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DIVIDEND YIELDS AND COMMON STOCK RETURNS
A NEW METHODOLOGY

by

Fischer Black and Myron Scholes

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I. Introduction

Miller and Modigliani, (1961), have proved that if capital markets are perfect and investors are rational, the dividend policy of a corporation has no relevance for corporate valuation, the cost of capital for the firm, and investment or financial policy of the firm. However, they do argue that the presence of market imperfections such as transactions costs, and the differential tax treatment of capital gains and dividend income may cuase some investors to prefer capital gains to dividends and other investors to prefer dividends to capital gains. There is no "a priori" reason to conclude that high dividend yielding securities should demand a premium over low dividend paying securities or visa versa. The crucial issue is whether or not the distribution of demanders of dividends is matched by the distribution of suppliers of dividends, the corporations. If this were the case, all investor demands would be satisified and the returns on securities would be unaffected by these imperfections. At the margin the corporation could Choose any dividend policy it wished and not effect its

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valuation in the market or the return on its shares. The returns on shares would be the same in the presence of these imperfections as they would be if the market were perfect; with no transactions costs or no differential tax treatment of capital gains versus dividend receipts.

Although there have been many attempts in recent years to test whether or not the dividend policy of a corporation effects the relative valuation of its shares, these tests have never been completely satisfactory.[1] Most authors have taken a cross-sectional sample of firms and regressed the prices of these securities against variables that in one way or another represent the dividend payout of these firms, and the retained earnings of these firms. The hypothesis to be tested is whether or not the coefficient on the dividend payout term is equal to the coefficient on the retained earnings term. When they regress prices on dividends and retained earnings, the estimate of the dividend coefficient tends to alyways come in with greater weight leading Graham and Dodd, (1951), for example, to conclude that dividends have four times as much weight in the valuation process as retained earnings.

The estimates of the coefficients tend to be very unstable when different years of data on the same companies are used. Also authors find that for some industries, after various corrections for the obvious biases in these cross-sectional tests, the dividend term has more weight than the retained earnings term and for some industries the converse is true.

The problems with the cross-sectional tests have been well documented by Friend and Puckett, (1964), who argue that failing to

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[1] Gordon, (1959), Gordon and Shapiro, (1956), Friend and Puckett, (1964), Diamond, (1968).

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properly control for differential riskiness of the firms in the sample causes the dividend term to be biased upward and the retained earnings term to be biased downward since there is negative correlation between the payout policies of firms and their riskiness. Also, they argue that the retained earnings of a firm does not capture its growth opportunities, which may lead to future external financing and this omission would cause the coefficient on the retained earnings term to be biased downward. They also point out that earnings in any one year are subject to transitory fluctuations that may not in any way reflect the true earnings power of the corporation. Since market prices and dividend payouts adjust to long run earnings expectations, they are relatively stable while retained earnings contain measurement error which causes attenuation of the coefficient of this variable in the regression.

The proposed solutions to these omitted variables and measurement error porblems are two-fold. In the first place, proxy variables that represent the omitted variables have been added to the equations and secondly, the variables were smoothed by averaging several years of data to try to eliminate the measurement errors in the variables. The studies have then concluded after using these various weighting schemes that dividends are preferred slightly to retained earnings for most non-growth industries and retained earnings are preferred slightly in growth industries. However, since the data has been smoothed to try to eliminate the measurement errors, there are no tests of stability of these coefficients over time, or no guarantee that the "ad hoc" arguments for including proxy variables for the omitted variables in the cross-sectional runs are not themselves causing other biases to creap in as well. The prime concern

of this paper is to offer an alternative approach to testing whether or not the dividend policy of a firm effects the valuation of its shares. The approach taken in the paper will be to use time-series analysis instead of the conventional corss-sectional tests. Section II presents the basic hypotheses to be tested and Section III, the data and methodology used to test the proposition. The results of the tests are presented in Section IV followed in Section V by the summary and the conclusion.

II. Market Imperfections and the Irrelevancy of Dividend Policy; A Hypothesis

The use of cross-sectional tests of prices on retained earnings and dividends lead to possible misspecification of the model and shed very little light on whether or not dividend policy effects the valuation of corporations. Retained earnings is not a variable of any great interest to the investor. Apart from its measurement errors that are confounded by accounting conventions, it does not represent a change in the investor's wealth position that has resulted from owning these shares. This change in investor wealth is due to two components. The first component is the value of the dividends he received during the period and the second component, a capital gains component, is the change in the market value of his shares. The controversy that must be resolved is whether or not a dollar of dividends has the same value as a dollar of capital gains.

If the capital markets were perfect in that there were no transactions costs to trade securities and no differential tax treatment of capital gians versus dividends it would be easy to argue that there would be no premiums paid for non-dividend paying firms or visa-versa no premiums paid for dividend paying firms. Why would any investor pay a premium for dividends when at no cost he could obtain any dividend he wished by selling shares in the market and conversely negate dividends by using his dividend receipts to purchase additional shares? No rational investor would pay the corporation to provide a dividend payment service when he could supply his own dividends at a zero cost. In this world it

would make no difference what dividend policy the firm adopted.

The introduction of market imperfections, such as taxes and transactions costs, may lead to a systematic preference of a large segment of the investing public for non-dividend paying shares. But these may also be many investors who actually prefer to receive dividends in lieu of capital gains. This is only the demand side of the dividend question. There is also the important supply side. Corporations can within relatively large limits choose any dividend payout policy they wish. This choice is restricted to some extent by current tax laws but there still is sufficient latitude for corporations as a whole to meet investor demands for dividends. If premiums are paid to corporations to supply dividends there is an incentive for corporations to supply dividends and when general equilibrium is reached in the market, it may be that the marginal corporation can set a dividend payout policy and not effect the market value of its shares at all. Equilibrium would be attained in the market with each investor choosing a portfolio that best suits his investment objectives and yet he would not receive a premium for holding eitherlow dividend or high dividend yielding securities.

The major market imperfection is the preferential tax treatment accorded to capital gians. Capital gains are only taxed if realized by investors, and need not be realized at all if securities are held until death. If realized, capital gains are taxed at the minimum of one half the investor's marginal tax rate or twenty-five percent, while dividends are taxed in the year received at the investor's marginal tax rate.

Brennan, (1970), assuming that investors do not have a systematic preference for dividends, and that the supply of dividends is fixed, has

shown that high dividend yielding securities should sell at a discount in the market, thereby offering a higher before tax rate of return to induce investors to hold high dividend yielding securities. The amount of the premium is a complicated weighted average of investor marginal tax rates, where the weights are a function of investor risk preferences. His conclusion is that a premium should be observed on low dividend yielding securities such that the after tax rates of return on securities are equalized at this weighted average marginal tax rate. Investors with tax rates greater than this rate will buy low dividend yielding securities; investors with tax rates less than this average will buy high dividend yielding securities.

It is possible to challenge his assumption of no systematic investor preference for dividends versus capital gains. The standard argument against such a preference is that investors can sell shares to meet current consumption needs. Even if there are substantial transactions costs to produce current income, investors turnover their portfolio, to some extent to balance its riskiness and therefore can generate income out of these transactions.

Even taking account of these arguments there is a large class of investors for which the receipt of dividends has greater value than the receipt of capital gains. There are corporations who receive a preferential tax treatment on the receipt of dividends since they have an eighty-five percent dividend exclusion right, which implies that their tax rate is only seven and one half percent on dividends while it is twenty-five percent on capital gains if shares are sold in the tax year. Many tax exempt institutions such as university and charitable trusts have

parts of their endorsements restricted and can only spend out of dividend income and therefore actually have a preference for dividend paying securities. There are many other classes of investors who pay no taxes at all or very small tax bills who would be indifferent to dividend receipts. These investors would tend to reduce the premiums to be received from purchasing high dividend yielding securities.

Lastly, there are many investors who seldom turn over their holdings, and for whom the sale of securities would be expensive. Dividend receipts would be preferred to capital gains. There may be others who apart from transaction costs and tax reasons, feel that dividend receipts are preferred, and these investors also tend to reduce the hypothesized premiums.

But, the crucial variable that is ignored in most partial equilibrium models is the supply of dividends. The corporation can to a great degree set dividend policy at any level it desires, or change its dividend policy to meet investor demands. Although corporate tax laws restrict corporations from accumulating cash and equivalents to avoid paying dividends, there are no restrictions on cash-flow retention if the corporation has justifiable investment uses for its cash throwoff. Most, if not all corporations can satisfy this restriction if not by internal investment, by buying other corporation shares or other enterprises.

Since corporations have this flexibility, it is very difficult to argue that they won't set dividend policies to meet market demands. If investors prefer capital gains to dividends, corporations will tend to reduce dividend yields. There can never be a convincing argument for the effects of market imperfections on security prices when only the demand

for dividends is considered and the crucial supply of dividends is ignored.

In conclusion, it is difficult if not impossible to argue from "a priori" arguments that premiums will be paid for non-dividend paying shares or visa-versa premiums will be paid for dividend paying shares. We can argue that there is a great incentive for corporations to take advantage of premiums in setting a dividend policy and thereby tend to eliminate these premiums. It is our hypothesis that premiums will be small if non-existent even with the various market imperfections that we have documented. In the next section, we will describe the data used to test this hypothesis and the methodology of the testing procedure.

III. Sample and Methodology

The reason other studies restricted their sample to a cross-section of firms in the same industry was to try to hold other variables that could effect the security's price constant. One such variable is the differential riskiness of firms in and across industry groups. It is not necessary to restrict a sample to several large industry groups; it is possible to use all securities and provide a test procedure that will use all the data for many years to test for the presence and more importantly, the significance of the dividend factor in determing security returns.

a. Sample

Dividends, month end prices and monthly return data were obtained from the tape prepared by the Center for Research in Security Prices of the University of Chicago[1] for every security listed on the New York Stock Exchange at any time in the period January 1926 to March 1966. Although we carried out the analysis for the total time period and various subperiods we will concentrate our analysis on the period 1947-1966 since the tax structure has remained relatively constant over this period.

b. Methodology

Over the sample period general economic conditions have changed dramatically and these changing conditions have had a differential impact on the returns of securities. Since these changing economic conditions are reflected to a great extent in the returns on all market assets, a "market factor" it would be impossible to test for the presence of a

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[1] A detailed description of the file is given in L. Fisher and J. Lorie, (1964).

[2] A tax on dividends was first instituted in 1942. The earlier period will be interesting for comparison purposes.

"dividend factor" without taking account of the market factor's influence on security returns. A very useful model for this purpose is the capital asset pricing model first proposed by Sharpe, (1964), and Treynor, (1961)[1]. The main result of the model is that there is a linear relationship between a security's expected excess return, and its systematic risk. That is,

$$E\ (\tilde{R}_i) - R_f = (E\ (\tilde{R}_m) - R_f\ )\ \beta_i \tag{1}$$

where

$E\ (\tilde{R}_i) - R_f$ = the expected one period excess rate of return, (dividend plus capital gain divided by initial price) on asset i above a riskless rate of interest, R_f.

$E\ (\tilde{R}_m)$ = the expected one period rate of return on the market portfolio, with variance $\sigma^2(\tilde{R}_m)$.

β_i = $\text{cov}\ (\tilde{R}_i, \tilde{R}_m)/\ \sigma^2(\tilde{R}_m)$ = "the systematic risk" of asset i, the covariance of asset i with the market return divided by the variance of the market.

In equilibrium, the expected returns on securities differ only through their differential expected covariance with the market portfolio. It is possible to restate the model in terms of realized returns, by using the "market model" first proposed by Markowitz (1959), and extended by Sharpe (1963) and Fama (1968a).

That is let

$$\tilde{R}_i = E(R_i) + \beta_i\tilde{\pi} + \tilde{e}_i \ ? \tag{2}$$

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[1] Credit must also be given to Lintner, (1965a,b), Mossin, (1966), Fama (1968a,b) and Jensen (1968, 1969) for extending and clarifying the model. The model assumes all investors are single period risk-averse utility of terminal wealth maximizers; that there are no taxes or transaction costs; that all investors have homogeneous expectations regarding the parameters of the probability distributions of all security returns; and that all investors can borrow and lend at a given riskless rate of interest.

where R_i is the realized one period return on security i and $\tilde{\pi}$ is equal to the "unexpected" excess market returns, $R_m - E(\tilde{R}_m)$. $\tilde{\pi}$ and $\tilde{e}_i$ are normally distributed random variables with $E(\tilde{\pi})$, $E(\tilde{e}_i)$, and $E(\tilde{\pi}\,\tilde{e}_i)$ all equal to zero, and

$$E(\tilde{e}_j,\tilde{e}_i) = \begin{cases} 0 & i \neq j \\ \sigma^2(e_i) & i=j \end{cases}$$

On substitution of (1) into (2), we obtain

$$\tilde{R}_i - R_f = (\tilde{R}_m - R_f)\,\beta_i + \tilde{e}_i \qquad (3)$$

In addition, if we allow for the possibility of other factors influencing security returns that do not have a zero mean, we can alter the model slightly to include an intercept, such that,

$$\tilde{R}_{i,t} - R_{f,t} = \alpha_i + \beta_i\,(\tilde{R}_{m,t} - R_{f,t}) + \tilde{e}_{i,t} \qquad (4)$$

The crucial assumption of this model is that the parameter, β_i accounts for all the differential returns on security i due to its relative riskiness. That is, the realized return on a security should be proportional to its systematic risk, with the proportionality factor being equal to the realized return on the market portfolio. Extensive tests of this assumption of the model have been conducted by Black, Jensen and Scholes, (1970) and by Miller and Scholes, (1970) who find that the strict proportionality assumption does not hold. That is, the low risk securities have significantly positive intercepts and the high risk securities have significantly negative intercepts.[1]

It is commonly known and will be documented below, that low risk securities generally have higher dividend yields than high risk securities.

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[1] Since the market portfolio is composed of all securities used in the sample, the average estimated regression coefficient is constrained to be 1, and the average estimated intercept is constrained to be zero. The average of all securities is the market portfolio.

One hypothesis that could possibly account for the finding of significantly positive intercepts for low beta securities is the dividend factor. The argument would be that in the presence of taxes, high dividend yielding securities sell at a discount to induce investors to hold them, and as a result their realized before tax rate of return would be larger than that assumed by the model. It would be necessary to restate the capital asset pricing model to include the presence of taxes. Following Brennan (1970), the capital asset pricing model on an after tax basis for a portfolio would be

$$E(\tilde{R}_p)^T = (1 - \beta_p)\, R_f^T + \beta_p\, E(\tilde{R}_m)^T \qquad (5)$$

where

$E(\tilde{R}_p)^T = E(\tilde{R}_p) - T\,\delta_p$, the expected before tax return on a portfolio, minus the weighted average marginal tax bracket T times the expected dividend yield, δ_p, on the portfolio, assuming for simplicity that capital gains are not realized.

$R_f^T = (1 - T)\, R_f$, the after tax rate of return on investing in the riskless asset.

$E(\tilde{R}_m)^T = E(\tilde{R}_m) - T\,\delta_m$, the expected before tax rate of return on the market portfolio, minus the tax rate times the expected dividend yield on holding the market portfolio.

On substituting, these relationships into (5) we see that on an after tax basis

$$E(\tilde{R}_p) - R_f = \beta_p\, (E\,(\tilde{R}_m) - R_f) + T(\delta_p - R_f - \beta_p\, (\delta_m - R_f)\,) \qquad (6)$$

and in terms of ex post realizations

$$\tilde{R}_{p,t} - R_{f,t} = \alpha_p + \beta_p(\tilde{R}_{m,t} - R_{f,t}) + \tilde{e}_t \qquad (7)$$

where $\alpha_p = T(\delta_p - R_f - \beta_p\, (\tilde{\delta}_m - R_f)\,)$

If it turned out that the α_p term in (7) was positive for the low

beta securities with large dividend yields and negative for high beta securities with low dividend yields, this could explain the significance of the observed intercept terms in the Black et. al and Miller and Scholes studies. But this is only conjecture at this time since as we have noted there are investors who prefer dividends, and secondly the supply of dividends may be altered such that when testing for T, which is a weighted average of investor preferences and tax rates, the resultant estimated T may be insignificantly different from zero.

However, starting with a relationship such as (7) it is possible to construct a more direct test of the significance of the dividend factor while eliminating the effects of differential returns due to the security's beta. Let us assume that we can construct a portfolio with a beta of one that has a large dividend yield relative to the market and another portfolio of securities with a beta of 1.0 that has a small dividend yield relative to the market. Equation (7) then reduces to equation (8)

$$\tilde{R}_{p,t} - R_{f,t} = \alpha_p + 1.0\,(\tilde{R}_{m,t} - R_{f,t}) \qquad (8)$$

where $\alpha_p = T(\delta_p - \delta_m)$

With a portfolio of securities with average beta of 1.0, it is possible to obtain an estimate of T and its significance by using time-series data. Given the estimated α_p of the portfolio we can test for the significance of the dividend factor in explaining security returns.

c. Experimental Design

The objective is to construct two portfolios that will have an average beta of 1.0 and yet have a large spread in their realized dividend yields. It would be possible to select securities according to their dividend yields and run a regression of the excess rates of return on this

portfolio on the market excess return but there would be no guarantee that we would find that beta was one. In fact for high dividend yield securities the beta would be less than one and it would not be possible to separate the effects of the dividend factor from other factors that might be influencing security returns. An alternative procedure would be to select portfolios according to their estimated betas from the regression, and try to obtain portfolios of similar betas but with different realized dividend yields. Unfortunately, this approach is subject to bias the results because of measurement errors in the estimated betas that are used to select the portfolios. The methodology that will be described below eliminates virtually all of the bias associated with using estimated betas and using realized dividend yields[1] to select portfolios.

Starting in March of 1926 and using sixty monthly observations through February of 1931 a regression of the excess return on each security that had 5 years of data over this period was run on the market excess return to obtain an estimated beta.[2] Also, the dividend yield on each of the securities was computed for the year, March, 1930 to February, 1931 for each security for which there was an estimated beta. That is, the sum of the dividends paid in this year over the price at the end of

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[1] A proof of the proposition that this methodology eliminates the measurement errors is given in detail in Black, Jensen and Scholes, (1970).

[2] The market portfolio return for a month is the simple average of the returns of all securities listed on the exchange during that month. The risk free rate was taken to be the dealer's paper rate at the start of each month from 1926-1947 and the 30 day treasury bill rate, taken from the Solomon and Brothers quote sheets at the end of the previous month for the following month for the years 1947-1966. Also, the use of 60 months of data to estimate beta was arbitrary but tests have shown that the results to be described are not sensitive to the length of this interval. 60 seemed a good compromize in terms of efficiency and obtaining a long-time series.

February was used as an ex ante estimate of next year's dividend yield. The securities were then ranked on this ex ante dividend yield from maximum to minimum and divided into 5 classes. The top 25 percent had the largest ex ante dividend yields, the bottom 25 percent the smallest ex ante dividend yields. Within each dividend class the estimated betas of the securities were ranked from maximum to minimum and divided into 5 subclasses. That is, the top subclass contained 25 percent of the securities that had the highest estimated betas within the 25 percent of the securities that had the largest ex ante dividend yields. This first subclass contained the securities that were held in portfolio one for the following year, March of 1931 to February of 1932. The excess returns on each of these securities were averaged each month to obtain a realized monthly portfolio return.[1] Similarly, the securities in subclass two within the highest dividend yield class were held in portfolio two for the following year. In this way we obtained the monthly returns on 25 portfolios for the following year. The top portfolio, number one, contained the securities with the highest ex ante estimated betas within the highest ex ante dividend yield class. Portfolio 25 contained the securities with the lowest ex ante estimated betas within the lowest ex ante dividend yield class.

The average ex ante dividend yield of the securities that comprized each portfolio was saved and the average ex post dividend yield realized on each portfolio for the following year was recorded. The

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[1] If a security was delisted during the year, it was only included in the portfolio for the months of the year for which there was data. If a security went broke in a month, its return for that month was -1.0.

realized dividend yield on a security is the sum of the dividends paid during the next year divided by the initial price, or the same price used to compute the ex ante dividend yield. Since dividend payments don't change very markedly, and since we use portfolios, we will see that the ex ante dividend yields are extremely good predictors of realized dividend yields.

This procedure gave us the portfolio returns for March of 1931 to February of 1932. The whole procedure was repeated to obtain portfolio returns for March of 1932 to February of 1933. The betas were estimated using 60 observations on each security that was listed over the period March of 1927 to February of 1932, and the ex ante dividend yield was computed using dividends paid in March 1931 to February 1932 divided by the end of February, 1932 price. The stocks were ranked by dividend yields and then within a dividend yield class by beta and the securities within the subclass held for a year in their appropriate portfolio. In this way portfolio one held for each year the securities that had the highest ex ante dividend yields and the highest estimated betas using the previous 5 years to obtain the estimate.

At the end of all the rankings, 420 monthly excess return observations were recorded for each of the 25 portfolios. The composition of the portfolios changed somewhat each year as the estimated beta changed or the estimated dividend yield changed. Evidence that we have on looking at the composition of the portfolios suggest that the turnover is quite low since both dividend yields and estimated betas change slowly and large portfolio groupings are used.

To obtain an index of market returns that would constrain the average estimated betas of the twenty-five portfolios to be one, and therefore the average estimated alpha of the portfolios to be zero, the market excess return for each month was taken to be the average of the returns on the twenty-five portfolios for each of the 420 months of data. The following regression was run for each of the twenty-five portfolios:

$$\tilde{R}_{i,t} = \hat{a}_i + \hat{\beta}_i \tilde{R}_{m,t} + \tilde{e}_t$$

where $\tilde{R}_{i,t}$ is the excess return on portfolio i for month t; $\tilde{R}_{m,t}$ is the excess return on the market portfolio for month t, and $\hat{a}_i$ and $\hat{\beta}_i$ are the estimated intercept and regression coefficient for each of the $i = 1,\ldots,25$ portfolios.

It must be stressed that the use of portfolios each containing 40 to 50 securities tends to eliminate most of the random errors associated with ex ante misclassification of securities by dividend yield and estimated betas. These ex ante estimates are used only to select portfolios and not to test for the presence of the dividend factor. The selection procedure guarantees a large spread in both the realized dividend yield and the realized betas on the 25 portfolios if there is relative stationarity in both the ex ante dividend yield as a predictor of the realized dividend yield and the ex ante betas as a predictor of the ex post realized betas.

To show this, assume that the estimate of beta in period 1, $\hat{\beta}_{i1}$, is equal to the true beta, β_i plus a random error term, $\tilde{u}_i$. That is

$$\hat{\beta}_{i1} = \beta_i + \tilde{u}_i \qquad (9)$$

where $E(\tilde{u}_i) = 0$, and since $\hat{\beta}_{i1}$ is computed from the regression of the excess returns on a security on the market return, the estimate of $\sigma^2(\hat{u}_i)$ is:

$$\sigma^2(\hat{u}_i) = \sigma^2(\hat{e}_i)/z$$

where $\sigma^2(\hat{e}_i)$ is the estimated residual variance and z is the sum of squared deviations of the market returns from their mean for the period. Similarly, assume that the estimate of beta in the follow period, $\hat{b}_{2i}$ is related to the true beta by:

$$\hat{b}_{2i} = \beta_i + \tilde{v}_i \tag{10}$$

Now $\hat{b}_{1i}$ is not an unbiased predictor of $\hat{b}_{2i}$, nor is the average of the ranked $\hat{b}_{1i}$ into a high beta portfolio, an unbiased predictor of the estimated realized portfolio beta, $\hat{b}_{2p}$. But, more importantly, $\hat{b}_{2p}$, will be shown to be an unbiased estimate of the true β_p.

Take a cross-sectional regression of $\hat{b}_{2i}$ on $\hat{b}_{1i}$; that is, estimate the regression coefficient λ_1 of the following relationship:

$$\hat{b}_{2i} = \lambda_0 + \lambda_1 \hat{b}_{1i} + \tilde{w}_i$$

where

$$\lambda_1 = \frac{\text{cov}\,(\tilde{b}_{1i}, \tilde{b}_{2i})}{\sigma^2\,(\tilde{b}_{1i})}$$

which on substitution from (9) and (10) is:

$$\lambda_1 = \frac{\text{cov}\,(\beta_i + \tilde{u}_i, \beta_i + \tilde{v}_i)}{\sigma^2\,(\beta_i) + \sigma^2\,(\tilde{u}_i)}$$

and since there is no reason to assume that the random error in period 1, $\tilde{u}_i$ is correlated with the random error in period 2, $\tilde{v}_i$, this reduces to:

$$\begin{aligned}\lambda_1 &= \frac{\sigma^2\,(\beta_i)}{\sigma^2\,(\beta_i) + \sigma^2\,(\tilde{u}_i)} \\ &= \frac{\sigma^2\,(\hat{b}_{1i}) + \sigma^2\,(\tilde{u}_i)}{\sigma^2\,(\hat{b}_{1i})} \\ &= r^2\,(\beta_i, \hat{b}_{i1}) \\ &< 1\end{aligned}$$

as long as there is measurement error in the estimates of $\hat{b}_{1i}$. The

realized $\hat{b}_{2i}$ regress toward the mean. The grouping of securities into portfolios based on the ranked $\hat{b}_{1i}$ will not eliminate this problem since the realized portfolio beta, $\hat{b}_{2p}$ will still regress toward the mean. The $\tilde{u}_i$ in equation (9) of the ranked securities will be correlated. The large estimated betas will tend to have positive errors while the low estimated betas will tend to have negative errors.

However, the estimates of $\hat{b}_{2p}$ are unbiased estimates of the true portfolio beta, β_p, since the $\tilde{v}_i$ in equation(10) will be uncorrelated and random in sign within a portfolio grouping.

That is,

$$E(\hat{b}_{2p}) = \sum_{\substack{i=1 \\ i\epsilon p}}^{N} E(\hat{b}_{2i})/N$$

$$= \frac{1}{N} \sum_{\substack{i=1 \\ i\epsilon p}}^{N} [E(\beta_i) + E(\tilde{v}_i)] = \beta_p$$

This concludes the discussion of the test methodology. The methodology will enable us to use long time series of returns on portfolios with different betas and different realized dividend yields to test for the significance of the dividend factor. The remainder of our analysis will concentrate on testing the model specification and presenting the analysis of the effects of differential dividend yields on security returns.

IV. Empirical Results

We will confine our initial analysis to the post-war period, March 1947 to February 1966. Over this period the tax incentive for capital gains over dividends remained essentially unchanged. Also, evidence in Black et al (1970) suggests that the structure of returns and risk has been relatively constant over this period while the pre-war period was characterized by much larger variations in returns. The pre-war period will be interesting as a contrast to the post war period since there was no differential tax treatment of dividends during this period.

The monthly excess returns on each of the final twenty-five portfolios were regressed on the monthly market excess returns for the period 1947 to 1966. The summary statistics of the regressions are given in Table 1. The evidence in Table 1 tends to confirm our earlier hypothesis. It does not appear that the higher dividend yield classes have larger or smaller mean excess returns (column (3)) than the lower dividend yield classes once we take account of the systematic risk, $\hat{b}$. This can be confirmed to some extent by choosing a $\hat{b}$ from column (4) that is approximately the same in each of the 5 yield classes and observing the corresponding estimated intercept, $\hat{a}$, in column (6). Take the $\hat{b}$ of 1.20 for example and observe that $\hat{a}$ is negative and approximately of the same magnitude in each of the 5 yield classes. There is no tendency, once a $\hat{b}$ is chosen, for the $\hat{a}$ to decrease or increase as a function of the dividend yield. This is a weak test, however, and we will describe a more powerful test below.

Also, notice in Figure 1 that the scatter diagram of the mean excess returns of the portfolios against their corresponding systematic risk indicates that there is one relationship and not distinct lines as

TABLE 1

SUMMARY STATISTICS ON 25 PORTFOLIOS RANKED BY DIVIDEND YIELD AND BETA, 1947-1966

Yield Class (1)	Beta Class (2)	Mean Return (3)	$\hat{b}$ (4)	t-$\hat{b}$ (5)	$\hat{a}$ (6)	$\sigma(\hat{a})$ (7)	t-$\hat{a}$ (8)	$\hat{r}_{im}$ (9)	Ex-Ante δ (10)	Ex-Post δ (11)	Portfolio Number (12)
I	1	.0107	1.22	39.5	-.0025	.0012	-2.1	.93	.082	.067	1
I	2	.0115	1.04	42.4	.0002	.0010	.2	.94	.078	.071	2
I	3	.0103	.96	41.4	-.0001	.0009	- .1	.94	.079	.071	3
I	4	.0098	.80	37.9	.0011	.0008	1.3	.93	.078	.071	4
I	5	.0099	.70	31.9	.0022	.0009	2.6	.90	.078	.071	5
II	1	.0127	1.20	44.5	-.0004	.0011	- .3	.95	.057	.061	6
II	2	.0118	1.08	53.7	.0000	.0008	.0	.96	.058	.061	7
II	3	.0116	.90	50.5	.0017	.0007	2.4	.96	.058	.061	8
II	4	.0110	.79	48.2	.0024	.0007	3.7	.95	.058	.059	9
II	5	.0100	.57	27.8	.0038	.0008	4.8	.88	.057	.060	10
III	1	.0116	1.19	51.7	-.0014	.0009	-1.5	.96	.047	.053	11
III	2	.0121	1.05	51.0	.0006	.0008	.8	.96	.047	.053	12
III	3	.0108	.90	43.0	.0009	.0008	1.1	.94	.047	.053	13
III	4	.0114	.72	31.5	.0036	.0009	4.0	.90	.047	.053	14
III	5	.0094	.56	21.8	.0033	.0010	3.2	.82	.047	.051	15
IV	1	.0114	1.31	50.2	-.0028	.0010	-2.8	.96	.035	.044	16
IV	2	.0110	1.09	47.1	-.0009	.0009	-1.0	.95	.035	.043	17
IV	3	.0099	.94	35.8	-.0003	.0010	- .3	.92	.036	.044	18
IV	4	.0103	.79	28.4	.0016	.0011	1.4	.88	.036	.043	19
IV	5	.0087	.60	21.2	.0022	.0011	2.0	.81	.036	.043	20
V	1	.0107	1.66	39.3	-.0074	.0017	-4.4	.93	.003	.011	21
V	2	.0131	1.50	43.7	-.0032	.0014	-2.4	.94	.006	.016	22
V	3	.0110	1.36	42.1	-.0039	.0013	-3.0	.94	.010	.023	23
V	4	.0111	1.12	37.8	-.0012	.0012	-1.0	.93	.012	.024	24
V	5	.0109	.97	36.7	.0004	.0010	.3	.92	.013	.027	25

AVERAGE RETURN VERSUS RISK

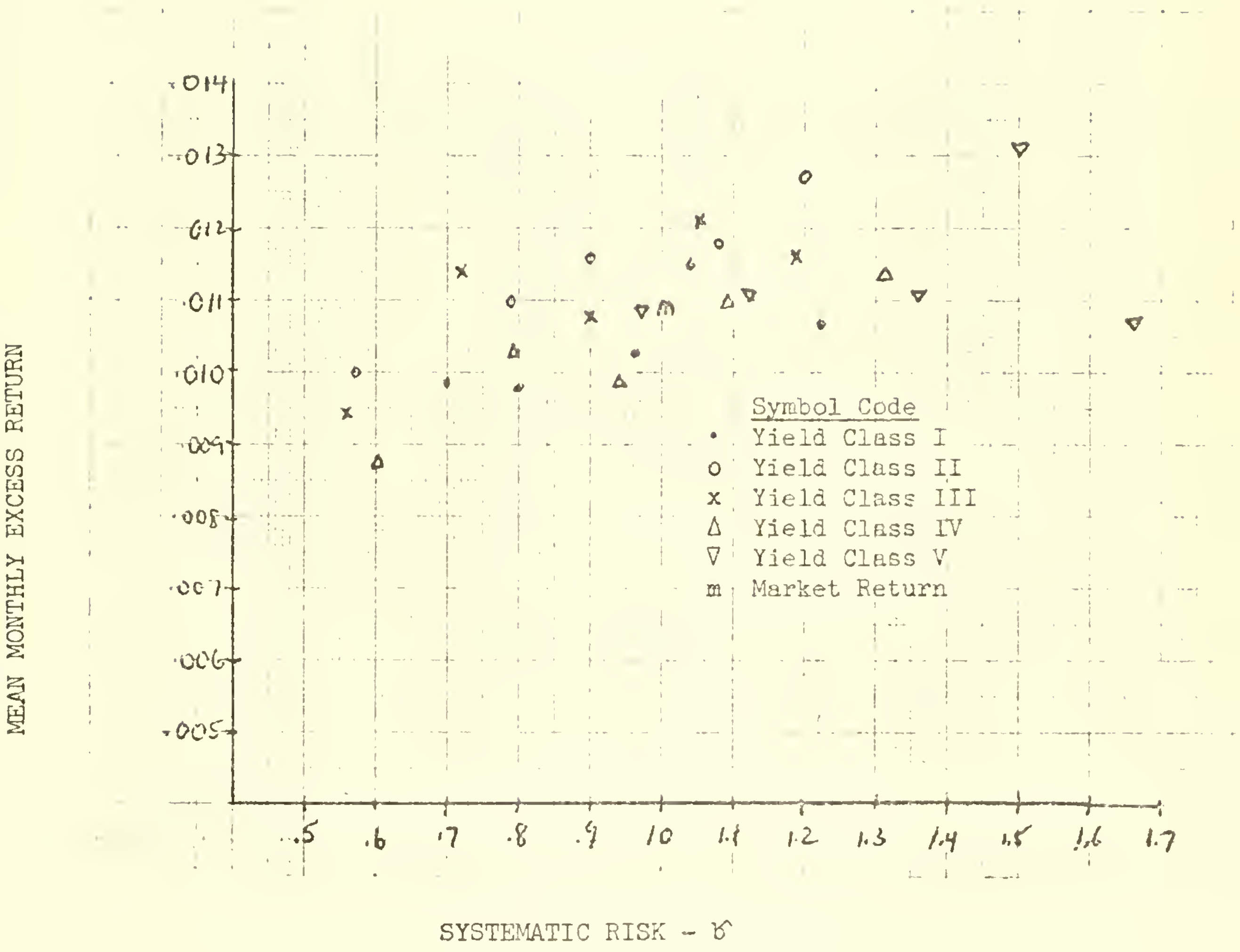

Fig. 1--Scatter diagram of return and risk for 25 portfolios for the period 1947-1966.

a function of the dividend yields. The different symbols denote the different yield classes. The results appear essentially the same as found in the Black et al paper when dividend yield was not considered as a separate variable.

The evidence in Table 1 suggests that the model specification is appropriate. The estimated $\hat{b}$ within each yield class decrease monotonically indicating that there is stability in the estimates of beta. That is, if the betas were not stationary we would not be able to obtain a large spread in the realized portfolio betas for they would fluctuate around a value of 1.0. Also the estimated portfolio betas are extremely accurate estimates of the true beta since as seen in column (5) the t-statistics are all extremely large implying that the standard errors of estimate are very low.

Similarly, the spread in the ex-post or realized average dividend yields[1] is quite large. The top ex-ante dividend yield class had the largest ex-post dividend yields and the other yield classes contain lower and lower realized dividend yields as expected. There is the expected regression toward the mean. The top yield classes tend to lower their dividends, the lowest yield classes tend to raise their dividends. Of interest in this period is that the bottom 4 yield classes tended to increase their dividends while only the top yield class tended to lower their dividends. As Lintner (1956) has shown, firms tend

---

[1] The ex-ante dividend yield, δ in column (10) is the average of the yearly dividend yields for 1947 to 1966 within a portfolio grouping. The ex-post dividend yield in column (11) is the average of the realized dividend yields on each of the 25 portfolios for 1947-1966.

to increase their dividends if managers feel they can maintain the dividend, but they increase the dividend with a lag to increased anticipation of future earnings. Over this period and especially in the 1947-1956 period firms experienced large increases in earnings and future earnings prospects that were reflected in the year's terminal stock price but not as yet in the dividend payout. The dividends tended to be increased in the subsequent year and this is evident from columns (10) and (11) in Table 1. This, as we will see below was not as evident in the period 1956-1966. Even though these arguments would suggest that a distributed lag model such as Lintner proposed would be a better predictor of next years dividend than the classification scheme that we used, severe data limitations would cause the sample size to be drastically cut, and this refinement would not in all probability alter these results. The spread in realized dividend yields is very large and it is not obvious that a more sophisticated model would produce larger spreads.

Also, notice in Table 1 that all the correlation coefficients of the returns on the portfolios with the market, (column 9) are all very high. The serial correlation of the residuals of each of the portfolios was very close to zero indicating that the model is well specified.

There does appear to be a negative association between dividend yield and systematic risk. This is especially so in the lowest dividend yield class which tends to have the highest betas. To confirm this association, we repeated the analysis described in the previous section ranking all the securities in each year by their ex-ante dividend yield

but not using the estimated betas at all for selecting the portfolios. We constructed 25 portfolios using only the ranked ex-ante dividend yield and holding the top 4 percent in portfolio 1 for a year, the next 4 percent in portfolio 2 for a year and the bottom 4 percent in portfolio 25. The next year we recomputed the dividend yields and held the top ranked 4 percent in portfolio 1 and continued in this way until we had monthly excess portfolio returns from 1931 to 1966. We ran the 25 regressions of these excess monthly portfolio returns on the market excess monthly return for the 1947-1966 period to compare the results with those shown in Table 1. The summary statistics of these regressions are presented in Table II. Since the betas are ex-post betas and not used for portfolio selection, they are unbiased estimates of the true portfolio betas. In fact, each successive group of 5 portfolios in Table 1 will have the same average values of the mean return, $\hat{a}$, $\hat{b}$, ex-ante δ, and ex-post δ, as the corresponding group of 5 portfolios in Table 2. In Table 2, column (5) we see that once again there does not appear to be any tendency for the estimated intercepts to decrease or increase as a function of the dividend yield once we control for beta. It is interesting to observe in column (3) that the $\hat{b}$ first tend to decrease as the dividend yield goes down and then increase dramatically only in the last 5 portfolios. The relationship between dividend yield and beta tends to be somewhat U-shaped or non-linear. Also the spreads on the betas tend to be very small except for the last 5 portfolios. This shows the superiority of the methodology used to construct portfolios that preserves the spread on the betas. We loose virtually nothing

TABLE 2

SUMMARY STATISTICS ON 25 PORTFOLIOS RANKED ON DIVIDEND YIELD, 1947-1966

Portfolio Number (1)	Mean Return (2)	$\hat{b}$ (3)	$t_{\hat{b}}$ (4)	$\hat{a}$ (5)	$\sigma(\hat{a})$ (6)	$t_{\hat{a}}$ (7)	$\hat{r}_{im}$ (8)	Ex-Ante δ (9)	Ex-Post δ (10)
1	.0101	.96	29.8	-.0004	.0013	- .3	.89	.108	.079
2	.0100	.96	42.3	-.0005	.0009	- .6	.94	.079	.071
3	.0113	.93	43.4	.0011	.0009	1.3	.94	.073	.069
4	.0108	.91	44.3	.0009	.0008	1.1	.95	.068	.067
5	.0104	.94	46.3	.0002	.0008	.3	.95	.065	.065
6	.0110	.92	56.8	.0010	.0006	1.5	.97	.062	.063
7	.0111	.89	50.6	.0013	.0007	1.9	.96	.060	.062
8	.0118	.89	43.2	.0020	.0008	2.5	.94	.057	.061
9	.0112	.92	53.8	.0012	.0007	1.8	.96	.055	.058
10	.0119	.90	50.5	.0020	.0007	2.8	.96	.053	.057
11	.0101	.88	49.5	.0005	.0007	.6	.96	.051	.055
12	.0105	.88	44.2	.0010	.0008	1.2	.95	.049	.054
13	.0116	.89	45.7	.0019	.0008	2.4	.95	.047	.052
14	.0105	.87	43.9	.0010	.0008	1.2	.95	.045	.052
15	.0121	.89	40.6	.0024	.0009	2.8	.94	.043	.050
16	.0103	.90	43.8	.0005	.0008	.6	.95	.041	.047
17	.0106	.92	41.0	.0006	.0009	.7	.94	.039	.046
18	.0094	.92	38.2	-.0007	.0010	- .7	.93	.036	.044
19	.0104	.95	41.3	.0000	.0009	.0	.94	.033	.041
20	.0108	1.03	36.5	-.0004	.0011	- .4	.92	.029	.037
21	.0116	1.15	49.5	-.0010	.0011	- .9	.94	.025	.032
22	.0120	1.20	44.2	-.0011	.0012	- .9	.93	.016	.028
23	.0111	1.37	45.7	-.0038	.0014	-2.7	.93	.004	.015
24	.0109	1.46	43.9	-.0049	.0017	-3.0	.91	.000	.013
25	.0112	1.45	40.6	-.0046	.0015	-3.0	.93	.000	.012

in the spread on the realized dividend yields, (compare column (10) in Table 2 with column (11) in Table 1) but gain in a large spread in the realized betas.

One way to test the significance of the dividend variable in explaining security returns is to run a cross-sectional regression of the mean excess returns of each of the 25 portfolios against the estimated betas and the realized dividend yields. Since the realized betas have very low standard errors, measurement error in the betas will not effect the results to any great degree. We ran the cross-sectional regression using the statistics from the two groups of portfolios and the results are shown in Table 3. As seen by the panel, the beta term comes in significantly, and the sign on the dividend yield term is positive but insignificantly different from zero. In the second panel, B, the beta term and the dividend term come in with negative signs and both are insignficant. This evidence suggests that ranking on dividend yield and then beta gives much more relevant information. We don't destroy the spread on the betas or the dividend yield.

However, cross-sectional regressions such as this are only suggestive in that the non-linearity of the relationship between beta and dividend yield may make the magnitudes and the signs of the coefficients change in different periods. For this reason, we suggest a more powerful time series procedure that controls for the differential riskiness of the portfolios but preserves the spread in the dividend yields. From the data in Table 1 it is possible to construct two portfolios; one portfolio with high realized dividend yield and a beta of 1.0 and the

TABLE 3

MEAN EXCESS RETURNS ON SYSTEMATIC RISK

DIVIDEND YIELD, 1947-1966

A. Ranked on dividend yield and beta

$\bar{R}_i =$	γ_0	$+ \gamma_1 \hat{b}_i$	$+ \gamma_2 \delta_i$	r^2
	.0087 (.0006) t=14.6	.0023 (.0006) t=4.0		.41
	.0115 (.0006) t=18.5		-.0094 (.0119) t= -.79	.03
	.0075 (.0011) t=7.0	.0028 (.0007) t=4.2	.0149 (.0108) t=1.3	.46

B. Ranked on dividend yield

$\bar{R}_i =$	γ_0	$+ \gamma_1 \hat{b}_i$	$+ \gamma_2 \delta_i$	r^2
	.0103 (.0010) t=10.9	.0006 (.0009) t=.7		.02
	.0113 (.0005) t=23.6		-.0086 (.0092) t= -.9	.04
	.0118 (.0025) t=4.8	-.0110 (.0170) t= -.7	-.0003 (.0017) t= -.2	.04

second portfolio with a low realized dividend yield and a beta of 1.0. That is, if we make one portfolio out of the excess returns from portfolios 1-9, 11-12, 16, and .53 percent of portfolio 10, the average beta of this portfolio would be 1.0 and the average dividend yield of this portfolio would be the average of the realized dividend yields of the 12.53 portfolios, or 6.2 percent. Using the high dividend yield portfolios to construct a portfolio with average beta of 1.0 and having the largest spread in its realized dividend yield relative to the market dividend yield of 4.9 percent required that we use this combination of portfolios. This gave us a spread of 1.3 percent on the dividend yield. The remaining portfolios were grouped into a single portfolio and this portfolio will also have a beta of 1.0. The realized dividend yield on this portfolio was 3.6 percent with a spread of -1.3 percent relative to the market portfolio. A regression of the excess returns on each of these two portfolios was run on the market portfolio. The test of the significance of the dividend factor in explaining security returns is the magnitude and significance of the new estimated alpha in these two regressions. The results of the two regressions were as follows:

$$R_{i,t} = \underset{\substack{(.00033)\\ t=.72}}{.00024} + \underset{\substack{(.0085)\\ t-118.3}}{1.000}\, R_{m,t} \qquad r^2 = .984$$

$$R_{i,t} = \underset{\substack{(.00033)\\ t=-.72}}{-.00024} + \underset{\substack{(.0085)\\ t-118.3}}{1.000}\, R_{m,t} \qquad r^2 = .984$$

The intercept is insignificantly different from zero with a "t" value of .72 when we compare the intercept with its theoretical value of

zero[1]. If we take the estimated intercept at face value, this implies that over a year we would earn approximately 12 times .00024 or a .288 percent excess yearly return with a spread of 1.3 percent in the dividend yield. This implies that the estimated elasticity is:

$$\eta = .288/1.3 = .22$$

A one percent increase in the spread of the dividend yield of the portfolio would imply a .22 percent increase in return per year; a number that is certainly within transactions costs. Since the excess return is insignificantly different from zero, the evidence indicates that differential dividend yields have no material effect on a security's return. Even with market imperfections, market prices adjust as if there were no market imperfections associated with dividend and non-dividend paying securities.

a. A Confirmation of the Results In Different Time Periods

The returns on the 25 portfolios allow us to check the sensitivity of the results in different time periods. Since the 1947-1966 results indicated that the dividend factor did not explain differential security returns over this period, it will be of interest to divide the period into two periods, 1947-1955 and 1956-1966 to check the sensitivity of the dividend effect. The regressions on the twenty-five portfolios were run using only the 1947-1955 data and then run on only the 1956-1966 data. The summary statistics on the regressions are displayed in Tables 4 and 5.

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[1] Although, there are other combinations of portfolios that will give differential dividend yields and an average portfolio beta of 1.0, there is a trade-off between diversification on the one hand, (more portfolios in a group the larger will be the correlation with the market portfolio and a lower standard error on the intercept) and spread in yields on the other hand. We tried other combinations and although the intercepts changed somewhat, they still remained insignificantly different from zero.

TABLE 4

SUMMARY STATISTICS ON 25 PORTFOLIOS RANKED BY DIVIDEND YIELD AND BETA, 1947-1955

ield lass (1)	Beta Class (2)	Mean Return (3)	$\hat{b}$ (4)	$t_{\hat{b}}$ (5)	$\hat{a}$ (6)	$\sigma(\hat{a})$ (7)	$t_{\hat{a}}$ (8)	$\hat{r}_{im}$ (9)	Ex-Ante δ (10)	Ex-Post δ (11)	Portfolio Number (12)
I	1	.0139	1.22	33.6	-.0012	.0015	- .8	.95	.099	.084	1
I	2	.0150	1.10	34.4	.0014	.0013	1.1	.96	.093	.084	2
I	3	.0120	1.02	33.7	-.0006	.0012	- .5	.95	.095	.084	3
I	4	.0106	.86	27.8	.0000	.0013	.0	.93	.092	.083	4
I	5	.0108	.75	25.3	.0016	.0012	1.3	.92	.095	.086	5
II	1	.0144	1.23	32.0	-.0009	.0016	- .6	.95	.070	.073	6
II	2	.0141	1.10	42.4	.0006	.0011	.5	.97	.070	.074	7
II	3	.0132	.95	38.1	.0015	.0010	1.5	.96	.070	.072	8
II	4	.0110	.83	40.2	.0008	.0009	.9	.97	.070	.071	9
II	5	.0092	.56	22.2	.0022	.0011	2.1	.90	.069	.072	10
III	1	.0142	1.25	44.3	-.0012	.0012	-1.0	.97	.057	.067	11
III	2	.0148	1.04	41.0	.0020	.0011	1.9	.97	.057	.065	12
III	3	.0137	.90	28.9	.0026	.0013	2.0	.94	.057	.064	13
III	4	.0134	.73	29.5	.0044	.0010	4.3	.94	.057	.064	14
III	5	.0010	.50	18.5	.0038	.0011	3.4	.87	.057	.061	15
IV	1	.0135	1.27	36.8	-.0023	.0014	-1.6	.96	.044	.057	16
IV	2	.0131	1.05	31.7	.0001	.0014	.1	.95	.044	.055	17
IV	3	.0119	.88	23.8	.0010	.0015	.6	.91	.045	.055	18
IV	4	.0107	.72	18.8	.0017	.0016	1.1	.87	.044	.052	19
IV	5	.0087	.53	15.4	.0022	.0014	1.6	.82	.044	.050	20
V	1	.0118	1.68	26.7	-.0089	.0026	-3.5	.93	.004	.014	21
V	2	.0150	1.53	29.8	-.0039	.0021	-1.8	.94	.007	.020	22
V	3	.0112	1.36	30.2	-.0056	.0019	-3.0	.94	.0128	.028	23
V	4	.0111	1.10	30.3	-.0025	.0015	-1.7	.94	.0162	.031	24
V	5	.0120	.86	26.9	.0013	.0013	1.0	.93	.0197	.037	25

TABLE 5

SUMMARY STATISTICS ON 25 PORTFOLIOS RANKED BY DIVIDEND YIELD AND BETA, 1956-1966

Yield Class (1)	Beta Class (2)	Mean Return (3)	$\hat{b}$ (4)	$t_{\hat{b}}$ (5)	$\hat{a}$ (6)	$\sigma(\hat{a})$ (7)	$t_{\hat{a}}$ (8)	$\hat{r}_{im}$ (9)	Ex-Ante δ (10)	Ex-Post δ (11)	Portfolio Number (12)
I	1	.0075	1.20	23.9	-.0039	.0019	-2.1	.91	.066	.051	1
I	2	.0080	.96	26.9	-.0011	.0014	- .8	.93	.064	.059	2
I	3	.0090	.89	26.3	.0006	.0013	.5	.93	.064	.058	3
I	4	.0092	.74	26.8	.0022	.0010	2.2	.93	.065	.058	4
I	5	.0091	.65	20.0	.0029	.0012	2.4	.88	.063	.057	5
II	1	.0010	1.16	31.3	-.0001	.0014	- .1	.95	.046	.048	6
II	2	.0095	1.05	34.0	-.0005	.0012	- .4	.95	.047	.048	7
II	3	.0100	.86	34.1	.0019	.0010	2.0	.95	.047	.049	8
II	4	.0113	.75	31.3	.0042	.0009	4.6	.95	.047	.048	9
II	5	.0110	.57	18.1	.0055	.0012	4.6	.86	.046	.049	10
III	1	.0087	1.13	32.1	-.0020	.0013	-1.5	.95	.038	.039	11
III	2	.0092	1.06	32.5	-.0008	.0012	- .6	.95	.038	.040	12
III	3	.0080	.91	32.6	-.0006	.0011	- .6	.95	.038	.042	13
III	4	.0098	.71	18.4	.0031	.0015	2.2	.86	.038	.041	14
III	5	.0094	.64	15.0	.0033	.0016	2.1	.81	.038	.042	15
IV	1	.0091	1.35	35.2	-.0037	.0015	-2.6	.96	.027	.031	16
IV	2	.0088	1.13	35.4	-.0019	.0012	-1.6	.96	.028	.031	17
IV	3	.0080	.99	27.4	-.0015	.0014	-1.1	.93	.028	.033	18
IV	4	.0101	.88	22.3	.0018	.0015	1.2	.90	.028	.034	19
IV	5	.0092	.68	15.8	.0027	.0016	1.7	.83	.029	.035	20
V	1	.0092	1.63	30.0	-.0062	.0020	-3.0	.94	.002	.008	21
V	2	.0110	1.46	32.6	-.0029	.0017	-1.7	.95	.006	.012	22
V	3	.0102	1.37	31.6	-.0028	.0016	-1.7	.95	.007	.017	23
V	4	.0110	1.16	24.2	.0000	.0018	.0	.92	.008	.018	24
V	5	.0099	1.08	27.1	-.0004	.0015	- .3	.93	.007	.018	25

It appears from column (6) in Table 4 and 5 that the dividend factor tended to be positive in the period 1947-1955 and negative in the period 1956-1966. The variability in the sign of the coefficients is what we would expect if the dividend factor is insignificant. The estimated betas of the corresponding portfolios tended to be very similar in both periods with a tendency for the high dividend yielding securities to have slightly lower betas in the second half of the period. Also, of interest is a comparison of column (11) in both tables. The ex-post average dividend yields in the second period are much lower, on average, than the first half of the period. The mean dividend yield was 6.0 percent for 1947-1955 and 3.8 percent for 1956-1966. However, we must realize that the post war period has been marked by generally rising stock prices. Evidence in Weston and Brigham (1969) suggests that corporate payouts have remained relatively constant over the post war period. For 1945-1950 corporations paid out 36 percent of after tax profits; 1950-1955 41 percent; 1955-1960, 45 percent and 1960-1966 they paid out 47 percent. During the 1931-46 period the average dividend yield was 4.1 percent which indicates that most of the fluctuation in dividend yields is due to stock price changes and not to corporations altering their dividend payout policies to any great extent.

Once again we constructed two portfolios in each time period that would have a large spread in dividend yield and a realized beta of 1.0. In the first period, we combined portfolios 1-9, 11-13, and 50 percent of portfolio 10, which gave an average dividend yield of 7.5 percent and a spread over the market dividend yield of 1.5 percent. In the second period we combined portfolios 1-8, 11-13 and 16, which gave an average

dividend yield of 4.9 percent and a spread over the market dividend yield of 1.1 percent. The regression results for the two high dividend yielding portfolios were as follows:

$$\begin{array}{lccccc}
R_{i,t} & = & .0006 & + & 1.00\ R_{m,t} & r^2 = .99 \\
 & & (.00038) & & (.00932) & \text{period } 1947\text{-}1955 \\
 & & t=1.57 & & t=107.4 & \\
\end{array}$$

$$\begin{array}{lccccc}
R_{i,t} & = & -.00043 & + & 1.00\ R_{m,t} & r^2 = .97 \\
 & & (.00057) & & (.0151) & \text{period } 1956\text{-}1966 \\
 & & t= -.75 & & t=66.2 & \\
\end{array}$$

We see that in the earlier period the intercept was positive and in the later period the intercept was negative. In both periods it was insignificantly different from zero as we expected.

The 1931-1946 period will be interesting as a contrast to the post war period. The regressions were run on the twenty-five portfolios using the excess monthly returns from 1931-1946. The results are summarized in Table 6. The estimated alphas in column (6) of the Table indicate that the high dividend yielding securities had negative alphas in this period. But as seen in column (7) and column (8) the standard errors of estimate are larger in this period than the post-war period and only 2 portfolios have t statistics on the intercept greater than 2.0. The estimated betas in column (4) tend to be much lower for the high dividend yield classes than we observed in the post-war period and this factor made it more difficult to select a portfolio that would have an average beta of 1.0 yet still have a high dividend yield. To construct this portfolio it was necessary to use portfolios 1 to 8, 11-12, 16-17 and 50 percent of portfolio 13. The average realized dividend yield of this portfolio was 5.3 compared to 4.1 percent for the market. The 1.2 percent spread in the realized dividend yield is about the same as the spread in

TABLE 6

SUMMARY STATISTICS ON 25 PORTFOLIOS RANKED BY DIVIDEND YIELD AND BETA, 1931-1946

Yield Class (1)	Beta Class (2)	Mean Return (3)	$\hat{b}$ (4)	$t_{\hat{b}}$ (5)	$\hat{a}$ (6)	$\sigma(\hat{a})$ (7)	$t_{\hat{a}}$ (8)	$\hat{r}_{im}$ (9)	Ex-Ante δ (10)	Ex-Post δ (11)	Portfolio Number (12)
I	1	.0155	1.05	37.6	-.0038	.0036	-1.1	.94	.106	.071	1
I	2	.0112	.92	39.3	-.0051	.0030	-1.7	.94	.099	.072	2
I	3	.0144	.77	34.2	.0003	.0029	.1	.93	.103	.078	3
I	4	.0107	.68	28.1	-.0018	.0031	- .6	.90	.102	.075	4
I	5	.0108	.61	28.8	-.0005	.0027	- .2	.90	.099	.075	5
II	1	.0156	1.03	47.8	-.0034	.0028	-1.2	.96	.058	.054	6
II	2	.0130	.84	39.7	-.0025	.0027	- .9	.95	.061	.057	7
II	3	.0124	.79	33.7	-.0021	.0030	- .7	.93	.062	.057	8
II	4	.0094	.57	32.4	-.0012	.0023	- .5	.92	.062	.059	9
II	5	.0107	.44	23.1	.0026	.0025	1.0	.86	.061	.061	10
III	1	.0213	1.32	59.3	-.0030	.0029	-1.1	.97	.031	.036	11
III	2	.0189	1.12	37.2	-.0018	.0039	- .5	.94	.033	.036	12
III	3	.0179	1.00	37.2	-.0005	.0035	- .1	.94	.034	.038	13
III	4	.0145	.80	30.9	-.0002	.0033	- .1	.91	.035	.041	14
III	5	.0132	.69	25.1	.0005	.0035	.2	.88	.037	.041	15
IV	1	.0280	1.51	40.6	.0003	.0048	.1	.95	.007	.014	16
IV	2	.0257	1.34	46.3	.0011	.0037	.3	.96	.009	.018	17
IV	3	.0243	1.20	35.5	.0023	.0044	.5	.93	.011	.020	18
IV	4	.0168	1.02	52.7	-.0021	.0025	- .8	.97	.012	.020	19
IV	5	.0165	.85	29.0	.0008	.0038	.2	.90	.014	.024	20
V	1	.0300	1.54	35.0	.0016	.0057	.3	.93	.000	.004	21
V	2	.0269	1.46	47.5	.0000	.0040	.0	.96	.000	.012	22
V	3	.0261	1.31	58.5	.0019	.0030	.7	.97	.000	.011	23
V	4	.0317	1.20	40.3	.0095	.0039	2.5	.95	.000	.013	24
V	5	.0250	.95	34.8	.0072	.0035	2.1	.93	.001	.014	25

the post war period. It does appear that even if the levels of dividend yields change in various periods, the spread remains relatively constant. The regression result for the 1931-1946 period for the high dividend yield portfolio was

$$R_{i,t} = \underset{\substack{(.001)\\ t=-1.7}}{-.0018} + \underset{\substack{(.008)\\ t=121.8}}{1.00}\, R_{m,t} \qquad \begin{array}{c} r^2 = .99 \\ \text{period 1931-1946} \end{array}$$

indicating that even though the higher dividend yielding securities had lower returns than predicted by the capital asset pricing model, the standard error is quite large and therefore the t-statistic of -1.7 is still not significant at the five percent level. Some may interpret these results as an indication of a dividend preference in the pre-war period that was not completely satisfied by the corporations. One must be very careful to attribute significance to the magnitude of this number since it does have a large standard error.

The sub-period 1940-1945 is of interest because the tax on dividends was instituted in 1942. One could argue that if this factor had a significant impact on the structure of returns in the market, high dividend yielding securities would experience capital losses to induce investors to hold these securities while low dividend yielding securities would go to a premium in the market. Thus, high dividend yielding securities would have negative alphas and low dividend yielding securities would experience positive alphas over this period. This is not the case. The high dividend yielding portfolio with a beta of 1.0 had an average alpha of -.0008 and a spread of 1.0 percent in its realized dividend yield. This alpha was again not significantly different from zero.

Combining the results of both periods 1931-1966 produced results that were the average of the two periods and obviously for the total period

the dividend factor had virtually zero weight in explaining security returns. The market, on the average, does not pay more or less for securities that have high dividend yields once we control for the differential riskiness of securities in the sample.

V. Summary and Conclusions

The main conclusion of our analysis is that a dollar of dividends has the same value as a dollar of capital gains in the market. There are virtually no differential returns earned by investors who buy high dividend yielding securities or low dividend yielding securities once we control for the crucial risk variable. The demand for dividends is met by corporations who supply dividends and the end result is a market equilibrium in which the dividend factor is insignificant in magnitude.

We have presented a powerful time series test of the effects of differential dividend yields on security returns and found that even with market imperfections the returns on securities are unaffected by these imperfections. The use of the time series methodology avoids all the problems associated with errors of measurement and omitted variables that plague the cross-sectional tests. The investor is interested in changes in his terminal wealth. This suggests a time series methodology to measure his differential wealth position given a dividend and risk choice. Even in different periods, if the cross-sectional tests indicated that dividends were preferred,this would not show up in the time series results. In many different time periods, with changing economic conditions and payouts the dividend factor was insignificant in explaining security returns.

There are two hypotheses that could explain these findings and

the evidence presented in this paper is consistent with both hypotheses. The first hypothesis is that each firm attracts a "clientele" of investors who prefer a certain dividend yield. As our results indicate it would not matter what particular "clientele" the firm attracted. Firms have adjusted their payouts to match the demands of client classes. Thus, investors who prefer dividends would be attracted to dividend paying firms and investors who preferred not to receive dividends for tax reasons would be attracted to non-dividend paying firms.

A second hypothesis that could explain these results is that a dollar of dividends has the same value as a dollar of capital gains even in the presence of market imperfections. That is, it is not worth the extra costs for investors to worry about whether or not their return is coming from a dollar of dividends or a dollar of capital gains. At the margin no investor will worry about this difference.

The results with the two portfolios with betas of 1.0 and differential dividend yield of 1.3 percent for the post war period can be used as an example. The estimated alpha for the high dividend yielding portfolio was .00024. For this extra return the investor was forced to take extra risk because the portfolio returns were not perfectly correlated with the market. The return was insignificantly different from zero and was negative in some periods and positive in other periods. If the investor in a high marginal tax braket, 50 percent for example, bought the high dividend yielding portfolio, his after tax return would be reduced by .5 x 1.3 or by .65 percent a year. On a monthly basis this would be .0005 and he would make .00024 - .0005 or an excess return of -.00026 after taxes instead of -.00024 if he held the low dividend yielding portfolio.

If he held the market portfolio or forgot about the dividends he would have been as well off.

Apart from playing with the numbers it is obvious if the effect is insignificant the investor shouldn't worry about the fact he must pay taxes on dividends received. The extra risk he must take is not worth the extra returns especially if in some periods his net results will be negative and some periods positive.

Whether or not it is the clientele effect or the non-preference effect is immaterial for basic policy considerations of corporations. Since it is of little consequence what payout policy a corporation adopts, the dividend policy of a corporation has no effect on its security's returns. As always, the crucial investment decisions of corporations effect their performance not the way they pay out the fruits of their endeavors to corporate shareholders. There is no optimal dividend payout policy for the corporation.

This methodology can be extended to other situations in which the variable of interest is correlated with the riskiness of firms. For example, the methodology can be used to test whether or not the price earnings ratio of corporations, the growth factor, implies differential security returns once we control for risk. This analysis can be used to evaluate analyst performance over time, to evaluate valuation models as well as other variables that the change over time such as corporate earnings and investment. The evidence that is presented in this paper as well as in the Black _et al_ paper suggests that other factors may be differentially effecting security returns. One factor that does not account for differential returns is the dividend factor.

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