

**CORPORATE DIVIDEND PAYOUT POLICY**

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**I. Introduction and Preliminary Analysis**

One of the major puzzles in corporation finance is why corporations pay out a large share of their earnings as dividends, instead of retaining them for reinvestment, in view of the substantially higher income tax rates that individual stockholders must pay on dividends relative to capital gains. Sometimes tax avoidance devices are cited as a basis for minimizing these disincentives but all the evidence we are familiar with would suggest that in fact very limited use is made of the avoidance devices described by Miller and Scholes [1978]. Direct evidence on the limited use of these devices is provided by Feenberg [1981] and by Peterson, Peterson and Ang [1985]. As pointed out by Modigliani [May 1982], all credible estimates of the effective capital gains tax indicate that it is very much lower than the effective personal tax rate, at least for the United States and we suspect in most countries. Thus it can be shown that the payment of dividends must unequivocally reduce the market value of the firm within the cost/benefit structure ordinarily studied, at least until the advent of signalling theories.

The effective capital gains tax in the United States for the post-World War II period has been estimated to be roughly .05 in magnitude in two independent studies by Feldstein [1976] and by Friend and Hasbrouck [1982]. Estimates of the effective rate of taxation on dividend income in the United States have been consistently higher and have generally ranged from about .25 to .50. The most recent estimate we have seen, by Ang and Peterson [1985], was about .50, actually .566 on the assumption of a zero tax rate on capital gains, though we suspect that this is well on the high side. Other post-World War II estimates ranged from 25% by Friend and Puckett [1964], 35% by Elton

and Gruber [1970], 36% by Jolivet [1966], to 46% by Weston and Brigham [1966], based on several different approaches and periods. Regardless of the approach taken to the estimation of the effective tax rate on dividend income, all of the estimates we have seen systematically indicate a much higher rate than that on capital gains.

How is the over \$80 billion of annual dividend payout in the United States in 1985 to be explained? We estimate that something under half of these dividends are received by institutional investors. This is based on findings by Blume and Friend [1987], that institutional investors probably hold less than half of all outstanding stock and received a median dividend yield of 3.42% on all common stocks held in 1985, almost identical with the median dividend yield of 3.40% for stock held by all investors.<sup>1</sup>

Assuming a zero tax rate for institutions, an effective personal tax rate on dividends of between 25% and 50%, and an effective capital gains tax of 5%, it would appear that \$8 to \$18 billion of unnecessary taxes are paid by stockholders each year. This is hardly an inconsequential amount.

The initial question to be addressed is whether dividends are paid out by management because it believes stockholders value a dollar of after-tax dividend income more than a dollar of after-tax retained earnings and the resulting capital gains, or whether management pays dividends on its stock even though it believes stockholders would prefer retention of earnings or capital gains. The latter possibility would not seem to make much sense unless some reason were found for management to prefer dividend payout to retention of earnings. On the other hand, if management simply behaved in a manner consistent with stockholder wishes, then we are left with the obvious question of why stockholders should hold such apparently irrational preferences.

One possible explanation is that stockholders may not have great confidence that a dollar of retained earnings will necessarily produce a dollar of

capital gains for them.<sup>2</sup> The statistical relationship between aggregate retained earnings and capital gains is not impressive. In four regressions covering the post-World War II period, annual capital gains of NYSE firms were not found to be significantly related to retained earnings for the same year or for previous years, and the multiple correlation coefficients adjusted for degrees of freedom were close to zero.<sup>3</sup> Particularly notable is the decade of the 1970s, when a substantial volume of retained earnings was associated with substantial capital losses. While uncertainty as to the impact of retained earnings on capital gains might help to explain a relatively low valuation placed on retained earnings, it would not, of course, affect the valuation placed on capital gains actually achieved.

Apart from the extensive cross-section regression analyses which will be discussed subsequently, there are three quite different sources of relevant data bearing on the value placed on dividends relative to capital gains, all of which tend to support the view that the market is indifferent between a dollar of before-tax dividend income and a dollar of other corporate return or actually prefers dividend income in spite of the higher taxes that have to be paid on such income. The first is the well-known analysis of the Citizens Utility case by Long [1978], which finds that per dollar of before-tax return the price of taxable dividend-paying shares issued by this utility is approximately equal to or somewhat higher than that of another class of otherwise equivalent stock issued by the same corporation which pays only untaxed stock dividends. Both Long and Poterba [1986], who recently expanded and updated the earlier analysis of Citizens Utility, concluded that the market considered a dollar of before-tax income on dividend-paying shares at least as desirable as a dollar of capital gains.

Related evidence on the apparent preference by many investors for dividends rather than retained earnings is provided by the outcome of a General

Public Utilities Corporation proposal to substitute stock dividends for cash dividends, associated with an offer to sell these stock dividends (with minimal brokerage costs) on behalf of any stockholder who wanted to realize the same cash income as he would have received from dividends. In spite of the substantial cash savings to G.P.U. and its stockholders that would have resulted, the reaction of stockholders was strongly negative and the proposal was dropped. (See details in Loomis, "A Case for Dropping Dividends" [1968], or summary in Shefrin and Statman [1984].) Reference might also be made to another related phenomenon -- the recent dramatic growth of new fixed income mutual funds with portfolios largely based on a combination of GNMA's and long-term and intermediate-term government bonds. In such portfolios, capital gains are frequently sacrificed for yield.

The two other independent sources of information which point to some market preference for dividend income are a survey of a large sample of U.S. individual investors in different socio-economic classes conducted in the latter part of 1975 by Blume and Friend [1978], and surveys of corporate financial and related policy conducted by Blume, Friend and Westerfield [1982, 1984]. The 1975 survey of individual investors indicated a preference for dividends over retained earnings by investors in all economic classes including those with over \$50,000 in yearly income and over \$100,000 in market values of stock holdings. The 1984 corporate survey indicated that 47% of the managers believed that their stock's market price would go up as a result of increased dividends compared with 17% who believed that market price would go down. The question asked was "Suppose your firm increased its cash dividend by 20 percent more than was generally anticipated by investors, or began paying a cash dividend if you now pay none, with no accompanying explanation for the changes in dividend payout, what do you believe would happen to your stock price?"

Corporate management was also asked how such an increase would be financed and, of particular interest in the present context, why they believed stock prices would be different. Informational effects were cited most often, with higher stock prices resulting if greater future profitability was inferred and lower prices if the dividend increase was viewed as indicating a lack of profitable investment opportunities. Upside effects exceeded downside effects by 15 percentage points. However, the next most important reason cited for the expected increase in price was that cash dividends are valued by investors more highly than uncertain but potentially greater dividends in the future: 12% of the respondents provided this answer while less than 1% stated they expected a decrease in prices because investors have a tax-based preference for capital gains rather than dividends.

These various items of direct evidence on the effect of dividend policy on stock prices and market returns jointly seem to indicate that market prices reflect preference for dividends by investors which at least in considerable part offsets the negative personal tax effect of dividend payout. This obviously is a distasteful finding from the viewpoint of economic theory based on expected utility maximization so that many attempts have been made to reconcile theory and the empirical evidence.

Section II of this paper will deal with signalling models, the most recent and currently most fashionable explanation of dividend payout. Section III will discuss just how much tax changes have affected payout ratios since it seems likely that unfavorable (favorable) changes in taxation of dividend income relative to capital gains would show at least some positive association with decreases (increases) in the payout ratio. Section IV will describe and analyze the results of earlier cross-section regression studies which have attempted to ascertain the relative pricing of one dollar of dividends versus one dollar of retained earnings or capital gains, and will examine alternative

rationales for dividend preferences. Section V will draw some tentative conclusions from the theoretical analysis and empirical findings obtained from all available approaches.

However, before proceeding to the rest of the paper, we should like to discuss briefly three offsets to differential tax effects which have sometimes been adduced to explain the otherwise surprisingly high dividend payout -- viz., lack of adequate corporate investment opportunities, capital market transaction costs and, more prominent in the literature, clientele effects. The first two reasons for dividend payout are not likely to be major. Even if there were in some sense a shortage of investment opportunities, it is not clear why corporations could not buy back their own shares or buy equally risky marketable securities of other corporations.<sup>4</sup> In terms of the expense of realizing capital gains for current use, explicit costs on the sale of shares would probably have averaged well under 2% in this period, though implicit transaction (including information) costs might be significantly higher especially for the elderly. Mutual funds could be used to minimize excessive implicit costs but this adds another layer of agency costs in the form of sales loads and management fees.

While clientele effects reflecting tax differentials -- especially as between individual and institutional investors and between high income and lower income stockholders -- have frequently been assigned a major role in the explanation of the substantial dividend payout, it is easy to show that there is little basis for this position. To cite direct evidence, Poterba notes that for Citizen's Utility, the one company for which the dividend payout effect can be analyzed directly, institutions had negligible holdings. Much more cogent evidence against the adequacy of institutional clientele effects to explain the large dividend payout by corporations is provided by the finding, mentioned earlier, of almost identical dividend yields on stocks held

by institutions and those held by investors as a whole. Along the same lines, Table 1 provides the results of cross-section regressions of stock prices on dividends and retained earnings for a large sample of NYSE stocks in 1976 grouped by the percent of stocks held by pension funds, as obtained from Hobeika [1980]. Institutional ownership does not seem to increase the dividend coefficient relative to the retained earnings coefficient either in this year or in the other years covered.

Even for individual investors, where studies by Crockett and Friend [1963] for 1960 and by Blume, Crockett and Friend [1974] for 1971 do provide direct evidence of a greater preference by high income than by low income investors for stocks with low dividend yields, the difference is not nearly so marked as might have been expected from differential tax effects. This evidence is summarized in Table 2.

Another clientele effect has recently been addressed in a paper by Shleifer and Vishny [1986]. That paper attributes dividend payout to the preference of corporations which are large stockholders in other companies. Such preferences reflect the lower intercorporate tax rate on dividend income as against much higher capital gains tax rates. This argument to explain the observed substantial payout of U.S. corporations seems without substance for two reasons. First, the corporations in which other corporations are large stockholders are generally wholly-owned subsidiaries and their payout policy has little relevance to the companies paying out the great bulk of dividends. Second, the dividend aggregate and associated personal tax burden referred to earlier are dividends and taxes related to personal income only.

It should be emphasized that the evidence we have cited on the inadequacy of a tax clientele effect to explain dividend policy does not mean that there is no effect, but simply that it does not go very far in providing an answer to the observed phenomenon. Moreover, mention should be made of another sig-

nificant clientele effect which is probably associated with transaction costs. Thus Pettit [1977] found a very strong positive relationship between investors' age and the dividend yield of their portfolios when other relevant variables are kept constant. He attributes this finding in large part, correctly we believe, to the greater dependence of the older stockholders on current income from investment for consumption purposes and their desire to avoid the transactions costs involved in realizing the same cash flow by sale of part of their stock.

Though Pettit does not comment on this fact, the older investors hold a large and rising share of the aggregate stock owned by individuals, a fact pointed out in the Crockett-Friend and Blume-Crockett-Friend papers mentioned earlier. The apparent preference of the aged for dividends rather than equivalent proceeds associated with the sale of stock is presumably not only a function of explicit but even more of implicit transactions costs.<sup>5</sup>

## II. Signalling Models

Recently, attention has focused on signalling as an explanation for the payment of dividends in spite of personal tax disincentives. Dividends are assumed to affect stock price because the market believes that they signal favorable insider information. Insiders are motivated to pay (or raise) dividends in order to communicate information (or misinformation) and thus achieve a higher market price for the firm's stock than would otherwise prevail. Two recent papers, one by Miller and Rock [1985] and the other by John and Williams [1985], explore this possibility.

Some empirical evidence suggests that current and past dividends have little predictive power over current and past earnings in forecasting future earnings.<sup>6</sup> While at present it is true that a dividend announcement may provide otherwise unavailable information on current earnings, a question



immediately arises as to why insider information relating to current and even future earnings cannot be conveyed to the market in some other way involving less tax cost to the stockholders than the payment of dividends -- for example, by the earlier release of full information on current earnings or the regular publication of earnings projections for the period ahead. To make a convincing case for the use of dividends for signalling purposes, it would appear that something more than an improved estimate of current earnings must be communicated -- for example, whether a change in earnings is due to transitory factors or is believed to be permanent. Kane, Lee and Marcus [1984] show that when roughly coincident earnings and dividend surprises are examined, interaction effects are more significant than the magnitude of the surprises themselves in terms of the effect on stock price. This suggests that earnings changes are more likely to be viewed as permanent when confirmed by dividend changes in the same direction.

The Miller-Rock paper fails to address this point, since the true value of current earnings is assumed to be the only element of asymmetric information. That paper deals with a two-period model in which earnings consist of a deterministic component (based on initial assets and the production function and known to the public) and a serially-correlated stochastic component. The current value of this stochastic component is known to management for some interval of time before it becomes known to the market. If a dividend announcement precedes the full disclosure of current earnings and if the market assumes that investment will be undertaken at the level that would be optimal under symmetric information, then an inference can be drawn from the announced dividend as to the stochastic component of current earnings: a higher dividend implies higher current earnings. Expectations of future earnings are affected because of serial correlation in the stochastic component, and stock price will adjust to the change in these expectations.

In this situation, M-R point out that management can benefit those stockholders who wish to sell their stock in the interval between the dividend announcement and the full disclosure of current earnings by reducing planned investment below the level assumed by the market and raising dividends accordingly. Since the increment in dividends is known to the public but the reduction of planned investment to a suboptimal level is not, a false inference is induced as to the stochastic component of current earnings and a mistaken increase in the price of the stock occurs.

M-R hypothesize that management, acting in the best interests of its stockholders, will in fact manipulate dividends so as to generate misinformation of this kind. They show that in this case a signalling equilibrium does exist, but at the cost of a level of investment that is suboptimal.

We find the objective function which M-R attribute to management highly implausible, in that it takes no account of the clear divergence of interest between management and stockholders. If management behaves as hypothesized, it will have benefitted one group of stockholders, but this is the group who will sell their stock and thus can have no effect on management's future prospects. They will be replaced by new purchasers, who are twice cheated: first because they have been misled as to the stochastic component of future earnings, as they will learn as soon as current earnings are fully disclosed;<sup>7</sup> and second because the deterministic component of future earnings has been reduced through underinvestment. Furthermore, although Miller and Rock claim that there is no damage to stayers (initial stockholders who do not wish to sell in the interval between the dividend announcement and the earnings announcement), this is not quite correct even in a tax-free world. The stayers will be worse off to the extent that a differential exists between the cost of capital and the rate of return that would have been earned on the foregone investment. For finite reductions in investment, this differential

is not zero. (In the real world, stayers would also be hurt by having to pay taxes on the increment in dividends.)

Thus a management which acts in the way M-R envisage will be faced at the next stockholders' meeting by one group of shareholders (the stayers) who are mildly disgruntled and a second group (the recent purchasers) who will be severely annoyed. This is a considerable cost for managers to incur in order to benefit a group of stockholders who plan to sell their holdings and thus will have no further influence on managerial tenure or rewards. There may be an offset to this cost if the managers themselves are planning to sell shares in the interval between the dividend and earnings announcements. This might provide a considerable temptation to generate misinformation, in the absence of disclosure requirements for insider trading. Under the current law, the risk of stockholder displeasure would be considerably increased if management succumbed to such a temptation.<sup>8</sup>

Therefore it seems to us quite unlikely that a real-world management would embark on the path that would lead eventually to the signalling equilibrium that M-R present. Even if it did so, the persistent underinvestment that would occur under the signalling equilibrium would make the company a prime target for acquisition by a group intending to take it private.

The John-Williams model is attractive in several respects: (1) dividends signal something more subtle than information about current earnings -- possibly (in terms of the historical literature) something about the average return expected on new investment -- and thus it is not so obvious that less costly methods of communication would be as effective; (2) taxes on dividend income are introduced; (3) the liquidity requirements of both the firm and the stockholders are permitted to affect the dividend decision. There is a clientele effect to the extent that some stockholder groups have larger liquidity requirements than others. These stockholder needs may be met by the repur-

chase of Treasury stock when profitable investment opportunities are small relative to cash flow. If the liquidity requirements of the firm for investment, when added to those of the stockholders, are large relative to cash flow, dividends are paid and the stockholders' needs are served in part by the dividends they receive and in part by the higher stock price generated by the payment of dividends, which permits liquidation on favorable terms. It is interesting that the zero-payout firms are not expected to be those that are capital constrained but those with small investment relative to cash flow. An empirical investigation of whether this is in fact the case is perhaps in order.

The J-W paper finds that for dividend-paying firms the amount of dividends is inversely proportional to the tax rate on dividends and directly proportional to the net liquidity requirements of the firm and its stockholders (i.e., those that cannot be met out of current cash flow) and to the logarithm of expected future earnings. The solution depends, perhaps critically, on the assumption of stockholder homogeneity as to liquidity needs: all stockholders liquidate the same fraction of their holdings in any given year. Realistically, some stockholders sell out entirely and some do not sell at all. This non-homogeneity will produce a conflict of interest between the sellers and the stayers in case the cash flow is sufficient to meet investment needs but insufficient to satisfy also all stockholders' liquidity needs through the repurchase of Treasury stock. In that case, dividends will be paid and the sellers will benefit from the higher price associated with dividend payment, while the stayers will pay the tax cost of the dividend without benefitting from the higher price. It is not clear that a rational management, concerned with its own tenure, will impose this cost on the stayers for the sake of the sellers unless the stayers perceive some offsetting benefit (say a reduction in risk) to result from the dividend payout.<sup>9</sup>

While the J-W model goes some way toward explaining why dividends are valued, there are three pieces of evidence which it fails to reconcile with market rationality:

1. The Citizens Utility and General Public Utilities Corporation cases.
2. The fact that individual investors do not hold lower payout stock than institutional investors, in spite of the difference in tax liability, and that upper and lower income investors do not differ nearly as much in the payout ratios of the stock they held as would be expected from the differences in their effective tax rates.
3. The fact that, over the post-World War II period, substantial changes in income tax rates, which should affect stockholders' preferred mix of dividends and retained earnings, have not produced corresponding changes in payout ratios.

Signalling theory cannot contribute to an explanation of the first and third pieces of evidence, and can contribute to the second only if it is hypothesized that the information signalled is more important to individuals than to institutions and to upper than to lower income individual investors.

### III. Effect of Tax Changes on Payout Ratios

Very substantial changes in tax rates have occurred since 1940, and the payout ratio has fluctuated widely over this period. Regression analysis, however, shows tax rates to be at best marginally significant as a determinant of payout ratios when other relevant variables are included in the regression and correction is made for the very substantial autocorrelation of residuals.

Three tax variables were tested: TAX1 is an average tax rate computed as the ratio of personal tax payments in the national accounts to personal income; TAX2 is the rate for the top bracket of the Federal income tax; and TAX3 is the mean of the rates for the lowest and highest brackets. Because of the large concentration of stockownership in the high tax brackets, TAX2 or TAX3 is probably more relevant than TAX1.<sup>10</sup> It would be preferable to use differentials between the effective tax rate on current income and on capital

gains instead of the rate on current income alone, but in view of the fairly stable relationship between the two taxes over the 1940-85 period the significance of the tax variables should not be substantially affected. Excluding the war years 1943-1945, TAX1 rises almost monotonically, except for brief shallow dips reflecting tax cuts and/or recessions. The increases are substantial in percentage terms; from about 4 percent in 1940-42 to 10 percent in 1946-50, 12 percent in 1951-67 and 14½ percent in 1968-85. This reflects, of course, the impact of inflation and rising real income in moving individuals into higher tax brackets and increases in some state and local income taxes, as well as increases in Federal income tax rates in the earlier years of this period.

TAX2 and TAX3, on the other hand, fall very substantially over the post war period, largely in two steps occurring in 1964 and 1982. During 1946-63, TAX3 averaged 54 percent; in 1964-81, 43 percent; and since 1982, 31 percent. Regression results were very similar for TAX2 and TAX3 and are shown only for TAX3, which performed a little better in terms of the correlation coefficient and/or the significance levels of the parameter estimates.

Since dividend levels are sticky, the payout ratio is strongly influenced by volatility in earnings, and a large proportion of its variance is explained by the profit residual, defined as the deviation from the semi-log time trend of real after-tax corporate profits after capital consumption and inventory valuation adjustments. This profit series was substantially revised in 1985 and the latest revision is used. Two other variables of less importance are the corporate bond rate (Moody's AAA) and an investment requirements variable, defined as the ratio of real expenditure for nonresidential fixed investment to real after-tax corporate cash flow. Both would generally be expected to have negative effects on dividend payout, although it should be noted that the John-Williams analysis would imply that the impact of investment requirements

should be positive.

Table 3 shows the results of the regression analysis. The first regression omits any tax variable. The profit residual has a strongly significant negative effect, which it retains throughout the analysis. The bond rate and the investment variable are negative but insignificant. When the logarithm of TAX1 is added in the second regression, it is significant with the expected negative coefficient. However, the bond rate and the investment variable now become positive, the latter significantly so, contrary to expectations, except for the implications of the J-W model for investment requirements. We disregard this regression because we regard these results as implausible and because we are able to improve the tax variable used. When log TAX3 is added to the basic regression, it too is significant and the bond rate is now significantly negative, while the investment variable is negative but completely insignificant.

All of the ordinary least squares regressions suffer from extremely low Durbin-Watson statistics. The last four regressions on the right are corrected for first-order autocorrelation. Tax variables now generally fall short of significance, and the investment variable, when included, is significantly positive. The tax variables were tested with and without the logarithmic transformation and performed at least as well and sometimes better in log form. TAX3 somewhat outperforms TAX1 in that the coefficient of the corporate bond rate becomes negative, though insignificant, and the correlation coefficient is a little higher. We would place little weight on the last two equations, regarding the positive effect of the investment variable as implausible, but someone of the J-W persuasion may prefer them. In any case, the tax effect approaches marginal significance in only one regression, once the Cochran-Orcutt correction is made.

Further tests, summarized below, analyze the residuals from the basic

regression shown in column 1 of Table 3. Now TAX2 performs a little better than TAX3. Both variables reach significance at the 5 percent level with small correlation coefficients and unsatisfactory Durbin-Watson statistics even after a first-order autocorrelation correction.

	Coefficient	T value	$\bar{R}^2$	DW	$\rho$
Log TAX2	-.343	-2.6	.131	1.46	.857
Log TAX3	-.321	-2.4	.112	1.40	.858

In addition, tests indicated that the mean residuals from the basic regression were insignificantly different under the three tax regimes. The failure of payout ratios to respond significantly to tax changes is particularly notable in the case of the 1964 cut. The sample is small subsequent to the 1981 cut and the data are distorted by the cyclical decline in profits.

Our tentative conclusion from the above tests is not that tax rates do not affect payout significantly, but rather that the effect is fairly moderate. Two other studies by Poterba and Summers [1984] and by Venthienen and Vermelen [1985] based respectively on changes in British and Belgian tax policy in the post-World War II period also find a significant but somewhat stronger inverse relationship between the level of personal taxes on dividend income and the payout ratio.

Some longer-term insights into the relation between the personal tax rate on dividend income and the payout ratio by U.S. corporations can be obtained from the national accounts data back to 1929 and much more roughly from the Cowles Commission stock indexes back to 1871. Prior to 1940, in view of the major post-1929 depression, the most relevant year from the national accounts data to compare with current payout behavior is 1929. Thus, the payout ratio of .391 in 1985 (with profit after taxes adjusted for inventory and capital consumption revaluation) and an average personal tax rate of 15.6% can be com-



pared with corresponding figures of .707 and 3.1% in 1929. As between the beginning and end of this period, there was a fairly marked decrease in the payout ratio generally consistent with the increases in both the higher average and top personal income tax rates.

The Cowles Commission stock indexes permit us to make rough estimates of the dividend payout ratio by U.S. corporations back to 1871.<sup>11</sup> The average payout ratio for the 1871-74 period was .689 on the basis of one set of estimates and .706 on the basis of another set.<sup>12</sup> Now there is no clear indication of a secular movement in payout from the 1870s to 1929, though there were no personal income taxes in the early part of this period.

#### **IV. Are Investors Irrational?**

The signalling theories provide some rational (if less than convincing) explanation for the survey evidence (1) that a high proportion of managers believe that an increase in dividends would raise the price of their stock and (2) that investors in all tax brackets not only hold dividend-paying stock but report a preference for dividends over retained earnings. However, we have pointed to other highly relevant pieces of evidence that cannot under current theory be reconciled with investor rationality. Are there insights in the extensive historical literature based on statistical analysis of cross-section data that would facilitate a convincing reconciliation?

##### **A. Statistical Analysis of Cross-Section Data**

There is broad theoretical agreement that a rational investor, planning to hold a stock for  $n$  periods, should be willing to pay the discounted present value of (1) the dividend stream expected over the next  $n$  periods, plus (2) the selling price expected at the end of the holding period. Returns should be measured after all relevant taxes and transactions costs; and there is no requirement that the same discount rate be used for all components of return,

if some are perceived as less certain than others.

Stockholders are not necessarily indifferent to the mix of return as between current dividends, future dividends and future capital gains. For zero bracket taxpayers, dividends may be preferred if they are perceived as relatively risk free -- i.e., characterized by relatively low variance about the expected value or low covariance with other income -- or if they involve relatively low transactions costs for purposes of meeting liquidity needs. In higher brackets dividends would presumably be disfavored on the basis of relative tax costs, in the absence of risk and/or transactions costs differentials. If dividends are either preferred or disfavored, this raises the possibility of observing cross-sectional variations in stock price depending on payout ratio, when earnings are held constant. Such variation, if observed, would invite a further question as to why firms do not adjust their payout behavior to stockholder preferences.

Another consideration may also operate to produce a cross-sectional relationship of stock price to payout ratio, given earnings. To the extent that the payout ratio contains information that affects the expected levels of future dividends and/or stock price, which are non-observable variables affecting current stock valuation, a cross-sectional association between payout and current price will be induced. In the J-W model, high dividends induce more favorable earnings expectations (and hence more favorable expectations as to future dividends and stock price) than lower dividends would do, given current earnings. A positive relationship between payout and current price would therefore be expected. On the other hand, earlier models tended to assume that high retention conveys good news about the profitability of available investment opportunities and thus about the growth rate of earnings, dividends and stock price. On this basis a negative association between payout and stock price might be expected in the cross-section. In either case it should

be emphasized that the effect does not reflect a causal relationship, but a statistical bias due to correlation with omitted variables. Such a bias is important because it tends to distort any true causation based on tax, risk or transaction cost differentials or any other factors that might cause dividends to be preferred or disfavored, given the profitability of current and future investment opportunities.

Early cross-section studies regressed stock price in a particular period against the dollar amount of dividends and retained earnings in the same period and tested for significant differences in the estimated coefficients. Obviously, a dollar of dividends is worth less than one dollar after tax to most individual investors. On the other hand, retained earnings are valued, not per se, but for the capital gains they are expected to generate; and there is substantial uncertainty as to both the timing and the magnitude of the ensuing capital gains. Presumably the value that an investor places on a dollar of retained earnings is reduced on account of this uncertainty. Is this reduction greater or less per dollar of retained earnings than the tax cost per dollar of dividends?<sup>13</sup>

If dividends and retained earnings are the only two independent variables used, then their estimated coefficients may be distorted by correlation with omitted factors that are significant for stock price -- in particular, company risk and the availability of highly profitable investment opportunities. In various studies, a number of attempts were made to control for those two factors with varying results. Generally, industry effects were found to be significant. Much of the early evidence indicated a preference for dividends over retained earnings, but Friend and Puckett [1964], using a number of different procedures to control for risk and investment opportunities, found little difference in the two effects, with some preference for retained earnings in growth industries and dividends in other industries.

Subsequent analyses investigated the rates of return experienced by a cross section of stocks over a specific holding period. Theoretically, the required rate of return (an ex ante concept) should be related to risk, as measured by such proxies as covariance ( $\beta$ ), residual risk ( $\sigma_p$ ), leverage or industry, and these studies attempt to test whether it is affected by the payout ratio as well. If dividends are preferred, this should produce an inverse relationship between the payout ratio and the required rate of return. In other words, the required sum of the two components of return (dividend yield and growth or capital gains) should decline as the mix becomes more attractive. Unfortunately, it is the ex post rate of return that serves as the dependent variable in virtually all cross-section studies; and it is quite difficult to determine whether any given explanatory variable affects the required rate of return or the deviation of the ex post rate from the ex ante rate or both.

In view of the voluminous, and in our view inconclusive, literature on this subject, we do not propose to reexamine here all the conflicting cross-section regression evidence on the relative effect of dividend income and retained earnings (or capital gains) on stock prices.<sup>14</sup> One of the most interesting and generally neglected cross-sectional studies of holding period returns in the dividend literature is Nerlove [1968]. He relates rates of return over three 5-year and one 15-year holding period to dividends and retained earnings (both normalized by assets to control for scale), earnings growth, sales growth and a number of other variables, including a measure of leverage and industry dummies. As indicated above, a preference for dividends should induce investors to require a relatively low rate of return on stocks with high payout, resulting in a smaller coefficient for dividends than for retained earnings, while a preference for capital gains based on tax incentives should have the opposite effect. In fact, the coefficient of dividends

was found to be about one-seventh that for retained earnings, ranging from a little under one-tenth to a little over one-fifth in the four time periods analyzed. A second finding of some interest was the significantly positive effect of both earnings growth and sales growth. If these growth rates were correctly anticipated, they should already have been embedded in initial price and in the ex ante rate of return. To the extent that they are unanticipated they will produce deviations of ex post from ex ante return and may serve as reasonably effective proxies for such deviations. The inclusion of such proxies (as well as a number of other relevant variables) increases the usefulness of the study as a test of the effect of payout on the required rate of return.<sup>15</sup>

Another type of test relates the realized rate of return to a particular measure of risk,  $\beta$ , and to the dividend yield, rather than to the levels of dividends and retained earnings or the payout ratio. This is a joint test of the capital asset pricing model and the hypothesis that investors value equally an after-tax dollar of (expected) dividends and an after-tax dollar of (expected) capital gains, in spite of the greater variance of the latter about its expected value. Under this hypothesis, the required rate of return should rise linearly as dividend yield increases, with the slope coefficient equal to or greater than the difference between the (average) tax rate on dividends and that on capital gains. Some studies, such as Litzenberger-Ramaswamy [1979], support the expected result.<sup>16</sup> However, a very careful paper by Blume [1980] strongly suggests nonlinear behavior in which the required rate of return initially decreases until a fairly high level of dividend yield is reached.

It should be noted that when the Blume model is modified to take account of the greater uncertainty associated with the expected capital gains component, a zero or negative effect of the dividend yield becomes quite possible.<sup>17</sup> For simplicity, assume that the capital gains tax is zero and that

the dividend yield is considered to be essentially certain, given initial price. Let  $t$  be the tax rate on dividend income and let the certainty equivalent of one dollar of expected capital gains be  $1 - f(\beta)$ , where  $f(\beta)$  is an increasing function of  $\beta$  restricted to the range from zero to one. Then the certain after-tax required rate of return will be constant across stocks:

$$(1 - t)r_{id} + [1 - f(\beta)] r_{ic} = \gamma ,$$

where  $r_{id}$  is the dividend yield,  $r_{ic}$  the expected value of percentage capital gains for the  $i^{\text{th}}$  stock, and  $\gamma$  is a constant. Rearranging terms, this implies that the uncertain before-tax required rate of return (which can be directly observed) must be

$$r_{id} + r_{ic} = \frac{\gamma}{1 - f(\beta)} + \frac{t - f(\beta)}{1 - f(\beta)} r_{id} .$$

Clearly if  $f(\beta) > t$ , the effect of dividend yield becomes negative. In this model, the total realized rate of return is, of course, nonlinear in  $\beta$ .

These studies, to the extent that dividend yield or payout effects are found, leave unresolved the puzzle as to why firms do not adjust their dividends so to minimize the required rate of return on equity. Possibly this adjustment would increase the costs of financing optimal investment. Many firms paying no dividends may in fact be capital constrained. They may be unable to sell equity without undue dilution in a world of asymmetric information. Other firms with a similarly large volume of profitable investment opportunities relative to cash flow, but better access to the equity markets, may reduce the cost of the new equity they offer by paying dividends to signal their earnings prospects, as suggested in the John-Williams paper. What remains unclear is why any firm should pay so high a dividend as to raise its cost of equity, rather than using the funds to repurchase Treasury stock or buy stock of other companies of equal risk. The Blume study, though not the

Friend-Puckett or the Nerlove (correctly interpreted) results, suggests that some firms do so. The Litzenger-Ramaswamy (L-R) study, which concludes that investors effectively value a dollar of after-tax dividends the same as a dollar of after-tax capital gains, attributes this result to clientele effects so that management behavior is not necessarily inconsistent with stockholder optimization. However, with no direct evidence supporting strong tax clientele effects, their result would seem to imply that stock prices would be maximized by a close to zero dividend payout.<sup>18</sup> The L-R results are, furthermore, inconsistent with direct evidence from stockholder surveys and with the observed portfolio behavior of high-income and institutional investors.

B. Toward a Reconciliation of Theory and Behavior

As indicated above, the cross-section studies provide conflicting evidence. Some studies suggest investor indifference or preference for dividends, at least in some industries or some ranges of the dividend yield. These are broadly consistent with various items of direct evidence cited earlier and with management behavior that attempts to serve the stockholders' interest. Other studies, which show a preference for retained earnings in line with the tax advantage of capital gains, not only are inconsistent with the direct evidence cited, but also lead to the inference that managers are acting contrary to stockholders' interest in paying out dividends.

In evaluating cross-section regression analyses, it should be kept in mind that they are susceptible to bias on several grounds. First, dividend variables may be correlated with significant omitted variables, such as earnings variance or the availability of a large volume of profitable investment opportunities. Second, when the realized rate of return is the dependent variable, explanatory variables thought to affect the required rate of return may instead (or in addition) be correlated with the deviation of ex post from ex ante return. Theoretically, studies which use ex ante return as the

dependent variable should avoid this problem, but such studies have been based on scanty evidence and are inconclusive. Third, when dividend yield is incorporated in the dependent variable and also appears as an explanatory variable on the right, a spurious correlation due to common measurement errors may result, to the extent that initial price deviates from its equilibrium value. Fourth, the coefficient of retained earnings, in regressions containing that variable, may be biased downward because measurement error is likely to be substantial. Thus cross-section results must be utilized with caution, and the weight attached to any particular result should depend on the care and judgment exercised in attempting to mitigate the potential for bias.

As previously indicated, it is not possible to reconcile plausibly the payout of more dividends than stockholders want with optimization of stockholders' interest by management. Nor is there any obvious reason why management, acting in its own interest, should wish to pay excessive dividends. On the other hand, the payment of lower dividends than stockholders might prefer can be justified on the grounds that the firm is capital constrained<sup>19</sup> or that the cost of financing optimal investment with additional debt or external equity would be higher than the cost implicit in holding dividends below their preferred level. Thus, if stockholders do indeed prefer dividends, at least up to some payout or yield level, observed payout policy may be broadly consistent with the stockholders' interest. The question remains as to whether a preference for dividends can be reconciled with investor rationality in view of the tax cost. There are several theoretical grounds on which such a preference might be rationalized.

We have seen that signalling models can lead to a positive effect of dividend payout on stock price, operating through an effect on the expected value of current and future returns as perceived by the market. Implicit in some of the cross-sectional studies may be a different rationale based on the



assumption that dividend payments are perceived as less uncertain than the capital gains resulting from retention of earnings. There are various ways of rationalizing this perception. One would be to use an argument similar to the "control hypothesis" for bonds [Jensen, 1986], which holds that debt reduces the agency costs of free cash flow by cutting down the cash available for spending at the discretion of management. Similarly, it might be argued that cash dividends could be considered as providing some protection to the firm against management benefitting themselves at the stockholders' expense.

A second rationale is that, because of market imperfections, stockholders may view the firm's investment as dependent in some degree on earnings retention. The firm may not have access to external equity on favorable terms or the fixed costs inherent in such an issue may preclude offerings below some minimum size.

In this case, stockholders will perceive a reduction in retained earnings to involve the loss of a claim on the risky earnings stream that would have been generated by the foregone real investment. The impact of such a reduction on end-of-period price is uncertain, both because the foregone earnings stream is uncertain and because the risk premium which the market would apply to it at the end of the period is uncertain.

Consider a simplistic one-period holding-period model, in which the end-of-period dividend is considered essentially certain while the end-of-period capital gain is uncertain.<sup>20</sup> If the expected value of capital gains equals the increment in assets resulting from earning retention, with no change expected in the price-earnings multiple, then

$$E(P_1) = P_0 + E(Y) - D \quad ,$$

where  $Y$  and  $D$  are earnings and dividends per share in the current period and  $P_1$  is end-of-period price.

Apart from signalling effects, the beginning-of-period price is therefore given by

$$P_0 = \frac{D}{1+i} + \frac{E(P_1)}{1+i'} = D\left(\frac{1}{1+i} - \frac{1}{1+i'}\right) + \frac{P_0 + E(Y)}{1+i'}$$

where  $i$  is the riskfree rate and  $i'$  is the required rate of return on equity. Clearly this is positively affected by the level of dividends. However, as payout rises it is likely that the expected marginal return on foregone investment will rise above  $i'$ . In this case, the prior assumption -- that the expected value of capital gains,  $E(P_1 - P_0)$ , equals the expected value of the increment in assets due to earnings retention,  $E(Y - D)$  -- no longer hold; the sacrifice of expected capital gain associated with a further increment in dividends will then exceed the dividend increment. If  $(1 + \epsilon)$  is the reduction in expected capital gain associated with an additional dollar of dividends, then it pays to increase dividends only so long as

$$(1 + \epsilon) < \frac{(1 + i')}{(1 + i)}$$

Now let expected earnings on initial assets, and therefore price, be favorably affected by dividends. If  $E(Y) = f(D)$  and  $\gamma$  is the expected earnings multiplier, then  $\gamma f(D)$  is the expected value of the earnings stream  $Y$ , based on initial assets, and

$$E(P_1) = (\gamma + 1)f(D) - D$$

$$P_0 = \left(\frac{1}{1+i} - \frac{1}{1+i'}\right)D + \frac{(\gamma + 1)f(D)}{1+i'}$$

Here the second term reflects the positive effect on price of dividend signalling. Note that the relationship derived does not imply that a firm can increase its stock price by raising its dividend. So long as an optimal investment program is being financed with the lowest cost mix of retained earnings, debt and external equity, it cannot do so in any permanent way. But

the above model does lead to a cross-sectional association of price with dividends, given earnings and company risk.

A third rationale for dividend preference lies in the liquidity requirements of stockholders who depend on investment income to support consumption. Many elderly stockholders fall in this category, and there may be substantial transactions costs, implicit as well as explicit, in continual liquidation of stock to capture capital gains for consumption purposes. Also unattractive to the elderly is the additional element of risk introduced by uncertainty as to the earnings multiplier that will be realized. Deviations of the price-earnings multiple from its long-term norm tend to be strongly autocorrelated, and a series of liquidations early in the retirement years at multiples well below the norm could seriously erode the asset base.

#### V. Some Conclusions

While much of the apparent irrationality in dividend behavior can be explained on theoretical grounds, significant anomalies remain that cannot be reconciled with firm and investor rationality under current theory.

Dividend signalling, risk aversion which may lead investors to prefer cash dividends to uncertain but potentially larger capital gains, and the transactions cost/liquidity risk associated with systematic liquidation of stock all help to rationalize a number of findings that may appear counterintuitive with respect to individual investors: (1) the survey evidence that investors at all income levels show some preference for dividends relative to retained earnings and that corporate managers predominantly believe that stock price is either favorably affected or unaffected by dividend payout, in spite of the tax cost to individual investors; (2) the IRS data showing that stockholders in the highest brackets hold stock with substantially higher dividend-paying stock than would be expected; and (3) those cross-sectional regression

analyses which indicate that dividends enhance stock price or reduce the required rate of return on equity, at least for some industries and some range of the dividend yield. Individually, each of the three reasons advanced for dividend preference may appear inadequate to offset the heavy tax cost, but the case may be more convincing when all three are combined. However, we have reservations about the importance of the signalling motive for dividend payout both because the signalling is ambiguous (since low investment potential rather than favorable earnings prospects may be indicated) and because alternative signals mentioned earlier would appear to be less ambiguous and very much less expensive.

To explain the failure of institutional investors to hold higher payout stock than individuals, in spite of the tax differential, it is necessary to argue that the reasons for dividend preferences are less compelling for institutions than for individuals. Probably for most institutions liquidity considerations are less important and the transactions cost of meeting them is lower than for many individual investors. It may also be argued that institutional investors feel somewhat greater confidence in their estimates of capital gains in view of the larger amount of resources they devote to detailed company analyses, and therefore discount this component of return less heavily than individual investors.<sup>21</sup> Similarly, it is possible that the informational content of dividends is less important to institutions since it adds less to the information they already have. However, the historical record of institutional portfolio performance does not lend much support to such an assumed informational superiority.

The Citizens' Utility and G.P.U. cases are harder to explain. While the transactions cost/liquidity risk rationale works in the right direction, it would become a convincing explanation only if there were reason to believe that the G.P.U. shareholders and the holders of dividend-paying Citizens'

Utility stock were predominantly elderly and/or low income individuals.

Remaining unexplained are: (1) the payment by some firms of dividends so large as to increase the before-tax required rate of return on equity, and (2) the failure of the payout ratio to rise significantly in response to declining tax rates in the post-World War II period.<sup>22</sup> The first is indicated by the Litzenberger-Ramaswamy and other studies referred to earlier. Even if the opportunities for profitable real investment are small relative to cash flow, it seems clearly irrational to pay unwanted dividends instead of repurchasing Treasury stock or the stock of other corporations. With respect to the post-war tax cuts, the absence of significant response seems to us to imply either a failure of investors to adjust their valuation of dividend-paying stock to a substantial change in tax rates or a failure of firms to respond to the tax-motivated shift in stockholder preferences or both. If there was a significant decline in investment opportunities subsequent to the 1950s as is frequently maintained, this would make it even more difficult to explain the absence of any increase in dividend payout.

## FOOTNOTES

- \* University of Pennsylvania. We are grateful for the comments of a number of colleagues and in particular Roland Portait.
- 1 The Blume-Friend study, which provides detailed data on the stocks held by institutions as compared to the market as a whole, indicates that as of June, 1985 institutional investors held 39.8% of the value of all outstanding stock where institutions are defined as those with at least \$100 million of equities under management which must periodically file Form 13F with the S.E.C. The addition of institutions with common stock holdings under \$100 million, obtained from the enumeration of such holdings by Vickers Stock Research Inc., would increase somewhat the potential percentage of stock owned by institutions, but it would probably still remain well under the 50% figure frequently cited. Since the median dividend yield is the same as for individuals, the proportion of dividends received by institutions would be not much different from the percentage of stock they owned.
- 2 Under the standard capital market assumptions, investors must believe this with certainty. Realistically, they may not do so. We do not assume that stockholders have homogeneous perceptions as to the earnings prospects of individual firms, that they can borrow at the riskfree rate, or that they perceive investment decisions of the firm to be independent of dividend policy. We assume that transactions costs may in some cases be non-negligible.
- 3 In these regressions, undistributed earnings were measured both in aggregate terms and as a fraction of profits, while capital gains were measured both as the absolute change in the stock price index and in percentage terms. Undistributed earnings were based on national income accounts profit data after capital consumption and inventory valuation adjustments, not on book value of profits.
- 4 There is no tax cost in buying back their own shares, and the maximum effective tax cost of buying other corporate shares would generally have amounted to about 7.5%, or roughly one-half of 15%, if all returns were received as dividend income. Barclay and Smith [1986] argue that cash dividends in lieu of share repurchases bond the firm against management benefitting themselves at the stockholders' expense, but this seems inconsistent with the trend in share repurchases which were relatively small until recent years when they increased dramatically.
- 5 It may also reflect the greater tax incentives of the aged to avoid realization of capital gains.

FOOTNOTES (cont.)

- 6 Ross Watts, "The Information Content of Dividends," Journal of Business, April 1973; and Nicholas J. Gonedes, "Corporate Signalling, External Accounting and Capital Market Equilibrium: Evidence in Dividends, Income and Extraordinary Items," Journal of Accounting Research 16, 1978.
- 7 While no one is fooled once the signalling equilibrium is attained, this does not happen instantaneously. In fact, it presupposes a learning process. In the early stages of the process, it is the purpose of management to generate misinformation by raising dividends and keeping them higher than would be justified under full information. Initially, they succeed in this purpose.
- 8 Work now under way at the University of Pennsylvania is investigating the possible relationship between insider trading and dividend policy.
- 9 J-W recognize that "If insiders can trade anonymously on personal account, they can signal falsely and then sell their shares before outsiders learn the truth. This precludes a signalling equilibrium...."
- 10 If we were to go back to 1929, the top bracket rate would be of dubious significance since it was applicable to so few taxpayers. Over time, the proportion of stockholders subject to the top rate has become much more significant.
- 11 Cowles Commission, Common Stock Indexes, pp. 372-455.
- 12 The first set is obtained from the Cowles  $Y_a$  Indexes divided by the RR Indexes for all stocks; the second set is obtained from the  $Y_{Ea}$  Indexes divided by the R indexes to base dividends and earnings on an identical sample of cases.
- 13 The certainty equivalent of the uncertain capital gain due to one dollar of retained earnings is the value,  $\bar{G}$ , such that  $U(\bar{G}) = EU(\sum_{j=1}^T \tilde{G}_j / (1+r)^j)$ , where the  $\tilde{G}_j$  are jointly distributed random variables representing the capital gains that may result in periods 1,2,...,T from one dollar of current retained earnings, and  $r$  is the riskfree rate. The relevant question is the relationship of  $1-t$  to  $\bar{G}$ .
- 14 See, for example, Blume, Marshall [1980], Litzenberger and Ramaswamy [1979], and Black and Scholes [1974].

## FOOTNOTES (cont.)

- 15 Nerlove seems to misinterpret the meaning of his results since he interprets them as showing the "unimportance of dividends over short periods as contrasted with retained earnings and their [only] moderate importance over long periods."
- 16 Of interest in this connection are some limited tests using ex ante returns as the dependent variable. For example, the paper by Ang and Peterson, referred to earlier, carries out a cross-section regression of Value Line ex ante stock returns on ex ante dividend yields, obtaining the theoretically expected positive yield coefficient in most years. Combining results, the findings are statistically significant at the 90% level.
- 17 For an earlier discussion of the effect of uncertainty on dividend payout, see Arditti, Levy and Sarnat [1976].
- 18 Any non-tax clientele effects such as that attributed to age would have to rely heavily on large implicit transactions costs, which raises some questions about stockholder rationality. Moreover, as L-R recognize, their tax clientele argument essentially implies that shareholders would not agree on dividend policy, so that value maximizing behavior by firms "does not have a strong theoretical basis," (p. 172).
- 19 There is some evidence that firms paying zero dividends tend to be relatively small and thus more likely than larger firms to be capital constrained. See Keim [1982].
- 20 Obviously the model does not hold at very high payout levels, since without a substantial cushion of asset and earnings growth the dividend would be endangered by earnings variance.
- 21 Institutions are known to have much higher stock portfolio turnover ratios than individual investors, reflecting a greater emphasis on short-term trading profits in an attempt to achieve superior market performance.
- 22 The failure of the payout ratio to decline in the pre-1930 period subsequent to the introduction of Federal income taxes represents another anomaly but too much should not be made of this in view of the low tax rates in effect in this period.



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TABLE 1

Effects of Dividends and Retained Earnings on Stock Prices  
 Cross-Section Analysis: 1976

(Stocks ranked by percent of shares owned by  
 pension funds from lowest to highest)

$$P_{it} = a + bD_{it} + cR_{it}$$

a	b	t(b)	c	t(c)	$\bar{R}^2$
4.27	8.898	3.609	3.35	1.887	0.513
8.653	4.714	2.067	5.417	5.037	0.62
10.71	6.443	3.382	3.556	3.002	0.47
13.31	5.85	2.105	5.54	3.572	0.458
27.8	-1.99	-0.418	4.014	2.378	0.25
25.33	2.762	0.667	4.546	2.074	0.343
13.756	0.966	0.133	11.73	2.85	0.443
16.168	-1.156	-0.396	9.383	5.57	0.746
38.75	-11.81	-1.453	3.91	3.91	0.503
-22.06	21.02	6.711	14.7	4.796	0.945

Source: Louis Hobeika, Ph.D. disssertation, University of Pennsylvania, 1980.

TABLE 2

Dividends to Market Price Ratios for Different Income Groups  
1960 and 1971

Income Group	<u>Dividends to Market Price (Ratio)</u>	
	1971	1960
Under \$5,000	0.028	0.035
\$5,000 - \$9,999	0.030	0.034
\$10,000 - \$14,999	0.027	0.034
\$15,000 - \$24,999	0.026	0.035
\$25,000 - \$49,999	0.024	0.036
\$50,000 - \$99,999	0.022	0.033
\$100,000 - \$199,999	0.021	0.031
\$200,000 - \$499,999	0.022	0.031
\$500,000 and over	0.021	
TOTAL	0.025	0.034

Sources: Crockett & Friend, "Characteristics of Stock Ownership," Proceedings American Statistical Association, 1964; and Blume, Crockett and Friend, "Stockownership in the United States: Characteristics and Trends," Survey of Current Business, March 1971.

TABLE 3

Regressions Explaining Dividend Payout  
(Annual Data: 1940-42, 1946-85)

Independent Variable	Ordinary Least Squares			Cochran-Orcutt First-Order Correction			
	1	2	3	4	5	6	7
Profit Residual	-.422 (-11.5)	-.352 (-11.5)	-.468 (-14.4)	-.426 (-13.1)	-.448 (-13.6)	-.421 (-14.2)	-.428 (-14.4)
Corporate Bond Rate	-.002 (-.8)	.003 (1.5)	-.015 (-4.1)	.003 (.9)	-.004 (-.9)		
Investment Requirements	-.104 (-1.2)	.244 (2.7)	-.043 (-.6)			.224 (3.0)	.199 (2.7)
log TAX1		-.150 (-5.5)		-.066 (-1.4)		-.092 (-1.9)	
log TAX3			-.274 (-4.2)		-.112 (-1.6)		-.077 (-1.3)
Constant Term	.567 (10.0)	-.027 (-.2)	.393 (6.3)	.313 (2.8)	.413 (9.9)	.124 (1.0)	.266 (4.0)
R <sup>2</sup>	.760	.862	.832	.832	.840	.869	.879
DW	.74	.91	.97	1.83	1.88	1.79	1.93
P				.567	.617	.672	.798