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Dissertation Advisor

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CORPORATE TAXES AND DIVIDEND CLIENTELES: THE CASE OF PUBLIC UTILITY PREFERRED STOCK

A Dissertation

Presented to

The Graduate School of

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In Partial Fulfillment

of the Requirements for the Degree

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by

Thomas Brice Crawford

August 1995

ABSTRACT

Recent research has documented the existence of abnormal returns on the day a stock trades ex-dividend. Much research is consistent with a tax hypothesis to explain this phenomena. Less explored is the effect of heterogenous income tax law on ex-dividend day returns. For example, U.S. corporations face a high domestic tax rate on capital gains and a low domestic rate on dividend income. Individuals, on the other hand, have higher tax rates on their dividend income. This dissertation searches for effects that corporate investment activity may have on ex-day returns by examining the effect of two corporate tax variables which affect corporate investors but not individual investors. Public utility preferred stock was selected for study because it has a special corporate tax attribute and since preferred stock isolates the effect of dividend taxation from capital gains taxation. The period 1948 - 1964 was selected because it covers a United States tax law change affecting the dividends received corporate stockholders.

One goal for this study is to characterize tax based corporate dividend clienteles and the effect of corporate investment activity on the ex-dividend price setting process. A second goal for this project is to contribute to the understanding of the effects of corporate tax rules on the ex-dividend returns.

This work extends earlier studies on ex-day returns by developing a previously unexplored data set. It confirms work done on other data documenting an abnormal ex-day return consistent with an income tax effect. The findings of this research are partially consistent with corporate investors being the marginal investor for public utility preferred stock. In spite of higher yields, ex-day returns increased after the imposition of a holding period for the corporate dividends received deduction. Such a holding period should reduce effective returns to corporate investors who act as marginal trader and bid away the abnormal return tax premium in the period. On the other hand, new money public utility preferred stock, which has lower effective corporate tax rates than the corporate tax rate on dividends from old money stock, are not associated with lower abnormal ex-day returns. This result is not consistent with tax motivated corporate investors being marginal ex-day traders for new money preferred stock. Risk is conjectured as a factor interacting with tax costs to impact clientele formation.

LIST OF TABLES

TABLE OF CONTENTS

INTRODUCTION

Income Taxes Related to Dividend Issues

Heterogeneous tax treatment for dividend payments and capital gains among different classes of shareholders may create tax based dividend clienteles. In a diverse tax environment, using a single representative investor with a single tax rate for all income may lead to incorrect conclusions about the asset pricing process. Therefore, documenting the existence of dividend clienteles and characterizing them based on tax law becomes important for understanding asset pricing. The search for and clarification of dividend clienteles is the main subject of this paper.

It has been suggested that investors buy stocks which fit their own tax situation; high income investors will buy low yield and high capital gain stock while low income investors and institutional investors buy high yield shares. This paper reviews the evidence on clienteles and focuses tax law consistent with the identity of different marginal traders or investors. Since different investor groups have different tax treatments for dividends and capital gains, trading behavior by group may effect the price adjustment when a stock goes ex-dividend. Three groups have varying tax attributes for dividends and capital gains; corporations, individual investors, and institutional investors. In addition, dividend clienteles may occur due to differing marginal rates faced by investors.

Research has documented the existence of clienteles consistent with taxation of individuals. Corporate dividend clienteles, however, have been less easy to characterize. To isolate the effect of corporate shareholding on the ex-dividend day price behavior, an environment with significant changes in corporate tax attributes and few changes in individual tax law is needed. To meet this objective, public utility preferred stock was selected and data gathered over the period from 1948 to 1964. This allowed for two important corporate tax attributes to be studied; a change in the holding period for the dividends received deduction and different tax rates for different types of public utility preferred stock.

The following literature review chapter covers tax law and financial economics studies of the ex-day price and return studies. In the analytical development chapter, a daily model of preferred stock ex-day returns is

developed to include different tax rates on dividend and capital gain income and other tax features studied herein. The two primary hypotheses are developed in the methodology and statistical test design chapter, together with other hypotheses, design issues, and selected test statistics. A chapter on data sources and collection describe the data set. Three data analysis chapters cover the test results. The first data analysis chapter describes the data and expands existing results to new data sets. The next chapter covers test of the holding period change. The final analysis chapter examines the tax rate differential for public utility preferred stock. Two final chapters draw conclusions and conjectures about the results and make recommendations for future research efforts.

Abnormal Returns and the Ex-Day Trading Problem

Two institutional characteristics of stock payments underlie the tax rationale for ex-day trading behavior; differential, effectively non-tradable, tax attributes for investors, and discrete, periodic payments to owners. Stock ownership on a given trading day confers a right to the owner to receive a periodic dividend. If the stock is subsequently traded, it is traded ex-dividend. Ex-dividend is without the right to receive the dividend and the stock price falls from its cum-dividend (with the right to receive the dividend) trading price. According to tax adjusted asset pricing models, how much the price falls will depend on the after tax value of the dividend to the recipient. For example, if tax rate on dividends were 50% for all traders we would expect the ex-day stock to fall from $100.00 to $99.50 if it paid a $1.00 dividend and if we ignore other factors such as a small discount for delayed payment.

Pricing assets in this environment may be complicated by different tax clienteles for dividends. Tax clienteles could exist because investors face different marginal tax rates and therefore, place different value on the dividend. Since tax attributes are generally non-tradable, adjustments must be made to pre-tax returns if investors are to realize identical after-tax returns. One implication of this situation is that stock/dividend clienteles may be optimal responses for investors. That is, investors of different tax types will hold different portfolios to maximize after-tax risk adjusted returns. If such clienteles do occur, determining which clientele provides the marginal trader becomes an important question. The next section discusses the three groups with

different attributes for the taxation of dividends and capital gains and which may form the basis for dividend clienteles.

LITERATURE REVIEW

Current U.S. Income Tax Law Relating to Dividends and Capital Gains

Individual Investors

Three groups of investors with potentially different pre-tax values for capital gains and dividends can be identified; individuals, institutional investors, and corporations. Individual investors face immediate income taxation on all dividends received at tax rates up to 39.6% (1995 rates). Income from appreciation (capital gains) are taxed at a lower marginal rate of 28% if the security has been held at least one year. More importantly, gains are not taxed until a transaction (sale or exchange) has been consummated. In addition, income taxation of gains can be avoided permanently upon inheritance. Capital losses are limited to $3,000 but may be offset by capital gains and can be carried forward to future tax years without limitation. Prior to 1987, income tax law provided further tax advantage to capital gains, with rates significantly lower than the tax rate on dividends.

Due to progressive rates and other complexities in tax law, clienteles may also exist between individual investors. For example, retirees with significant exempt income, may be in a lower tax bracket than younger investors with similar wealth. Such investors may value dividends more highly than younger investors.

Institutional Investors

Institutional investors form the second potential tax based dividend clientele. These investors face approximately the same effective marginal tax rate on capital gains as they face on dividends. Institutional investors include broker/dealers in securities, certain financial intermediaries such as pension funds, and regulated investment companies also called mutual funds. Charitable and educational organizations also hold significant endowment portfolios. They are not subject to income taxation and therefore, face similar relative tax rates on dividends and capital appreciation. Restrictions on the use of endowment capital versus endowment income, however, may create a non-tax clientele.

Broker/dealers, which include securities brokerage firms, hold stocks and bonds as inventory. Therefore, they are generally taxed the same corporate rate of 35% at the top bracket on dividends received and capital gains realized. Since brokers keep stock in inventory for immediate resale, turnover is rapid and effective rates on both types of income are the same.

Qualified pension funds, both defined benefit and defined contribution plans, are not taxable entities. Since all earnings are generally distributed to beneficiaries as ordinary income, distributions will be taxable at the beneficiaries top marginal rate. Consequently, there is generally no tax difference to a pension fund between capital gains and dividends.

Mutual funds are not taxed on income as long as they pay almost all income to the fund owners. The income does retain its character, however, and capital gains or losses are distinguished from dividends in tax treatment to fund investors. Most mutual funds try to keep unrealized capital gains a small part of their portfolio since new fund owners must pay tax on appreciation that they do not receive. This practice eliminates the advantage to deferral and means that mutual funds have significantly less tax advantage from deferring sale than do individual investors who can defer taxes by waiting to sell.

Corporations

Operating corporations (as distinct from institutional investors which are usually special types of corporations) form a third potential tax clientele. On realized capital gains, corporations must pay the top marginal tax rate of 35% (1995 rates). Although like individuals, corporations may defer taxation through holding securities for later sale, special provisions in tax law prevent them from being formed primarily to hold securities. This prevents individuals from realizing the benefits of setting of a corporation to own stock. Dividends received from stock ownership are eligible for a 70% dividend received deduction, so only 30% of dividend is taxed. With a 35% rate for corporate income, the effective tax rate on dividends is 10.5%. To realize this tax benefit however, corporations must own the stock at least 45 days.

Insurance companies are an important shareholder of preferred stock. According to Wilson (1987), preferred stock owned by property casualty insurers was about $9 billion at the end of 1984 and about $11 billion was owned by life insurance companies at the same date. Insurance companies are taxed like other

operating corporations on capital gains and for purposes of the dividends received deduction.

In summary, individual investors have the greatest relative tax advantage for capital gain income, institutional investors have no significant difference between dividends and capital gains, and corporations have a relative tax advantages for receiving income in the form of dividends. These income tax differences form the basis for potential dividend clienteles and underlie issues addressed in the literature.

U.S. Income Tax Law: 1948 - 1964

The income tax for individuals was significantly expanded during the years around the second world war. Just before the war less than ten percent of income earners filed tax returns. The filing rate rose to about 55% immediately afterward. Rates were highly progressive for ordinary income such as dividends. A dividend exclusion of $50 was enacted into law during 1954. This reduced the effective tax rate on dividend income to zero on the first $50 of dividend income received. Capital gains realized by individuals received a 50% deduction making the effective rate half the rate for dividends and creating a preference for capital gains relative to dividend income. Capital losses were limited to $1,000 in excess of capital gains. See 1939 Internal Revenue Code (IRC) §117 for capital gain law and 1954 IRC §116, §1202 and §1211 for the dividend exclusion and capital gain and loss provisions.

Corporations during this period faced a 25% tax rate on capital gain income. The effective rate on dividend income was determined by actual tax rates and the dividends received deduction. This deduction remained at 85% of dividends received over this period. The resulting effective tax rate on dividend income was 15% times the top marginal corporate rate. Effective for tax years beginning after 1957, corporations were required to own dividend paying stock 16 days to be eligible for the dividends received deduction and therefore be eligible for the lower effective tax rate. This 15 day holding period (requiring 16 days of ownership) was lengthened again at the end of 1984 to 45 days. For stock not owned 16 days, no dividends received deduction was available and corporations would be required to pay tax at their top marginal rate. This tax law change motivates one primary hypotheses. See 1939 IRC §26

and 1954 IRC §243, §246 for the dividends received deduction. See 1939 IRC §117 and 1954 IRC §1201 and §1211 for corporate capital gains and losses.

Regulated public utilities, including electricity and gas providers, telephone companies, and water suppliers, were corporations with a special tax attribute. During 1942, Congress allowed public utility corporations to begin deducting a portion of the dividends paid on their preferred stock outstanding as of October 1 of that year. Such shares were called "old money" in distinction to the "new money" stock for preferred stock issued after this date. To individual shareholders, there is no distinction in tax treatment between the two types of stock. Corporate shareholders, however are required to reduce their dividends received deduction on dividends received from old money public utility preferred stock. This tax attribute motivates the second primary hypothesis. See 1939 IRC §26 and 1954 IRC §244 and §247 for public utilities tax law.

Dividend Literature - Framing the Issue

Corporate finance has long been concerned with the effect of taxation on firm dividend decisions. It is puzzling to see firms pay dividends even though such dividends are taxed to investors at higher effective rates than the capital gains which could be earned retaining and reinvesting earnings. Such phenomena has been explained as signalling (eg. Miller & Rock 1985), as reducing agency costs on free cash flow (eg. Jensen 1986). Especially puzzling behavior occurs when firms simultaneously pay dividends and raise funds by issuing new shares. This has been described as reducing agency costs through the market discipline from the new issue process (Easterbrook 1984).

Research which spawned interest in ex-day returns focused on the larger issue of how a firm's dividend decision affects it's value. This work helped frame and clarify the importance of tax based ex-dividend trading behavior and dividend clienteles.

The possibility of tax based dividend clienteles was suggested by Miller & Modigliani in their 1961 dividend paper. Although the key point of their paper is that firms should be indifferent between producing capital gains (profit retention) and dividends in a world without taxes or transactions costs, they note that taxes may be a systematic source of inefficiency. The result of differing marginal tax rates among investors could result in dividend clienteles

such that firms would have a different payout strategy depending on their clientele.

In 1974, Black and Scholes looked at the relationship between dividends and expected return and found no significant relationship. They suggested that dividend payout may not be of first order importance in the process of firm valuation.

In their 1978 theory paper, Miller & Scholes use the Miller and Modigliani framework to explore the relationship between dividends and taxes. They develop sufficient conditions for investors to be indifferent between capital gains and dividends despite differential tax treatment. They reason that individuals can create their own leverage to shield dividends with interest deductions on borrowed funds. So if a firm increases its dividend payout, investors can replicate the prior tax position by borrowing to purchase more shares. While this technique has the effect of increasing risk, it converts dividend income into capital gains for tax purposes.

Individual investors can risk adjust to increases (or decreases) in a firm's dividend payout by borrowing and investing the proceeds in life insurance. Since life insurance has a tax free build up and a low risk return, investors can get the same tax deferral without changing risk extant under higher capital gains and lower dividend payouts. In general, dividends can be converted to capital gains by borrowing and investing in tax deferred low risk entities. Miller and Scholes also mention pension funds as a similar investment to adjust portfolios without increasing risk or tax obligation.

Litzenburger and Ramaswamy (1979) extend Brennan's (1970) tax adjusted capital asset pricing model to include certain types of leverage and suggest that there is a positive relationship between expected return and dividend yield. They also provide some evidence for the existence of a dividend clienteles.

Using monthly CRSP data from 1931 to 1977 and maximum likelihood techniques they estimate the coefficient on dividend yield. They find the relationship between pre-tax expected return and dividend yields to be less than one but significantly greater than zero. On average they suggest that investors require an added $.23 in pre-tax return for dividends.

In 1982, Litzenburger and Ramaswamy follow-up their 1979 study to address suggestions that dividend effects are due to information events rather than tax

effects. They cite numerous studies that report a positive coefficient for dividend effects, that is, that the dividend is related to expected return. They also cite the ex-dividend excess return estimates of those studies which range from $.18 to $.52 on $1.00 of return.

They strengthen this argument by showing portfolios ranked by dividend yield have differing coefficients. Presumably, due to different tax clienteles rather than information differences.

Miller and Scholes in 1982 caution against interpreting the ex-day behavior as tax based. They suggest a problem with prior studies is that the dividend yield variable is misspecified. They separate the intra-month payments from cross-month payments and find that dividend yield coefficients are not significant when this variable is included as they specified. They are unable to reject the null of a relationship between expected return and dividend yield when their specification used. They reason that marginal traders are likely to be institutions that are indifferent between dividends and capital gains rather than individuals.

The Ex-day Price Response and Abnormal Returns

Estimating Marginal Tax Rates

In 1970 Elton & Gruber noted that the price falls by less than the dividend paid. Concluding that dividend tax effects are causing the differential, they use this to estimate investors marginal tax rates. Their evidence suggests that the price drop with and without the dividend divided by the dividend is less than one as follows

$$(P_{ex} - P_{cum}) / D < 1$$

They suggest that investors may self select into tax clienteles. Kalay (1982) refines Elton & Gruber and also finds dividend related tax effects.

In 1984, Eades, Hess & Kim compared ex-day returns for taxable and non-taxable distributions. Using daily close to open price data from 1962 to 1972 for common stocks, they find that the excess return is associated with the period between the price at the close of trading and the next opening price. This was measured at the point where the stock trades with the dividend at close and without the dividend at the next open. They suggest this is strongly

supportive of the tax hypothesis. Using daily data and close to close prices from 1962 to 1980 they also find an ex-day excess return consistent with tax clienteles on dividends. They find that tax effects are reduced upon the introduction of negotiated commissions (which is widely believed to reduce trading costs). However, this reduction in excess return does not occur for preferred dividends.

They find that high yield securities, such as preferred stock, have negative rather than positive excess returns around the ex-day and suggest this is consistent with corporate ownership and corporations preference for dividends over capital gains.

Eades, Hess, and Kim note several other phenomena not consistent with the tax hypothesis. Non-taxable distributions show significant negative excess returns, while stock splits and stock dividends are significantly positive. They also find abnormal returns on the day before the ex-day and suggest this result casts doubt on the tax hypothesis.

Pre-Income Tax Ex-Day Price Changes

Barclay (1987) looked at the ex-dividend behavior of common stocks prior to the United States federal income tax. He models the relationship between dividends and capital gains as

$$(P_{t-1} - E(P_t))\ (1-t_c) = D_t\ (1-t_o)$$

where D_t is the period t dividend, $E(P_t)$ is the expected price of the security at period t, P_{t-1} is the price of the security last period, t_c is the tax rate on capital gains, and t_o is the tax rate on ordinary income. Barclay gathered daily open and close common stock price data from 1900 to 1910, including price around the ex-day. He found that on ex-dividend days the stock fell by the full amount of the dividend. As other ex-day studies have done, he ranked portfolios by dividend yield and found no evidence of a tax clientele effect. The experiment is repeated on daily CRSP data between 1962 and 1985 and finds, as do other studies, the existence of excess returns. He suggests that capital gains and dividend income appear to be perfect substitutes in the pre-tax environment and interprets the data as supporting the income tax hypothesis that the tax causes current discounting of dividends relative to capital gains.

Trading Volume

The marginal investor (price setting investor), according to Elton and Gruber is the investor who trades for reasons unrelated to the dividend. To identify the marginal trader. Lakonishok & Vermaelen (1986) looked at trading volume around ex-dividend dates for cash dividends and found significant increases in trading volume. The increase in trading volume is more significant for high yield stocks and for actively traded stocks. The volume increase became more pronounced after trading commissions became negotiable in 1975 (presumed lower trading costs). They interpret these results as consistent with the hypothesis that short term traders are the marginal investor around these dates. They also find negative abnormal volume around ex-dividend days for non-taxable distributions.

Trading Costs

In 1988, Karpoff & Walkling suggest that the dividend penalty and tax trading are not competing explanations as suggested by Lakonishok and Vermaelen, rather are complementary to each other. They reason that investors, who are trading for reasons other than tax incentives (eg. portfolio rebalancing), have an inventive to time trades to maximize after tax returns (sell before the ex date and buy immediately after). This presents opportunities for short term traders (who presumably, have no differential between marginal tax rates on dividends or capital gains). The three hypotheses they examine are; ex-day returns are increasing in transactions cost, short term trading increases after May 1975 when commission rates are presumed to fall, and short term trading will be concentrated among high yield stocks. They use daily data from CRSP tapes 1965 - 1984, include only ordinary (taxable) dividends, and exclude payments associated with stock splits and special distributions. Transactions costs were proxied from 1984 COMPUSTAT data. The four proxies for transactions costs are: inverse of stock price, firm market value, bid-ask spread, standard deviation of stock return. They find little evidence of a correlation between ex-day returns and transaction costs prior to May 1975 (date of negotiated commissions) but some evidence after that date. In addition, low yield stocks show no evidence of a positive correlation between ex-day returns and transaction costs even after May 1975. Among high yield stocks however, there is significant positive correlation between transactions costs and ex-day returns.

Karpoff and Walkling interpret these findings as consistent with short term traders affecting ex-dividend day returns for high yield stocks and after negotiated commissions. These results are consistent with the predictions that net benefits of short term trading vary directly with dividend size and vary inversely with the cost of trading.

Dividend Capture

Karpoff & Walkling (1990) develop the dividend capture hypothesis that, where dividend capture trading occurs, ex-day abnormal returns are eliminated up to the marginal cost of trading. Dividend capture is the short term purchase of stock for the excess dividend return. This hypothesis implies a positive relationship between ex-day returns and transactions costs, and should be increasing in dividend yield. Thus, the excess return reflects the marginal investors trading costs and not investor's marginal tax rates. Also, dividend capture trading helps explain the trading volume increases around the ex-day.

Dividend capture in NASDAQ stocks is explored by looking at cross sectional relationships between ex-day abnormal returns and transactions costs. Bid-Ask spread is used to proxy for transaction cost and it is found that ex-day returns and bid-ask spreads are positively related, and the relationship increases in dividend yield. This relation does not appear to exist in non-ex-dividend days. Karpoff and Walkling suggest this provides evidence that ex-day abnormal returns are eliminated to the marginal cost of trading.

Time Series Properties of Ex-Day Returns

Gordon and Bradford (1980) examine the relationship between capital gains and dividends over the period between 1926 and 1978. In spite of differential dividend and capital gain pricing, they find an approximately equal relationship. They also suggest a cyclical pattern that paralleled the business cycle.

Hess (1982) searches for dividend clienteles by examining daily data from NYSE common stocks between July 1962 and December 1979. Forming ten portfolios on dividend yield, he rejects the clientele effect model to explain dividend yields and ex-day returns. Interestingly, forming portfolios over time, he finds that ex-day returns are not the same over time.

Eades, Hess, and Kim (1994) study the time series properties of ex-day returns. Using CRSP daily data between July 1962 and October 1989 they examine all taxable NYSE dividends and find a different pattern between high and low yield ex-day returns. Fitting an ARIMA model to the data shows low yield ex-day returns are relatively stable over the period while high yield securities exhibit more volatility. They examine changes in the tax law for capital gains holding period, changes in the capital gain exclusion, tax rate changes, and personal dividend exclusion changes. The only significant tax change was 1982 with a reduction in the top bracket and was significant only for the high yield sample. Eades, Hess and Kim did find that the 1975 and the advent of negotiated commissions marked an important change in ex-day returns, particularly for the high yield sample. They find on month T-Bill rates positively related to ex-day returns and negatively related to dividend yields. They conclude that these results are generally consistent with corporate dividend capture.

Preferred Stock

Stickel (1991) studies ex-day returns and trading volume of preferred stock from 1972 to 1980 in the CRSP preferred stock file. He selected non-convertible preferred traded on the NYSE and AMEX. Using cumulative daily returns he suggests that his evidence is consistent with short term investors reducing the ex-day return of more liquid, higher yield stocks. Although sensitive to the definition of liquidity, less liquid stocks have higher ex-day returns.

Effect of 1986 Tax Act on Ex-Day Returns

Michaely (1991) uses 50 day returns around the ex-day over the 1986 to 1989 period (excluding October 1987) to search for tax premiums in ex-day returns due to the 1986 tax act. Using generalized least squares to control for heteroskedasticity arising from differing dividend yields, Michaely finds that the change in relative dividend to capital gain tax rates has no effect on the ex-day price response. This is interpreted to be consistent with a significant role for corporate traders.

Lamdin and Heimstra (1993), using CRSP data from 1982 to 1991, examine the ex-day price response of common stocks. In contrast to Michaely, they find

that ex-day price responses are consistent with a change in relative tax value for long term investors.

Han (1994), using a longer sample period than Michaely, also finds that the 1986 tax reform act had no significant effect on ex-day returns of NYSE and AMEX stocks but does find a significant change in ex-day returns of NASDAQ traded shares.

Holding Period and At Risk Rules

Grammatikos (1989), using 1975 to 1985 NYSE and AMEX data on common stocks from the CRSP tapes, found a significant change from the 1984 tax act. This tax law changed the holding period from 15 to 45 days for corporate stockholders to get the dividend received deduction. The 1984 tax act also required corporations to be at risk by eliminating possible offsetting hedge positions for the dividends received deduction. He finds this result for high yield stocks only.

Eades, Hess, and Kim (1994) suggest that this result is sensitive to the sample period selected. They find that different periods around this date give different results.

Foreign Taxes

Foreign tax environments provide for additional tests of tax hypotheses. Booth and Johnson (1984) examine Canadian stock prices over a period where four distinct tax periods are discernable. They find the ex-day price response significantly different from one. They do not find much evidence supporting short term investors setting ex-day prices. Canadian stocks cross listed on US exchanges have different ex-day price responses than those listed in Canada alone.

In another tax environment, Kaplanis (1986) studies UK options and the ex-day price change. Options are included a proxy for determining the expected ex-day price change. Using 360 pairs of cum/ex day prices on 14 British shares from 1979 to 1984 and the underlying equity options, Kaplanis found the ex-day price predicted by options fell less than the full dividend. Also, this predicted price response was not significantly different than the actual ex-day price change. Kaplanis interprets these results as consistent with long run tax clienteles and inconsistent with the short term trading hypothesis.

Electric Utility Common Stocks

Sartoris and Moore (1988) look at the dividend clientele issue by studying special dividends on the common stock of electric utility companies. A number of electric utility companies have recently issued non-taxable return of capital dividends. These are often issued as a part of a regularly taxable dividend. They obtain survey data between 1977 and 1981. Using the price change framework, they contend that including the non-taxable return of capital variable allows for identification of tax clienteles. They suggest the evidence is consistent with the existence of clienteles for both individual investors and corporate investors.

Motivation For This Research

That income taxes affect the ex-day return seems to have become a consensus. Researchers do not agree, however, on the role heterogeneous tax laws play in asset pricing and in the formation of dividend clienteles. Tax motivated corporate trading activity is considered important and plausible by many researchers studying ex-day price behavior. Corporate trading and investment activity as motivated by income tax law has been suggested as the explanation for much of the variation in ex-day returns. Although corporate tax attributes have been included in research (see Grammatikos (1989) and Eades, Hess, and Kim (1994), they have not been the primary focus of most work. Additionally, when a corporate tax variable has been included as an explanatory variable studies have not controlled for important changes in individual income tax law. This research is an attempt to clarify the role corporate clienteles while holding constant the effect of individual investors.

ANALYTICAL DEVELOPMENT

Valuation Models Developed

Simple Equilibrium Conditions Between Prices and Dividends

Expected Return

In equilibrium, or at least given no arbitrage opportunity, a stock going ex-dividend implies the instantaneous price change should equal the present value of the dividend paid. In a world without taxes or other market imperfections, and where the dividend and initial price are known prior to the next instantaneous price, this relation is

$$D = P_{cum} - E(P_{ex}), \tag{1}$$

where D is the present value of the dividend, P_{cum} is the price immediately before the dividend and $E(P_{ex})$ is the price expected immediately after. The return form of this condition is developed by dividing each side by P_{cum}, without income taxes, this condition is

$$D / P_{cum} = (P_{cum} - E(P_{ex})) / P_{cum}. \tag{2}$$

The left hand side can be interpreted as the dividend yield and the right hand side as the expected capital gain yield. In equilibrium, we expect the ex-dividend price to adjust so that this condition holds. Any single investor owning stock as it becomes ex-dividend receives the return from the left hand side of this condition (the dividend yield) plus the right hand side (the capital gain yield). This is the investor's instantaneous expected ex-dividend return before taxes. It has the limiting value of zero if the above equilibrium condition is met. The expected ex-day return $E(R_{ex})$ is

$$E(R_{ex}) = D / P_{cum} - (P_{cum} - E(P_{ex})) / P_{cum} = 0. \tag{3}$$

Effective Tax Rates

Adding an income tax on all income at a uniform rate t maintains the equilibrium. Investors earn the difference between the income received and the present value of the tax. This is equivalent to multiplying by (1 - t) giving

$$D\ (1 - t) = (P_{cum} - E(P_{ex}))\ (1 - t). \quad (4)$$

Note that imposing a single rate implies an expected price response equal to the dividend. It also implies an instantaneous expected return equal to zero. If, however, dividends were taxed at a rate different than the rate imposed on capital gains the ex-dividend price response no longer equals the dividend. Allowing for different tax rates on dividend and capital gain income alters the equilibrium condition as follows

$$D\ (1 - t_{div}) = ((P_{cum} - E(P_{ex}))\ (1 - t_{cg}), \quad (5)$$

where t_{div} is the effective tax rate on dividend income and t_{cg} is the effective tax rate on capital gain income. If the effective tax rate on dividend income is greater than the effective tax rate on capital income then the expected price change no longer equals the present value of the dividend. This can be seen by using the following price response form of the above equilibrium condition

$$(1 - t_{div}) / (1 - t_{cg}) = ((P_{cum} - E(P_{ex})) / D. \quad (6)$$

Maintaining this condition implies that the expected instantaneous pre-tax price response to dividend no longer must have a limiting value of one. This can also be written in the form of expected pre-tax ex-dividend return as $E(R_{ex})$ was defined in (3)

$$E(R_{ex}) = D / P_{cum}\ (1 - (1\ t_{div})/(1 - t_{cg})). \quad (7)$$

This implies that expected pre-tax ex-dividend return increases (decreases) as the tax on dividends t_{div} increases (decreases) relative to the tax on capital gains t_{cg}.

This model has assumed an instantaneous price change such that the limiting price response equals the dividend and the limiting return equals zero. The ex-dividend period actually occurs over the discrete time interval of one day and requires a discrete time model of the pricing process to be developed.

Daily Rate Price Model for Preferred Stock

Yield Measurement

The value of preferred stock where P_{cum} can be modeled as the price immediately before going ex-dividend, D = the present value of the quarterly dividend, and r is the nominal quarterly rate of return is $P_{cum} = D / r$. The actual quarterly yield can be approximated from observed dividends and ex-day price to measure the actual yield as

$$r = Div / P_{cum}. \tag{8}$$

Here the actual dividend Div is substituted for the present value of the dividend D.

Daily Rate

Using this expected quarterly rate of return we can define an average daily rate of return r_d as

$$r_d = (1 + r)^{(1/91)} - 1. \tag{9}$$

This modeling of the daily rate assumes a constant daily price path for preferred stock over all days such that $P_t (1 + r_d) = P_{t+1}$. However, we are interested in examining the data for a different ex-day rate of return without the rate constraint imposed by this formulation.

Growth Rate

To allow for an ex-day rate of return different from the growth rate we define the rate of price growth r_g as the rate of price growth over each day not going ex-dividend. This is measured

$$r_g = [(1 + r_d)^{91} / (1 + r_{ex})]^{1/90} - 1, \tag{10}$$

where r_{ex} is the ex-day rate of return as measured in equation (3) with the observed ex-day price in place of the expected ex-day price. Note that r_{ex}, as measured from observed data, includes both the daily growth rate r_q and an abnormal portion. We expect to observe $r_{ex} > r_d > r_q$ if the ex-day price response is less than the present value of the dividend. The signs would be reversed if the ex-day price response were greater than the present value of the dividend. The daily rate model can motivate adjustments for growth and discounting dividends to expand the above equilibrium condition from an instantaneous to a discrete time equilibrium condition.

Growth Rate and Dividend Present Value Adjustments

Adjustments for one day returns r_q and the number of days until dividend payment can motivate changes in the equilibrium condition from instantaneous time to a one day time horizon. In price response form, adjusting for a daily growth rate and for n days until dividend payment gives the condition

$$(1-t_{div})/(1-t_{cg}) = [(1+r_q)\ P_{cum}-E(P_{ex})]\ (1+r_q)^n\ /\ Div. \qquad (11)$$

This condition can also be stated in terms of pre-tax expected returns

$$Div\ /\ P_{cum}\ (1+r_q)^n - ((1+r_q)\ P_{cum} - E(P_{ex}))\ /\ P_{cum} = Div\ /\ P_{cum}\ (1 - (1 - t_{div})/(1 - t_{cg})). \qquad (12)$$

Corporate Income Taxation and Valuation Models

Dividends Received Deduction

Corporations that own stock in other corporations receive a deduction for a percentage of the dividends earned. This dividends received deduction percentage (DRD%) has ranged from 85 down to 70 percent under current income tax law. This has the effect of adjusting the tax rate for dividend income of corporations as follows

$$\text{Tax on Dividends} = (Div - Div\ DRD\%)\ t_c = Div\ (1 - DRD\%)\ t_c.$$

So the corporate tax rate on dividend income t_{cdiv} can be stated as

$$t_{cdiv} = (1 - DRD\%)\ t_c. \qquad (13)$$

Using the 85% dividends received deduction, which was the percentage in effect over the sample period of 1948 to 1964, the tax rate on dividend income reduces to $t_{cdiv} = .15\ t_c$. Therefore, over the sample period the effective corporate tax rate on dividends is 15% of the statutory corporate rate.

Holding Period

Prior to 1958, corporations could receive the full dividends received deduction on most US corporation's stock owned regardless of the length of time the stock was owned. As long as the corporation was owner of record when shares went ex-dividend, the corporate shareholder could receive a deduction. Stock purchased one afternoon could be sold ex-dividend the following morning. The purchasing corporation would receive the dividend, pay a low tax on it, and earn an abnormal ex-day return.

Effective for dividends received after December 31, 1957, a fifteen day holding period was imposed for corporations to get the dividends received deduction and be taxed at the lower rate. This requirement has imposed at least three costs on corporate investors. First, if alternative investments are available that yield a nominal return greater than the daily growth rate, then corporate stockholders receive a lower effective rate of return. This assumes the existence of an abnormal ex-day return and the existence of alternative investments that yield at least the daily growth rate. Second, the tax benefit is reduced if part of the investment return comes in the form of capital gains through increases in price rather than dividend income. This is a small cost relative to the others. Finally, imposing a holding period creates more interest rate risk for corporate shareholders. While risk is not specifically an issue for corporations, it may be relevant in treasury matters. Corporations are generally considered risk neutral with respect to operating projects since investors can more efficiently perform diversification in the capital market. However, corporations select treasury investments for temporary excess cash as if they were risk averse by giving up higher expected returns for increased liquidity and safety.

To model the first holding period cost mentioned above, assume that corporations can trade at no cost and there are no taxes. Assume also that investments earn r_d on non-ex-days and r_{ex} on ex-days. If corporations are required to hold stock h more days, then the quarterly return r_q is

$$r_q = (1 + r_{ex})\ (1 + r_d)^{90-h}\ (1 + r_q)^h - 1. \qquad (14)$$

For $r_d > r_q$ the quarterly rate of return r_q is decreasing as the holding period h increases. Also, for r_d, r_q greater than 0 and less than 1, the holding period cost is increasing as the difference between r_d and r_q increases. For a fixed nominal daily market return (fixed r_d), r_q is decreasing as r_{ex} increases. Thus the cost of imposing a holding period is increasing as the ex-day abnormal return r_{ex} increases. Although this reasoning naively assumes that corporations forgo earning the higher return r_{ex} each day, it does capture the cost of a required holding period to a corporate shareholder.

Old Versus New Money

As shareholders of public utility preferred stock, corporations are eligible for the full dividends received deduction (DRD). This can be written as the effective statutory tax rate on dividend income from new money shares t_n where

$$t_n = t_c - DRD\%\ t_c = t_c\ (1 - DRD\%). \qquad (16)$$

Here the statutory income tax rate is t_c. Note that t_n is identical to the tax rate t_{div} developed earlier. Corporations that own old money public utility preferred shares must reduce their dividends received deduction. Since issuers of those shares may deduct old money dividends in the ratio of $.14/t_c$, tax law requires corporate shareholders of public utility preferred to reduce their dividends received deduction by the same ratio as the issuer's deduction. Similar to the new money shares above, the effective statutory tax rate on old money dividends received by a corporation t_o can be written a follows

$$t_o = t_c\ (1 - (DRD\% - DRD\%\ .14/t_c)) = t_c - DRD\%\ (t_c - .14). \qquad (17)$$

The difference between the effective statutory tax rates on new and old money public utility preferred dividend income is

$$t_n - t_o = DRD\% \ .14. \qquad (18)$$

This difference between rates is independent of the prevailing corporate tax rate t_c. For the period under study, the dividends received deduction was 85% of dividends received. This resulted in a difference between the old and new money rates of 11.9%. Thus for example, over the period 1952 to 1963 when the top marginal corporate tax rate was 52%, the effective statutory tax rate on new money preferred stock dividends was 7.8% and the effective statutory rate on dividends from old money preferred stock was 19.7%.

METHODOLOGY AND STATISTICAL TEST DESIGN

Research Overview and Hypothesis Development

Evidence from prior research is generally consistent with the existence of tax based clienteles and dividend taxation appears to explain a significant part of the abnormal ex-day return. Barclay (1987) found no differential return between capital gains and dividends prior to the introduction of the income tax, and Eades, Hess, and Kim (1984) showed that most of the abnormal return occurs in the close to open period as the dividend record date passes.

The literature, however, has not resolved which clientele is setting prices on ex-dividend returns. As suggested by Karpoff and Walkling (1990), it is likely that the ex-day premium is bid away up to the marginal transaction costs.

It has been documented that preferred stock prices fall further when going ex-dividend than common stock prices (Eades, Hess, Kim 1984). This may indicate a corporate clientele for preferred stock since the tax code makes dividends are more valuable than capital gains to corporate investors. Preferred stock of public utilities provides a way to search for the existence of and help characterize corporate clienteles while holding the influence of other tax based clienteles relatively constant. We can attempt to measure the changes in ex-day returns, if any, coincident with two tax attributes affecting only corporate shareholders.

Holding Period Hypothesis

Beginning in 1958, corporations were required to own stock at least 16 days around the ex-day to be eligible for the dividends received deduction and associated reduced tax rates. Before 1958, corporations had no minimum holding period. Given the existence of abnormal ex-day returns, this holding period requirement imposes an increased cost on corporate owners but not individual owners. As shown earlier, the existence of an abnormal ex-day return implies lower returns on non-ex-dividend days and implies that holding period costs are not zero. In addition, requiring a holding period imposes interest rate risk on stockholders. While corporate shareholders may not price risk in their operating projects, it seems plausible that risk avoidance is present in treasury functions.

A test of this hypothesis is constructed by comparing data means before and after the holding period requirement was imposed. The maintained hypothesis suggests no difference between the pre and post 1958 data after the imposition of a 15 day holding period requirement. In price response form, this hypothesis is

$$(P_{ex,post} - E(P_{cum,post})) / D_{post} = (P_{ex,pre} - E(P_{cum,pre})) / D_{pre}.$$

We should not expect to reject this null hypothesis if corporate shareholders are not affecting ex-day returns. However, if corporate investors significantly impact ex-day pricing then we should be able to reject this hypothesis. Given that the ex-day rate of return exceeds the daily growth rate, the alternative hypothesis is consistent with price setting corporate investors.

$$(P_{cum,post} - E(P_{ex,post})) / D_{post} < (P_{cum,pre} - E(P_{ex,pre})) / D_{pre}$$

This suggests that ex-day prices dropped a larger portion of the dividend in the earlier (pre-holding requirement) period. Finding that the ex-day price response was larger before the imposition of the corporate holding period requirement is consistent with corporate investors being the marginal trader.

Using the return form of this hypotheses changes the direction of the alternative prediction. Under the null hypothesis measured in return form, we continue to expect ex-day returns to be equal across the change in holding period. However, when the hypothesis is stated in return form rather than in price response form, the alternative hypothesis suggests that returns will increase in the period after the imposed holding period.

Old Versus New Money Hypothesis

As discussed earlier, utilities issuing "old money" preferred stock receive tax benefits in the form of a dividends paid deduction. Except for shareowning corporations, these dividends are taxed to investors like any other dividend. Corporations, however, must reduce their dividends received deduction which raises the effective tax rate on old money dividends. For the 1948 to 1964 period corporate shareholders paid an additional tax of 11.9% on dividends from old money shares. For the years 1952 to 1963 this amounted to a top

marginal federal income tax rate of 7.8% (52% rate less 85% dividends received deduction) for dividend income. Old money dividends, however, would be taxed to corporate shareholders at a 19.7% rate.

Based on this analysis, our null hypothesis in price response form is

$$(P_{cum,old} - E(P_{ex,old})) / D_{old} = (P_{cum,new} - E(P_{ex,new})) / D_{new}.$$

where P is the price with and without the dividend, and D is the dividend. We would not expect to reject the null hypothesis in at least two situations; if corporations are the marginal traders on the new money preferred and on the old money preferred but do not differentiate between types of stock, or if non-corporate investors are the marginal investor on both types of securities. We should be expected to reject the null, however, if corporations are the marginal traders on new money preferred but not on old money preferred stock. We should also be able to reject the hypothesis if corporations are the marginal trader on both old and new money stock but differentiate between the after-tax value of the dividends. In either case the alternative hypothesis is

$$(P_{cum,old} - E(P_{ex,old})) / D_{old} < (P_{cum,new} - E(P_{ex,new})) / D_{new}.$$

This hypothesis follows from the corporate tax rate on old money dividend income exceeding that on new money. Rejecting the null hypothesis is consistent with corporations valuing dividends of new money public utility preferred stock more than dividends of old money public preferred, and that corporations are the marginal trader for new money preferred. This test is a useful extension of existing work because it holds constant some competing explanations (such as the transactions cost hypothesis) while examining the tax hypothesis. It also could provide further evidence of a corporate dividend clientele for public utility preferred stock.

Restating this hypotheses in return form changes the direction of the alternative prediction. Under the null hypothesis we continue to expect ex-day returns to be equal across old and new money stock. However, when the alternative hypothesis is stated in return form rather than in price response form we expect returns on old money preferred to be larger than returns on new

money preferred stock. Both primary hypotheses are summarized in the table below.

Table I

Tax Hypothesis Predictions Summarized

	----- Price Setting Investor ----- Corporations	Individuals
Predicted Magnitude		
Ex-Day Return[1]	small close to 0	large far from 0
Ex-Day Price Response[2]	large could be > 1	small less than 1
Predicted Relative Magnitude		
Ex-Day Return	New < Old	New = Old
Ex-Day Return	Pre < Post	Pre = Post
Ex-Day Price Response	New > Old	New = Old
Ex-Day Price Response	Pre > Post	Pre = Post

[1]Ex-Day Return = Div / P_{cum} - (P_{cum} - P_{ex}) / P_{cum}
[2]Ex-Day Price Response = (P_{cum} - P_{ex}) / Div

Other Variables

In addition to the holding period and old versus new money, other variables also may affect the value of the dividend. Such variables affect ex-day returns and ex-day price responses and are included in this analysis.

Daily Growth Rate

In common stock studies which use close to close pricing, returns are often adjusted by the ex-day market returns as measured by the market model. Stickel, who has close to close pricing for his preferred stock data, also applies the market model. This study controls for market effects of ex-day returns by using close to open pricing. Thus ex-day event are excluded from data by design.

Additionally, the daily growth rate is compared to average ex-day returns and found to be small. Yields over the sample period were fairly stable indicating few confounding effects due to uncertainty from interest rate change. Accordingly, no adjustment for daily growth rate is made.

Using only a one day window to measure any abnormal return may understate the abnormal return and overstate the measured growth rate. Studies have suggested that abnormal returns span several days around the ex-day. This bias, however, is against rejecting the null.

Time Until Dividend Payment

As modeled in the previous chapter, differences in the period between the ex-day and the dividend payment day affect the value of the dividend on the ex-day. We expect the ex-day return to decrease and the ex-day price response to increase in the time to dividend payment. This should be true whether corporations or individuals are the marginal trader.

Opportunity Cost

Eades, Hess and Kim (1994) suggest that ex-day returns may be less impacted by corporate trading activity when short term interest rates are high. They interpret this as an opportunity cost phenomena. Accordingly, the three month treasury bill rate is included as a variable. We expect ex-day returns to be positively related to three month T-bill rates as corporations invest in treasury bills rather than stock, allowing individuals to set the price. Ex-day price responses should be negatively related to three month T-bill rates.

Dividend Yield

Several studies find a negative relationship between ex-day returns and dividend yields (eg. Eades, Hess & Kim, 1994). This generally is interpreted as evidence that corporate traders engage in dividend capture only in higher yielding stock. Dividend capture would bid down ex-day returns and increase the ex-day price response. Also mentioned in several more recent studies is the role yield could play as a proxy for risk. Accordingly, dividend yield is included as a variable which may help explain ex-day returns.

Table II

Predicted Relationship Between Other Variables and Ex-Day Returns and Price Change to Dividend

Dependent Variable	Independent Variables		
	Dividend Yield (YIELD)[1]	Opportunity Cost (T-BILL)[2]	Days to Payment (PMTDA)[3]
Ex-Day Return (REX)	inverse (-)	direct (+)	direct (+)
Price Change to Dividend (PCD)	direct (+)	inverse (-)	inverse (-)

[1]YIELD = Dividend/Cum Price (Div/P_{cum})
[2]T-BILL = annual rate of three month U.S. Treasury bill
[3]PMTDA = number of days between dividend ex-day and payment date

Design Issues

Some public utilities have both old and new money preferred stock outstanding. This provides an environment to search for corporate tax clienteles while holding relatively constant the marginal trading cost and dividend yield. By examining public utility preferred stock and comparing ex-day behavior on old money preferred to ex-day behavior of new money preferred, we can hold transactions cost constant. Presumably, the transactions cost of trading similar preferred shares in the same or similar companies would be constant. In addition, according to Wilson (1987), most preferred stock listed on the New York has received exemption from Rule 390 which requires listed stock to be traded on the floor. Wilson asserts that most preferred stock is effectively traded over the counter and transactions can be more readily negotiated. Presumably then, commissions for preferred stock were also negotiated. Negotiated transactions allows for lower transactions costs and opens the possibility that short term trading could be profitable. Low trading costs make dividend capture a more viable strategy for corporations.

By selecting preferred stock, we have a relatively homogeneous dividend yield. This is in contrast with common stock studies where dividend yields vary by widely and could have sub-clienteles.

Non-convertible preferred stock also has the advantage of providing returns to shareholders primarily in the form of dividends. This allows for

isolating dividends and the effect of dividend taxation from the effect of capital gains tax rules. This is important in evaluating such factors as the change in holding period for corporate dividends received deductions.

Public utility preferred stock provides for an excellent way to search for the effect of corporate clienteles because of the special tax feature associated with this stock. As discussed earlier, old money public utility preferred stock allows for a partial deduction for dividends paid. Correspondingly, corporate shareholders must reduce their dividends received deduction. This raises corporations effective tax rate on old money dividends received by 11.9% over the normal corporate dividend tax rate. New money preferred stock does not have this tax feature. Non-corporate shareholders (eg. individuals and most institutions) have no distinction between the two types of shares.

To reduce selection bias, public utilities with both types of preferred stock (old and new money) issued and outstanding were studied. This design allows for matched pair analysis. Returns on old money stock from one firm, going ex-dividend on the same day and with the same payment date is matched with identical new money stock from the same firm. This controls for many of the confounding effects of risk and timing. This also protects against possible bias from selection differences for companies that have only one type of stock issued. However, limiting the sample to firms with both types of preferred stock may introduce selection bias against newer firms.

Only firms with both classes of stock listed on the NYSE were selected for study. The New York Stock Exchange listing was desirable to get consistent and available data. Since preferred stock is not frequently traded, the NYSE listing is a signal of market depth. More frequently traded shares should have less noise in the ex-day return.

Limiting the study to public utilities preferred is does not unduly limit the sample to non-representative preferred stock since utilities are the primary issuer of preferred stock. Regulatory reasons, combined with tax law, are often cited as the primary motive for utilities to use preferred stock in their capital base. Brealey & Myers (1991) suggest the lack of a deduction for dividends (unlike deductible interest) is a limitation for most firms to issue preferred stock rather than bonds. They suggest that, since tax payments are included in rate based calculations of regulated utilities, the tax disadvantage

can be passed through to customers by way of higher user rates. Accordingly, they suggest that a large fraction of the dollar value of non-convertible preferred stock is from public utilities.

Casual empiricism also supports the conclusion that public utilities are the primary issuer of preferred stock. For example, a Securities and Exchange Commission study of 1971 - 1972 new issues of preferred stock showed $4.03 billion was preferred stock issued by utilities out of a total annual issue registered of $4.38. Thus approximately 92% (by value) of preferred stock issued in this period was from utilities.

A second regulatory reason that public utilities issue preferred stock relates to SEC capital requirements. The SEC stated in 1952 that the capital structure of an electric utility should not exceed 60% debt and that common stock should not be less than 30% of capital. This leaves 10% in the capital base that could be filled by preferred stock.

The time period selected of 1948 to 1964 is important to the design of the study. It was selected because of data availability and environmental stability. This period was one of relatively consistent tax laws. Interest rates were relatively stable. Significant structural change (eg. depression, world war, supply shock) did not appear to occur. This allows for the study of the change in dividends received deduction holding period at the end of 1957. The year 1948 was selected as the first year of the study because of the availability of Moody's data from that date forward. Data was gathered through 1964 to provide a sufficient sample size of observations after the holding period change.

One relevant issue to the study of dividend taxation, but which is beyond the scope of this study, is the issue of determining which type of corporate investor is involved in setting prices. Corporate investment activity could be long run for certain companies (such as insurance companies) and they affect prices through the timing of trades. Alternatively, much recent literature has focused on corporate dividend capture that arises from short term trading activity. The tests performed in this study were not designed to distinguish between such sub-clienteles.

Statistics

Test of Significance

Following statistical techniques in the literature, the test statistic used for significance tests is

$$X \;/\; (s \;/\; n^{.5}).$$

This follows a t distribution given that s is the sample standard deviation and X is the mean of a normally distributed variable. In this study, X is the mean of ex-day returns R_{ex} or the mean of the price response coefficient PCD.

Differences of Means

The test statistic to examine differences of means is

$$(X_1 \;-\; X_2) \;/\; se.$$

Given the normality assumption for each variable, this statistic follows a t distribution where se is the joint sample standard error and X_1 and X_2 are the mean of the test statistics.

Estimating the joint sample standard error depends on whether the population variances are equal or not. If the variances are unequal and the sample sizes are large (as we assume for both), the standard error is

$$se \;=\; (s_1^2 \;/\; n_1 \;+\; s_2^2 \;/\; n_2)^{.5}$$

where s_1 and s_2 are the sample standard deviations of variables 1 and 2 and n_1 and n_2 are the number of observations in the sample of variables 1 and 2. The return or price change variables are grouped on pre or post holding period or on old or new money stock for this analysis.

Types of Techniques

Functional Form of Dependent Variables

Returns

Two approaches to measuring the abnormal ex-day behavior have been used in the literature; calculating the ex-day return and calculating the ex-day

price response. Each statistic is a function of the same random variable, the expected ex-day price. However, the ex-day return is a non-linear transformation of the price response measure. Accordingly, each statistic may have different distributional properties and both are evaluated. The ex-day return for the ith observation is calculated using the following equation

$$R_i = D_i / P_{cum,i} - (P_{cum,i} - P_{ex,i})) / P_{cum,i}.$$

Price Response

Much of the literature measures and tests the price response statistic (price change to dividend) rather than calculating returns. Although the return formulation is the primary approach used in this study, the price response approach was also developed and is tested for significance using means of

$$PCD_i = (P_{cum,i} - P_{ex,i}) / D_i,$$

where i is the ith observation. This has been used primarily when smaller samples are necessary (see Barclay or Lamdin and Hiemstra or Sartoris and Moore).

Data Grouping

By Characteristic

As described in the hypothesis development section, the two primary attributes being studied are discrete characteristics. For testing the effect of these attributes on ex-day returns, data is grouped by distinguishing characteristic. Then means, standard deviations, and sample sizes of ex-day return groups are calculated. Data significance and difference of means tests are then applied.

By Portfolio Quintile

To raise the power of these tests, portfolios were formed from ranked data. First, data were partitioned by characteristic and then ordered by magnitude. Five equal size portfolios were formed for each characteristic taking the smallest fifth to largest fifth. Tests of difference of means are then applied to each portfolio of the same quintile rank.

By Matched Pair

One characteristic of interest, old versus new money, allowed for the formation of a linear difference of individual observations matched by firm and dividend declaration date. Matching is possible since selected firms have both old and new money preferred stock outstanding. Firms also use the same record and payment date for both types of stock. A specific ex-day return of a particular firm's old money stock are is from the ex-day return of the matched new money stock. The difference between the new and old money ex-day returns creates a new variable, the mean of which, is tested for significance.

Regression

Ordinary least squares regression was applied to evaluate the relationship between the ex-day return and the other variables. Regression is the better tool for such analysis since these other variables; time until dividend payment, T-bill rate, and dividend yield are continuous variables. Dummy variables are included to evaluate the joint effects of holding period and old/new money.

Econometric Issues

Heteroskedasticity

Studies of common stock had significant variation in dividend yield and exhibit heteroskedasticity. Michaely (1991) controls for this problem by developing a generalized least squares estimator. Rather than using generalized least squares, this study controls for the problem by experimental design. Most of the preferred stock prices over the period are close to $100 and yields over the period are quite similar relative to common stock. Accordingly, heteroskedasticity from differing yields should not be a problem in this study.

Market Model Adjustments and the Daily Growth Rate

The market model is often used to adjust daily returns of common stocks. Stickel (1991) also uses the market model to adjust preferred stock returns for common movement in calculating the cumulative abnormal returns. Gathering close to open prices obviates the need to adjust for market effects.

Since non-convertible preferred stock is a fixed income security, it earns income over time. Daily growth rate effects are evaluated.

Multicollinearity

Since yields on preferred stock increased during the sample period, there is anticipated multicollinearity between yield and the holding period dummy variable. Regressions with and without each variable consider this problem. I conjecture that little specification error is introduced by the omission of the yield variable. This is supported by the fact that the sign of the yield variable coefficient is not as predicted. The tax hypothesis, as developed in prior literature, suggests that high yields should attract corporate investors to bid away the return premium. Empirical evidence from prior research supports this with evidence of reduced returns on high yield stocks. The results discussed later do not find this relationship.

DATA SOURCES AND COLLECTION

Sample Selection and Data Availability

Data Characteristics

Non-convertible preferred stock was selected for study due to its high yield and minimum confounding effects of capital gains taxes. Public utility preferred stock has a special tax attribute for corporate shareholders and is the type of non-convertible preferred stock selected for study. The time period selected spanned the change in holding period requirement change taking effect at the end of 1957. Since Moody's began publishing the list of old/new money public utility preferred in 1948, this year was selected as the first year for collection. Only companies with both old and new money preferred stock where both type shares are listed on the New York Stock Exchange were selected. The companies selected were from Moody's Public Utility Manuals based on the existence of new money preferred stock. Determination of NYSE listing was made by examining Moody's Dividend Record for all public utility companies with new money preferred stock. A list of companies and preferred share classes is included in the appendix.

Data Collection

After determining the firms and preferred shares that matched the desired profile, dividend data was collected from Moody's Dividend Record. The dividend amount, the record date (which determines the ex-dividend date for NYSE shares), and the payment date were collected for each quarterly dividend for each class of preferred stock for each public utility firm. After gathering dividend data, price data was gathered from the New York Times. The number of potential observations was 1,852 for each dividend/share. To measure the ex-day return requires the cum and ex price of each observation. Over the sample period, opening prices were published in the New York Times and were used for the ex-day price. The prior days closing price was collected for the cum-dividend price.

Price pairs were obtained for 433 observations, of which 412 observations were useable. Additional samples with incomplete data were gathered. These include observations where the cum price was reported but no ex-day price was reported or where the ex-day price was reported but no cum price was reported. This data set does not contain all reported prices since in instances where a

cum or ex price was not reported by the paper the related cum or ex price was not collected. These data are a random sample of prices without a cum or ex pair. There were 249 ex-day prices collected without a cum price reported by the newspaper and 230 cum prices collected without an ex-day price reported by the newspaper.

To summarize, of the 1,852 dividend/shares searched, 433 had both cum-day and ex-day prices reported, 479 of the observations with only one price reported were actually collected, and the remaining 940 dividend/shares had only one price reported and was therefore, not collected, or had no price reported on either day.

Data Sets

Several overlapping data sets are used in the data analysis. The full data set containing all 412 observations were used in the preliminary data analysis. A 404 element subset of this data set was prepared by eliminating eight observations from the fourth quarter of 1957. This 404 member data set was used primarily in holding period analysis. A third data set containing 384 elements was prepared by eliminating certain shares which are part old money and part new money. The 384 member data set was used primarily in analyzing old versus new money issues. Finally, when holding periods are analyzed together with old and new money a 376 element data set was used. This is the same as the 384 element set without the eight observations from the 4th quarter of 1957.

DATA ANALYSIS:

ABNORMAL EX-DAY RETURNS

Existence of Abnormal Ex-Day Returns

Replication on New Data

Recent research has documented the existence of abnormal ex-dividend day returns. This study also finds significant abnormal ex-day returns for public utility preferred stock over the sample period consistent with the tax hypothesis. The following table illustrates mean ex-day return and mean price change to dividend ratio. Ex-day returns are calculated without adjustment for the growth rate and, therefore, include both the abnormal portion and some portion of the daily growth rate. Market model adjustments to the ex-day returns are not required since close to open price data was available.

Excluding the daily growth rate does not alter the fundamental result that ex-day returns for public utility preferred stock over the sample period include a significant abnormal component consistent with the tax hypothesis.

This analysis reveals an ex-day return significantly different from the predicted value of zero. The t statistic of 7.4 on ex-day returns is significant. Similar results are obtained when the analysis is repeated using the price change to dividend ratio. Price change (cum price less ex-day price) is dividend by the full amount of the (undiscounted) dividend. The predicted value of one is subtracted from this ratio and its value tested for significance. As with the ex-day return, the ex-day price response is significantly different than one. This value can be interpreted as an average ex-day price change of $.74 for a $1.00 dividend.

Table III

Tests of Significance on All Data:
Ex-Day Returns and Price Change to Dividend

	Ex-Day Return	Price Change to Dividend minus 1
Mean	.00294165	-.259541
Std. Error	.0003959	.03489
Number	412	412
t statistic	7.431	-7.440

Yield Analysis and Descriptive Statistics

Yield as an Explanatory Variable

It has been suggested in studies on common stock ex-day price behavior that dividend yield is an important predictor in determining abnormal ex-day returns. They reason that the attractiveness of high yields to corporate investors and the resulting effect that corporate investment activity may have on setting the price is likely reduce ex-day returns. However, since returns on non-convertible preferred stock come from dividends, with little return from capital gains, preferred stock of this study is all high yield stock. Therefore, it is less likely that yield is an important factor in a study of dividend clienteles in preferred stock. To examine the yield hypothesis, ex-day returns were regressed on dividend yield using the following model

$$R_{ex,i} = \alpha + \beta\ YIELD_i + \epsilon_i.$$

The predicted sign of ß is negative. That is, higher yields are expected to attract more corporate investment activity and bid away abnormal expected returns. In terms of the price change to dividend dependent variable, PCD, the tax hypothesis predicts that the price response will be increasing in yields, and ß should be positive for the following model

$$PCD_i = \alpha + \beta\ YIELD_i + \epsilon_i.$$

From the regression results, reported in the following table, an interesting relationship emerges. Contrary to the corporate tax hypothesis, which suggests that ex-day returns should be lower if high yields attract corporate investors, we find that dividend yield is significantly and positively related to ex-day returns. The t statistic is 2.7. The sign of this result is contrary to the tax hypothesis as discussed above. Repeating the process using the price change to dividend ratio as the dependent variable, reduces some of this relationship. Yield, however, continues to be significantly related to ex-day price behavior (t statistic = 2.2).

One explanation for this result may be risk. If preferred stock yield proxies for risk, and if corporate treasury activities behave in a risk averse fashion, then corporate investors may prefer lower yield. Lower yield

preferred stock could then have different ex-day price than higher yield preferred stock. This is consistent with the Stickel's result.

A second possibility for explaining this relationship is that yield is a proxy for the change in holding period. Since, on average, yields increased over the sample period and the holding period was imposed from 1958 to 1964. This will be considered further in the next chapter.

Table IV

Ex-Day Returns and Price Change to Dividend Regressed on Yield

Ordinary Least Squares:	Ex-Day Returns on Dividend Yield		
Dependent Variable	REX	Number of Observations	404
Mean of Dep. Variable	.0030	Std. Dev. of Dep. Var.	.008024
Std. Error of Regr.	.0080	Sum of Squared Residuals	.254805E-01
R - squared	.01801	Adjusted R - squared	.01557
F(1, 402)	7.3729	Prob. Value for F	.00691

Variable	Coefficient	Std. Error	t-ratio	Prob|t|>x	Mean of X	Std.Dev.of X
Constant	-.131424E-01	.5946E-02	-2.210	.02764		
YIELD	1.45237	.5349	2.715	.00691	.01109	.00074

Ordinary Least Squares:	Price Change to Dividend on Dividend Yield		
Dependent Variable	PCD	Number of Observations	404
Mean of Dep. Variable	.7377	Std. Dev. of Dep. Var.	.708189
Std. Error of Regr.	.7048	Sum of Squared Residuals	199.689
R - squared	.01202	Adjusted R - squared	.00956
F(1, 402)	4.8891	Prob. Value for F	.02759

Variable	Coefficient	Std. Error	t-ratio	Prob|t|>x	Mean of X	Std.Dev.of X
Constant	1.89899	.5264	3.608	.00035		
YIELD	-104.699	47.35	-2.211	.02759	.01109	.00074

Effect of Dividend Payment Dates

Variation in payment dates alters the present value of dividends. Longer times to payment should reduce the present value of otherwise identical dividends. To evaluate whether differing payment dates significantly relate to the level of ex-day returns, ex-day returns were regressed on the number of days between the ex-day and the payment day using the following model.

$$R_{ex,i} = \alpha + \beta\ PMTDA_i + \epsilon_i$$

The expected sign of the ß is increasing in the number of days until payment. The present value of the dividend, and therefore returns, should be less as this time period increases.

Regressions were run on the 404 observation data set. While the coefficient sign is as predicted, the number of days until dividend payment does not significantly relate to either the ex-day return or the price response to dividend. The regression results for the above model, where PMTDA is the number of days between the dividend ex-day and payment day and REX is the ex-day return, are reported in the table below.

Table V

Ex-day Returns Regressed on Days to Dividend Payment

Ordinary Least Squares						
Dependent Variable	REX		Number of Observations		404	
Mean of Dep. Variable	.0030		Std. Dev. of Dep. Var.		.008024	
Std. Error of Regr.	.0080		Sum of Squared Residuals		.259069E-01	
R - squared	.00158		Adjusted R - squared		-.00091	
F(1, 402)	.6346		Prob. Value for F		.42616	
Variable	Coefficient	Std. Error	t-ratio	Prob|t|>x	Mean of X	Std.Dev.of X
Constant	.167102E-02	.1674E-02	.998	.31890		
PMTDA	.500881E-04	.6288E-04	.797	.42616	25.86139	6.35981

Effect of Three Month Treasury Bill Rates

Eades, Hess and Kim (1994) suggest that abnormal ex-day returns may be related to alternative investments. They find some direct relationship between short term treasury bill rates and ex-day returns. If corporate investment activity includes more investment in preferred stock during periods when short term interest rates are low, then we would expect the ex-day return and short term rates to be directly related. Using the 404 observation data set, ex-day returns were regressed on three month treasury bill rates as follows

$$R_{ex,i} = \alpha + \beta\ TBILL_i + \epsilon_i$$

We expect ß to be positive for this regression since higher yield investment alternatives should reduce corporate investment activity in preferred stock. Regression results are reported in the table below. While these results have the predicted sign, this hypothesis is not significant for public utility preferred stock over the sample period analyzed.

Table VI

Ex-day Returns Regressed on the 3 Month T Bill Rate

Ordinary Least Squares			
Dependent Variable	REX	Number of Observations	404
Mean of Dep. Variable	.0030	Std. Dev. of Dep. Var.	.008024
Std. Error of Regr.	.0080	Sum of Squared Residuals	.258395E-01
R - squared	.00418	Adjusted R - squared	.00170
F(1, 402)	1.6860	Prob. Value for F	.19488

Variable	Coefficient	Std. Error	t-ratio	Prob|t|>x	Mean of X	Std.Dev.of X
Constant	.143427E-02	.1246E-02	1.152	.25020		
TBILL	.619367E-01	.4770E-01	1.298	.19488	.02474	.00837

Daily Growth Rate Returns

As defined in the analytical development chapter, a preferred share's daily growth rate of return is the daily geometric average return calculated from 91 day yield after subtracting the ex-day return. Thus, the daily growth rate should vary inversely to the ex-day return for any fixed yield. Establishing that growth rate returns are less than ex-day returns implies that imposing a holding period is costly. That is, imposing a holding period imposes below market returns over the holding period time interval. In addition, the following table shows that the daily growth rate returns are small relative the to the ex-day return. We expect the holding period cost to be increasing in this difference.

Dividend yield is measured by dividing the cum price into the dividend. Since there are four dividends paid each year, this is a quarterly yield. Ex-day return is calculated in the usual way, ie. dividend yield less price change divided by cum price. The growth rate is the rate which solves equation (10) in the analytical development chapter. Observations are grouped by year with the number of observations shown in the second column. Annual equivalent yields are included for intuitive analysis. The annual equivalents compute the growth rate over 360 days and the ex-day return over the four ex-dividend days. Note that the average ex-day return for this sample is over 28 times as large as the average growth rate. Requiring a holding period, therefore, imposes a cost on corporate shareholders. Note also that ex-day returns are more volatile than the growth rate returns.

Table VII

Ex-Day Returns Grouped by Year: Average Annual Yield, Average Annual Ex-Day Return, Implied Daily Growth Rate, Annual Equivalents

Quarterly Yields and Daily Returns

Year	Number	Yield	Ex-Day Return	Growth Return
48	13	0.010410	0.002968	0.000082
49	9	0.010137	0.000191	0.000110
50	15	0.009855	0.001823	0.000089
51	14	0.010507	0.000556	0.000110
52	19	0.010442	0.001740	0.000096
53	14	0.010774	0.001713	0.000100
54	21	0.010095	0.002941	0.000079
55	12	0.010249	0.000822	0.000104
56	22	0.010625	0.001861	0.000097
57	21	0.011808	0.003320	0.000094
58	27	0.011294	0.004823	0.000071
59	43	0.011934	0.003288	0.000095
60	15	0.012294	0.005270	0.000077
61	31	0.011671	0.002455	0.000101
62	40	0.011320	0.004132	0.000079
63	60	0.011100	0.002867	0.000091
64	36	0.011296	0.003666	0.000084
Averages		0.010930	0.002616	0.000092
Total Number	412			

Annual Equivalent Yield and Returns

Year	Yield	Ex-Day Return	Growth Return
48	4.229%	1.192%	3.010%
49	4.117%	0.076%	4.049%
50	4.001%	0.731%	3.255%
51	4.270%	0.223%	4.049%
52	4.243%	0.698%	3.531%
53	4.380%	0.687%	3.678%
54	4.100%	1.181%	2.892%
55	4.163%	0.329%	3.832%
56	4.318%	0.746%	3.556%
57	4.808%	1.335%	3.437%
58	4.595%	1.943%	2.609%
59	4.860%	1.322%	3.502%
60	5.009%	2.125%	2.832%
61	4.751%	1.002%	3.722%
62	4.605%	1.663%	2.902%
63	4.515%	1.152%	3.334%
64	4.596%	1.475%	3.084%
Averages	4.445%	1.052%	3.369%

annual equivalents: 4 ex-days and 360 growth days

DATA ANALYSIS:

CHANGE IN HOLDING PERIOD FOR THE DIVIDENDS RECEIVED DEDUCTION

Analysis Approach

The tax hypothesis developed earlier suggests that increasing the holding period for the dividends received deduction reduces the net return to corporate stockholders. The prediction is that increasing this holding period results in less corporate investing and trading activity for stock in general, and for public utility preferred stock in particular. Reduced corporate influence in the price setting process for public utility preferred stock implies higher ex-day returns and lower ex-day price responses. Generally, the data from this sample period is consistent with this hypothesis. We find that ex-day returns do increase in the period after the holding period is imposed. We also find that return volatility increases consistent with corporations facing increased interest rate risk.

Significance Tests

Of the 412 usable observations, 8 from the fourth quarter of 1957 which could have spanned the change in law, were eliminated. This left a sample of 404 observations used in the following analysis.

Grouping ex-day returns by pre and post holding period and comparing means reveals an increase in mean return. This result that is consistent the tax hypothesis of less corporate preferred stock investing. Ex-day returns and price responses were computed as discussed previously. Ex-day returns were sorted into pre and post holding period groups. Statistics for each group were computed and mean ex-day returns compared. Pre-holding period ex-day returns numbered 152 observations and there were 252 ex-day returns from the post holding period. Mean ex-day returns rose from about .0020 to .0036 between the first period (1948 to 1957) and the second period (1958 to 1964). This is weakly significant (t statistic of 1.92). Note also that return variances increased as measured in the following table by the standard deviation of ex-day returns. This may be evidence of more selective corporate investment activity.

Table VIII

Mean Difference in Pre and Post Holding Period Ex-Day Returns

	---- Ex-Day Returns --- Pre 4th Qtr 1957	Post 4th Qtr 1957	Ex-Day Return Difference
Mean	0.0019814	0.00356	0.001579
Std. Deviation	0.0059604	0.009029	
Number	152	252	
Joint Std. Error			0.000823
t statistic			1.91816

These tests were repeated using the ex-day price change to dividend ratio in place of ex-day return. Quite similar results emerged and are not reported here.

The power of this test is raised by forming portfolios based on ex-day return for pre and post ex-day holding period data. After sorting ex-day returns into the pre and post holding period groups, each was ranked by return. Five approximately equal size portfolios were formed with statistics computed for each portfolio. Portfolios of the same rank are compared using the means tests between pre and post holding period returns. Those results are reported in the table below.

Table IX

Mean Differences in Pre and Post Holding Period Ex-Day Returns of Ranked Quintiles

Portfolio Quintile		Pre 4th Qtr 1957	Post 4th Qtr 1957	Difference
1	Mean	-0.006676	-0.00924	-0.00256
	Std. Deviation	0.0030747	0.003884	
	Number	30	50	
	Joint Std. Error			0.000832
	t statistic			-3.07669
2	Mean	-0.000619	-0.00137	-0.00076
	Std. Deviation	0.000886	0.001332	
	Number	30	50	
	Joint Std. Error			0.000274
	t statistic			-2.75946
3	Mean	0.0018817	0.003248	0.001366
	Std. Deviation	0.0008795	0.001907	
	Number	30	50	
	Joint Std. Error			0.00037
	t statistic			3.687128
4	Mean	0.0048242	0.009034	0.00421
	Std. Deviation	0.0010059	0.001881	
	Number	31	51	
	Joint Std. Error			0.000367
	t statistic			11.4832
5	Mean	0.0101297	0.015778	0.005649
	Std. Deviation	0.0028194	0.003704	
	Number	31	51	
	Joint Std. Error			0.000774
	t statistic			7.296717

This table shows significant mean differences for each portfolio. The t statistic for the three highest return portfolios are 3.7, 11.5, and 7.3 indicating a significant positive change in the ex-day return. The lowest return portfolios were also significant but not of the predicted sign. It was predicted that imposing a holding period reduces the effective return to corporate shareholders and provides less incentive to invest in stocks. Without considering risk, we expect that returns would increase unambiguously. If however, corporations are risk averse with respect to their treasury investments, we would expect firms involved in short term trading to enter the market for preferred stock only when interest rate uncertainty is low. Therefore, corporate purchases of stock could increase the volatility of ex-day returns if they buy preferred stock only at certain times. This conjecture

rationalizes the observed result and is consistent with suggestions from other research. See Eades, Hess, and Kim (1994) and Stickel (1991) for their analysis of volatility.

The primary result is that ex-day returns increased after the imposition of a holding period on corporations. This is consistent with an overall reduction in the price setting influence of corporate shareholders.

Regression Analysis

Ex-day returns and the price response variable were each regressed on a holding period dummy variable and the other independent variables discussed earlier. Each of the following models were estimated using the 404 observation data set. The variable PRE1 is a dummy associated with the pre-holding period observations. It is expected to be negative in returns and positive in price changes. Predicted signs for the other variables are as discussed previously and summarized in Table II.

$$R_{ex,i} = \alpha + \beta_1 \, PRE1_i + \epsilon_i$$

$$R_{ex,i} = \alpha + \beta_1 \, YIELD_i + \beta_2 \, PMTDA + \beta_3 \, TBILL + \beta_4 \, PRE1 + \epsilon_i$$

$$PCD_i = \alpha + \beta_1 \, YIELD_i + \beta_2 \, PMTDA + \beta_3 \, TBILL + \beta_4 \, PRE1 + \epsilon_i$$

As in the analysis above, the holding period dummy is related to the ex-day return. The t statistic of 1.9 suggests at least a weakly significant relationship between the period and the ex-day returns. Including yield as a variable subsumes the holding period dummy. The t statistic on the holding period dummy falls to .5 for the full model. Dividend yield however, is generally increasing over the sample period making this variable collinear with the dummy variable.

The prediction relating to the T-Bill rate is not significant. Additionally, we suggested that higher alternative interest rates reduce the incentive of corporations to buy preferred stock. The relation between ex-day returns and interest rates is negative rather than positive as predicted. Likewise, the days to dividend payment variable is not significantly related to ex-day returns. The coefficient is however, of the predicted sign.

Table X

Regression Results: Ex-Day Returns on Holding Period Dummy, on Other Variables and Holding Period Dummy, and Price Response on Other Variable and Holding Period Dummy

Ordinary Least Squares: Ex-Day Returns on Holding Period Dummy

Dependent Variable	REX	Number of Observations	404
Mean of Dep. Variable	.0030	Std. Dev. of Dep. Var.	.008024
Std. Error of Regr.	.0080	Sum of Squared Residuals	.257114E-01
R - squared	.00911	Adjusted R - squared	.00665
F(1, 402)	3.6960	Prob. Value for F	.05525

Variable	Coefficient	Std. Error	t-ratio	Prob|t|>x	Mean of X	Std.Dev.of X
Constant	.356045E-02	.5038E-03	7.067	.00000		
PRE1	-.157901E-02	.8213E-03	-1.923	.05525	.37624	.48504

Ordinary Least Squares: Ex-Day Return on Other Variables, Holding Period Dummy

Dependent Variable	REX	Number of Observations	404
Mean of Dep. Variable	.0030	Std. Dev. of Dep. Var.	.008024
Std. Error of Regr.	.0080	Sum of Squared Residuals	.254323E-01
R - squared	.01987	Adjusted R - squared	.01004
F(4, 399)	2.0220	Prob. Value for F	.09059

Variable	Coefficient	Std. Error	t-ratio	Prob|t|>x	Mean of X	Std.Dev.of X
Constant	-.128569E-01	.8213E-02	-1.565	.11829		
YIELD	1.47541	.7501	1.967	.04989	.01109	.00074
PMTDA	.318833E-04	.6294E-04	.507	.61272	25.86139	6.35981
TBILL	-.455977E-01	.6953E-01	-.656	.51234	.02474	.00837
PRE1	-.631529E-03	.1239E-02	-.510	.61058	.37624	.48504

Ordinary Least Squares: Price Change to Dividend on Other Variables, Holding Period Dummy

Dependent Variable	PCD	Number of Observations	404
Mean of Dep. Variable	.7377	Std. Dev. of Dep. Var.	.708189
Std. Error of Regr.	.7067	Sum of Squared Residuals	199.299
R - squared	.01394	Adjusted R - squared	.00406
F(4, 399)	1.4107	Prob. Value for F	.22962

Variable	Coefficient	Std. Error	t-ratio	Prob|t|>x	Mean of X	Std.Dev.of X
Constant	1.82387	.7271	2.508	.01252		
YIELD	-101.243	66.40	-1.525	.12814	.01109	.00074
PMTDA	-.303682E-02	.5571E-02	-.545	.58600	25.86139	6.35981
TBILL	3.70582	6.155	.602	.54748	.02474	.00837
PRE1	.628671E-01	.1097	.573	.56689	.37624	.48504

Variables Defined:

REX - Ex-day Return
PCD - Price Change to Dividend ratio
PRE1 - Holding period dummy variable, pre 4th quarter 1957 = 1, post = 0
YIELD - Individual firm yield, dividend divided by cum price
PMTDA - number of days between dividend ex-day and payment day
T-BILL - annual rate on three month U.S. T-Bill

Further Yield Analysis

To further compare the relationship between dividend yield and ex-day returns the data was partitioned into pre and post holding period subsets and

ex-day return again regressed on yield. Two data sets were created to eliminating the effect of the change in holding period. Using the combined data and regressing the ex-day return on yields (see Table IV) found a significant relationship with a t statistic of 2.7. Partitioning the data into a pre and post holding period and regressing ex-day returns on dividend yields resulted t statistics of 1.4 and 1.5 respectively. This was due in part, but only in part, to lost power from the reduced sample size.

It seems likely that yield plays a role in effecting the ex-day price behavior of preferred stock. That role, however, appears different from the common stock studies. In those, increased yields are associated with more corporate share ownership. The conjecture here is that dividend yield may be a risk proxy. Accordingly, higher risk is associated with high yields attracts less corporate investment.

Summary of Holding Period Analysis

These results are generally consistent with the tax hypothesis that increases in the holding period should be associated with less corporate investment activity and higher ex-day returns. The effect of imposing a holding period is that returns should be higher after imposing the holding period, since this raises costs to corporate investors and reduces the marginal value of the dividend. Therefore, the predicted sign of a pre holding period dummy on the ex-day return is negative and on the price change dependent variable is positive.

By forming portfolios ranked on return, significant mean differences in the ex-day returns of pre and post holding periods were distinguished. This is the primary result of this section.

The variables, number of days until dividend payment and the 3 month T-Bill rate, do not appear to affect the ex-day return and were not statistically significant in any regressions of ex-day returns on those variables.

One weakness of the holding period result is that does not control other factors. Unlike the old and new money tests, and especially, the matched pair design, the holding period comparison is of two different time periods.

Two considerations imply that risk also affects ex-day returns. First, after the imposition of the holding period, the variation in returns increased. This is consistent with selective corporate investment activity. Second, dividend yield is directly related to ex-day returns. Research on common stock

finds an inverse relationship between yield and ex-day return. This has been interpreted as higher yields attracting more corporate trading and bidding down the return. The positive relationship between yields and ex-day returns for preferred stock is consistent with yield functioning as a proxy for risk. The relationship between yield and ex-day returns in referred stock appears to be an area for further research.

DATA ANALYSIS:

OLD VERSUS NEW MONEY PUBLIC UTILITY PREFERRED

Analysis Approach

The tax hypothesis predicts that otherwise identical old and new money public utility preferred will have different ex-day returns if corporations are the price setting shareholders. This follows from the higher effective tax rate to corporate owners of dividends received on old money stock as opposed to new money stock. To evaluate the tax difference, ex-day returns and price change to dividend ratios were computed and means compared across the old and new money shares.

The 412 item sample included several classes of stock which were part new and part old money. Part old money stock requires corporate stockholders to reduce their dividends received deduction proportionate to the old/new percentage. This significantly reduces the tax distinction between share type. Accordingly, 28 observations from the sample were eliminated as part old money shares. On the other hand, part old money shares were included and grouped with old money if the percentage of old money was 90% or more. The effective tax rate on 100% old money dividends for most of the sample period was 19.7% and for new money dividends was 7.8%. The effective tax rate on part old/new money dividends if the stock is 90% old money falls to 18.51%. Part old/new money shares are identified in Moody's Public Utility Manual.

As with the holding period analysis, two types of techniques were applied; regression and mean difference analysis. Ex-day returns were regressed on continuous variables and a dummy for old/new money. Tests of significance were performed on data grouped by old and new money attribute. Returns were ranked and portfolio quintiles formed for difference of means tests between old and new money stock. Additionally, regressions with interactive dummies for joint tests of holding period and old or new money shares were performed.

Test were also performed using matched pair data. Some public utilities issue both old and new money preferred shares of similar characteristics differing only in type of shares: old versus new money. This allowed for matching by firm and dividend date to control for risk and time differences. Only that subset of the sample with a single firm having both old and new money stock and going ex-dividend on the same day were selected. This resulted in 98 observations and 49 matched pairs.

In spite of the difference in corporate tax treatment between old and new money shares, no significant differences predicted by the tax hypothesis were found. This lack of significance of predicted difference holds for all experimental designs including the matched pair analysis and controlling for the holding period and for both measures of the dependent variable.

One significant difference was found on the matched pais analysis for the pre holding period data. This result, however, is the opposite sign of that predicted by the tax hypothesis and is not easily reconciled with any of the received theories or the tax hypothesis explored in this paper.

Regression Analysis

In the regression analysis, the following models were estimated using the 384 observations as discussed above. Results are reported in the following table.

$$R_{ex,i} = \alpha + \beta_1 \, OLD1_i + \epsilon_i$$

$$R_{ex,i} = \alpha + \beta_2 \, YIELD_i + \beta_2 \, PMTDA + \beta_3 \, TBILL + \beta_4 \, OLD1 + \epsilon_i$$

The tax hypothesis predicts that returns will be higher for old money than for new money public utility preferred stock. Thus the sign of the coefficient on the dummy variable OLD1 should be positive. Results in the following do not show the predicted sign for this variable. As in earlier analysis, the yield variable is significant but of the opposite sign than that predicted by the tax hypothesis. Again, yield is correlated with the holding period dummy. It also appears to be consistent as a proxy for risk. Removing the 24 part old money stock (all at least 90% old money) from the old money observations does not alter this general result.

Table XI

Regression Results: Ex-Day Returns on Old Money Dummy, Ex-Day Returns on Other Variables and Old Money Dummy

Ordinary Least Squares: Ex-Day Returns on Old Money Dummy

Dependent Variable	REX	Number of Observations	384
Mean of Dep. Variable	.0028	Std. Dev. of Dep. Var.	.008059
Std. Error of Regr.	.0081	Sum of Squared Residuals	.248599E-01
R - squared	.00055	Adjusted R - squared	-.00206
F(1, 382)	.2119	Prob. Value for F	.64558

Variable	Coefficient	Std. Error	t-ratio	Prob|t|>x	Mean of X	Std.Dev.of X
Constant	.309701E-02	.7763E-03	3.990	.00008		
OLD1	-.421445E-03	.9156E-03	-.460	.64558	.71875	.45020

Ordinary Least Squares: Ex-Day Returns on Other Variables and Old Money Dummy

Dependent Variable	REX	Number of Observations	384
Mean of Dep. Variable	.0028	Std. Dev. of Dep. Var.	.008059
Std. Error of Regr.	.0080	Sum of Squared Residuals	.242642E-01
R - squared	.02450	Adjusted R - squared	.01421
F(4, 379)	2.3799	Prob. Value for F	.05128

Variable	Coefficient	Std. Error	t-ratio	Prob|t|>x	Mean of X	Std.Dev.of X
Constant	-.180812E-01	.7166E-02	-2.523	.01204		
YIELD	1.93909	.7230	2.682	.00764	.01115	.00074
PMTDA	.336052E-04	.6295E-04	.534	.59378	25.91406	6.55050
TBILL	-.522440E-01	.6401E-01	-.816	.41488	.02495	.00828
OLD1	-.425815E-03	.9124E-03	-.467	.64100	.71875	.45020

Variables Defined:

REX - Ex-day Return
OLD1 - Old money dummy variable, old money = 1, new money = 0
YIELD - Individual firm yield, dividend divided by cum price
PMTDA - number of days between dividend ex-day and payment day
T-BILL - annual rate on three month U.S. T-Bill

Significance Tests

The tables which follow show test results for difference of means in ex-day returns and after grouping data into old money and new money sets. No significant difference is noted.

Table XII

Mean Difference in Old and New Money Ex-Day Returns

	New Money	Old Money	Difference
Average Return	0.003097	0.002737	0.00036
Std. Deviation	0.0082955	0.0079548	
Number	108	252	
Joint Std. Error			0.0009268
t statistic			0.3884184

To raise the power of these tests, portfolio quintiles were formed on increasing ex-day returns for each group. The 384 element sample was used which eliminate the 28 part old money observations less than 90% old. These results also show no significant difference between old and new money ex-day returns for any of the portfolios. No difference is found when the test is repeated using the price change to dividend ratio.

Table XIII

Mean Differences in Old and New Money Ex-Day Returns of Ranked Quintiles

Portfolio Quintile		New Money	Old Money	Difference
1	Average Return	-0.008576	-0.008359	-0.000217
	Std. Deviation	0.0046612	0.0035169	
	Number	21	50	
	Joint Std. Error			0.0010098
	t statistic			-0.214668
2	Average Return	-0.000979	-0.001285	0.0003056
	Std. Deviation	0.0012007	0.0011813	
	Number	21	50	
	Joint Std. Error			0.0003087
	t statistic			0.9900903
3	Average Return	0.0024258	0.0021857	0.0002401
	Std. Deviation	0.0013438	0.0012163	
	Number	22	50	
	Joint Std. Error			0.0003213
	t statistic			0.747248
4	Average Return	0.0073866	0.0067767	0.0006099
	Std. Deviation	0.0014706	0.0015266	
	Number	22	51	
	Joint Std. Error			0.0003852
	t statistic			1.5832518
5	Average Return	0.014512	0.0140596	0.0004524
	Std. Deviations	0.0037531	0.0035642	
	Number	22	51	
	Joint Std. Error			0.0009236
	t statistic			0.4898165

Joint Hypothesis Regressions

Possible interaction between the holding period change and the old/new money variable were also explored. Regressions were run using all variables and joint dummy variables for the holding period and old/new money. PREOLD is a

dummy for all old money observations from pre-holding period (ie before fourth quarter 1957). POSTOLD, PRENEW, and POSTNEW are similarly defined. The model used is as follows. The predicted sign is positive for POSTOLD and negative for PRENEW. Predicted signs for the other two joint variables are indeterminate.

$$R_{ex,t} = \alpha + \beta_1 \text{ YIELD}_t + \beta_2 \text{ PMTDA} + \beta_3 \text{ TBILL} + \beta_4 \text{ PREOLD} + \epsilon_t$$

As reported earlier, the yield variable is significantly related to ex-day returns. It is not of the predicted sign. The tax hypothesis suggests that higher yields are more attractive to corporations and should have the lowest ex-day return. Here again the two variables are positively related.

Table XV

Regression Results: Ex-Day Returns on Other Variables and Holding Period/Old and New Money Interactive Dummies

Ordinary Least Squares:	Pre-Holding Period, Old Money Interactive Dummy					
Dependent Variable	REX	Number of Observations			376	
Mean of Dep. Variable	.0028	Std. Dev. of Dep. Var.			.008048	
Std. Error of Regr.	.0080	Sum of Squared Residuals			.236713E-01	
R - squared	.02545	Adjusted R - squared			.01495	
F(4, 371)	2.4224	Prob. Value for F			.04792	
Variable	Coefficient	Std. Error	t-ratio	Prob|t|>x	Mean of X	Std.Dev.of X
Constant	-.145944E-01	.7891E-02	-1.849	.06520		
YIELD	1.67329	.7557	2.214	.02742	.01113	.00073
PMTDA	.293293E-04	.6308E-04	.465	.64223	25.86968	6.58658
TBILL	-.659192E-01	.6887E-01	-.957	.33912	.02479	.00830
PREOLD	-.115544E-02	.1150E-02	-1.005	.31564	.28723	.45307

Ordinary Least Squares:	Post-Holding Period, Old Money Interactive Dummy					
Dependent Variable	REX	Number of Observations			376	
Mean of Dep. Variable	.0028	Std. Dev. of Dep. Var.			.008048	
Std. Error of Regr.	.0080	Sum of Squared Residuals			.237250E-01	
R - squared	.02324	Adjusted R - squared			.01271	
F(4, 371)	2.2069	Prob. Value for F			.06773	
Variable	Coefficient	Std. Error	t-ratio	Prob|t|>x	Mean of X	Std.Dev.of X
Constant	-.168625E-01	.7552E-02	-2.233	.02615		
YIELD	1.78851	.7544	2.371	.01826	.01113	.00073
PMTDA	.293761E-04	.6322E-04	.465	.64242	25.86968	6.58658
TBILL	-.464017E-01	.6581E-01	-.705	.48123	.02479	.00830
POSTOLD	.392605E-03	.9596E-03	.409	.68268	.43085	.49586

Ordinary Least Squares:	Pre-Holding Period, New Money Interactive Dummy					
Dependent Variable	REX	Number of Observations			376	
Mean of Dep. Variable	.0028	Std. Dev. of Dep. Var.			.008048	
Std. Error of Regr.	.0080	Sum of Squared Residuals			.237075E-01	
R - squared	.02396	Adjusted R - squared			.01344	
F(4, 371)	2.2771	Prob. Value for F			.06053	
Variable	Coefficient	Std. Error	t-ratio	Prob|t|>x	Mean of X	Std.Dev.of X
Constant	-.186450E-01	.7405E-02	-2.518	.01223		
YIELD	1.92955	.7397	2.608	.00946	.01113	.00073
PMTDA	.293168E-04	.6314E-04	.464	.64272	25.86968	6.58658
TBILL	-.343406E-01	.6448E-01	-.533	.59467	.02479	.00830
PRENEW	.106101E-02	.1596E-02	.665	.50656	.07979	.27132

Ordinary Least Squares:	Post-Holding Period, New Money Interactive Dummy					
Dependent Variable	REX	Number of Observations			376	
Mean of Dep. Variable	.0028	Std. Dev. of Dep. Var.			.008048	
Std. Error of Regr.	.0080	Sum of Squared Residuals			.237357E-01	
R - squared	.02280	Adjusted R - squared			.01227	
F(4, 371)	2.1643	Prob. Value for F			.07248	
Variable	Coefficient	Std. Error	t-ratio	Prob|t|>x	Mean of X	Std.Dev.of X
Constant	-.176836E-01	.7287E-02	-2.427	.01572		
YIELD	1.86022	.7344	2.533	.01172	.01113	.00073
PMTDA	.307974E-04	.6326E-04	.487	.62664	25.86968	6.58658
TBILL	-.404077E-01	.6514E-01	-.620	.53541	.02479	.00830
POSTNEW	.336663E-04	.1074E-02	.031	.97501	.20213	.40212

Matched Pair Analysis

Matched pair analysis, that is comparing ex-day price responses of the same firm on the same day, was possible for companies having both new money and old money stock outstanding. Matched pair analysis provides control of other events that may distort ex-day price responses.

From the 412 usable observations, 49 matched pairs were constructed. The ex-day return of old money shares were subtracted from the ex-day return of new money shares where the ex-day return was measured on a single day for particular firm. The data do not support the tax hypothesis and are not consistent with corporate investors being the marginal investor in new money shares.

Table XV

Test of Significance of Matched Pairs of Old and New Money Ex-Day Returns and Price Change to Dividend Minus One

	Differences	
	Ex-Day Returns New - Old	Price Response New - Old
Average Difference	.00219	-.20437
Number of pairs	49	49
Standard Error	.00134	.12130
t statistic	1.6343	-1.6848

Price Response = Price Change / Dividend - 1

The sign of the difference between new and old ex-day returns is inconsistent with that predicted by the tax hypothesis. The same is true for the price response formulation. If corporations are marginal trader or investor on new money stock, then expected ex-day returns on new money stock should be smaller than old money. Accordingly, price changes on new money should be larger than on old money shares. This should also be the case if corporations are the marginal trader or investor of both types of stock. Thus, when old money returns are subtracted from new money returns, the predicted sign of the difference should be negative if corporations are the marginal trader. Likewise, the tax hypothesis predicts a positive sign for the difference between new and old money price change ratios. These predictions are not supported by this sample. The result while not significant, are the opposite of that predicted.

The sample is partitioned into pre and post holding period data sets and the process repeated. The results reported in the following table suggest a change in the ex-day difference. Before the holding period new money price responses are significantly larger than those on old money. The difference disappeared after the 15 day holding period requirement was imposed.

This result does not appear to have a ready explanation in tax based clienteles. While the matched pair difference between old and new money ex-day price response narrowed, the variation of differences increased in the post holding period. This is reflected in the higher standard error for the post holding period. The convergence of matched pair differences in the post holding period could occur if corporations reduced trading of old money stock or increased trading in new money stock. Old money public utility preferred stock tends to be older shares of stock pre-dating October 1942. No identifiable stock rights appear to account for this difference. Being more established old money preferred may have a different clientele.

Table XVI

Test of Significance of Matched Pairs of Old and New Money
Price Change to Dividend Minus One for Pre and Post Holding Period

	Pre Holding Period New - Old	Post Holding Period New - Old
Average Difference	-.38101	-.07189
Number of pairs	22	28
Standard Error	.1290	.2280
t statistic	-2.9534	-0.3152

Price Response = Price Change / Dividend - 1

There is no clear tax based prediction why corporations would own more old money preferred stock than new money preferred stock. Other bases for clientele formation must be explored. One conjecture to address this paradox is that public utilities have specialized investment which is funded by preferred shares. Klein, Crawford, and Alchain (1978) suggest that specialized investment is subject to risk from post contractual opportunistic behavior and vertical integration may be a solution to this problem. If old money preferred shares have been issued to related firms then potential post contractual opportunistic behavior may be reduced.

CONCLUSIONS

This work extends earlier research on ex-day returns by developing a previously unexplored data set of public utility preferred stock. The findings of this research are partially consistent with identifying the existence of corporate clienteles for public utility preferred stock. Four primary conclusions and a conjecture are considered here. Although most results are stated in ex-day returns, they are robust to measuring the dependent variable in price response form.

First, this research documents significant abnormal ex-day returns on a previously unexplored data set. The data set is public utility preferred stock over the period 1948 to 1964. The result documented is consistent with tax motivated pricing of dividends.

Second, this research documents a significant increase in ex-day returns after the imposition of a corporate holding period for the dividends received deduction. Ex-day returns increased after the holding period despite higher yields and the introduction of a small dividend exclusion that lowered the effective tax rate for many individual investors. This result is consistent with a reduction in the marginal influence of tax motivated corporate ex-day trading.

Third, this research documents the lack of a significant excess of old money ex-day returns over ex-day returns on new money stock. Some evidence of the converse is found. Since corporations face lower effective corporate tax rates on new money stock, the tax hypothesis predicts lower ex-day returns on new money relative to old money stock. The evidence is not consistent with the tax hypothesis that corporations are the marginal ex-day trader on new money preferred stock.

Fourth, this research finds a positive and significant relationship between dividend yield and ex-day abnormal returns in public utility stock before controlling for the holding period change. After controlling for the holding period change, however, this result is no longer significant. Regardless, this positive relationship is the opposite of that found in the common stock literature. Ex-day returns increasing in yield is inconsistent with corporations being the price setting investor under the received tax hypothesis. It is suggested here, however, that such a result is not inconsistent with the existence of corporate dividend clienteles under certain

conditions. If yield proxies for risk which corporations want to avoid, then a positive relationship between yield and ex-day return is consistent with the corporate dividend clientele hypothesis.

The research results, taken as a whole, lead to a conjecture about risk. One conjecture arising from this work is that risk is avoided in corporate investment activity and impacts the formation of tax based clienteles. This is supported in two ways. First, yield is positively related to ex-day returns rather than negatively related as implied by the tax hypothesis. If yield is a proxy for risk and corporations own substantial preferred stock but avoid risky preferred stock, then ex-day prices evidence corporate influence. A second result supporting the risk conjecture, is finding the holding period change significant while the old versus new money difference is not. Finding the only first to be significant implies that risk may be important. This supports the risk conjecture because the holding period change affects both risk and expected after tax return. The old/new money difference affects only the expected after tax return and does not affect risk faced by corporate shareholders.

RECOMMENDATIONS

This research provides mixed results regarding the documentation of a corporate tax clientele for public utility preferred stock. While the imposition of a tax based holding period is found to be associated with a change in the ex-day return, there is no similar finding for old versus new money stock. The first result is consistent with a change in corporate clienteles for public utility preferred stock dividends.

Several frontiers may be fruitful for further exploration. A finer partition of interest rates, for example quarterly rather than annual treasury bill rates may be used.

Additional data may also be useful. To further study the holding period effect, data on other types of preferred stock could be gathered over the same period. In addition, the legal holding period was lengthened from 15 days to 45 days in the 1980's and the CRSP preferred stock tapes could be used to analyze this issue. The CRSP preferred stock tapes, which have daily data from 1972 forward, could also be used to further explore the old versus new money issue. With the coming of negotiated commissions in the mid 1970's trading costs have been reduced and make this period useful for again looking at old versus new money stock.

Added data from the period 1965 through 1971 could be gathered to study the old versus new money problem. While the number of old money classes of stock will continue to decrease over time, such observations were the majority of observations in this work and should be sufficient to provide a basis for extensions to this study into 1965 through 1971.

One of the interesting implications emerging from this work is that risk may be an important factor in dividend clienteles. Consistent with Stickel's (1991) study of preferred stock, it may be that low risk preferred has a corporate clientele while higher risk (and higher yield) preferred stock does not. Proxies for risk, such as Moody's preferred stock ratings, might be a suitable risk measure. Moody's ratings are published beginning in July 1975. Additional expectations based variables may also be constructed to explore this hypothesis. For example, do ex-day returns fall in periods of relative interest rate certainty (consistent with corporate share ownership) and rise in periods of relative uncertainty.

Institutional data about the types of preferred stock owners could increase our understanding tax and non-tax clienteles. Wilson (1987) for example, suggests that insurance companies are major owners of preferred stock. Changes in insurance tax law may provide an environment for further study. Government publications of tax return data and insurance industry analysts may also have useful institutional analysis.

Institutional data may also be useful for evaluating relationships between utilities and possible preferred shareowners. This could provide evidence about specialized investment susceptible to post contractual opportunistic behavior relieved by vertical integration using preferred stock.

APPENDICES

Appendix A

Public Utility Companies, Classes of Preferred Stock, Par Value, Stock Type

Company	Class	Par	Type	
Cincinnati Gas & Elec. Co.	4.750%	100	N	
Cincinnati Gas & Elec. Co.	4.000%	100	O	
Consumers Power Co.	4.520%	NP	N	
Consumers Power Co.	4.500%	NP	O	
Consumers Power Co.	4.160%	NP	N	
Dayton Power & Light Co A	3.750%	100	O	
Dayton Power & Light Co B	3.750%	100	N	
Dayton Power & Light Co C	3.900%	100	N	
Gulf States Utilities Co.	5.080%	100	N	
Gulf States Utilities Co.	5.000%	100	N	
Gulf States Utilities Co.	4.520%	100	N	
Gulf States Utilities Co.	4.440%	100	N	
Gulf States Utilities Co.	4.400%	100	P	91.660% Old
Gulf States Utilities Co.	4.200%	100	N	
Kansas City Power & Light Co.	4.500%	100	N	
Kansas City Power & Light Co.	4.350%	100	N	
Kansas City Power & Light Co.	4.200%	100	N	
Kansas City Power & Light Co.	4.000%	100	N	
Kansas City Power & Light Co.	3.800%	100	P	90.000% Old
Niagara Mohawk Power Corp	5.250%	100	N	
Niagara Mohawk Power Corp	4.850%	100	N	
Niagara Mohawk Power Corp	4.100%	100	N	
Niagara Mohawk Power Corp	3.900%	100	O	
Niagara Mohawk Power Corp	3.600%	100	N	on new money list 51-59
Niagara Mohawk Power Corp	3.600%	100	O	dropped new list 60-64
Niagara Mohawk Power cl A	3.400%	NP	O	
Northern States Power MN	4.800%	100	N	
Northern States Power MN	4.560%	100	N	
Northern States Power MN	4.160%	100	N	
Northern States Power MN	4.110%	100	N	
Northern States Power MN	4.100%	NP	N	
Northern States Power MN	4.080%	100	N	
Northern States Power MN	3.600%	100	O	
Ohio Edison Co.	4.560%	100	N	
Ohio Edison Co.	4.440%	100	N	
Ohio Edison Co.	4.400%	100	O	
Ohio Edison Co.	3.900%	100	O	Old money from a merger
Oklahoma Gas & Electric	4.240%	100	N	
Oklahoma Gas & Electric	4.000%	20	P	83.330% Old
Pennsylvania Power & Light	4.500%	100	O	
Pennsylvania Power & Light	4.400%	100	N	
Philadelphia Electric Co.	4.680%	100	N	
Philadelphia Electric Co.	4.400%	100	P	49.275% Old
Philadelphia Electric Co.	4.300%	100	N	
Philadelphia Electric Co.	3.800%	100	N	
Public Service Co Indiana	4.900%	25	N	
Public Service Co Indiana	4.320%	25	N	
Public Service Co Indiana	4.200%	100	N	
Public Service Co Indiana	4.160%	25	N	
Public Service Co Indiana	3.500%	100	P	98.790% Old
Union Electric Company	4.560%	NP	N	
Union Electric Company	4.500%	NP	O	
Union Electric Company	4.000%	NP	N	
Union Electric Company	3.700%	NP	N	
Union Electric Company	3.500%	NP	O	
Virginia Electric & Power	5.000%	100	O	
Virginia Electric & Power	4.800%	100	N	
Virginia Electric & Power	4.200%	100	N	
Virginia Electric & Power	4.120%	100	N	
Virginia Electric & Power	4.040%	100	N	
West Penn Power Co.	4.500%	100	O	
West Penn Power Co. B	4.200%	100	N	
West Penn Power Co. C	4.100%	100	N	

N, O, P - New Money, Old Money, Part Old/New Money

Appendix B

Summary and Citations of Selected U.S. Income Tax Law

Corporate Taxation

Tax Rates IRC §11 (39 Code §13,14)
see Appendix C for top marginal rates

Dividends Received Deduction IRC §243 (39 Code §26)
Deduction for a percentage of dividends from domestic companies
Percentage was 85% for dividends received

Reduction of Dividends Received Deduction IRC §244 (39 Code §26)
On old money public utility preferred stock

Dividends Paid Deduction IRC §247 (39 Code §26)
Partial deduction for old money preferred dividends
effective for old money stock in place October 1, 1942

Holding Period to Get Dividend Received Deduction IRC §246
15 day holding period
effective for dividends received after December 31, 1957

Insurance Company Rules (39 Code §201-207)
Life Insurance Companies IRC §801-818
Other Insurance Companies IRC §831-848

Capital Gains of Corporations IRC §1201 (39 Code §117)
capital gains taxed at a 25% rate

Capital Losses IRC §1211 (39 Code §117)
not deductible

Taxation of Individuals

Tax Rates IRC §1 (39 Code §11,12)
see Appendix A for selected rates

Dividend Exclusion IRC §116
$50 exclusion of dividends received by individuals
effective from 1954, $100 effective 1964

Capital Gains IRC §1202 (39 Code §117)
capital gains receive a 50% deduction

Capital Losses IRC §1211 (39 Code §117)
limited to $1,000

Taxation of Institutional Investors

Charities, Foundations and Exempt Organizations IRC §501-515
exempt from income tax (39 Code §541-563)

Pension Fund Rules IRC §401-418 (39 Code §3-4, §501-515)
exempt from income tax
income flows through to beneficiaries who pay the tax
usually no distinction between capital gain and ordinary income

Mutual Fund Rules IRC §851-855 (39 Code §361-362)
called Regulated Investment Companies
generally exempt from income tax
income flows through to fund owners who pay the tax
capital gains and ordinary income usually distinguished

Appendix C

Summary of Individual and Corporate Tax Rates

U.S. Corporate Top Marginal Income Tax Rates

	1948-1949	1950	1951	1952-1953	1954-1963	1964
$25,000 +	38.00%	42.00%	50.75%	52.00%	52.00%	50.00%

1948 & 1949 rate is over $50,000

U.S Individual Income Tax Rates: Selected Brackets

Taxable Income	1948-1949	1950	1951	1952-1953	1954-1963	1964
0 - 4,000	16.60%	17.40%	20.40%	22.20%	20.00%	18.00%
16,000-20,000	29.92%	30.94%	35.00%	38.00%	34.00%	30.50%
36,000-40,000	46.64%	48.23%	54.00%	59.00%	53.00%	53.50%
88,000-100,000	63.36%	65.52%	73.00%	75.00%	72.00%	63.50%

Representative Brackets for Married Filing Jointly

Appendix D

Ex-Day Price Response Implied by Specific Tax Rates

Equation (6) in Analytical Development with $P_{ex} = E(P_{ex})$ and Div = D

$(1 - t_{div}) / (1 - t_{cg}) = (P_{cum} - P_{ex}) / Div$

Assuming Individual Investors are setting price

P_{cum} = \$100.00
Div = \$1.00

t_{cg}	t_{div}	$P_{cum}-E(P_{ex})$	$E(P_{ex})$	PCD	R_{ex}
any	same	1.00	99.00	1.00	0.000%
0.0%	0.0%	1.00	99.00	1.00	0.000%
0.0%	30.0%	0.70	99.30	0.70	0.300%
20.0%	40.0%	0.75	99.25	0.75	0.250%

.growth rate is excluded from E(P) and from the ex-day return; allows for prediction of abnormal return portion only
.assumes no discount factor for dividends

Assuming Corporate Investors are setting price

P_{cum} = \$100.00
Div = \$1.00

	t_{cg}	DRD%	t_{div}	$P_{cum}-E(P_{ex})$	$E(P_{ex})$	PCD	R_{ex}
New	25.0%	85.0%	7.8%	1.23	98.77	1.23	-0.229%
Old	25.0%	85.0%	19.7%	1.07	98.93	1.07	-0.071%

.growth rate is excluded from E(P) and from the ex-day return; allows for prediction of abnormal return portion only
.assumes no discount factor for dividends
.corporate tax rate of 52%

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