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Convertible Debt: Corporate Call Policy and Voluntary Conversion

PAUL ASQUITH and DAVID W. MULLINS, JR.*

ABSTRACT

This paper examines why, in contrast to the predictions of finance theory, firms do not call convertible debt when the conversion price exceeds the call price. The empirical results suggest that the principal reason is because some firms enjoy an advantage of paying less in after-tax interest than they would pay in dividends were the bond converted. This cash flow incentive is the inverse of an investor's incentive to convert voluntarily if the converted dividends are greater than the bond's coupon. Because of taxation, however, the decisions by investors and firms are not symmetric, and there exist bonds which the firm may not call and an investor will not convert. The results also find that voluntary conversion is significantly related to both the conversion price and the differential between the coupon and the dividends on the converted stock.

FINANCE THEORY PROVIDES THE optimal policy for calling a convertible bond (Brennan and Schwartz (1977, 1980) and Ingersoll (1977a)). A firm should call a convertible bond as soon as its conversion value (market value of stock received upon conversion) exceeds its call price. Empirical studies, however, demonstrate that corporations do not always follow this optimal policy (Ingersoll (1977b) and Mikkelsen (1981)). These studies find that many firms fail to call convertibles even after their conversion value far exceeds the call price.

While many researchers have advanced plausible reasons for this apparent anomaly, an empirically satisfying explanation has yet to appear in the literature. Ingersoll (1977b) concludes that underwriting costs and the effects of the call notice period cannot explain the deviation from optimal call policy. Harris and Raviv (1985) present a signalling rationale to justify corporate call practices but present no empirical tests. In their model managers only call convertibles if they receive unfavorable private information. If the information is favorable, managers will wait for voluntary conversion later. Constantinides and Grundy (1987) investigate a variety of hypotheses and also conclude that managers view voluntary and forced conversion as substi-

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tutes. They relate voluntary conversion to the difference between a convertible bond's coupon and the dividends on the converted stock.¹

Ofer and Natarajan (1987) provide evidence which supports an information signalling model. Their results show that firms which call convertible bonds suffer a significant decline in earnings performance after the call as well as significant negative cumulative abnormal returns on their common stock. Campbell, Ederington, and Vankudre (1991), however, challenge this result by claiming that Ofer and Natarajan's post-call results are due to a sample selection bias. They argue that since convertible bonds are generally issued with the conversion price substantially above the current market price, only firms which perform well experience the rise in stock price necessary for the convertibles to be called. Therefore, measures of post-call earnings growth and abnormal stock returns for these firms will be biased downward if they are only compared to the pre-call period. Correcting for this bias, Campbell, Ederington, and Vankudre find that post-call earnings growth rates are not abnormally low, rather that pre-call earnings growth rates are unusually high. They also find that the post-call cumulative abnormal returns are not significantly negative.

That such a simple issue of questionable economic significance has attracted so much research is perhaps surprising. However, optimal call policy is one of the few straightforward, easily testable predictions of finance theory. The empirical failure of this prediction calls into question the usefulness and validity of financial models. This issue bears upon the normative implications of finance theory for managerial behavior. An understanding of optimal convertible call policy is also important for the theory and practice of pricing securities. Finally, insight into this puzzle should provide management with more realistic and useful guidance on convertible call policy.

This paper addresses the issue of optimal convertible call policy by focusing on a narrower question. Why do firms not call convertible bonds with conversion values exceeding call prices? The empirical studies above, as well as Brealey and Myers (1988), have noted that, at any point in time, one can observe a large sample of convertible bonds with conversion values exceeding call prices. Finance theory implies that these bonds should be called forcing conversion. Understanding the firm's motives for not calling these issues provides insight into the apparent anomaly of suboptimal convertible call policy.

This study identifies 208 convertible bonds with conversion values exceeding call prices at the end of January 1984. To explore the reasons that sample bonds are not called, three criteria, each based upon an explanatory rationale, are applied to segment the sample.

Criterion I excludes all sample bonds that were call-protected in January 1984. Criterion II incorporates the effect of the call notice period on the call

¹ Rock (1985) also presents a signalling theory of the call decision. He argues that management's failure to incorporate an automatic optimal call provision in the bond indenture suggests that there must be value associated with management's retaining discretion concerning the call decision.

decision and, consistent with managerial practices, excludes bonds with conversion value less than 120% of call price. Finally, Criterion III excludes bonds with after-corporate-tax interest less than the dividends on the newly converted shares. By not calling these bonds, firms enjoy a cash flow advantage of paying less in after-tax interest than in the dividends they would have to pay if they issued new shares through forced conversion. Criterion III is the most frequent explanatory rationale with two-thirds of the noncall protected bonds satisfying it.

The results are impressive. Of the 208 bonds with conversion value exceeding call price, only 22 remain after applying these three criteria. Analysis of this residual sample reveals that all but seven were subsequently called or retired in 1984. For six of these remaining bonds, dividend increases or stock price declines soon brought them under Criterion II or III. Only one bond that did not meet any of the three criteria in January 1984 (or shortly thereafter) remained outstanding after 1984.

In addition to these results on forced conversions, if firms have a cash flow incentive not to call convertibles, investors may have a cash flow incentive to convert voluntarily. This is also observed in the results. For bonds with pre-tax interest less than converted dividends, less than 20%, on average, of the original issue remains outstanding.

Firms' incentives not to force conversion and investors' incentives to voluntarily convert are not necessarily symmetric, however, due to differences in tax treatment. A firm can deduct interest payments from taxable income but not dividend payments. In contrast, most investors receive the same tax treatment on interest and dividend income (i.e., tax-neutral investors). For this reason there is a range in which the firm has a cash flow incentive not to call (after-corporate-tax interest less than the pro forma converted dividends), and tax-neutral investors have no corresponding cash flow incentive to convert voluntarily (interest is greater than pro forma converted dividends).² For bonds which fall into this cash flow range, over half the original issue remains outstanding.

The results of this study provide insight into the puzzle of why firms do not call convertible bonds even though conversion value exceeds call price. The findings underscore the importance of the cash flow advantage on the decision to call.³ Nonetheless, this study does not constitute a rigorous analysis

² Corporate investors are not tax neutral since they receive advantageous tax treatment of dividend income relative to interest income. This advantage is not greater than the tax advantage to the issuing firm from interest deductibility relative to dividend payments. It does, however, reduce the size of the range where the issuing firm has an incentive not to call and a corporate investor has an incentive not to convert. This is discussed in more detail below and in Figure 1.

³ This cash flow explanation of convertible call policy is not necessarily devoid of signalling in all circumstances. If the converted dividends are less than the after-tax interest payments, a call delay by the firm may indicate that management believes that dividends will increase enough in the future to eliminate the present value of any current cash flow disadvantage. Correspondingly, when converted dividend payments are greater than after-tax interest payments, a call conveys a signal that management expects dividends or stock prices to decrease in the near future.

Figure 1.

The Cash Flow Advantage Rationale

Definitions and assumptions:

I = interest on convertible bond,
 D = dividends on the stock received if converted, and
 t_c = 1984 corporate tax rate of 46%.

A tax neutral investor is subject to the same marginal tax rate on dividend and interest income.

For a 1984 taxable corporate investor, 85% of dividend income is excluded from taxable income.

It is assumed that the bond's conversion price exceeds its call price, that the effect of the call notice period does not preclude calling the bond, and that the bond is not call protected.

Issuer's decision	
If $I(1 - t_c) \geq D$ Issuer calls (sufficient condition)	If $I(1 - t_c) < D$ Issuer may not call (necessary, but not sufficient condition)
Tax neutral investor's decision	
If $I \geq D$ Tax neutral investor will not convert (sufficient condition)	If $I < D$ Tax neutral investor may convert (necessary, but not sufficient condition)
Taxable corporate investor's decision	
If $I(1 - t_c) \geq D(1 - 0.15t_c)$ or $[I(1 - t_c)] \div [1 - 0.15t_c] \geq D$ Taxable corporate investor will not convert (sufficient condition)	If $I(1 - t_c) < D(1 - 0.15t_c)$ or $[I(1 - t_c)] \div [1 - 0.15t_c] < D$ Taxable corporate investor may convert (necessary, but not sufficient condition)
Range in which issuer may not call and tax neutral investor will not convert	
$I(1 - t_c) < D \leq 1$	
Range in which issuer may not call and taxable corporate investor will not convert	
$I(1 - t_c) < D \leq [I(1 - t_c) \div (1 - 0.15t_c)]$	

of optimal call policy. The question of when it is optimal to call convertible bonds remains a topic for future research.

I. Rationales

Under the standard assumptions of finance theory, it is optimal for a firm to call a convertible bond as soon as the conversion value (the value of the stock received upon conversion) exceeds the call price (see Ingersoll (1977a)). This maximizes shareholders' value by extinguishing any bondholders' premium or option value (difference between bond price and conversion value) and captures this premium for shareholders.⁴ As noted in the previous section,

⁴ While calling the bond as soon as conversion value exceeds call price is optimal, Ingersoll (1977a) points out that not calling in this case is suboptimal only if the bond price exceeds conversion value.

empirical studies have found large samples of outstanding convertibles with conversion values exceeding call prices. Although a wide variety of explanations has been advanced and analyzed by numerous researchers, a satisfactory empirical explanation for this anomaly has yet to be documented in the literature.

This study explores three rationales for firms not calling convertible bonds even though conversion value exceeds call price. The first rationale is straightforward. The indentures of many convertible bonds prohibit the firm from calling for a certain time period. Uncalled, in-the-money convertibles may simply be within this period of call protection.

The second rationale, the existence of a call notice period, has been modeled by Jaffee and Shleifer (1990). In calling a convertible, the firm must give bondholders prior notice, typically 30 days. During this period, the firm's stock price might decline, driving the conversion value below the call price. In this case instead of forcing conversion, the firm is forced to redeem the bond. This is costly to the firm for a variety of reasons. The firm may end up paying more than the bond is worth.⁵ The firm may also encounter difficulty and incur underwriting costs in financing the redemption. This is particularly true if the cash must be raised on short notice. The notice period problem is complicated by the fact that Mikkelsen (1981) finds a negative stock price reaction to convertible call announcements.

Thus, to avoid the problem of a failed forced conversion (i.e., an unintended redemption), firms seeking forced conversion may typically delay calling until the conversion value exceeds the call price by some amount. A number of researchers have tried to analyze what this amount should be, but they have had difficulty quantifying it (see Ingersoll (1977b) and Mikkelsen (1980)). Nonetheless, the second criterion employed in this paper is that the conversion value is less than 120% of the call price. This percentage is chosen because it is the percentage given by managers in a survey conducted by Brigham (1966) and because 20% to 25% is the premium most often mentioned by investment banks. Furthermore, bonds which meet this criterion (i.e., bonds with conversion value greater than 120% of call price) are deep in-the-money convertibles, and the call notice period explanation should not apply.⁶

The final rationale for not calling convertibles when it appears optimal to do so concerns a cash flow advantage received by the firm.⁷ It is perhaps easier to understand this rationale by focusing first on when it is optimal to

⁵ At the call date, the bondholders receive the maximum of the conversion value or call price. So if the conversion value is less than the call price, bondholders are in effect able to sell stock to the firm at a price which exceeds the current stock price. Ingersoll (1977b) and others have modeled this phenomenon as a notice period put.

⁶ It is also true that for these bonds the premium or option value (difference between bond price and conversion value) will likely be small. This has implications for voluntary conversion by investors as well as for corporate call policies.

⁷ The discussions as well as the empirical analysis which follows ignores many of the realistic complexities associated with predicting future dividends.

call the bond. If conversion value is greater than call price and if the present value of future after-tax interest on the convertible bond is greater than the present value of future dividends which would be paid on conversion, it is optimal for the firm to call the convertible. The reason is that with conversion bondholders lose the option value or premium reflecting the downside protection afforded by the bond, and the firm will conserve cash.

However, if after-tax interest on the bond is less than the dividends to be paid upon conversion, the resulting cash flow advantage (after-tax interest minus dividends) may make it optimal not to call. By not calling, the firm saves cash—the difference between the actual after-tax interest paid and the dividends which would have to be paid on the newly issued shares—and this cash flow savings accrues to current shareholders. This cash flow savings can exceed the benefit to current shareholders of extinguishing the option value or premium.⁸

It may seem that a call is moot in this case because investors should voluntarily convert. If it is optimal for the firm not to call due to a cash flow advantage, it should be optimal for investors to convert voluntarily if they have a symmetric cash flow disadvantage.⁹ This is true if the dividends on the newly issued shares exceed the interest on the convertible bond. Investors may voluntarily forego the downside protection inherent in the bond in exchange for the cash flow advantage of the stock. (This result is analogous to the optimal early exercise of an American call option on a dividend paying stock analyzed by Merton (1973).) However, due to differences in the tax treatment of dividends and interest, the firm's call decision and investor's conversion decisions are not symmetric.

For a tax-neutral investor (dividends and interest subject to the same marginal tax rate) a necessary though not sufficient condition for voluntary conversion is that the dividends to be received upon conversion exceed the interest on the convertible bond. A firm, however, may optimally choose not to call if converted dividends are greater than the after-corporate tax interest on the bond. Thus, there may exist bonds for which the converted dividends are greater than after-corporate tax interest but below before-corporate tax

⁸ An alternative strategy may be to call the convertible bonds, issue new convertible bonds at a higher out-of-the-money conversion price, and then use the proceeds of this new issue to repurchase the stock from forced conversions. This would follow the rule of always calling as soon as the conversion price exceeds the call price to extinguish the option value, yet it would avoid losing any potential cash flow savings. This strategy may not be optimal, however, if the issuing and repurchasing costs exceed the value of the in-the-money-option.

⁹ Ingersoll (1977a) explores a *sleeping investor* hypothesis under which irrational bondholders fail to convert optimally in the presence of a sufficient cash flow disadvantage. In this case he argues that it would be detrimental to shareholders for the firm to call the bond and force irrational bondholders into the correct action. Constantinides and Grundy's (1987) yield advantage (defined as the bond coupon minus the dividends from conversion) supports the identical implication. Both of these papers, however, fail to consider the difference between individuals and corporations regarding the tax treatment of interest payments. The tax asymmetries which result from those differences may provide a more complete explanation of optimal call policy and voluntary conversion.

interest. This is because the interest on the convertible bond is tax deductible to a firm while the dividends which would be paid upon conversion are not. In those cases the firm receives an after-tax cash flow advantage from not calling while simultaneously there exists no investor cash flow advantage for voluntary conversion.¹⁰

These results are summarized in Figure 1. For tax-neutral investors there exists a substantial range within which the firm may find it optimal not to call and the investor will not convert. Again, this range is generated by the corporate tax deductibility of interest enjoyed by the issuer which reduces the after-tax cash flow burden of interest on debt relative to dividends on stock.¹¹

In sum, the third criterion to be applied to the convertible bond sample focuses on cash flow advantage. For an optimal decision not to call based upon the cash flow rationale, a necessary (though not sufficient) condition is that the after-corporate tax interest on the convertible bond is less than the dividends which would be paid on the newly issued shares were the bond converted. In this case, the firm receives a cash flow advantage from not calling the convertible.

Finally, to explore the issue of voluntary conversion by investors, the sample is further subdivided on various cash flow dimensions. Sub-Criterion IIIa segments those convertible bonds with pre-tax interest less than pro forma converted dividends. For this subset, it may be optimal for the firm not to call, but investors may voluntarily convert to capture the advantage of dividends over interest. One might expect a relatively small fraction of the initial issue to remain unconverted and outstanding, although some of the investors in this subsample may be *sleeping* investors who irrationally fail to convert.

Sub-Criterion IIIb defines the following sample subset: after-corporate tax interest less than pro forma converted dividends (so the firm may not call) and converted dividends less than pre-tax interest (so tax-neutral investors will not convert). This is the cash flow range in which it can be optimal for firms not to call and investors not to convert voluntarily. Unlike the uncalled bonds defined by Criterion IIIa, a relatively large percentage of the original issue may be outstanding. Nonetheless, even within this cash flow range, there can be voluntary conversions by corporate investors who enjoy the corporate dividend tax exclusion.¹²

¹⁰ The level of investor tax rates do not matter, only the fact that firms have asymmetric treatment of dividends and interest while individual investors do not. For individual investors, regardless of income level or tax bracket, income from dividends and income from interest are taxed at identical rates. This analysis also does not violate Miller's (1977) equilibrium since coupon payments are already higher due to the personal tax on interest. Furthermore, in a Miller model it is appropriate for a firm to compare after-tax interest with pre-tax dividends.

¹¹ Corporate investors, however, do receive asymmetric tax treatment on dividend and interest income. This is because of the dividend tax exclusion for corporate investors. As a result, the cash flow range (shown in Figure 1) where the firm finds it optimal not to call and a corporate investor will not convert is very small.

¹² Of course, deviations from these predictions can also be caused by the realistic complexities of determining an appropriate measure of future dividends as well as the past history of dividends. As a simplification, we have ignored these complexities in our analysis.

In summary, this study explores three rationales: call protection, the call notice period, and the interest-dividend cash flow advantage, to explain the failure of firms to call convertible bonds although conversion value exceeds call price. To do this, three explanatory criteria based upon these rationales are applied to a large sample of such bonds. The three criteria consistent with the explanatory rationales are: Criterion I, the convertible bond is call protected, Criterion II, the conversion value is less than 120% of the call price, and Criterion III, if converted, the dividends on the newly issued shares exceed the after-corporate tax interest on the convertible bond. Criterion III is subdivided to explore the issue of voluntary conversion by investors.

The sample bonds remaining after applying the three criteria represent the subset not explained by the three rationales discussed above. These bonds are examined on an ex post basis to gain insight into why they have not been called.

II. Data

This study analyzes 208 convertible bonds whose conversion values were greater than their par value at the end of January 1984. The sample was obtained by examining all convertible bonds listed in the January 1984 *Moody's Bond Record*.¹³ Information collected from *Moody's Bond Record* about each bond included the coupon, maturity, amount outstanding, conversion ratio, and the annual dividends on the prospective stock. This information was verified from *Moody's Manuals*. Additional information on call protection provisions, sinking funds, the current tax treatment of the issuing firm, and any unusual history of the convertible bond was also collected from the *Manuals*.

The percentage outstanding for any bond was calculated two ways. The first was to divide the amount outstanding by the amount issued. The second adjusted the amount issued by any required sinking funds and retirements and divided the amount outstanding by this adjusted amount. The results presented here use the second method although using the first method does not alter the results or conclusions in any meaningful way. The January 1985 *Moody's Bond Record* was then used to determine if any of the convertible bonds in this data set were called during 1984. The *Wall Street Journal Index* was used to date any such calls. Finally, each firm was investigated to determine whether it paid taxes, and if it did, a 46% marginal tax rate was used to calculate after-tax interest payments employed on Criterion III.

¹³ There were 216 bonds listed in January 1984 *Moody's Bond Record* with conversion values greater than par values. Six of these bonds were incorrectly included by *Moody's*; one bond was called in December 1983, two were exchange bonds convertible into the stock of another firm not the issuing firm, and in three instances *Moody's* had an incorrect stock price. With the correct stock price the conversion value was less than the par value. One bond was not included in the final sample because it had a variable interest rate and one bond was not included because the percentage outstanding could not be determined.

III. Results

The results are striking. Of the sample of 208 convertible bonds with conversion value exceeding call price at the end of January 1984, all but 22 (11%) meet the three explanatory criteria outlined above. For 89% of the sample, the firm's decision not to call is consistent with one or more of the rationales presented earlier. Furthermore, ex post analysis of the residual sample of 22 provides explanations consistent with these rationales for all but one bond.

The number of sample convertible bonds satisfying each criterion is presented in Table I. Since these criteria are not mutually exclusive, the number of bonds meeting multiple criteria is also listed.

Thirty of the sample bonds are call protected, and no further explanation for firms' failure to call these bonds is necessary. Of these 30 bonds, call protection would expire in 1984 for 19 bonds. Nine of these 19 bonds were called shortly thereafter; the remaining 10 bonds also satisfy one of the two other criteria. These 30 bonds had an average percentage outstanding of 90.4%.

Criterion II is based upon the existence of a call notice period, typically 30 days. This criterion reflects the risk that the stock price (and conversion value) declines during the call notice period, resulting in an unintended redemption of the bond rather than forced conversion. To avoid this, firms may not call if conversion value is less than 20% above the call price. Of the 178 noncall protected bonds, 66 met this criterion. Of these 66 with conversion value less than 20% above the call price, 36 bonds satisfy no other explanatory criteria. For these 36 bonds, of course, the economic rationality of the 20% criterion is still open to question.

Criterion III focuses on the cash flow consequences of conversion. By not calling the bond, the firm continues to be obligated to make interest payments which, for a tax paying firm, are tax deductible. If the firm calls the bond and forces conversion, the dividends paid on the newly issued shares are not tax deductible. Thus, there is a cash flow advantage for the firm not to call the convertible bond if Criterion III is satisfied—that is, if after-corporate tax interest is less than the dividends that would be paid on the newly issued shares were the bond converted.

The cash flow advantage criterion is the most powerful of the three explanatory criteria. Of the 178 noncall protected bonds, 120 satisfy Criterion III. By not calling these bonds, the firm pays out less in after-tax cash flows to these investors, and this cash flow advantage accrues to the firm's existing shareholders.

In deciding not to call bonds which satisfy Criterion III, the firm must weigh the loss of the cash flow advantage resulting from conversion against the benefit of conversion—extinguishing the convertible's option value or premium (difference between the bond price and conversion value) and capturing this incremental value for shareholders. Since it reflects the value of the downside protection afforded by the bond, the premium should fall as the stock price and conversion value rise. Thus, a cash flow advantage

Table I
Number of Convertible Bonds and Percentage Outstanding for
All Combinations of Call Delay Criteria

Sample of 208 convertible bonds with conversion value greater than call price as of January 1984 and mean percentage of original issue outstanding subdivided by criteria. *CV* is conversion value, *I* is interest on the bond, *D* is the dividends on stock if converted, and t_c is the corporate tax rate.

Panel A		
Criteria	Number of bonds	Mean percentage of original issue outstanding
Total sample of convertible bonds with conversion value greater than call price	208	50.0
I. Call protected January 1984	30	90.4
Subsample of noncall protected bonds	178	43.1
II. Conversion value less than 120% call price	66	66.0
Cash flow criteria		
III. $I(1 - t_c) < D$	120	32.2
IIIa. $I < D$	77	18.8
IIIb. $I(1 - t_c) < D < I$	43	56.1
Panel B		
Intersecting criteria	Number of bonds	Mean percentage of original issue outstanding
and	$CV < 120\%$ call price	66
	$I(1 - t_c) > D$	36
	$I(1 - t_c) < D$	30
	$I < D$	12
	$I(1 - t_c) < D < I$	18
and	$CV > 120\%$ call price	112
	$I(1 - t_c) > D$	22
	$I(1 - t_c) < D$	90
	$I < D$	65
	$I(1 - t_c) < D < I$	25
and	$I(1 - t_c) < D$	120
	$CV < 120\%$ call price	30
	$CV > 120\%$ call price	90
and	$I(1 - t_c) > D$	58
	$CV < 120\%$ call price	36
	$CV > 120\%$ call price	22
and	$I < D$	77
	$CV < 120\%$	12
	$CV > 120\%$	65

Table I—Continued

Criteria	Number of bonds	Mean percentage of original issue outstanding	
and	$I(1 - t_c) < D < I$	43	56.1
	$CV < 120\%$	18	66.1
	$CV > 120\%$	25	48.9

(after-tax interest less than dividends) is more likely to inhibit the firm from calling if the conversion value is high resulting in a small option value. The results in Table I are consistent with this logic. Of the 120 bonds with after-tax interest less than converted dividends, 90 have conversion values greater than 120% of call price.

These results are summarized in a nested format in Table II. Of the 208 convertible bonds in the January 1984 *Moody's Bond Record* with a conversion value exceeding call price, 30 are call protected. Of the remaining 178 bonds, 66 have a conversion value less than 120% above the call price. Of the remaining 112 bonds, 90 have after-corporate tax interest payments less than the dividends that would be paid if converted. This leaves a total of 22 bonds which are not explained by a strict application of these three criteria.

Ex post analysis of this residual sample provides insight into why these convertible bonds were not called. Of the 22 bonds, 4 were in the process of being called and 10 more bonds were called in 1984, 3 in January alone. So, of the total sample of 208 bonds, all but 8 either satisfy the three rationales or are called in 1984. Of these eight; for two bonds the firms increased dividends enough within 6 quarters to satisfy Criterion III. Four additional bonds are close to meeting Criterion II; two meet Criterion II within 1 month, one within 4 months, and the other has a conversion value of 126-1/2 and a call price of 101.

This leaves just two bonds that are neither called nor come quite close to satisfying one of the three criteria. One bond was from a firm which was acquired in 1984, and it was retired in the acquisition. For the last bond there is no apparent reason why it was not called. This bond was called in May 1985, well after the three criteria predict it should have been, but long before it's 1997 maturity date.

While the three explanatory criteria are surprisingly effective in providing insight into a firm's decision not to call, the cash flow rationale raises questions concerning investors' voluntary conversion decision. Insight into this decision is provided by the results presented in Table III.

Of the 178 noncall protected bonds, 120 meet Criterion III—the after-corporate tax interest is less than the dividends that would be paid were the bond converted. While the firm maintains a cash flow advantage by not converting, some investors may voluntarily convert to capture what can be a cash flow advantage from their perspective. Reflecting this incentive for

Table II

Convertible Bonds Grouped by Issuer Call Delay Criteria

Subsamples of 208 convertible bonds with conversion value greater than call price as of January 1984. Number of bonds in subsamples are determined by selection criteria. (Mean percentage outstanding is given in parentheses under number of bonds in subsample). CV is conversion value, I is interest on the bond, D is the dividends on stock if converted, and t_c is the corporate tax rate.

	Total sample 208 (50.0)	
	Explained by criteria	Unexplained by criteria
Criterion I call protected	30 (90.4%)	178 (43.1%)
Criterion II $CV < 120\%$ call price	66 (66.0%)	112 (29.6%)
Criterion III $I(1 - t_c) < D$	90 (25.1%)	22 (48.1%)
Total explained	186	Total unexplained 22 ^a

^aEx post analysis provides explanations for all but one of these 22 bonds.

voluntary conversion, the mean percentage of the original issue outstanding is only 32.2% for the 120 bonds satisfying Criterion III, versus 65.9% for the 58 noncall protected bonds not satisfying Criterion III.

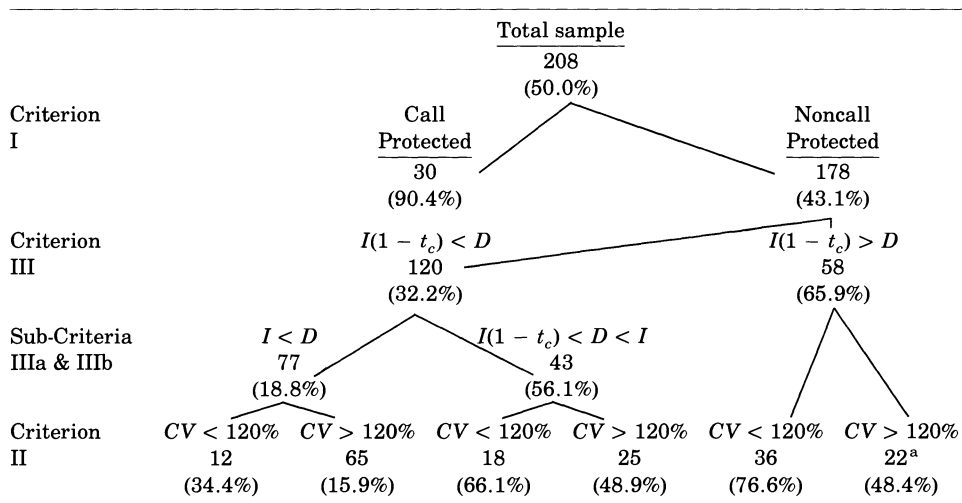
Table III also presents an analysis of the sample defined by sub-Criterion IIIa—those bonds with (pre-corporate tax) interest less than converted dividends. For this sample, it may be optimal for the firm not to call, but investors may voluntarily convert to capture the cash flow advantage of dividends over interest. For the 77 bonds with pre-tax interest less than pro forma converted dividends, an average of only 18.8% of the original issue remains outstanding.

However, by converting voluntarily, investors must give up the option value or premium (difference between the convertible bond price and the conversion value). This option value reflects the downside protection afforded by the bond. As the stock price rises, pushing up the conversion value, this premium should fall reflecting the diminished value of downside protection. When the conversion value is sufficiently high and option value sufficiently low, the cash flow differential of dividends over interest can be great enough to engender voluntary conversion. This suggests that with dividends from converted stock greater than interest, voluntary conversion should be more prevalent for bonds with conversion value greater than 120% of call price.

The results in Table III confirm this. Of the 77 bonds with converted dividends greater than pre-tax interest, 65 bonds have conversion prices exceeding 120% of call price. The mean percentage outstanding for these 65 bonds is only 15.9%. In comparison, an average of 34.4% of the original issue

Table III
Voluntary Conversion of Convertible Bonds Grouped by Cash Flow Criteria and Conversion Value

Subsamples of 208 convertible bonds with conversion value greater than call price as of January 1984. Number of bonds in subsamples are determined by selection criteria. (Mean percentage outstanding is given in parenthesis under number of bonds in subsample). CV is conversion value, I is interest on the bond, D is the dividends on stock if converted, and t_c is the corporate tax rate.



^aEx post analysis provides explanations for all but one of these 22 bonds.

remains outstanding for the 12 bonds which meet both Criterion IIIa (interest less than converted dividends) and Criterion II (conversion price less than 120% of call price).

Thus, for bonds with a cash flow advantage to conversion from the investor's viewpoint, a large majority of the issue has been voluntarily converted. Because of the cash flow disadvantage from the firm's perspective, the firm may choose not to call the issue to force the small remaining percentage outstanding to convert. Only a small fraction of bonds are not voluntarily converted with dividends greater than interest and conversion value exceeding 120% of call price (suggesting a small option value). It may be tempting to think of these investors as *sleeping investors* whose failure to convert is irrational. However, their behavior might be explained by transaction costs, taxes, information costs, and/or institutional restrictions on the holding of common equity.

Finally, sub-Criterion IIIb segregates the cash flow range in which it can be optimal for firms not to call (after-corporate tax interest less than pro forma converted dividends), and tax-neutral investors will not voluntarily convert (converted dividends less than pre-tax interest). Compared with the sample defined by Criterion IIIa (converted dividends greater than pre-tax

interest), one would expect a larger percentage outstanding for bonds satisfying Criterion IIIb reflecting the tax-neutral investors' incentive not to convert. Nonetheless, in this subsample corporate investors may voluntarily convert due to the favorable corporate tax treatment of dividend income.

The results presented in Table III are consistent with this reasoning. For the 43 bonds satisfying Criterion IIIb (converted dividends less than interest but greater than after-corporate tax interest) an average of 56.1% of the original issue remains outstanding compared with 18.8% outstanding for the 77 bonds satisfying Criterion IIIa (converted dividends greater than interest).

For the subsample defined by Criterion IIIb, more voluntary conversion is observed for deep-in-the-money convertibles. Only 48.9% of 25 bonds with conversion values greater than 120% of call price remain outstanding compared to 66.1% outstanding for the 18 bonds with conversion values less than 120% of call price. However, there is substantially less voluntary conversion in these two Criterion IIIb subsamples compared with the corresponding Criterion IIIa subsamples. With conversion value greater than 120% of call price, the 48.9% outstanding for bonds satisfying Criterion IIIb compares with only 15.9% for bonds satisfying Criterion IIIa. With conversion value less than 120% of call price, the mean percentages outstanding are 66.1% for Criterion IIIb versus 34.4% for IIIa.

The regression results presented in Table IV confirm the importance of cash flow (dividends less interest) and conversion value in explaining voluntary conversion. Both are highly significant variables in explaining the percentage of the original issue which remains outstanding. Voluntary conversion occurs more often the higher the conversion value. This is expected since investors should recognize that the option value from holding the convertible is smaller the more the conversion value exceeds the call price. Furthermore, more voluntary conversion occurs the higher the common stock dividend. This is also expected since the cost of not converting rises as

Table IV
Regression of Percentage Outstanding on Conversion Value
and Cash Flow Advantages

Regression results on the entire sample of convertible bonds with conversion value greater than call price in January 1984. *CV* is conversion value, *I* is interest on the bond, *D* is the dividends on stock if converted, *CP* is the call price, and t_c is the corporate tax rate. (*t*-statistics in parentheses).

Regression Equation:							
$\% \text{ outstanding} = \alpha + \beta(CV - CP) + \gamma(CV) + \delta(D - I(1 - t_c)).$							
<i>N</i>	α	β	γ	δ	R^2	<i>F</i>	$F_{\text{sig.}}$
208	45.5 (15.34)	-0.106 (-3.21)		-0.473 (-11.42)	0.488	97.97	0.00
208	55.2 (9.34)		-0.099 (-2.97)	-0.481 (-11.71)	0.485	96.61	0.00

dividends rise. These results are consistent with Dunn and Eades' (1989) results on voluntary conversion of convertible preferreds.¹⁴ They are also consistent with Harris and Raviv's (1985) assumption that voluntary conversion will occur if managers of good firms delay calling a convertible.

Therefore, the results illustrate the related incentives for firms not to call and investors to convert voluntarily. The cash flow incentive for the firm not to call applies to two-thirds of the noncall protected bonds. The incentive for the firm not to call is strongest when converted dividends are greater than pre-tax interest and conversion value is greater than 120% of call price resulting in small option value. Of the exhaustive categorizations, this one includes the largest number of sample bonds (65 bonds) but the smallest mean percentage outstanding (15.9%) due to the correspondingly strong incentive for investors to convert voluntarily.

A large percentage of the original issue outstanding is observed only for bonds with conversion price less than 120% of call price and also satisfying sub-Criterion IIIb—the cash flow range where it can be optimal for the firm not to call and investors not to convert. While this subcriterion accounts for only 10% of the noncall protected bonds, its importance is underscored by the large fraction of these issues outstanding (66.1%). Differences in tax treatment between issuers and investors produce the asymmetry that leads issuers not to call and investors not to convert.

IV. Conclusions

This study provides insight into why firms do not call convertible bonds even though conversion value exceeds call price. Three rationales explain this apparent contradiction of finance theory. Analysis of the first rationale reveals that 14% of the sample of convertible bonds were call protected.

The most powerful explanatory rationale is that firms enjoy a cash flow advantage from not calling. For two-thirds of the noncall protected bonds, after-corporate tax interest expense is less than the dividends that would be paid if the bonds were converted to common stock. The firm's incentive not to call in this case is the other side of investors' incentive to convert voluntarily to increase investor cash flow. The latter incentive is analogous to the well-known incentive for the holder to exercise early an American call option on a dividend-paying stock.

While the cash flow incentive for the firm not to force conversion is the mirror image of investors' incentive to convert voluntarily, these incentives are not symmetric. This asymmetry is the result of differences in the tax treatment of firms and investors.

The results on the percentage of original issue outstanding confirm the

¹⁴ Dunn and Eades examine the dividend differential between the dividend on convertible preferreds and the dividend on the converted common stock. That case is simpler than the one examined here, however, since the corporate tax treatment of preferred dividends and common stock dividends is identical.

importance of the cash flow incentive in explaining investors' decision to convert voluntarily. With dividends exceeding pre-tax interest, voluntary conversion produces a cash flow increase for investors, and for such bonds only a small fraction of the original issue remains outstanding. In contrast, a much larger percentage of the original issue remains outstanding for bonds in the cash flow range where firms have a cash flow incentive not to call (after-corporate tax interest less than pro forma converted dividends), and tax-neutral investors have no cash flow incentive to convert voluntarily (pre-tax interest is greater than converted dividends). Voluntary conversion results are also influenced in a predictable manner by the level of conversion value which affects the option value of the convertible bond.

The call notice period explanation also plays a role in the results. Consistent with the existence of potential costs from a failed conversion, firms seem to require the conversion value to be at a premium to the call price. The managerial rule of thumb of not calling until conversion value exceeds call price by 20% applies uniquely to 20% of the noncall protected bonds. The economic justification for the 20% is a criterion that remains a topic for future research.

After applying the three explanatory rationales (call protection, cash flow advantage, and call notice period) only 22 of the sample of 208 bonds remain. Ex post analysis based upon the three explanatory rationales is successful in explaining why firms did not call for all but one of these residual 22 convertible bonds.

The explanation that managers do not call convertibles in order to save cash has a number of signalling implications. For example, if a firm does not call a convertible bond when the dividends are less than the after-corporate tax interest, this may imply that the managers expect to raise dividends in the future. Calling a convertible bond when the dividends are greater than the after-corporate tax interest is somewhat more ambiguous. It may signal that managers expect dividends or the stock price to fall in the future, or it may be a way to clean up an issue where many of the holders have already voluntarily converted. Not calling a convertible bond when the dividends exceed the after-corporate tax interest is information that no negative events are expected to occur and managers are willing to continue to collect the cash flow advantage from *sleeping investors*.

It should be noted, however, that while all of these managerial actions may convey information, the reason for a call or lack of call relies entirely on the desire of managers to conserve cash flow to current equityholders. It does not necessarily have anything to do with the managers' desire to signal the market or directly avoid stock price reactions.

Finally, while this study provides insight into why firms do not call convertible bonds with conversion values exceeding call prices, it does not address the broader and more difficult question of when it is optimal to call a convertible bond. Nonetheless, the results contribute to this research topic. The findings underscore the importance of cash flow incentives in optimal call policy. The role of dividends in the cash flow incentive also potentially

provide insights into the stock price impact of decisions to call convertibles. While many questions remain unanswered, explaining why convertibles are not called provides a useful foundation for future research on convertible call policy.

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