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CAPITAL STRUCTURE CHANGE AND DECREASES
IN STOCKHOLDERS' WEALTH: A CROSS-SECTIONAL
STUDY OF CONVERTIBLE SECURITY CALLS

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Capital Structure Change and Decreases in Stockholders' Wealth:
A Cross-Sectional Study of Convertible Security Calls

ABSTRACT

This paper is a cross-sectional analysis of the relationship between common stock price reactions to announcements of convertible security calls and variables that represent possible determinants of changes in common stockholders' wealth. The variables are measures of the following effects of convertible security calls: (1) the change in interest expense tax shields, (2) the potential redistribution of wealth from common stockholders to preferred stockholders and debtholders, (3) the decrease in the value of conversion privileges held by convertible securityholders, (4) the relative increase in shares outstanding and (5) the change in earnings per share. A significant relationship is found only between the measure of the reduction in interest expense tax shields and the stock price response to call announcements. The apparent corporate tax effect is consistent with some combination of effects due to (1) a reduction in interest expense tax shields and (2) unfavorable information about the calling firm's value or earnings prospects that is conveyed by a call of convertible securities. The evidence is consistent with theories of capital structure that imply optimal financial leverage depends on earnings prospects and with theories that imply reductions in leverage convey unfavorable information about firm value.

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I. Introduction

Several studies document a statistically significant decrease in the price of firms' common stock at the earliest public announcement of certain types of capital structure changes. For example, Masulis (1978) reports statistically significant negative average common stock returns at the announcement of intrafirm exchange offers that involve the issuance of common stock for debt, common stock for preferred stock, or preferred stock for debt. Mikkelson (1981) reports a significant negative average common stock return at the announcement of convertible debt calls that force conversion of debt to common stock. Dann and Mikkelson (1982) and Korwar (1982) also report a negative average return at the announcement of the issuance of convertible debt and common stock, respectively. None of these studies of capital structure changes, however, resolves the issue of what factors determine the negative average stock price response. Nor do they completely explain the motivation for these capital structure changes.

This study attempts to shed light on these unresolved issues by investigating potential determinants of negative stock price reactions to the announcements of convertible debt and convertible preferred stock calls that force conversion. The empirical analysis extends Mikkelson's (1981) study of convertible security calls by estimating the cross-sectional relationship between abnormal common stock price responses to call announcements and variables that represent possible determinants of stock price reactions. The variables are measures of the following effects of calls: (1) the change in interest expense tax shields, (2) the potential redistribution of wealth from common

stockholders to preferred stockholders and debtholders, (3) the decrease in the value of conversion privileges held by convertible securityholders, (4) the relative increase in shares outstanding and (5) the change in earnings per share.

The empirical results indicate that wealth redistribution from common stockholders to debtholders has no measurable effect on stockholders' wealth. Some evidence, however, suggests that the conversion of debt to common stock alters the relative priority of outstanding preferred stock claims sufficiently to affect share price. There is no evidence of an association between common stock returns and decreases in the value of called convertible securities at the announcements of calls. The potential wealth transfers from convertible securityholders are typically quite small relative to the market value of common stock. In addition, there is no support for the notion particularly popular among practitioners that the negative stock price response to call announcements is attributable to a decrease in earnings per share or an increase in the supply of outstanding shares.

The results reveal a positive association between the reduction in interest expense tax shields and the announcement period common stock returns. One interpretation is that the association between stock returns and the corporate tax variable solely reflects the wealth impact of a decrease in interest expense tax shields. This interpretation implies that on average the market does not anticipate complete replacement of the tax shields with a subsequent issuance of new debt, even though refinancing the called debt may be in stockholders' interests.

A second interpretation of this evidence recognizes that the negative stock price response may reflect information about the

calling firm's value. This interpretation presumes that the decision to call and to reduce financial leverage is in the interests of stockholders, but is based on information not reflected in the calling firm's security prices. For example, a call decision may convey management's lowered assessment of the firm's optimal level of interest payments or preferred dividends, and thereby convey management's reduced expectations about future earnings. A convertible security call and the associated decrease in financial leverage, therefore, can be viewed as a value-maximizing response to a decrease in the firm's earnings prospects, even though the share price reaction to a call announcement is negative.

Under the second interpretation, the evidence of a relationship between stock returns at the time of call announcements and changes in interest expense tax shields may in part, or even entirely, reflect information about the firm's value or earnings prospects. The results presented in this study, however, do not resolve the extent to which the stock price responses to call announcements reflect a tax effect versus an information effect.¹

The paper is organized as follows: Section II discusses possible determinants of stock returns at the announcements of convertible security calls. A specification of a cross-sectional relationship between common stock returns and the possible determinants is also developed in this section. Section III describes the sample of convertible security calls and the empirical proxies for the possible determinants of stock returns. Estimates of the cross-sectional relationship are presented in section IV. Section V interprets the findings. The final section presents a summary and the conclusions of the study.

II. Potential Determinants of Changes in Stockholders' Wealth at Announcement of Convertible Security Calls

This section discusses potential determinants of changes in stockholders' wealth in response to call announcements and develops a simple model of the determination of the stock price response to call announcements. A specification of the potential impact on common stockholders' wealth, expressed as a return, is presented for the following effects of convertible security calls: (1) a reduction in interest expense tax shields, (2) an increase in the relative priority of a subset of claims senior to common stock, (3) a reduction in the conversion premium of called securities, (4) an increase in shares outstanding and (5) a change in earnings per share.

Several assumptions are made in developing a simple model of the share price effects of a convertible security call. First, the calling firm has three classes of securities outstanding: (1) callable convertible debt (CD), (2) nonconvertible debt (D), and (3) common stock (CS). Second, the value of the convertible debt (V_{CD}) exceeds its call price and the optimal response of the convertible bondholders is conversion. Third, the call is unanticipated by the market.²

In expression (1), the market value of common stock (V_{CS}) immediately prior to the call announcement equals the total value of the firm (V_F) less the market values of the callable convertible debt (V_{CD}) and the remaining outstanding debt securities (V_D).

$$V_{CS} = V_F - V_{CD} - V_D \quad (1)$$

Temporarily, it is assumed that the market value of convertible debt equals its conversion value, which equals the product of the fraction of outstanding shares issued upon conversion (α) and the market value of outstanding

common stock. In (2), the market value of common stock is expressed in terms of the number of shares outstanding (n) and share price (P).

$$nP = V_F - \alpha(nP) - V_D \quad (2)$$

The pre-announcement share price, as given by (3), equals the difference between the value of firm and the value of senior securities divided by the total number shares outstanding after conversion of outstanding convertible securities.

$$P = (V_F - V_D) / [(1+\alpha)n] \quad (3)$$

The post-announcement share price (P') can be expressed as the difference between the post-announcement value of the firm (V'_F) and the value of outstanding senior securities (V'_D) divided by $[(1+\alpha)n]$.

$$P' = (V'_F - V'_D) / [(1+\alpha)n] \quad (4)$$

Thus, the announcement period per share return (expression (5)) implied by the pre-announcement and post-announcement share prices equals the change in the difference between firm value and the value of senior securities $[\Delta(V_F - V_D)]$ divided by the market value of shares, including shares issued upon conversion, prior to the call announcement $[(1+\alpha)nP]$.

$$(P' - P) / P = \Delta(V_F - V_D) / [(1+\alpha)nP] \quad (5)$$

The remainder of this section discusses several possible effects of a convertible security call on stockholders' wealth, and presents specifications of the potential effects on share price based on expression (5).

II.A. Reduction in Interest Expense Tax Deductions

If the calling firm has sufficient earnings to fully utilize the interest expense tax deductions provided by convertible debt, ceteris paribus a call reduces cash flows available to securityholders. How-

ever, the net tax effect of a reduction in debt outstanding on stockholders' wealth is ambiguous. The net effect depends on whether the decrease in leverage is expected to be temporary and on the extent to which the loss of corporate tax benefits is offset by other types of tax shields or by the elimination of costs, such as default related costs and personal tax disadvantages associated with the called debt.

Various models of optimal capital structure that include corporate taxes imply different valuation effects of a reduction in the amount of debt outstanding. For example, Miller's (1977) analysis implies that for any level of financial leverage of a firm, the loss in interest expense tax deductions due to the conversion of debt is offset exactly by the gain of eliminating interest payments that have been "grossed up" to provide taxable debtholders with their required return net of personal taxes. As a result, the conversion of debt to common stock and the reduction in interest expense tax deductions have no effect on the wealth of common stockholders.

DeAngelo and Masulis (1980) present an analysis of optimal capital structure that incorporates uncertainty about a firm's ability to fully utilize interest expense tax deductions. In their model, firms issue debt up to the point where the marginal benefits of uncertain interest expense deductions equal the marginal costs of debt. Consequently, a reduction in financial leverage generally affects stockholders' wealth.

Assuming a call is completely unanticipated, a corporate tax effect of a call announcement decreases firm value by an amount equal to the present value of the change in interest expense tax shields (ΔT). Substituting ΔT into the numerator of the right-hand side of equation (5)

gives equation (6), the corporate tax effect expressed as a relative change in share price.

$$(P' - P)/P = \Delta T / [(1+\alpha)nP] \quad (6)$$

Miller's model implies that ΔT is exactly offset by the elimination of personal tax disadvantages of debt, while DeAngelo and Masulis' model implies that ΔT may be only partially offset by the reduction in debt related costs. In equation (7), which incorporates the different predictions of these models, the value of γ is between 0 and 1, depending on the marginal effect of a reduction in interest expense tax deductions on firm value.

$$(P' - P)/P = \gamma(\Delta T) / [(1+\alpha)nP] \quad (7)$$

Thus, the tax effect as measured by a return per share of common stock equals the net marginal effect of a reduction in interest expense tax deductions on firm value [$\gamma(\Delta T)$] divided by the sum of the pre-announcement value of common stock and the conversion value of the called securities [(1+ α)nP].

II.B. Change in the Value of Senior Securities

An unanticipated announcement of a convertible debt call that forces conversion may cause a wealth transfer from common stockholders to preferred stockholders and debtholders. Any claims on the firm's assets with a priority higher than common stock, but not higher than the called debt, increase in priority relative to the debt claims converted to common stock. Even if the firm's expected cash flows and asset structure are unchanged by the call announcement, the value of a subset of claims senior to common stock may increase due to the elimination of competing debt claims. A corresponding decrease in the value of common stock reflects a wealth transfer from common stockholders.³

Holding the value of the firm constant in expression (5), the impact of a change in the value of senior securities (ΔV_D) on the value of common stock is expressed as a return per share in (8).

$$(P'-P)/P = -\Delta V_D / [(1+\alpha)nP] \quad (8)$$

The relative price change equals the change in the value of senior securities divided by the product of the total number of shares outstanding following conversion and the pre-announcement share price.

II.C. Transfer of Conversion Premium from Convertible Securityholders

If prior to a call announcement the market does not fully anticipate the timing of a call, the market value of convertible debt (V_{CD}) in general exceeds its conversion value (αV_{CS}).⁴ An effect of a call announcement is to eliminate any conversion premium ($V_{CD} - \alpha V_{CS}$), so that following the call announcement the market value of convertible debt equals its conversion value. The decrease in the market value of the called securities is a wealth transfer from the called securityholders to the remaining securityholders of the firm.

Holding aside all other effects of a call announcement on the value of the firm or on the value of senior securities and assuming that the transfer of the conversion premium is captured entirely by common stockholders, the impact of a decrease in conversion premium on the price of a share of common stock is given by (9).

$$(P'-P)/P = (V_{CD} - \alpha V_{CS}) / [(1+\alpha)nP] \quad (9)$$

The total wealth of the convertible securityholders decreases by the amount of the pre-announcement conversion premium ($V_{CD} - \alpha V_{CS}$) less the portion of conversion premium regained upon conversion $\{[\alpha/(1+\alpha)](V_{CD} - \alpha V_{CS})\}$.

The quantity $(1+\alpha)$ in the denominator of expression (9) reflects the fact that only the fraction $[1/(1+\alpha)]$ of the conversion premium is captured by the holders of common stock claims outstanding prior to the call.

II.D. Increase in Shares Outstanding

Some corporate officers and investment bankers attribute the negative stock price reactions to call announcements to the eventual increase in the number shares outstanding. One price impact often cited is in effect a movement along a downward sloping demand curve for the calling firm's shares. Also mentioned is a price effect due to a decrease in earnings per share caused by conversion of the called securities. Both effects lack rigorous support in theory. On the other hand, neither notion has been tested thoroughly. For this reason, both potential effects are examined in this study.

Supply Effect. If the demand for a firm's common stock is not perfectly elastic, the increase in the number of shares outstanding due to conversion of debt may explain some part of the decrease in share price at call announcements. That is, if the common stock claims of the calling firm do not have close substitutes, ceteris paribus an unanticipated increase in the number of shares outstanding is associated with a detectable price decrease. On the other hand, if shares of common stock have perfect or very close substitutes in the form of another security or a portfolio of securities, no significant price change is caused solely by an increase in the number of shares outstanding.

Existing evidence does not support the notion of a supply effect on share prices. Neither Scholes' (1972) examination of secondary

distributions of common stock nor Marsh's (1979) study of U.K. rights offerings of common stock uncovers evidence of price changes that depend on the size of the offering. A study of convertible security calls differs from Scholes' study in that calls result in an increase in the number of shares outstanding, and also differs from Marsh's study in that a call does not produce a direct change in the firm's asset structure. Estimation of the relationship between abnormal common stock returns at the call announcements and the ensuing increase in the number of shares outstanding provides new evidence on the importance of a supply effect.

This study tests the hypothesis that the size of the relative increase in the number of shares outstanding due to conversion (α) is unrelated to the relative stock price change $[(P' - P)/P]$ in response to call announcements, adjusting for the possible price effects of corporate taxes and wealth redistribution. However, no theory of price pressure or supply effects exists that implies a particular specification of the relationship between stock price and the quantity of shares outstanding. For this study, therefore, only a general form relationship is specified. That is, $(P' - P)/P = f(\alpha)$ and $f'(\alpha) < 0$.

Failure to reject the null hypothesis is consistent with a perfectly elastic demand for shares, i.e., no supply effects. But since the test is based on estimation of a cross-sectional relationship, there is an assumption of a homogeneous relationship between common stock returns and the relative changes in shares outstanding for the sample of calling firms. If the assumption of a homogeneous relationship is incorrect, the finding of no relationship between the stock price responses and the relative increases in shares outstanding may simply reflect an incorrect specification of the test.

Earnings Dilution Effect. Financial economists generally argue

that there are no valuation effects attributable solely to changes in earnings per share. Prevailing theory of capital structure in a setting of no taxes, as first presented by Modigliani and Miller (1958), implies that to the extent a reduction in earnings per share of common stock reflects a decrease in expected cash flows per share due to a change in capital structure, there is compensating decrease in the required return for common stock. That is, changes in capital structure per se, even if they bring about a decrease in earnings per share, do not necessarily affect shareholders' wealth.

The issuance of new shares due to conversion of convertible debt or preferred stock reduces earnings per share, while the reduction in interest expenses or preferred dividends increases earnings per share. Typically, the net effect of a call and conversion is to reduce earnings per share. After adjusting for the possible effects of corporate taxes and wealth redistribution, the Modigliani and Miller theory predicts no price impact of a change in earnings per share. Therefore, estimation of the cross-sectional relationship between the stock price responses to call announcements and the associated relative changes in earnings per share $[\Delta\text{EPS}/\text{EPS}]$, taking account of the effects of corporate taxes and wealth redistribution, provides an opportunity to test directly for a price effect due to dilution of earnings per share.⁵

II.E. Specification of the Cross-Sectional Relationship

On the assumption that the possible determinants examined in this section are additive, expression (10) is the cross-sectional relationship to be estimated.

$$\begin{aligned} (P' - P)/P = & \beta_0 + \beta_1 [\gamma(\Delta T)/(1+\alpha)nP] + \beta_2 [-\Delta V_D/(1+\alpha)nP] \\ & + \beta_3 [(V_{CD} - \alpha V_{CS})/(1+\alpha)nP] + \beta_4 [f(\alpha)] + \beta_5 [\Delta\text{EPS}/\text{EPS}] \quad (10) \end{aligned}$$

A positive value of β_1 is consistent with a corporate tax effect on

share price. An increase in the value of senior securities implies a positive value for β_2 . Loss of a conversion premium by convertible securityholders implies a positive value for β_3 . A supply effect is consistent with a negative value for β_4 , while a positive value for β_5 is implied by an earnings dilution effect. The sample of calls and the empirical proxies for the variables in (10) are described in the next section.

III. Data

III.A. Sample of Calls

The sample consists of 107 convertible debt calls and 57 convertible preferred stock calls from the period 1962 through 1978.⁶ Each call announcement is reported in the Wall Street Journal, and no other firm-specific news, related or unrelated to the call announcement, is revealed by the Wall Street Journal Index or the cited call announcement article. In every case, the conversion value exceeded the call price at the time of the call announcement. In addition, all of the firms were listed on the New York or American Stock Exchange at the time of the announcement. Summary statistics of the convertible security calls are discussed in the following section.

III.B. Empirical Proxies for the Possible Determinants of Changes in Stockholders' Wealth

The Relative Price Change at Announcement. An estimate of a two-day announcement period risk-adjusted common stock return is the empirical measure of the stock price impact of a call announcement. Risk-adjusted returns (AR_{jt}) for firm j equal the difference between the unadjusted stock returns (R_{jt}) and expected returns derived from firm j 's market model. That is, on day t

$$AR_{jt} = R_{jt} - (\hat{b}_0 + \hat{b}_1 R_{Mt}), \quad (11)$$

where \hat{b}_0 and \hat{b}_1 are coefficient estimates of the linear relationship between firm j 's daily stock returns taken from the CRSP Daily Returns File, and the daily returns of the CRSP Value-Weighted Index (R_{Mt}).^{7,8} The period used to estimate the parameters b_0 and b_1 begins 61 trading days following the date of the call announcement and ends 200 trading

days following the announcement date.⁹

Table 1 presents average adjusted common stock returns for 21 trading days centered on the date of the initial published report of the call announcement (day 0). Column 1 presents the trading day relative to day 0. For the sample of convertible debt calls, the average adjusted daily returns are presented in column 2 and the percentage of positive adjusted returns is presented in column 3. For the sample of convertible preferred stock calls, the average adjusted returns and the percentage of positive adjusted returns are presented in columns 4 and 5, respectively.

The stock price response to the announcements of convertible debt calls appears to be confined primarily to trading days -1 and 0. For the sample of convertible debt calls, the average adjusted returns on days -1 and 0 are large in absolute value relative to any of the surrounding trading days. In addition, the relatively low percentage of positive adjusted returns on days -1 and 0 also implies an impact confined to these days. Furthermore, over trading days +11 through +60 no statistically significant average adjusted returns are observed.

For the convertible preferred stock calls, no dramatic stock price impact is observed on any day around day 0. However, on day -1 only 18 of 57 adjusted returns are positive, which suggests a possible stock price impact on day -1. The percentages of positive returns in column 5 provide no evidence of a price impact on any other day nearby trading day 0. Based primarily on the returns data for convertible debt calls, the announcement period adjusted return for preferred stock calls is also measured over trading days -1 and 0.¹⁰

The first row of panels A and B of Table 2 presents summary statistics of the two-day announcement period adjusted returns (AR_{2a})

TABLE 1

Adjusted Daily Common Stock Returns^a for 21 Trading Days Around the Date of the Earliest Published Report (Trading Day 0) of Convertible Debt Calls (107 Events) and Convertible Preferred Stock Calls (57 Events)

(1) Trading Day	Convertible Debt Calls		Convertible Preferred Stock Calls	
	(2) Average Adjusted Return (%)	(3) Proportion of Positive Returns	(4) Average Adjusted Return (%)	(5) Proportion of Positive Returns
-10	.15%	.47	.59%	.63
- 9	.10	.44	-.27	.42
- 8	.13	.48	.23	.65
- 7	- .19	.43	-.43	.44
- 6	- .15	.46	-.15	.47
- 5	.08	.48	-.08	.44
- 4	.29	.56	.01	.51
- 3	.02	.46	.20	.51
- 2	.03	.51	.30	.56
- 1	- .92	.35	-.22	.32
0 ^b	-1.23	.30	-.21	.44
1	- .05	.47	.00	.60
2	- .20	.43	-.04	.53
3	- .04	.47	-.02	.51
4	- .27	.43	.60	.47
5	- .15	.48	-.08	.44
6	.10	.50	.45	.61
7	.16	.46	-.23	.40
8	.36	.52	-.08	.51
9	- .13	.40	-.04	.47
10	- .29	.41	-.12	.44

^a Adjustment is the difference between raw daily stock returns and returns predicted by the firm's market model. The estimate of the market model is based on the firm's raw daily returns and the CRSP Value-Weighted Index returns from trading days +61 through +200.

^b Date of the earliest published report of the call announcement in The Wall Street Journal.

for the samples of convertible calls. The mean two-day adjusted return is -2.21% for the convertible debt calls (row 1, panel A) and is -.44% for the convertible preferred stock calls (row 1, panel B). The standard deviation and range of AR_{2a} are not markedly different between the two samples of calls, but the hypothesis that the mean two-day announcement period returns of the samples are equal is rejected at the .01 level. For the convertible debt calls, the hypothesis that the mean two-day announcement period return equals zero is rejected at the .01 level, but this hypothesis is not rejected at .10 level for the convertible preferred stock calls. These data imply a differential average impact of convertible debt and convertible preferred stock calls on common stockholders' wealth. In the course of data collection, however, no potentially relevant differences were observed between the timing or content of convertible debt and convertible preferred stock call announcements that might explain the different average announcement period returns.

Change in Interest Expense Tax Deductions. Three estimates of the reduction in interest expense tax shields are computed. The estimates are based on different assumptions about the market's view of the permanence or duration of the reduction in interest expense tax shields. The assumptions range from the expectation of a one year decrease to a permanent decrease in interest expense tax shields. No attempt has been made to estimate the calling firms' effective marginal tax rates at the time of the call announcements. For all three measures of the reduction in interest expense tax shields, the calling firm's effective marginal tax rate is assumed to equal .48.

The first estimate of the reduction in tax shields (TD) is the product of the tax rate and the total face value of the called debt. This measure presumes that removal of the debt portion of the called debt claims is a permanent reduction in the amount of debt outstanding. Thus, TD estimates

17
TABLE 2

Summary Statistics of Empirical Proxies for the
Abnormal Common Stock Price Change and the Possible
Determinants of the Change in Stockholders' Wealth
Associated with Convertible Debt and
Convertible Preferred Stock Call Announcements

A. Convertible Debt Calls						
(1) Empirical Measure ^a	(2) Mean	(3) Median	(4) Standard Deviation	(5) Maximum Value	(6) Minimum Value	(7) Number of Calls
(1) AR_{2a}	-.022	-.022	.037	.133	-.107	107
(2) TD/V_{CS}^b	-.035	-.029	.028	-.000	-.100	107
(3) TI/V_{CS}^b	-.002	-.001	.002	-.000	-.011	107
(4) $TPVI/V_{CS}^b$	-.016	-.012	.017	-.000	-.139	107
(5) FV_{CD}/V_{CS}	-.073	-.060	.058	-.001	-.289	107
(6) D/V_{CS}	.400	.209	.726	6.514	.000	107
(7) PS/V_{CS}	.067	.000	.182	1.163	.000	107
(8) $V_{CD}/\alpha V_{CS}$	1.018	1.005	.044	1.217	.953	77
(9) V_{CD}/FV_{CD}	1.628	1.439	.546	3.883	1.094	77
(10) $(V_{CD} - \alpha V_{CS})/V_{CS}$	.002	.001	.005	.017	-.011	77
(11) α	.138	.092	.136	.747	.001	107
(12) $\Delta EPS/EPS$	-.082	-.064	.144	.191	-1.243	107

B. Convertible Preferred Stock Calls						
(1) Empirical Measure	(2) Mean	(3) Median	(4) Standard Deviation	(5) Maximum Value	(6) Minimum Value	(7) Number of Calls
(1) AR_{2a}	-.004	-.006	.042	.189	-.091	57
(2) LV_{PS}/V_{CS}^b	-.081	-.062	.085	-.000	-.425	57
(3) PS/V_{CS}	.049	.000	.103	.531	.000	57
(4) $V_{PS}/\alpha V_{CS}$	1.007	1.008	.028	1.082	.959	46
(5) V_{PS}/C_{PS}	1.597	1.344	.910	6.300	1.042	46
(6) $(V_{PS} - \alpha V_{CS})/V_{CS}$	.000	.000	.004	.014	-.013	46
(7) α	.136	.010	.134	.669	.014	57
(8) $\Delta EPS/EPS$	-.053	-.060	.082	.369	-.230	57

^a(variable definitions presented on the next page)

^bThese variables have negative values since they measure a decrease in tax shields or a reduction in claims outstanding.

TABLE 2 (cont.)

${}^aAR_{2a}$	=	two-day announcement period adjusted common stock return
V_{CS}	=	market value of common stock prior to the call announcement
TD	=	tax rate (.48) multiplied by the face value of the called debt
TI	=	tax rate (.48) multiplied by annual interest payments of the called debt
TPVI	=	tax rate (.48) multiplied by estimate of the present value of remaining interest payments of the called debt
FV_{CD}	=	face value of called debt
D	=	face value of long-term debt outstanding after the call
PS	=	liquidation value of preferred stock outstanding after the call
V_{CD}	=	market value of called debt plus accrued interest prior to the call announcement
αV_{CS}	=	conversion value of called securities prior to the call announcement
α	=	relative increase in shares outstanding due to conversion of the called debt
$\Delta EPS/ EPS$	=	relative change in earnings per share due solely to the call and conversion of convertible securities
LV_{PS}	=	liquidation value of called preferred stock
V_{PS}	=	market value of called preferred stock prior to the call announcement
C_{PS}	=	aggregate call value of called preferred stock

the present value of a perpetual stream of interest expense tax shields.

The second measure is the amount of annual interest expense tax deductions (TI) provided by the called debt. This estimate equals the product of the tax rate and the amount of annual interest payments of the called debt issue. The assumption underlying this measure is that the call of debt is viewed as only temporarily reducing the amount of available interest expense tax deductions. That is, the expected reduction in the firm's cash flows equals the value of one year's interest expense deductions.

The third measure is the product of the corporate tax rate and an estimate of the present value of the remaining interest expenses of the called debt (TPVI). The remaining interest payments are discounted by the yield to maturity for corporate debt with a comparable Moody's quality rating at the time of the call announcement. An implicit assumption of this measure is that the expected duration of the reduction in interest expense tax shields equals the time remaining to maturity at the time of call announcement. Thus, the expected duration of the decrease in interest expense deductions implied by this measure is less than for the estimate TD, but greater than for the estimate TPVI.

Summary statistics for the three measures of the change in interest expense tax deductions are presented in rows 2, 3 and 4 of panel A of Table 2. Each of the tax variables shown in Table 2 is measured relative to the market value of common stock (V_{CS}) prior to the call announcement. Data on the terms of the called debt issue and the number of shares outstanding are obtained from Moody's manuals and the Wall Street Journal. The

common stock prices are taken from the Commercial and Financial Chronicle or the Wall Street Journal. The mean value of the estimate of the reduction in interest expense tax shields divided by the market value of common stock is $-.035$ for TD/V_{CS} , $-.016$ for $TPVI/V_{CS}$ and $-.002$ for TI/V_{CS} .

Change in the Value of Senior Securities. In general, a substantial portion of a firm's senior securities, i.e., debt and preferred stock, are either privately held or publicly held and traded infrequently.¹¹ Unlike common stock, therefore, it is not possible to obtain a direct measure of the impact of a call announcement on the total value of senior securities. Instead, a proxy for the impact of wealth redistribution among classes of securityholders is used.

For a call of convertible debt, the change in the value of debt securities that remain outstanding following the call (ΔV_D) is assumed to depend on the amount of debt called (ΔD) and the amount of debt relative to common stock outstanding after the call (D/V_{CS}).

A general form specification is

$$\Delta V_D = h(\Delta D, D/V_{CS}), \quad (12)$$

where $h_1 > 0$ and $h_2 > 0$. That is, the change in the value of outstanding debt is greater, the larger the amount of debt called and the greater the ratio of debt to common stock outstanding after the call. Similarly, the impact on the value of outstanding preferred stock (ΔV_{PS}) is assumed to be a function of the amount of debt called (ΔD) and the amount of

preferred stock relative to common stock (PS/V_{CS}) outstanding following the call. That is,

$$\Delta V_{PS} = k(\Delta D, PS/V_{CS}), \quad (13)$$

where $k_1 > 0$ and $k_2 > 0$.

The intuition for the hypothesized signs of h_1 and k_1 is that for a given amount of outstanding debt or preferred stock, the greater the amount of debt claims retired, the greater is the increase in the relative priority of the remaining debt and preferred stock claims. Thus, the greater is the impact on the values of outstanding debt and preferred stock. The positive signs predicted for h_2 and k_2 reflect that for a given amount of debt claims retired, the total dollar wealth redistribution from common stockholders is expected to be larger, the greater is the relative amount of debt or preferred stock claims that remain outstanding after the call.

For a call of convertible preferred stock, it is assumed that only the relative priority of outstanding preferred stock claims is affected. The general form expression for the impact on the value of preferred stock (ΔV_{PS}) is

$$\Delta V_{PS} = \ell(\Delta PS, PS/V_{CS}), \quad (14)$$

where ΔPS is the amount of preferred stock called and PS/V_{CS} is the relative amounts of preferred stock and common stock outstanding following the call. Based on the same intuition presented for expressions (12) and (13), ℓ_1 and ℓ_2 are hypothesized to be positive.

Various specifications of $h(\cdot)$, $k(\cdot)$ and $\ell(\cdot)$ are employed in the estimation of the cross-sectional relationship given by (10).

For all of the specifications, the amount of debt called (ΔD) equals the total face value of the called debt and the amount of preferred stock called (ΔPS) equals the total liquidation value of the called preferred stock. The amounts of preferred stock (PS) and long-term debt (D) that remain outstanding after the call are also measured by the total liquidation value and total face value, respectively. All of these data are obtained from Moody's manuals.

For the sample of convertible debt calls, row 5 of panel A in Table 2 presents summary statistics for the change in the amount of debt outstanding as measured by the ratio of the total face value of the called debt to the market value of common stock (FV_{CD}/V_{CS}). The mean ratio is $-.073$. Rows 6 and 7 present summary statistics for the total face value and total liquidation value of remaining long-term debt and preferred stock, respectively, divided by the market value of common stock. The mean value of D/V_{CS} is $.400$ and the mean value of PS/V_{CS} is $.067$. Row 2 of panel B gives summary data on the change in the amount of preferred stock outstanding as measured by the ratio of the liquidation value of called preferred stock relative to the market value of common stock. The mean value of LV_{PS}/V_{CS} is $-.081$. Data on the liquidation value of preferred stock outstanding following the call relative to the market value of common stock is presented in row 3 of panel B. The mean ratio of PS/V_{CS} for preferred stock calls is $.049$.

Reduction in Conversion Premium. For only 77 of 107 convertible debt calls and 46 of 57 convertible preferred stock calls, a market value of the called securities can be measured within the two weeks immediately preceding the call announcement. Rows 8, 9 and 10 of panel A

of Table 2 present the following summary statistics for these 77 convertible debt calls: (1) the ratio of the total value of the called debt (adjusted for accrued interest)¹² to the total conversion value of the called debt ($V_{CD}/\alpha V_{CS}$), where both value estimates come from the same trading day, (2) the ratio of the total market value of the called debt to its aggregate face value (V_{CD}/FV_{CD}) and (3) the total dollar conversion premium, derived from V_{CD} and αV_{CS} , divided by the market value of common stock $[(V_{CD} - \alpha V_{CS})/V_{CS}]$.

Corresponding measures for the calls of convertible preferred stock are presented in rows 4, 5 and 6 of panel B of Table 2. Summary data on the total market value of the called preferred stock divided by the aggregate conversion value of the preferred stock ($V_{PS}/\alpha V_{CS}$), measured from the same trading day, is reported in row 4. The ratio of the value of the called securities to the aggregate call value (V_{PS}/C_{PS}) is summarized in row 5. Data on the total dollar conversion premium divided by the market value of common stock $[(V_{PS} - \alpha V_{CS})/V_{CS}]$ is reported in row 6.

For each firm, the values of the common stock and the callable convertible security are based on price quotations reported in the Commercial and Financial Chronicle or the Wall Street Journal for the same day of trading. The terms of the conversion privileges and the call provisions are identified in Moody's manuals and the Wall Street Journal.

The mean ratio of market value to conversion value of the called securities equals 1.018 for the convertible debt calls and equals 1.007 for the convertible preferred stock calls.¹³ These mean ratios are each significantly different from 1.0 at the .05 level. Measured within the two weeks just prior to call announcement, the average ratio of conversion value to face value of the called debt securities equals 1.628. The mean

ratio of conversion value to call payment value equals 1.597 for the convertible preferred stock sample. As a proportion of the market value of common stock, the average conversion premium is .0019 for convertible debt calls and is .0001 for convertible preferred stock calls.

Based on these sample means, convertible debt and preferred stock call policies appear to occur at similar times, as measured by the ratio of market value to face value or call payment value of the called securities. In addition, just prior to call announcements, both types of securities are priced at similar premiums relative to conversion value.¹⁴

Increase in Shares Outstanding. The measure of the relative increase in the number of common shares outstanding (α) equals the number of shares issued upon conversion divided by the number of shares outstanding prior to the call announcement. Data on shares outstanding and the conversion terms of the called securities were collected from Moody's manuals and the Wall Street Journal.¹⁵

The mean relative increase in shares outstanding is .138 for the convertible debt sample (row 11, panel A) and .136 for the convertible preferred stock sample (row 7, panel B). The summary statistics indicate that the distributions of α for the two samples are quite similar.

Change in Earnings Per Share. The variable $\Delta\text{EPS}/\text{EPS}$ measures the relative change in earnings per share due to conversion of the called securities. That is, holding total earnings before interest and taxes constant, $\Delta\text{EPS}/\text{EPS}$ measures only the effects of (1) an increase in the number of shares outstanding and (2) a reduction in after-tax interest expenses or preferred dividends.¹⁶ Thus, ΔEPS does not measure any change in

earnings observed over time. The mean values of $\Delta\text{EPS}/\text{EPS}$ are $-.082$ and $-.053$ for the convertible debt (row 12, panel A) and convertible preferred stock (row 8, panel B) samples, respectively. The earnings, interest payment and preferred dividend data used to calculate $\Delta\text{EPS}/\text{EPS}$ are obtained from Moody's manuals.

Based on the summary statistics presented in Table 2, the samples of convertible debt and convertible preferred stock calls are quite similar. The most apparent differences are associated with the average two-day stock return (AR_{2a}) and the corporate tax variables. Since no other potentially important differences have been uncovered, a preliminary conclusion is that the decrease in interest expense tax deductions, or an associated factor, explains the larger negative average stock return at the announcements of convertible debt calls.

III.C. Specification of the Estimated Cross-Sectional Relationship

Various specifications of the following linear regression model are estimated for the sample of convertible security calls:

$$\begin{aligned} \text{AR}_{2a} = & b_0 + b_1 [\text{TD}/(1+\alpha)V_{\text{CS}}] + b_2 [h(\Delta\text{D}, \text{D}/V_{\text{CS}})/(1+\alpha)V_{\text{CS}}] \\ & + b_3 [k(\Delta\text{D}, \text{PS}/V_{\text{CS}})/(1+\alpha)V_{\text{CS}}] + b_4 [\lambda(\Delta\text{PS}, \text{PS}/V_{\text{CS}})/(1+\alpha)V_{\text{CS}}] \\ & + b_5 [V_{\text{CD}} - \alpha V_{\text{CS}}]/(1+\alpha)V_{\text{CS}} + b_6 [f(\alpha)] + b_7 [\Delta\text{EPS}/\text{EPS}] + \tilde{u} \end{aligned} \quad (15)$$

In (15), the empirical proxies discussed in this section are substituted for the variables in the cross-sectional relationship specified by (10), and u represents a random error term that has a zero mean. The measures TI and TPVI are substitute measures for TD, the change in interest

expense tax shields. For four terms in (15), a general form is given for the relationship between AR_{2a} and the proxy for a potential determinant of the announcement period stock return. As reported in the next section, several specifications of these terms are examined in estimating the cross-sectional relationship.

For each of the potential effects, the null hypothesis tested is that the coefficient of the corresponding independent variable in (15) equals zero. A positive value of \hat{b}_1 is consistent with a valuation effect associated with the corporate tax variable. Defining $h(\cdot)$, $k(\cdot)$, and $\ell(\cdot)$ to have nonnegative values, negative values of \hat{b}_2 , \hat{b}_3 and \hat{b}_4 are consistent with wealth redistribution from common stockholders to more senior securityholders. Negative values for \hat{b}_2 and \hat{b}_3 are consistent with wealth transfers to debtholders and preferred stockholders, respectively, for calls of convertible debt. A negative value of \hat{b}_4 is consistent with a wealth transfer to preferred stockholders for calls of convertible preferred stock. A positive value of \hat{b}_5 is consistent with a wealth transfer from the called convertible securityholders to common stockholders. A negative value of \hat{b}_6 is consistent with a supply effect, and a positive value of \hat{b}_7 is consistent with an earnings per share dilution effect. Coefficient estimates are presented in the next section.

IV. Estimates of the Cross-Sectional Relationship

Estimates of the relationship given by (15) are presented in this section. The cross-sectional relationship is estimated using different measures of the change in interest expense tax deductions and using different specifications of the variables expressed in a general form in (15). The cross-sectional relationship is also estimated for several subsets of the calls.

IV.A. Total Sample of Convertible Debt and Convertible Preferred Stock Calls

Initially, ordinary least squares (OLS) estimates of the cross-sectional relationship given by (16) are analyzed.

$$\begin{aligned} \tilde{AR}_{2a} = & b_0 + b_1 \{TD / (1+\alpha)V_{CS}\} + b_2 \{[\Delta D(D/V_{CS})] / (1+\alpha)V_{CS}\} \\ & + b_3 \{[\Delta D(PS/V_{CS})] / (1+\alpha)V_{CS}\} + b_4 \{[\Delta P(PS/V_{CS})] / (1+\alpha)V_{CS}\} \\ & + b_5 \{\alpha\} + b_6 \{\Delta EPS / EPS\} + \tilde{u} \end{aligned} \quad (16)$$

The joint hypothesis that the coefficients of (16) equal zero is rejected at the .05 level. However, only the t-value for the coefficient of the interest expense tax deductions variable (b_1) is significant at the .05 level.

Given that the variance of common stock returns is not constant across firms, there is reason to suspect that the error term of the regression model is not homoscedastic. Tests on the residuals of the OLS estimates of (16) indicate that the variance of the error term is positively related to the standard deviation of the two-day adjusted stock returns.¹⁷ Thus, statistical inferences based on the OLS results are possibly incorrect and the OLS estimates are not presented in detail.

No evidence is found that suggests a relationship between the values of any independent variable in (16) and the variance of the error term. Therefore, in order to correct for heteroscedasticity, each two-day adjusted announcement period stock return (AR_{2a}) is divided by an estimate of the standard deviation ($\hat{\sigma}$) of the calling firm's two-day adjusted stock returns. That is, standardized risk-adjusted announcement period returns ($AR_{2a}/\hat{\sigma}$) are regressed on the independent variables of (16).¹⁸ Tests of the residuals of the OLS estimates of the model with standardized adjusted returns uncover no evidence of heteroscedasticity in the error term. Therefore, all of the regression estimates presented in this section are based on a dependent variable that is a standardized two-day return.

Table 3 presents OLS estimates of the cross-sectional relationship where the dependent variable is a standardized common stock return. The first three rows contain coefficient estimates of specifications that differ only in terms of the measure of the change in interest expense tax shields. In all three cases, however, the joint hypothesis that the coefficients equal zero cannot be rejected at the .10 level.

The remaining results presented in Table 3 are estimates for the relationship between the standardized returns and the variable(s) that represents a particular potential determinant of the stock price response. Rows 4, 5, and 6 present the estimates for the simple regression of the standardized return on a measure of the change in interest expense tax shields. In each case, the t-value of the estimated coefficient is significant at the .01 level, and the sign of the estimated coefficient is consistent with a corporate tax effect.

TABLE 3

Ordinary Least Squares Estimates of the Linear Relationship between the Standardized Two-Day Adjusted Common Stock Returns and Possible Determinants of Changes in Stockholders' Wealth at the Announcements of Convertible Debt and Convertible Preferred Stock Calls
(164 observations, t-statistics in parentheses)

Independent Variables		TD	TI	TPVI	$\frac{\Delta D/V_{cs}}{(1+\alpha)V_{cs}}$	$\frac{\Delta D(PS/V_{cs})}{(1+\alpha)V_{cs}}$	$\frac{\Delta PS(PS/V_{cs})}{(1+\alpha)V_{cs}}$	α	$\Delta EPS/EPS$	Adjusted R^2	F-Value
Constant	$\frac{(1+\alpha)V_{cs}}$										
(1)	$-.380^b$ (-2.30)	14.756 ^b (2.25)			-2.211 (-.88)	-.290 (-.03)	-10.040 (-.64)	.283 (.28)	-.964 (-.64)	.057	1.57
(2)	$-.437^a$ (-2.69)	182.184 (1.62)			-1.775 (-.67)	-.616 (-.07)	-7.034 (-.45)	.177 (.17)	-.637 (-.42)	.042	1.16
(3)	$-.448^a$ (-2.78)			21.021 (1.56)	-1.855 (-.70)	-.710 (-.08)	-6.533 (-.42)	.237 (.22)	-.453 (-.29)	.041	1.12
(4)	$-.340^a$ (-2.40)	14.544 ^a (2.90)								.050	8.43 ^a
(5)	$-.401^a$ (-2.96)		199.037 ^a (2.55)							.039	6.48 ^a
(6)	$-.414^a$ (-3.09)			23.563 ^a (2.45)						.036	6.01 ^a
(7)	$-.583^a$ (-5.28)				-.312 (-1.20)	-9.501 (-1.16)	.583 (.02)			.019	1.05
(8)	$-.488^a$ (-3.17)							-.927 (-1.16)		.008	1.34
(9)	$-.538^a$ (-4.34)								1.081 (1.26)	.010	1.60

^aSignificant at the .01 level (one-tailed test).

^bSignificant at the .05 level (one-tailed test).

Row 7 presents the estimates of the relationship between the standardized two-day common stock return and the variables that measure the possible effects of wealth redistribution. The F-statistic for the regression is not significant at .10 level. The last two rows present the estimates of simple regressions where the independent variable is the measure of the relative increase in shares outstanding (row 8) or the measure of the change in earnings per share (row 9). The t-statistic of the estimated coefficient is not significant at the .10 level for both regressions. The estimated coefficient of $\Delta\text{EPS}/\text{EPS}$ also is not statistically significant for the subset of 142 calls that were associated with a decrease in earnings per share, i.e., $\Delta\text{EPS} < 0$.

The results presented in Table 3 only provide support for a price effect associated with the measure of the change in interest expense tax deductions. For all three measures of interest expense tax shields, the estimates of the simple regression suggest that larger decreases in interest expense tax deductions are associated with larger negative announcement period stock returns. The results do not reveal valuation effects on common stock that are attributable to wealth redistribution from common stockholders to preferred stockholders or debtholders. In addition, the evidence does not support a supply effect or an earnings per share dilution effect on share price.

Estimation of several alternative specifications of the cross-sectional relationship confirms the results reported in Table 3. For example, no significant nonlinear relationship is found between the standardized common stock returns and the values of α or $\Delta\text{EPS}/\text{EPS}$. Four specifications of each of the variables that measure the impact of calls on the value of debt and preferred stock are also examined.¹⁹ In

only one instance, for the variable that measures the impact of convertible debt calls on outstanding preferred stock, is the t-value of an estimated coefficient significant at the .05 level. The results presented in Table 3, therefore, are generally supported by the estimates of alternative specifications of the model.

IV.B. Subsets of the Calls Sample

Calls Associated with a Negative Stock Price Reaction. Each of the independent variables in the cross-sectional relationships reported in Table 3 is a potential determinant of a negative share price response to a call announcement. None of the coefficients implies a positive price change. Therefore, a relevant determinant of the stock price response may be missing from the model, especially for the calls associated with a positive stock price response. In addition, a positive stock price response may reflect a prior release of news of the call or it may reflect an accurate prediction of the timing of the call by the market. If either of these problems exist, the tests on the full sample of calls are likely biased against rejecting the hypothesis of no price impact for each of the possible determinants. Furthermore, a test of the residuals of the OLS estimates rejects the hypothesis that the subsample of calls with positive stock price responses and the subsample with negative stock price responses are described by the same cross-sectional model.²⁰ For these reasons, the cross-sectional relationship is estimated for the sample of calls with a negative announcement period adjusted stock return.

Estimated coefficients for the subset of calls with a negative announcement price response are reported in (17).

potential wealth transfer from convertible securityholders to common stockholders. Second, to some extent the size of a conversion premium reflects the market's expectations about the timing of a call announcement. Estimates of conversion premiums, therefore, may be helpful in identifying call announcements that were a greater surprise to the market. Analysis of calls associated with larger pre-announcement conversion premiums can provide a stronger test of the potential determinants of stock price responses to call announcements.

For the sample of 123 calls with conversion premium data, the regressions reported in rows 1, 2 and 3 of Table 3 are augmented to include a variable that measures the total conversion premium of the called securities $[(V_{CD} - \alpha V_{CS}) / (1 + \alpha) V_{CS}]$. However, the F-statistics of these regressions are not significant at the .10 level.

Expressions (18) and (19) present the estimates of simpler versions of the cross-sectional relationship that include a variable for the conversion premium. In (18), the independent variables are measures of the effects due to a permanent change in interest expense tax shields $[TD / (1 + \alpha) V_{CS}]$ and the potential wealth transfer from convertible securityholders $[(V_{CD} - \alpha V_{CS}) / (1 + \alpha) V_{CS}]$. The t-statistics are in parentheses.

$$[AR_{2a} / \hat{\sigma}_{AR}] = -.431 + 11.086 [TD / (1 + \alpha) V_{CS}] - 28.479 [(V_{CD} - \alpha V_{CS}) / (1 + \alpha) V_{CS}]$$

$$\begin{matrix} (-2.48) & (1.80) & (-.78) \end{matrix}$$

$$R^2(\text{adj.}) = .041, F = 2.57 \quad (18)$$

The negative estimated coefficient for the variable that represents the conversion premium is not consistent with a wealth transfer from the called securityholders to stockholders. For the simple regression

reported in (19), the coefficient of the conversion premium variable is again negative.

$$[\text{AR}_{2a} / \hat{\sigma}_{\text{AR}}] = - .636 - 47.849[(V_{\text{CD}} - \alpha V_{\text{CS}}) / (1 + \alpha) V_{\text{CS}}]$$

$$(-4.78) \quad (-1.36)$$

$$R^2(\text{adj.}) = .015, \quad F = 1.85 \quad (19)$$

The failure to find evidence of a wealth transfer from convertible securityholders is not surprising, however, given the small estimated mean value of the conversion premiums and the apparent measurement error in the estimates of the conversion premiums, as indicated by the fact that 51 of the 123 estimates of the conversion premiums are negative.

The estimated coefficients of the cross-sectional relationship may depend on the accuracy of the market's expectation of the timing of call announcements. If calls with lower estimates of the preannouncement conversion premiums represent calls that were more accurately anticipated, ceteris paribus the two-day announcement period returns are closer to zero for these calls. As a result, more accurate anticipation of the timing of call announcements tends to induce a downward bias in the estimates of the coefficients of the variables that measure tax effects, wealth redistribution effects, supply effects or earnings per share dilution effects.²²

The possible effect of varying degrees of anticipation of call announcements is examined by estimating the cross-sectional relationship on subsamples of calls grouped by the sign of the estimated conversion premium. Table 4 presents estimates of cross-sectional regressions for two subsamples of calls. Panel A presents three sets of coefficient

TABLE 4

Ordinary Least Squares Estimates of the Cross-Sectional Relationship between Standardized Two-Day Announcement Period Adjusted Common Stock Returns and Possible Determinants of the Returns for Subsamples of Convertible Security Calls Grouped by the Sign of the Estimated Pre-Announcement Conversion Premium (t-statistics in parentheses)

Independent Variables		Adjusted R ²	F-Value						
Constant	TD $\frac{\Delta D(D/V)_{cs}}{(1+\alpha)V_{cs}}$	$\frac{\Delta D(PS/V)_{cs}}{(1+\alpha)V_{cs}}$	$\frac{\Delta PS(PS/V)_{cs}}{(1+\alpha)V_{cs}}$	α	ΔEPS				
<u>A. 72 Calls with Positive Estimated Conversion Premiums</u>									
(1)	-.590 ^b (-2.23)	3.428 (.34)	-5.484 (-1.49)	-16.761 (-1.50)	-6.340 (-.28)	-1.514 (-.93)	-3.338 (-1.31)	.115	1.43
(2)	-.741 ^a (-4.04)		-1.972 (-1.14)	-17.374 (-1.60)	-1.726 (-.08)			.078	1.92
(3)	-.567 ^b (-2.33)	13.022 ^b (1.81)						.045	3.28 ^b
<u>B. 51 Calls with Negative Estimated Conversion Premiums</u>									
(4)	-.239 (-.67)	12.616 (.76)	6.493 (.61)	28.885 (.60)	-7.695 (-.31)	-.481 (-.27)	.669 (.29)	.060	.22
(5)	-.422 ^b (-1.99)		.129 (.02)	23.536 (.52)	-6.431 (-.28)			.009	.15
(6)	-.350 (-1.40)	3.910 (.35)						.003	.12

^a Significant at the .01 level (one-tailed test).

^b Significant at the .05 level (one-tailed test).

estimates for the 72 calls with positive conversion premiums and Panel B presents estimates for the 51 calls with negative conversion premiums.

The results presented in Table 4 suggest that the estimates of the coefficients depend on the sign of the conversion premium. For example, the estimated coefficient of the tax variable $[TD/(1+\alpha)V_{CS}]$ is greater for the sample of calls with positive conversion premiums (row 3) than for the sample of calls with negative conversion premiums (row 6). In addition, the coefficients for the wealth redistribution variables are all negative and one t-value is significant at .10 level for the sample calls with positive conversion premiums. This is consistent with a valuation effect of wealth redistribution. No significant t-values are found among the estimated coefficients for the sample of calls with negative estimated conversion premiums. It should also be noted that the unexplained variance of common stock returns, as indicated by R^2 , is noticeably higher for the subsample of calls with negative conversion premiums.

But even though the regression results appear to depend on the degree of anticipation of calls, as measured by conversion premiums, the inferences drawn from the regressions presented in rows 1, 2 and 3 of Table 4 are not markedly different from the inferences drawn from the results for the full sample of calls. The t-values for the estimated coefficients of variables that represent the possible effect of wealth redistribution are not significant at the .05 level. In addition, there is no evidence in Table 4 that supports either a supply effect or an earnings dilution effect. And like the results for the full sample,

the results for the sample of calls with positive conversion premiums imply an impact on share price that is associated with the decrease in interest expense tax shields.

V. Interpretation of the Results

The principal finding of the cross-sectional analysis is a positive and statistically significant relationship between the announcement period adjusted stock returns and measures of the change in interest expense tax shields. One interpretation of this effect is that the negative stock price response reflects the expected reduction in the firm's after-tax cash flows due to a decrease in interest expense tax deductions. This interpretation is consistent with the finding of a significant negative average stock price reaction to convertible debt call announcements, but not to convertible preferred stock call announcements. This interpretation is troublesome, however, because it does not identify a benefit to securityholders of calling convertible securities, and it raises questions about whether managers' call decisions are in stockholders' interests.

A second interpretation attributes some part of the apparent tax effect to information about the calling firm's value that is implicitly conveyed by the call decision. This interpretation presumes that the capital market correctly believes that managers' call decisions are in the interests of stockholders, and are in part based on information that is not reflected in security prices. Therefore, if the managers' assessment is that the net benefits of a call and conversion are positive and the decision to call is based on earnings prospects that are less favorable than those held by the capital market, a call decision may convey unfavorable information about the value of the firm. That is, a call announcement is associated with a negative

stock price reaction, even though the call decision is a positive net present value decision based on managers' more complete information.

According to the second interpretation, the variable that measures the change in interest expense tax deductions may reflect both (1) a reduction in tax shields and (2) a reduction in firm value due to information conveyed by the call. For example, if the decision to call is motivated by a lowered assessment of the amount of interest expenses that can be supported by the firm's cash earnings and the capital market infers that motivation from the decision to call, the decrease in share price reflects both the reduction in interest expense tax shields and the expected decrease in cash earnings. In that case a relationship between the price response to call announcements and a measure of the reduction in interest expense tax deductions is consistent with theories that imply the optimal level of financial leverage depends on earnings coverage of interest payments and utilization of available interest expense tax deductions.

This study does not resolve to what extent the results reflect a corporate tax effect or an effect due to information conveyed about firm value. However, one piece of evidence supports an information effect. For the sample of 57 calls of convertible preferred stock, further investigation uncovers a significant relationship (at the .10 level) between the common stock returns at the announcements of preferred stock calls and the amount of preferred stock called, as measured by liquidation value.²³ That is, even for convertible securities that provide no corporate tax deductions, there is evidence that the stock price response to a call announcement depends on the size of the issue called. This finding also suggests that the larger negative stock price response to calls of con-

vertible debt than to calls of convertible preferred stock may reflect the effect of a reduction in expected earnings that is reinforced by the effect of a reduction in interest expense tax deductions. But in the final analysis, whether the announcement period stock price responses reflect a downward revision in expected earnings is left as an open issue.²⁴

The high frequency of estimates of negative conversion premiums just prior to the call announcement suggests that many calls are anticipated quite accurately. Therefore, the measured stock price responses in some cases appear to reflect only a small revision in the expected timing of a call. Furthermore, examination of the subset of calls with estimates of positive conversion premiums (Table 4) indicates that the magnitude of the coefficient of the tax variable depends on the anticipation of the call announcement. Consequently, the entire valuation effect associated with the interest expense tax shields variable, i.e., the price response that would be observed if the call announcement was a complete surprise, is probably larger than is suggested by the results presented in Section IV.

Estimates of the conversion premium prior to the call announcement also indicate that on average the potential wealth transfer from convertible securityholders is small relative to the market value of common stock. Within two weeks preceding the call announcement, the average total dollar conversion premium equals \$591,000, or .1% of the market value of common stock. In addition, a wealth transfer from the called securityholders is not found to be a significant explanatory variable for the stock price responses to convertible security calls. Thus, the potential wealth transfer from convertible securityholders does not appear to be an important motivation for call decisions.

The results also do not provide strong support for a stock price impact attributable to changes in the relative priority of debt and preferred stock that remain outstanding following a call. Since convertible debt is typically a subordinated debt claim, the shifts in the relative priority of debt claims are probably minor. Therefore, it is not surprising that wealth transfers to debtholders are not detected. For outstanding preferred stock, conversion of debt to common stock replaces a higher priority claim with a lower priority claim. Thus, the impact on the relative priority of preferred stock is clearer. Some evidence reported in section IV (see footnotes 20 and 22) is consistent with a positive effect on the value of preferred stock. The results for the sample of calls with negative stock price responses (expression (17)) and for the sample of calls with positive conversion premiums (panel A, Table 4) also provide some support a valuation effect on common stock due to a wealth transfer to preferred stockholders. However, direct measurement of preferred stock price responses for a subsample of announcements of convertible debt calls does not uncover any price changes that are consistent with a wealth transfer to preferred stockholders.²⁵ Thus, the results provide some support, but not strong support, for a valuation effect attributable to wealth redistribution to preferred stockholders.

Finally, there is no evidence of price responses to convertible security call announcements that are attributable to an increase in the number of shares outstanding. The announcement period adjusted stock returns are not related cross-sectionally to the relative increases in number of shares outstanding that result from the call of convertible securities. This does not support the notion of a supply effect on share prices. In addition, the relationship between the common stock returns

and the effect of the convertible security calls on earnings per share is not statistically significant. Contrary to arguments commonly presented by practitioners, the evidence does not support a price effect due to a change in earnings per share.

VI. Summary and Conclusions

This study investigates possible determinants of stock price reactions to announcements of capital structure changes. Specifically, the study presents estimates of the cross-sectional relationship between risk-adjusted common stock returns at the announcements of convertible security calls that force conversion and variables that represent potential determinants of the valuation effects of call announcements. The variables include proxies for: (1) the change in interest expense tax shields, (2) the change in the relative priority of outstanding securities, (3) the wealth transfer from the holders of called convertible securities, and (4) the increase in the number of shares outstanding.

Estimation of a cross-sectional regression model provides evidence that the stock price responses to convertible security call announcements are related to measures of the decrease in interest expense tax deductions. The results, however, do not resolve to what extent this finding reflects a valuation effect due to corporate taxes per se versus a valuation effect due to information conveyed by call announcements. Weak evidence consistent with a price effect due to wealth redistribution from common stockholders to preferred stockholders is also found. The potential stock price effects of an increase in the number of shares outstanding are not supported by the results.

Evidence of price effects related to a measure of the change in interest expense tax deductions is consistent with the results of a similar study. Masulis' (1983) cross-sectional study of both leverage increasing and leverage decreasing intrafirm exchange offers also reports a positive statistically significant relationship between announce-

ment period common stock returns and a measure of the change in interest expense tax shields. And he also interprets his results as being consistent with an information effect. In view of Masulis' findings, the results presented in this study of convertible security calls appear to reflect a general pattern in stock price responses to capital structure changes. However, a complete explanation of the motivation for capital structure changes requires a better understanding of managers' incentives to make capital structure decisions that convey unfavorable information about the value of the firm.

FOOTNOTES

1. This study does not address the interesting question of why the calling firms issued convertible securities. The only rationale for the issuance of convertible securities that is accepted generally among financial economists is that debt or preferred stock with conversion privileges reduces costs associated with conflicts of interest between common stockholders and more senior securityholders [e.g., see Smith and Warner (1977)]. At this time, however, there exists no strong empirical support for this rationale. The results of this study of convertible security calls, therefore, must be interpreted subject to not fully understanding the motivation for the issuance of convertible securities.
2. Call announcements are not likely completely unanticipated, since calls of convertible securities are not uncommon events. Prior to a call announcement, a firm's stock price reflects both the probability of a call and the expected timing of a call. Thus, the stock price response to a call announcement reflects only the revisions in the probability and expected timing of a call. The importance of anticipation of call announcements is examined in section IV.B.
3. Smith and Warner (1977) discuss the notion that the issuance of debt with conversion privileges mitigates the asset substitution incentive engendered by the issuance of debt claims. Consequently, the call and conversion of convertible debt may be expected to exacerbate this incentive and reduce the value of outstanding debt. However, Mikkelsen (1981) reports a positive, but statistically insignificant, return for straight debt during the week of a call announcement. If

there is any price impact on the value of outstanding debt, a shift in the relative priority of outstanding claims appears to be the dominant effect on the value of senior securities.

4. A nonzero probability of the conversion value being less than the face value of the convertible debt prior to the expected expiration date of the conversion privileges implies $V_{CD} > \alpha V_{CS}$.
5. The notion of an earnings per share dilution effect on share price is not rigorously developed in theory. Several corporate finance testbooks, however, present an alternative to the Modigliani and Miller (1958) theory that implies a valuation effect of changes in capital structure per se. Weston and Brigham (1978), for example, present the "net income approach" to valuation of a levered firm that assumes the required return on common stock is independent of financial leverage and implies reductions in leverage decrease shareholders' wealth. In the spirit of this valuation approach, an earnings dilution effect is specified under the assumption that the firm's P/E ratio is unaffected by a call of convertible securities and a reduction in leverage. That is, before the call and conversion share price is $P=(c)(EPS)$ and after the conversion share price is $P'=(c)(EPS')$, where c is a constant. Earnings per share before and after the conversion are represented by EPS and EPS' , respectively. Thus, the potential earnings per share dilution effect is specified as

$$(P'-P)/P = (EPS'-EPS)/EPS = \Delta EPS/EPS.$$

6. The sample of calls is derived from the sample formed for the time-series study of security returns reported in Mikkelson (1981). Six calls are excluded from this study because of the unavailability of

financial data or stock return data following the call announcement.

7. Center for Research in Security Prices, the University of Chicago.
8. In order to mitigate the bias in the OLS estimates of the market model due to nonsynchronous trading of securities (see Scholes and Williams (1977)), the estimate of b_1 is derived from OLS estimates of the coefficients of R_{jt} regressed on R_{mt-1} , R_{mt} and R_{mt+1} .
9. There are two reasons for using returns following the call announcement to estimate each firm's market model. First, calls are typically announced following a period of generally positive risk-adjusted returns. These returns impart an upward bias to the estimation of the parameters of the market model. Second, to some degree, if not completely, the decrease in systematic risk of common stock due to conversion and a reduction in financial leverage occurs on the call announcement date. Post-announcement returns should provide estimates of the market model coefficients that more accurately reflect the reduction in systematic risk at the announcement date.
10. Several recent investigations of security returns around announcements of capital structure changes have also found a price impact that is concentrated on days -1 and 0. For example, see Dann (1980), Masulis (1980), Korwar (1982), and Dann and Mikkelson (1982).
11. Among the 107 convertible debt calls, in only 19 cases did the calling firm have publicly traded nonconvertible debt outstanding that traded actively enough to compute an announcement week return. Publicly traded nonconvertible preferred stock was outstanding in only 7 cases.
12. The purchaser of a bond pays interest accrued since the preceding coupon payment date but receives no interest payments from the firm

upon conversion of the debt. Therefore, a zero arbitrage profits condition implies that the sum of the convertible bond price plus accrued interest is not less than the conversion value of the bond. The adjusted bond prices are calculated under the assumption that the holder is entitled to three months of accrued interest.

13. Several estimates of conversion premiums are negative. This need not reflect an arbitrage profit opportunity. It may reflect either (1) nonsynchronous price quotes for the firm's common stock and convertible debt or (2) the assumption of three months accrued interest (see fn. 11). Investigation of a number of estimates of negative premiums and precise measurement of accrued interest indicates that nonsynchronous prices are likely the more important reason for the negative estimates of conversion premiums.
14. The hypothesis that the mean ratios of market value to conversion value are equal for the two samples is not rejected at the .10 level.
15. The actual number of called securities converted to common stock is not easily determined. Instead, it is assumed for the sample of calls that a large, constant proportion of called securities are converted rather than redeemed at the call price. Table 3 indicates that for calls of convertible debt, on average the price per called bond is more than \$60 greater than its face value. This suggests that on average the conversion value exceeds the call price by approximately \$50 per bond. Thus, the incentive of a bondholder to convert is substantial.
16. Earnings per share (EPS_{-1}) at the fiscal year-end preceding the call announcement equals net income (E_{-1}) less preferred dividends (PD_{-1}) divided by the number of outstanding shares of common stock

(PD_{-1}) , i.e., $EPS = (E_{-1} - PD_{-1}) / S_{-1}$. This measure of earnings per share is the denominator of $(\Delta EPS / EPS)$. Following a convertible debt call announcement, earnings available to common stockholders equal net income for the preceding fiscal year (E_{-1}) less preferred dividends (PD_{-1}) plus the annual after-tax interest payments on the called debt $((1-t)I_c)$. Earnings per share equals this quantity divided by the total shares outstanding following the call and conversion ($S_{-1} + \Delta S$). Thus, the change in earnings per share (ΔEPS) due to the call and conversion of debt equals

$$\Delta EPS = [(E_{-1} - PD_{-1} + (1-t)I_c) / (S_{-1} + \Delta S)] - [(E_{-1} - PD_{-1}) / S_{-1}].$$

For a call of convertible preferred stock, earnings available to common stockholders increases by the annual preferred dividends (PD_c) of the called issue. The change in earnings per share due to a call of convertible preferred stock equals

$$\Delta EPS = [(E_{-1} - PD_{-1} + PD_c) / (S_{-1} + \Delta S)] - [(E_{-1} - PD_{-1}) / S_{-1}].$$

17. The estimate of the standard deviation of the two-day announcement period adjusted return ($\hat{\sigma}_{AR}$) equals the standard deviation of the 25 two-day risk-adjusted returns from trading days +11 through +60. Using this estimate, two tests of homoscedasticity are computed.

The first, proposed by Goldfield and Quandt (1965), involves ranking the observations by the estimate of the standard deviation of two-day adjusted returns and estimating the cross-sectional relationship separately on the 60 observations with the smallest values of $\hat{\sigma}_{AR}$ and the 60 observations with the largest values of $\hat{\sigma}_{AR}$. The ratio of the sum of squared residuals of the two regressions has the F-distribution. For two sets of estimates of the specification given by (16), the F-value of the ratio of the sum of squared residuals

equals 3.47. The hypothesis of a homoscedastic error term is rejected at the .01 level.

The second test, presented by Glejser (1969), regresses the absolute value of the regression residuals ($|e|$) on the estimate of the standard deviation of the two-day adjusted common stock return ($\hat{\sigma}_{AR}$). The estimated relationship is

$$|e| = .006 + .703(\hat{\sigma}_{AR})$$

and the t-value of the slope coefficient is 4.16. Again, the hypothesis of homoscedasticity is rejected at the .01 level.

18. An alternative procedure to correct for heteroscedasticity is to divide each of the terms of the regression by $\hat{\sigma}_{AR}$. For reasons that are not clear, this weighted least squares procedure induces another source of heteroscedasticity in the error term. The residuals of a weighted least squares regression are related significantly to the independent variable that measures the change in interest expense tax deductions. This problem is not found when only the dependent variable is divided by $\hat{\sigma}_{AR}$.
19. For the measure of the impact of a convertible debt call on outstanding preferred stock, the following specifications of $k(\cdot)$ are examined: (1) $[\Delta D^2(PS/V_{CS})]$, (2) $[\Delta D^{.5}(PS/V_{CS})]$, (3) $[\Delta D(PS/V_{CS})^2]$ and (4) $[\Delta D(PS/V_{CS})^{.5}]$. Corresponding specifications were also examined for the other two variables that represent the potential wealth redistribution from common stockholders to debtholders or preferred stockholders.
20. For the 114 observations where $AR_{2a} < 0$, the sum of the squared residuals of the regression model given by (16) equals 78.7. The sum of squared residuals equals 293.6 for the full sample of calls.

An F-statistic is computed to test the hypothesis that the two samples of calls grouped by the sign of AR_{2a} are explained by the same cross-sectional relationship. The F-statistic equals 5.84, which is significant at the .01 level.

21. Regressions that correspond to the specifications presented in rows 4 through 9 in Table 3 are estimated for the subset of 114 calls with $AR_{2a} < 0$. The results show a significant coefficient for each of the three corporate tax variables and insignificant coefficients for the variables that measure the relative increase in shares outstanding and the change in earnings per share. The only departure from the results for the full sample is the finding of a significant negative coefficient for the variable that measures the impact of a convertible debt call on the value of outstanding preferred stock. This result is consistent with a wealth redistribution effect.
22. No patterns were uncovered in the magnitudes of the estimated conversions premiums. For example, the correlation between the estimates of the conversion premium and the ratios of conversion value to face value, or call value, (a measure of how much the conversion privileges are in the money) is found to be insignificant. Also, no relationship is found between the conversion premiums and the corporate tax variables.
23. For the sample of 57 calls of convertible preferred stock, the standardized two-day announcement period stock returns were regressed on the liquidation value of the preferred stock divided by the market value of common shares $[LV/(1+\alpha)V_{CS}]$. The following estimates were obtained

$$[AR_{2a} / \hat{\alpha}_{AR}] = -.038 + 4.133 [LV/(1+\alpha)V_{CS}].$$

(-.16) (1.60)

$$R^2(\text{adj.}) = .044, F = 2.55$$

24. If managers act to maximize stockholders' wealth, a conjecture is that calls motivated by unfavorable inside information about the firm's value are more likely to occur when the conversion value is closer to the call price. That is, the value of the downside protection offered by the debt component of a convertible bond is greater, the lower is the conversion value. Thus, the expected valuation impact of a call that conveys unfavorable information is possibly greater at lower conversion values. However, investigation of the calls indicates that the stock price response to call announcements does not depend on the level of conversion value relative to call price.
25. For 19 calls of convertible debt, the calling firm had a publicly traded preferred stock issue outstanding at the time of the call announcement. A total sample of 30 preferred stock issues was formed that consists of 8 nonconvertible issues and 22 convertible issues. Average daily preferred stock returns for these two samples of preferred stock issues are examined over 21 trading days centered on the call announcement date. For neither sample is a significant average preferred stock return found on or nearby the date of the call announcement.

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