Convertible Bonds Are Not Called Late

PAUL ASQUITH*

ABSTRACT

Starting with Ingersoll (1977b), the academic literature has repeatedly sought to explain why convertible bonds are called late. The findings here demonstrate there is no call delay to explain. This paper finds that most convertible bonds, given their call protection, are called as soon as possible. For those that are not, there are significant cash flow advantages to delaying. The median call delay for all convertible bonds is less than four months. If a safety premium is desired to assure the conversion value will exceed the call price at the end of call notice period, the median call period is less than a month.

THE QUESTION OF WHAT is the optimal call policy for convertible bonds has attracted considerable attention since Brennan and Schwartz (1977) and Ingersoll's (1977a) seminal work. That work suggests that the optimal call policy is to call the bond when the conversion value first exceeds the call price, since forcing conversion eliminates the bondholders' premium or option value. However, empirical studies (e.g., Ingersoll (1977b) and Constantinides and Grundy (1987)) claim that firms consistently deviate from this call policy and delay calls. This claim is based on Ingersoll's finding that firms wait, on average, until the conversion value exceeds the call price by 43.9%, a result confirmed in Mikkelson (1985).

Trying to explain this call delay phenomenon has generated an impressive literature. To date, however, no one has actually documented whether there is a delay or measured how long the delay is. In addition, the existing empirical work has focused either on a subsample of called bonds or on a subsample of bonds remaining uncalled at a given point in time. These partial samples are not adequate to empirically determine average call delays for convertible bonds or to distinguish between the various hypotheses proposed for call delays.

This article takes a more complete approach by examining the sample of all convertible bonds issued in 1980 through 1982. Each bond's conversion value and call price is calculated daily from its issue date until December 1993. This

* MIT Sloan School of Management. I wish to thank Benjamin Bisconti, Charles Drakos, Paul Healy, Milton Harris, Deborah Lucas, Stewart Myers, the referee for this journal, Eduardo Schwartz, Paul Sequin, Andrei Shleifer, René Stulz, and especially Andrew Alford and Anne Beatty for helpful discussions and comments. In addition, I wish to thank the participants of the finance workshops at Harvard, Indiana, Notre Dame, and MIT. Finally, I wish to thank Jean Ihm and Matthew Zames for their research assistance. Financial support was provided by MIT's International Financial Services Research Center and the Judy C. Lewent Fund for Research in Finance.

dynamic analysis allows call delays to be measured and alternative theories tested. The findings demonstrate that there is no call delay phenomenon to explain. Most bonds, given their call protection, are called as soon as possible. For those that are not, there are significant cash flow advantages to delaying. The median call delay for all convertible bonds is quite short: slightly less than four months. Even then a "safety premium" explains a good portion of this delay. That is, firms want the conversion value to exceed the call price by enough to safely assure it will still exceed the call price at the end of the normal 30 day call notice period. Assuming a 20 percent safety premium, the median delay period is less than one month.

In addition, while the average call premium is 50.2 percent, part of it is explained by bonds whose conversion values rose to large premiums while they were call protected. For example, the average call premium for bonds called as soon as their call protection expires is 80.8 percent. Part of the premium is also explained by cash flow motivated delays or sudden increases in a firm's stock price. After considering these three factors, the average call premium is only 25.8 percent.

This article has four sections. Section I reviews the current theory on convertible calls. Section II describes the data sample and methodology. Section III presents the empirical results on call delays and call premiums. It also documents the market's reaction to calls and the firm's post-call performance. Finally, Section IV summarizes the evidence and presents conclusions.

I. Theory and Hypotheses

A. Current Theory and Evidence

Ingersoll's (1977a and 1977b) two papers identified an apparent anomaly in corporate finance. In one paper, Ingersoll (1977a) shows that finance theory predicts that firms should call their convertible bonds as soon as the conversion value exceeds the call price. In the second, Ingersoll (1977b) shows that firms wait until the conversion price exceeds the call price by 43.9 percent on average. This result was interpreted almost universally as showing that firms did not call when theory predicted they should. Indeed, Brealey and Myers (1991) state "The reason for firms' reluctance to call convertibles is not known."

Ingersoll suggests several explanations for this apparent delay, including possible stock price volatility during the call notice period. Firms are generally required to announce a call 30 days before the redemption date (the last date bondholders can exercise the conversion option). During this call notice period, the price of the stock could conceivably fall enough so the conversion value is less than the call price, thereby forcing the firm to redeem the bond with cash. However, Ingersoll concludes that, while some safety premium is reasonable, a 43.9 percent premium implies a higher implicit stock price volatility than normally expected.

This call notice delay and safety premium of conversion value over call price is modeled in Jaffee and Shleifer (1990), who assume it is costly to raise the

cash necessary to redeem non-converted bonds. Although Jaffee and Shleifer do not assign any size to this premium, Asquith and Mullins (1991) use a 20 percent safety premium, maintaining that in practice managers use 20 to 25 percent. Twenty percent is the minimum percentage usually recommended by investment bankers, and it is the percentage cited by Brigham (1966) in his survey of managers. Finally, 20 percent is slightly less than twice the average monthly standard deviation of stock prices for the firms in this sample.

Asquith and Mullins (1991) provide an additional explanation for Ingersoll's result. They argue that the liability to shareholders from the bond's option value may be more than offset by the present value of the cash-flow advantage that occurs when the firm is paying less in after-tax coupon payments than it would pay in dividends on the converted bond. Thus managers may be maximizing present shareholders' wealth by delaying the call. Likewise, when the cost of dividend payments on the converted bond is less than the cost of after-tax coupon payments, the firm has a cash-flow advantage by calling the bond.[1] Asquith and Mullins' (1991) empirical results show that the cash flow advantage theory in combination with the lack of a safety premium explains well why bonds remain uncalled. It does not, however, demonstrate that firms without a cash flow advantage call quickly as Ingersoll (1977a) and Brennan and Schwartz (1977) predict. Asquith and Mullins (1991) fail to test this second question because their sample contains only uncalled bonds.[2]

Harris and Raviv (1985) propose an alternative explanation arguing the market interprets convertible calls as negative signals from management about future firm performance. This theory is consistent with Mikkelson's (1981) finding of a negative stock price reaction to the call announcement and with Ingersoll's assertion that firms delay their calls. As a consequence, management should call a bond only when it believes that the opportunity to force conversion will disappear in the future. In contrast, a call delay implies that future expectations are positive (or at least not negative).[3]

Constantinides and Grundy (1987) explain call delays by assuming that voluntary conversion is less costly and thus preferred to a call. They maintain that the investor's yield advantage (the difference between the coupon and the dividend payments) is the primary factor in explaining voluntary conversion. Their study contends that when the yield advantage is negative voluntary

[1] Another way to consider this rule is that Ingersoll (1977a) and Brennan and Schwartz (1977) do not price the complete option for convertible bonds. That is, they fail to consider the cash flow implications of the cash dividends on converted bonds. More recently Asquith *et al.* (1994) argue that the option value of the bondholders' put on an in-the-money convertible is essentially zero, since the firm can call at any time. They argue that once a bond is sufficiently in-the-money, the only decision criterion for calling or not is cash flow.

[2] Asquith and Mullins do use cash flow advantage to investigate voluntary conversion. They find that the percentage of bonds voluntarily converted is significantly related to the cash flow advantage and to the amount the conversion value exceeds the call price. The second term is an indirect measure of the bondholders' option value.

[3] Several articles investigate whether firms that call have negative postcall performance. Most recently, Campbell, Ederington, and Vankudre (1991) demonstrate that pre- and postcall earnings growth and stock returns do not differ.

conversion occurs and bonds are not called; when the yield advantage is positive, there is less voluntary conversion and the probability of a call increases.[4] Furthermore, if dividends are expected to increase, management should not call, since bondholders will soon voluntarily convert. Thus their hypothesis incorporates Harris and Raviv's (1985) key conclusion; calling a convertible bond implies negative information about the firm since management is signalling they believe dividends will not increase in the future.[5]

This article tests whether firms call convertible bonds in a manner that maximizes value for the current shareholders. Unlike previous empirical work which has examined either the subset of called bonds or the subset of in-the-money outstanding bonds, it does so on a complete sample of issued bonds. More importantly, this is the first study to calculate the call delay between when the conversion value first exceeds the call price and when the bond is called. This paper shows that firms call convertible bonds as soon as conversion value is greater than call price unless: 1) there is a significant risk that the conversion value will fall before the call notice period expires or 2) the present value of the after-tax coupon payments is less than the present value of the dividend payments on the converted bond by an amount greater than the option value extinguished in a call. This is consistent with Ingersoll's (1977a) and Brennan and Schwartz's (1977) original prediction modified by Asquith and Mullins' (1991) cash flow advantage.

B. Other Motivations for Calling

Other motivations for calling a convertible bond include refunding at a lower rate, issuing debt with less restrictive covenants than the old debt, extinguishing the equity if the issuing firm is acquired in a merger, or exchanging the debt in a bankruptcy or restructuring. Refunding at a lower rate may occur because interest rates have fallen generally or because the firm's bond rating is raised.

II. Sample and Data Sources

The sample consists of all convertible bonds issued between January 1, 1980 and December 31, 1982. The initial sample of 219 convertible bonds was

[4] Constantinides and Grundy (1987) also provide empirical tests on call delay, but their sample selection criteria introduces a severe bias. They only examine bonds that are in-the-money in January and July of their sample years. This not only makes their sample less complete, but more importantly it misses many bonds that become in-the-money in interim months and are called quickly, i.e., before the next January or July. This selection procedure thus biases upward all the results on call delay in that article.

[5] Asquith and Mullins' cash flow advantage also allows for the possibility of signalling. If dividends on the converted bond are less than the after-tax coupon payment, a call delay may indicate that management believes future dividends will increase enough to eliminate any cash-flow advantage. Correspondingly, if the current cash flow advantage does not favor calling the bond, yet the firm does, this should be negative information. Firms should only call in this instance if they expect the stock price to fall enough so that conversion value (CV) goes below the conversion price (CP), (thus eliminating management's option to force conversion by calling).

obtained using a data base of convertible issues provided by Securities Data Corporation. Twenty bonds are excluded from the final sample for the following reasons: nine were exchangeable bonds, which are convertible into the equity of another firm's stock, not the issuing firm; four were convertible into ADR's or foreign stock; one was a delayed convertible; one was convertible only into cash; two bonds did not have call announcement dates that could be verified; and three did not have sufficient price data on the Nasdaq, New York Stock Exchange (NYSE), or American Stock Exchange (AMEX) CRSP files over the relevant period.

Information on each bond's interest rate, conversion rate, call protection period, and call price schedule is from *Moody's Manuals* and *Moody's Bond Record Guide*. This information is verified from the prospectuses. Information on stock splits, stock dividends, cash dividends, and stock prices is from Center for Research in Security Prices (CRSP). After-tax coupon payments are calculated using the firms' income tax rate for the year of the call. The dividend amount on the converted bond is calculated as the conversion ratio multiplied by the annual per share dividend payment. Information on which bonds are called, the call and redemption dates, and whether the issuing firm has been involved in a merger or acquisition is taken from the Committee on Uniform Securities Identification Procedures *(CUSIP) Guide*, the *Wall Street Journal Index*, *NEXIS*, and the *S&P Called Bond Guide*.[6] The call delay period is calculated by counting, after call protection expires, the number of days the conversion value exceeds the call price until a call announcement. This calculation uses daily stock prices, the bond's call price schedule (which typically declines over time), and all stock splits and stock dividends that affect the conversion price.

As noted above, a call may occur for reasons unrelated to conversion values, cash flows, or signalling. Some bonds are called when the issuing firm is merged into another firm. In addition, if the issuing firm restructures its liabilities, the convertible bond is sometimes exchanged. In both of these instances—mergers and financial restructurings—the decision to call is unlikely to be consistent with the rationales discussed above. For this reason, bonds called in mergers, exchanges, and bankruptcies are analyzed separately. However, these bonds are also examined before the merger or restructuring to see if they behave similarly to the other bonds discussed above.

For the final sample of 199 bonds, the average and median issue sizes are $53.5 and $35 million. The average and median coupons are 9.99 percent and 9.75 percent. The average and median conversion premium at time of issue, i.e., the amount the conversion price exceeds the issuing day stock price, are 22.1 percent and 19.5 percent. The average maturity is 22.3 years, and the

[6] Not all call announcement dates are reported in the *Wall Street Journal*. When they are not, *NEXIS* was used as the primary source. When both the *Wall Street Journal* and *NEXIS* do not have an announcement date, the date of the *S&P Called Bond Guide* where the call is reported is used. (This occurred in 10 of the 123 calls.) This last reference is published weekly and sometimes delays reporting a call for a week or two. This means that the actual call delays are less than or equal to those reported below.

Table I

Outcomes as of December 31, 1993 for Convertible Bonds Issued During 1980 to 1982

Panel A is the sample of 199 convertible bonds issued during 1980 to 1982 subdivided by potential outcomes as of December 31, 1993. Panel B divides Panel A's sample of 199 convertible bonds into two subsamples: 47 bonds where the conversion value never exceeds the call price and 152 bonds where the conversion value does exceed the call price in the period between call protection expiration and December 31, 1993. CV is conversion value and CP is call price.

Criteria	Number	Called	Still Outstanding	Issuing Firm Acquired	Restructuring of Issuing Firm
Panel A: All Bonds					
All Bonds	199	123	14	32	30
Panel B: Outcomes Divided by Criteria that CV Exceeds CP					
CV < CP for entire period from call protection expiration until called or 12/31/93	47	8	8	14	17
CV > CP for at least one day after call protection expires and before bond is called	152	115	6	18	13

median maturity is 25 years. The call protection period averages 295 days and has a median of 252 days. (Days throughout this article refer to trading days, i.e., days when the stock is open for trading. There are approximately 21 trading days in a month and 252 trading days in a calendar year.) However, 21 percent of all bonds have no call protection period at all.

III. Empirical Results

A. Bond Outcomes

Table I, Panel A gives the distribution of outcomes for the sample of 199 convertible bonds. As of December 31, 1993, there are 123 called bonds, 14 outstanding bonds, 32 issued by firms that were acquired, and 30 issued by firms that either went bankrupt or restructured their debt. Eight of the 14 outstanding bonds never had their conversion value greater than their call price after the call protection expired.

Table I, Panel B divides the sample by whether the conversion value (CV) exceeds the call price (CP) in the period after the bond's call protection expires and before the bond is called or involved in a merger, bankruptcy, or exchange. For the subsample of 47 bonds where the conversion value does not rise enough to exceed the call price, there are 8 outstanding bonds and surprisingly 8 called

Table II

Number of Days Until Call Announcement for Bonds That Had Conversion Value Greater Than Call Price

Sample of 152 bonds that had conversion value greater than call price for at least one day after call protection expired and before the bond was called as of December 31, 1993 subdivided by outcome and cash flow advantage. CV is the conversion value of the bond. CP is the call price. ND is the number of days that CV>CP until call announcement or until December 31, 1993. ND20 is the number of days that CV>120 percent CP until call announcement or until December 31, 1993. MAX D is the maximum dividends on the converted stock from the time the bond is first convertible until December 31, 1993. I(1 − t) is the after-tax coupon payments on the bond.*

				Max D < I(1 − t)			Max D > I(1 − t)		
		ND	ND20		ND	ND20		ND	ND20
	N	Mean/ Median	Mean/ Median	N	Mean/ Median	Mean/ Median	N	Mean/ Median	Mean/ Median
Called	115	170.5/77	95.7/20	86	97.0/70.5	37.8/17.5	29	388.1/128	267.4/41
Outstanding	6	1185.7/799	1041.8/439.5	3	720/62	0.3/0	3	2299.3/2647	2083.3/2585
Mergers	18	222.3/144.5	138.8/56.5	14	153.3/109.5	77.9/39	4	463.8/447.5	352.3/388.5
Bankruptcy	13	92.2/43	8.6/0	13	92.2/43	8.6/0	0	N/A	N/A

* Number of days is cumulative and not necessarily consecutive.

bonds. For those 8 bonds, conversion is an unlikely motive for calling.[7] Of the 152 bonds where CV > CP for at least one day, there are 121 bonds not involved in a merger or restructuring. Of these, 115 are called. If the CV > CP requirement is made more realistic by requiring that the CV exceed 120 percent of the call price, the number of bonds is 109 and the number of bonds called is 105. Thus Table I shows that most convertible bonds are called if the conversion value exceeds the call price.

B. Call Delays

This section examines the amount of time a convertible bond is in the money, i.e., the number of days the CV exceeds the CP after call protection expires. As shown in Table II, for the 115 called bonds, the average number of days the CV exceeds the CP before a call announcement is 170.5 and the median is 77 days. If a 20 percent premium is desired to compensate for possible volatility in stock prices (and thus the possibility of a failed call), the average number of days is 95.7 and the median is 20.

The number of days given in Table II and the text is cumulative and not necessarily consecutive days. That is, the CV may exceed the CP for one or

[7] Four of these firms stated that they were using the proceeds of new debt to redeem their old convertibles. In two cases the new debt was another convertible. For example, a 7-3/4 percent convertible bond was issued to redeem a 9 percent convertible bond. The other four firms did new financing at a lower cost during the period they were calling their convertible bonds, but they did not formally announce any link. In addition, there are five bonds that have CV < CP at the announcement date, even though they previously had CV > CP. These are discussed later.

several days and then fall below the CP, only to exceed it again later. This strengthens the conclusion that firms do not usually delay calls, since the median call delay of 20 days may include several periods where the CV fluctuates over and under the CP. In fact, the average number of times the CV crosses the CP for the sample of 115 calls is 7.6. This means that on average, the CV exceeds the CP four times and falls back below it three times. The average number of times CV crosses 120 percent CP is 5.7. These fluctuations again emphasize the volatility of stock prices and support the rationale for some safety premium. This issue of stock price volatility and safety premiums is addressed in more detail below.

For bonds still outstanding, the call delays are much longer. Call delays are calculated until December 31, 1993. Choosing a later date may either extend this period or result in a called bond. The six outstanding bonds in Table II have CV > CP for 1185.7 days on average by December 31, 1993 with a median of 799 days. After applying the 20 percent premium, the average and median number of days are 1041.8 and 439.5.

B.1. Call Delays and Cash Flow Advantage

There is, of course, another possible reason for call delays other than not exceeding a 20 percent safety premium. This is the cash flow advantage developed in Asquith and Mullins (1991). As Table II shows, dividing the samples by whether the maximum dividend (max D) on the converted stock exceeds the after-tax coupon dramatically affects the call delay. Max D is calculated as the largest cash dividend from the first day CV > CP until December 31, 1993. For 86 called bonds with max D < I(1 − t), the mean and median number of days where CV > 120 percent CP is 37.8 and 17.5 days, while for 29 called bonds with max D > I(1 − t) the mean and median days where CV > 120 percent CP are 267.4 and 41.

In addition, regressing Log(Number of days CV > 120% CP) = a + b*Log(max dividend on converted stock/after-tax coupon) yields the following significant results[8]:

	a	b	R^2	F
coefficient	3.19	1.92	0.1484	12.33
t-statistic	(17.83)	(3.15)		

While Table II and the regression results demonstrate that the cash flow advantage is an important factor in determining when firms call their convertible bonds, the results raise additional questions. Table II shows there are three uncalled bonds with max D < I(1 − t), and 29 called bonds with

[8] These regression results are for the sample of 66 firms with CV > 120 percent CP for at least one day that are also not in the money the first day the call protection expires. When the firms that have CV exceed CP during the call protection period are included, the regression results are similar in size and significance but the residuals are nonnormal. However, nonparametric Spearman rank order correlations between the number of days CV > 120 percent CP and the ratio of maximum dividend to after tax-coupon are significant over both samples.

max D > I(1 − t). These two subsamples seemingly contradict the prediction that the call delay period depends on cash flow.

Of course, the maximum dividend on converted stock in Table II and in the regression is taken at one point in time. Comparing the maximum dividend to the after-tax coupon is not a direct measure of the present value of future dividends (PV(D)) versus the present value of future after-tax interest payments (PV(I(1 − t))).[9] To examine whether these two subsamples really do violate the cash flow hypothesis, it is necessary to look at the time series of dividends before and after the call.

Examining first the three firms with max D < I(1 − t) that don't call, Table II reports that the average and median number of days CV > 120 percent CP is 0.3 and 0. This, of course, means the number of days for the three bonds is 1, 0, and 0. Thus for these bonds, CV did not exceed CP by much or for very long, and the risk of an unsuccessful call is enough to explain their failure to call. In contrast, for the three outstanding bonds with max D > I(1 − t) the mean and median number of days CV > 120 percent CP is 2083.3 and 2585. In fact, the only convertible bonds that are call-delayed for long periods are those with max D > I(1 − t).[10]

For the 29 called bonds that have max D > I(1 − t), Table II reports that the mean and median number of days that CV > 120 percent CP is 267.4 and 41. Examining the dividend history of these bonds reveals that for 18 of the 29 bonds, D > I(1 − t) at the time the bond was called. For all 18 bonds, the dividends rose enough after the call to make D > I(1 − t). This raises a separate issue if the firms knew that dividends would rise enough to exceed after-tax coupons.[11] It may be that managers did not expect dividends to rise as much, or it may be that the present value advantage of paying lower dividends now outweighs the disadvantage of higher dividends later. After the call, the average number of quarters until the dividends exceeds the after-tax coupon is 12.6 with a median of 8.5.

For 11 of these 29 bonds, however, D > I(1 − t) at the time of the call. This raises the question of whether the dividends subsequently declined enough to justify a call; presumably the CV would also fall, so future forced conversion would be impossible. In eight cases the dividends rose, and in only one of the 11 cases did the dividends decline in the ensuing five years. Also, only one of the 11 bonds had CV fall enough to be less than CP during the subsequent twelve months.[12] No existing cash flow or signalling explanation is consistent

[9] Max D does proxy for the present value. If the maximum dividend paid on the converted stock is always below I(1 −t), the PV(D) must be below PV(I(1 − t)).

[10] There are only nine bonds in the entire sample where the call delay of CV > 120 percent CP exceeds 200 days, and eight of those have max D > I(1 − t). Three of these eight remain outstanding. The ninth bond, which did not have max D > I(1 − t), was called.

[11] If they know, this contradicts Constantinides and Grundy (1987), who predict that managers will delay calling bonds if the firm expects good news, preferring instead for investors to voluntarily convert.

[12] This is a Union Carbide bond, the same firm that cut dividends. The dividend cut and stock price performance occurred during the period of litigation from the Bhopal disaster.

with these 11. However, it should be noted that the average call delay of CV > 120 percent CP for these 11 is 628.2 days, with a median call delay of 160 days. For the other 18 bonds where D > I(1 − t) at the time of call, the average and median call delays are 46.9 and 36 days.

The two other subsamples in Table II behave as the cash flow advantage hypothesis predicts. For 86 bonds with max D > I(1 − t), the firms call them quickly as expected. For the three firms that have max D > I(1 − t) and don't call this is also expected. The mean and median number of days that CV > 120 percent CP is 2083.3 and 2585. Furthermore, the converted dividends for these bonds have exceeded I(1 − t) for most of the period that CV > 120 percent CP. The mean and median number of days that both CV > 120% CP and D > I(1 − t) simultaneously are 1852.7 and 2407. This is strong evidence that for the small portion of the sample with max D > I(1 − t), call policy is affected as Asquith and Mullins (1991) predict.[13]

B.2. Call Delays in Mergers, Restructurings, and Bankruptcies

For bonds issued by firms involved in mergers and restructurings, the results are similar to those above. For the 14 merged bonds in Table II with max D < I(1 − t) the average number of days that CV > 120 percent CP before the merger bid announcement is 77.9 and the median is 39. For the four merged bonds with max D > I(1 − t) conversion value exceeded 120 percent of call price before the merger bid for an average of 352.3 days. All four bonds had max D > I(1 − t) for the entire period that CV > CP.

Of the 30 bonds in Table I involved in bankruptcies and restructurings, 13 had CV exceed CP before the restructuring. None of these 13 had CV > CP at the time of the restructuring, however. The shortest period between when the CV was last greater than CP and the bankruptcy or restructuring is eleven months. Furthermore, for all 13 the CV never exceeded the CP by very much. As reported in Table II, the average number of days CV > 120 percent CP is only 8.6, and the median is 0. Thus merged and restructured bonds follow the pattern displayed by the other convertible bonds.

One final piece of evidence underscores that calls are rarely delayed. The call protection period for convertible bonds is usually fixed at the time of issue and averages 295 days for the sample. For 17 bonds, however, there is a provision allowing an early call if the stock price rises enough. Sixteen of the bonds permit an immediate call if the CV exceeds 150 percent of the conversion price. One bond permits it if the CV exceeds 200 percent of the conversion price. For two of the 17 bonds, stock prices rise enough to remove their call protection. Both are called earlier than their original call protection period allowed. One

[13] Two of these bonds also have D greater than before-tax-coupon payments. If investors consider cash flow as Asquith and Mullins (1991) predict, then these two bonds should have a large percentage of bonds voluntarily converted. The percentages still outstanding for these two bonds are 6.5 percent and 0.4 percent. For none of the called bonds is D > I while the bond was still outstanding.

Table III

Call Premiums at Call Announcement Date for Convertible Bonds Issued During 1980 to 1982

Average and median call premiums (i.e., conversion value/(1-call price)) at call announcement date for the 115 called convertible bonds issued during 1980 to 1982 that had conversion value greater than call price for at least one day. Number of bonds in each subsample is determined by the selection criteria. CV is conversion value; CP is call price; Max D is the maximum dividends on the converted stock from the time the bond is first convertible until December 31, 1993, and $I(1 - t)$ is the after-tax coupon on the bond.

	Number	Mean	Median
		%	%
Entire sample	115	50.2	33.4
Bonds with CV > CP when call protection expires	38	77.1	48.2
Remaining called bonds	77	36.9	28.1
Bonds with Max D > $I(1 - t)$ and CV < CP when call protection expires	17	64.7	27.5
Remaining called bonds with Max D < $I(1 - t)$	60	29.0	28.4
Bonds with average daily price gains of greater than 1% (from first day CV > 120% CP until call date)	5	63.5	51.6
Bonds with: (1) CV < CP when call protection expires (2) Max D < $I(1 - t)$ (3) Average daily price gain of less than 1% (from first day CV > 120% CP until call date)	55	25.8	26.2

is called on the first day call protection is removed and the other 205 days after call protection is removed.[14]

C. Call Premiums

As noted above, Ingersoll (1977b) implied that firms call convertible bonds late. He reached this conclusion not by measuring the time until the call but by measuring the premium at the call date. Since the average call premium was 43.9 percent, he concluded that bond calls are delayed. Table III reports the premiums of conversion value over call price for this sample are consistent with Ingersoll (1977b). After excluding the called bonds whose CV never exceeds CP, the average call premium is 50.2 percent. This does not mean, however, that bonds are called late. Call premiums are not a useful way to determine whether firms delay calls for several reasons. Most importantly, it fails to consider call protection on the bonds. Many of the convertibles are at a large premium the first day they are callable. Furthermore, the cash flow advantage may cause some firms to delay calls, which may also increase their

[14] All of this evidence on timely calls raises the issue of why, if firms desire to delay their calls as Harris and Raviv (1985) and Constantinides and Grundy (1987) predict, are call provisions and call protection periods necessary.

premiums. In addition, some stock prices may rise so suddenly that even though management calls the bond quickly, the CV is still at a large premium to CP. Finally, firms with high stock price volatility may require a larger call premium to protect against a failed call.

C.1. Call Premiums and Call Protection

As reported in the data section, 79 percent of the bonds in this sample are issued with call protection. This means that some bonds may have CV > CP while they are uncallable. Call protection thus increases the average call premium, even if the bond is called immediately. In fact, 15 bonds are called exactly 30 days before their call protection expired so they could be redeemed on the first possible day. For these bonds there can be no question of delay. The average call premium for these 15 is 80.8 percent. In total, 38 of the called bonds have CV > CP when their call protection expires. Table III shows the average call premium for these 38 is 77.1 percent, well above the average 50.2 percent for the entire sample of called bonds. The average call premium for the 77 called bonds that do not have CV > CP when they are first callable is 36.9 percent.

C.2. Call Premiums and Cash Flow Advantage

If a firm delays calling for any reason, this can cause the eventual call premium to increase. Table III reports that for the 17 bonds with max D > I(1 − t) that do not simultaneously have CV > CP on the first possible call day, the average call premium is 64.7 percent. For the 60 bonds with max D > I(1 − t) that do not have CV > CP on the first possible call day, the average call premium is 29.0 percent. This result extends the earlier conclusion that firms with a cash flow disadvantage delay their calls, since call delays also affect the eventual call premium.

In addition, there is another factor that may affect measured call premiums. For some bonds the conversion value may rise suddenly. Even if the firm calls quickly, the average call premium of CV-CP can be large. Of the 60 remaining bonds five have average daily stock price returns greater than 1 percent from the first day that CV > 120 percent CP until the bond is called. Even though the average number of days that CV > 120 percent CP for these five bonds is only 28.8, the average call premium for these bonds is 63.5 percent.

Thus as Table III shows, the average call premium for the entire sample of 115 called bonds is 50.2 percent. Eliminating bonds where CV exceeds CP at the time call protection expires reduces the average premium on the remaining bonds to 36.9 percent. Eliminating the 17 bonds that have a cash flow disadvantage to calling reduces the average call premium further to 29.0 percent. Finally, eliminating the five bonds with an average daily stock price runup over 1 percent from the first day that CV exceeds 120 percent CP until the call announcement reduces the average call premium to 25.8 percent and the median premium to 26.2 percent. What is clear from this discussion is that call premiums are not the correct way to determine if a bond is called late or not.

C.3. Call Premiums and Stock Price Volatility

In addition, stock price volatility should be a factor in deciding when a firm calls a convertible bond. The average monthly stock price standard deviation for the 115 called bonds is 10.8 percent. This is measured over the period one month before and one month after the date when CV first exceeds CP. The median monthly standard deviation is 11.0 percent. For the sample of all 152 bonds that have CV > CP, the mean and median monthly standard deviations are both 10.7 percent. Thus, on average, Asquith and Mullins' (1991) 20 percent safety premium is approximately two monthly standard deviations and should provide a sufficient safety premium for most calls. In fact, of the 115 calls only 31 call below a 20 percent premium, and only 12 call below a 10 percent premium.[15]

Importantly, very few calls fail. A failure is where CV > CP at the call announcement but CV < CP by the end of the call notice period. In this sample of 115 calls only one fails. Singh, Cowan, and Nayar (1991), in a different sample of 129 convertible bond calls, also find only one failure. Thus firms wait until the call premium is large enough, so that convertible calls rarely fail. This behavior is consistent with costs from failed calls, as Jaffee and Shleifer (1990) predict.

D. Announcement Day Returns and Post-Call Performance

This section briefly examines announcement day returns and the post-call performance of stock returns, dividends, and stock prices. These results are consistent with other studies (e.g. Mikkelson (1981)) and suggest that the issue period 1980 to 1982 and the postissue period 1980 to 1993 are typical. Daily market adjusted returns, R_{stk}-R_{mkt}, are used to estimate excess stock returns since this introduces no estimation bias from either pre- or postcall performance. The stock market's reaction to call announcements and to announcements of convertible issuances for this sample are both significantly negative. For the 104 firms whose call announcements are in the *Wall Street Journal* or *NEXIS*, the average market adjusted announcement day stock return is −1.08 percent (t = −2.99). The median excess return is −1.45 percent. The average market adjusted stock return for issue day announcements is −1.03 percent (t = −3.41) for the entire sample of 183 issuing firms where an announcement date could be identified and −1.42 percent (t = −4.17) for the sample of 108 firms that eventually called. Possible reasons for the negative market reaction at the issue announcement date are developed in Stein (1992).

Postcall cumulative excess returns show no significant trend. Examining postcall dividends also finds that dividends rarely decrease. Only eight of the

[15] Five of these 12 are bonds with CV below the CP on the day the call is announced, although CV was greater than CP earlier. One of these five bonds has CV > CP by the redemption date. The other four bonds behave similarly to the eight bonds which never have CV exceed CP, yet are called. (See footnote 7 above) That is, these four convertibles, with coupon rates of 11 percent, 12-5/8 percent, 10 percent, and 12-1/4 percent, and called and refunded at lower rates.

115 called bonds cut dividends from the time of the call until December 1993. Of these eight, six raised dividends after the call before later cutting them, and five still had December 1993 dividend levels above the dividend level at the time of the call. Union Carbide is the only firm to cut dividends within four quarters of the call. Finally, examining postcall stock prices finds that only 16 of the bonds have CV $<$ CP on the one year anniversary of the call. This is neither significant nor surprising, given that the monthly standard deviation of returns for the sample of called bonds is 10.8 percent, which implies an annual standard deviation of 37.5 percent. With an average call premium of 50.2 percent and assuming a normal distribution of returns, 10.4 bonds are expected to fall out of the money after one year.

IV. Conclusions

This article examines the set of all convertible bonds issued in the three years 1980 to 1982 to examine whether firms delay their calls. The evidence strongly indicates that calls are not delayed. If CV exceed the CP by a sufficient safety premium so the risk of a failed call is low, and if the firm gains a cash flow advantage by calling, then the call delay is extremely short. With a safety premium of 20 percent (which is approximately twice the average monthly stock price standard deviation) and with a cash flow advantage of lower dividends on the converted shares than the after-tax coupon payments on the unconverted bond, the mean and median call delays for called bonds are only 37.8 and 17.5 days. These results hold even for firms eventually acquired in mergers or restructured.

The average call premium at the time of call is 50.2 percent. This premium, however, is strongly influenced by the existence of call protection and is also affected by the cash flow advantage and the volatility of stock prices. After correcting for 1) bonds that had CV $>$ CP at the time call protection expired, 2) bonds that had a cash flow disadvantage to calling, and 3) bonds that had large stock price increases shortly before a call, the average call premium is 25.8 percent. In addition, failed calls are extremely rare. Because of all of the above phenomena, call premia are not an accurate way to analyze whether a bond is called late or not.

In summary, convertible bonds are called quickly after the CV exceeds the CP plus some safety premium, unless there is a cash flow advantage to not calling. The required safety premium appears to be a function of stock price volatility. The large call premium found by Ingersoll (1977b) is largely explained by call protection and doesn't indicate a call delay. A firm's decision to call is consistent with extinguishing the option value as predicted by Ingersoll (1977a) and Brennan and Schwartz (1977), the existence of a safety premium as modeled by Jaffee and Shleifer (1990), and the direction of the cash flow advantage as hypothesized by Asquith and Mullins (1991).

REFERENCES

Asquith, P., J. Cox, C. Drakos, S. Myers, and J. Stein, 1994, Optimal call policy for convertible bonds, Working paper, M.I.T.

Asquith, P., and D. Mullins, 1991, Convertible debt: Corporate call policy, *Journal of Finance* 46, 1273–1290.

Brealey, R. A., and S. C. Myers, 1991, *Principles of Corporate Finance,* Fourth ed. (McGraw-Hill, New York).

Brennan, M. J., and E. S. Schwartz, 1977, Convertible bonds: Valuation and optimal strategies for call and conversion, *Journal of Finance* 32, 1699–1715.

Brigham, E. F., 1966, An analysis of convertible debentures, *Journal of Finance* 21, 35–54.

Campbell, C. J., L. Ederington, and P. Vankudre, 1991, Tax shields, sample selection bias, and the information content of convertible bond calls, *Journal of Finance* 46, 1291–1324.

Constantinides, G. M., and B. D. Grundy, 1987, Call and conversion of convertible corporate bonds: Theory and evidence (Graduate School of Business, University of Chicago, Chicago, Illinois).

Harris, M., and A. Raviv, 1985, A sequential model of convertible debt call policy, *Journal of Finance* 40, 1263–1282.

Ingersoll, J. E., 1977a, A contingent-claims valuation of convertible securities, *Journal of Financial Economics* 4, 289–322.

Ingersoll, J. E., 1977b, An examination of corporate call policy on convertible securities, *Journal of Finance* 32, 463–478.

Jaffee, D., and A. Shleifer, 1990, Costs of financial distress, delayed calls of convertible bonds, and the role of investment banks, *Journal of Business* 63, S107–S124.

Mikkelson, W. H., 1985, Capital structure change and decreases in stockholders' wealth: A cross-sectional study of convertible security calls, in *Corporate Capital Structures in the United States,* Benjamin M. Friedman Ed., The University of Chicago Press, 265–296.

Mikkelson, W. H., 1981, Convertible calls and security returns, *Journal of Financial Economics* 9, 237–264.

Singh, A. K., A. R. Cowan, and N. Nayar, 1991, Underwritten calls of convertible bonds, *Journal of Financial Economics* 29, 173–196.

Stein, J. C. 1992, Convertible bonds as backdoor equity financing, *Journal of Financial Economics* 32, 3–21.