The Existence of Corporate Bond Clawbacks (IPOCs): Theory and Evidence

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Abstract

Clawback provisions allow the issuer to partially redeem a bond issue often within three years of issuance using proceeds only from new equity issues. Empirical evidence indicates the clawback provision is rarely exercised. This poses an interesting dilemma as clawback provisions are an expensive source of funding, often commanding yields that are significantly higher than traditional corporate bonds. We develop a simple model that provides a rationale for the scarcity of call redemptions and the higher yields of clawback bonds. The model predicts a relation between issuance of clawback bonds, cash flow volatility and the probability of renegotiation of clawback debt contracts.

The Existence of Corporate Bond Clawbacks (IPOCs): Theory and Evidence

Corporate bond clawbacks (IPOCs)[1], sometimes called an equity clawback, grew out of the high yield debt market of the 1980s. The development of institutional investors with an appetite for high yield debt spurred by Drexel, Burham and Lambert, created the original issue high yield debt market and increased the usage of the corporate bond clawback provision (Daniels, Demissew, and Jayaraman (2009)). The clawback provision, in an IPOC, allows the debtor the option to redeem a preset fraction of the bond within a preset period at a predetermined price as long as the funds used for the debt redemption come from an equity offering.

IPOCs have three distinctive features. First, IPOCs are predominantly high yield securities. Second, as documented in this paper, corporate bond clawback provisions are rarely exercised. Third, IPOCs have a relative short redemption window which starts immediately upon issuance and usually spans for up to three years. The existence of these features raises important questions as to why and under what conditions IPOCs are used, the use of a short redemption window, and its timing among others. Extant literature on IPOCs is limited to a few papers empirically dealing with the first feature[2]. We develop a simple model that gives a rationale for the use of IPOCs and provide empirical evidence supporting the predictions of our model[3]. Our IPOC model determines the ex-

[1] IPOC stands for initial public offering clawbacked.

[2] Daniels et. al. (2009) demonstrate that firms like issuing IPOCs because an IPOC provides access to the public debt markets and allows for the financial markets to improve the transparency of the firm during the debt issuance process.

[3] Theoretical models such and Brennan and Kraus (1987) , Constantinides and Grundy (1989) amd Stein (1992) are similar in style to our theoretical model. However, we emphasize that our motivation for the issuance of IPOCs presents a novel explanation for the capital structure and financing of the firm.

ante consequences of the clawback provision. In the model, a firm seeks to finance an initial investment by issuing an IPOC. We determine under what conditions it is rational for a firm to issue an IPOC and what fundamental factors determine the existence of the distinctive features of an IPOC. Our model is able to investigate the impact of certain contract features of the IPOC such as the percentage of the firm's equity that IPOC holders receive in exchange for their debt. We also demonstrate that private benefits of corporate control have an impact on the IPOC issuance decision. To our knowledge there has not been a theoretical model which specifically analyzes the IPOC contract.

The existing literature on convertible corporate bonds recognizes that high value firms like to distinguish their performance such that low value firms cannot mimic their strategies Stein (1992). We use the IPOCs to show that once financial distress costs become significant issuing straight debt and callable convertible debt becomes less feasible. Hence, we illustrate why the issuance of the IPOC is a rational choice given its high yield, associated with a relatively expensive clawback option. Our model builds on the existing literature of corporate bond clawbacks and exploits the assumption that firm managers seek to avoid significant share dilution and to maximize the long-term equity value of its shareholders. Also, firms seek to avoid bankruptcy and attempt to minimize their probability of being in financial distress. More importantly, for IPOC issuers, firms seek flexibility in the financing of their capital structure and monitor their ability to renegotiate their existing debt. In such a model, cash flow volatility and the possibility of future debt renegotiations are key factors determining the use of IPOCs.

The contributions of the model are threefold. First, the model demonstrates the necessary conditions for rarely exercising the clawback option of IPOCs. This happens when owners of the firm are significantly confident of positive cash flows that they are less likely to exercise the clawback provision. Second, the model predicts that IPOCs command higher yields. Firms that have

high growth prospects are more likely to face more severe asymmetric information[4]. Firm managers know the projects are "good" but they have difficulty in convincing bondholders. As a result, the firm must pay higher interest costs than they "should" given the quality of the project[5]. Third, the model documents that, in the presence of high benefits of private control, the option to convert is less valuable to managers of firms with higher volatility of cash flows. Finally, the model provides the conditions under which renegotiation of IPOC debt contracts would occur. Hennessy (2004) encourages additional research on the role of renegotiation in debt contracts. While not explicitly modeled, we provide insights into the bargaining power in debt renegotiations that is gained by the issuers of IPOCs and disposition of creditors to debt renegotiation and risk sharing with the firm. Thus, this paper contributes to the literature on the role of renegotiation on contract design. Hart and Moore (1988) recognize that when cash flows are not verifiable that the possibility of renegotiation is an important factor which may have an impact on the design of the original contract[6]. Also, Myers (1977) and Hart and Moore (1994) imply that when debt renegotiation breaks down it generates a debt overhang which negates the ability of the firm to renegotiate with

[4] Also, given that the majority of firms that issue an IPOC are small firms that are in financial distress, the financial constraints that are placed upon the firms are significant and traditional bank financing may only be available at a significant penalty to the current management of the firm.

[5]It is possible that once the project has been "revealed", bondholder's benefit at the expense of stockholders, as they receive above average rates of interest although the risk has been revealed to be much lower than anticipated. This expropriation of wealth by bondholders reduces the benefits that flows to the shareholders and weakens the incentive to invest. Under this framework, corporate bond clawbacks can be seen as an instrument designed to protect the firm from the consequences of the underinvestment problem but also deliver additional benefits that have not been clearly outlined in the previous literature.

[6] There is a large literature on incomplete contracts such as Aghion and Bolton (1992), Dewatripont and Tirole (1994) that recognizes complete contracts are costly to design and may not be feasible given the inability to verify contingent cash flows under different state of natures.

its creditors and jeopardizes the firm as an ongoing concern. IPOCs could play a role in dealing with this debt overhang.[7]

We demonstrate that owners anticipate the possibility of renegotiation which gives a degree of flexibility in the capital structure. Hart and Moore (1998) support this view based on a dynamic theory of debt where a borrower threatens to withdraw from the project and triggers renegotiation of the debt contract. Green (1987) and Wang (2000) also support the notion of a dynamic contract that allows the possibility of renegotiation which avoids bankruptcy while helping debtors and creditors share risk. Sigouin (2003) builds on the notion of risk sharing by illustrating that capital alters the terms of a financial relationship and allows creditors the latitude to increase their commitment to a debtor.[8] In our scenario, non-conversion of the clawback provision is strategic and leads to an increased commitment from creditors. Here, relationships are extended due to the renegotiation of the IPOC, a desire for investment continuity and the need to share risk.[9]

The predictions of the model are supported by the findings of our empirical study. We compare IPOCs to callable convertibles bonds (CCBs), the security which has the closest resemblance to the IPOC, during the period 1993-2009. We find that IPOCs are more closely

[7] The clawback provision may be helpful in alleviating debt overhangs because it allows an issuer to circumvent the non-refundability of debt. Like simultaneous tenders and calls (STACs), clawbacks represent a financial tool that allows the bond issuer to legally circumvent standard bond contractual features. STACs allow a firm to redeem non-refundable debt using "clean" cash (See Dhillon, Noe, and Ramírez (2001) for a detailed presentation). The legal dispute and court ruling in Macy's STAC in 1990 practically eliminated the viability of this tool.

[8] Hart and Moore (1988) also distinguish between an incomplete contract and information asymmetry.

[9] Sigouin (2003) notes that relationship lending in this context is not driven by asymmetric information as in Boot et. al 1991. We also note that given the average firm that uses an IPOC is a small firm that a form of relationship lending is advantageous as the firm moves through the growth cycle. However, relationship lending in corporate debt markets is driven by risk sharing rather than the degree of information asymmetry.

associated with firms that have low cash flow volatility, and have higher yields (on average about 10% vs. about 4% for convertibles), and have higher likelihood of renegotiating its debt (via either an exchange or a tender offer) than convertibles. These differences persist even after accounting for credit quality, issue characteristics, and time trends using a multivariate analysis. Results are robust to several definitions of credit quality.

The rest of the paper is structured as follows. We present a simple model for IPOCs in Section 2. Section 3 illustrates a basic numerical analysis of the model. We present data and sample characteristics in Section 4. Section 5 provides multivariate analysis and empirical results. Section 6 discusses the results with some implications for policy.

1. IPO CLAWBACKS MODEL

IPOCs are different from convertible bonds. IPOCs provide more flexibility to the issuing firm in terms of its ability to convert part of the issued debt into equity shortly after issuance. Convertible bonds have a protection period, usually three or more years, where the bond cannot be called for early redemption by the issuing firm. Another difference is that IPOCs can be redeemed only by issuing equity, while convertibles do not have restrictions on the sources of funds used to pay bondholders upon early redemption. Finally, while convertibles have a strike price for the call option to be exercised, IPOCs do not have one. Accordingly, IPOCs can be called for redemption regardless of the price of the equity of the firm. Since IPOCs usually have call provisions effective after the clawback provision expires, the main differences between these instruments are the protection period and the absence of a strike price for the redemption of IPOCs.

We propose a simple model that gives a rationale for the use of IPOCs. Our model is able to explain three empirical regularities observed in the market. First, the high interest rate offered by

IPOCs; second, the fact that the conversion option is seldom exercised and third, renegotiation of IPOCs is often observed.

1.1. THE BASIC MODEL

Consider an economy with two different types of firms, where types are related to the characteristics of the set of investment opportunities each firm faces. Each firm can invest in a positive net present value investment project. The risk associated with the projects differs between firms. For each firm in the economy we assume that the manager is the owner of the firm and that she does not have enough funds to invest in the project. The firms have assets in place, which values depend on the investment decision. In particular, if a firm does not invest, the base value of the assets is *1*. We assume that the assets in place are not completely specific to the economic activities of the firms. In this sense, if a firm is liquidated, its assets can be sold at a discount, ρ, with $0 \leq \rho \leq 1$.[10] Furthermore, we assume that the residual value of the assets in place is zero. We consider a three period time model.

At time *t = 0* the initial investment required for the project is $I_0 = \theta$, with $\theta > 1$. If the initial investment is not made, the investment opportunity vanishes. At this point in time, firms can issue IPOCs or convertible bonds (CBs) to raise funds for their projects. The face value of any of these instruments is $D = I_0 = \theta$. Furthermore, the manager of the firm knows what type of firm she is in charge of, but outside investor do not know this.

At time *t = 1*, IPOCs can be partially called by the issuing firm and converted into equity. A fraction γ of the debt, with $0 < \gamma < 1$, is converted into equity upon conversion. Consequently, $(1-\gamma)$

[10] We are assuming that the liquidation discount of all firms is the same. Allowing for different liquidation discounts do not alter the main implications of the model.

of the debt remains in the firm´ s capital structure. Let α be the fraction of the firm´ s equity that IPOCs´ holders receive in exchange for the fraction γ of the outstanding debt they are giving up. The conversion option expires at the end of time t =1.

At time t =2, convertible bonds can be called by the issuing firm and converted into equity at the bondholders' will. The strike price of the convertibles bonds is *K*. Upon conversion, bondholders get ε of the value of the firm.[11] Also, at this time, the proceeds from the investments and the assets in place are distributed and all types of debt issued at time *t = 0* are due. By setting the due date of the option to call IPOCs at time *t = 1* and the maturity of the convertible bonds option at time *t = 2*, we attempt to capture the longer protection period for convertibles.

If a firm invests, it will generate random cash flows, *CF*, at time *t = 1* and at time *t = 2*. The characteristics of these cash flows depend on the type of firm facing a particular investment opportunity. The characteristics of these cash flows for each of the firms are the following:

For the first type of firms, type *I* firms, cash flows are identically and independently distributed according to:

$$CF_t^I = \begin{cases} u & \text{with probability } p \\ d & \text{with probability } 1\text{-}p \end{cases} \qquad t = 1, 2 \tag{1.1}$$

with *u > 1, 0 < d < 1* and *p > ½.* For the second type of firms, type *C* firms, cash flows are identically and independently distributed according to:

[11] Note that since the debt associated with convertible bonds is completely exchanged for equity upon conversion, the value of the firm´s equity is equal to the value of the assets of the firm.

$$CF_1^C = \begin{cases} u & \text{with probability } p \\ d & \text{with probability 1-}p \end{cases}$$
$$CF_2^C = \begin{cases} v & \text{with probability } q \\ d & \text{with probability 1-}q \end{cases} \qquad (1.2)$$

with $v > u$ and $q > p$. With this specification we attempt to model different types of firms as having different investment opportunities.[12] In particular, type *C* firms has higher growth opportunities than type *I* firms, reflected in the fact that cash flows in the second period for the former type of firms are always as large as the cash flows for the later. Even though investor cannot distinguish firm types at time *t = 0,* they do know the distribution of cash flows for each type of firm.

The basic structure of the model is presented in Figure 1. We assume that if the materialization of cash flows at time *t = 1* is *u* (high value cash flows) , any type of firm can always repay the debt associated with its corresponding issued debt obligation, regardless of the cash flows materialized at time *t = 2*. Similarly, if the bad state of nature materializes at time *t = 1*, it is possible that firms fall into financial distress at time *t = 2*, which will occur if low value cash flows materialize at that time too. In other words, we are assuming that $u+d > \theta(1+r)^2 > 2d$, where *r* corresponds to the interest rate offered by the firm´s specific debt instrument used to raise funds.[13] Failure to pay any debt obligation makes the firms fall into financial distress. We assume that there is a fixed cost of financial distress equal to *c*, with *c > 0*. We assume that all participants are risk neutral, so financial instruments are priced at their expected values. Note that if the low value of cash flows materializes at time *t = 1*, type *I* firms have a probability of $(1-p)$ to fall into financial distress, which can be much higher than the ex-ante probability of financial distress at

[12] Notice *p* is set greater than 0.5 in order to make sure that projects are positive NPV ventures.

[13] Note that given that $v > u > d$, this condition suffices to guarantee that any type of firm will be able to honor its debt at time t = 2 after a high value realization of cash flows at time t = 1.

time *t = 0*, which is given by $(1-p)^2$. Furthermore, for type *C* firms, the time *t = 0* probability of falling in financial distress is $(1-p)(1-q) < (1-p)^2$. Type *I* firms are able to avoid financial distress if part of their debt is converted into equity at time *t = 1*.

IPOCs offer a nominal interest rate r_I per period, CBs offer a nominal interest rate r_C per period and the risk free interest rate in the economy is r_f. All interest payments are made, together with the principal, at the end of *t = 2*. For the investments projects to represent positive NPV investments it is necessary that $2(pu + (1-p)d) > \theta\ (1+r_f)^2$.

We also assume that the strike price of convertibles bonds, *K*, is such that $2u < K < u + v$, so only type C firms are able to force conversion at time *t = 2* after high value realizations of cash flows. In other words, only firms with valuable investment opportunities are able to force conversion of convertible bonds after good realizations of cash flows.

1.2. THE CASE FOR IPOCS

We first analyze the case in which type I firms issue IPOCs and invest. We develop a set of conditions under which IPOCs issuing firms do not use the conversion feature of their issued bonds and renegotiation takes place.

THE VALUE OF EQUITY

Let *V* be the value of the equity of a firm of *type I* issuing IPOCs at time *t = 0*. At time *t = 1* IPOCs may be partially redeemed by the issuing firm. We need to characterize the value of equity in each of the possible states of nature at time *t =1*. Let´s consider first the case when the good state of nature has materialized so that the value of the cash flows of the firm at time *t = 1* is *u*. This corresponds to node A in Figure 1. If conversion takes place, the value of the equity of the firm is:

$$E_{t=1}\left[V^A \mid conversion\right]=[u\left(1+\ p\right)+(1-p)d-(1-\gamma)\theta\left(1+r\right)^2]^+ \tag{1.3}$$

where $[Z]^+ = Max[0,Z]$. Analogously, if conversion does not take place, the value of the equity of the firm in node A is:

$$E_{t=1}[V^A \mid no\ conversion]=[u\left(1+\ p\right)+(1-p)d-\theta\left(1+r\right)^2]^+ \tag{1.4}$$

On the other hand, if the bad state of nature materializes at time t = 1 (node B in Figure 1) the value of the equity of the firm, with and without conversion is given by, respectively:

$$E_{t=1}[V^B \mid conversion]=[p\left(d+u\right)+(1-p)2d-(1-\gamma)\theta\left(1+r\right)^2]^+ \tag{1.5}$$

$$E_{t=1}[V^B \mid no\ conversion]\ =[p\left(d+u\right)+(1-p)2d-\theta\left(1+r\right)^2]^+ \tag{1.6}$$

We have assumed that once in node A, all types of firms can repay the debt associated with the IPOC, regardless of the cash flows materialized at time *t = 2*. Specifically, for IPOCs, this is equivalent to assume that $u+d>\theta\left(1+r_I\right)^2$. In the same way, the firm will fall into financial distress if a bad state of nature materializes both at time *t = 1* and at time *t = 2*. However, the firm is able to avoid financial distress if part of its debt is converted into equity at time t = 1. We assume that if γ, the fraction of debt outstanding that is converted into equity at *t = 1*, is high enough, the firm is able to avoid financial distress even in the worst case scenario (which corresponds to two low value realizations of cash flows); that is, $2d\ >\ (1-\gamma)\theta\ (1+r_I)^2$. On the basis of these assumptions, we impose the following restrictions:

Condition 1 (Cash Flows and Debt Characteristics):

$$u+d\ >\ \theta\ (1+r_I)^2\ >\ 2d\ >\ (1-\gamma)\theta\ (1+r_I)^2 \tag{1.7}$$

It should be noted that the restrictions imposed by assumption (1) also make the project a positive NPV investment, since $2(pu+(1-p)d) > u+d > \theta\,(1+r_I)^2 \geq \theta\,(1+r_f)^2$.

INCENTIVES OF THE OWNER OF THE FIRM

As mentioned in the previous section, at time *t = 1*, IPOCs may be partially redeemed by the issuing firm. Since this option belongs to the owner-manager of the firm, conversion will only take place as long as the increase in equity value, due to the reduction in debt, more than compensates the reduction in the manager´s utility as a consequence of the dilution of his ownership in the firm. We assume that the manger derives utility from the cash flows of the firm and from the percentage of ownership in the firm due to, for instance, the existence of private benefits of control. The utility function of the risk neutral manager/owner of the firm is then given by:

$$U(W,\alpha) = W + w(1-\alpha) \tag{1.8}$$

where α is the fraction of equity that IPOCs´ holder would get upon conversion and $w(1-\alpha)$ is the manager´ valuation of a fraction $(1-\alpha)$ of the ownership of the firm and *W* is wealth. Without loss of generality, we assume that the private benefits of control are proportional to the base value of the assets of the firm.

We now characterize the conditions under which she would be willing to convert part of the outstanding debt into equity at time *t = 1*. On the one hand, she will have incentives to convert as long as $\mathrm{E}_{t=1}[\mathrm{U}_{\text{owner}}^{\text{high value}} \mid \text{conversion}] \geq \mathrm{E}_{t=1}[\mathrm{U}_{\text{owner}}^{\text{high value}} \mid \text{no conversion}]$. In the appendix, we show that conversion is not in the interest of the manager after the realization of high value states of nature as long as Condition 2 below holds:

Condition 2 (No Conversion in Good States of Nature):

$$u(1+p)+d\ (1-p)+w\ >\ \theta\ (1+r_I)^2[\frac{\gamma\ +\alpha\ (1-\gamma)}{\alpha}]\equiv f\ (\alpha,\theta,\ r_I,\ \gamma) \qquad (1.9)$$

According to equation (1.9) the firm will not call the IPOC for partial redemption at *t = 1* after a good realization of cash flows if the expected pay offs from the investment project (LHS of (1.9)) are high enough. Intuitively, the owner of the firm does not want to share the returns of the project with new shareholders. Similarly, if the private benefits of control are high, the manager will not want to convert and dilute his ownership in the firm. Now, regarding the RHS of equation (1.9), note that $\frac{\partial f}{\partial \alpha}=\left[\frac{-\theta(1+r_I)^2\gamma}{\alpha^2}\right]<0$. So, the higher the fraction of equity that IPOCs´ holder would get upon conversion (and that the owner gives up upon conversion), the less likely is that the owner of the firm will call for conversion after a high value of cash flows is realized. Similarly, $\frac{\partial f}{\partial \gamma}=\theta\ (1+r_I)^2\frac{(1-\alpha)}{\alpha^2}>0$. Accordingly, the higher the value of *γ*, ceteris paribus, the more likely is that conversion will take place, because a higher amount of debt would be converted into equity. Finally, the RHS of equation (1.9) is increasing in *θ* and increasing in *r*, so the higher the value of debt that has to be repaid at *t = 2*, ceteris paribus, the higher the incentives of the manager to convert after high value realization of cash flows. .

On the other hand, after a low value realization of the cash flows at time *t = 1*, the owner of the firm will have incentives to convert as long as her expected utility for converting is higher than her expected utility from not doing so: $E_{t=1}[U_{owner}^{low\ value}\mid conversion]\geq E_{t=1}[U_{owner}^{low\ value}\mid no\ conversion]$. In this case, however, if the manager decides not to convert, the firm will face financial distress with

probability $(1-p)$. Therefore, and as shown in equation (2.5) in the appendix, the expected utility for the owner of the firm now incorporates the expected cost of distress. The owner of the firm will have incentives to convert as long as the following condition holds:

$$p(u-d) < \frac{(1-p)\ c+(2d+w)(1-p-\alpha)+\theta\ (1+r_I)^2\ (p-(1-\gamma)(1-\alpha))}{\alpha} = g(\alpha,\theta,r_I,\gamma) \tag{1.10}$$

Since we are assuming the cash flows of the model follow a binomial distribution independently distributed through time, it should be noted that the unconditional variance of the cash flows of the project at time t = 0 is given by:

$$\sigma^2_{CF} = Var_{t=0}[CF] = 2p(1-p)(u-d)^2 \tag{1.11}$$

Accordingly, the LHS of equation (1.10) can be written as $p(u-d) = \sqrt{\frac{p}{2(1-p)}}\sigma_{CF}$. Therefore, the condition for conversion in bad states of nature can be written as stated in Condition 3 below.

Condition 3 (Conversion in Bad States of Nature):

$$\sqrt{\frac{p}{2(1-p)}}\sigma_{CF} < \frac{(1-p)\ c+(2d+w)(1-p-\alpha)+\theta\ (1+r_I)^2\ (p-(1-\gamma)(1-\alpha))}{\alpha} \tag{1.12}$$

Consider an increase in the volatility of cash flows induced by an increase in the difference between high and low cash flows $(u-d)$. The LHS of (1.12) will increase, while the RHS can only decrease. It follows that the higher the volatility of cash flows, the lower the incentives of managers to call at *t = 1*. The conversion option is less valuable to managers of firms with a higher volatility of

cash flows. Consequently, and given that the conversion option is rather expensive for the issuing firm in terms of the offered yields, we should expect to observe that IPOCs issuers exhibit a lower volatility of cash flows than other type of issuers. Thus, our first proposition is stated as follows:

Proposition 1: *Other things equal, the higher the volatility of cash flows, the less likely is that firms issue IPOCs.*

Regarding the effect of γ on the probability of conversion, it should be noted that $\frac{\partial \mathrm{g}}{\partial \gamma} = \frac{(1-\alpha)\theta\left(1+\mathrm{r}_I\right)^2}{\alpha} > 0$, so the higher the reduction in the outstanding debt due to conversion, the more likely is that conversion takes place after a bad realization of cash flows. Regarding the effect of α, $\frac{\partial \mathrm{g}}{\partial \alpha} = \frac{(p-1)w+(1-p-\gamma)\left(\theta r_I^{\,2}+2\theta r+\theta\right)+\left(2d+c\right)(p-1)}{\alpha^2}$. Given the restrictions imposed by Condition 1, this expression will generally be negative, so the higher α, the less likely is conversion. Regarding ownership, $\frac{\partial \mathrm{g}}{\partial \mathrm{w}} = \frac{1-\mathrm{p}-\alpha}{\alpha}$. The sign of this expression can be negative or positive. However, since p is greater or equal than 0.5, reasonable values of α will make this expression negative. Therefore, the higher the manager valuation of his ownership, the less likely is that she will be interested in converting.[14] Finally, note the larger the costs of financial distress the larger the RHS of equation (1.12) making the manager more willing to convert.

[14] In the numerical example of the model presented in section 3, we obtain the predicted signs for these effects.

THE ROLE OF RENEGOTIATION

As we argued before, if the value of the expected future cash flows at time *t = 1*, after the realization of good states of nature is high enough, it will not be in the interest of the manager to partially redeem the issued IPOCs. By doing so, she would be sharing the value generated by the investment project with new shareholders. Similarly, and upon the realization of low value cash flows at time *t = 1*, it is in the owner´ s interest to convert a fraction of the debt associated with the IPOCs if the expected costs of financial distress are high enough. However, empirically, the IPOC conversion option is seldom exercised. In fact, what it is observed is that in most cases renegotiation with IPOCs´ holders takes place. Let´s assume that renegotiation can take place at time *t =1* after the realization of low value cash flows. For renegotiation to be possible, it must be preferred to conversion by both IPOCs´ holders and by the owners of the firm.

We will assume that the firm attempts to renegotiate the whole debt outstanding associated with the IPOC.[15] If renegotiation takes place, the firm reinvests the cash flows from the project in that period, *d*, and the life of the project and the maturity of the debt is extended to a third period, time *t = 3*. The distribution of cash flows at time *t = 3* is also given by equation (1.1).

IPOCs holders will be willing to renegotiate as long as their expected payoff is higher with renegotiation: $E_{t=1}\left[\text{Pay off}^{\text{low value}}_{\text{IPOCs holders}} \mid \text{renegotiation}\right] > E_{t=1}[\text{Pay off}^{\text{low value}}_{\text{IPOCs holders}} \mid \text{conversion}]$. In the appendix we show that this condition is equivalent to Condition 4:

[15] This assumption is consistent with existing literature that finds most renegotiations via a tender offer or exchange offers targets 100% of the debt.

Condition 4 (IPOCs holders prefer renegotiation over conversion):

$$\frac{(1-p)^2\,2d+\theta(1+r_I)^2\left(\beta\left(1-(1-p)^2\right)-(1-\gamma)\right)}{2d+p(u-d)-(1-\gamma)\theta(1+r_I)^2}=h(\beta,\gamma,u,d)>\alpha \qquad (1.13)$$

where β is the proportion of the current debt that is renegotiated. Equation (1.13) establishes a maximum to the value of α, the fraction of the firm´ s equity that IPOCs´ holders receive in exchange for the fraction γ of the debt they are giving up, so that they prefer renegotiation over conversion. Intuitively, if α is too high, ceteris paribus, IPOCs holders might prefer to get a large stake of the company rather than renegotiating the original debt. Regarding the LHS of equation (1.13), it is clear that the larger the value of β, the more plausible is renegotiation. Consider now an increase in the volatility of cash flows induced by an increase in the difference between high and low cash flows $(u-d)$. It is clear that the value of $h(\cdot)$ decreases, making the inequality in (1.13) less likely to hold and renegotiation less plausible. Accordingly, for firms with relatively low volatility of cash flows, everything else constant, it should be easier to renegotiate their IPOCs associated debt upon the realization of low value cash flows. This result is consistent with Proposition 1 and emphasizes the central role of cash flow volatility as a key determinant for the choice between IPOCs and other type of hybrid securities.

The conversion option is more valuable to managers of firms with a lower volatility of cash flows. Since the IPOC option is expensive, we expect to observe a relatively low cash flow volatility among IPOCs issuers. Also, firms with a low volatility of cash flows might find it easier to renegotiate their debt, because an stable pattern of cash flows over time –a reduced cash flow volatility - makes the renegotiation game akin to a repeated game, in the sense that creditors face basically the same conditions they faced with the original loan. So, with the same level of

uncertainty and risk, if they provided funds the first time, they should be willing to provide funds a second time. Therefore, renegotiation is more likely to be observed among IPOCs issuers not only because the characteristics of these instruments gives leverage to the manager, but also because the conditions that make renegotiation an attractive mechanism are present in IPOCs issuers.

With respect to γ, the fraction of debt that is converted into equity upon conversion, it is possible to verify that, setting $\beta = 1$,

$$\frac{\partial h(\cdot)}{\partial(1-\gamma)} = \frac{\left(1-(1-p)^2\right)\left(\theta^2(1+r_I)^4 - 2d\theta(1+r_I)^2\right) - p(u-d)\theta(1+r_I)^2}{\left(2d + p(u-d) - (1-\gamma)\theta(1+r_I)^2\right)^2}$$

This expression does not have an unambiguous sign; however, and as shown in the next section, for reasonable values of the parameters of the model we obtain that $\frac{\partial h(\cdot)}{\partial(1-\gamma)} < 0$, so the higher the fraction of debt that is converted into equity, everything else constant, the higher is $h(\cdot)$ and the more attractive is renegotiation from IPOCs holders perspective.

Similarly, regarding the owner-manager of the firm, she will prefer renegotiation to conversion if $E_{t=1}[\mathrm{U}_{\text{owner}}^{\text{low value}}|\text{renegotiation}] > E_{t=1}[\mathrm{U}_{\text{owner}}^{\text{low value}}|\text{conversion}]$. In the appendix, we show that this condition is equivalent to Condition 5 below.

Condition 5 (Manager prefers renegotiation to conversion):

$$\frac{2up + d(1+p)(1-p) - \theta\beta(1+r_I)^2 - (1-p)^2 c + \left(1-(1-p)^2\right)w}{2d + p(u-d) - (1-\gamma)\theta(1+r_I)^2 + w} = l(\gamma, \beta, c, w) > 1-\alpha \quad (1.14)$$

Regarding the RHS of equation (1.14), the higher the proportion of the equity of the firm that the manager keeps upon renegotiation, the more attractive is conversion compared to renegotiation. Similarly, $\frac{\partial l(\cdot)}{\partial \gamma} < 0$, so the higher the fraction of debt converted into equity, for fixed values of the other parameters, the less attractive is renegotiation from the manager´s perspective. Regarding the costs of financial distress, $\frac{\partial l(\cdot)}{\partial c} < 0$. Accordingly, the higher the costs of financial distress, renegotiation becomes less attractive for managers relative to conversion, since with conversion they eliminate the risk of distress. Finally, $\frac{\partial l(\cdot)}{\partial w} > 0$, so the larger the manager´s valuation of her equity ownership in the firm, the more managers lean towards renegotiation.

Thus, our second proposition follows:

Proposition 2: *Other things equal, firms that issue IPOCs will have a higher propensity to renegotiate their debt.*

It should be noted that, from the point of view of IPOCs holders, the proper comparison is between the payoffs from renegotiation and the payoffs from conversion. The manager can always call their IPOCs for conversion, since she is not bounded by a strike price. If upon a renegotiation offer IPOCs holders do not accept, the manager can call.

INVESTORS PARTICIPATION CONSTRAINTS

We have derived so far conditions under which our theoretical model provides empirical implications consistent with some empirical regularities observed when firms issue IPOCs. In particular, under *Condition 1* to Condition *5*, the model predicts that the option embedded in the IPOC contract will not be exercised. Actually, in our theoretical development we analyze the

behavior of investors once they are already holding the bonds. The question that naturally arises is whether they are willing to do so or not.

Under the restrictions imposed by Condition 1 to Condition *5*, the expected pay off to bondholders from holding IPOCs is given by:

$$E_{t=0}[\text{Payoff}_{\text{IPOCs holders}}] = p\theta S\left(1+r_I\right)^2 + (1-p)\{(1-p)^2 2Sd + (1-(1-p)^2)\theta S\left(1+r_I\right)^2 \beta\} \tag{1.15}$$

Given that investors are risk neutral, they will provide funds as long as (1.15) is at least as high as $\theta S\left(1+r_f\right)^2$. By setting β = 1 and normalizing r_f to zero, this condition can be written as stated in condition 6 below;

Condition 6 (IPOC' holders Participation Constraint):

$$\theta\left(1+r_I\right)^2\left(1-\ (1-p)^3\right)+(1-p)^3 2d \geq \theta \tag{1.16}$$

Bondholders' participation in the corporate bond clawback market is an important consideration which allows corporate bond funding to a set of firms which cannot access funding from the traditional corporate bond market. From (1.16) it is clear that investors will participate and provide funds as long as the interest rate offered by IPOCs is higher than what they can get by investing in risk free debt. To see this, let $r_I = r_f = 0$ in equation (1.16). It follows that this inequality will hold only if $2d \geq q$. Accordingly, if the amount of debt required is high compared to the value of cash flows in low value states of nature, bondholders will be willing to provide funds only if the interest rate paid offered by IPOCs is sufficiently higher than the risk free rate.

Lastly, the manager/owner of the firm will find attractive to issue IPOCs as long as her expected utility from issuing and investing is higher than the alternative of closing down the firm and use the proceeds to invest at the risk free rate. Given that the restrictions imposed on the parameters of the model that make the projects positive NPV ventures, the restriction will be generally satisfied. In the numerical example presented in section 3 we show that this is the case for reasonable values of the parameters of the model.

1.3. THE CASE FOR CONVERTIBLES

In this section we briefly analyze the situation of type C firms assuming that these type of firms issue convertible bonds. We first assume that only type *C* firms are able to force the conversion of convertible bonds at $t = 2$, since they have higher growth opportunities than type *I* firms. Accordingly, we set the strike price K such that $u+v-\theta\left(1+r_c^2\right) \geq K \geq 2u-\theta\left(1+r_c^2\right)$. For conversion to take place, it must be in the interest of bondholders to convert, in the sense that what they get form conversion is higher than the value of the debt: $\varepsilon\left[\left(u+v\right)+K\right]-K \geq \theta\left(1+r_c\right)^2$. This condition for conversion can be written as:

Condition 7 (Condition for Conversion of Convertibles):

$$u+v \geq \frac{\theta\left(1+r_C\right)^2+K\left(1-\varepsilon\right)}{\varepsilon} \tag{1.17}$$

Accordingly, if growth opportunity are attractive enough (high value of *v*), type C firms will be able to force conversion of convertible bonds after high value realizations of cash flows.

Regarding the willingness of investors to hold convertible bonds issued by type *C* firms, it must be the case that the expected payoff from holding convertibles must be as high as the expected

payoff from investing in risk free assets: $E_{t=0}[\text{Payoff}_{\text{CB holders}} \,|\text{issued by type C firm}] \geq \theta\left(1+r_f\right)^2$. As shown in sub section A3 in the appendix, setting $r_C = r_f = 0$, this condition can be expressed as:

Condition 8 (Participation Constraint for Convertible Bond Holders):

$$pq\left(\varepsilon\left[\left(u+v\right)+K\right]-K\right) \geq \left(1-p\right)\left(1-q\right)2d \tag{1.18}$$

Therefore, if growth opportunities are high enough (high value of *v*), investors are willing to hold convertible bonds offering an expected yield equal to the risk free rate of the economy. It follows that it should be observed that IPOCs offer a higher interest rate than convertible bonds. From Condition 6 and Condition 8 follows our third proposition.

Proposition 3: *Other things equal, IPOCs should offer a higher interest rate than other types of instruments, like convertible bonds.*

Finally, for the manager/owner of the firm to find attractive to issue convertibles and invest it must be the case that her expected payoff from doing so is higher than the alternative of closing down the firm, selling the assets and investing at the risk free rate. Given the restrictions imposed on the parameters of the model, this condition is generally not binding. In the appendix, section A4, we present this condition formally.

1.4. SEPARATING EQUILIBRIUM

We claim that there exists a separating equilibrium in which type *C* firms issue convertible bonds and type *I* firms issue IPOCs. For this equilibrium to hold, it must be the case that neither type of firm has incentives to mimic another type.

It is easy to see that managers of type *C* firms will not be interested in mimicking type *I* firms by issuing IPOCs. Firstly, given the distribution of cash flows, their assets and financial instruments would be undervalued. Secondly, they would have to pay a higher interest rate that they would if they issue convertible bonds. The managers of type *I* firms, however, face a trade off: if they mimic type *C* firms and issue convertibles at time *t = 0*, these securities will be over priced. But, given the distributions of their cash flows, they will not be able to convert, so conversion is not longer a way to avoid financial distress. We argue that if the expected cost of financial distress is high enough, they will have no incentives to mimic high value firms and a separating equilibrium would be achieved in the economy.

Formally, over pricing is given by the difference in price of a convertible bond issued by a type *C* firm and a convertible bond issued by a type *I* firm. That is:

$$OP = E_{t=0}[\text{Payoff}_{\text{CB holders}} \,|\, \text{issued by type C firm}] - E_{t=0}[\text{Payoff}_{\text{CB holders}} \,|\, \text{issued by type I firm}] \tag{1.19}$$

In the appendix we show that equation (1.19) can be expressed as:

$$OP = pq\left(\varepsilon\left(u+v+K\right)-K-\theta\left(1+r_C\right)^2\right) > 0 \tag{1.20}$$

Note that given the restrictions imposed on the parameters of the model, equation (1.20) is always positive. Now, managers derive utility from both her level of wealth and her ownership in the firm. In terms of wealth, the utility a manager of a type *I* firm derives from mimicking a type *C* firm is given by (1.20). In terms of ownership, her expected utility from issuing convertible bonds is given by $\left(1-\left(1-p\right)^2\right)w-\left(1-p\right)^2 c$, since conversion will never take place, allowing her to obtain the full benefits of ownership - $\alpha = 0$ - as long as the firm does not fall in financial distress, in which

case she would bear the costs of distress. If she issues IPOCs, the expected utility she derives from ownership would be given by $pw+(1-p)\left[(1-p)^2(-c)+\left(1-(1-p)^2\right)w\right]$. Accordingly, her non-pecuniary benefits from mimicking (NPBM) will be:

$$NPBM=\left(1-(1-p)^2\right)w-(1-p)^2c- \left(pw+(1-p)\left[(1-p)^2(-c)+\left(1-(1-p)^2\right)w\right]\right) \tag{1.21}$$

After some algebra, the non-pecuniary benefits from mimicking can be expressed as:

$$NPBM=-\left[(1-p)^2-(1-p)^3\right](w+c)<0 \tag{1.22}$$

According to (1.22), the higher the costs of financial distress or the higher the manager´s valuation of her ownership of the firm, the more negative the non pecuniary benefits of mimicking. Note also that this expression is always negative. The total benefits from mimicking (*TBM*) for the manager are the sum of the over pricing plus the non pecuniary benefits of control:

$$TBM=pq\left(\varepsilon(u+v+K)-K-\theta(1+r_C)^2\right)-\left((1-p)^2-(1-p)^3\right)(w+c) \tag{1.23}$$

According to (1.23), the total benefits from mimicking can be negative if the costs of financial distress or the manager´s valuation of her ownership of the firm are sufficiently high. Managers will not have incentives to mimic each other type if *TBM* are negative or equivalently if Condition 9 below holds:

Condition 9 (Truthful Revelation Constraint for Type *I* Firms):

$$w+c>\frac{pq\left(\varepsilon(u+v+K)-K-\theta(1+r_C)^2\right)}{\left((1-p)^2-(1-p)^3\right)} \tag{1.24}$$

2. NUMERICAL EXAMPLE

In this section we consider a numerical example to analyze under which circumstances it is possible to achieve an equilibrium in which conditions 1 to 9 hold simultaneously. Under such equilibrium, firms with high growth opportunities and relatively more volatile cash flows prefer convertible bonds over IPOCs to fund their investment opportunities, while firms with relatively more stable cash flows and no growth opportunities prefer IPOCs, investors are willing to provide funds for either type of firms and the conversion option in the IPOC contract is never used. Furthermore, for IPOCs issuing firms, renegotiation would take place at time t = 1 after an unfavorable realization of cash flows.

For the distribution of cash flows of type I firms we consider $u = 1.3$, $d = 0.7$ and $p = 0.7$. For type C firms we consider $v = 1.7$, $d = 0.7$, $q = 0.8$. We assume that the required investment for the project is $\theta = 1.5$. The interest rate offered by IPOCs is $r_I = 5\%$ and the risk free interest rate is set to $r_f = 0$. We set the interest rate offered by convertible bonds equal to the risk free rate. In the IPOC contract, we set $\alpha = 0.6$ and $\gamma = 0.8$. In order to be able to make meaningful comparisons with IPOCs, we assume that upon conversion, convertible bonds holders get $\varepsilon = \alpha/\gamma$ of the value of the firm. Regarding the utility of the managers, we set $w = 0.8$. Finally, we set $\beta = 1$ and $\rho = 1$. This is summarized on Table 2, Panel A. It should be noted that, as shown at the bottom of the table, the ex ante probability of falling into financial distress is higher for IPOCs than for convertibles, despite the fact that the volatility of cash flows is higher for convertible bonds. Finally, the cost of financial distress $c = 2,6$ is chosen such that it makes the total benefits of mimicking equal to zero.

On Table 2, Panel B, we present the numerical values taken by the equations associated with conditions 1 to 9 for the specified parameters values. It is straightforward to check that all nine

conditions hold. Furthermore, for the functions $g(\alpha,\theta,r_I,\gamma)$ in equation (1.10) (Condition 3), $h(\beta,\gamma,u,d)$ in equation (1.13) (Condition 4) , and $l(\gamma,\beta,c,w)$ in equation (1.14) (Condition 5), the numerical values of the derivatives whose signs are not straightforward to obtain or that are not unambiguous are presented on the table. With respect to $g(\cdot)$, $\frac{\partial g(\cdot)}{\partial \alpha}<0$ and $\frac{\partial g(\cdot)}{\partial w}<0$, so the higher the fraction of the firm´ s equity that IPOCs´ holders receive upon conversion, *α*, and/or the higher the manger valuation of his ownership, *w*, the less likely is that she will be interested in converting after low value realizations of cash flows at time *t = 1.* With respect to $h(\cdot)$, $\frac{\partial h(\cdot)}{\partial(1-\gamma)}<0$. Accordingly, the higher the fraction of debt that is converted into equity, everything else constant, the more attractive is renegotiation from IPOCs holders perspective. Finally, $\frac{\partial l(\cdot)}{\partial w}>0$, so the larger the manager´s valuation of her equity ownership in the firm, the more she prefers renegotiation over conversion.

On Table 3 we present the expected utility of a manager of a type I firm, with and without renegotiation, for different values of *w*. For values of *w* lower than 0,6, Condition 5 does not hold, and managers prefer conversion to renegotiation at time t = 1. For higher values of *w*, the expected utility of the manager is always greater with renegotiation than without it. Furthermore, the manager will prefer to issue and invest than liquidate the assets of the firm. Accordingly, it seems to be the case that IPOC issuers will tend to be firms where management has an interest in the property of the firm and/or for which there are not negligible benefits of control.

Finally, it is easy to check that under the specified parameter values, managers of type *C* firms are willing to issue and invest (the expected pay off for the manager of a type C firm is 1,176) rather than liquidating and investing at the risk free rate.

On the basis of the theoretical model developed of Section 1 and the results obtained from the numerical examples we have several testable empirical hypotheses that we investigate. The implications of our analysis imply that although debt finance is costly and may impose significant financial distress costs upon the firm, there exists an intricate relationship between management and investors that focuses on several key contract and firm characteristics. Fluck (1998) illustrates that projects with higher cash flow variability use only outside equity financing. Our model supports this notion by showing that firms with lower cash flow volatility have a propensity to issue IPOCs. Also, consistent with Fluck (1998) our model implies that debt-equity ratios will be higher in in industries where cash flow volatility is low and that given it is costly to verify cash flows ex ante firms (as well as investors) may prefer contracts that ex post allow flexibility in the capital structure. IPOCs may be an example of a well-designed contract that gives managers the flexibility in their capital structure to renegotiate their debt given the ex post realizations of their cash flows. Our empirical investigation looks deeper into these propositions which emanate from our prior analysis.

4. Data selection and sample construction

We first select a sample of corporate bonds with clawback provisions. We obtain all the corporate bonds reported in Fixed Income Security Database (FISD) that have a flag for clawbacks during the period 1993 to 2009. After cleaning the resulting observations, eliminating repeated observations for 144A bonds, and matching with exchange and tender offers data, the IPOC[16]

[16] Securities issued in the 144A market are unregistered securities that can be subsequently registered by exchanging the unregistered security for an identical registered security. FISD keeps both records and considers the registering as an exchange. We tracked down repeated cases in FISD and consolidated them to keep the unregistered security information but consider in the analysis only registered securities. We also eliminated as part of this procedure cases in which a value of 1 was assigned by FISD to a registration_rights code. This implies the security has a clause that it needs to be registered within certain time often 180 days after issuance. However, this variable does not fully

sample reduces to 4,320 bonds. A similar procedure is followed to obtain the sample of callable convertible bonds. The resulting callable convertible bond sample is comprised of 1,994 bonds. We also collected a sample of straight bonds and callable bonds using the same procedure and use it for robustness checks of our regressions.

Table 1, Panel A shows the frequency distribution of IPOC and CCB debt by year and industry classification of the issuer. Each debt type starts with over 100 issues in 1993 but declines respectively for 1994 and 1995. Following the declines IPOC issuance rises to a peak issuance of 656 in 1998 but issuance declines during the 2000/2001 recession. CCB issuance never reaches the peak as IPOC issuance over the same time period. Both IPOC and CCB issuance peak (425 and 201, respectively) in 2004 and trend down over the remainder of the sample until 2009. Panel B illustrates the industry concentration of each debt type with IPOC issuance having a concentration in financial, machinery and retail, while the industry concentration for CCB issuance is similar but also shows industry concentration in oil, transportation and construction.

Descriptive statistics of the sample are presented in Table 1, Panel C.

Table 1 about here

In general, corporate bonds with the clawback features are characterized by relatively smaller issue sizes, and higher offering yields than corporate callable convertible debt (CCB). Our finding that IPOCs are smaller (lower offering amount) and have higher coupon rates and offering yields than callable convertible bonds is consistent with the previous literature such as Daniels et.

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reflect all 144A registrations that take place (See Huang and Ramirez, 2010). Accordingly, we further eliminate securities for which an exchange offer occurs within 180 days of issuance.

al.(2009). IPOCs also tend to be shorter in maturity with a noninvestment grade rating and have a redemption that averages about 35% per issue. Consistent with the underpinnings of our model, the clawback option is rarely exercised at 4%. We infer that this is a strategic management decision that illustrates the rationality of the corporate manager. Finally, we use the callable convertible bonds as a control group of debt since it has the debt characteristics which are similar to the IPOC.

5. Empirical Analysis

5.1. Multivariate Analysis

In this section, we provide an empirical investigation of the relation between security issuance (proposition 1 of the model) and cash flow volatility along with a set of factors capturing credit quality, issue and issuer characteristics using a probit estimation. We also estimate the probability of renegotiation (proposition 2 of the model) using a probit model and accounting for the presence of IPOCs. We also estimate the relationship between similar factors and offering yields (proposition 3 of the model) using OLS regressions and accounting for the presence of IPOCs.

The relationships are expressed in the following manner:

IPOC issuance = ƒ(credit quality, issue characteristics, issuer characteristics) (5.1)

Offering Yields = = ƒ(security type, credit quality, issue characteristics, controls) (5.2)

Renegotiation = ƒ(security type, credit quality, issue characteristics, issuer characteristics) (5.3)

CREDIT QUALITY is a vector that represents a set of variables capturing the credit risk of the issue. We rely on credit ratings to proxy for credit quality as it is the only information provided in the

database.[17] Alternatively, we proxy for credit quality with a set of two variables: a dummy variable to indicate whether a firm is rated by a credit agency (RATED_DUMMY) and a dummy variable that indicates whether the debt issue is of speculative grade (SPEC). We also used a third specification to capture credit quality: a dummy variable that indicates whether a firm is in financial distress (FD). FD is computed estimating an Altman Z-score and classifying the firm as being in financial distress if the Z-score is lower than 1.80. ISSUE CHARACTERISTICS is a vector of variables capturing the contract terms of each issue and include the log of the maturity and the log of the issue amount (for the renegotiation equation, we also include coupon rate). ISSUER CHARACTERISTICS is a vector of variables capturing the nature and type of issuers and includes factors such as variance of cash flows (Cash_Flow_Volatility), total assets (SIZE), a dummy variable to indicate if the firm is private (PRIVATE), leverage (DEBT RATIO), and return on equity (ROE).

The testable form for the IPOC issuance equation (5.1) is:

$$\mathbf{IPOC} = \mathbf{a_0} + \mathbf{b_1}(\mathbf{FD}) + \mathbf{b_2}(\mathbf{Rated\_dummy}) + \mathbf{b_3}(\mathbf{SPEC}) + \mathbf{b_4}(\mathbf{Drating}) + \mathbf{b_5}(\mathbf{Log\_size}) + \mathbf{b_6}(\mathbf{Log\_mat}) +$$

$$\mathbf{b_7}(\mathbf{Cash\_Flow\_Volatility}) + \mathbf{b_8}(\mathbf{SIZE}) + \mathbf{b_9}(\mathbf{PRIVATE}) + \mathbf{b_{10}}(\mathbf{DEBT\ RATIO}) + \mathbf{b_{11}}(\mathbf{ROE}) + \varepsilon_i . (\mathbf{5}.4)$$

We use the IPOC dummy to capture the propensity to issue a corporate clawback bond. Empirically, we estimate equation (5.4) three times each time using a categorization of credit quality explained in equation (5.1). Our main interest is focused on the cash flow volatility and the firm's financial distress (FD) on the propensity to issue an IPOC. We expect that cash_flow_volatility will be negatively related to likelihood of IPOC issuance and the firm's financial distress (FD) will be positively associated with the likelihood of IPOC issuance. Our rationale, following *proposition 1*, is that managers of firms with a higher levels of cash flow volatility have less of an incentive to

[17] Drating that captures the categorical structure of the S&P ratings where an AAA rating is represented by the value of 1, a AA rating by a value of 2, and so for with a value of 22 for a D rating.

convert debt to equity (represented by α and γ in the model), thus reducing the value of the clawback option. Also we expect that IPOCs require higher yields on the debt, even after controlling for credit quality, which makes the cash flow requirements sufficiently difficult for cash flow volatile firms. We now turn our attention to the investigation of the IPOC yield.

We use a multivariate analysis to estimate the determinants of the yield. The functional form for the yield equation is:

$$\mathbf{YIELD} = \mathbf{a_0} + \mathbf{b_1}(\mathbf{IPOC}) + \mathbf{b_2}(\mathbf{rated\_dummy}) + \mathbf{b_3}(\mathbf{SPEC}) + \mathbf{b_4}(\mathbf{Drating}) +$$

$$\mathbf{b_5}(\mathbf{log\_size}) + \mathbf{b_6}(\mathbf{log\_mat}) + \mathbf{b_7}(\mathbf{private\_placed}) + \mathbf{b_{8-23}}(\mathbf{D94 - D09}) + \mathbf{w_i} \,.\, (\mathbf{5.5})$$

YIELD is the initial offering yield as reported in FISD database. All independent variables as defined previously. We control for whether the issue was privately placed using a dummy variable (private_placed) and for time trends using year dummies noted by D94-D09. We control for industry concentration using a OLS estimation accounting for clustering by industry.

We infer that the initial offering yield is determined by the fundamentals of the bond and issuer along with credit quality. The variable of particular interest to us is IPOC which captures the additional information revealed by a specific borrower's decision to use an IPOC rather than other securities. From our model predictions and implications from *proposition 3*, we expect a positive relationship between the IPOC dummy and YIELD. From existing studies such as Daniels et. al (2009), we expect the size of the issue to be negatively related to YIELD. However, for the maturity of the issue we have no expectation of the sign given the shorter maturity for the IPOC issues relative to the callable convertible bonds. We also expect privately placed issues to be positively related to the YIELD given private issue are in general less transparent than public issue.

We also investigate the decision to renegotiate debt and the factors which drive the propensity to renegotiate following *proposition 2.* The empirical form for the renegotiation equation (5.3) is:

$$\textbf{Prob.}\,(\textbf{Renegotiation}) = \Lambda[\mathbf{a_0} + \mathbf{b_1}(\textbf{IPOC}) + \mathbf{b_2}(\textbf{rated\_dummy}) + \mathbf{b_3}(\textbf{SPEC}) + \mathbf{b_4}(\textbf{Drating}) +$$

$$\mathbf{b_5}(\textbf{log\_size}) + \mathbf{b_6}(\textbf{log\_mat}) + \mathbf{b_7}(\textbf{coupon}) + \mathbf{b_{8-23}}(\textbf{D94} - \textbf{D09})] \,. \quad (5.6)$$

In the probit regression the dependent variable is DRENEG which is a dummy variable that takes the value of one if the bond issue is renegotiated. An issue is considered renegotiated if it is reported in the FISD database as being subject to an exchange or tender offer. Similarly, we use the bond and issuer fundamentals as controls for the propensity to renegotiate. From our model predictions and implications from *proposition 3*, we expect a positive relation between the IPOC dummy and DRENEG.

5.2. Empirical Results

5.2.1 Cash Flow Volatility, Financial Distress and the likelihood of IPOC issuance

Table 4 presents the results of the IPOC probit regression (Equation 5.4).

Table 4 about here

The coefficient for cash flow volatility shows support for *Proposition 1*. We find a significant negative relationship between the volatility of cash flows and the likelihood of IPOC issuance at the 1% level. We find that our results are significant after controlling for the financial distress of the firm. Consistent with prior literature, Daniels et. al. (2009), we find that IPOC issuance is positively and significantly impacted by the financial distress of the firm. We also find that firm size has

significant negative effect on the probabilities of issuing IPOCS. Small firms facing greater information asymmetry and high risk of undervaluation opt for the type of debt that allows them the option to redeem the debt subsequently or strategically position for a renegotiation. Leverage as measured by the debt ratio is positive and significant at 1% level. This is consistent with firms having high leverage resorting to using the clawback provision. Borrowers that are rated a speculative grade issue or a non-rated firm are also more inclined to use the clawback feature. The coefficient of private firms is also positive and significant at 1% level indicating a close association with the issuance of IPOCS. This is consistent with our expectations as private firms are characterized by high levels of information asymmetry.

An examination of the issue characteristics shows that the size of the issue (log_size) has a significant and positive coefficient at the 1% level, while maturity (log_mat) has a significant and negative coefficient at the 1% level. Our result for maturity is consistent with our prior expectations as IPOCs have a relative shorter maturity than callable convertible bonds.

5.2.2 Yields and IPOCs

Table 5 presents the results of the YIELD regression (Equation 5.2).

Table 5 about here

Because IPOCs and convertibles are the closest securities in terms of features, we report results using the IPOCs and CCBs samples. Though not reported in table form, results are very similar and conclusions remain unaltered when callable and straight bonds are included in the estimation sample. The focus of our attention in these regressions is on the IPOC dummy variable which measures the impact of clawback provision on yields. Its coefficient ranges between 5.6840 and

5.5676 basis points, respectively and is significant at 1% level. This means, relative to the other provisions in the debt contract, inclusion of clawback provision increases the yield[18]. Thus, the prediction from the model of IPOCs having higher yields is supported by the empirical analysis and consistent with *Proposition 3*. Assuming that both issuers and investors are rational utility maximizing decision makers, the economic significance of the higher cost of capital indicates that issuers do not view this cost as prohibitive in return for the flexibility available to them. This result is also consistent with the view that for small firms the clawback provision is a feature that provides them an important capital market function allowing their growth to be protected, managed and maintained among well established firms and financiers[19]. An examination of the individual coefficients shows that the size of the issue (log_size) has negative coefficients in all the regressions. Maturity (log_mat) also has negative and significant coefficients in all three regressions. The dummy variables representing credit rating have signs consistent with theory. Rated issues have lower yields as indicated in Model 1, speculative grade issuers have higher yields as indicated by Model 2, and lower ratings are significantly associated with higher yields as indicated by the negative coefficient for Drating. The coefficient for private_placed is not significant at the 5% level in any of the models. For brevity and space concerns, coefficients for year dummies are not reported in the table.

5.2.3 IPOCs and likelihood of renegotiation of debt contracts

Table 6 presents results of the debt renegotiation model.

[18] We also conduct the analysis considering other securities in addition to convertibles (straight debt and callable issues). The estimated regression provides similar qualitative results but the impact of the clawback provison on corporate bond yields becomes less pronounced, ranging from 1.96 basis points to 2.95 basis points, after controlling for the type of debt.

[19] It is also possible that while clawback features may provide the ability to issuers to mitigate wealth transfers from shareholders to bondholders, issuers ex-ante pay more for this protection.

Table 6 about here

After controlling for credit quality and issue characteristics, the likelihood of renegotiation of the contract is positively and significantly associated with issuing an IPOC as indicated by the positive and significant coefficients for the IPOC variable in all three estimations. The results are consistent with the *Proposition 2* and highlight the dynamic relationship between the debtor and debtee.

The remaining results for the effects of issue characteristics and credit risk are consistent with theory. Borrowers that are not rated are more likely to renegotiate their debt. Surprisingly, being rated investment grade does not seem to have an impact on the probability of renegotiation as indicated by the insignificant coefficient for SPEC. This is consistent with our expectations that investment grade firms have less information asymmetries, lower exposure to financial distress and therefore a lower propensity to renegotiate their debt. However, the lower the credit rating, as captured by the variable drating, the higher the probability of renegotiating the debt. The likelihood of debt renegotiation is positively affected by the size of the issue (as indicated by the positive and significant coefficient for log_size) but not associated with the maturity of the issue (as indicated by the insignificant coefficient for log_mat).

5.2.4 Renegotiation dynamics and IPOCs

We further examine the dynamics of renegotiation in the presence of IPOCs versus CCBs. We match our sample of IPOCs and CCBs with data on exchanges and tender offers also from FISD database. This allows us to look into the relation between renegotiation and the expiration of the clawback provision relative to the CCBs. Table 7 summarizes this analysis.

Table 7 about here

The total number IPOC issues eventually undergoing a renegotiation in our sample is 859 for IPOCs relative to 117 for callable convertible bonds. Renegotiations take the form of an exchange offer in which debt is offered in exchange for the old debt or a tender offer in which case cash is offered in exchange. Our results also show that 19.88% of IPOC versus 5.87% of CCB issues went into renegotiation in the form of an exchange or tender offer before the expiration of the clawback option. For IPOCs, renegotiation takes the form of an exchange offer in 24.10% of the sample while for CCBs it is significantly higher at 42.74%. It is also possible that a renegotiation fails and it is retried, or that modifications need to be made to an offer, or that additional subsequent exchange or tender offers are made to complete the full extinguishment of the debt contract. The average number of renegotiations per IPOC issue is 1.08 times compared to 1.04 times per CCB issue. Similar to our previous analysis, we find that the contract characteristics of IPOCs versus CCBs under renegotiations illustrates that IPOCs have higher coupon rates and offering yields coupled with lower offering amounts, lower maturities but more rated issues.

Table 8 about here

Table 8 shows the timing of the exchange offer surrounding the IPOC expiration date is also interesting. We find that there is a higher proportion of exchange offers before the expiration of the IPOC clawback with 389 renegotiations (34.19%) as exchange offers. The percentage tendered was 90.73%. This contrasts with the 470 renegotiations after the expiration of the IPOC clawback which represents a 15.74% of the sample in the form of an exchange offer. The percentage tendered was

83.47%. The totality of these results suggest that the clawback is a strategic tool used by the firm which significantly increases the chances of debt renegotiations and more importantly the renegotiation of debt before the IPOC clawback expiration further illustrates its strategic use.

Tables 7 and 8 illustrate the complex nature of the firm's capital structure and the type of debt they are inclined to issue. Our model and analysis complements the dynamic debt contracting literature exhibited by models such as Hart and Moore (1998) and the initial clawback analysis of Goyal et. al. (1998) whereby both contributions illustrate the conditions upon which investors and firm owners protect their majority interest. Our model provides further detail of these majority interests. For example, firm owners are less willing to exercise the IPOC clawback and are more inclined to renegotiation the IPOC clawback when they sense that future cash flows will probably be high. Our empirical analysis confirms the inferences of the model and the propensity of the IPOC clawback to be highly associated with debt renegotiations. We suggest that the use of the IPOC clawback is an important strategic management tool and innovation which deserves further attention in the traditional corporate finance literature.

6. Conclusion

The prevalence of IPOCs as an important source of capital for firms poses some interesting dilemmas for corporate managers and analyst of corporate bond markets. Why do firms rely on such an expensive source of corporate finance and rarely use the clawback option associated with IPOCs? In this paper, we presented a theoretical and empirical analysis of the corporate bond clawback. We develop a model that provides the rationale for the use of IPOCs. It is a simple model based on the cash flows of a project and their uncertainty. The model provides the conditions under which the clawback provision of IPOCs is rarely exercised. This occurs when the firm runs into financial distress and the payoffs to the bondholders by renegotiating their debt are larger than by converting

part of the issue into equity via the IPOC. The model also predicts that yields for IPOCs must be higher than other instruments otherwise investors will not invest in the IPOC. Finally, an implication of the conditions of the model for not exercising the clawback option is that IPOC firms renegotiate their debt more often than firms issuing other instruments. We use convertible bonds and IPOCs to test these implications. The results of multivariate analysis provide support for the predictions and implications of the model. Firms using IPOCS are more likely to be in financial distress and have lower cash flow volatility. Also, yields are higher and positively associated with issuing IPOCs and the existence of an IPOC is associated with higher probability of renegotiation. Also, our ancillary analysis shows that a greater percentage of exchange offers occur before the expiration of the IPOC clawback which further strengthens our inference about the strategic use of IPOC clawbacks.

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Figure 1: Basic structure of the model.

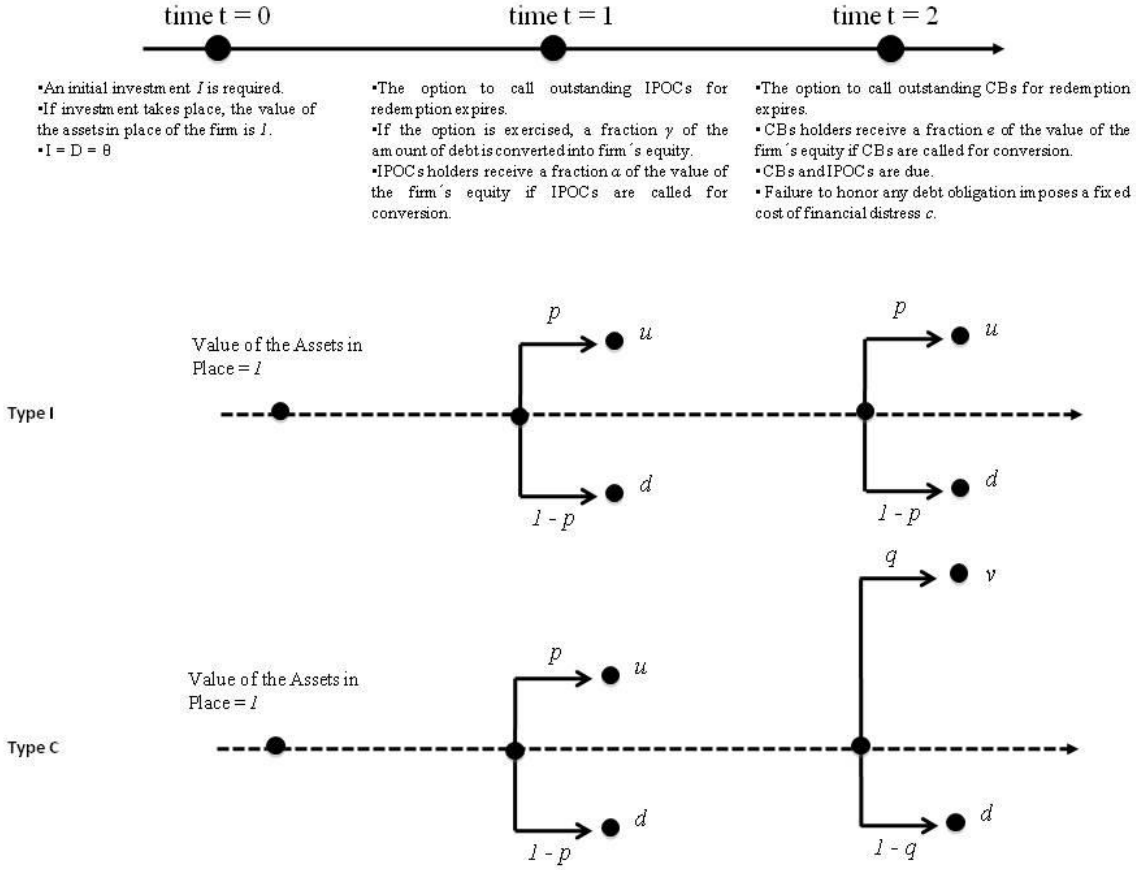

Table 1

IPOCs and Convertible Bonds Sample

Panel A: Chronological distribution of IPOCs and CCBs

	IPOCs	CCBs
1993	108	109
1994	83	55
1995	89	45
1996	176	124
1997	420	126
1998	656	118
1999	412	64
2000	193	116
2001	191	150
2002	221	106
2003	323	194
2004	425	210
2005	343	131
2006	198	138
2007	263	187
2008	126	71
2009	94	41

Table 1-Continued

IPOCs and Convertible Bonds Sample

Panel B: Industry distribution of IPOCs and CCBs

Industry	IPOCs	CCBs	Total
Automobiles	101	22	123
Chemicals	151	20	171
Clothing	78	6	84
Construction	142	53	195
Consumers	56	92	148
Durable goods	129	18	147
Fabric product	47	9	56
Financials	272	328	600
Food	130	23	153
Machinery	215	315	530
Mining	46	39	85
Oil	257	71	328
Others	2,123	792	2,916
Retail	226	84	310
Steel	112	20	132
Transportation	155	76	231
Utilities	80	26	106
Total	4,320	1,994	6,314

Table 1 -Continued

IPOCs and Convertible Bonds Sample and Contract Characteristics

Panel C: This table presents contract term characteristics of a sample of bond clawbacks (IPOCs) and callable convertible debt (CCB) issued during the period 1993-2009. Data is obtained from FISD database.

	IPOCs	CCBs	t-test value for difference in group means
Number of issues	4,320	1,994	
Coupon rate of issue	9.50%	4.12%	72.08***
Offering yield	10.49%	4.40%	62.40***
Average amount per issue (millions)	$275.01	$320.28	3.82***
Maturity in years	8.63	11.89	17.85***
Rated issues	52.40%	26.53%	20.74***
Issues that went into renegotiation in the form of an exchange or tender offer before the expiration date of the clawback option	859 (19.88%)	117 (5.87%)	17.44***
Clawback percentage for redemption	35	----	
Proportion of IPOCs that use the clawback option	4%	----	

Table 2

Numerical Example

Panel A. This table presents the values given to the parameters of the model in the numerical example.

	IPOCs	**CBs**
Assets initial value	1	1
u	1.3	
v		1.7
d	0.7	0.7
θ	1.5	1.5
γ	0.8	
α	0.6	
β	1	1
ε		0.75
K		1.5
ri	5%	
rf	0%	0%
rc		0%
p	0.7	0.7
q	0.8	0.8
c	2.6	2.6
w	0.8	0.8
SD(Cash Flows)	38.88%	48.54%
Prob (FD)	0.09	0.06

Table 2 - Continued

Numerical Example

Panel B. This table presents the values taken by the equations associated with Condition 1 to Condition 9 for the parameter values in Panel A. Below each expression in parenthesis we present its numerical value .

Conditions Related to IPOCs

Condition 1: Cash Flows and Debt Characteristics

$$\underset{(2)}{u+d} \quad > \quad \underset{(1.65)}{\theta\,(1+r_I)^2} \quad > \quad \underset{(1.40)}{2d} \quad > \quad \underset{(0.33)}{(1-\gamma)\theta\,(1+r_I)^2}$$

Condition 2: No Conversion in Good States of Nature

$$\underset{(3.22)}{u(1+p)+d\,(1-p)+w} \quad > \quad \underset{(1.65)}{\theta\,(1+r_I)^2\,[\frac{\gamma+\alpha\,(1-\gamma)}{\alpha}]} \equiv f\,(\alpha,\theta,\,r_I,\,\gamma)$$

Condition 3 **(Conversion in Bad States of Nature):**

$$\underset{(0.42)}{\sqrt{\frac{p}{2(1-p)}}\sigma_{CF}} \quad < \quad \underset{(1.91)}{\frac{(1-p)\,c+(2d+w)(1-p-\alpha)+\theta\,(1+r_I)^2\,(p-(1-\gamma)(1-\alpha))}{\alpha}} \equiv g(\alpha,\theta,r_I,\gamma)$$

$$\frac{\partial g}{\partial \alpha} = -6,30$$

$$\frac{\partial g}{\partial w} = -0,5$$

Condition 4 **(IPOCs holders accept renegotiation):**

$$\underset{(1.63)}{E_{t=1}\left[\text{Pay off}^{B}{}_{\text{IPOCs holders}} \mid \text{renegotiation}\right]} \quad > \quad \underset{(1.22)}{E_{t=1}[\text{Payoff}^{B}{}_{\text{IPOCs holders}}|\text{conversion}]}$$

$$\frac{\partial h}{\partial(1-\gamma)} = \text{-0,14}$$

Condition 5 **(Managers prefers renegotiation to conversion):**

$$\underset{(1.02)}{E_{t=1}[\text{U}^{B}{}_{\text{owner}}|\text{renegotiation}]} \quad > \quad \underset{(0.92)}{E_{t=1}[\text{U}^{B}{}_{\text{owner}}|\text{conversion}]}$$

$$\frac{\partial l}{\partial w} = 0,20$$

Condition 6 **(IPOC' holders Participation Constraint):**

$$\underset{(1.65)}{\theta(1+r_I)^2\left(1-\,(1-p)^3\right)+(1-p)^3 2d} \quad > \quad \underset{(1.50)}{\theta}$$

Table 2 - Continued

Numerical Example

Conditions Related to Convertible Bonds		
Condition 7 (Condition for Conversion of Convertibles):		
$u+v$	$>$	$\frac{\theta(1+r_C)^2+K(1-\varepsilon)}{\varepsilon}$
(3.00)		(2.50)
Condition 8 (Participation Constraint for Convertible Bond Holders):		
$pq\left(\varepsilon\left[(u+v)+K\right]-K\right)$	$>$	$(1-p)(1-q)2d$
(1.05)		(0.08)
Separating Equilibrium		
Condition 9 (Truthful Revelation Constraint for Type *I* Firms):		
$w+c>$	$>$	$\frac{pq\left(\varepsilon(u+v+K)-K-\theta(1+r_C)^2\right)}{\left((1-p)^2-(1-p)^3\right)}$
(3.40)		(3.33)

Table 3

Renegotiation and the Expected Utility of Manager of Type I Firms

This table presents the expected utility of the manager with and without the possibility of renegotiation. Parameter values, other than *w*, correspond to those presented in Panel A of Table 2.

Expected Utility of the Owner/Manager of Type I Firm

With Renegotiation	Without Renegotiation	*w*
112.51	112.51	0.5
120.71	120.71	0.6
130.43	128.91	0.7
140.16	137.11	0.8
149.89	145.31	0.9
159.62	153.51	1.0
169.35	161.71	1.1
179.08	169.91	1.2
188.81	178.11	1.3
198.54	186.31	1.4
208.27	194.51	1.5

Table 4

Probability of IPOC Issuance

This table presents the results of a probit estimation of the probability of IPOC issuance controlling for credit quality, contract terms and firm fundamentals. The dependent variable is a dummy that takes the value of 1 if an IPOC is issue and 0 if issue is a convertible security. The independent variables are credit quality as captured by a dummy for rated issues (rated_dummy), the natural log of the issue amount at offering (log_size); the natural log of the number of years to maturity of the issue (log_mat); ROE is the return on equity for the firm, Cash_Flow_Volatility is the standard deviation of the operating income of the firm, Debt Ratio reflects the leverage of the firm, Size reflects the total assets of the firm, SPEC is dummy variable that takes the value of 1 if the firm has a speculative grade and 0 otherwise, Private is a dummy variable that takes the value of 1 if a private firm and 0 otherwise, FD is dummy variable that takes the value of 1 if the firm is in financial distress and 0 otherwise, and we also have a set of dummies for year effects. Period of estimation is from 1993 to 2009. The sample is comprised of 4,320 IPOCs and 1,994 convertible issues.

Independent variables	Model1	Model2	Model3
Credit quality:			
FD	0.38***	0.29***	0.33***
	(0.05)	(0.05)	(0.06)
rated_dummy		0.57***	0.59***
		(0.10)	(0.09)
SPEC	0.54***	0.97***	1.01***
	(0.08)	(0.10)	(0.06)
Issue characteristics:			
log_size	0.47***	0.45***	0.44***
	(0.11)	(0.09)	(0.09)
log_mat	-0.03***	-0.05***	-0.04***
	(0.00)	(0.00)	(0.01)

Table 4-Continued

Probability of IPOC Issuance

This table presents the results of a probit estimation of the probability of IPOC issuance controlling for credit quality, contract terms and firm fundamentals. The dependent variable is a dummy that takes the value of 1 if an IPOC is issue and 0 if issue is a convertible security. The independent variables are credit quality as captured by a dummy for rated issues (rated_dummy), the natural log of the issue amount at offering (log_size); the natural log of the number of years to maturity of the issue (log_mat); ROE is the return on equity for the firm, Cash_Flow_Volatility is the standard deviation of the operating income of the firm, Debt Ratio reflects the leverage of the firm, Size reflects the total assets of the firm, SPEC is dummy variable that takes the value of 1 if the firm has a speculative grade and 0 otherwise, Private is a dummy variable that takes the value of 1 if a private firm and 0 otherwise, FD is dummy variable that takes the value of 1 if the firm is in financial distress and 0 otherwise. Period of estimation is from 1993 to 2009. The sample is comprised of 4,320 IPOCs and 1,994 convertible issues.

Independent variables	Model1	Model2	Model3
Issuer characteristics:			
Cash_Flow_Volatility	-0.001**	-0.002***	
	(0.00)	(0.00)	
SIZE	-0.59***	-0.32***	-0.34***
	(0.06)	(0.06)	(0.06)
PRIVATE	3.37***		
	(0.25)		
DEBT RATIO	0.51*	0.68**	0.68**
	(0.24)	(0.22)	(0.23)
ROE	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)
Constant	60.10***	85.9***	82.27***
	(11.57)	(8.4)	(9.34)
Pseudo R2	0.45	0.33	0.32
N	6,314	6,314	6,314

* p<0.05, ** p<0.01, *** p<0.001

Table 5

Yields and IPOC Issuance

This table presents the results of an OLS estimation of the relation between security yields and issuance of IPOCs controlling for credit quality and contract terms. The dependent variable is the offering yield as reported in FISD and the independent variables are credit quality as captured by a dummy for rated issues (rated_dummy), a dummy for investment grade rating (IG_dummy), and a categorical variable capturing the credit rating structure (Drating); a dummy indicating whether the issue was a private placement (private_placed); the natural log of the issue amount at offering (log_size); the natural log of the number of years to maturity of the issue (log_mat); a dummy (Ipoc) that takes the value of 1 if an issue is an IPOC and 0 if issue is a convertible security, and a set of dummies for year effects. Period of estimation is from 1993 to 2009. The sample is comprised of 4,320 IPOCs and 1,994 convertible issues. All data is obtained from FISD database. Heteroskedasticiy corrected and clustering-adjusted (by industry) standard errors are in parentheses.

Independent variables	Model1	Model2	Model3
IPOC	5.6840***	5.6775***	5.5676***
	(0.1617)	(0.1589)	(0.1557)
Credit quality:			
rated_dummy	-0.699***	-0.50**	
	(0.1787)	(0.1699)	
IG_dummy		-0.415***	
		(0.08)	
drating			0.0291***
			(0.0056)
Issue characteristics:			
log_size	-0.8496***	-0.8274***	-0.8461***
	(0.0648)	(0.0649)	(0.0665)
log_mat	-1.0804***	-1.0644***	-1.0703***
	(0.1445)	(0.1433)	(0.1434)

Table 5-Continued

Yields and IPOC Issuance

This table presents the results of an OLS estimation of the relation between security yields and issuance of IPOCs controlling for credit quality and contract terms. The dependent variable is the offering yield as reported in FISD and the independent variables are credit quality as captured by a dummy for rated issues (rated_dummy), a dummy for investment grade rating (IG_dummy), and a categorical variable capturing the credit rating structure (Drating); a dummy indicating whether the issue was a private placement (private_placed); the natural log of the issue amount at offering (log_size); the natural log of the number of years to maturity of the issue (log_mat); a dummy (Ipoc) that takes the value of 1 if an issue is an IPOC and 0 if issue is a convertible security, and a set of dummies for year effects. Period of estimation is from 1993 to 2009. The sample is comprised of 4,320 IPOCs and 1,994 convertible issues. All data is obtained from FISD database. Heteroskedasticiy corrected and clustering-adjusted (by industry) standard errors are in parentheses.

Independent variables	Model1	Model2	Model3
Controls:			
PRIVATE_PLACE	-1.4665**	-1.5204***	-1.6024
	(0.4307)	(0.4314)	(0.4367)
Constant	17.72***	17.54***	16.99***
	(0.90)	(0.89)	(0.86)
YEAR DUMMIES	YES	YES	YES
R2	0.573	0.575	0.572
N	6,314	6,314	6,314

* p<0.05, ** p<0.01, *** p<0.001

Table 6

Probability of Renegotiation and IPOC Issuance

This table presents the results of a probit estimation of the probability of renegotiation and IPOCs controlling for credit quality and contract terms. The dependent variable is a dummy that takes the value of 1 if the issue was renegotiated via an exchange/tender offer as reported in FISD and the independent variables are credit quality as captured by a dummy for rated issues (rated_dummy), a dummy for investment grade rating (IG_dummy), and a categorical variable capturing the credit rating structure (Drating); the coupon rate of the issue (coupon); the natural log of the issue amount at offering (log_size); the natural log of the number of years to maturity of the issue (log_mat); a dummy (ipoc) that takes the value of 1 if an issue is an IPOC and 0 if issue is a convertible security, and a set of dummies for year effects. Period of estimation is from 1993 to 2009. The sample is comprised of 4,320 IPOCs and 1,994 convertible issues. All data is obtained from FISD database. Heteroskedasticiy corrected and clustering-adjusted (by industry) standard errors are in parentheses.

Independent variables	Model1	Model2	Model3
IPOC	0.9628***	0.9786***	0.8451***
	(0.1782)	(0.1883)	(0.1714)
Credit quality:			
rated_dummy	-0.5939***	-0.4528***	
	(0.0906)	(0.0803)	
IG_dummy		-0.3143***	
		(0.0810)	
drating			0.0239***
			(0.0041)
Issue characteristics:			
coupon	-0.0246*	-0.0280*	-0.0195
	(0.0103)	(0.0112)	(0.0110)
log_size	-0.8496***	-0.8274***	-0.8461***
	(0.0648)	(0.0649)	(0.0665)
log_mat	-1.0804***	-1.0644***	-1.0703***
	(0.1445)	(0.1433)	(0.1434)

Table 6-Continued

Probability of Renegotiation and IPOC Issuance

This table presents the results of a probit estimation of the probability of renegotiation and IPOCs controlling for credit quality and contract terms. The dependent variable is a dummy that takes the value of 1 if the issue was renegotiated via an exchange/tender offer as reported in FISD and the independent variables are credit quality as captured by a dummy for rated issues (rated_dummy), a dummy for investment grade rating (IG_dummy), and a categorical variable capturing the credit rating structure (Drating); the coupon rate of the issue (coupon); the natural log of the issue amount at offering (log_size); the natural log of the number of years to maturity of the issue (log_mat); a dummy (ipoc) that takes the value of 1 if an issue is an IPOC and 0 if issue is a convertible security, and a set of dummies for year effects. Period of estimation is from 1993 to 2009. The sample is comprised of 4,320 IPOCs and 1,994 convertible issues. All data is obtained from FISD database. Heteroskedasticiy corrected and clustering-adjusted (by industry) standard errors are in parentheses.

Independent variables	Model1	Model2	Model3
Coupon	-0.0246* (0.0103)	-0.028* (0.0112)	-0..0195 (0.0110)
Constant	-2.7993*** (0.43)	-2.8654*** (0.44)	-3.3488*** (0.44)
YEAR DUMMIES	YES	YES	YES
Pseudo R2	0.09	0.10	0.09
N	6,314	6,314	6,314

* p<0.05, ** p<0.01, *** p<0.001

Table 7

Contract Characteristics of IPOCs and Convertible Bonds undergoing renegotiations

This table presents contract term characteristics of a sample of bond clawbacks (IPOCs) and callable convertible debt (CCB) issued during the period 1993-2009 that undergo debt renegotiations. Data is obtained from FISD database.

	IPOCs	CCBs	t-test value for difference in group means
Number of issues	859	117	
Coupon rate of issue	9.33%	3.90%	22.83***
Offering yield	9.91%	4.38%	16.85***
Average amount per issue (millions)	$297.0	$385.0	1.52
Maturity in years	8.31	13.00	6.20***
Rated issues	32.48%	18.80%	3.45***
Issues that went into renegotiation in the form of an exchange or tender offer before the expiration date of the clawback option as percentage of total in sample	(19.88%)	(5.87%)	17.44***
Average number of renegotiation Offers made for an issue	1.08	1.04	1.67*
Proportion of renegotiation that took form of an exchange offer	24.10%	42.74%	3.87***

Table 8

Renegotiation and IPOCs

This table presents descriptive regarding renegotiation dynamics and IPOCs

	Timing of renegotiation relative to expiration of the IPOC clawback:		t-test statistic for differences
	Before	After	in means
Number of renegotiations	389	470	
	(45.29%)	(54.71%)	1.25
In the form of exchange offers	133	74	
	(34.19%)	(15.74%)	4.00***
Proportion tendered	90.73%	83.47%	6.28***

Appendix

A1. The Expected Utility of the Manager of Type I Firms and the Decision to Convert

As shown in Figure 1, after a good realization of the cash flows of the firm at time *t = 1*, if the owner converts her expected utility is:

$$\mathrm{E}_{t=1}[\mathrm{U\ owner} \mid \mathrm{conversion}] = (1-\alpha)\cdot \left[u(1+\ p)+(1-p)d-(1-\gamma)\theta(1+r_I)^2+w\right] \tag{2.1}$$

The expected utility for the owner of the firm if she does not convert is:

$$\mathrm{E}_{t=1}[\mathrm{U\ owner} \mid \mathrm{no\ conversion}] = u(1+\ p)+(1-p)d-\theta(1+r_I)^2+w \tag{2.2}$$

Therefore, conversion will not take place in node A if and only if:

$$u(1+\ p)+(1-p)d-\theta\ (1+r_I)^2+w\ > (1-\alpha)[u(1+\ p)+(1-p)d-(1-\gamma)\theta\ (1+r_I)^2+w] \tag{2.3}$$

Condition 2 follows directly from equation (2.3). Similarly, after a low value realization of the cash flows at time *t = 1*, the expected utility for the owner of the firm from converting is:

$$E_{t=1}[\mathrm{U\ owner}|\mathrm{conversion}] = (1-\alpha)[p(d+u)+ (1-p)2d-(1-\gamma)\theta(1+r_I)^2+w] \tag{2.4}$$

If the manager decides not to convert, the firm will face financial distress with probability $(1-p)$. Therefore, the expected utility for the owner of the firm from not converting is:

$$E_{t=1}\left[\mathrm{U\ owner}|\mathrm{no\ conversion}\right] = p[u+d-\theta\ (1+r_I)^2+w]-(1-p)c \tag{2.5}$$

Accordingly, the owner of the firm will have incentives to convert as long as the following condition holds:

$$p(u-d) < \frac{(1-p)\ c+\left(2d+w\right)(1-p-\alpha)+\theta\ \left(1+r_I\right)^2\ \ (p-(1-\gamma)(1-\alpha))}{\alpha} = g\left(\alpha,\theta,r_I,\gamma\right) \tag{2.6}$$

A2. Renegotiation

If IPOCs holders accept to renegotiate at *t = 1* after the low value cash flows has materialized (in node B in Figure 1), their expected pay off is given by:

$$E_{t=1}\left[\text{Pay off}^{\text{low value}}_{\text{IPOCs holders}} \mid \text{renegotiation}\right] = (1-p)^2 2d + (1-(1-p)^2)\theta\left(1+r_I\right)^2\ \beta \tag{2.7}$$

where β is the proportion of the current debt that will be repaid and that will be due at time t=3. Similarly, the expected pay off that they would receive if the firm converts is:

$$E_{t=1}[\text{Pay off}^{\text{low value}}_{\text{IPOCs holders}}|\text{conversion}] = \alpha[d+\ pu+(1-p)d-(1-\gamma)\theta\left(1+r_I\right)^2]+(1-\gamma)\theta\left(1+r_I\right)^2 \tag{2.8}$$

IPOCs holders will be willing to renegotiate as long as their expected payoff is higher with renegotiation than with conversion. Setting equation (2.7) greater than equation (2.8) and solving for α yields Condition 4.

The expected levels of utility associated for the firm manager at *t = 1* after the low value cash flows has materialized are given by:

$$E_{t=1}[\mathrm{U}_{\text{owner}}^{\text{low value}}|\text{renegotiation}] = p[u(1+p)+(1-p)d-\theta(1+r_I)^2\beta]+(1-p)[d+pu-\theta(1+r_I)^2\beta] + (1-p)^2(-c)+(1-(1-p)^2)w \quad (2.9)$$

and

$$E_{t=1}[\mathrm{U}_{\text{owner}}^{\text{low value}}|\text{conversion}] = (1-\alpha)[p(d+u)+(1-p)2d-(1-\gamma)\theta(1+r_I)^2+w] \quad (2.10)$$

It is clear that the manager will prefer renegotiation to conversion as long as $E_{t=1}\left[\text{Pay off}_{\text{IPOCs holders}}^{\text{low value}}|\text{renegotiation}\right] > E_{t=1}[\text{Pay off}_{\text{IPOCs holders}}^{\text{low value}}|\text{conversion}]$. By setting equation (2.9) greater than equation (2.10) and solving for $(1-\alpha)$ we obtain the equation characterizing Condition 5.

A3. Participation Constraint for Convertible Bond Holders

The expected payoff for holders of convertible bonds issued by type *C* firms is:

$$E_{t=0}[\text{Payoff}_{\text{CB holders}}|\text{issued by type C firm}] = pq\{\varepsilon[(u+v)+K]-K\}+ \theta(1+r_C)^2(p(1-q)+(1-p)q)+(1-p)(1-q)2d \quad (2.11)$$

Regarding the willingness of investors to hold convertible bonds issued by type *C* firms, it must be the case that the expected payoff from holding convertibles must be as high as the expected payoff from investing in risk free assets: $E_{t=0}[\text{Payoff}_{\text{CB holders}}|\text{issued by type C firm}] \geq \theta(1+r_f)^2$

Replacing (2.11) in this inequality and setting $r_C = r_f = 0$, yields Condition 8.

A4. Participation Constraint for Convertible Bond Issuers.

Assuming that the owner/manager of a type *C* firm has the same utility function as the manager of a type *I* firm, her expected utility from issuing and investing will be given by:

$$\begin{aligned} E_{t=0}[\text{Payoff}_{\text{Firm C Manager}}] = pq(1-\varepsilon)(u+v+K+w) + p(1-q)\left(u+d-\theta(1+r_C)^2+w\right) \\ +(1-p)q\left(d+v-\theta(1+r_C)^2+w\right)+(1-p)(1-q)(-c) \end{aligned} \tag{2.12}$$

Consequently, she will be interested in issuing a convertible bond and investing as long as:

$$E_{t=0}[\text{Payoff}_{\text{Firm C Manager}}] \geq \rho(1+r_f)^2 \tag{2.13}$$

A5. Overpricing.

The value of a convertible bond issued by type *C* firms corresponds to its expected payoff as given by equation (2.11).

The "true" value of a convertible bond issued by a type *I* firm is given by:

$$\begin{aligned} E_{t=0}[\text{Payoff}_{\text{CB holders}} \,|\, \text{issued by type I firm}] = \left(1-(1-p)(1-q)\right)\theta(1+r_C)^2 \\ +(1-p)(1-q)2d \end{aligned} \tag{2.14}$$

Note that since $r_I > r_C$, Condition 1 is sufficient for financial distress occurring with probability $(1-p)(1-q)$. Subtracting equation (2.14) from equation (2.11) and rearranging yields equation (1.20).