Mergers, Debt Capacity, And Stockholder-Bondholder Wealth Transfers

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ABSTRACT

This study presents a framework for determining whether post merger actual debt of a merged firm is higher than its potential debt capacity. Our results show that on the average, actual debt of the merged firm is significantly higher than its potential debt capacity, and that the proportion of firms with actual debt higher than potential debt capacity is higher than expected. This evidence is consistent with the argument that the co-insurance wealth transfer from shareholders to bondholders is negated by increased leverage post merger. The results on abnormal returns to bondholders for the two subgroups with actual debt higher/lower than the potential debt capacity support the neutralization of wealth transfers. Forty nine industrial mergers during 1970-1984 and the associated debentures comprise the sample. We measure the potential debt capacity after the merger based on a theoretical model using pre merger correlation of the cash flows of the merging firms and their debt ratios. Our results indicate that post merger actual debt ratios are significantly higher than the potential theoretical ratios providing support for the increased debt capacity as motive for merger. We also find evidence for leverage induced neutralization of wealth transfers to bondholders.

I. INTRODUCTION

A. Perspectives

The relevance of considering the impact of managerial decisions on all constituents of the firm has been emphasized in recent work by Fama (1980) and Fama and Jensen (1983). A number of recent studies have pursued this approach in the context of merger events by including an analysis of the event effects on fixed income security holders in addition to common stockholders. Interest has been focused on wealth transfer effects between bondholders (or preferred stockholders) and common stockholders.

The co-insurance hypothesis (Galai and Masulis,1976; Kim and McConnell, 1977) predicts that mergers will result in increases in the value of senior securities of merging firms at the expense of stockholders. Positive wealth transfer effects to bondholders from stockholders consequent on a merger can be avoided by retiring the debts of the merging firms at their pre-merger market values and reissuing debt in the merged firm with a market value equal to the sum of debts in the merging firms (Kim, McConnell and Greenwood, 1977). The co-insurance wealth transfer effects can also be negated by increased leverage after the merger, leading to the neutralization of wealth transfers to bondholders (Galai and Masulis, 1976). This phenomenon is the subject of this paper.

Lewellen (1971) has proposed the increased debt capacity as a possible motive for merger : the combined firm is a better credit risk due to the possibility of protection extended by one firm to another when the latter might have gone bankrupt and vice versa. Stapleton (1982), drawing on previous formulations of Brennan (1979) and Cox, Ross and Rubinstein (1979), provides a framework for measuring debt capacity after the merger under an option pricing model framework. Debt capacity is defined as the maximum amount of debt that can be borrowed for a given rate of interest. With normal distribution of cash flows and assuming an exponential utility function, Stapleton derives expres-

sions for debt capacity of the merged firm under risk neutrality and under risk averse pricing. Debt capacity itself is shown to be a function of relative risks of the merging firms as well as the correlation of cash flows (earnings) of the merging firms. Thus, Stapleton's measure of debt capacity provides opportunities to measure empirically potential debt capacity after the merger. We argue that merger related leverage changes should be measured relative to a measure such as Stapletons'. We provide empirical evidence on the stockholder-bondholder wealth transfer phenomenon in connection with debt capacity effects of corporate mergers.

The rest of this article is organized as follows: In the remainder of this section, empirical evidence and proposed research objectives are presented. In Section II information on data and methods of analysis are presented. Results on debt capacity as a consequence of mergers and debt capacity and abnormal returns to bondholders are presented in Section III. Section IV contains Summary and Conclusions.

B. Previous Research And Proposed Objectives

Kim and McConnell (1977) study the returns to bondholders consequent on a conglomerate merger. They find positive average and cumulative residuals accruing to bondholders, but the residuals are not statistically significant. They conclude that increased debt financing after the merger may have nullified the wealth transfers to bondholders. Asquith and Kim (1982) test for diversification effect which predicts increase in the senior security values at the expense of stockholders; also tested is the incentive effect that posits that stockholders would engage in high risk projects, in this case merger, to expropriate wealth from bondholders to themselves. Since synergies may have some effect on bond values, any observed diversification and or incentive effect will include synergy effects. They find no evidence to support either hypothesis. They observe that increased leverage on account of merger may have neutralized the wealth transfers. Eger (1983) studies the transfer of wealth from stockholders to bondholders in a sample of pure exchange (common stock) mergers for the period 1958 to 1980 and finds that holders of risky debt experience significant positive abnormal returns. Settle, Petry and Hsia (1984) also examine the diversification and incentive effects, and find, contrary to Asquith and Kim, that the wealth of bondholders is affected positively by merger, implying synergies and/or diversification effect. Finally, Dennis and McConnell (1986) study returns accruing to various classes of security holders, and report partial support for the co-insurance hypothesis. None of the above studies have empirically addressed the relationship between increased debt capacity and stockholder-bondholder wealth transfers; and none has provided empirical evidence for the neutralization of wealth transfers, even though theory predicts such effects for bondholders due to the increase in leverage after the merger. One issue is defining the level of debt in the combined firms which would neutralize wealth transfers. The present study is aimed at bridging this gap : we compare actual post-merger debt levels with estimates of the potential debt capacity after the merger to analyze the impact of increased debt financing on wealth transfers to bondholders. A comparison of actual market value of the debt after the merger in relation to potential debt capacity a la Stapleton (1982) is made to confirm the increased debt capacity consequence of mergers. Specifically, we test the following hypothesis.

Hypothesis 1:

Given rational expectations in the market place, actual debt levels post merger will be greater than or equal to the potential debt capacity, as measured by Stapleton's model.

Confirmation of the above hypothesis would lend support to increases in financial leverage as a means of neutralizing the flow of wealth from bondholders to stockholders; it will provide evidence for the motive of increased debt capacity for mergers and/or the co-insurance effects of mergers. Thus, we contend that given rational expectations, any potential increase in debt capacity will be exploited, and fully anticipated by bondholders at the time of merger announcement.

The above hypothesis is tested as follows: First, a parametric test comparing the actual post merger mean debt ratios to the potential mean debt ratios. Second, a non-parametric test comparing the actual number of firms with actual debt ratios greater than or equal to potential debt ratios with the number of cases that would be expected by chance.

The expectation of bondholders that merger will be followed by increase in debt levels up to the maximum of potential debt capacity may not always materialize in every merger. Some firms might increase debt levels more than predicted by potential debt capacity while some others might not resort to that much debt financing: in essence, there will be a set of firms with "unexpected" increases and another set with "unexpected" decreases in actual debt levels in relation to expected potential debt capacity ratios. This observation leads to the second hypothesis.

Hypothesis 2:

Where there are unexpected decreases in debt levels, the co-insurance effects are not fully neutralized and bondholders continue to gain at the expense of stockholders. Bondholders in firms with unexpected leverage increases will experience losses or lower gains vis-a-vis the bondholder group with debt ratios less than or equal to potential debt capacity, due to the neutralization of wealth transfers to bondholders.

The wealth transfer effects associated with unexpected increases and decreases in actual debt levels given rational expectations in the market place are presented below:

EXHIBIT #1

Debt Ratios	Bond
Unexpected Increases[1]	< 0
Unexpected Decreases[1]	> 0

We hypothesize that the group with unexpected decreases will show positive wealth transfer effects to bondholders while the group with unexpected increases will show smaller, possibly negative or 0 wealth transfers, indicating possible neutralization of diversification effects to bondholders in this group[2]. This hypothesis will be tested by comparing the abnormal returns of two groups of bondholders (unexpected increases and unexpected decreases) over the post announcement period.

The potential debt capacity is measured using Stapleton's model. Essentially, potential debt capacity measurement involves the use of pre-merger debt levels of the merging firms and the variances and correlation of their cash flows. The actual debt level is measured using the total debt of the combined entity in the immediate post-merger year. The actual debt ratios are computed both in market value and book value terms.

Potential debt capacity of the combined merged firm is computed as follows:

$$(1+r)\ D_i = \mu_i\ [F^*(Y_i)] - \sigma_i f^*(Y_i) + Y_i\ [1-F^*(Y_i)] \qquad (1)$$

where,

r = risk-free rate; $\mathbf{Y_i}$ = debt obligation due at the end of the period; $\mathbf{X_i}$ = cashflow at the end of one period including liquidation value of assets, assumed to be normally distributed; μ_i = mean of X_i; under risk averse pricing equals $Rv + l\sigma_i P_{iM}$, where Rv is the certainty equivalent of mean return μ_i, σ_i is the standard deviation of Y_i, and P_{Im} is the correlation coefficient of cash flows i with that of the Market M; l = risk aversion coefficient; $\mathbf{D_i}$ = debt capacity in market value terms; **f*** = standard normal density function; and **F*** = cumulative standard normal distribution.

The potential debt capacity of merging firms was derived based on mean cash flows (EBIDT) of acquired and acquiring firms, the variances and correlation of cash flows of the merging firms, and their debt obligations pre merger. Debt obligations include long term and short term debt. The data on mean cash flows and debt obligations are obtained from COMPUSTAT. Then using the normal density function, the potential debt capacity is computed. The empirical measurement of potential debt capacity is explained in greater detail in Appendix A, which is available from the lead author.

With the potential debt capacity determined, the potential debt capacity ratio for firm i is computed as follows:

$$POTPTBK_i = DEBTCAP_i/PSEQTAG_i \qquad (2)$$

where,

$\mathbf{POTDTBK_i}$ = potential debt capacity ratio in book value terms; $\mathbf{DEBTCAP_i}$ = potential debt capacity (D_j) determined from eq. (1); and $\mathbf{PSEQTAG_i}$ = equity of the acquiring firm in the post-merger year in book value terms.

The actual debt capacity ratio is computed as:

$$ACTDTBK_i = TOTDT_i\ /PSEQTAG_i \qquad (3)$$

where,

$\mathbf{TOTDT_i}$ = the sum of long-term and short-term debt in book value terms in the post merger year; and
$\mathbf{PSEQTAG_i}$ = the equity in the post merger year.

With the potential and actual debt ratio computed, the bonds are classified into two groups:

1. With $ACTDTBK_i > POTDTBK_i$
2. With $ACTDTBK_i \leq POTDTBK_i$

Also computed are the potential and actual debt levels in market value terms:

$$ACTDTMKT_{1i} = MKTVAL_{1i}/MKTAG_{1i} \qquad (4)$$

where,

$ACTDTMKT_{1i}$ = the measure of actual debt ratio in market value terms post merger; and **$MKTVAL_{1i}$** = $STDT_i + MKT_{1i}/PBAL_i$;

with

$STDT_i$ = short-term debt post merger; **MKT_{1i}** = market value of all debentures of a given firm; **$PBAL_i$** = $BALDT_i/LTDT_i$; **$BALDT_i$** = book value of debentures for a given acquired/acquiring firm; and **$LTDT_i$** = the long-term debt (book value) of a given firm.

Thus, $MKTVAL_{1i}$ imputes debenture market value per book dollar to non debenture debt.

The potential debt capacity in market value terms is computed as follows:

$$PTMKTAC_{1i} = DEBTCAP_i / MKTAG_i; \quad (5)$$

where,

$MKTAG_i$ stands here for the market value of equity of the combined firm post merger and is computed as:

$$MKTAG_i = SHNOAG_i * CLPRAG_i \quad (6)$$

where,

$SHNOAG_i$ = the number of shares of the combined firm in the post merger year, and **$CLPRAG_i$** = the closing price in the postmerger year.

II. DATA AND METHODOLOGY

A. Sample Selection

This study examines mergers between firms listed in the New York Stock Exchange. The period of mergers covered is 1970 through 1984. The period from 1970 through 1984 was chosen to provide homogeneity of sample with regard to accounting rules on mergers[3]. An initial sample of mergers for 1970 through 1984 is constructed based on the data from the *Conference Board's* announcement of mergers in the *Mergers and Acquisitions Journal* (1970-1984). The criteria used to screen the mergers for the final sample are as follows:

1. The merger should be a major one; that is the book value of assets of the smaller firm (more often the acquired firm) had to be at least 5% of the respective book value of the larger firm (acquiring firm). (All firms had total assets of $10 million or more.)

2. The merger should be complete. That is, the common stock of the acquired company had to be purchased entirely by the acquiring company, and outstanding debentures of the acquired company assumed by the acquiring company. Terms of the merger as well as the information on the assumption of debentures are obtained from *Moody's Industrial Manuals* and *CCH Capital Changes Reporter*[4]

3. Neither of the merging companies should be a foreign concern.

4. At least one of the merging companies should have long-term publicly traded bonds outstanding for a period of 24 months before and after the merger.

5. The acquiring company should not have engaged in any other major merger 24 months before and after the announcement date of the merger.

6. The sample should not include firms from regulated industries like banks, railroads and utilities.

7. Both the acquired and acquiring firms' stock returns data should be available in the monthly CRSP data file for the monthly sample and in the daily CRSP files for daily sample as well as in the Industrial COMPUSTAT data file.

8. The announcement of the merger should have appeared in the *Wall Street Journal* and be referenced in the *Wall Street Journal Index.*

Information on the total assets of the merging firms is provided in Table 1. Total assets of all firms are greater than $10 million. The mean value of total assets for acquired firms is $490.2 million while that of acquiring firms is $2507.2 million.

B. Bond Price Data Sources

Month-end bond prices were collected from Moody's *Bond Guide* monthly[5]. Since bonds trade infrequently, settlement prices are utilized, when available. If no settlement price is available for a given bond in a month, then the bid price is used. If neither the settlement price nor the bid price is available, then the ask price is employed. When price quotes are not available in the Moody's *Bond Guide*, the *Bank Quotation Record* is used to find price quotes for missing months[6].

C. Monthly Sample

Table 2 provides information on the bonds included

in the monthly study. There are a total of 146 bonds[7]. Multiple bonds from a given merger in either of the acquired and/or acquiring company are included in the sample. Of the 146 bonds, 29 bonds (19.86%) are of the acquired firm and 117 bonds (80.14%) are of the acquiring firm. There are 22 (22.07%) convertible bonds[8] and 124 (84.93%) nonconvertible bonds. A substantial proportion of nonconvertible bonds are callable. All convertible bonds are callable.

D. Monthly Returns on Bonds and Abnormal Returns to Bondholders

One hundred forty-six corporate bonds in the sample were matched with 27 Treasury Bonds from the CRSP Government Bond file, based on term remaining to maturity, Coupon and callability features. Returns were adjusted for the term structure of interest rates as explained in Handjinicolau and Kalay (1984)[9]. In effect, this procedure can be described as term structure adjusted comparison mean approach. Specifically, consider the corporate bond return:

$$R_{Cit} = \frac{(P_{Cit} - P_{Cit-1}) + (M_{ivt} - M_{vit-1})\ (k/12) * 100}{P_{Cit-1} + M_{ivt-1}\ (\ (k/12) * 100)} \qquad (7)$$

TABLE 1

Asset Characteristics of Sample Firms

Total Assets	n	Mean	Standard Deviation	Minimum Value	Maximum Value
Acquired Firms	49	490.2	916.1	11.9	5993.6
Acquiring Firms	49	2507.2	3610.0	91.6	14109.3

TABLE 2

Characteristics of Bonds

in the Monthly Study

	Acquired Firm #	Acquiring Firm #	Total #
Convertible	10	12	22
Non-Convertible	19	105	124
Total #	29	117	146

where,

$\mathbf{R_{Clt}}$ = Corporate bond i's one month holding period return for month t; $\mathbf{P_{Clt}}$ = price of the corporate bond i in month t; $\mathbf{P_{Clt-1}}$ = price of the corporate bond i in month t-1; **k** = annual coupon rate; $\mathbf{M_{lvt}}$ = number of months from the last coupon to the t^{th} month; and $\mathbf{M_{lvt-1}}$ = number of months from the last coupon payment to the t-1 month.

Matching T-bond monthly returns are obtained from the CRSP Government bond file. These T-bond returns are computed in a fashion similar to the computation of returns on corporate bonds. Letting the T-bond monthly return equal to RT_{it}, following Handjinicolau and Kalay (1983), we can define the term structure adjusted excess monthly corporate bond return for the t th month as:

$$\overline{R}_{Eit} = R_{Cit} - R_{Tit} \quad (8)$$

The post-announcement bond comparison mean is computed as follows:

$$\overline{R}_{posbi} = \sum_{m=2}^{25} R_{Eit}/11 \quad (9)$$

Then, the abnormal return to the bondholders for bond i for the t^{th} month is computed as follows:

$$EXRTN_{it} = R_{Eit} - R_{posbi} \text{ for } t= 0,...,8 \quad (10)$$

E. Average Residuals

The average abnormal return for a given month is computed as follows:

$$AVRS_t = \sum_{i=1}^{n} EXRTN_{it}/n \quad (11)$$

where, n is the number of non-missing bond returns in a given month.

F. Cumulative Average Residuals for Bondholders

Cumulative Average Residuals (CARS) and Cumulative Standardized Average Residuals (CSAVRS) are computed by scanning over desired monthly intervals as follows:

$$CAR = \sum_{t=bm}^{em} AVR_t \quad (12)$$

where,

CAR = the cumulative average residual; $\mathbf{AVR_t}$ = the average residual for the t^{th} month; **bm** = beginning month; and **em** = ending month.

G. t-Statistics for AVRS of Bonds

Let us define the variance of excess return for month t as:

$$\sigma^2_t = \sum_{i=1}^{n} (EXRTN_{it} - AVRS_t)^2/(n-1) \quad (13)$$

where, $AVRS_t$ is the cross-sectional mean excess return in month t

$$\text{and } AVRS_t = \sum_{i=1}^{n} EXRTN_{it}/n$$

Then, the t-statistic for $AVRS_t$ is computed as:

$$t_{AVRS} = AVRS_t / (\sigma^2_t/n)^{\frac{1}{2}} \quad (14)$$

H. t-Statistics for CARS of Bonds

t-Statistics for CARS of bonds are computed as follows: Defining,

$$\sigma^2 CAR(b,e) = \sum_{t=b}^{e} \sigma^2_t / n \quad (15)$$

where, $\sigma^2 CAR(b,e)$ is the variance of CAR in the interval beginning in month b and ending month e. Then, the t-statistic for CARS is defined as:

$$t_{CAR(b,e)} = \frac{[\ CAR(b,e)\ ]}{\sqrt{\sigma^2_{CAR(b,e)}}} \quad (16)$$

III. RESULTS: RATIONAL EXPECTATIONS AND THE INCREASED DEBT CAPACITY AS A MOTIVE FOR MERGER

A. Debt Capacity and Increased Debt Capacity Consequence of Mergers

In this segment, we present the results of Hypotheses # 1 and # 2 namely, the increased debt capacity consequence of mergers and neutralization of wealth transfers through leverage increases. Hypothesis #1 contends that potential increases in debt capacity associated with the merger will be exploited. Hypothesis #2 is built on rational expectations regarding debt capacity and suggests that in the set of bonds with "unexpected" increas-

es in actual debt ratios compared to potential debt ratios, neutralization of wealth transfers will occur. However, the bonds with "unexpected" decreases in actual debt ratios compared to potential debt ratios, would continue to reap significantly positive excess returns.

The results of differences in potential and actual debt ratios based on the two different market value measures are presented in Table 3. DIFF1MKT1 is computed by subtracting the actual debt capacity ratio from the potential debt capacity ratio in market value terms ($PTMKTAC_1$). DIFF2MKT2 is obtained by subtracting the actual debt ratio from the potential debt ratio based on a hybrid market value measure[10].

As the results show, both the differences DIFF1-MKT1 and DIFF2MKT2 are positive and significant at 5% and 1%, respectively. Thus, the actual debt ratios exceed the potential debt ratios. Therefore, the hypothesis relating to the increased debt capacity motive or co-insurance wealth transfer neutralization for merger seems to be supported at the 5% level of significance.

The results of observed frequencies of firms with actual debt ratios greater than or equal and less than or equal to potential debt ratios are presented in Table 4. Assuming equal likelihood, the expected numbers are presented in parentheses.

Considering the frequency distribution based on the book value measure first, the Chi-square value for the distribution amounts to 5.00 (significant at 1%) rejecting the null hypothesis that observed frequency equals the expected frequency. For the market value measure groupings, the grouping based on the first measure, results in a Chi-square value of 2.78 (significant only at the 10% level). However, the grouping based on the second measure results in a Chi-square value of 9.00, which is significant at the 1% level.

Thus, the observed number of firms with actual debt ratios greater than the potential debt capacity ratio is far greater than expected by chance.

B. Debt Capacity and Abnormal Returns to Bondholders

We now look at the relationship of actual debt ratios to potential debt ratios. Bondholders in firms with actual post merger ratios greater than or equal to potential debt ratios (unexpected increases in debt ratios) will, according to the theory, show negative, or small positive residuals over the post announcement period compared to bondholders in firms with actual debt ratios lower than the predicted potential debt ratios. The rationale is that any increase in debt levels due to the merger would result in neutralization of wealth transfers accruing to bondholders. The mean difference between

Table 3

Comparison of Actual Debt Ratios versus Potential Debt Capacity Ratios

Variable	Mean	Standard Deviation	t-value	n
DIFF1MKT1	0.1236	0.316	2.31**	
DIFF2MKT2	0.1879	0.405	2.75***	

*** Significant at 1% level.

** Significant at 5% level.

TABLE 4

Comparison of Actual Number of Firms versus Expected Number of Firms Based on Debt Capacity

Grouping & Type of Ratio	No. of firms with actual debt ratio ≥ potential debt capacity ratio	No. of firms with actual debt ratio < potential debt capacity ratio	Chi-Square Value
1. Based on Book Value[1]	30 (22.5)	15 (22.5)	5.00***
2. Based on Market Value[2]			
i) Measure$_1$	23 (18)	13 (18)	2.78*
ii) Measure$_2$	27 (18)	9 (18)	9.00***

[1]Book-Value measures are

(i) POTDTBK = DEBTCAP/ CNEQTAG ; where

POTDTBK = the potential debt ratio in book value terms;
DEBTCAP = the debt capacity;
CNEQTAG = the equity of the acquiring firm postmerger.

(ii) ACTDTBK = TOTDT/CNEQTAG; where

ACTDTBK = the actual debt capacity in book value terms;
TOTDT = total debt in the postmerger year;
CNEQTAG = equity of the acquiring firm postmerger.

[2]Computations of market value measures are explained in the methodology section.

@Figures in parentheses are expected numbers.

*** Significant at 1% level.

* Significant at 10% level

announcement and merger months was 4 1/2 months. We assume that revision of expectations regarding the extent of leverage would occur between merger announcement and consummation.

Results of CARS from 0 through +8 month of announcement for bonds with actual debt levels greater than or equal to the potential debt capacity appear in Table 5. CARS of bonds with actual debt levels lower than the potential debt levels are presented in Table 6. The CARS of the latter group amount to 0.0527 with a significance level of 5% level while the CARS of the former group amount to 0.0127 and are nonsignificant. A plot of the CARS of both roups appears in Figure 1. As seen in the figure, the CARS of the group with actual debt ratios greater than or equal to potential debt ratios remain in the one to two percent range; The CARS for the group with actual debt ratios lower than potential debt ratios start increasing from post-announcement month and continue to rise through month 8 with a peak value of 5.27% . Hence, there is evidence that the abnormal returns accruing to the bonds with actual debt levels lower than potential debt capacity levels are higher than the returns to the group with actual debt levels greater than potential debt capacity[11]. That is, the hypothesis of significant excess returns accruing to bondholders with unexpected decreases in debt ratios can not be rejected at 5% level of significance. In the absence of any neutralization from additional debt levels, bondholders gain significantly following the merger.

Therefore, if the corporate managers want to avoid wealth transfers to bondholders, they should lever the corporation with the merger thereby neutralizing the wealth transfers.

IV. SUMMARY AND CONCLUSIONS

The question of increase in debt capacity after the merger is explored using Stapleton's model. We measure the potential debt capacity of the merged firm using the pre-merger variances and correlation of cash flows of the merging firms and their pre-merger debt levels. Then, we computed the actual debt levels of the merged firm in the immediate post-merge year. Our results indicate that: (a) actual debt ratios are significantly higher than potential debt ratios and (b) significant number of firms have actual debt ratios higher the potential debt ratios.

We also look at the cumulative average residuals of the excess bond returns (CARS) of the two groups of firms: (a) those with actual debt ratios higher than or equal to potential debt ratios, and (b) those with actual debt ratios lower than potential debt ratios. Our findings show that the group with actual debt ratios lower than potential debt ratios has higher CARS over the 8 month post-announcement period (significant at 5% level). The other group with actual debt ratios higher than potential debt ratios has lower and statistically non significant CARS during the same interval. Thus, there is evidence suggesting that increased debt financing after the merger may help in neutralizing the wealth transfers to bondholders.

We also measured the potential debt capacity after the merger using Stapleton's model. Here, we provide empirical evidence on possible neutralization of wealth transfers to bondholders.

Thus, by means of this study, we have reached more definitive conclusions on the wealth transfer phenomena associated with merger activity. This is an important aspect and a contribution to the understanding of mergers in general.

In conclusion, our results show that a significant number of firms, in fact, have higher debt ratios after the merger compared to their potential debt ratios. This may be one of the ways used by corporations to neutralize wealth transfers to bondholders.

FOOTNOTES

1. These unexpected increases and decreases in debt levels are measured two ways: a) In relation to actual debt ratios versus potential debt ratios (Staplton, 1982) and b) In relation to actual debt ratios versus weighted average of pre-merger debt ratios (naive classification).

2. These wealth transfers do not exclude synergy effects; any observed wealth transfers would be in addition to the synergy related bond value changes.

3. Prior to 1970 there have been quite a few changes in accounting for mergers. (For example, the Tax Reform Act of 1969 disallowed interest deductibility to a corporation that incurs acquisition indebtedness if the interest expense was greater than $ 5 million.)

4. In some cases where the acquiring company has prior holdings of 25% or more of the common stock of the acquired company, the merger was excluded from the sample.

5. Nunn, Hill and Schneewis (1986) compare Moody's bond quotes with Merrill Lynch bond data sources and claim the latter to be a better source of bond price quotes. However, in actuality the Merrill Lynch quotes are not market determined bid, ask and settlement prices. Those prices are generated from a matrix system based on comparable bonds in terms of coupon, maturity, etc. In fact, the exact procedure of price generation is not publicly available information. Given our interest in studying the impact of merger announcement (event study), we decided to use Moody's quotes rather than Merrill Lynch generated quotes used to price institutional holdings.

TABLE 5

Cumulative Average Residuals of Bonds with Actual Post-merger Debt Levels Greater Than or Equal to Potential Debt Capacity

Month[1]	CAR	T-Statistic	n
0	0.0103357	1.582	92
+1	0.0098588	1.143	92
+2	0.0089932	0.896	92
+3	0.0122604	1.076	92
+4	0.0213698	1.712	92
+5	0.0201161	1.502	92
+6	0.0128633	0.918	92
+7	0.0185913	1.236	92
+8	0.0127961	0.768	92

[1]0 month is the announcement month.

TABLE 6

Cumulative Average Residuals of Bonds with Actual Post-merger Debt Levels Lower Than Potential Debt Capacity

Month[1]	CAR	T-Statistic	n
0	-0.0002684	-0.032	45
+1	-0.0041317	-0.353	45
+2	0.0017963	0.135	45
+3	0.0158804	1.082	45
+4	0.0247949	1.502	45
+5	0.0317105	1.696	45
+6	0.0363240	1.737	45
+7	0.0503116	1.964**	46
+8	0.0527260	2.001**	46

[1]0 month is the announcement month.

** Significant at 5% level.

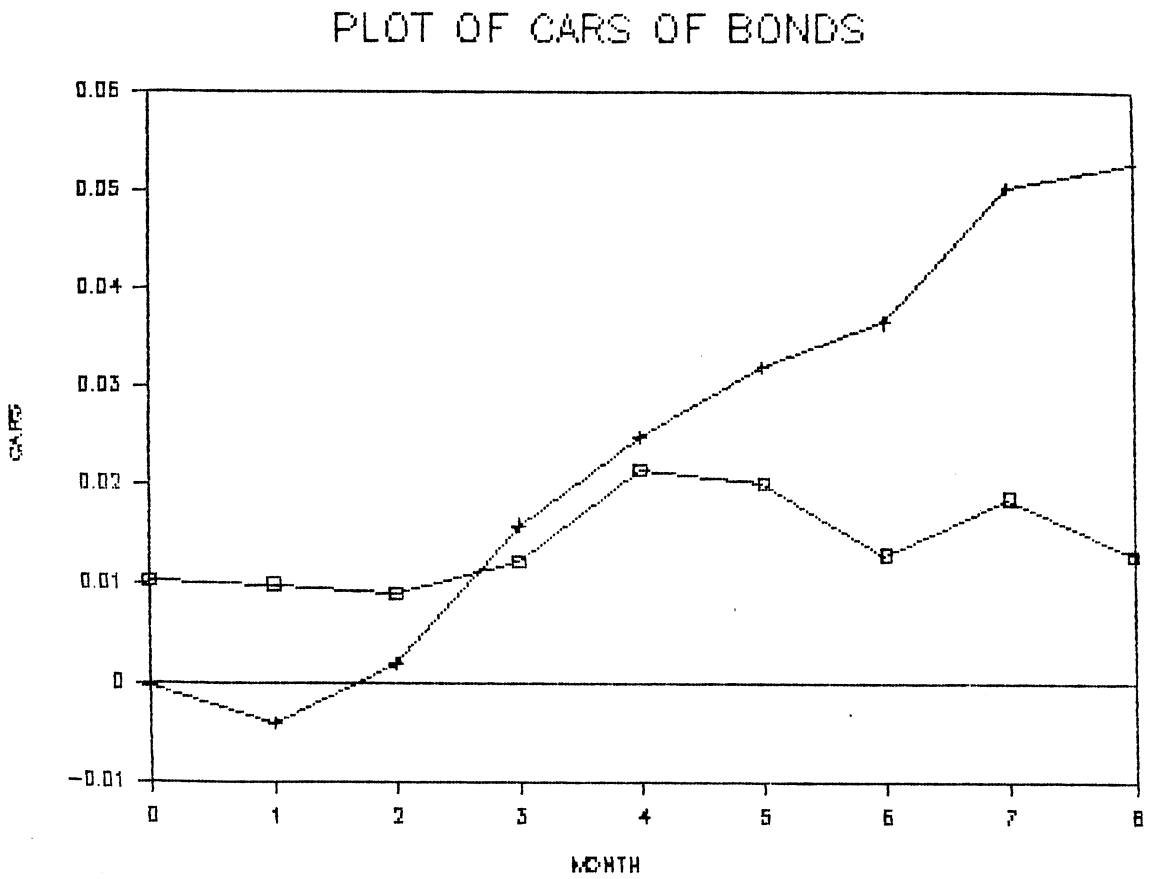

Figure 1. Plot of CARS of bonds.

LEGEND:

CARS of bonds with actual debt ratios GE potential debt ratio.

CARS of bonds with actual debt ratios LT potential debt ratio.

6. In a few cases where the quotes from the two sources differed widely, the respective bond issues were excluded from the sample.

7. Only those bonds with price data available are included in the sample of 146 bonds. A merger remains in the sample so long as complete price data is available for at least one of its bonds.

8. Convertible bonds are included in the sample only if they are convertible into the common stock of the acquired/acquiring firm. In the case of the acquired firm, after the merger, the bonds should be convertible into the common stock of the acquiring company according to the terms of merger. This is done to maintain homogeneity of the convertible bond group. Since the conversion option in convertible debt will be less (more) valuable following a stockholder to bondholder (bondholder to stockholder) wealth transfer, we expect the presence of conversion feature to dampen any wealth transfer effects. Both the co-insurance and incentive effect analyses have assumed nonconvertible bonds. However, both effects may affect any senior security including convertible debt. For example, consider two firms with a common stock and convertible debt outstanding. In the absence of synergies, if these two firms merge, then given the diversification effect, the aggregate market value of convertible debt will increase, while the aggregate market value of common stock will decrease. Also, the price of the convertible bond does not have to move in the same direction as that of the common stock. It is quite conceivable that due to co-insurance effect in a merger, the price of the common stock and convertible debt may move in opposite directions.

9. After adjusting for the term structure of interest rates, the comparison mean approach was used to compute the abnormal returns to bondholders. Also, bonds trade infrequently. A bond return was computed only when price data was available for a given month. If no bond price was available for a given month, then a missing bond return was generated for that month. Therefore, the number of bond returns in the sample varies from month to month.

10. We also computed another potential debt ratio in market value terms; after adjusting for the market value of debentures, the remaining debt was added back in book value terms to derive a hybrid ratio.

11. Also, the abnormal returns were computed by redefining t=0 month as month of merger and post merger financial year month. The results based on the above groupings do not seem to follow any pattern.

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