhibit better operating performance (relative to matched non-issuers) in the years after the issue compared to ordinary convertible issuers. The last three results provide support for the asymmetric information or undervaluation hypothesis for issuing puttable convertibles. Finally, puttable convertible issuers have better post-issue long-run stock return performance (relative to matched non-issuers) compared to ordinary convertible issuers. Overall, the results of our univariate as well as multivariate analyses of a firm's choice between puttable and ordinary convertibles support the asymmetric information hypothesis but reject the risk-shifting hypothesis.

References

- Altman, E., 1968. Financial Ratios, Discriminant Analysis, and the Prediction of Corporate Bankruptcy. *Journal of Finance* 23 (4), 589–609.
- Asquith, P., Mullins, D., 1986. Equity Issues and Offering Dilution. *Journal of Financial Economics* 15 (1–2), 61–89.
- Baker, M., Wurgler, J., 2006. Investor Sentiment and the Cross-Section of Stock Returns. *Journal of Finance* 61 (4), 1645–1680.
- Barber, B., Lyon, J., 1997. Detecting Long-Run Abnormal Stock Returns: The Empirical Power and Specification of Test Statistics. *Journal of Financial Economics* 43 (3), 341–372.
- Bernard, V., Thomas, J., 1989. Post-Earnings-Announcement Drift: Delayed Price Response or Risk Premium? *Journal of Accounting Research* 27 (3), 1–36.
- Brennan, M., Kraus, A., 1987. Efficient Financing Under Asymmetric Information. *Journal of Finance* 42 (5), 1225–1243.
- Chemmanur, T., Nandy, D., Yan, A., 2003. Why Issue Mandatory Convertibles? Theory and Empirical Evidence. Working Paper, Boston College and Fordham University.
- Constantinides, G., Grundy, B., 1989. Optimal Investment with Stock Repurchase and Financing as Signals. *Review of Financial Studies* 2 (4), 445–465.
- Cook, D., Easterwood, J., 1994. Poison Put Bonds: An Analysis of Their Economic Role. *Journal of Finance* 49 (5), 1905–1920.
- Dann, L., Mikkelsen, W., 1984. Convertible Debt Issuance, Capital Structure Change and Financing-Related Information. *Journal of Financial Economics* 13 (2), 157–186.
- David, A., 2001. Pricing the Strategic Value of Putable Securities in Liquidity Crises. *Journal of Financial Economics* 59 (1), 63–99.
- Dehejia, R., Wahba, S., 2002. Propensity Score-Matching Methods for Nonexperimental Causal Studies. *The Review of Economics and Statistics* 84 (1), 151–161.
- Fama, E., French, K., 1993. Common Risk Factors in the Returns on Stocks and Bonds. *Journal of Financial Economics* 33 (1), 3–56.
- Fama, E., French, K., 1997. Industry Costs of Equity. *Journal of Financial Economics* 43 (2), 153–193.
- Fama, E., French, K., Booth, D., Siquefield, R., 1993. Differences in the Risks and Returns of NYSE and NASD Stocks. *Financial Analysts Journal* 49 (1), 37–41.
- Foster, G., Olsen, C., Shevlin, T., 1984. Earnings Releases, Anomalies, and the Behavior of Security Returns. *The Accounting Review* 59 (4), 547–573.
- Gibson, S., Singh, R., 2002. Using Put Warrants to Reduce Corporate Financing Costs. University of Minnesota Working Paper.

- Green, R., 1984. Investment Incentives, Debt, and Warrants. *Journal of Financial Economics* 13 (1), 115–136.
- Grossman, S., 1981. The Informational Role of Warranties and Private Disclosure about Product Quality. *Journal of Law and Economics* 24 (3), 461–483.
- Hertzel, M., Smith, R., 1993. Market Discounts and Shareholder Gains for Placing Equity Privately. *Journal of Finance* 48 (2), 459–485.
- Hillion, P., Vermaelen, T., 2004. Death Spiral Convertibles. *Journal of Financial Economics* 71 (2), 381–415.
- Jensen, M., Meckling, J., 1976. Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure. *Journal of Financial Economics* 3 (4), 305–360.
- Landier, A., Thesmar, D., 2003. Financial Contracting with Optimistic Entrepreneurs. Working Paper, New York University.
- Lewis, C., Rogalski, R., Seward, J., 1999. Is Convertible Debt a Substitute for Straight Debt or for Common Equity? *Financial Management* 28 (3), 5–27.
- Lewis, C., Rogalski, R., Seward, J., 2001. The Long-Run Performance of Firms That Issue Convertible Debt: An Empirical Analysis of Operating Characteristics and Analyst Forecasts. *Journal of Corporate Finance* 7 (4), 447–474.
- Loughran, T., Ritter, J., 1995. The New Issues Puzzle. *Journal of Finance* 50 (1), 23–51.
- Loughran, T., Ritter, J., 1997. The Operating Performance of Firms Conducting Seasoned Equity Offerings. *Journal of Finance* 52 (5), 1823–1850.
- Masulis, R., Korwar, A., 1986. Seasoned Equity Offerings: An Empirical Investigation. *Journal of Financial Economics* 15 (1–2), 91–118.
- Mayers, D., 1998. Why Firms Issue Convertible Bonds: The Matching of Financial and Real Investment Options. *Journal of Financial Economics* 47 (1), 83–102.
- McConnell, J., Schwartz, E., 1992. The Origin of LYONS: A Case Study in Financial Innovation. *Journal of Applied Corporate Finance* 4 (4), 82–89.
- Mikkelson, W., Partch, M., 1986. Valuation Effects of Security Offerings and the Issuance Process. *Journal of Financial Economics* 15 (1–2), 31–60.
- Myers, S., 1977. Determinants of Corporate Borrowing. *Journal of Financial Economics* 5 (2), 147–175.
- Nanda, V., Yun, Y., 1996. Financial Innovation and Investor Wealth: A Study of the Poison Put in Convertible Bonds. *Journal of Corporate Finance* 3 (1), 1–22.
- Purnanandam, A., Swaminathan, B., 2004. Are IPOs Really Undervalued? *The Review of Financial Studies* 17 (3), 811–848.
- Shumway, T., 2001. Forecasting Bankruptcy More Accurately: A Simple Hazard Model. *Journal of Business* 74 (1), 101–124.

Smith, C., Watts, R., 1992. The Investment Opportunity Set and Corporate Financing, Dividend, and Compensation Policies. *Journal of Financial Economics* 32 (3), 263–292.

Spiess, D. K., Affleck-Graves, J., 1995. Underperformance in Long-Run Stock Returns Following Seasoned Equity Offerings. *Journal of Financial Economics* 38 (3), 243–267.

Spiess, D. K., Affleck-Graves, J., 1999. The Long-Run Performance of Stock Returns Following Debt Offerings. *Journal of Financial Economics* 54 (1), 45–73.

Stein, J., 1992. Convertible Bonds as Backdoor Equity Financing. *Journal of Financial Economics* 32 (1), 3–21.

Villalonga, B., 2004. Does Diversification Cause the “Diversification Discount”? *Financial Management* 33 (1), 5–27.

Zmijewski, M., 1984. Methodological Issues Related to the Estimation of Financial Distress Prediction Models. *Journal of Accounting Research* 22 (Supplement), 59–82.

Table 1

Summary statistics of putable and ordinary convertible debt offerings for the sample period from 1982 to 2003. Items refer to Compustat data items. Issue Proceeds are the total proceeds of the issue. Cash Flow is the free cash flow in the fiscal year prior to issue computed as operating income before depreciation (item 13) minus income taxes (item 16) plus change in deferred taxes from previous year to the current year (change in item 35) minus interest expense (item 15) minus sum of preferred dividends (item 19) and common dividends (item 21). Total Assets are book value of firm's total assets at the end of the fiscal year prior to issue (item 6). Market Value of Equity is the number of shares outstanding (item 25) times share price (item 199) at the end of the fiscal year prior to issue. Long-Term Debt is the book value of firm's long-term debt at the end of the fiscal year prior to issue (item 9). Cash & Equivalents are the cash and short-term investments at the end of the fiscal year prior to issue (item 1). Capital Expenditures are the capital expenditures for the fiscal year prior to issue (item 128). R&D is the research and development expenses for the fiscal year prior to issue (item 46). Income Taxes are total income taxes for the fiscal year prior to issue (item 16). Sales are total sales for the fiscal year prior to issue (item 12). Q Ratio is Tobin's Q computed for the fiscal year prior to issue as the market value of assets divided by the book value of assets, where market value of assets equals the book value of assets plus the market value of common equity (item 199 times item 25) less the book value of common equity (item 60). Market-to-Book is the market value of equity over the book value of equity at the end of the fiscal year prior to issue. ROA is the return on assets in the fiscal year prior to issue computed as the ratio of net income (item 172) to the assets. Interest coverage is the ratio of operating income before depreciation to interest expense. Cash Flow volatility is the standard deviation of firm's Cash Flow/Assets over the five year period prior to issue. Stock Return Volatility is the standard deviation of the daily stock returns for a period of 255 trading days ending 46 days before the issue date. Idiosyncratic Risk is the residual standard deviation of the market model estimated over 255 trading days ending 46 days before the issue date. 1 Year Prior Market Adjusted Cumulative Return is computed by cumulating daily market adjusted returns for a period of 255 trading days prior to issue date. Shumway Bankruptcy Measure (SBM) is computed after Shumway (2001) as $SBM = -1.982 \times (ROA) + 3.593 \times (\text{total liabilities (item 181)/assets}) - 0.467 \times (\text{logarithm of the ratio of market value of equity to the total market value of equity of all Compustat firms}) - 1.809 \times (1 \text{ Year Prior Market Adjusted Cumulative Return}) + 5.791 \times (\text{Idiosyncratic Risk})$. Cardinalized Bond Rating is the cardinalized rating based on the firm's S&P bond rating, where AAA = 1, ..., C = 9, and unrated issues receive a code of 10. Maturity is the years to final maturity. Yield to Maturity over Treasury is the difference between the offer yield to maturity and the closest maturity treasury security yield to maturity in the same month of issue. Investor Sentiment Index is the first principal component of orthogonalized values of value-weighted average closed-end fund discount, log of NYSE share turnover detrended using five year moving average, the number and average first-day returns on IPOs, the equity share in new issues of equity and long-term debt, and dividend premium defined as the log difference between average value-weighted market-to-book ratios of dividend payers and non-dividend payers. Investor Sentiment Index is measured at the beginning of the issue month. ***, **, and * indicate significance at the 1, 5, and 10 percent levels, respectively.

	Putable Convertible Offerings			Ordinary Convertible Offerings			Difference in Means <i>t</i> -statistic	Difference in Medians <i>z</i> -statistic
	N	Mean	Median	N	Mean	Median		
Issue Proceeds (\$ million)	365	331.80	195.60	1,670	100.73	50.00	17.16***	17.55***
Issue Proceeds/Assets (%)	342	18.09	10.38	1,469	38.99	23.78	-7.46***	-10.39***
Cash Flow/Assets (%)	301	5.94	6.39	1,166	-1.34	5.74	3.61***	3.13***
Cash Flow/Issue Proceeds (%)	301	82.04	61.10	1,165	-1.45	22.27	2.75***	10.71***
Total Assets (\$ million)	342	14,904.93	2,016.83	1,470	1,675.41	228.08	8.88***	17.40***
Market Value of Equity (\$ million)	348	7,085.01	1,605.18	1,467	1,299.81	234.91	9.72***	16.25***
Long-Term Debt/Assets (%)	342	24.82	22.72	1,460	22.79	18.13	1.30	3.03***
Cash & Equivalents/Assets (%)	342	13.30	5.91	1,463	17.83	9.68	-3.81***	-4.08***
Capital Expenditures/Assets (%)	333	6.65	4.46	1,376	9.44	5.99	-4.11***	-4.06***
R&D/Assets (%)	342	2.85	0.00	1,470	6.26	0.00	-3.65***	-3.08***
Income Taxes (\$ million)	341	172.74	34.61	1,467	18.78	2.38	9.17***	12.75***
Income Taxes/Sales (%)	341	3.60	2.78	1,445	2.36	1.72	3.37***	4.49***
Q Ratio	342	1.95	1.51	1,451	2.68	1.60	-2.95***	-2.20**
Market-to-Book	332	2.15	2.23	1,330	6.61	2.15	-0.68	0.42
ROA (%)	332	1.99	3.63	1,331	-8.13	2.94	4.21***	3.04***
Interest Coverage	315	122.41	5.85	1,284	19.09	3.84	1.55	6.11***
Cash Flow Volatility (%)	307	4.38	2.66	1,042	7.88	3.39	-4.07***	-3.80***
Stock Return Volatility (%)	360	3.16	2.81	1,552	3.68	3.15	-4.54***	-3.69***
Idiosyncratic Risk (%)	360	2.87	2.61	1,552	3.45	2.99	-5.40***	-4.89***
1 Year Prior Market Adjusted Cumulative Return (%)	360	10.63	7.39	1,552	20.30	18.17	-2.84***	-4.23***
Shumway Bankruptcy Measure	333	6.19	6.08	1,312	6.59	6.38	-3.25***	-2.94***
Cardinalized Bond Rating	365	6.50	6.00	1,670	8.12	10.00	-10.94***	-10.47***
Maturity (Years)	365	19.98	20.29	1,527	14.21	10.20	12.55***	11.45***
Yield to Maturity over Treasury (%)	293	-1.59	-1.66	1,194	0.53	-0.77	-4.73***	-8.19***
Investor Sentiment Index	365	-0.06	-0.14	1,671	0.54	0.52	-13.00***	-13.35***

Table 2

Announcement effects of putable and ordinary convertible issues for the sample period from 1982 to 2003. Panel A reports results for the entire sample of putable and ordinary convertible issues. Panel B reports results for a matched sample where each putable convertible issuer is matched with an ordinary convertible issuer using propensity score matching algorithm. Propensity scores are estimated based on previous fiscal year (OIBD + Interest Income)/Assets, Profit Margin, ROA, (OIBD + Interest Income)/Sales, (Capital Expenditures + R&D)/Assets, Market-to-Book, Total Assets, and a set of 2-digit SIC codes. The propensity score logit function is estimated using all issues and a matching ordinary convertible issuer is selected to have the closest propensity score within the same type of issue (public or rule 144A private placement) and in the same year of issue as the putable convertible issuer. If a proper match is not found in the year of issue within the same type of issue the matching ordinary convertible issuer is selected from the previous two years. Announcement effect for each issue is computed as the cumulative abnormal return (CAR) for a particular window around the announcement day of the offering. Daily abnormal returns are computed using the market model for two market indices: value-weighted and equally-weighted CRSP indices. Market model parameters are estimated over 255 trading days ending 46 trading days before the offering announcement with at least 100 non-missing daily returns in the estimation period. Announcement date is denoted as date 0. ***, **, and * indicate significance at the 1, 5, and 10 percent levels, respectively, using two-sample *t*-test for the differences in means.

	Window	Putable Convertible Issuers		Ordinary Convertible Issuers		Difference in Means (%)
		Mean (%)	Median (%)	Mean (%)	Median (%)	
Panel A: Comparison of entire sample of putable and ordinary convertible issues						
Value-Weighted	-1 to 0	-1.31	-1.00	-0.69	-0.98	-0.62*
Equally-Weighted	-1 to 0	-1.52	-1.01	-0.85	-1.09	-0.67*
Value-Weighted	-1 to +1	-3.24	-2.69	-1.67	-1.69	-1.56***
Equally-Weighted	-1 to +1	-3.55	-3.06	-1.91	-1.94	-1.64***
Value-Weighted	0 to +1	-3.38	-2.69	-1.82	-1.59	-1.56***
Equally-Weighted	0 to +1	-3.61	-3.05	-1.99	-1.67	-1.63***
Value-Weighted	-3 to 0	-0.94	-0.54	-0.48	-0.98	-0.46
Equally-Weighted	-3 to 0	-1.39	-0.95	-0.74	-1.18	-0.65
Value-Weighted	-3 to +3	-2.83	-1.83	-1.89	-2.14	-0.94
Equally-Weighted	-3 to +3	-3.58	-2.33	-2.34	-2.41	-1.24*
Value-Weighted	0 to +3	-3.34	-2.79	-2.24	-2.18	-1.10**
Equally-Weighted	0 to +3	-3.77	-2.86	-2.51	-2.30	-1.25**
Number of Firms		358	358	1,487	1,487	
Panel B: Comparison of putable convertible issues with propensity score matched ordinary convertible issues						
Value-Weighted	-1 to 0	-1.30	-1.03	-1.49	-1.58	0.18
Equally-Weighted	-1 to 0	-1.52	-1.02	-1.75	-1.59	0.22
Value-Weighted	-1 to +1	-3.23	-2.84	-3.97	-3.58	0.74
Equally-Weighted	-1 to +1	-3.57	-3.21	-4.44	-4.26	0.88*
Value-Weighted	0 to +1	-3.39	-2.73	-4.23	-3.37	0.85*
Equally-Weighted	0 to +1	-3.63	-3.16	-4.60	-3.75	0.97**
Value-Weighted	-3 to 0	-0.83	-0.44	-1.23	-1.39	0.40
Equally-Weighted	-3 to 0	-1.32	-0.87	-1.83	-1.71	0.51
Value-Weighted	-3 to +3	-2.66	-1.80	-4.34	-4.14	1.68**
Equally-Weighted	-3 to +3	-3.47	-2.18	-5.41	-5.00	1.94***
Value-Weighted	0 to +3	-3.28	-2.81	-4.86	-4.03	1.57***
Equally-Weighted	0 to +3	-3.74	-2.86	-5.48	-4.65	1.74***
Number of Firms		313	313	313	313	

Table 3

Median operating performance of putable and ordinary convertible issuers relative to matched samples of non-issuers from four years before the issue year until four years afterwards for the sample period from 1982 to 2003. Panel A reports median ratios for the putable convertible issuers, the non-issuing matched firms, and median differences between the performance ratios of putable convertible issuers and non-issuing matched firms. Panel B reports median ratios for the ordinary convertible issuers, the non-issuing matched firms, and median differences between the performance ratios of ordinary convertible issuers and non-issuing matched firms. Matched non-issuing firms are chosen following the Loughran and Ritter (1997) matching algorithm. Each issuing firm is matched with a firm that has not issued convertible debt during the five years prior to the issue date. The non-issuer had to be in the same industry (using 2-digit SIC codes) with asset size at the end of the previous fiscal year relative to the issue year between 25 to 200 percent of the issuing firm, and then the non-issuer with the closest operating income before depreciation, amortization, and taxes (OIBD) relative to assets was chosen. If no non-issuer met these criteria then industry requirement was dropped and a matching firm was chosen with asset size within 90 to 100 percent of the issuing firm and with closest, but higher, OIBD/Assets ratio. The Compustat data items for the performance variables are operating income before depreciation/assets (OIBD + interest income (items 13 + 62)/assets (item 6)), return on assets (net income (item 172)/assets (item 6)), and OIBD/sales (OIBD + interest income (items 13 + 62)/sales (item 12)). Panel C tests whether in a given year relative to the issue year, the distributions of the differences in operating performance ratios of putable convertible issuers and ordinary convertible issuers from matched non-issuers are equal. ***, **, and * indicate significance at the 1, 5, and 10 percent levels, respectively.

Fiscal Year Relative to Offering	Number of Firms	OIBD/Assets (%)	ROA (%)	OIBD/Sales (%)	OIBD/Assets (%)	ROA (%)	OIBD/Sales (%)	OIBD/Assets (%)	ROA (%)	OIBD/Sales (%)
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Panel A: Median operating performance ratios for putable convertible issuers, matched non-issuers, and median differences

Fiscal Year Relative to Offering	Number of Firms	Putable Convertible Issuer Medians			Matched Non-Issuer Medians			Median Differences		
		OIBD/Assets (%)	ROA (%)	OIBD/Sales (%)	OIBD/Assets (%)	ROA (%)	OIBD/Sales (%)	OIBD/Assets (%)	ROA (%)	OIBD/Sales (%)
-4	285	12.80	4.07	16.70	13.14	4.25	14.83	0.54	0.35	0.54
-3	289	12.59	3.73	16.37	13.47	4.08	14.89	0.14	-0.35	0.36
-2	309	12.46	3.58	15.75	11.99	3.83	14.60	-0.20	0.06	0.62
-1	323	12.07	3.64	16.84	11.49	3.52	14.33	0.01	0.10	1.38***
0	200	12.60	3.64	17.02	12.26	3.43	14.20	0.19	0.19	1.77**
+1	167	12.13	2.86	16.33	12.00	3.16	13.22	0.25	-0.19	1.84*
+2	103	11.61	2.88	15.35	11.60	2.37	12.05	0.61	0.29	3.23**
+3	86	12.61	3.06	15.84	12.72	3.36	13.14	0.66	-0.48	3.23
+4	77	13.31	4.01	16.50	13.38	4.10	14.65	-1.51	-0.87	1.94

Panel B: Median operating performance ratios for ordinary convertible issuers, matched non-issuers, and median differences

Fiscal Year Relative to Offering	Number of Firms	Ordinary Convertible Issuer Medians			Matched Non-Issuer Medians			Median Differences		
		OIBD/Assets (%)	ROA (%)	OIBD/Sales (%)	OIBD/Assets (%)	ROA (%)	OIBD/Sales (%)	OIBD/Assets (%)	ROA (%)	OIBD/Sales (%)
-4	862	12.80	4.09	12.18	13.62	5.12	11.28	-1.20***	-0.92***	0.60
-3	980	12.48	3.49	12.05	12.58	4.20	10.85	-0.93***	-0.71***	1.10*
-2	1,114	11.46	3.17	11.84	12.15	3.66	10.60	-0.60***	-0.66***	0.98***
-1	1,285	10.99	3.13	11.76	11.13	3.05	9.85	-0.01**	0.10	1.09***
0	1,127	10.02	2.65	11.87	10.88	2.89	9.60	-1.28***	-0.69	1.92***
+1	972	10.20	2.26	12.57	11.29	3.21	9.72	-1.20***	-1.02***	2.00***
+2	807	9.60	1.49	11.66	11.46	3.42	9.97	-1.60***	-1.84***	1.45**
+3	678	10.71	2.16	11.94	11.76	3.31	10.50	-1.42***	-1.17***	1.64***
+4	587	10.56	2.01	11.29	11.57	3.15	10.25	-2.12***	-0.94**	0.78**

Panel C: z-statistics testing whether the yearly distributions of the differences in operating performance ratios of putable convertible issuers and ordinary convertible issuers from matched non-issuers are equal using the Wilcoxon two-sample rank-sum test

Fiscal Year Relative to Offering	OIBD/Assets	ROA	OIBD/Sales
-4	2.41**	1.95*	0.76
-3	0.76	0.93	-0.63
-2	1.64	1.54	-0.15
-1	1.94*	-0.15	0.06
0	2.50**	1.77*	-0.01
+1	1.53	1.67*	-0.48
+2	2.95***	2.61***	1.26
+3	1.35	1.15	-0.22
+4	0.98	0.69	-0.25

Table 4

Stock valuation of putable and ordinary convertible debt issuers based on the comparable firm approach. This table reports medians of price-to-intrinsic value (P/V) ratios for putable and ordinary convertible issuers one day prior to the announcement day for the sample period from 1982 to 2003. The intrinsic value is the fair value of the convertible issuer computed based on market price-to-sales, market price-to-OIBD, market price-to-earnings, and market price-to-book value ratio of an industry peer. Sales are the total sales (Compustat item 12), OIBD is the operating income before interest, taxes, depreciation, and amortization (Compustat item 13) and represents operating cash flow, earnings is the income before extraordinary items (Compustat item 18), and book value is the book value of equity (Compustat item 60). Panel A reports results with the industry peer selected following the Purnanandam and Swaminathan (2004) algorithm as a comparable publicly traded firm in the same Fama and French (1997) industry as the convertible issuer which has the closest sales and OIBD margin (OIBD/Sales) in the pre-offer announcement fiscal year. Panel B reports results with the industry peer selected as a comparable publicly traded firm in the same two-digit SIC code industry as the convertible issuer and has the closest propensity score value based on previous fiscal year (OIBD + Interest Income)/Assets, Profit Margin, ROA, (OIBD + Interest Income)/Sales, (Capital Expenditures + R&D)/Assets, Market-to-Book, and Total Assets. Propensity score logit functions are estimated separately for putable convertible issuers and ordinary convertible issuers in each year. P/V is the ratio of one day prior to announcement day price-to-sales, one day prior to announcement day price-to-OIBD, one day prior to announcement day price-to-earnings, or one day prior to announcement day price-to-book value of the convertible issuer divided by corresponding price-to-sales, price-to-OIBD, price-to-earnings, or price-to-book value of the comparable firm. *z*-statistics correspond to the Wilcoxon two-sample rank-sum test testing the equality of distribution of P/V values for putable convertible issuers and ordinary convertible issuers. ***, **, and * indicate significance at the 1, 5, and 10 percent levels, respectively.

	P/V Ratio Based on Price/Sales Multiple		P/V Ratio Based on Price/OIBD Multiple		P/V Ratio Based on Price/Earnings Multiple		P/V Ratio Based on Price/Book Value Multiple	
	Number of Firms	Median P/V	Number of Firms	Median P/V	Number of Firms	Median P/V	Number of Firms	Median P/V
Panel A: Industry peers selected following the Purnanandam and Swaminathan (2004) matching algorithm								
Putable Convertible Issuers	332	1.29	300	1.28	241	1.38	308	1.17
Ordinary Convertible Issuers	1,284	1.61	952	1.39	781	1.33	1,192	1.42
<i>z</i> -statistic for valuation difference		-2.00**		-1.63		-0.15		-3.54***
Panel B: Industry peers selected using the propensity score matching algorithm								
Putable Convertible Issuers	303	1.33	276	1.28	205	1.15	282	1.21
Ordinary Convertible Issuers	1,129	1.62	812	1.33	645	1.32	1,070	1.45
<i>z</i> -statistic for valuation difference		-2.33**		-1.31		-1.19		-2.56**

Table 5

Long-run stock return performance of putable and ordinary convertible issuers relative to a matched sample of non-issuers, and the CRSP value-weighted index for eight different event windows for the sample period from 1982 to 2003s. Panels A and B present long-run stock return performance of putable convertible issuers relative to a matched sample of non-issuers and the CRSP value-weighted index, respectively. Panels C and D present long-run stock return performance of ordinary convertible issuers relative to a matched sample of non-issuers and the CRSP value-weighted index, respectively. Matching non-issuers both for putable and ordinary convertible issuers were chosen following the Loughran and Ritter (1997) matching algorithm. Each issuing firm was matched with a firm that had not issued convertible debt during the five years prior to the issue date. The non-issuer had to be in the same industry (using 2-digit SIC codes) with asset size at the end of the previous fiscal year relative to the issue year between 25 to 200 percent of the issuing firm, and then the non-issuer with the closest operating income before depreciation, amortization, and taxes (OIBD) relative to assets was chosen. If no non-issuer met these criteria then the industry requirement was dropped and a matching firm was chosen with asset size within 90 to 100 percent of the issuing firm and with closest, but higher, OIBD/Assets ratio. In each panel the holding period returns are calculated for eight different event windows; for each of three years prior to the issue date and for each of five years after the issue date. Holding period returns are calculated as $[\prod_{t=1}^{T_i} (1 + R_{it}) - 1] \times 100\%$, where R_{it} is the return on stock or index i on the t -th day of the event window and T_i is the number of trading days in the event window. For firms that were delisted before the end of the event window, the holding period return is calculated until the delisting date, and the corresponding matched firm's and index's return is calculated over the same truncated period. If the matched firm is delisted, the next closest matched firm's return is used. For each category of firms in each event window the average holding period returns are calculated as the average over the number of firms in that particular event window. Abnormal average returns are then calculated as the difference between holding period returns of issuers and matched non-issuers or CRSP value-weighted index and t -statistics are calculated to test if the abnormal average returns are significantly different from zero. ***, **, and * indicate significance at the 1, 5, and 10 percent levels, respectively.

	Year 3 prior to issue	Year 2 Prior to Issue	Year 1 Prior to Issue	Year 1 After Issue	Year 2 After Issue	Year 3 After Issue	Year 4 After Issue	Year 5 After Issue
Panel A: Average holding period returns by event years for putable convertible issuers and a matched sample of non-issuers								
Putable Convertible Issuers	25.58%	21.24%	38.51%	2.97%	14.32%	12.45%	12.21%	17.42%
Matched Non-Issuers	20.52%	16.23%	10.50%	12.50%	17.95%	19.61%	13.65%	15.23%
Abnormal Return	5.06%	5.01%	28.00%	-9.53%	-3.63%	-7.17%	-1.44%	2.19%
t -statistic	1.16	0.84	3.28***	-3.42***	-0.63	-1.57	-0.28	0.32
Number of Firms	311	320	322	316	204	167	101	85
Panel B: Average holding period returns by event years for putable convertible issuers and the CRSP value-weighted index								
Putable Convertible Issuers	25.58%	21.24%	38.51%	2.97%	14.32%	12.45%	12.21%	17.42%
CRSP Value-Weighted Index	6.21%	0.33%	4.91%	6.28%	10.84%	13.75%	13.81%	10.77%
Abnormal Return	19.37%	20.90%	33.60%	-3.31%	3.48%	-1.30%	-1.60%	6.64%
t -statistic	6.09***	4.26***	3.93***	-1.65*	0.80	-0.42	-0.37	0.99
Number of Firms	311	320	322	316	204	167	101	85
Panel C: Average holding period returns by event years for ordinary convertible issuers and a matched sample of non-issuers								
Ordinary Convertible Issuers	35.77%	33.87%	60.28%	5.29%	6.97%	7.02%	11.46%	11.85%
Matched Non-Issuers	26.67%	15.36%	31.52%	12.12%	16.46%	12.17%	14.90%	9.85%
Abnormal Return	9.09%	18.51%	28.76%	-6.83%	-9.50%	-5.16%	-3.45%	1.99%
t -statistic	2.61***	5.59***	6.90***	-2.92***	-3.51***	-2.21**	-1.20	0.64
Number of Firms	1,147	1,269	1,281	1,259	1,103	936	776	627
Panel D: Average holding period returns by event years for ordinary convertible issuers and the CRSP value-weighted index								
Ordinary Convertible Issuers	35.77%	33.87%	60.28%	5.29%	6.97%	7.02%	11.46%	11.85%
CRSP Value-Weighted Index	14.70%	9.54%	14.91%	10.27%	11.63%	12.64%	14.69%	9.88%
Abnormal Return	21.07%	24.34%	45.37%	-4.98%	-4.66%	-5.63%	-3.23%	1.96%
t -statistic	7.24***	8.16***	11.53***	-2.92***	-2.31**	-3.09***	-1.56	0.81
Number of Firms	1,147	1,269	1,281	1,259	1,103	936	776	627

Table 6

Time-series regressions of post-issue monthly percentage returns of putable and ordinary convertible issuers using Fama-French's three-factor model

$$(R_{pt} - R_{ft}) = \alpha + \beta(R_{mt} - R_{ft}) + s SMB_t + h HML_t + \varepsilon_t$$

where R_{pt} is the return on the portfolio of sample firms in month t ; R_{mt} is the return on the value-weighted index of NYSE, Amex, and NASDAQ stocks in month t ; R_{ft} is the 3-month T-bill yield in month t ; SMB_t is the return on small firms minus the return on large firms in month t ; and HML_t is the return on high book-to-market stocks minus the return on low book-to-market stocks in month t . The factor definitions are described in Fama et al. (1993). The sample period is January 1982 to December 2003 (264 months), and sample firm returns are included in a particular monthly portfolio if the firm's convertible debt offering date occurred within the last 60 months. The number of firms in the portfolio ranges from 1 to 234 for the putable convertible sample and from 3 to 609 for the ordinary convertible sample. Regressions (1) and (2) in each panel use equally weighted (EW) returns, and regressions (3) and (4) use value-weighted (VW) returns (with value measured as the sample firms' month-end market capitalization in the month prior to the portfolio formation). Regressions (1) and (3) in each panel are estimated using ordinary least squares (OLS), and regressions (2) and (4) are estimated using weighted least squares (WLS) with the weights based on the number of offering firms in the monthly portfolio. Parameter estimates are presented with t -statistics in parentheses. ***, **, and * indicate significance at the 1, 5, and 10 percent levels, respectively.

	α	β	s	h	R^2_{adj}
Panel A: Putable Convertible Issuers					
(1) EW portfolios/OLS	-0.22 (-1.05)	1.00 (19.34)***	0.51 (7.74)***	0.02 (0.24)	0.71
(2) EW portfolios/WLS	-0.33 (-1.80)*	1.16 (27.08)***	0.52 (9.09)***	0.11 (1.56)	0.80
(3) VW portfolios/OLS	-0.20 (-0.82)	1.00 (17.07)***	0.27 (3.62)***	-0.23 (-2.50)**	0.67
(4) VW portfolios/WLS	-0.33 (-1.86)*	1.10 (26.38)***	0.13 (2.27)**	-0.18 (-2.73)***	0.79
Panel B: Ordinary Convertible Issuers					
(1) EW portfolios/OLS	-0.75 (-3.83)***	1.28 (26.74)***	0.92 (14.93)***	-0.04 (-0.53)	0.85
(2) EW portfolios/WLS	-0.61 (-3.31)***	1.26 (29.90)***	0.90 (14.88)***	-0.08 (-1.11)	0.87
(3) VW portfolios/OLS	-0.21 (-1.26)	1.16 (27.89)***	0.37 (6.90)***	-0.43 (-6.78)***	0.86
(4) VW portfolios/WLS	-0.25 (-1.97)**	1.16 (39.07)***	0.32 (7.76)***	-0.43 (-8.42)***	0.92

Table 7

Logit regressions explaining the choice between putable convertible issues and ordinary convertible issues for the sample period from 1982 to 2003. The dependent variable is equal to 1 if the convertible issue is putable and 0 if the convertible issue is ordinary. Shumway Bankruptcy Measure (SBM) is computed after Shumway (2001) as $SBM = -1.982 \times (ROA) + 3.593 \times (\text{total liabilities (Compustat item 181)/assets (Compustat item 6)}) - 0.467 \times (\text{logarithm of the ratio of market value of equity (Compustat item 199 times Compustat item 25) to the total market value of equity of all Compustat firms}) - 1.809 \times (1 \text{ Year Prior Market Adjusted Cumulative Return}) + 5.791 \times (\text{Idiosyncratic Risk})$, where ROA is the return on assets in the fiscal year prior to issue computed as the ratio of net income (Compustat item 172) to the assets, 1 Year Prior Market Adjusted Cumulative Return is computed by cumulating daily market adjusted returns for a period of 255 trading days prior to issue date, and Idiosyncratic Risk is the residual standard deviation of the market model estimated over 255 trading days ending 46 days before the issue date. LT Debt is the book value of firm's long-term debt at the end of the fiscal year prior to issue (Compustat item 9). Assets are book value of firm's total assets at the end of the fiscal year prior to issue (Compustat item 6). CapEx is the capital expenditures for the fiscal year prior to issue (Compustat item 128). Stock Return Volatility is the standard deviation of the daily stock returns for a period of 255 trading days ending 46 days before the issue date. Firm Size is the market value of firm's equity calculated as the number of shares outstanding (Compustat item 25) times share price (Compustat item 199) at the end of the fiscal year prior to issue (\$ billions). P/V based on Price/Book Value is the price-to-value ratio, where value is the fair value of the issuer computed based on market price-to-book value ratio of an industry peer following Purnanandam and Swaminathan (2004). Income Taxes are issuer's total income taxes for the fiscal year prior to issue (Compustat item 16). Sales are total sales in the fiscal year prior to issue (Compustat item 12). Investor Sentiment Index is the first principal component of orthogonalized values of value-weighted average closed-end fund discount, log of NYSE share turnover detrended using five year moving average, the number and average first-day returns on IPOs, the equity share in new issues of equity and long-term debt, and dividend premium defined as the log difference between average value-weighted market-to-book ratios of dividend payers and non-dividend payers. Investor Sentiment Index is measured at the beginning of the issue month. Cash Flow is the free cash flow in the fiscal year prior to issue computed as operating income before depreciation minus income taxes plus change in deferred taxes from the previous year to the current year (change in Compustat item 35) minus interest expense (Compustat item 15) minus sum of preferred dividends (Compustat item 19) and common dividends (Compustat item 21). ***, **, and * indicate significance at the 1, 5, and 10 percent levels, respectively.

	Coefficient (<i>t</i> -statistic)	Coefficient (<i>t</i> -statistic)	Coefficient (<i>t</i> -statistic)	Coefficient (<i>t</i> -statistic)	Coefficient (<i>t</i> -statistic)	Coefficient (<i>t</i> -statistic)	Coefficient (<i>t</i> -statistic)	Coefficient (<i>t</i> -statistic)	Coefficient (<i>t</i> -statistic)	Coefficient (<i>t</i> -statistic)	Coefficient (<i>t</i> -statistic)
	1	2	3	4	5	6	7	8	9	10	11
Intercept	-0.271 (0.77)	1.068 (2.57)**	0.383 (0.79)	-0.351 (-1.32)	0.354 (0.74)	0.269 (0.57)	-0.405 (-0.93)	1.148 (2.49)**	0.480 (1.46)	-0.535 (-2.62)***	-0.095 (-0.30)
Shumway Bankruptcy Measure	-0.077 (-1.48)	-0.221 (-3.66)***	-0.124 (-1.81)*		-0.078 (-1.22)	-0.123 (-1.82)*	-0.159 (-2.45)**	-0.216 (-3.28)***	-0.166 (-3.35)***		-0.176 (-3.69)***
LT Debt/Assets	0.670 (1.55)	1.104 (2.39)**	1.028 (2.05)**	0.741 (1.57)		0.768 (1.58)	1.323 (2.73)***	1.207 (2.49)**	0.802 (1.94)*	0.485 (1.24)	1.123 (2.79)***
CapEx/Assets	-3.705 (-3.72)***	-2.198 (-2.26)**	-2.785 (-2.68)***	-2.651 (-2.61)***	-2.465 (-2.41)**		-2.941 (-2.84)***	-3.347 (-3.21)***	-4.252 (-4.34)***	-4.020 (-4.23)***	-4.180 (-4.30)**
Stock Return Volatility	-14.875 (-3.30)***	-26.295 (-5.14)***	-26.699 (-4.56)***	-28.041 (-4.80)***	-28.274 (-4.85)***	-27.403 (-4.66)***		-27.596 (-4.85)***	-15.125 (-3.50)***	-16.896 (-3.94)***	
Firm Size	0.104 (6.94)***	0.084 (6.18)***	0.086 (5.88)***	0.092 (6.20)***	0.089 (6.00)***	0.090 (6.15)***	0.086 (6.05)***				
P/V based on Price/Book Value	-0.084 (-3.11)***	-0.062 (-2.90)***	-0.059 (-2.45)**	-0.056 (-2.21)**	-0.060 (-2.42)**	-0.064 (-2.69)***	-0.066 (-2.76)***	-0.017 (-0.88)	-0.042 (-2.13)**	-0.033 (-1.78)*	-0.050 (-2.46)**
Income Taxes/Sales		0.264 (0.21)	0.505 (0.37)	0.987 (0.74)	0.323 (0.24)	0.318 (0.24)	1.081 (0.83)	0.915 (0.66)		2.598 (2.11)**	2.434 (2.00)**
Investor Sentiment Index		-1.248 (-10.94)***	-1.276 (-10.50)***	-1.244 (-10.36)***	-1.267 (-10.42)***	-1.333 (-11.03)***	-1.135 (-10.01)***	-1.343 (-11.35)***			
Cash Flow/Assets			2.390 (2.92)***	2.710 (3.40)***	2.317 (2.93)***	1.882 (2.49)**	3.130 (3.99)***	2.219 (2.87)***			
N	1,417	1,417	1,296	1,296	1,298	1,319	1,296	1,417	1,417	1,419	1,417
Pseudo R ²	0.1085	0.2138	0.2221	0.2197	0.2191	0.2169	0.2047	0.1758	0.0442	0.0397	0.0378

Figure 1

Total proceeds of putable and ordinary (non-putable) convertible debt offerings conducted in the US from 1982 to 2003 by year of issue. The numbers represent the total proceeds of all the issues of putable and ordinary convertible debt (with the exclusion of poison put convertible debt offerings) identified in SDC/Global New Issues database for the sample period.

