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Robert F. Bruner
University of Virginia

YIELD PREMIA ON DEBT IN LEVERAGED BUYOUTS

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Because of their unusual terms, size, and number, leveraged buyouts (LBOs) have emerged as one of the more arresting features in the corporate financial landscape.[1] As yet these have received little attention in the academic literature,[2] though popular commentators offer an almost uniformly negative view. One prominent criticism is that banks and institutional investors are showing too little pricing discipline for such a risky lending activity. One financial executive, for example, suggested that "banks are rushing in and bidding recklessly for leveraged buyout business."[3] If such criticisms are true, they suggest an imperfection in the capital markets.

Closer scientific scrutiny of LBO financing seems warranted. As yet there is no published scholarly research on this subject. The objective of this study is to shed some light on the pricing of debt issued in leveraged buyouts. Specifically, it compares the yield premia on LBO debt to the yield premia predicted by a sample of high-yield (i.e., "junk") bonds. This comparison affords a test both of the conventional assertion that yields are inadequately low and of the possible existence of an LBO debt clientele.

The following section considers the methodological problem of testing the pricing of LBO debt and discusses the groundwork afforded by previous researchers. Section 2 describes the estimation procedures for the premium prediction models. Actual and predicted premia are compared in Section 3, and possible structural differences in the pricing of junk and LBO debt are analyzed. Section 4 concludes the paper with a summary of findings and a discussion of implications for other research.

Studies of Debt Pricing

Modern research methods afford at least four possible alternatives for judging the adequacy of debt prices. Two of these, capital asset pricing and Monte Carlo simulation, are precluded from use in our case by the unavailability of forecasts or **ex post** trading data about the LBO target. A third method, measuring the relative bankruptcy rate or bankruptcy costs, is precluded by our brief experience with LBOs.[4] Fortunately, the fourth alternative, yield-premium estimation based on firm and issue characteristics, is both empirically feasible and well known. Since previous research offers some direction on the testing of LBO debt yields, it is appropriate to review briefly this work.

The literature largely begins with Fisher's [11] classic study of the determinants of risk premia on corporate bonds. Cross-sectionally analyzing data on a large sample of industrial corporate bonds for the years 1927, 1932, 1937, 1949, and 1953, he found that four variables account for about three-fourths of the variance in the logarithm of risk premium and that the elasticity of risk premium with respect to these variables is relatively stable over time. The four variables were earnings variability, period of solvency, equity/debt ratio, and amount of bonds outstanding. The risk premium was measured by subtracting the yield on a Treasury security maturing in the same year. Given the stability of coefficients, Fisher pooled the observations across time and found an adjusted r-squared of .741. For the annual models, the r-squared varied from .721 to .786.

Fisher's approach was implicity criticized for assuming that the maturity of the bond and macroeconomic effects do not matter. Studies by Robinson [25], Johnson [18], and McInish [22] suggest that maturity matters significantly. And time-series studies by Yawitz [30], Jaffee [16], and Forbes and Peterson [12] found that risk premia varied directly with the level of Treasury yields. Indeed, numerous studies generally support the finding that risk premia tend to be smaller in buoyant economic periods, and larger in recessionary periods (e.g., Jaffee [16], Van Horne [29], Sloane [26], and Benson and Rogowski [2]).

Another line of criticism of Fisher's work is that it omitted variables which appear to have an influence on yields and risk premia, such as call provision and security status. Studies by Cohan [6], Silvers [27], Fair and Malkiel [10], and Pye [24] show the significance of these effects. And a study by Boardman and McEnally [4] revealed that rating category, industrial classification of the issuer, existence of a sinking fund provision, security status, probability of call, bond beta, and measure of marketability helped explain the price of the bond. The r-squared on their estimated equations was generally above .90.

Virtually all of the debt issued in connection with LBOs has been privately placed. Perhaps the seminal study of the effect of private placement on bond yields is by Cohan [5]. He found that yields on directly placed debt were 6 to 80 basis points higher than on comparable publicly placed debt, but that this difference varied by year and, inversely, with risk. In other words, the public is willing to pay a premium for higher-quality issues, and exacts a penalty (i.e., higher risk premium) for lower-quality issues. He also found that the determinants of yield were total pro-forma interest, size of company (as measured by total capital), earnings before interest and taxes, and size of issue. Variables such as type of security, industrial class, years non-refundable, and maturity were significant but did not have much impact on yield. Shapiro and Wolf [28] report yield differentials varying between 18 and 36 basis points. Hayes, Joehnk, and Melicher [14] report a differential of 46 basis points. They find that in modeling the risk premium on privately placed debt the following variables are significant: issue size, security, years to maturity, and times interest earned. Variables that were not significant were earnings before interest and taxes (EBIT) trend, EBIT variability, long-term debt to assets, and EBIT to assets. The r-squared for their equation was .129—surprisingly low, given the relatively greater r-squareds of other researchers.

Research Methodology

Abstracting from the bond pricing literature, 18 variables were identified that might explain the risk premium. These are defined in Table 1. Against various combinations of these variables the yield premium of each junk issue is regressed. The objective was to obtain the best predictive model of risk premia defined in terms of the coefficient of determination (r-squared), F-statistic, reasonableness of coefficient signs, and parsimony of variables.[5] I pursued this objective through two alternative routes: (a) an intuitive approach using variables significant in previous research and (b) the use of an "all possible combinations" regression package, which determined the best model based on Mallow's Cp statistic.[6] In addition, models were estimated on both a pooled (i.e., 1981-1984) basis and an annually disaggregated basis (i.e., re-estimated for the individual years). In sum, four predictive models were developed: a) intuitive pooled; b) intuitive disaggregated; c) best estimates pooled; and d) best estimates disaggregated.

TABLE 1

Definition of Variables Used In Predictive Models

Variable	Definition
COVG	A measure of interest coverage. Mean net operating income for the past nine years, divided by projected interest expense for the next fiscal year.
EA	A measure of leverage. Book value of common equity divided by total assets.
DI1	Equals 1 if the issuer is in a capital goods industry, otherwise zero.
DI3	Equals 1 if the issuer is in a service, retailing, or working-capital-intensive industry, otherwise zero.
DLBO	Equals 1 if the issuer is the target of an LBO, otherwise zero.
LTLTD	Natural logarithm of total long-term debt.
MAL	Maximum average life of the issue in years.
MEAN	Mean net operating income over the past nine years.
SFBM	Sinking fund by maturity, in millions of dollars. Portion of the issue unamortized by maturity.
SUBORD	Equals 1 if the issue is subordinated.
TLTD	Total long-term debt.
TREAS	Yield to maturity on a U.S. government Treasury issue of similar average life to the LBO or junk debt issue.
YTC	Number of years for which the issue is call-protected.

The control sample for this study consisted of 267 new issues of low grade debt (rated BBB or lower) issued between 1981 and 1984 inclusive. These issues and details about them were provided by Securities Data Company. Because of missing information there were only 68 cases with complete information on all the variables listed in Table 1. The sample of LBO debt issues was developed as follows. First, a list of 97 leveraged buyouts occurring between 1981 and 1984 inclusive was obtained from the mergers data base at **Mergers and Acquisitions** magazine. For each buyout, the proxy statement filed with the SEC was inspected for the terms of debt financing such as interest rates, call provisions, amortization, subordination, and security, as well as for financial characteristics of the firm **pro forma** the buyout. At least partial information on 67 debt issues was obtained. These issues form the test sample.

The spread or yield premium was calculated as follows:

$$(1) \qquad \pi = i_{HY} - i_{TC}$$

Where: π = Spread or yield premium

i_{HY} = Yield to maturity on the high-yield issue.

i_{TC} = Yield to maturity on a Treasury issue of equivalent average life.

The exact definitions of other variables used in the premium estimation model are given in Table 1.

Intuitive Model

Table 2 presents the estimates for the model developed by the intuitive approach. This model contains variables that are specific to the design of the individual security (MAL, SUBORD, SFBM, and YTC), capture current capital market conditions (TREAS), describe the industry (DI3), and describe the **pro forma** capitalization of the firm (LTLTD). Of these, only TREAS and SFBM are statistically significant. The sign and significance of TREAS is consistent with the study by Emery and Cogger (1985), who modeled the yield premia on commercial paper. In general, the significance of Treasury yield is consistent with the observation of a "flight to quality" during periods of high interest rates. The positive and significant sign on SFBM is also consistent with intuition in that the larger the value of SFBM, the more the unamortized debt principal by maturity. The insignificance of the other variables is surprising, though in each case they are of the expected sign.

The results of the pooled model generally remain consistent even when the model is re-estimated over annual periods. Treasury yield remains positive and significant throughout the years. SFBM, however, is positive and significant only in 1981, 1982, and 1984. In 1983 SFBM is estimated to be negative and insignificant. Other variables remain insignificant in the annual re-estimates.

The explanatory power of the intuitive model estimate, as measured by the r-squared of .596, is consistent with the studies of other researchers reviewed in Section 1. When the estimates of the model are disaggregated by year, the r-squared rises as high as .801, and in three of the years is higher than the estimate of the pooled equation.

"Best Estimates" Regression Model

As a check against possible researcher bias, yield-premium models were estimated using an "all possible combinations" regression software package.[7] From these the software determined the best model as being that which achieved the lowest score of Mallow's Cp. These estimates, based on pooled and annual data, are presented in Table 3.

The estimates based on pooled data are presented in the first group of estimates. The sign and significance of Treasury yield and SFBM are consistent with the

Table 2

Estimated Regression Coefficients Derived from Trial-and-Error Approach

Model: $\pi_i = a + b_1 (TREAS) + b_2 (MAL) + b_3 (SUBORD) + b_4 (DI3) + b_5 (SFBM) + b_6 (YTC) + b_7 (LTLTD) + e_i$

(t-statistics are presented in parentheses.)

Observation Period	a	b_1	b_2	b_3	b_4	b_5	b_6	b_7	Adjusted r-square	F	N.OBS
1981-1984	−589.99	54.16	1.90	23.15	15.66	1.18	2.79	−3.64	.596	32.2	149
	(−6.73)	(10.84)	(1.13)	(1.11)	(.69)	(4.70)	(1.30)	(−.525)			
1981	−1181.63	88.25	3.34	−20.4	−36.4	1.15	4.57	−7.82	.801	21.07	36
	(−7.00)	(8.46)	(.99)	(−.48)	(−.70)	(2.19)	(1.07)	(−.64)			
1982	−613.91	57.47	−.803	14.17	−27.67	1.51	1.26	2.99	.544	8.34	44
	(−2.63)	(4.41)	(−.169)	(.21)	(−.41)	(2.14)	(.25)	(.14)			
1983	−1088.23	95.96	2.04	67.56	2.65	−.101	−.26	2.89	.739	13.96	33
	(−5.69)	(7.36)	(1.17)	(2.88)	(.102)	(−.36)	(−.12)	(.311)			
1984	−587.66	60.32	−4.13	−11.8	19.84	1.07	3.28	−7.55	.628	9.44	36
	(−2.37)	(4.15)	(−.89)	(−.44)	(.756)	(2.45)	(.40)	(−.874			

estimates under the intuitive approach. But also included is a third factor, MEAN, the average operating income of the firm for the past nine years. MEAN is significantly positive, suggesting a positive relation between size and yield premium. The adjusted r-squared for the pooled model is .646, marginally better than the estimates under intuitive approach.

When the models are re-estimated by year, there is a substantial change in the composition of the model. For instance, in 1981, the "best" model has four factors, SFBM, TLTD, and the two industry dummy variables, DI3 and DI1. Treasury yield does not appear in the equation. SFBM has a sign consistent with all previous estimates. TLTD is positive and significant, suggesting a positive relation between total debt outstanding and yield premium. And the two industry dummies are significant and negative. The r-squared for the 1981 estimate is .79.

The following year, 1982, shows a three-factor model, including YTC, SFBM, and DI1. SFBM and DI1 are consistent with previous estimates. YTC is significant

Table 3
Best Estimates Under
All-Possible-Subsets Regression

Observation Period	Variable Name	Estimated Coefficient	t-statistic	Mallow's Cp	Adjusted r-squared	F	N.OBS
1981-1984	INTERCEPT	−486.64	−5.66				
	SFBM	1.45	5.05				
	TREAS	47.49	8.34	−3.97	.646	41.8	68
	MEAN	.22	2.12				
1981	INTERCEPT	461.44	7.28				
	SFBM	2.66	6.07				
	TLTD	.126	5.99	−.54	.790	17.9	19
	DI1	−300.2	−4.33				
	DI3	−237.6	−3.16				
1982	INTERCEPT	567.19	4.82				
	YTC	−26.52	−2.27	−.04	.640	9.32	15
	SFBM	2.89	4.04				
	DI1	−232.18	−3.07				
1983	INTERCEPT	−1131.36	−7.34				
	TREAS	100.80	8.77	−1.44	.842	46.31	18
	SUBORD	80.99	3.69				
1984	INTERCEPT	−918.09	−4.33	−1.86	.675	32.24	16
	TREAS	80.19	5.68				

with a negative sign, suggesting that the lower the risk of being called, the lower the yield premium. The r-squared in this model is .64.

The models for 1983 and 1984 are considerably shorter. Both include Treasury yield as a positive effect. The 1983 model includes the subordinated dummy variable, which appears to add 81 basis points at the margin. In 1984, Treasury yield is the only factor. The r-squared is .842 in 1983 and .675 in 1984.

In short, the all-possible-subsets regression approach yields predictive models rather different in form from the intuitive approach. In addition, it is found that the "best" model can vary rather significantly when estimated on a non-pooled annual basis. However, in terms of general explanatory power, both approaches provide generally similar results; the adjusted r-squareds of this study are of similar magnitude to the unadjusted r-squareds of other researchers reviewed in Section 1.

Empirical Results

Predicted and Actual Yield Premium

The pooled and non-pooled versions of the trial-and-error and all-possible-subsets regression estimates were used to predict the yield premia on leveraged buyout debt. These predicted premia were then tested for the significance of difference using a paired sample t-statistic. The actual and predicted risk premia and paired sample t-statistics are presented in Table 4.

Table 4

Actual and Predicted Yield Premiums (Basis Points)

	Yield Premium	Difference From Actual	t-statistic
Actual	283.5	--	--
Predicted			
1. Deterministic Model, Pooled	93.38	190.1	7.99
2. Deterministic Model, By Year	74.2	209.3	8.51
3. Best Estimates Model, Pooled	91.6	191.9	8.00
4. Best Estimates Model, By Year	128.1	155.4	5.76

The yield premia on leveraged buyout debt are found to average 155 to 209 basis points higher than predicted by the models. The associated paired-sample t-statistics ranged from 5.76 to 8.51, indicating a significant difference above the .001 level.

The average residuals were partitioned by seniority and type of debt in an attempt to determine whether the deviation from predicted values originated in particular segments of the capital structure. Table 5 presents the average residuals by debt category.

The tabulation shows that residual yield premia are relatively small in the bank loan (82 basis points) and senior-secured (15 basis points) categories. On the other hand, the residuals in the senior-unsecured and subordinated categories are 226 and 312 basis points, respectively. An F-test of this partition gives a statistic of 3.64, indicating significance at the .017 level. The characteristic which explains the magnitude of residual yield premia is the presence of a secured claim on the assets. Whether residuals of 82 or 15 basis points above junk bond yields are "fair" is beyond the scope of this paper. But since junk issues are rarely secured, the residuals imply that LBO yields on secured debt are not **below** those of junk debt. The same may be said for the more comparable senior-unsecured and subordinated categories.

Table 5

Differential Yield Premium
Partitioned by Type of Credit
Based on Best-Estimates Model, By Year

	Differential Yield Premium (Basis Points)	N.OBS
Bank Loan (Senior, Secured)	82.06	33
Other Senior, Secured	15.02	2
Senior Unsecured	311.89	5
Subordinated	226.48	27
TOTAL	155.4	67

F-statistic = 3.64*

*Significant at .017 level

Clientele Effect: Test of Homogeneity of Pricing

The striking findings of the preceding section invite further examination. If LBO debt and junk debt are of roughly comparable risk, what might explain the higher yields on LBO debt? One hypothesis is that **all** LBO debt is simply priced to yield a higher rate regardless of the features of the issues or the issuer. This would hold, for instance, if LBO debt and junk debt are priced in different segments of the capital market. **A priori** this is a reasonable expectation since virtually all LBO debt is privately placed, since our sample of junk issues are public placements. Cohan [5] found that yields on privately-placed debt are uniformly higher than publicly-placed debt. Thus, the higher yields might simply reflect the difference between yields in the publicly- and privately-placed debt markets. The higher yields might reflect the scarcity of investors who are sophisticated enough to understand and are willing to invest in LBOs. This hypothesis, which I call the **Generic Effect Hypothesis**, would predict that in a regression of yield premia against explanatory variables, junk and LBO issues would have significantly different intercepts.

A second possible hypothesis is that LBO issues will be priced significantly differently, based on **certain** (i.e., not all) features. This too might be termed a clientele effect. This hypothesis suggests that investors "price" certain fundamental determinants of risk differently with respect to LBO debt as compared to junk debt. The first hypothesis holds that it is the LBO **per se** which the credit markets price differently; this hypothesis holds that it is risky fundamentals in the context of an LBO which are priced differently. For example, Miller [23] has presented a rationale for the existence of leverage clienteles, where investors with low tax exposure prefer to invest in firms with high debt. Kim, Lewellen, and McConnell [19] find a small but significant leverage clientele effect. Perhaps there are leverage clientele effects in the debt markets. If the **Fundamental Risk Hypothesis** is true, being an LBO target will interact with those fundamental features to produce a significant effect on the yield premium (i.e., a shift in the slope coefficients).

The **Null Hypothesis** is that the yield premia are determined by specific characteristics which are priced the same regardless of whether the debt is a junk or LBO issue. Under this hypothesis, the intercept terms would not be significantly different, nor would the interaction effects be material. This result would be inconsistent with the existence of an LBO debt clientele.

A test of the comparative strength of these hypotheses requires a premium prediction model which includes three kinds of factors. First, it must include the usual firm and issue-specific variables, such as those listed in Table 1, which were used in the premium prediction models. Under the null hypothesis, only these variables will have any significance in predicting the yield premia of both issues.

Second, the model must include a dummy variable (DLBO) indicating whether the individual debt issue is related to an LBO. Under the generic effect hypothesis, the coefficient of this variable will be significant.

Third, the model must include interaction effects between the LBO variable and the firm- and issue-specific variables. These variables are computed as the product of DLBO and the fundamental variables. Under the fundamental effect hypothesis, all or some of the coefficients on these variables will be significant.

To restate the test design in econometric terms, the LBO dummy variable and interaction terms test for a shift in the estimated coefficients due to the type of issuer, LBO versus conventional. Significance of these coefficients would indicate that LBO yield premia are affected differently than junk bond premia.

The resulting explanatory model is given at the top of Table 6. To estimate this model the samples of LBO and non-LBO issues were combined into one sample. The model was estimated from 124 observations for which there was complete information on the variables in this model.

Table 6 presents the estimates of this model. Among the main effects, Treasury yield and SFBM are positive and significant, consistent with the models described in Section 2. More significantly, the leveraged buyout dummy variable is not significant, suggesting that the yield-premium residuals described in Section 3.1 are not due to generalized higher yield premia on leveraged buyout debt.

Instead, the interaction effects presented in Table 6 show that the higher yield premia in leveraged buyout debt are signficantly affected by subordination and pro forma capital structure. Subordination in leveraged buyouts adds 174 basis points on average ($t=2.73$). And yield premia vary inversely with the equity-to-assets ratio ($t=2.07$).

Table 6

Estimated Regression Coefficients

Model: $\pi = a + b_1 (DLBO) + b_2 (TREAS) + b_3 (YTC)$
$+ b_4 (SFBM) + b_5 (MAL) + b_6 (SUBORD)$
$+ b_7 (DI3) + b_8 (COVG) + b_9 (TLTD) + b_{10} (EA)$
$+ b_{11} (DLBO*TREAS) + b_{12} (DLBO*YTC)$
$+ b_{13} (DLBO*SFBM) + b_{14} (DLBO*MAL) + b_{15} (DLBO*SUBORD)$
$+ b_{16} (DLBO*DI3) + b_{17} (DLBO*COVG)$
$+ b_{18} (DLBO*TLTD) + b_{19} (DLBO*EA) + e$

Variable	Coefficient	Estimate	t-statistic
CONSTANT	a	−499.98	−3.09***
DLBO	b_1	151.81	.59
TREAS	b_2	46.39	4.44***
YTC	b_3	7.32	.80
SFBM	b_4	1.29	2.51*
MAL	b_5	−.41	−.08
SUBORD	b_6	12.11	.31
DI3	b_7	22.65	.52
COVG	b_8	−1.29	−.14
TLTD	b_9	.00001	.44
EA	b_{10}	16.94	.10
L*TREAS	b_{11}	11.90	.64
L*YTC	b_{12}	−4.56	−.43
L*SFBM	b_{13}	−66.33	−1.13
L*MAL	b_{14}	−14.31	−1.60
L*SUBORD	b_{15}	174.10	2.73**
L*DI3	b_{16}	22.97	.33
L*COVG	b_{17}	34.11	.87
L*TLTD	b_{18}	.00006	1.20
L*EA	b_{19}	−519.71	−2.07*

Adjusted r-squared	.372
F-statistic	4.83
Standard Error of the Estimate	142.29
Number of Observations	124

***Significance Better Than .005
**Significance Better Than .01
*Significance Better Than .04

On the basis of these results, the null and generic effect hypotheses are rejected. However, we cannot reject the fundamental risk hypothesis. This suggests that the positive residual yield premia on LBO debt over junk debt presented in Table 4 are not attributable to naive pricing behavior by investors—i.e., requiring higher returns on LBO debt **per se** rather than fundamental differences between LBO debt and non-LBO high-yield debt. Instead, the results suggest that investors price certain fundamental determinants of risk differently in LBO debt as compared to other issues.

Summary and Conclusions

This study of the yield premia on leveraged buyout debt was prompted by an interest in the conventional perception that investors in these issues are not compensated for the risk which they assume. This is an interesting issue not only because of the current prominence of the LBO phenomenon, but also because the determinants of yield premia in the low-quality end of the debt markets are largely unexplored.

A straightforward test of risk-adjusted returns on LBO debt is infeasible due to the limited information on issuers and issues of LBO debt. Virtually the only standard of comparison is the return on other (i.e., non-LBO) low quality debt issues. Accordingly, a yield-premium prediction model was estimated from a sample of new-issue, low-grade debt. Four such models were estimated, two from a pooled sample and two from annual samples. The explanatory power of these models, measured by adjusted r-squared, is comparable to the models of other researchers on debt premia. The data for leveraged buyouts were used in these models to predict yield premia. The actual and predicted yield premia were compared.

The principal findings of this study are as follows:

- Yield premia on leveraged buyout debt range from 155 to 209 basis points higher than the premia consistent with other low-grade debt. Paired-sample t-statistics show a highly significant difference between the predicted and actual premia.
- Type of security (bank loan, senior-secured, senior-unsecured, and subordinated) explains significant variation in the yield-premium residual. Unsecured and subordinated issues show residuals of 312 and 226 basis points. Bank loan and senior-secured issues show residuals and 82 and 15 basis points, respectively.

Superficially, by the standard of other low-grade debt, the yields on LBO debt appear to be supernormal. This finding contrasts with the conventional thinking that adjusting for risk, returns on LBO debt are unattractive. However, these positive residual premia raise the possibility that LBO debt simply is priced differently by investors; for instance, there exist clienteles of limited numbers of investors who are willing to invest in LBO debt and require higher yields than on junk issues. To test this possibility a model was estimated using the combined sample of LBO debt and other low-grade issues. The estimates revealed that:

- Leveraged buyout yield premia are higher on average than premia on junk debt because of differences in pricing subordination and capital structure risk. We cannot reject the possibility of subordination and leverage clienteles.

These findings present a challenging picture of leveraged buyout financing. By a simple standard of comparison, it does not appear to be **less** attractive to invest in leveraged buyout debt as opposed to other issues of low-grade securities. However, the findings also suggest that investors in the market for leveraged buyout securities price specific aspects of the LBO issue and issuer differently than do other sectors of the fixed-income securities market price conventional issues.

Unfortunately, the possible clientele effect complicates the bottom-line conclusion. If there is an LBO debt clientele, it will be necessary to model its required yield premium rather than take the yield premium on junk debt as the standard of comparison. To do this, many more observations and much more information will be required than are presently available. However, until that time, we can at least observe that LBO debt premia are not low compared to other investments in the same general risk class. This conclusion, at least, affords a fresh perspective on the LBO phenomenon and particularly on the comparison to LBO creditors.

To explore further the origins of the clientele effect is beyond the scope of this study. But the findings herein invite future research about the consistency and rationality of pricing in the low-grade end of the debt market and about the possible existence of investor clienteles who may have a special appetite for the risk-return characteristics of LBO debt.

Footnotes

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[1]W.T. Grimm and Company estimated that in 1979 the value of firms going private was $636 million. By 1985 **U.S. News and World Report** estimated the value of leveraged buyouts to be $24.6 billion. (**U.S. News and World Report**, November 18, 1985.)

[2]To date, the only published empirical study of leveraged buyouts, by DeAngelo **et al.** [8] focused on the returns to selling shareholders. Lowenstein [21] summarizes many of the criticisms of buyouts.

[3]Robert Miller of Congress Financial Corp., quoted in "Fearing New Loan Troubles, Banks Start to Sour on Leveraged Buyouts," in **Wall Street Journal**, May 8, 1984. See also "On a Buyout Binge and a Takeover Tear," by Felix Rohatyn in **Wall Street Journal**, May 18, 1984; "The Leveraging of America," by John S. R. Shad in **Wall Street Journal**, June 8, 1984; and "Who's Got the Leverage," by the Editors, **Wall Street Journal**, June 21, 1984.

[4]This method is used prominently in research on the high-yield segment of the bond market. See Blume and Keim [3], Hickman [15], Atkinson and Simpson [1], Fraine and Mills [13], and Johnson [18].

[5]In addition to using the yield premium as the dependent variable, the relative risk premium was used, following Lamy and Thompson [20]. But the resulting estimates were immaterially different, and for brevity are not presented here.

[6]Mallow's Cp is discussed in Daniel and Wood ([7], P. 86) and is computed as:

$$C_p = \frac{RSS}{S^2} - (N - 2_p)$$

Where: RSS = Residual sum of squares for the best subject being tested.

S^2 = residual mean square based on the regression using all independent variables.

P = Number of variables in the best subset including the intercept.

N = Number of cases.

Best is defined as the smallest Cp.

[7]The "all possible combinations" regression software package used was that of BMDP Statistical Software, Published by University of California Press, 1983.

References

1. Atkinson, Thomas R., and Elizabeth T. Simpson, **Trends in Corporate Bond Quality**. New York: National Bureau of Economic Research, 1967.
2. Benson, Earl D. and Robert J. Rogowski, "The Cyclical Behavior of Risk Spreads on New Municipal Bonds," **Journal of Money Credit and Banking** (August 1978): 348-62.
3. Blume, Marshall E. and Donald B. Keim, "Risk and Return Characteristics of Lower-Grade Bonds," Unpublished Paper, Rodney L. White Center for Financial Research, Wharton School, University of Pennsylvania, 1984.
4. Boardman, Calvin M. and Richard W. McEnally, "Factors Affecting Seasoned Corporate Bond Prices," **Journal of Financial and Quantitative Analysis**, 16 (June 1981): 207-26.
5. Cohan, Avery B., **Yields on Corporate Debt Directly Placed.** New York: National Bureau of Economic Research, 1967.
6. Cohan, Avery B., "Yields on New Underwritten Corporate Bonds, 1935-48," **Journal of Finance**, 17 (December 1962): 585-605.
7. Daniel, C. and F.S. Wood, **Fitting Equations to Data**. New York: Wiley, 1971.
8. DeAngelo, Harry, Linda DeAngelo, and Edward Rice, "Going Private: Minority Freezeouts and Stockholder Wealth," **Journal of Law and Economics**, 27 (1984): 367-401.
9. Emery, Gary W. and Kenneth O. Cogger, "Yield Premiums on Commercial Paper," Unpublished Paper, Indiana University, 1985.
10. Fair, Ray C. and Burton G. Malkiel, "The Determination of Yield Differentials Between Debt Instruments of the Same Maturity," **Journal of Money, Credit, and Banking**, 3 (November 1971): 733-49.

11. Fisher, Lawrence, "Determinants of Risk Premiums on Corporate Bonds," **Journal of Political Economy**, 67 (June 1959): 217-37.

12. Forbes, J. R. and J. E. Peterson, **Costs of Credit Erosion in the Municipal Bond Market**. Chicago: Municipal Finance Officers Association, 1975.

13. Fraine, Harold G. and Robert G. Mills, "Effects of Defaults and Credit Deterioration on Yields of Corporate Bonds," **Journal of Finance**, 16 (September 1961): 423-34.

14. Hayes, Patrick A., Michael D. Joehnk, and Ronald W. Melicher, "The Differential Determinants of Risk Premiums in the Public and Private Corporate Bond Markets," **Journal of Financial Research**, 2 (Fall 1979): 143-52.

15. Hickman, W. Braddock, **Corporate Bond Quality and Investor Experience**. Princeton: Princeton University Press, 1958.

16. Jaffee, Dwight M., "Cyclical Variations in the Risk Structure of Interest Rates," **Journal of Monetary Economics**, 1 (July 1975): 309-25.

17. Joehnk, Michael D. and James F. Nielsen, "Return and Risk Characteristics of Speculative Grade Bonds," **Quarterly Review of Economics and Business**, 15 (Spring 1975): 27-46.

18. Johnson, Ramon E., "Term Structures of Corporate Bond Yields as a Function of Risk of Default," **Journal of Finance**, 22 (May 1967): 313-45.

19. Kim, E. Han, Wilbur Lewellen, and John McConnell, "Financial Leverage Clienteles: Theory and Evidence," **Journal of Financial Economics** (March 1979): 83-110.

20. Lamy, Robert E. and G. Rodney Thompson, "Risk Premia on Primary Issue Bonds," Unpublished Manuscript, Virginia Polytechnic Institute and State University, 1986.

21. Lowenstein, Louis, "Management Buyouts," **Columbia Law Review**, 85 (May 1985): 730-784.

22. McInish, Thomas H., "Behavior of Municipal Bond Default-Risk Premiums by Maturity," **Journal of Business Research**, 8 (1980): 413-18.

23. Miller, Merton, "Debt and Taxes," **Journal of Finance**, (May 1977): 261-275.

24. Pye, Gordon, "The Value of Call Deferment on a Bond: Some Empirical Results," **Journal of Finance**, 22 (December 1967): 623-36.

25. Robinson, Roland I., **Postwar Market For State and Local Government Securities**. New York: National Bureau of Economic Research, 1960.

26. Sloane, Peter, "Determinants of Bond Yield Differentials," **Yale Economic Essays** (Spring 1963): 2-55.

27. Silvers, J. B., "An Alternative to the Yield Spread as a Measure of Risk," **Journal of Finance**, 28 (September 1973): 933-55.

28. Shapiro, Eli and Charles R. Wolf, **The Role of Private Placements in Corporate Finance**. Cambridge: Harvard University Graduate School of Business Administration Division of Research, 1972.

29. Van Horne, James C., "Behavior of Default-Risk Premiums for Corporate Bonds and Commercial Paper," **Journal of Business Research**, 7 (December 1979): 301-13.

30. Yawitz, Jess B., "Risk Premia on Municipal Bonds," **Journal of Financial and Quantitative Analysis**, 13 (1978): 475-86.

Robert F. Bruner is an Associate Professor in the Colgate Darden Graduate School of Business Administration at the University of Virginia.