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CONVERTIBLE BONDS AS "BACK DOOR" EQUITY FINANCING

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ABSTRACT

This paper argues that corporations may use convertible bonds as an indirect (albeit possibly risky) method for getting equity into their capital structures in situations where adverse selection problems make a conventional stock issue unattractive. Unlike other theories of convertible bond issuance, the model of this paper highlights: 1) the importance of call provisions on convertibles; and 2) the significance of costs of financial distress to the information content of a convertible issue.

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1. Introduction

Convertible bonds are an important source of financing for many corporations--according to data presented in Essig (1991), more than 10% of all Compustat companies had ratios of convertible debt to total debt exceeding 33% during the period 1963-84. A good deal of research effort has been devoted to the development of pricing models for convertibles[1], as well as to the issues surrounding corporations' policies for calling them.[2] Surprisingly, somewhat less work has been addressed to the fundamental question of why companies issue convertibles in the first place.

This paper develops a theoretical rationale for the use of convertible debt. I argue that convertible bonds may be used as an attempt by companies to get equity into their capital structures "through the back door" in situations where (as in Myers and Majluf (1984)) informational asymmetries make conventional equity issues unattractive. In other words, convertible bonds represent an indirect (and possibly uncertain) mechanism for implementing equity financing that mitigates the adverse selection costs associated with direct equity sales.

The view of convertible bond financing offered here contrasts with that seen in other recent works.[3] A couple of prominent explanations for the use of convertibles are premised on the observation that these securities are relatively insensitive to variations in the riskiness of the underlying assets. Thus

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[1]See, e.g. Ingersoll (1977a) and Brennan and Schwartz (1977, 1980).

[2]See Ingersoll (1977b), Mikkelson (1981), Harris and Raviv (1985), Jaffee and Shleifer (1990) and Asquith and Mullins (1991), among others.

[3]Although the rationale for convertibles presented below has not been formally developed in the academic literature, something very close to it is mentioned in Greenwald's (1986) teaching note for the MCI Communications case study. This case, and Greenwald's analysis of it, are discussed in detail in section 4 of the paper.

convertibles may be useful if ex-post risk-shifting is a concern (see Green (1984)) or if it is simply difficult to estimate asset risk (see Brennan and Kraus (1987) and Brennan and Schwartz (1988)).

Another rationale for convertibles is presented by Constantinides and Grundy (1989). Their theory bears a superficial resemblance to the one in this paper, in that both focus on the ability of convertibles to resolve problems associated with asymmetric information. However, as is discussed in section 3 below, the two theories have quite different empirical implications.

The "back door equity" explanation for the use of convertibles emphasizes two factors that do not play a central role in any of the other theories: 1) convertible bonds almost always have a call feature, so that companies can force early conversion; and 2) excessive debt can lead to costs of financial distress. Clearly, if companies issue convertibles in the hopes of getting equity into their capital structure in the near future, a call feature is critical--it is the only way to actually force investors to exercise their conversion option early, thereby inducing them to swap their bonds for shares of stock. In contrast, theories built around notions such as risk-shifting do not have clear-cut implications for the use of call provisions--even if a convertible bond remains uncalled for a long period of time, it can still be relatively insensitive to variations in asset risk.

Costly financial distress plays a key role in shaping the informational consequences of a convertible issue. The basic intuition is as follows. If a company that is already substantially levered opts for convertible financing, it must be relatively optimistic about the future prospects for its stock price. For if the stock price falls, the company will be unable to force conversion, and will be left with an even larger debt burden to service. Given the costs of

financial distress associated with such a debt burden, this is an undesirable outcome. Thus a convertible bond issue should be greeted with a less negative (or perhaps even positive) announcement impact than an equity issue of the same size by the same company.

Section 2 of the paper formalizes this intuition with the aid of a highly simplifed model. Section 3 discusses some of the model's empirical implications, and compares them with existing evidence. Section 4 presents a brief case study of one company--MCI Communications--that made heavy use of convertibles over a number of years, and that provides a particularly good illustration of the ideas developed here. Section 5 concludes the paper.

2. The Model

2.1 Technology and information structure

The model is an adaptation of that in Myers-Majluf (1984). There are three time periods, 0, 1 and 2; and three types of firms, G ("good"), M ("medium") and B ("bad"). Each type of firm has access to the same new investment opportunity. This investment has an expected net present value of N, and requires an infusion of capital of I at time 0, which must be raised from external sources. As will become clear below, the model is easiest to interpret if one thinks of the firm as "entrepreneurial"--i.e., completely owned by its manager--before the infusion of new money at time 0.[4]

The proceeds from the new investment, as well as from assets already in place, arrive at time 2. Each firm receives a gross cashflow of either X_H or X_L at this time, with $X_H > I > X_L$. The only differences between the types are in the ex-ante probabilities attached to the better outcome. In particular, G

[4]This interpretation is not critical to the model's results, however.

types receive X_H with certainty, M types receive X_H with probability p, and B types receive X_H with probability q; it is assumed that $1 > p > q$.

Firm types are private information as of time 0. However, at time 1, two things happen. First, the private information from time 0 is made public--that is, it is revealed whether a firm is a G, M, or B type. Second, more fundamental news arrives about the value of type B firms. With probability z, a type B firm "deteriorates" at time 1. Deterioration means that the updated probability of the X_H outcome falls to 0. With probability (1-z), a type B firm "improves" at time 1. Improvement means that a type B becomes indistinguishable from a type M--that is, its updated probability of the X_H outcome rises to p. Consistency requires that $q = (1-z)p$.

Thus there is volatility in the true value of type B firms between time 0 and time 1. For the sake of notational economy, no similar volatility is assumed for type M and type G firms--their probabilities of receiving the better outcome remain unchanged at p and 1, respectively. However, such volatility could be accomodated without changing the qualitative conclusions offered below. The key feature here is simply that firms may receive bad news that will push asset values down, and that as of time 0, a type B firm's private information indicates that it is more likely to receive such bad news than is a type M firm.

2.2 Financing instruments

In the first part of the analysis, I focus on three financing options open to firms at time 0: equity, long-term debt, and convertibles. For the time being, short-term debt--i.e, debt due at time 1--is not considered. This rules out the possibility that some types simply attempt to "wait out" the adverse selection problem by issuing short-term debt at time 0, and then refinancing this

debt with an equity issue at time 1, once private information has been revealed. This possibility will be addressed in detail in section 2.4 below.

A policy of equity financing can be completely summarized by the fraction of the firm's time 2 gross cashflows apportioned to outside claimants. A policy of long-term debt financing can be described by the face value of the debt--i.e., the promised repayment as of time 2. It is assumed that long-term debt financing carries with it the potential for costly financial distress. In particular, if the firm's cashflow at time 2 falls short of the face value of the debt, a deadweight cost of c is imposed on the owner-manager. For the sake of simplicity, this cost c is taken to be exogenous, and might be thought of as representing time and resources devoted to litigation, etc.[5] A more general approach, and one more suited to the case of non-owner-managed firms, might involve endogenizing the extent to which financial distress imposes costs on shareholders, perhaps by appealing to Myers' (1977) idea of underinvestment in the face of a debt overhang, or a related concept.

If a convertible bond is issued, it carries both a face value and a conversion ratio. It is also callable as of time 1, so that the issuer may attempt to force conversion at this time. If the investor converts, he gets the specified number of common shares. If the bond is not called, he retains a debt contract with the original face value. Clearly, the issuer will not always be able to successfully force conversion--the investor will rationally convert only if the stock price at time 1 is high enough, so that the conversion value exceeds the call price.

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[5]A similar formulation--non pecuniary bankruptcy costs for the owner-manager--is adopted by Diamond (1984).

2.3 A separating equilibrium with convertible financing

In order to illustrate the benefits of convertible financing, I first demonstrate that the existence of a convertible bond allows for a separating equilibrium in which all types of firms issue fairly priced claims and invest efficiently--an outcome that is not in general possible when long-term debt and equity are the only financing options. I then argue in section 2.4 (using a slightly expanded version of the model) that even when we enrich the range of financing choices to include short-term debt, it is still not in general possible to achieve an efficient separating equilibrium without the use of convertibles.

The nature of the efficient separating equilibrium is summarized in the following proposition:

> Proposition: If costs of financial distress are sufficiently high--if $c > (I-X_L)$--then the following is a separating equilibrium:
>
> i) G type firms issue debt with a face value of I and invest;
>
> ii) B type firms issue a fraction $I/(qX_H + (1-q)X_L)$ of equity and invest;
>
> iii) M type firms issue a convertible bond and invest. The convertible has a face value of $F > X_L$; a call price K that is given by $X_L < K < I$; and is convertible into a fraction $I/(pX_H + (1-p)X_L)$ of the firm's equity.

In order to prove the proposition, we need to check three pairs of incentive conditions. Given the market beliefs implied by the equilibrium, we require that: 1) a type B does not wish to mimic either a type M or G; 2) a type M does not wish to mimic either a type B or G; and 3) a type G does not wish to mimic either a type B or M.

2.3.1 The perspective of a type B firm

Much of the insight for the proposition is contained in the first incentive condition, namely that a type B must not mimic a type M by issuing a convertible bond. To verify that this condition is satisfied, note that, given the convertible structure outlined above, a type B firm issuing a convertible would face a probability z of being unable to force conversion at time 1. This is because when a type B deteriorates (which happens with probability z) the conversion value of the bond falls below the call price K. In this circumstance, the call provision cannot be used to force conversion.

Consequently, if a type B issues a convertible, there is a probability z that it will be left with a debt burden of F.[6] This "convertible overhang" in turn leads to financial distress with certainty, since a deteriorated type B's cashflow always falls short of F. So the expected costs of financial distress to a type B associated with a convertible issue are given by zc.

On the other hand, there is some gain to a type B in mimicking a type M, in that it sells an overpriced security. In particular, it sells a convertible that it knows will remain a debt claim worth X_L with probability z, and that will convert into equity worth I with probability (1-z). The true value of this convertible is thus $(1-z)I + zX_L$, but B is able to raise an amount I with it. Thus B has issued a security that is overpriced by an amount $z(I-X_L)$.

Taking both factors into consideration, B will only choose to issue the convertible if the overpricing amount exceeds the expected distress costs of zc. However, given the condition on c stipulated in the proposition, this can never

[6]Note that a deteriorated type B is not only unable to use the call provision to force conversion, but is also unable to use the call provision to buy back the convertible for cash. This is because the call price exceeds the entire market value of a deteriorated type B, so that no method of financing will allow it to raise enough cash at time 1 to pay the call price.

happen, so B does not mimc M. The central role of costs of financial distress is apparent here; if c were smaller, then there would indeed be an incentive for a B type to mimic an M type, and the conjectured separating equilibrium would be destroyed.

The argument that a B type will also not mimic a G type is more direct: If B mimics G, it issues debt that has a true value of $qI + (1-q)X_L$. Since B raises an amount I, the debt issue is overpriced by $(1-q)(I-X_L)$. But given the condition on c stipulated in the proposition, this is again less than the costs of financial distress (1-q)c. So B does not mimic G.

2.3.2 The perspective of a type M firm

When a type M firm issues a convertible, it is issuing a security that it views as fairly priced. In addition, a type M bears no expected costs of financial distress with a convertible--it knows that the conversion value of the bond will always be equal to I at time 1. Since this conversion value exceeds the call price K, a type M can force conversion with certainty, and is never left with any debt burden.[7]

In view of this fact, it is obvious that a type M will not wish to mimic a type B. Such mimicking would entail M issuing an underpriced (from its perspective) equity security, and gaining nothing in return--unlike a type B, a type M cannot reduce expected distress costs by switching to equity financing, since it already perceives these costs to be zero.

A type M will also not wish to mimic a type G, for the same reasons that

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[7]It is easily checked that it is always in a type M's best interest to use the call provision to force conversion at time 1. This would be true even without costs of financial distress--by forcing conversion, a type M extinguishes an otherwise valuable option held by the investor.

a type B will not wish to mimic a type G. As before, the expected distress costs associated with long-term debt outweigh the benefits that come from selling an overpriced security. Indeed, the logic is identical to that sketched above, with q replaced everywhere by p.

2.3.3 The perspective of a type G firm

There is clearly no reason for a type G firm to deviate from its policy of long-term debt financing. A type G bears no expected costs of distress with long-term debt. Thus by mimicking a type B or a type M, it can only sell what it perceives to be an underpriced security, with no compensating benefit.

In summary, the logic for a convertible is this: a type M firm does not want to issue equity because of the negative inference that the market would draw. Unfortunately, straight debt is also unattractive, because of costs of financial distress. A convertible allows a type M to get equity into its capital structure, while at the same time conveying a more positive message to the market--a convertible issue cannot be coming from a type B firm, since a type B firm knows that its stock price may not be high enough at time 1 to realize conversion.

In this framework, the use of convertible securities has positive efficiency implications. In the separating equilibrium described above, all firms invest, and no costs of distress are actually borne in equilibrium. If convertibles were not available, this would not generally be the case. Rather, we would be back in a situation very similar to that described in the original Myers-Majluf (1984) paper, and might well have some types of firms failing to invest. With only two modes of financing (equity and long-term debt) available,

any equilibrium that had all types of firms investing would have to involve some pooling in terms of financing choices. But if the NPV of the investment is relatively small, such pooling equilibria cannot be sustained--the higher quality firm in the pool will prefer to pass up the investment instead of issuing what it perceives to be an underpriced security.[8]

2.4 Why don't type M's simply postpone equity issues until time 1?

As noted above, we have thus far not explored the possibility that firms might issue short-term debt and then refinance this short-term debt at time 1 with an equity issue. If this option were introduced into the current set-up, it would also be possible to achieve an efficient separating equilibrium without appealing to convertible bonds. For example, suppose that G types and B types behaved as before (i.e., financed with long-term debt and equity respectively), but that M types simply used short-term debt to postpone an equity issue until time 1. It is easily verified that this also satisfies the conditions for a separating equilibrium.[9]

However, this strategy of simply postponing an equity issue works well only because the current version of the model has the unnatural feature that information asymmetries disappear completely after time 0. This feature implies

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[8]For example, if costs of financial distress were very high, then M and B types would be unwilling to ever use long-term debt. Thus in order for both types to invest, they would both have to issue equity. This pooling equilibrium cannot be sustained if N is small relative to $(p-q)(X_H-X_L)$.

[9]The logic is similar to that above. Since there is symmetric information at time 1, the M type knows that it will be selling a fairly priced security. The B type will not mimic the M strategy of delaying the equity issue, since if it deteriorates, it will be unable to raise enough equity financing to refinance its short-term debt, and will thus face costs of financial distress. Neither the B type nor the M type will mimic the G type by issuing long-term debt, again because of costs of financial distress.

that there are no adverse selection problems associated with a time-1 equity issue. A more complete model would have the property that there is a "steady-state" level of information asymmetry--when managers' time 0 private information becomes public at time 1, managers learn a new piece of private information. In this way, managers are always one step ahead of the rest of the market, and the adverse selection problems associated with an equity issue cannot be avoided simply by postponing the issue.[10]

It is straightforward to extend the model in this direction. Two new assumptions are needed: 1) At time 1, half of the M types (call them the M_G's) get some new private information that suggests that they will do better than previously expected--their probability of receiving X_H rises from p to $p_G > p$. The other half of the M types (the M_B's) see their probability of receiving X_H fall to $(2p-p_G) < p$; 2) At time 1, the some of the existing firm's assets can be liquidated, and the initial outlay of I recovered. However, the NPV of this liquidation strategy is negative--in particular, liquidation reduces the net value of the firm by L.

In the appendix, I prove that if (p_G-p) and L are both sufficiently large, and N is sufficiently small, then there can no longer be any separating equilibrium (efficient or otherwise) where the M types issue short-term debt at time 0. The logic is as follows. If an M type receives optimistic new private information at time 1 (i.e., becomes an M_G) it will then be reluctant to go through with the planned equity issue at that time, perceiving itself to be undervalued. This may result in an M_G instead inefficiently liquidating some

[10]Lucas and McDonald (1990) present an infinite-horizon steady-state model of equity issues, wherein managers always have one-step ahead knowledge of firm value.

assets in order to repay its short-term debt.[11] Folding back to time 0, there can thus be ex-ante expected costs to a type M of relying on postponed equity financing. We can therefore endogenously rule out the postponed equity strategy, leaving convertible bonds as the only means of achieving an efficient separating equilibrium.[12]

Clearly, the model is extremely stylized, and some of the specific conclusions are due to oversimplified assumptions. For example, it is unrealistic to assume that a type M firm will be able to achieve conversion with certainty. However, at the expense of a bit more notation, it would be possible to generalize the model so that a type M firm is just more likely to achieve conversion than a type B firm, but still faces significant uncertainty. In this case, convertibles would not wholly eliminate expected costs of financial distress. Nonetheless, the qualitative conclusion--that convertibles offer an attractive middle ground between the high expected costs of distress associated with a debt issue and the large negative announcement impact associated with an equity issue--should remain unchanged.

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[11]Such inefficient liquidation at time 1 would be an exact analog to the Myers-Majluf (1984) result that "good" types may pass up positive NPV investments rather than issue underpriced equity.

[12]Central to this result is the fact that an equity issue at time 1 is discretionary--a firm can decide to scrap a planned issue if its private information is optimistic. If it were possible to contractually precommit to equity issues sufficiently far in advance, then such precommitted issues might represent a viable means for overcoming information problems and restoring efficient investment.

3. Empirical Implications

The theory of convertible bond issuance presented above has a number of empirical implications. In this section, I discuss four categories of evidence that are relevant for assessing the theory: 1) managers' stated motivations for using convertibles; 2) characteristics of firms that rely heavily on convertibles; 3) convertible call provisions and firm's call policies; and 4) stock price reactions to announcements of convertible issues.

3.1 Evidence on managers' motivations for using convertibles

Several researchers have used surveys to gather direct evidence on why managers opt for convertible financing. An early such study is Pilcher (1955). Pilcher's survey asked:

"Which played the most important role in the decision by your company to utilize the convertible privelege: the desire to "sweeten" the senior leverage, thereby making it more attractive to buyers, or the desire to raise common equity on a sort of delayed action basis?" (page 60)

In this survey, 82% of the respondents chose the "delayed equity" answer, and 18% chose the "sweetened debt" answer. Brigham (1966) asked almost identical questions, and the pattern of responses was very similar--73% indicated that their primary intent in issuing a convertible was to obtain equity financing, while 27% indicated that they wished to sweeten a debt issue. Brigham also asked those in the 73% majority <u>why</u> they used a convertible as a means of effectuating equity financing. Of the 73%, the overwhelming majority--68%--stated stated that they believed their stock price would rise over time, so that a convertible provided a way of selling common stock at a price above the existing market.

Finally, Hoffmeister's (1977) survey allowed respondents to choose from

among five other possible rationales besides delayed equity and sweetened debt. The respondents were also asked to pick a first, second and third choice. Again, the delayed equity motive emerged as the single most important, ranking as first choice for 34% of the firms and as one of the top three choices for 70% of the firms.[13] In sum, the overriding message from the surveys seems to be that many (if not most) managers issue convertibles in the hopes of eventually increasing the amount of equity in their capital structures. Thus the survey data support the basic premise of the model developed here.

In addition, the survey data help to underscore the important differences between this model and that of Constantinides and Grundy (1989). In their model, as in this one, the use of a convertible helps to overcome problems due to asymmetric information--it allows for a separating equilibrium and efficient investment. However, in the Constantinides-Grundy model, the issue of a convertible must be combined with a publicly observed stock repurchase to have the desired effect. "Bad" firms are deterred from issuing convertibles not because of costs of financial distress, but rather because they find it unattractive to repurchase overpriced stock.[14]

This implication of the Constantinides-Grundy model is difficult to square with the survey data--if managers say they are using convertibles to get more

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[13]Hoffmeister also split his sample between industrial and financial firms, and found that the delayed equity motive was disproportionately important for the industrial firms, 47% of whom ranked it as their first choice. In contrast, sweetened debt was the most important motive for financial firms, with 41% picking it as their first choice.

[14]In Constantinides and Grundy (1989), as in the other theories of convertible bond issuance cited above, little importance is assigned to the callability feature. What is distinctive about a convertible in their framework (i.e., what allows the combination of a convertible issue and a stock repurchase to have the desired informational properties) is simply that it is concave in firm value for low values of the firm, and convex for higher values.

equity into their capital structures, they would certainly not want to use the proceeds of a convertible issue to buy back stock. Other available evidence also casts some doubt on the notion that convertible issues are accompanied by stock repurchases. For example, the papers of Dann and Mikkelson (1984), Eckbo (1986) and Mikkelson and Partch (1986) all contain data (taken from issuer prospectuses) on the planned use of proceeds from convertible issues. None make any mention of share repurchases--the most significant uses of proceeds are capital expenditures, general corporate spending, and debt refinancing.

In fact, debt refinancing is a very important use of convertible proceeds. For example, Dann and Mikkelson (1984) note that "one-third of the issuances were virtually entirely refinancing of existing straight debt." (page 175). This is what one might expect if (as the survey data suggest) managers use convertibles in the hopes of eventually attaining a less-levered capital structure. It is, however, essentially the reverse of what is predicted by the Constantinides-Grundy model.

3.2 Characteristics of convertible issuers

The model of this paper suggests that convertibles would be especially valuable for firms that: 1) are characterized by significant informational asymmetries; and 2) might incur large costs of financial distress if they added more debt to their capital structures.

Broman (1963) presents some early evidence consistent with the latter prediction. He examines 60 industrial firms which issued convertible bonds of $10 million or more in the period 1951-1959, and finds higher leverage ratios for these firms than for those issuing straight debt. Indeed, this finding leads Broman to conclude that: "debt advantages (of convertibles) are not as important

in the minds of issuers as an eventual increase in equity ownership." (page 71).

More recently, Essig (1991) conducts a detailed study of the characteristics of convertible issuers. Among the variables he examines are: 1) the ratio of R&D to sales; 2) the ratio of "tangible" assets (property plant and equipment plus inventories) to total assets; 3) the ratio of market value of equity to book value; 4) the ratio of long-term debt to equity; and 5) the standard deviation of changes in cash flow. Using both simple stratifications of the data as well as a more sophisticated multivariate regression framework, Essig relates these variables to firms' propensities to employ convertible financing.

A number of significant patterns emerge.[15] First, firms are more apt to rely on convertibles if they have high ratios of R&D to sales. For example, firms that make "heavy" use of convertibles (i.e., a ratio of convertible debt to all debt of greater than 67%) have R&D to sales ratios almost twice that of other firms. To the extent that a high R&D ratio can be taken as a proxy for potential asymmetries of information, this finding supports the prediction of the model. Alternatively, one might argue that a high R&D ratio indicates that a firm has important growth options, which--in the context of Myers (1977)--would tend to make financial distress more costly. Under this interpretation too, the empirical relationship conforms to that predicted by the model.

Essig also finds that convertible use is strongly negatively related to the ratio of tangible assets to total assets, and strongly positively related to the market-to-book ratio. In both cases, one can interpret the results in a manner similar to the results for the R&D to sales ratio. For example, a low level of

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[15]The patterns discussed below appear to be quite robust--they show up both in the simple stratifications as well as in a variety of multivariate regression specifications.

tangible assets might make liquidation (and hence financial distress) costly. Similarly, a high market-to-book ratio would appear to indicate the presence of important growth options, which again would make distress costly.

With regard to the ratio of long-term debt to equity, Essig's results confirm Broman's (1963) earlier findings--firms that have high debt to equity ratios are significantly more likely to use convertibles. Finally, Essig documents that convertible use is also positively linked to the volatility of a firm's operating cashflows. Again, these results are consistent with the model's prediction that convertibles should be particularly attractive to issuers facing potentially large costs of financial distress.

3.3 Call provisions and firms' call policies

As noted earlier, the model presented here differs from other models of convertible bond issuance in that it emphasizes the importance of the call provision. Convertible bonds are typically callable after the expiration of a modest call protection period--in Asquith's (1991) sample of convertibles issued between 1980 and 1983, the median length of this call protection period is 252 days, and 21% of all convertibles have no call protection whatsoever.

Moreover, Asquith documents that, contrary to a widespread belief, firms actually do use the call feature to force prompt conversion after the expiration of the call protection period, provided that this is feasible (i.e., the conversion value exceeds the call price) and that there are not negative cashflow consequences associated with doing so. For example, Asquith finds that for firms where dividends are less than after-tax interest payments, conversion is forced almost immediately after the conversion value reaches 120% of the call price--the median delay from this point is only 18 days.

The end result is that a large fraction of convertibles wind up being converted into equity a relatively short time after the initial issue date. In Asquith's sample, approximately two-thirds of all convertible bonds issued (and not subsequently removed from the sample due to merger) are eventually converted. Asquith's empirical findings are thus consistent with both the spirit of the story offered here as well as with the expectations of the managers in the surveys--they suggest that firms issuing convertibles have a good chance of seeing them turn into equity financing within a reasonable time frame.

3.4 Stock price reactions to announcements of convertible issues

The model developed above also has implications for the magnitudes of stock price reactions to financing announcements. First and most directly, it suggests that the announcement of a convertible bond issue should not be interpreted as negatively by the market as the announcement of an equity issue of comparable size--a convertible issue reveals a firm to be a type M, whereas an equity issue reveals a firm to be a type B.

Table 1 summarizes some relevant evidence, taken from several papers that have studied these announcement effects. The first column of the table demonstrates that the absolute magnitude of the effect is indeed larger for equity issues than for convertible issues, by a factor of about two. And this simple comparison may understate the differences between the two, because convertible issues tend to be larger (as a fraction of firm value) than equity issues. The second column of the table therefore divides the average announcement impact reported in each study by the average issue size. Now the impact of an equity issue looks to be about three times as large as the impact of a convertible issue of the same size--an equity issue has a negative impact

on the order of 28% of issue size, while a convertible issue has a negative impact of roughly 9% of issue size.

Of course, these comparisons need to be interpreted with caution, as they completely overlook issues of sample selection. However, it would seem that controlling for issuer characteristics might well strengthen the contrast between equity and convertible issues. Both the theory and much of the evidence reviewed in section 3.2 above suggest that convertible issuers are exactly the sorts of firms who would otherwise be expected to suffer from particularly large announcement impacts--they are the ones for whom asymmetries of information are most pronounced. Thus the fact that we observe smaller announcement impacts with convertibles than with straight equity is all the more striking.

The model may also help to shed light on certain cross-sectional aspects of stock price reactions to convertible issues. For example, Mikkelson and Partch (1986) document that convertibles with high bond ratings (A and above) have very negative announcement effects, while convertibles with low ratings (B and below) have essentially no announcement effects. (See their Table 7.) Mikkelson and Partch, as well as other authors (e.g., Brennan and Kraus (1987)) have argued that this finding is difficult to reconcile with existing theory. However, the current model provides a simple explanation: the greater is the potential for costly distress (i.e., the lower is the bond rating) the more credible is the convertible as a signal of optimism. Firms with low bond ratings have the most to lose if they are unable to force conversion, and hence will only issue convertibles if they are quite optimistic about the prospects for their stock price.[16]

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[16]One should probably not place too much inferential weight on this particular empirical finding, however. First of all, the sample size is quite small. Second, an apparently contradictory result is reported by Eckbo (1986).

4. MCI's Use of Convertibles, 1978-1983[17]

MCI Communications Corporation was organized in response to a change in FCC policy that allowed new companies to enter the market for specialized long distance services. MCI went public in June of 1972, with an issue of $30 million of common stock. The company experienced large operating losses in the first few years following its inception.

By 1978, however, the outlook had improved considerably, in large part due to the success of MCI's "Execunet" service. Execunet, which was introduced in 1974, enabled MCI to attract small business subscribers who could not afford dedicated private lines between particular cities. Unfortunately, the growth of Execunet was constrained in its early years by a 1976 court order that restricted it to existing customers.

The court order was lifted in May of 1978. At this point MCI embarked on a period of dramatic growth. Total assets went from $161 million in March of 1978 to $2,071 million in March of 1983. This growth implied a need for repeated large infusions of external financing.

At the time this rapid growth began, MCI was highly levered. In March of

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Finally, there are again issues of sample selection--for example, low-rated issuers are probably subject to greater information asymmetries, and hence one might expect a larger price impact, all else equal.

[17]Most of the factual material in this section is drawn from the Harvard Business School case study: "MCI Communications Corp., 1983" written by Bruce Greenwald (1984). Moreover, in a teaching note for the MCI case, Greenwald (1986, p. 8) makes a verbal argument for convertibles that closely parallels the formal one offered here: "(Convertibles) offer a promise of ultimately escaping the business risk burdens of debt, while showing management's confidence in the future of the company. If the price of the stock does not rise above the price at which conversion can be forced, management must live with the burden of unconverted debt." My debt to Greenwald's analysis of the MCI case should be apparent from this passage.

1978, total debt stood at $173 million. Thus in book value terms, the company had a debt to total capital ratio in excess of 100%. Even in market value terms, the picture was not much better--the market value of common stock at this time was only in the neighborhood of $40 million. An application of Myers' (1977) logic suggests that, given the obvious importance of future investment in its growth options at this point in time, excessive debt could have been particularly damaging to a company like MCI.

MCI's high debt level and the accompanying potential for costly financial distress would seem to have dictated that the external funds be raised primarily via some sort of equity instrument. But MCI management expressed an aversion to the issuance of straight equity. Chief financial officer Wayne English was quoted as saying: "It was always our conviction that issuing more common would knock the props out from under our stock."

MCI decided to finance much of its growth with the use of convertible securities. At first, convertible preferred stock was used. Convertible preferred was apparently chosen over convertible debt because of tax considerations--MCI was initially unable to take advantage of the deductibility of interest expense due to a large accumulation of tax losses. A first issue of convertible preferred raised a gross amount (before issue expenses) of $28 million in December 1978. This was followed by a second offering in September 1979 which raised $67.5 million, and a third offering in October 1980 which raised $49.5 million.

The call provision on these securities allowed MCI to call them any time the market price of MCI common exceeded the conversion price by a stated margin (e.g. 25%) for 30 consecutive trading days. As its stock price rose, MCI was therefore able to force prompt conversion of all three convertible preferred

issues, with the last conversion being effected in November of 1981.

With its debt ratio improving, MCI undertook a $52.5 million sale of public subordinated debentures in July of 1980. Another bond issue in April 1981 raised $105.9 million. The company then returned to the use of convertible securities, although it switched from using convertible preferred to convertible subordinated debentures. An August 1981 convertible debt issued raised $100 million and a May 1982 issue raised another $250 million. Again, the use of early call provisions combined with a rising stock price enabled MCI to force prompt conversion of these two issues: they were both converted by February 1983.

Thus in a little over four years, MCI was able to force conversion on five consecutive convertible issues, representing total financing of almost $500 million. A sixth convertible issue--another convertible debenture--in March 1983 produced an additional $400 million. Finally, in July of 1983, MCI raised a record $1 billion with a "synthetic" convertible, consisting of a package of bonds and detachable warrants.

Unfortunately for MCI, it was unable to force conversion on these last two issues. Its stock price, which was in the low $40's at the time of both issues, began a sharp decline as MCI fared poorly in product market competition with AT&T. This left MCI with a large debt burden, which it had difficulty servicing. In apparently desperate circumstances, MCI sold an 18% equity stake to IBM in June of 1986, at a price of approximately $14/share. In December 1986, it announced major layoffs and large reductions in capital expenditures.

While the successful conversions of the first five issues illustrate how convertibles can be used as an indirect method of obtaining equity financing, the failures of the last two underscore that this method is not without its risks. As seen in the model of section 2, it is exactly the presence of these risks--the

potential for costly distress when stock prices fall and conversion cannot be forced--that enable convertibles to be issued with less adverse informational consequences than straight equity.

5. Concluding Comments

This paper has argued that companies may find convertible bonds an attractive middle ground between the negative informational consequences associated with an equity issue and the potential for costly financial distress associated with a debt issue. When used in conjunction with a call provision that enables early forced conversion, a convertible can serve as an indirect (albeit somewhat risky) means for implementing equity financing that entails less of an adverse price impact than an offering of common stock.

While a convertible may be a better option than straight debt or equity for some companies, nothing in this paper suggests that it represents the absolutely optimal financing vehicle. As noted above, a convertible is unlikely to completely eliminate expected costs of financial distress. Moreover, it is possible to imagine financing contracts that do completely eliminate costs of distress, while at the same time avoiding some of the informational problems associated with a common equity issue.

One example of such a contract can be given in the context of the model presented in section 2 of the paper. Suppose that at time 0, the company issues a security that can be redeemed at time 1 for k shares of stock, where the redemption ratio k depends on the stock price that prevails at time 1--in particular, k is given by $1/P_1$. It is easy to see that this security is "adverse-selection-proof"--no matter what management's information advantage is at time 0, everybody can agree that the security is worth $1. Furthermore, since

the security converts into equity with certainty at time 1, there is no potential for costly financial distress.[18]

This line of reasoning suggests that the theory of convertible bond issuance presented here is at best part of the story. While the theory may explain why some corporations prefer convertibles to straight debt or equity, it implicitly limits the menu of financing options to these three instruments. It would clearly be desirable to have a model that endogenously explains why the alternative (and apparently more efficient) sorts of securities described above are rarely seen in practice.[19]

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[18]Brennan (1986) discusses exactly such a security.

[19]Interestingly, there have been several recent issues of an instrument that resembles that sketched above. For example, in May of 1991, GM announced plans to raise $600 million by issuing a type of "preference" shares (dubbed "PERCS"). One key feature of the PERCS is that they would automatically convert into shares of GM common in July 1994, with the number of shares being a decreasing function of the stock price prevailing at that time. Thus as with the example given here, the PERCS represent a form of financing that: 1) has a true value that is relatively insensitive to any inside information that managers might have; yet 2) does not seem to involve any potential for costly financial distress.

Appendix

It remains to be shown that, for (p_G-p) and L sufficiently large and N sufficiently small, there cannot be any separating equilibrium in which M types issue short-term debt at time 0:

Suppose that a type M did issue short-term debt at time 0. Let us first ask whether we can have a pooling equilibrium in the time 1 subgame, so that both M_G and M_B types issue equity at that time--in other words, can we support the delayed equity strategy? The pooling outcome requires that an M_G prefer issuing equity at the pooling price to not issuing and liquidating some of its assets instead. This implies that there can be no pooling if:
$I(p_G-p)(x_H-x_L)/(px_H+(1-p)x_L) > L$. Thus if (p_G-p) is sufficiently large, there will be no pooling at time 1.

This means that one of two things must happen at time 1--either the M_G types will liquidate at cost L, or they will refinance with <u>debt</u> and incur expected bankruptcy costs of $(1-p_G)c$. So working backwards, the ex-ante expected profits to a type M in the posited separating equilibrium cannot exceed the maximum of $(N - L/2)$ and $(N -(1-p_G)c/2)$. Thus if N is small enough relative to L and c, ex-ante expected profits will be negative. This destroys the posited separating equilibrium, as an M type would be made better off simply by doing nothing--not issuing and not investing--at time 0.

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Table 1

Average two-day announcement impact for
common stock and convertible bond offerings

Study	Average Announcement Impact	Average Impact/Issue Size
A. Common Stock Offerings		
Asquith-Mullins (1986)[a]	-3.0%	-31.0%
Masulis-Korwar (1986)[b]	-3.25%	-22.0%
Mikkelson-Partch (1986)[c]	-4.46%	-29.5%
Unweighted average	-3.57%	-27.5%
B. Convertible Bond Offerings		
Dann-Mikkelson (1984)[d]	-2.31%	-10.5%
Eckbo (1986)[e]	-1.25%	-9.6%
Mikkelson-Partch (1986)[c]	-1.39%	-6.2%
Unweighted average	-1.65%	-8.8%

a Source: Tables 2 and 3 (Primary offerings only)

b Source: Average impact comes from Table 5 (industrial firms). Average issue size comes from Table 3, column 2.

c Source: Average impact comes from Table 4 (events with no contemporaneous announcement). Average issue size comes from Table 3, row 2.

d Source: Average impact comes from Table 3. Average issue sizes comes from Table 2, column 2.

e Source: Average impact comes from Table 4. Average impact/issue size is calculated on p. 149.