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Source: *The Journal of Finance*, Vol. 40, No. 2 (Jun., 1985), pp. 537-548
Published by: Blackwell Publishing for the American Finance Association
Stable URL: http://www.jstor.org/stable/2327899
Accessed: 26/11/2009 08:39

THE JOURNAL OF FINANCE • VOL. XL, NO. 2 • JUNE 1985

Return, Risk, and Yield: Evidence from Ex Ante Data

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ABSTRACT

The purpose of this study is to investigate the relationship between return and yield in the context of ex ante data from *The Value Line Investment Survey* and by examining the role of dividends as a proxy for risk. The use of ex ante data should substantially reduce the confounding of tax and information effects that has affected earlier studies. Heteroscedasticity is detected in the after-tax CAPM and found to be negatively related to yield and positively related to beta. Maximum likelihood methods are used to correct for heteroscedasticity and generate efficient coefficient estimates. Using data for each of the years 1973 through 1983, there is an overall positive relationship between expected return and yield. However, coefficient estimates of yield are highly variable from year to year.

THE RELATIONSHIP BETWEEN DIVIDEND yields and security returns is currently a subject of extensive research in finance. Empirically, a positive relationship is found by Blume [5], Gordon and Bradford [12], Elton, Gruber, and Rentzler [11], Litzenberger and Ramaswamy [24–26], and Rosenberg and Marathe [34], among others. No significant relationship is found by Black and Scholes [4] and Miller and Scholes [28]. However, several questions have arisen concerning the interpretation of these results. For example, Green [13], Kalay [20], Lakonishok and Vermaelen [23], and Miller and Scholes [28] question whether tax effects can be inferred from short-run yield measures around ex-dividend dates.[1] Concerns include the confounding of tax and information effects, the role played by short-term traders and tax exempt institutions, and the possibility that tax effects may influence returns over a lengthy period of time (more than a month). To help resolve these problems, Miller and Scholes [28] suggest employing long-run expectational data in empirical tests. Another problem with inferring tax effects from yield measures, noted by Hess [16] and Summers [35], is the possibility that dividends may be a proxy for non-tax-related variables such as risk and expected return.

The purpose of this study is to investigate the empirical relationship between stock returns and yield in the context of long-run expectational data after adjusting for risk-related factors. Thus, an attempt is made to deal with potential problems in earlier empirical tests. To accomplish this objective, long-run expectational data on return and yield from *The Value Line Investment Survey* are employed in this analysis. Such measures should be primarily free of information

* Both authors from Florida State University. We would like to thank an anonymous referee and associate editor for helpful comments.

[1] In this context, short term refers to a month or less.

effects. The potential for dividends to proxy for other factors, especially risk, is dealt with in two ways. First, heteroscedasticity is explicitly modeled in the empirical analyses as a function of both beta and yield. If, for example, residual variance is related to yield, then yield may be serving as a proxy for risk not explicitly modeled in a homoscedastic specification. An incorrect homoscedastic specification leads to inefficient estimators and incorrect tests of significance. Second, firm size is included as an explanatory variable. Several studies, including Banz [1], Reinganum [30–32], Keim [22], and Brown, Kleidon, and Marsh [9], find that size is a significant factor in asset pricing models, perhaps because it is a proxy for risk.[2] Keim [21] finds that the inclusion of size alters the relationship between return and yield. Thus, employing ex ante data, and adjusting for heteroscedasticity and size, may better reveal tax factors in security pricing.

This study is developed in the following sections. A description of the data is presented in Section I. The empirical methodology is described and results are reported in Section II. Concluding comments are provided in Section III.

I. Data

The equation that serves as the foundation for the empirical analyses to be performed is the after-tax capital asset pricing model (CAPM) developed by Brennan [7] and extended by Litzenberger and Ramaswamy [24]:

$$E(\tilde{R}_i) = \gamma_0 + \gamma_1\beta_i + \gamma_2 E(\tilde{Y}_i) \qquad (1)$$

where $E(\tilde{R}_i)$ is the expected excess return (return minus the risk-free rate) of security i, β_i is the beta coefficient of security i, and $E(\tilde{Y}_i)$ is the expected dividend yield of security i less the risk-free rate. The gammas are coefficients, where γ_1 represents the marginal effect of systematic risk and γ_2 represents the marginal effect of dividend yield.

Expectational data should be employed in empirical tests of Equation (1) not only because the model is inherently ex ante in nature, but also to reduce the chances of confounding tax and information effects.[3] In an effort to deal with the desirability of obtaining long-run expectational information, ex ante data for individual companies are drawn from *The Value Line Investment Survey.* One aspect of Value Line's review for each company is that it forms mean forecasts of selected financial information over a three- to five-year horizon, including an expected annual total return. This measure is used, along with a risk-free rate of interest, to form the variable on the left-hand side of Equation (1). Value Line also forecasts an average three- to five-year figure for dividends per share, and this measure is central to forming the yield variable used in this study.

The average three- to five-year dividend forecast is assumed here to represent expected dividends per share four years in the future. Combining the previous year's known dividends (reported by Value Line) with an assumption that

[2] However, Blume and Stambaugh [6] and Roll [33] find that the method of computing mean returns alters the estimated small firm premium.

[3] Miller and Scholes [28] demonstrate the adjustments necessary to remove information effects from short-run ex post data.

dividends per share are expected to grow at a constant rate over the next four years, the three- to five-year dividend forecasts can be used to calculate expected dividends per share for each of the next four years.[4] With knowledge of the current price (reported by Value Line), expected annual return, and expected dividends, the present value model is used to calculate an expected price for each of the four years to align with expected dividends per share.[5] Dividing each of the four dividend per share forecasts by each of the four price forecasts generates four expected yields, one for each of the next four years. To obtain a representative yield forecast over the next four years, a simple average of the four annual yield measures is taken to form an average yield.[6,7] This average yield measure is the variable employed in the study.

Risk-free rates of interest are treasury security yields to maturity on the security with a maturity closest to four years, as obtained from the *Wall Street Journal*.[8] Betas for each security are taken from Value Line, along with a measure of firm size formed by multiplying the current price times the number of shares outstanding. Excess returns and excess yields are formed by subtracting the risk-free rate from the expected return and yield, respectively.

Value Line regularly reviews each company four times a year, proceeding through four cycles of thirteen issues. For this study, data from the fourth cycle (chronologically corresponding to the fourth quarter) for each of the years 1973 through 1983 are employed. Data from one cycle are pooled into one set of observations. Thus, there are eleven annual samples. In order to roughly align risk-free rates of interest with Value Line data, the risk-free rates are obtained from closing prices the Friday prior to the date of the Value Line publication. This date approximately corresponds with the date of the current price published in Value Line and the date analysts are committed to their forecasts and, thus, is the appropriate date for return and dividend forecasts along with risk-free rates.

All domestic corporations, excluding investment companies and real estate

[4] The growth rate (g) equals $(D_4/D_{-1})^{0.2} - 1$ where D_4 is the annual dividend per share forecast from Value Line for year four and D_{-1} is last year's annual dividend per share. The dividend per share forecast for any future year t ($t = 1, 4$) is equal to $D_{-1}(1 + g)^{t+1}$. If either the previous year's dividends or the expected three- to five-year dividends are zero, then dividends per share are assumed to increase or decrease by a constant dollar amount each year.

[5] For example, for year 2 the forecasted price, P_2, equals $P_0(1 + r)^2 - D_1(1 + r) - D_2$ where r is the expected (annual) rate of return forecasted by Value Line, P_0 is the current market price, and D_1 and D_2 are determined as in footnote 4.

[6] The expected yield (at time 0) for security i, Y_i, $= ¼ \sum_{t=1}^{4} D_t/P_t$ where D and P are expected dividend and price per share, respectively. Note that care has been taken to avoid some of the possible biases noted by Summers [35]. These biases arise when the observed dividends and prices are not synchronized; price, which changes to reflect a different valuation of the firm, is matched with current (and stable relative to the past) dividends, not expected dividends. The bias problem is reduced here through synchronizing dividends and prices by using expected dividends and prices. The expectations of all variables are formed at the same time. These variables are revised, all simultaneously, only in the next cross-section of time. This solution would not have been possible if ex post data had been employed.

[7] It should be noted that forecasts relating to different periods are being mixed and that the mapping of predictions on their theoretical counterparts is approximate at best.

[8] If there are multiple securities with the same maturity then a simple average of the yields is used.

investment trusts, reviewed by Value Line, for which return, yield, and beta information are reported, are included for each annual study, with two minor qualifications. First, securities selling for less than $5 per share are excluded. As noted by Elton, Gruber, and Rentzler [11], stocks under $5 are treated differently by brokerage firms and financial institutions. Since different factors may be affecting the pricing of these securities, they are omitted from the analyses. Second, companies are required to have positive expected returns. The very few companies for which the expected returns are negative are predominantly companies about to be acquired. Although Value Line is aware of the pending acquisitions, they continue to make forecasts for these companies as if they remained a separate entity. The number of companies in each annual sample ranges between 1268 and 1525.

In basing the analyses which follow on Value Line's forecasts, an implicit assumption is made that Value Line's forecasts reflect those of the market as a whole. Although this can never be conclusively proved, there are several factors suggesting that Value Line's forecasts may represent a good source of expectational data. First, Value Line is probably the best known and most widely followed source of investment information and advice. Given that investors are willing to pay to obtain this information, it is likely that many investors will adopt Value Line's expectations as their own. Furthermore, Brown and Rozeff [8] find that Value Line's earnings forecasts are superior to those generated by several statistical models, including those employing Box-Jenkins techniques. A similar finding for dividend forecasts is reported by Woolridge [37]. The usefulness of Value Line's ranking system is documented by Black [3], Holloway [17], and Copeland and Mayers [10]. Thus, the superiority of Value Line's forecasts suggests that they may become widely adopted.

In order to examine the accuracy of Value Line's yield and return forecasts used in this study, the following two cross-sectional regressions are estimated for each of the years 1973–1977 and for a pooled sample over the entire five years:

$$ACTYLD_i = \alpha_0 + \alpha_1 VLYLD_i + \alpha_2 HISYLD_i + e_i \tag{2}$$

$$ACTRET_i = \delta_0 + \delta_1 VLRET_i + \delta_2 HISRET_i + e_i \tag{3}$$

where *VLYLD* and *VLRET* are Value Line's average forecasted yield and return, respectively, for the next four years; *HISYLD* and *HISRET* are historical averages of yield and return, respectively, over the previous four years; and *ACTYLD* and *ACTRET* are the actual future average yield and return, respectively, for the following four years. Historical and future data are obtained from the Annual COMPUSTAT file for which 1981 is the last year of information. All companies in the Value Line file which can be matched with the COMPUSTAT file are included. For each of the five years and for the pooled data, α_1 is significantly greater than zero at the 1% significance level. The same is true of δ_1 in four of the five years and for the pooled data. These results indicate that Value Line's forecasts provide information beyond that contained in historical data.

Although Value Line's forecasts may provide useful information, if the yield and return forecasts are constructed in such a manner that they can be related by a simple statistical rule, then it may not be possible to infer anything about the market premium associated with cash dividends. However, such a simple relationship does not appear to exist. Forecasts made by Value Line analysts are made on a "line-by-line basis through the income account" [36, p. 58]. In other words, a pro forma income statement is prepared where earnings equal all revenues minus all expenses. The forecasted number of shares is employed to generate forecasted earnings per share. A forecasted price-earnings ratio, formed from forecasts of interest rates and inflation rates and a nonparametric ranking of projected earnings growth, is then used to multiply the forecasted earnings per share to produce a forecasted price.

The forecasted dividend for the common stock is determined "after a look at the working capital position, the requirements for capital spending and debt requirement, and the past payout ratio of the subject company" [36, p. 60]. Although it is probably true that there is a positive correlation between price, earnings, and dividends (since companies which earn more tend to be more valuable and pay greater dividends), it is no more true with ex ante data than with ex post data. Furthermore, there is no statistical formula used to generate one forecast from another; instead, each company is examined on an individual basis. Therefore, it should be possible to ascertain yield premiums from the ex ante Value Line data.

II. Empirical Methodology and Results

A. Model Estimation

A formal treatment of expected return, risk, and yield is based on the after-tax capital asset pricing model presented in Equation (1). The model is adjusted to incorporate a dummy variable that has the value one if the expected yield is nil and is zero otherwise. This dummy variable is added because Blume [5], Litzenberger and Ramaswamy [25], and Elton, Gruber, and Rentzler [11] find that zero-dividend stocks behave differently from positive yield securities. Keim [21] finds that size influences the relationship between return and yield. Thus, the natural logarithm of firm size (price per share times number of shares outstanding) is added as an explanatory variable.[9] The modified version of Equation (1) is expressed as:

$$\tilde{R}_{it} = \gamma_{0t} + \gamma_{1t}\mathrm{DUM}_{it} + \gamma_{2t}\beta_{it} + \gamma_{3t}Y_{it} + \gamma_{4t}S_{it} + \tilde{e}_{it} \tag{4}$$

where DUM_{it} is the dummy variable and S_{it} is the log of size for security i, respectively.[10]

There are reasons to believe, however, that heteroscedasticity may exist and

[9] A linear relation between returns and the log of size is found by Brown, Kleidon, and Marsh [9]. Size is divided by 10^{12} before the logarithm is taken.

[10] The expectations operator has been dropped for notational convenience. Return and yield are both ex ante in form, however. In an econometric sense, yield and beta are treated as nonstochastic. This is a common procedure in models where expectational factors are independent variables and in most capital asset pricing model related tests, where beta is estimated over a prior period and expected to remain constant over a future period.

that the residual variance is likely to be a function of both beta and yield. If so, ordinary least squares estimators are inefficient and t-statistics are incorrect. Evidence that residual variance is a positive function of beta is found by Miller and Scholes [27]. Since residual variance is, in effect, a measure of unsystematic risk, higher beta securities may tend to have a greater amount of unsystematic risk. Residual variance may also be related to dividend yield. For example, many companies desire stable dividend policies. Companies with greater earnings volatility may be forced to adopt a lower payout than companies with more stable earnings over time, ceteris paribus. If companies with greater earnings volatility have greater unsystematic risk, then higher yields may be associated with less residual variance.[11] This may lead to investors interpreting dividend policy as a signal for the security's risk.[12] Multiplicative heteroscedasticity is offered as a functional form to examine the effect of heteroscedasticity in the after-tax CAPM.[13] Implementing multiplicative heteroscedasticity into the model gives:

$$\sigma_{it}^2 = \exp(\delta_{0t} + \delta_{1t}\mathrm{DUM}_{it} + \delta_{2t}\beta_{it} + \delta_{3t}Y_{it} + \delta_{4t}S_{it}) \tag{5}$$

where all four independent variables are allowed to affect residual variance. It is expected that δ_2 will be positive and δ_3 negative. Define the log of the likelihood function given by Equations (4) and (5) to be:

$$\ell = \frac{-n}{2}\log(2\pi) - \frac{1}{2}\sum_{i=1}^{n}\log\sigma_i^2 - \frac{1}{2}\sum_{i=1}^{n}(e_i/\sigma_i)^2 \tag{6}$$

Homoscedasticity is a nested version of the general heteroscedastic specification where δ_1, δ_2, δ_3, and δ_4 are constrained to zero in Equation (5) and σ_i is replaced by σ in Equation (6). All estimations are performed on individual securities as opposed to portfolios.[14, 15]

The log-likelihood function given by Equation (6) is maximized for each of the eleven years using the GQOPT algorithm from Princeton University. Estimated coefficients and t-statistics for each year are reported in Table I. Also presented are the arithmetic averages of the eleven yearly coefficients. The standard errors used to construct the t-statistics for the eleven-year average results are formed by dividing the sample standard deviation of the eleven yearly coefficients by the

[11] Much of this risk can be diversified away; although if investors target the yield of their portfolio, diversification may be easier for high yield portfolios. Diversification will not be as efficient, however, compared to a portfolio not targeted for yield.

[12] This is to be distinguished from dividends as a signal for the firm's value as in Bhattacharya [2].

[13] See Harvey [14], Judge et al. [18], Just and Pope [19], and Peterson and Waldman [29] for discussion and applications of multiplicative heteroscedasticity.

[14] The tradeoff is increased efficiency versus potential errors in variables.

[15] Econometric difficulties may exist because each year's data are drawn from thirteen points in time, potentially causing biases upon pooling. To examine the importance of this issue, intercept and slope dummy variables were introduced into Equation (4). With minor exceptions, the addition of the dummy variables added no significant explanatory power and the coefficients on beta and yield remained virtually unchanged. Therefore, it is felt that aggregating data over the thirteen-week periods is a fairly safe procedure, and the dummy variables are not included in any reported estimations.

Table I

Estimates of After-Tax CAPM with Dummy Variable and Size Included, Multiplicative Heteroscedastic Specification

$$\tilde{R}_{it} = \gamma_{0t} + \gamma_{1t}\mathrm{DUM}_{it} + \gamma_{2t}\beta_{it} + \gamma_{3t}Y_{it} + \gamma_{4t}S_{it} + \tilde{e}_{it}$$

$$\sigma_{it}^2 = \exp(\delta_{0t} + \delta_{1t}\mathrm{DUM}_{it} + \delta_{2t}\beta_{it} + \delta_{3t}Y_{it} + \delta_{4t}S_{it})$$

Year	γ_0	γ_1	γ_2	γ_3	γ_4	δ_0	δ_1	δ_2	δ_3	δ_4	LR
1973	−0.137*	0.041*	0.196*	2.363*	−0.317*	−6.824*	0.127	0.771*	−3.413*	−1.800*	106.539*
	(−9.238)	(3.767)	(16.259)	(15.294)	(−17.432)	(−27.965)	(0.983)	(5.513)	(−1.885)	(−6.468)	
1974	−0.148*	−0.008	0.295*	1.838*	−0.343*	−5.734*	0.013	−0.216	−12.179*	−1.833*	83.748*
	(−7.628)	(−0.534)	(18.360)	(12.376)	(−15.526)	(−21.971)	(0.079)	(−1.541)	(−7.075)	(−6.018)	
1975	−0.146*	0.037*	0.226*	1.271*	−0.317*	−6.231*	0.494*	0.705*	−2.933	−1.065*	81.937*
	(−8.362)	(2.566)	(15.592)	(9.212)	(−17.240)	(−22.877)	(3.322)	(3.556)	(−1.465)	(−3.851)	
1976	−0.112*	0.016	0.166*	0.349*	−0.290*	−5.600*	0.519*	0.571*	0.498	−0.169*	44.270*
	(−7.296)	(1.551)	(14.368)	(2.597)	(−17.597)	(−35.807)	(4.186)	(3.600)	(0.276)	(−5.985)	
1977	0.001	0.015	0.157*	−0.248*	−0.100*	−6.438*	0.407*	0.247*	−4.131*	−1.824*	87.186*
	(0.062)	(1.318)	(13.863)	(−1.925)	(−5.800)	(−25.533)	(3.009)	(1.802)	(−2.303)	(−5.986)	
1978	0.022	−0.011	0.136*	−0.252*	−0.084*	−7.206*	0.164	0.953*	−2.720	−2.086*	115.800*
	(1.516)	(−0.962)	(12.318)	(−2.140)	(−5.053)	(−30.314)	(1.165)	(6.277)	(−1.611)	(−7.373)	
1979	0.006	−0.040*	0.150*	−0.153	−0.096*	−5.658*	0.217	0.336*	−5.716*	−0.879*	44.766*
	(0.328)	(−2.862)	(10.584)	(−1.062)	(−4.068)	(−21.275)	(1.476)	(1.949)	(−3.517)	(−3.128)	
1980	0.046*	−0.070*	0.069*	−0.005	−0.099*	−4.963*	0.192	0.435*	−3.543*	0.200	21.489*
	(2.361)	(−5.310)	(4.457)	(−0.034)	(−4.565)	(−18.244)	(1.346)	(2.483)	(−1.800)	(0.763)	
1981	0.046*	−0.016	0.126*	0.188*	−0.039*	−7.050*	0.153	0.803*	−4.977*	−1.290*	104.465*
	(3.577)	(−1.619)	(12.413)	(2.414)	(−2.514)	(−29.804)	(1.183)	5.597)	(−4.860)	(−4.722)	
1982	0.037*	−0.011	0.077*	0.411*	−0.070*	−6.742*	0.241*	0.500*	−5.851*	−1.123*	91.518*
	(3.398)	(−1.213)	(8.811)	(5.577)	(−4.982)	(−29.746)	(1.879)	(3.748)	(−4.905)	(−4.127)	
1983	−0.001	0.013*	0.092*	0.459*	−0.049*	−8.110*	0.269*	1.120*	−1.691	−1.850*	140.773*
	(−0.133)	(2.280)	(12.439)	(7.552)	(−4.540)	(−34.310)	(2.290)	(6.584)	(−1.154)	(−6.829)	
1973–83	−0.035	−0.003	0.154*	0.566*	−0.164*	−6.414*	0.254*	0.566*	−4.241*	−1.247*	922.491*
	(−1.417)	(−0.305)	(7.605)	(2.133)	(−4.415)	(−23.754)	(5.335)	(5.087)	(−4.394)	(−5.581)	

Notes: LR is likelihood ratio test statistic of homoscedasticity versus heteroscedasticity. t-Statistics are in parentheses.

* Significant at a 10% level (two-tailed test for t-statistics).

square root of eleven.[16] In six of the eleven years and overall, the coefficients on the dummy variable (γ_1's) are insignificant (at the ten percent level). In three years they are positive and significant and in two years they are negative and significant. Thus, there is not a strong positive relationship as found by Elton, Gruber, and Rentzler [11].[17] The coefficients on beta (γ_2's) are positive and significant. The relationship between return and yield is generally positive, with seven yearly coefficients (γ_3's) positive and significant.[18] Two years, 1977 and 1978, have significant negative coefficients. The first three years have coefficients much larger than the remaining years. The average coefficient is 0.566, which is significantly greater than zero at the ten percent level.[19] There is a consistently strong and statistically significant negative relationship between returns and the log of firm size.

The hypotheses concerning heteroscedasticity are supported by the results reported in Table I. Residual variance tends to be positively related to beta and negatively related to yield. Furthermore, the residual variance is higher for nondividend paying firms, as indicated by the positive values for δ_1. Residual variance is negatively related to the log of firm size. All four of these relationships are generally statistically significant. Results of a formal test for heteroscedasticity are presented in the last column of Table I. Define ℓ^* to be the maximized log of the likelihood function generated by Equation (6) and define ℓ^{**} to be the maximized value of the log of the likelihood function from the constrained homoscedastic specification where δ_1, δ_2, δ_3, and δ_4 equal zero. To test the null hypothesis of homoscedasticity against the alternative of multiplicative heteroscedasticity for each year, a likelihood ratio (LR) test statistic is formed as $-2(\ell^{**} - \ell^*)$. This test statistic is distributed $\chi^2_{(4)}$. The likelihood ratio test statistic for the entire eleven-year period is formed by summing the individual statistics for each year. This statistic is distributed as $\chi^2_{(44)}$. All test statistics are highly statistically significant, substantiating the significant presence of heteroscedasticity.

B. Clientele Effects

As a final study, allowance is made for securities to have different slope coefficients on yield. Similar to Litzenberger and Ramaswamy [25, 26], it is assumed that investors belong to one of five tax clienteles.[20] Securities are sorted

[16] This is the procedure employed by Litzenberger and Ramaswamy [24] and Miller and Scholes [28].

[17] Estimations were also performed without the dummy variable included, with little change in the coefficients on the other variables.

[18] Estimations were also performed with yield as the only independent variable. Estimated slope coefficients were negative in six of eleven years. Furthermore, the average correlation coefficient between beta and expected yield over the eleven years is −0.563. Thus, yield may serve as a proxy for risk, and tax effects cannot be determined when a risk variable is not explicitly included in the model. Empirical models without a risk measure as an independent variable include Hess [15, 16].

[19] If the tax rate on capital gains is zero, 0.566 may be interpreted as the marginal tax rate on dividend income.

[20] A different approach is offered by Hess [16], who proposes the seemingly unrelated regression methodology. By offering two equations, one for securities and one for portfolios, he is able to nest

Table II

Estimation Results from Sort on Yield

$$\tilde{R}_{it} = \gamma_{0t} + \gamma_{1t}\text{DUM}_{it} + \gamma_{2t}\beta_{it} + \textstyle\sum_{j=1}^{5} \gamma_{j+2,t}\theta_{jt} Y_{it} + \gamma_{8t}S_{it} + \tilde{e}_{it}$$

$$\sigma_{it}^2 = \exp(\delta_{0t} + \delta_{1t}\text{DUM}_{it} + \delta_{2t}\beta_{it} + \delta_{3t} Y_{it} + \delta_{4t}S_{it})$$

Year	γ_3 (low)	γ_4	γ_5	γ_6	γ_7 (high)	LR
1973	2.409*	2.355*	2.086*	1.582*	2.467*	10.118*
	(12.557)	(9.886)	(10.256)	(5.272)	(4.868)	
1974	1.895*	1.757*	1.227*	0.787	2.171*	9.230*
	(8.518)	(6.161)	(4.579)	(1.534)	(6.660)	
1975	1.886*	1.713*	1.408*	0.952*	−0.909*	54.926*
	(10.544)	(7.414)	(6.701)	(3.136)	(−2.223)	
1976	0.811*	0.506*	0.214	−0.037	−0.424	28.142*
	(3.732)	(1.914)	(0.651)	(−0.064)	(−0.998)	
1977	−0.169	−0.437*	−0.709*	−1.570*	−0.949*	26.531*
	(−1.002)	(−1.945)	(−3.102)	(−4.064)	(−2.206)	
1978	−0.360*	−0.802*	−1.024*	−2.192*	−0.843*	84.631*
	(−3.016)	(−5.237)	(−6.188)	(−9.160)	(−1.871)	
1979	−0.017	−0.773*	−1.069*	−1.706*	−2.401*	166.911*
	(−0.130)	(−5.529)	(−6.665)	(−9.416)	(−9.215)	
1980	−0.100	−0.593*	−0.919*	−1.660*	−1.840*	222.909*
	(−0.814)	(−4.771)	(−6.288)	(−10.868)	(−8.001)	
1981	0.476*	0.708*	0.794*	0.915*	0.929*	24.811*
	(4.137)	(5.330)	(5.275)	(5.043)	(3.597)	
1982	0.511*	0.627*	0.661*	0.562*	−0.154*	33.115*
	(6.807)	(6.966)	(5.929)	(4.418)	(−2.082)	
1983	0.555*	0.590*	0.743*	0.805*	1.138*	24.560*
	(8.782)	(7.963)	(8.938)	(8.208)	(6.667)	
1973–83	0.718*	0.514	0.310	−0.142	−0.074	685.884*
	(2.524)	(1.560)	(0.939)	(−0.346)	(−0.156)	

Notes: LR is likelihood ratio test statistic for examining the null hypothesis that the coefficients γ_3 through γ_7 are all equal. t-Statistics are in parentheses.

* Significant at a 10% level (two-tailed test for t-statistics).

on the basis of yield and equal market values are placed in each group. However, these five groups are formed from only the positive yield securities. All securities are allowed to affect returns through beta and size effects, but only securities with positive yields are used to form the five yield clienteles. Consistent with this approach, Equation (4) is modified to:

$$\tilde{R}_{it} = \gamma_{0t} + \gamma_{1t}\text{DUM}_{it} + \gamma_{2t}\beta_{it} \textstyle\sum_{j=1}^{5} \gamma_{j+2,t}\theta_{jt} Y_{it} + \gamma_{8t}S_{it} + \tilde{e}_{it} \tag{7}$$

where θ_{jt} is one if security i is in classification j and zero otherwise. Equation (5) remains the model for residual variance.

The log-likelihood function given by Equations (5), (6), and (7) is maximized for each year and results are reported in Table II. The greatest number of net

four competing models of dividend behavior. However, he is limited to systems of thirty securities and his findings are inconsistent with all four models of dividends. Failure to include a risk variable in the security equation may contribute to these results.

positive significant coefficients is found in the low yield group and this number decreases for successively higher yield groups. Overall, the only statistically significant coefficient (at the ten percent level) is for the low yield group, and it is positive. These coefficients imply a positive relationship between expected return and yield for low yield securities and an insignificant relationship between expected return and yield for high yield securities, suggesting an overall nonlinear relationship between the two variables.

To provide statistical evidence on whether the yield coefficients are constant across clienteles, the log-likelihood function given by Equations (5), (6), and (7) is again maximized, but with γ_3 through γ_7 constrained to be equivalent. Define ℓ^0 to be the original maximized value of the log of the likelihood function and define ℓ^{00} to be the constrained maximized value. To test the equality of γ_3 through γ_7, the test statistic $-2(\ell^{00} - \ell^0)$ is formed and is distributed $\chi^2_{(4)}$. These test statistics are reported for each year in the final column of Table II. The eleven-year average statistic is formed by summing the eleven yearly statistics and is distributed $\chi^2_{(44)}$. In all cases the null hypothesis of constant coefficients on yield is rejected. The declining pattern of coefficients on yield as yield increases is consistent with earlier studies and with the clientele hypothesis that high tax bracket investors prefer low yield securities.

A clientele effect is detected even though the Value Line forecasts may be biased against finding such an effect. In examining the unbiasedness of Value Line forecasts, it is found that Value Line tends to overestimate (underestimate) the return and yield of high (low) return and yield securities. This effect is more pronounced for return than yield. Since there is a general positive relationship between expected return and yield, the estimated coefficients reported for the low yield portfolios may be too low and the estimated coefficients reported for the high yield portfolios may be too high. Specifically, securities grouped in the low yield (and return) category tend to have forecasts which are too low, especially for returns. This means that the estimated slope coefficients will also be too low. For the high yield and return category, forecasts tend to be too high, especially for returns, causing estimated slope coefficients to be too high. Thus, the clientele effect may be stronger than reported in Table II.

III. Conclusion

The purpose of this study is to investigate the relationship between return and yield in the context of ex ante data and by examining the role of dividends as a proxy for risk. The ex ante data are obtained from *The Value Line Investment Survey* for the years 1973 through 1983. Testing is performed on the basis of the after-tax capital asset pricing model developed by Brennan [7] and extended by Litzenberger and Ramaswamy [24], with the log of size added as an independent variable. The use of ex ante data should substantially reduce the confounding of tax and information effects that has plagued some earlier studies. Heteroscedasticity is detected and found to be negatively related to yield and size and positively related to beta. Maximum likelihood methods are used to estimate return and yield relationships while correcting for heteroscedasticity. Finally, a grouping procedure is employed to examine the presence of clienteles.

Results from the estimation of the after-tax CAPM indicate a general positive and significant relationship between return and yield, although there are years in which the relationship is insignificant. There is also a positive relationship between return and beta and a negative relationship between return and size, both of which are significant. With a size effect included in the model, the average coefficient on yield is 0.566. The grouping procedure gives a negative relationship between coefficients on yield and yield. Thus, a positive relationship is found between return and yield, and a clientele pattern is found which is consistent with earlier studies.

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